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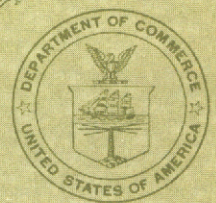
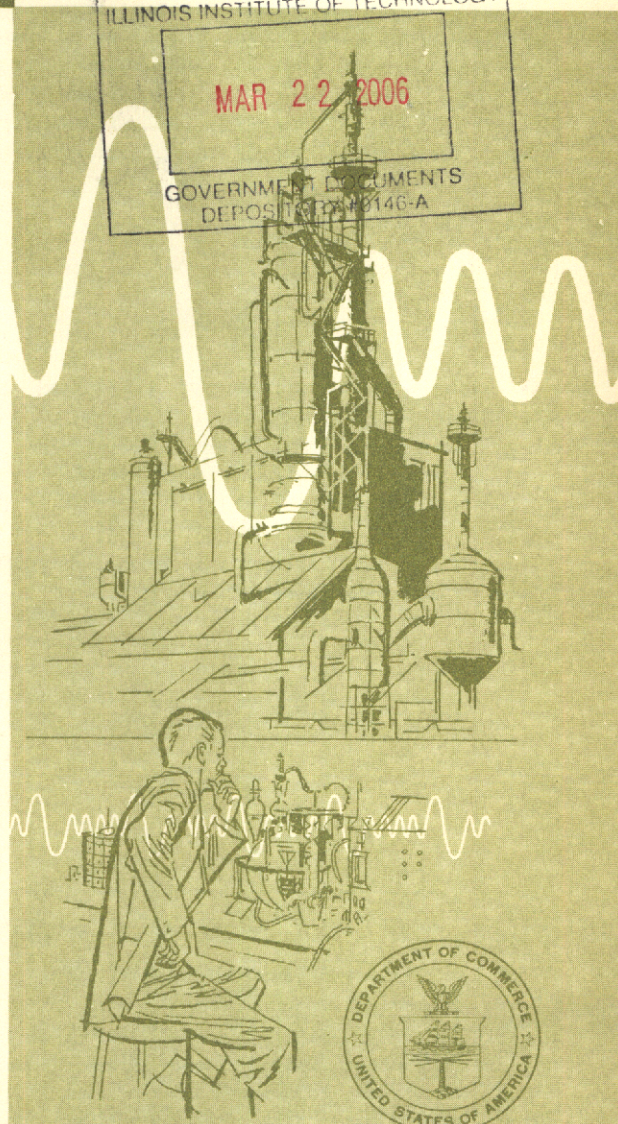
**In this issue:**

A complete index to U. S. Government Research Reports, January through June 1955.

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John C. Green, *Director*

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## CHEMICALS AND ALLIED PRODUCTS

### Organic Chemicals

Studies relating to the free radical chlorination of cyclobutanecarboxylic acids, by E. R. Buchman and W. A. Nevill. California Institute of Technology. Gates and Crellin Laboratories of Chemistry. Jun 1954. 74p diags, (1 fold) graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117370

To facilitate the direct synthesis of theoretically important cyclobutane derivatives, the free radical chlorination of two simple models, cyclobutanecarboxylic acid and 1,1-cyclobutanedicarboxylic acid, has been investigated. Necessary to this study was the synthesis of 5 isomeric monochlorocyclobutanecarboxylic acids. A chromatographic method has been developed capable of effecting the separation of these isomers from a mixture. Contract N6 ONR-244/XL

Characterization of C<sub>21</sub>-C<sub>30</sub> hydrocarbons and their mixtures, by Walter C. McCrone. Armour Research Foundation, Chicago, Ill. Feb 1954. 104p photos, drawings, diags, graphs, tables. Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. \$2.75. PB 111646

The crystallographic properties and behaviour of 10 straight chain hydrocarbons from C<sub>21</sub>H<sub>44</sub> to C<sub>30</sub>H<sub>62</sub> have been studied in detail. Morphological, x-ray, and optical properties of each are presented with as much information as possible on the polymorphic forms of each member of the series. Details are included for several new items of apparatus which were designed and constructed for use on this program. These included two hot stages for use with the phase

microscope and an x-ray camera. Representative binary composition diagrams were determined by a coordinated microscopical and x-ray diffraction approach. Finally, the relationship between the crystallographic properties of these waxes and their behaviour in lubricating oil is discussed. Contract AF 33(616)-7. AAF WADC TR 54-349.

Crystal structure of di-p-tolyl selenide, by W. R. Blackmore and S. C. Abrahams. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1954. 11p drawings, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117156

The crystal structure has been determined, and the 45 positional parameters refined by double Fourier series and least-squares methods, employing 401 terms. The selenium-carbon distance is 1.93 Å and the carbon-selenium-carbon valence angle is 106°. The planes of the two aromatic rings form an angle of 55° with each other. Contracts N5ori-07801 and N5ori-07858. MIT LIR TR 76.

Crystal structure of di-p-tolyl sulfide, by W. R. Blackmore and S. C. Abrahams. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1954. 16p drawings, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117157

The crystal structure has been determined, and 284 terms were used in double Fourier series and least-squares procedures to refine the atomic coordinates of the 45 positional parameters. The sulfur-carbon bond length is 1.75 Å and the carbon-sulfur-carbon bond angle is 109°. The normals to the two aromatic rings form an angle of 56° with each other. Contracts N5ori-07801 and N5ori-07858. MIT LIR TR 77.

Crystal structure of di-p-tolyl telluride, by W. R. Blackmore and S. C. Abrahams. Massachusetts



Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1954. 17p drawings, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117154

Contracts N5ori-07801, NR-017-421, and N4ori-07858, NR-017-422.

1. p-Tolyl ditelluride - Crystal structure 2. MTT LIR TR 75-77.

Final report under Contract N7onr-39424, Project NR 356 331, for period Jul I, 1953-Jul I, 1954, by R. A. Benkeser. Purdue Research Foundation. Dept. of Chemistry, Lafayette, Ind. Jul 1954. 5p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117474

Summarizes progress on: A. Electrical effects of the triphenylsilyl group. B. Rates of electrophilic attack at a position in a benzene ring. C. Preparation of trimethylsilylpotassium. D. Preparation and rates of cleavage of  $R_3Si-SnR_3$  types.

Kinetics and mechanism of high temperature reactions of nitric oxide. Part I: Thermal decomposition of nitric oxide, by Frederick Kaufman and John R. Kelso. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1954. 21p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117311

The decomposition of pure nitric oxide and mixtures with nitrogen or helium was studied at T = 1170 to 1530° K in quartz vessels. Above about T = 1400° K, the reaction is homogeneous and cleanly second order in NO throughout the course of decomposition. A change in the surface to volume ratio leaves the rate unchanged as does the addition of a fourfold excess of nitrogen or helium. Above 1400° K, the activation energy is constant at  $63.8 \pm .6$  Kcal. The effect of added oxygen was investigated and a mechanism is discussed which reconciles much of the available data. Dept. of the Army project no. 503-02-001. Ordnance Research and Development project no. TB 3-0110. APG BRL R 923.

## Plastics and Plasticizers

German protective sheets, nylon types, by Harold L. Pachernik. U. S. Chemical Warfare Service. 40th Chemical Laboratory Co. Nov 1944. 22p photo, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117293

Samples attached. Accompanied by Appendix B: Dark nylon type. - Appendix C: Blue nylon type. Feb 1945.  
1. Plastics, Nylon - Tests - Germany 2. CWS 40 CM TR 19.

Slip casting of barium titanate, by J. F. Murray.

U. S. Naval Research Laboratory. Feb 1955. 11p tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50  
PB 111629

An investigation into slip casting of barium titanate ceramic bodies has been made at the Naval Research Laboratory because casting is the only practicable method of producing special shapes which cannot be easily pressed. From the beginning it was clear that a good deflocculant was needed, and much of the investigation was devoted to the development of such a mixture. As a result of this study, a deflocculant was prepared, and this mixture produced good ceramic specimens from a wide variety of raw materials. NRL R 4483.

## Paints, Varnishes and Lacquers

Effect of paint upon the transmissibility of a resilient mounting, tested with improved apparatus, by Chester A. Arents, O. E. Curth and R. A. Einweck. Illinois Institute of Technology. Dept. of Mechanical Engineering, Chicago, Ill. May 1954. 15p photos, drawings, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117153

Engineering report no. 8 under Contract N7onr-32904, Project NR-264-003: Resilient mountings for reciprocative and rotating machinery.  
1. Vibration - Testing equipment 2. Mountings, Vibration - Effect of paint 3. Vibration - Transmission - Effect of paint.

Rate of loss of water of hydration from phosphate coatings determined radiometrically, by W. Dennis McHenry and Jodie Doss. U. S. Arsenal, Rock Island, Ill. Jan 1955. 13p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117282

Ordnance project no. TB4-302D, Report no. 15. Dept. of the Army project no. 593-14-006.  
1. Coatings, Manganese phosphate - Dehydration - Radiometric determination 2. Coatings, Zinc phosphate - Dehydration - Radiometric determination 3. RIAL R 55-336.

Studies of polymer association in mixed solvents, by Riad H. Gobran and H. Morawetz. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N. Y. Jun 1954. 13p graph, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117379

Technical report no. II under Contract Nonr 839 (02), Project no. NR 330-029.  
1. Polymers - Solubility 2. Solvent extraction processes - Theory 3. Polymers - Bonds.



Studies, research, and investigations to determine the spectral sensitivity of dichromated albumin. Final progress report, Jun 1, 1950 through Feb 29, 1952, under Contract no. DA-44-009 eng-13, by R. W. Koch, D. J. Byers, R. M. Schaffert, and W. T. Reid. Battelle Memorial Institute, Columbus, Ohio. Mar 1952. 59p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117345

Sensitometric data have been obtained and are reported here for films of dichromated albumin prepared from sensitized solutions having an initial pH of  $5.6 \pm 0.2$ ,  $7.6 \pm 0.2$ , and  $9.6 \pm 0.2$ . The films were dried, irradiated, and measured in an atmosphere having a temperature of  $73.5 F \pm 2 F$ , and a relative humidity of 50 per cent  $\pm$  4 per cent. A comprehensive review of the sensitometric method, materials, and instruments is presented. Also included are the results of exploratory studies to determine the applicability of the sensitometric method to determining the spectral sensitivity of other photosensitive coating materials. Dept. of the Army project no. 8-35-09-006.

### Inorganic Chemicals

Theory of liquid helium, by Laszlo Tisza. Massachusetts Institute of Technology. Research Laboratory of Electronics. May 1947. 37p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117183

Contract no. W 36-039-sc-32037.

1. Electronics - Research 2. Helium, Liquid 3. SIG Contract no. W 36-039-sc-32037 4. MIT RLE TR 39.

### Ordnance Chemicals

Investigation of 4.2-inch mortar ignition cartridge and M6 propellant, by Horman Kaplan. U. S. Chemical Warfare Service. 46th Chemical Laboratory Co. Apr 1945. 13p photos, fold drawing, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117298

1. M-6 (Propellant) 2. Mortars, Chemical - Igniters - Tests 3. Propellants - Tests 4. CWS 46 CMTR 27.

Efficiency of the MIX A-1 canister after two years of normal training service, by G. G. Schurr. U. S. Chemical Warfare Service. 41st Chemical Laboratory Co. Aug 1943. 8p fold table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117289

1. Respirators - Canisters - Tests 2. MIX A-1 (Canister) 3. CWS 41 CM TR 16.

German gas mask canister Fe42, by William T. Anasovich. U. S. Chemical Warfare Service. 46th Chemical Laboratory Co. Aug 1944. 19p photos, fold drawing, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117296

1. Respirators - Canisters - Germany 2. Fe42 (Canister) 3. CWS 46 CM TR 7.

Means of obtaining penetration curves on the intermittent flow canister testing machine, by D. G. Shea and H. M. Donaldson. U. S. Chemical Warfare Service. 43d Chemical Laboratory Co. Jun 1944. 6p diagr, graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117287

1. Respirators - Canisters - Testing equipment 2. CWS 43 CM TR 34.

Surveillance of H-filled M47 and M47A2 bombs, by H. A. Noe. U. S. Chemical Warfare Service. 42d Chemical Laboratory Co. Aug 1944. 49p photos, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117288

1. M47 (Bomb) 2. M47A2 (Bomb) 3. Bombs, Chemical - Storage 4. Mustard gas - Storage 5. CWS 42 CM TR 42.

### Analytical Chemistry

French and Italian chloropicrin, by Harold L. Pachernik. U. S. Chemical Warfare Service. 40th Chemical Laboratory Co. Nov 1944. 5p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117292

1. Chloropicrin - Analysis 2. CWS 40 CM TR 15.

### Miscellaneous Chemicals

Aromatic elimination (aromatic electrophilic substitution of hydrogen), by W. M. Schubert. Washington. University. Dept. of Chemistry, Seattle, Wash. Jun 1954. 14p diagrs, graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117381

Aromatic electrophilic substitution by hydrogen has afforded a means of studying acid-base catalysis in non-dilute strong mineral acid solutions, and has been found convenient for a study of deuterium isotope effects. For rate data to be interpreted, it was necessary to measure the basicities of a number of aromatic acids, aldehydes and ketones. The



effect of structure on the basicities has been discussed. The kinetics of the decarboxylation of 2,4,6-trihydroxybenzoic acid has been studied and a mechanism proposed. Spectroscopic and chemical properties of large ring benzocyanones have been investigated. Final report on Contract no. N8onr-52006, Project NR 055 187, for period Jan 1948-Jun 30, 1954.

## ELECTRICAL MACHINERY

### Communication Equipment

Theory of electromagnetically delayed telephone relays, (Q study of telephone relays 2) by Stig Ekelöf. Chalmers University of Technology, Gothenburg, Sweden. 1954. 88p photos, drawings, diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117115

The relay is assumed to have a fixed armature and constant reluctances. The magnetic leakage is taken into account by the simplified field picture treated in Part I of the study. For a relay with a wire wound delaying winding simple formulae are derived. A comparison is made between theoretical and experimentally recorded transients. A number of computed flux transients illustrate the behavior of different delaying arrangements and the influence of the magnetic leakage. Electrical engineering series, vol. 5, no. 10. Chalmers Univ. of Technology, Gothenburg, Sweden. Transactions no. 141. Acta polytechnica 153.

Transmission of information, by Robert M. Fano. Massachusetts Institute of Technology. Research Laboratory of Electronics. Contract no. W36-039-sc-32037. Dept. of the Army project no. 3-99-10-022. Signal Corps project no. 102B. Order parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Part I. Mar 1949. 36p diags, graphs, tables. Microfilm \$2.50, Photocopy \$5.25. PB 117176

1. Communications, Electrical - Theory 2. Information - Theory 3. SIG Contract no. W 36-039-sc-32037 4. MIT RLE TR 65.

Part II. Feb 1950. 31p graphs. Microfilm \$2.50, Photocopy \$5.25. PB 117166

1. Communications, Electrical - Theory 2. Information - Theory 3. SIG Contract W36-039-sc-32037 4. MIT RLE TR 149.

### Electronics

Aging study of metal plating on quartz crystals. Quarterly report no. 8, Jul 1, 1950 to May 1, 1952, under Contract no. DA 36-039-sc-147, by R. J.

Raudebaugh, W. A. Edson and R. B. Belser. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. May 1952. 130p photos, diagr, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.25, Photocopy \$16.50.

PB 117335

Changes in the frequencies of plated AT-cut quartz crystal resonators, during periods in which the crystals are either operative or inoperative, have been found to be caused in part by rearrangement of the atoms of the metal plating (recrystallization) and by corrosion of the plating. Other causes of frequency change such as soldering and mounting techniques have been explored in part. Best stabilities, in general, have been obtained by coating crystals with a uniform metal coating of 2,000-5,000 angstroms thickness and heating the crystals to a temperature characteristic of the plating metal used. For a number of crystals so treated, total changes between the initial and final frequency have been less than 25 cycles in 180 days. Dept. of the Army project: 3-24-02-021. Signal Corps project: 33-862A-5. SIG Contract DA 36-039-sc-147, Report no. 8.

Analog device for solving the approximation problem of network synthesis, by R. E. Scott. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1950. 49p photos, drawings, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.

PB 117168

Contract no. W-36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. 1. Circuits, Electric - Analogies 2. Mathematical equations and solutions 3. Probes, Electrokinetic - Design 4. Networks, Electrical - Synthesis 5. SIG Contract no. W36-039-sc-32037 6. MIT RLE TR 137.

Artificial quartz crystals, by Danforth R. Hale. Brush Development Co., Cleveland, Ohio. Contract W36-039-sc-38190. Dept. of the Army project no. 3-99-11-022. Signal Corps project no. 142B. Continuation of Contract no. W36-039-sc-32039. Order 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, Nov 15, 1948 to Mar 1, 1949. Mar 1949. 29p photos, tables. Microfilm \$2.25, Photocopy \$4.00. PB 117225

Report no. 353.  
1. Crystals, Quartz - Growth 2. Autoclaves - Design 3. SIG Contract W36-039-sc-38190, Report no. 1.

Second quarterly progress report. Jun 1949. 24p drawing, tables. Microfilm \$2.25, Photocopy \$4.00. PB 117226

Report no. 360.  
1. Crystals, Quartz - Growth 2. Autoclaves - Design 3. SIG Contract W36-039-sc-38190, Report no. 2.



Third quarterly progress report. Sep 1949. 27p photo, diagrs, graph, tables. Microfilm \$2.25, Photocopy \$4.00. PB 117227

Report no. 368.

1. Crystals, Quartz - Growth 2. Autoclaves - Design 3. SIG Contract W36-039-sc-38190, Report no. 3.

Fourth quarterly progress report. Dec 1949. 31p photos, tables. Microfilm \$2.50, Photocopy \$5.25. PB 117228

Report no. 377. Includes Piezoelectric measurements on some barium titanate crystals, by G. N. Cotton and Hans Jaffe.

1. Crystals, Quartz - Growth 2. Crystals, Barium titanate - Growth 3. Crystals, Piezoelectric - Research 4. Autoclaves - Design 5. SIG Contract W36-039-sc-38190, Report no. 4.

Seventh quarterly progress report. Sep 1950. 27p drawings, graph, tables. Microfilm \$2.25, Photocopy \$4.00. PB 117229

Report no. 405.

1. Crystals, Quartz - Growth 2. Autoclaves - Design 3. SIG Contract W36-039-sc-38190, Report no. 7.

Eighth quarterly progress report. Dec 1950. 30p photo, drawing, diagrs, graphs, tables. Microfilm \$2.25, Photocopy \$4.00. PB 117230

Report no. 415.

1. Crystals, Quartz - Growth 2. Autoclaves - Design 3. Pumps, Magnetic - Design 4. SIG Contract W36-039-sc-38190, Report no. 8.

Ninth quarterly progress report. Mar 1951. 25p photos, tables. Microfilm \$2.25, Photocopy \$4.00. PB 117231

Report no. 430.

1. Crystals, Quartz - Growth 2. Autoclaves - Design 3. SIG Contract W36-039-sc-38190, Report no. 9.

Final report, 8 Nov 1948 to 31 Aug 1951. Aug 1951. 108p photos, drawings, graphs (1 fold). Microfilm \$4.75, Photocopy \$14.00. PB 117232

The two-chamber oscillating autoclave for growing quartz crystals has been emphasized and the process improved. The two autoclaves obtained early in the contract have had sufficient use to demonstrate that their materials show satisfactory resistance to corrosion by alkaline solutions. Practicable reproducibility of runs, and thus an approach to adequate engineering control of the variables, has been proved by repeated runs on both of the smaller autoclaves. This has consisted of reasonably constant growing rates, continued high quality, and absence of spontaneous crusts. A preliminary study of producing controlled solution flow rate by external means has been made, and a magnetically operated piston pump has been designed. Resonant-frequency measurements on an organic piezoelectric crystal, sorbitol hexa-acetate (SHA), begun under an

earlier contract were concluded. Brush report no. 462. Appendix A: Short bibliography on synthetic quartz. - Appendix B: Principal equipment suppliers. - Appendix C: List of photographs and quarterly report in which they appeared. SIG Contract W36-039-sc-38190, Final report.

Comparison of the components of simulated radar bombing error in terms of reliability and sensitivity to practice, by William D. Voiers. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 19p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117269

Comparisons are made of the longitudinal (range) and lateral (deflection) components of simulated radar bombing error in terms of mean error, sensitivity to practice, and reliability. Because of its wide operational use, circular error is included in certain comparisons. AAF PTRC TR 54-74.

Design of a circuit to approximate a prescribed amplitude and phase, by Raymond Moos Redheffer. Massachusetts Institute of Technology. Research Laboratory of Electronics. Nov 1947. 19p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117172

Contract no. W 36-039-sc-32037.

1. Electronics - Research 2. Networks - Theory 3. Circuits - Design 4. SIG Contract no. W 36-039-sc-32037 5. MIT RLE TR 54.

Design of tunable resonant cavities with constant bandwidth, by L. D. Smullin. Massachusetts Institute of Technology. Research Laboratory of Electronics. Apr 1949. 8p drawings, diagrs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117169

Contract no. W 36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. 1. Cavities, Resonant - Theory 2. Cavities, Resonant - Design 3. Wave guides - Filters - Design 4. SIG Contract no. W 36-039-sc-32037 5. MIT RLE TR 106.

Effect of dissociation on thermodynamic properties of pure diatomic gases, by Harold W. Woolley. U. S. National Advisory Committee for Aeronautics. Apr 1955. 20p graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117083

A graphical method is described by which the enthalpy, entropy, and compressibility factor for the equilibrium mixture of atoms and diatomic molecules for pure gaseous elements may be obtained and shown for any dissociating element for which the necessary data exist. Results are given for hydrogen, oxygen,

and nitrogen. The effect of dissociation on the heat capacity is discussed briefly. NACA TN 3270.

Effect of transit angle on shot noise in vacuum tubes, by George E. Duvall. Massachusetts Institute of Technology. Research Laboratory of Electronics. Sep 1948. 131p drawings, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75. PB 117192

This report examines theories of the effects of transit angle on shot noise proposed by S. Ballantine and A. J. Rack. In order to explain some measured deviations from Ballantine's theory, the power spectrum of the noise in the external circuit of a saturated diode is computed, including the effects of secondary electrons emitted from the plate. The inclusion of secondary-electron effects produces good agreement between measured and theoretical values. The effect of finite plate current on shot noise in saturated diodes when transit angles are finite is discussed, and some experiments aimed to test the dependence are described. The effects of transit angle on shot noise in space-charge-controlled currents is discussed and measurements aimed to test Rack's theory are described. Appendices are devoted to the discussion of apparatus and measuring techniques. Contract no. W 36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. MIT RLE TR 82.

Experimental investigation of noise reduction in traveling wave tubes, by N. Bertil Agdur. Chalmers University of Technology, Gothenburg, Sweden. 1954. 23p photos, drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117114

The noise power output of a traveling wave tube is studied as a function of the distance between the anode and the helix input (drift space). This measurement gives a determination of the length of the space charge waves in the drift region, the quotient between the minimum and maximum noise factor, and the distance from the anode to the first noise minimum. Amplification measurements on a d.c. velocity decrease or increase, started at a suitable phase of the space charge waves, of the electron beam, gives rise to an amplification or attenuation respectively. In the preliminary experimental investigation of a velocity step tube, the amplification has been measured as a function of the d.c. velocity decrease. The experimentally obtained amplification curve differs only moderately from the theoretically predicted results. Electrical engineering series, vol. 5, no. 9. Research Laboratory of Electronics. Reports nos. 29 and 30. Includes Agdur, N. Bertil. Amplification measurements on a velocity step tube. (Research laboratory report no. 30). Chalmers University of Technology, Gothenburg, Sweden. Transaction no. 29. Acta polytechnica 152.

Field strength measurements in resonant cavities, by Leonard C. Maier, Jr. Massachusetts Institute of Technology. Research Laboratory of Electro-

tics. Nov 1949. 43p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117167

Contract no. W36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. 1. Perturbation - Theory 2. Cavities, Resonant - Theory 3. Magnetic fields - Measurements 4. SIG Contract no. W36-039-sc-32037 5. MIT RLE TR 143.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. Sixth quarterly progress report, Oct 1 to Dec 31, 1954, under Contract AF 19(604)-867, by John Koenig. Brush Laboratories Co., Cleveland, Ohio. Dec 1954. 28p photos, graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117348

Hydrothermal transfer of magnetite to natural and synthetic seeds was successfully achieved in several experimental runs. Ammonium chloride solutions, 0.5N and 1N, served as transferring agents, and synthetic magnetite powders as supply. The temperature in the growing zone was 430° - 450°C and in the supply zone 25° - 50°C higher. The pressures, depending on the degree of filling, ranged from 6500 to 22,500 psi. The pressure appreciably affects the growth rate. AAF CRC TN 55-176.

Matric algebra of electromagnetic waves, by Nathan Grier Parke III. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1949. 30p graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117181

Contract no. W 36-039-sc-32037.  
1. Electronics - Research 2. Harmonic analysis  
3. Wiener theory (Noise) 4. Mathematical equations and solutions 5. Waves, Electromagnetic - Theory  
6. SIG Contract no. W 36-039-sc-32037 7. MIT RLE TR 70.

Methods of measuring the properties of ionized gases at microwave frequencies, by Sanborn C. Brown, Manfred A. Biondi, Melvin A. Herlin, Edgar Everhart and Donald E. Kerr. Massachusetts Institute of Technology. Research Laboratory of Electronics. May 1948. 48p drawings, diags, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117177

This report has been written primarily to introduce workers in the field of gas discharges to the techniques used in measuring the properties of ionized gases at microwave frequencies. Since, however, several new microwave techniques have been devised, it should also be of interest to the general microwave experimenter. MIT RLE TR 66. SIG Contract W36-039-sc-32037.



Noise studies on CW klystrons. Period report no. 3,  
1 Nov 1954-31 Jan 1955, under Contract no. AF  
19(604)-1080, by G. A. Espersen and J. W. Rogers.  
Philips Laboratories, Inc., Irvington-on-Hudson,  
N. Y. Jan 1955. 12p diagr, graphs, table. Avail-  
able from Library of Congress, Publication Board  
Project, Washington 25, D. C. Microfilm \$2.00,  
Photocopy \$2.75. PB 117281

Noise measurements of the PKX-2 klystron have  
been completed and tabulated for different bandwidths.  
Because of the low microphonism of the PKX-4, no  
reliable noise data can be obtained by our present  
method of measurement. A modified method of noise  
measurement using a thermocouple-type voltmeter is  
now being tried. Further characteristics of the PKX-  
4 low-noise klystron have been tabulated during this  
report period. The specifications of the PKX-4 kly-  
stron are given in Appendix 1. Case 34-98. AAF  
CRC TN 55-179.

Note on the solution of certain approximation prob-  
lems in network synthesis, by R. M. Fano. Mass-  
achusetts Institute of Technology. Research Labo-  
ratory of Electronics. Apr 1948. 21p diagrs,  
graphs. Available from Library of Congress, Pub-  
lication Board Project, Washington 25, D. C.  
Microfilm \$2.25, Photocopy \$4.00. PB 117175

Contract no. W 36-039-sc-32037.

1. Electronics - Research 2. Networks, Electrical -  
Synthesis 3. Approximate computations 4. SIG Con-  
tract W 36-039-sc-32037 5. MIT RLE TR 62.

On a class of transfer functions suitable for video  
networks, by R. M. Fano. Massachusetts Institute  
of Technology. Research Laboratory of Electronics.  
Apr 1950. 16p diagrs, graphs. Available from  
Library of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$2.00, Photocopy  
\$2.75. PB 117165

Contract no. W36-039-sc-32037. SIG Project no.  
102B. Dept. of the Army Project no. 3-99-10-022.  
1. Networks - Filters - Theory 2. Networks, Elec-  
trical - Transfer characteristics 3. SIG Contract no.  
W36-039-sc-32037 4. MIT RLE TR 155.

Propagation of electronic space charge waves in  
periodic structures, by O. E. N. Rydbeck and B.  
Ågður. Chalmers University of Technology, Gothen-  
burg, Sweden. 1954. 22p graphs. Available from  
Library of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$2.25, Photocopy  
\$4.00. PB 117113

It is shown that exponentially increasing space  
charge waves (gaining waves) can be excited in the  
beam when the structural wavelength  $\lambda_m \cong \lambda_p/2$ ,  
where  $\lambda_p$  is the effective space charge wavelength  
of the excited mode. The maximum gain, in db,  
increases linearly with the square root of the beam  
current density. Considerable gain is technically  
possible with reasonable bandwidths. These, as a  
matter of fact, increase linearly with the gain in db.  
Applications will be found in the field of microwave  
electronics and, probably, in the fields of gas dis-

charges and cosmic radio noise. Electrical engi-  
neering series, vol. 5, no. 8. Research Laboratory  
of Electronics Report no. 28. Chalmers University  
of Technology, Gothenburg, Sweden. Transactions  
no. 138. Acta polytechnica 151.

Properties of guided waves on inhomogeneous cylin-  
drical structures, by R. B. Adler. Massachusetts  
Institute of Technology. Research Laboratory of  
Electronics. May 1949. 140p drawings, diagrs.  
Available from Library of Congress, Publication  
Board Project, Washington 25, D. C. Microfilm  
\$5.75, Photocopy \$17.75. PB 117186

Contract no. W 36-039-sc-32037. SIG Project no.  
102B. Dept. of the Army Project no. 3-99-10-022.  
1. Waves, Electromagnetic - Propagation - Theory  
2. Wave guides, Cylindrical - Theory 3. SIG Con-  
tract no. W 36-039-sc-32037 4. MIT RLE TR 102.

Quarterly progress report under Contract no. W36-  
039-sc-32037. Massachusetts Institute of Tech-  
nology. Research Laboratory of Electronics.  
Dept. of the Army project no. 3-99-10-022. Sig-  
nal Corps project no. 102B. Order separate  
parts described below from Library of Congress,  
Publication Board Project, Washington 25, D. C.,  
giving PB number of each part ordered.

9th, for period ending Apr 15, 1948, by J. A.  
Stratton, A. G. Hill and J. B. Wiesner. Apr  
1948. 82p photos, drawings, diagrs, graphs.  
Microfilm \$4.00, Photocopy \$11.50. PB 117221

1. Communications - Theory 2. Electronics -  
Research 3. Electrons - Emission 4. Helium,  
Liquid 5. Spectroscopy, Molecular 6. Tubes,  
Traveling wave 7. Accelerators, Linear.

10th, for period ending Jul 15, 1948, by J. A.  
Stratton, A. G. Hill and J. B. Wiesner. Jul  
1948. 96p photos, drawings, diagrs, graphs.  
Microfilm \$4.50, Photocopy \$12.75. PB 117222

1. Communications - Theory 2. Electronics -  
Research 3. Electrons - Emission 4. Helium,  
Liquid 5. Low temperature research 6. Spec-  
troscopy, Molecular 7. Tubes, Traveling wave  
8. Accelerators, Linear.

11th, for period ending Oct 15, 1948, by J. A.  
Stratton, A. G. Hill, and J. B. Wiesner. Oct  
1948. 79p photos, drawings, diagrs, graphs,  
tables. Microfilm \$3.75, Photocopy \$10.25.  
PB 117223

1. Communications - Theory 2. Electronics -  
Research 3. Electrons - Emission 4. Helium,  
Liquid 5. Spectroscopy, Molecular 6. Tubes,  
Traveling wave 7. Accelerators, Linear.

12th, for period ending Jan 15, 1949, by J. A.  
Stratton, A. G. Hill and J. B. Wiesner. Jan  
1949. 89p photos, drawings, diagrs, graphs.  
Microfilm \$3.75, Photocopy \$10.25. PB 117224

1. Communications - Theory 2. Electronics -  
Research 3. Electrons - Emission 4. Helium,

Liquid 5. Spectroscopy, Molecular 6. Tubes, Traveling wave 7. Accelerators, Linear.

13th, for period ending Apr 15, 1949, by J. A. Stratton, A. G. Hill, and J. B. Wiesner. Apr 1949. 91p photos, drawings, diags, graphs. Microfilm \$4.50, Photocopy \$12.75. PB 117212

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Helium, Liquid 5. Low temperature research 6. Spectroscopy, Molecular 7. Tubes, Traveling wave 8. Accelerators, Linear.

14th, for period ending Jul 15, 1949, by A. G. Hill and J. B. Wiesner. Jul 1949. 91p photos, drawings, diags, graphs, tables. Microfilm \$4.50, Photocopy \$12.75. PB 117213

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Helium, Liquid 5. Low temperature research 6. Spectroscopy, Molecular 7. Tubes, Traveling wave 8. Accelerators, Linear 9. Vacuum tubes, Magnetron - Research.

15th, for period ending Jul 15, 1949, by A. G. Hill and J. B. Wiesner. Jul 1949. 76p photos, drawings, diags, graphs. Microfilm \$3.75, Photocopy \$10.25. PB 117214

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Helium, Liquid 5. Low temperature research 6. Spectroscopy, Molecular 7. Tubes, Traveling wave 8. Accelerators, Linear 9. Vacuum tubes, Magnetron - Research.

16th, for period ending Jan 15, 1950, by A. G. Hill and J. B. Wiesner. Jun 1950. 104p photos, drawings, diags, graphs. Microfilm \$4.75, Photocopy \$14.00. PB 117215

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Helium, Liquid 5. Low temperature research 6. Spectroscopy, Molecular 7. Tubes, Traveling wave 8. Accelerators, Linear 9. Vacuum tubes, Magnetron - Research.

17th, for period ending Apr 15, 1950, by A. G. Hill, J. B. Wiesner and G. G. Harvey. Apr 1950. 92p photos, drawings, diags, graphs. Microfilm \$4.50, Photocopy \$12.75. PB 117216

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Low temperature research 5. Spectroscopy, Molecular 6. Tubes, Traveling wave 7. Vacuum tubes, Magnetron - Research 8. Helium, Liquid.

18th, for period ending Jul 15, 1950, by A. G. Hill, J. B. Wiesner and G. G. Harvey. Jul 1950. 114p photos, drawings, diags, graphs, tables. Microfilm \$5.00, Photocopy \$15.25. PB 117217

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Helium, Liquid 5. Low temperature physics 6. Spec-

troscopy, Molecular 7. Tubes, Traveling wave 8. Vacuum tubes, Magnetron - Research.

19th, for period ending Oct 15, 1950, by A. G. Hill, J. B. Wiesner, and G. G. Harvey. Oct 1950. 82p photos, drawings, diags, graphs. Microfilm \$4.00, Photocopy \$11.50. PB 117218

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20th, for period ending Jan 15, 1951, by A. G. Hill, J. B. Wiesner and G. G. Harvey. Jan 1951. 109p photos, drawings, diags, graphs, tables. Microfilm \$4.75, Photocopy \$14.00. PB 117219

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Low temperature research 5. Helium, Liquid 6. Spectroscopy, Molecular 7. Navigation, Aerial - Research 8. Vacuum tubes, Magnetron - Research 9. Tubes, Traveling wave 10. Nuclear physics - Research.

21st, for period ending Apr 15, 1951, by A. G. Hill, J. B. Wiesner, and G. G. Harvey. Apr 1951. 90p photos, drawings, diags, graphs, tables. Microfilm \$4.00, Photocopy \$11.50. PB 117220

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Low temperature research 5. Helium, Liquid 6. Spectroscopy, Molecular 7. Nuclear physics - Research 8. Tubes, Traveling wave 9. Vacuum tubes, Magnetron - Research.

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1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Low temperature research 5. Helium, Liquid 6. Spectroscopy, Molecular 7. Nuclear physics - Research 8. Vacuum tubes, Magnetron - Research 9. Computers, Analog - Research.

23d, for the period ending Oct 15, 1951, by A. G. Hill, J. B. Wiesner, and G. G. Harvey. 69p photos, drawings, diags, graphs. Microfilm \$3.25, Photocopy \$9.00. PB 117210

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Low temperature research 5. Helium, Liquid 6. Spectroscopy, Molecular 7. Nuclear physics - Research 8. Vacuum tubes, Magnetron 9. Tubes, Traveling wave 10. Computers, Analog - Research

Research investigations pertaining to low frequency contoured AT-cut quartz plates. Final report, 15 Jan 1951 to 14 Jan 1953, under Contract no. DA 36-039-sc-5460, Modification no. 3, by E. M. Washburn. Radio Corporation of America. RCA Victor Divi-



sion, Camden, N. J. Jan 1953. 84p photos, drawing, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.25. PB 111623

The main objective of this research investigation has been accomplished by the development and production of two types of crystal units covering the frequency range between 500 Kc and 1000 Kc. The first type, a 2-point cemented notched bracket design, is not sufficiently rugged to withstand rough usage as encountered in some types of military equipment. The second design was developed to overcome this mechanical weakness and yet maintain the performance characteristics of the 2-point design, plus improved aging characteristics. This final report presents complete crystal unit fabrication processes for both 2-point and 4-point units, a detailed summary of the work performed, with our conclusions, recommendations for further study, and a summary of the total engineering effort devoted to this investigation. Dept. of the Army project: 3-24-02-021. Signal Corps project 33-862A. SIG Contract DA 36-039-sc-5460, Mod. 3, Final report.

Shape of collision-broadened spectral lines, by E. P. Gross. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1954. 26p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117155

Two extreme models are studied. In one, the oscillators have a Maxwellian distribution of velocities after impact; the second is a Brownian motion treatment. The resulting line shape in both cases is that of a friction-damped oscillator. For collision frequency much less than the resonant frequency, the polarization postulated by Van Vleck and Weisskopf and Fröhlich is reached as a result of kinematic motion between collisions, and the line shapes agree with these. For testing the theories, experiments on foreign-gas broadening in the microwave region at pressures of the order of an atmosphere are required. Differences between the theories are small for conditions accessible experimentally at present. Contracts N5ori-07801, NR-017-421, and N5ori-07858, NR-017-422. MIT LIR TR 79.

Statistical optics: 1. Radiation, by Nathan Grier Parke III. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jan 1949. 17p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117187

Contract no. W36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. 1. Light - Polarization - Theory 2. Harmonic analysis 3. Optical systems - Mathematical analysis 4. SIG Contract no. W36-039-sc-32037 5. MIT RLE TR 95.

Study of the persistence characteristics of various cathode ray tube phosphors, by W. T. Dyall. Massachusetts Institute of Technology. Research Labo-

ratory of Electronics. Jan 1948. 111p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.00, Photocopy \$15.25. PB 117171

Contract W36-039-sc-32037.

1. Electronics - Research 2. Vacuum tubes, Cathode ray - Phosphors 3. Phosphors - Light emission 4. SIG Contract no. W 36-039-sc-32037 5. MIT RLE TR 56.

Symposium on television training and training research, 10-11 Dec 1952. U. S. Research and Development Board. Committee on Human Resources Panel on Training and Training Devices. 1952. 153p photos, diags, graphs. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$4.00. PB 111647

Contents: Introduction, by I. Keith Tyler. - Educational television in the United States, by Charles A. Siepmann. - ABC's of television, by E. A. Hungerford, Jr. - Television at the Special Devices Center, by Theodore Sherburne. - Survey of developments in education, by Burton Paulu. - Television utilization at Michigan State College, by Armand Hunter. - Utilization of theater television, by Jack T. Johnson. - Television utilization in the Army, by E. L. Scheiber. - Television utilization in the Air Force, by Gordon E. Barto. - Television utilization in the Navy, by Kenneth Thomas. - Civilian broadcast television research, 1952 model, by Dallas W. Smythe. - Summary of military television research: Army, by Claude H. Stewart. - Summary of military television research: Navy, by Clifford P. Seitz. - Implications for training and research, a panel discussion. RDB HTD 210/1.

Theoretical limitations of the broadband matching of arbitrary impedances, by R. M. Fano. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jan 1948. 46p drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117184

Contract no. W 36-039-sc-32037.

1. Electronics - Research 2. Communications - Theory 3. Impedance matching 4. SIG Contract no. W 36-039-sc-32037 5. MIT RLE TR 41.

Techniques for application of electron tubes in military equipment, by Rex S. Whitlock. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1955. 100p drawings, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.50. PB 111644

This report presents tube information primarily from the point of view of the electronic equipment designer as a guide in the application of electron tubes. In Part I the tube properties are discussed.

These are grouped according to ratings, characteristics essential in circuit operation, and properties detrimental to circuit operation. Part II takes up the tube properties in circuit design. It includes a check list for use of the circuit designer to insure coverage of all important design factors. Part III contains numerical data and special design considerations for specific tube types. The concepts of specification control, operation within ratings, and tolerance of characteristics are emphasized throughout. Supersedes AAF WCRE TN 53-16 (PB 112329). AAF WADC TR 55-1.

Theory of voltammetry at constant current. IV: Electron transfer followed by chemical reaction, by Paul Delahay, Calvin C. Matfax and Talivaldis Berzins. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Apr 1954. 38p diagr, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117022

Potential-time curves for the anodic oxidation of a metal with the formation of a precipitate are discussed and studied experimentally in the case of the oxidation of silver in halide solutions. Transition times for spherical diffusion and for linear diffusion with partial mass transfer by migration in an electric field of constant intensity are derived in the Appendix. For Report no. 14 see PB 115106. Technical report, Project NR-051-258. Appendix: Transition time for spherical diffusion, by G. Mamantov and P. Delahay.

TW-10, a high writing speed cathode-ray tube with distributed deflection, by R. V. Talbot and L. M. Johnson. U. S. Naval Research Laboratory. May 1954. 22p photos, drawing, diags, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117512

High deflection sensitivity with low transit-time distortion has been achieved by the use of a distributed deflection system on the signal axis, as in the TW-9 cathode-ray tube developed previously. Improved time resolution has been obtained by the combination of a small spot size and a large field on the time axis. The tube is particularly adapted to use in recording systems where signal transfer is obtained through coaxial transmission lines. Performance characteristics are listed and records are shown of nonrecurrent signals of millimicrosecond duration. NRL R 4377.

## Generators, Motors, Transmission

Design of linear accelerators, by G. C. Slater. Massachusetts Institute of Technology. Research Laboratory of Electronics. Sep 1947. 71p drawings, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117185

Contract no. W 36-039-sc-32037.

1. Electronics - Research
2. Accelerators, Linear - Design
3. SIG Contract no. W 36-039-sc-32037
4. MIT RLE TR 47.

Interference characteristics of pulse-time modulation, by E. R. Kretzmer. Massachusetts Institute of Technology. Research Laboratory of Electronics. May 1949. 244p photos, drawings, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$31.50. PB 117188

The interference characteristics of pulse-time modulation are analyzed mathematically and experimentally; particular forms examined are pulse-duration and pulse-position modulation. Both two-station and two-path interference are considered. The theoretical analysis consists, first, of a quantitative formulation of the defects imparted on the pulses by the interference, second, of a detailed evaluation of the resulting disturbance in the receiver output, based on auto-correlation analysis. Contract no. W 36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. MIT RLE TR 92.

Servomechanism synthesis through pole-zero configurations, by John G. Truxal. Massachusetts Institute of Technology. Research Laboratory of Electronics. Aug 1950. 103p drawings, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. PB 117170

Contract no. W 36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022.  
1. Electronics - Research  
2. Networks - Synthesis  
3. Mathematical equations and solutions  
4. Servomechanisms - Theory  
5. SIG Contract no. W 36-039-sc-32037  
6. MIT RLE TR 162.

Theory of the thermistor as an electric circuit element, (A study of thermistor circuits. - 1) by Stigs Ekelof and G. Kihlberg. Chalmers University of Technology, Gothenburg, Sweden. 1954. 39p photos, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117116

The basic physical and mathematical concepts underlying the calculation of electric circuits containing thermistors are presented. The advantage of replacing the thermistor temperature as a variable with the dissipated power is stressed. The important power balance equation (the thermistor equation) is written in a form containing the thermal time constant. From this equation, equivalent circuits of "thermo-positive" and "thermo-negative" resistors are deduced which allow the calculation of superposed variable states. Some simple applications are given. Electrical engineering series, vol. 5, no. 11. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 142. Acta polytechnica 154.



Use of silicon point-contact rectifiers for modulating microwave signals, by L. D. Smullin and W. N. Coffey. Massachusetts Institute of Technology. Research Laboratory of Electronics. Nov 1948. 16p photos, drawings, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117189

Contract no. W 36-039-sc-32037. SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022. 1. Crystals, Silicon 2. Rectifiers, Silicon - Tests 3. Rectifiers, Silicon - Uses 4. Radio waves - Modulation 5. Frequency modulation 6. SIG Contract no. W 36-039-sc-32037 7. MIT RLE TR 83.

### Miscellaneous

On the optimum design of cathode followers, by L. M. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Jun 1954. 23p diags, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117428

A-C amplifiers with conductive and inductive cathode admittance as well as d-c amplifiers are considered. The conditions of optimization of the design for maximum power or voltage output are discussed. Contract no. Nonr-839(05), Project NR 375-216. PIB R 390-54. PIB 323.

Radioactive battery, by Richard R. Annis. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Aug 1952. 39p photos, diags, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00. PB 111604

This report is the result of an experimental investigation of contact potential leading to the development of a radioactive battery. Theory, methods of measurement, factors to be considered, and results of measurement of contact potential are given. Theoretical and experimental results of making cells using two dissimilar metals and X-radiation are given, and design and test results of a radioactive battery resulting from this experimental work is explained in detail. Dept. of the Army project no. 3-12-80-021. Signal Corps project no. 212A. SCEL TM 1456.

## FUELS AND LUBRICANTS

Development of qualification test methods for gear lubricants. Progress report no. 26, Dec 15, 1954 to Jan 15, 1955, under Contract no. DA-11-022-ORD-905, by D. L. Powell and H. Ruwe Barton. Armour Research Foundation, Chicago, Ill. Jan 1955. 24p fold graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117283

1. Gears - Lubrication - Tests - Methods 2. Gears - Lubrication - Corrosion tests 3. Lubricants - Tests 4. ARF Proj L-030, Report no. 26.

Effect of ammonia addition on limits of flame propagation for isooctane-air mixtures at reduced pressures and elevated temperatures, by Cleveland O'Neal, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1955. 33p drawing, diags, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117086

Limits were determined for isooctane, ammonia, and mixtures of these two fuels with air at pressures up to 400 mm Hg and temperatures from 60° to 400° C. NACA TN 3446.

Experimentelle untersuchungen zur molekulartheorie der schierung (Experimental investigations on the molecular theory of lubrication), by O. Wittrock. Translated and edited by Prof. F. A. Raven. Mar 1955. 12p graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117135

Translated from Oel und Kohle, combined with Erdöl und Teer, vol. 13, no. 40, 21 Oct 1937, pp. 979-981. Paper delivered at the World Petroleum Congress in Paris, June 11-14, 1937.

1. Lubrication - Theory - Germany 2. Molecular theory - Germany 3. NAVSHIPS T 581 4. STS 210.

Synthetic liquid fuels. Annual report of the Secretary of the Interior for 1954. U. S. Bureau of Mines. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Part I: Oil from coal. Mar 1955. 89p photos, drawings, diags, graphs, tables. Microfilm \$4.00, Photocopy \$11.50. Limited supply available free from U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa. PB 117324

1. Fuels, Synthetic - Production 2. Coal - Hydrogenation 3. Gasoline - Synthesis 4. Fischer-Tropsch process 5. BM RI 5118.

Part II: Oil from oil shale. Mar 1955. 133p photos, drawings, diags, graphs, tables. Microfilm \$5.75, Photocopy \$17.75. Limited supply available free from U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa. PB 117318

1. Fuels, Synthetic - Production 2. Oil shales - Hydrogenation 3. Oil shales - Production 4. Shale oil - Production 5. BM RI 5119.

## INSTRUMENTS

Application of transistors to electronic counting equipment. Final report, 1 Jul 1952 to 25 Nov 1953, under Contract DA 36-039-sc-42471, by Richard E. Kimes. Beckman Instruments, Inc. Berkeley Division, Richmond, Calif. Nov 1953. 77p photos, diagrs, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.00. PB 111610

This is a final report on an investigation to transistorize frequency meter FR-67()/U. The background study indicated it was possible to completely transistorize the counter using the negative resistance characteristic of point contact transistors to synthesize switching circuit elements. The control circuit development resulted in the design of a point contact crystal controlled oscillator and a continuous frequency synchronized astable multivibrator type divider. An input amplifier using three junction transistors was developed, that had 300 kilohm input resistance and a gain of ten. A voltage discriminator having 2.5 volt sensitivity was used. A neon bias oscillator, a reset one shot multivibrator, a ring circuit control, and a diode gate were designed and built. The power supply using alloy junction diodes was designed. The frequency meter was built using plug-in construction and all transistor circuitry. Dept. of the Army project no. 3-27-06-170. Signal Corps project no. 33-2055H. SIG Contract DA 36-039-sc-42471, Final report.

Automatic error control, the initial value problem in ordinary differential equations, by S. Gorn and R. Moore. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jan 1954. 40p photos, drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117249

This report describes some general routines which will automatically analyze and control the accuracy of numerical procedures on high-speed digital computers. The routines described are applicable to any system of ordinary differential equations for which a solution is being sought to satisfy given initial conditions, provided that the numerical method being used is of the step-by-step type. Seven such numerical methods are listed, along with the results of applying the automatic control to the study of a spinning top. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007. APG BRL R 893.

Calculating machine for Fourier transforms and related expressions, by Raymond Moos Redheffer. Massachusetts Institute of Technology. Research Laboratory of Electronics. Sep 1946. 44p drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117182

1. Electronics - Research 2. Calculators - Design  
3. SIG Contract no. W 36-039-sc-32037 4. MIT  
RLE TR 13.

Comparison of machine methods for evaluating certain mathematical functions, by W. Barkley Fritz. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Mar 1954. 11p diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117255

Polynomial, series, and continued fraction approximation methods are compared briefly. Efficient computational procedures and their associated machine logical diagrams are given. Several examples of each method are presented. Important considerations in determining which process is optimum for use on a large scale automatic digital computer are discussed. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL M 774.

Desirable control-display relationships for moving scale instruments, 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. Sep 1954. 26p photo, diagrs, graphs. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75. PB 111649

This report summarizes a series of experiments designed (1) to investigate the effects of certain control-display relationships on making settings with moving-scale instruments, (2) to attempt to find the optimum control to moving-scale display relationship. AAF WADC TR 54-423.

Direct reading wave meter, by F. E. Snodgrass and R. R. Putz. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 14p photo, diagrs, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117295

Describes attempts to develop an ocean wave recorder which would directly record the characteristic wave height on one meter and the characteristic wave period on another meter. Circuits are given for final instruments. Results of field tests with the Mark IX shore wave recorder are presented in tabular form. It was found that the characteristic wave height as read from the wave-height meter compared favorably with the values obtained by standard wave-record analysis, but that the characteristic wave period as read from the wave-period meter fluctuated widely and did not compare well with the values obtained by the standard analysis. Contract N7 onr-295(28). UC IER Series 3, Issue 371.

Evaluation of Japanese designed speaker cones, by Louis F. Moses. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Jan 1955. 24p diagr, fold graph, fold tables (1 fold). Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117353

1. Loudspeakers - Cones 2. AAF RADC TR 55-1.

Machine solution for a system of linear algebraic equations, by Bailey T. Wade. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1954. 15p diagr. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117253

Dept. of the Army project no. DA-503-06-002. ORD project no. TB 3-0007K.

1. Equations, Linear 2. Computers, Electronic - Coding 3. APG BRL M 765.

Network synthesis procedures with a potential analog computer, by Robert Staffin. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Jun 1954. 41p drawing, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117427

The analog device reduces the complex problem of response matching to a relatively simple experimental procedure involving the location of line sources in a conducting medium. A number of source location techniques are discussed along with the general operating details of the computer. The major portion of the work has to do with the synthesis of networks with prescribed amplitude responses. A section is devoted to the operation of the computer for phase response curves. Contract no. Nonr 839(05), Project NR 075 216. PIB R 391-54. PIB 324.

New method for mounting samples for powder X-ray spectrometry, by H. D. Holland, W. B. Head, III, G. G. Witter, Jr. and G. B. Hess. Princeton University, Princeton, N. J. Jun 1954. 12p drawings, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117413

At the moment it appears doubtful that this technique can be improved appreciably. The main residual error now lies in the measurement of the 2 O values on the strip chart. This in turn is probably controlled mainly by fluctuations in the count rate of the spectrometer. The present technique therefore probably represents the extreme of accuracy to which X-ray powder spectrometry can be carried with the Norelco instrument. Technical report no. 1, under Contract N(our)-250(00).

ORDVAC floating binary code checker, by Lloyd W. Campbell. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug

1954. 29p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 117256

Routines known as "code checkers" are used to assist in the time-consuming problem of finding errors in codes written for large scale digital computers. These code checkers print information about the orders as they are performed in program codes. The code checker described in this report is designed to be used on problems that use a floating binary system on the ORDVAC. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007. APG BRL M 823.

ORDVAC routines for use of IBM input-output equipment, by Francis J. Lerch. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. May 1952. 39p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117245

Section I gives a description of the coded routines and related information. Section II presents the coding, flowcharts, and time charts for the routines described in Section I. The IBM input-output system described in this report has been superseded by a binary-decimal IBM input-output system. The new system permits the handling of binary-decimal data only on the IBM cards. It also includes the standard teletype input routine for the handling of sexadecimal and other input data. Project TB 3-0007K. APG BRL R 810.

Piston coring device for sediment sampling, by Richard G. Bader and Robert G. Paquette. Washington. University. Dept. of Oceanography, Seattle, Wash. Feb 1955. 22p photos, drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117405

Technical report no. 41 under Contract N8onr-520/III, Project NR 083 012 and Contract Nonr-477(01), Project NR 083 072.

1. Sediment, Marine - Sampling equipment 2. Coring devices - Design 3. WU OR 55-4.

Problem programming for the EDVAC, by Herbert B. Hilton. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Mar 1954. 57p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117254

This report describes the EDVAC and its operation as well as the steps involved in programming problems for solution on this machine. A general discussion is given of numerical methods, flow charts, coding and standard operating procedures. Two illustrative examples are included in an appendix. Dept. of the Army project no. 503-03-002. ORD project no. TB 3-0007K. APG BRL M 771.

Prototype section for a dynamic speech synthesizer, by George Rosen. Massachusetts Institute of Technology. Acoustics Laboratory. Feb 1955. 42p photos, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 117449

The development of a dynamic analog of the human vocal tract requires the design of transmission line sections consisting of low-loss electronically variable inductance and capacitance elements. A prototype section consisting of a saturable core inductor and a Miller-effect capacitor is described. The inductor-capacitor combination is varied by means of a single control voltage. Scientific report no. 1. Contract no. AF 19(604)-626. AAF CRC TN 55-196.

Reversible binary counter and shaft position indicator, by H. P. Stabler. Massachusetts Institute of Technology. Research Laboratory of Electronics. Mar 1947. 19p drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 117180

A binary counter has been developed that responds to subtracting pulses as well as to adding pulses. The two types of pulses are distinguished by different input channels, by polarity, or by size, and the reversible action is accomplished by suitable carry-over provisions between the counter stages. In conjunction with a photoelectric actuated pulse generator and a reading circuit, the counter has been used to indicate the angular position of a rotating shaft. While the system has been designed to provide one of the input parameters to a digital electronic computer, the methods employed can be used for other situations involving two directional motion and differential counting. MIT RLE TR 3. SIG Contract W36-039-sc-32037.

Simulation of a battle on high speed digital computers, by W. W. Leutert. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1954. 50p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 117251

Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007.  
1. Computers, Digital - Uses 2. Battles - Simulation  
3. APG BRL R 911.

Speech compression research. Status report. Massachusetts Institute of Technology. Acoustics Laboratory. Feb 1955. 27p photo, diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.  
PB 117344

This report describes the status of research on bandwidth compression of speech at the M.I.T. Acoustics Laboratory. Following an introductory discussion of the design principles for a bandwidth compression link, instrumentation for a speech

analysis-synthesis system is described. Synthesis equipment that is under development includes a resonance type of synthesizer and a dynamic analog of the vocal tract. A formant tracking device is the principal component of the speech analyzing equipment. The status of research on basic problems related to speech compression is also outlined. Contract no. AF 19(604)-626. AAF CRC TN 55-187.

Theory of the elementary processes in the spectrophone, by J. C. Decius. Oregon State College. Dept. of Chemistry, Corvallis, Ore. Jun 1954. 11p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117402

A mathematical discussion of the use of the infrared spectrophone for the determination of the life of excited molecules. Technical report no. 1. Contract Nonr-974(00), NR-019-130.

Theory of selective detectors for use in infrared gas analyzers, by Robert Edward Jenkinson. Ohio State University. Dept. of Physics and Astronomy, Columbus, Ohio. 1954. 122p drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.25, Photocopy \$16.50.  
PB 117286

This study is a detailed investigation of the physical processes involved in infrared gas analyzer detector cells, with a view to determining optimum design parameters for detectors to be used in air-borne gas analyzers. Scientific report 3. Contract no. AF 19(122)13. Thesis - Ohio State University. AAF CRC TN 55-263.

Torque magnetometer, by Albert M. Syeles and Edmond Adams. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1951. 12p photos, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117441

A wide-range high-sensitivity torque magnetometer used in measuring magnetic anisotropy is described. Developed in the Magnetics Division of the Naval Ordnance Laboratory, this magnetometer has been used in measuring torques varying from less than one dyne-cm to over 150,000 dyne-cm. Test specimens used are 3/4 inch diameter discs cut from magnetic sheet material. NAVORD 2152.

Treadmill for clinical studies of a compact and universal design, by Laurence R. Crisp. U. S. National Institutes of Health. Instrument Section. May 1955. 10p photos. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.  
PB 117606

1. Treadmills - Design.

Wide-band function multiplier, by J. A. Miller, R. E. Scott, A. S. Softes. U. S. Air Force. Air Research



and Development Command, Cambridge Research Center. Electronics Research Directorate. Computer Laboratory, Cambridge, Mass. Dec 1954. 17p photos, diagrs, graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117450

A simple analog four-quadrant function multiplier has been developed on the well-known quarter-square principle to explore the possibilities of using Raytheon type QK-329 beam deflection square-law tubes as the square-law circuit elements in this application. A frequency response flat from dc to 90-kc, accuracy within  $\pm 0.5$  percent of maximum product, and long-term stability within 1 percent were achieved with this relatively crude model. AAF CRC TR 54-107.

## MEDICAL RESEARCH AND PRACTICE

Comparison of the visual and auditory senses as channels for data presentation, by Richard H. Henneman and Eugene R. Long. Virginia. University, Charlottesville, Va. Aug 1954. 44p. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.25. PB 111651

It is the contention of this report that the choice between the eyes and the ears as sense channels for the presentation of information to the human operator rests upon the specific demands of various operational situations. Three sets of variables impose demands for the presentation of data, some of which have implications for visual or auditory presentation. It is possible to suggest some "division of labor" between the two sense channels for purposes of data presentation. AAF WADC TR 54-363.

Final report under Contract N7onr 418/I, NR-130-391, by Louis Weinstein. Boston University, School of Medicine. Dept. of Medicine, Boston, Mass. May 1954. 5p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117204

1. Infections, Streptococcus - Physiological factors.

German hautentgiftungssalbe (Skin detoxication ointment), by Harold L. Pachernik. U. S. Chemical Warfare Service. 40th Chemical Laboratory Co. Oct 1944. 12p photo, graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117291

1. Decontaminants - Germany 2. CWS 40 CM TR 4.

Monaural delay, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Mar 1954. 8p diagr, tables. Available from Library of Congress, Publication

Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117082

Contract AF 18(600)316, Report no. 9.  
1. Speech - Intelligibility - Testing equipment  
2. Speech - Intelligibility - Tests 3. Communications, Audio 4. OSURF Proj 519, Report no. 9.

Quarterly progress report, Jul-Sep 1954, by R. H. Bolt and R. D. Fay. Massachusetts Institute of Technology. Acoustics Laboratory. Sep 1954. 39p photos, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117332

1. Acoustic research 2. AAF CRC TR 55-170.

Research on metabolic traits in relation to alcoholism and mental disease, by Lorene L. Rogers. Texas. University. Dept. of Chemistry, Austin, Tex. Jul 1954. 5p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117193

The purpose of the study was to gain "an acquaintance with the individual metabolic patterns which people possess and to classify and relate these patterns to the incidence of alcoholism and mental disease." Final report under Contract no. N9onr-93900 for period 15 Jun 1949 to 14 May 1954.

Study of the influence of normal variations in composition of external solutions on the equilibrium pH of synthetic dental plaques. Final progress report 1 Jan 1953 to 30 Jun 1953, by R. S. Manly. Tufts College. Dental School, Medford, Mass. Jun 1953. 8p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117414

Contract Nonr-494(06).

1. Dental research 2. Hydrogen ion concentration  
3. Saliva - Acidity 4. Salivary sediment - Thickness - Measurement.

## METALS AND METAL PRODUCTS

Deformation of metals under combined tension and torsion, by J. B. Tiedemann. U. S. Naval Research Laboratory. Mar 1955. 35p photo, drawings, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117333

Permanent elongations and twist angles of slender rods and tubes of aluminum, copper, and steel, under the influence of constant torque and increasing axial load, have been studied to establish the orientation of the principal strain axes under combined stress. It was found that the principal axes of plastic strain coincide with the principal axes of stress for annealed materials, but for drawn materials there is substantial divergence. Appendix A. Theory of strain relationships in a cylinder under combined tension

and torsion. - Appendix B. Air-lubricated thrust bearing. NRL R 4499.

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, by N. J. Grant, H. C. Chang, F. C. Monkman, and Peter Price. Massachusetts Institute of Technology. Dept. of Metallurgy. May 1954. 6p table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117129

Periodic status rept. no. 7, Feb 1954-May 1954, under Office of Naval Research Contract no. N5-ori-07881, NR-039-007.

1. Metals - Deformation 2. Steel, Stainless - Properties 3. Steel, Stainless - Strength 4. Chromium-iron-nickel alloys.

Development of titanium alloy powder production. Interim technical report, Aug 15, 1951 to Feb 28, 1953, under Contract no. DA-33-019-ORD-328, by Harry W. Dodds. Brush Development Co., Cleveland, Ohio. Feb 1953. 24p photos, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117334

Work aimed at the disintegration of titanium alloy scrap has involved the following investigations: (a) mechanical disintegration by use of an attrition mill, (b) powdering by mechanical disintegration through use of a mutilator, and (c) hydriding. Protective precautions believed necessary in industry if scrap is to be made reusable are also suggested. Project TB 4-15. PN B-280. WAL R 401/120-20.

Electrical resistivity of cold-worked aluminum single crystals, by S. Sosin and J. S. Koehler. U. S. Office of Naval Research. May 1954. 63p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117152

A summary of the literature on the use of electrical resistivity measurements of cold-worked aluminum single crystals in the study of imperfections in solids. Technical report no. 10 under Contract Nonr-177-(00), NR 017-417. ONR TR 10.

Grain growth and recrystallization in titanium and its alloys, by Edward L. Bartholomew, Jr. Connecticut University. Dept. of Mechanical Engineering, Storrs, Conn. Jun 1954. 70p photos, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.75. PB 111627

This project covers the influence of temperature, time, amount of cold deformation and prior to deformation grain size on grain size of cold worked and annealed titanium (RC-55) and three alloys, Ti-100A, Ti-150A and RC-130A. Results of isothermal annealing microstructural studies to determine the kinetics

of recrystallization and mechanisms of grain growth in cold rolled and annealed titanium (RC-55) are also reported. Final report under Contract DA19-059-ORD-493. Dept. of the Army project no. 593-08-021. ORD project no. TB 4-15. Contents: Part I. Excessive grain coarsening. - Part II. Grain growth and recrystallization studies. WAL R 401/131-13.

Hartverchromung von aluminium (Hard chromium plating of aluminum), by E. Meyer-Rässler. Translated and edited by F. A. Raven. Mar 1955. 26p photos, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117354

The hard chromium plating of aluminum parts can be carried out in baths of the same composition as those used for the chromium plating of steel and iron. Finishing of the hard chromium coating can only be accomplished by grinding and honing. The most important field of application of the hard chromium plating of aluminum is for the fabrication of internal combustion motor cylinders. For purposes of chromium plating, the cylinder is mounted in an arrangement in which the cylindrical lead anode must be centered exactly in the interior of the aluminum cylinder. The thickness of the chromium plating ranges from 0.10 to 0.15 mm. Report of the Manle-Komm.-Ges., Stuttgart-Bad Cannstatt, Germany. Translated from Metall, vol. 6, no. 17/18, p. 504-509, Sep 1952. NAVSHIPS T 579. STS 208.

Heterogeneity of surfaces; immersion calorimetry and adsorption studies of heterogeneous nature of nickel and carbon surfaces, by A. C. Zettelmoyer, J. J. Chessick, F. H. Healey, Y. Yu. Lehigh University. Surface Chemistry Laboratory, Bethlehem, Pa. May 1954. 50p drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117144

Isotherms for the absorption of argon on oxide-coated nickel powder and on this sample after each of several reductions with dry hydrogen at 350° were determined at -195° and -183°. A low temperature calorimeter to measure heats of immersional wetting in liquid nitrogen has been constructed. The heats of immersion of magnesia, silene, alumina and Graphon (a graphitized carbon black) in liquid nitrogen were found to be practically the same. Contract N8onr-74300, Project no. NRO-358-186, Technical report no. 6, 1 June 1953 to 31 May 1954. ONR TR 6.

Metal processes and apparatus, machinery, and transportation equipment: Government-owned inventions available for license. U. S. Government Patents Board. Oct 1954. 61p. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.00. PB 111467

1. Metals - Production - Patents 2. Machinery - Patents 3. Transportation equipment - Patents 4. Patents - Bibliography 5. GPB PA 4.

Porosity of nickel deposits by autoradiographic technique, by Russell H. Wolff and Mary Ann Henderson. U. S. Arsenal, Rock Island, Ill. Mar 1954. 37p photos, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117368

A non-destructive, reproducible test is described for the determination of flaws in both electrodeposited and electroless coatings of nickel. Dept. of the Army Project no. 593-14-006. (Protective finishes (other than organic) for metals). Rock Island Arsenal Laboratory Project no. TB 4-302C, Report no. 4. RIAL R 54-24.

Refractoriness of some types of quartz and quartzite, Pt. I, 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 117118

The refractoriness was determined from the linear expansion of test pieces which were heated at continuously increasing temperature under a load of 0.5 kg/cm<sup>2</sup>. The experimental results give important information about melting and transformation processes which occur in rammed furnace linings during the period of their first heating. The results make it possible to determine in the laboratory not only the suitability of different types of quartz and quartzite for the varying types of acid furnace linings, but also the kinds and amounts of oxides which should be added to the silica materials in order to change their properties in a desired direction. Chemistry including metallurgy series, vol. 4, no. 3. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 147. Acta polytechnica 156.

Solubility of silver azide and the formation of complexes between silver and azide ions, by I. Leden and N. H. Schön. Chalmers University of Technology, Gothenburg, Sweden. 1954. 18p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117117

Using a differential potentiometric micro titration and a radio assay technique (<sup>110</sup>Ag), the authors determined the solubility, *l*, of silver azide in aqueous solutions of sodium azide at 25°C in the molar concentration range  $10^{-4} < [N_3^-] < 4$  but at a constant ionic strength of 4 M (NaClO<sub>4</sub>). Potentiometric measurements with silver electrodes in unsaturated solutions containing silver and sodium azide agreed quantitatively with this view of the complex formation. Chemistry including metallurgy series, vol. 4, no. 2. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 144. Acta polytechnica 155.

Thermal conductivity of mercury, by C. T. Ewing, R. E. Seebold, J. A. Grand, and R. R. Miller. U. S. Naval Research Laboratory. Mar 1955. 13p drawing, graphs, tables. Available from Library of

Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117336

The thermal conductivity coefficients of high purity mercury have been measured from 150° to 540° C with longitudinal heat flow apparatus. The vapor pressure varied greatly over this range (less than atmospheric to over 25 atmospheres). However, an increase from 8 to 22 atmospheres in pressures at one temperature showed no change in the conductivity coefficients. Lorentz values, while fairly constant, are somewhat higher than the theoretical values. Values of conductivity for the two sections of stainless steel bar used in the measuring unit gave values more widely separated than was contemplated. NRL R 4506.

## METEOROLOGY AND CLIMATOLOGY

Bibliography on snow, ice and permafrost, with abstracts. U. S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Jan 1955. 273p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$35.25. PB 117329

Dept. of the Army project no. 8-66-02-004. For vols. 1-6 see PB 113539-113540, 112250, 112252, 114461, 115969.

1. Snow - Bibliography 2. Ice - Bibliography 3. Permafrost - Bibliography 4. SIPRE 12, vol. 7.

Case study of the high tropospheric wind field over the Caribbean region in spring, by José A. Colón. Chicago. University. Dept. of Meteorology. Jun 1954. 27p maps, diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$4.00. PB 117435

This report describes the period March 29-April 2, 1953 during which a high-level trough traversed the whole Caribbean area from west to east, greatly influencing the cloud and weather structure of the troposphere. Contract N6 ori-02036, Project NR 035-003.

Data on the problem of ice crossings, edited by B. L. Lagutin. Revised edition. U. S. Army. Corps of Engineers. New England Division. Arctic Construction and Frost Effects Laboratory, Boston, Mass. Dec 1954. 134p diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75. PB 117355

Investigation of construction and maintenance of airdromes on ice, fiscal year 1954. Originally translated by Eugene A. Golomshtok, from Trudy Nauchno-Issledovatel'skikh Uchrezhdeniy, ser. 5, vyp. 20, 1946. Contents: Editor's preface, by B. L. Lagutin. - On the problem of computing the load carrying capacity of ice covers, by A. P. Shul'man.

Methods of calculating the load carrying capacity of ice crossings, by B. L. Lagutin and A. P. Shul'man. - Problem of the value of temporary resistance of thawing spring ice to bending, by I. N. Neronov. - Theoretical and experimental basis for the tables of load carrying capacity of ice covers, by A. P. Shul'man and M. M. Kazanskii.

Energy releasing processes and stability of thermally driven motions in a rotating fluid, by Hsiao-Lan Kuo. Massachusetts Institute of Technology. Dept. of Meteorology. Dec 1954. 61p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117257

The effects of the various physical factors on the motions produced by differential heating in a rotating fluid are examined by solving the simultaneous hydrodynamic and thermodynamic equations. Scientific report no. 1 under Contract AF 19(604)-1000, General circulation project.

Examples of the development and persistence of distal cyclones in the tropical North Pacific, by W. D. Ohmstede and Gordon A. Dean. California University. Institute of Geophysics, Oahu Research Center, Oahu, Hawaiian Islands. Dec 1954. 133p fold maps, diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75. PB 117362

This is the first detailed synoptic study of the upper tropospheric circulation over the central North Pacific during the period covered by Operation Ivy. The research results are largely embodied in the maps, the text being reduced to the minimum required to follow the analysis. Scientific report no. 9 under Contract no. AF 19(604)-546.

Further studies of atmospheric composition by airborne infrared gas analyzers, by Dudley Williams. Ohio State University. Dept. of Physics and Astronomy, Columbus, Ohio. 1954. 35p photos, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117285

The flight systems used in attempts to map the CO<sub>2</sub> profile in the atmosphere are described in this report. The results obtained in flights made during the summers of 1953 and 1954 are presented and criticized. Modifications of the present equipment for use in possible future work in this field are suggested. Contract no. AF 19(122)-13. AAF CRC TN 55-262.

Hurricane Hazel and a long-wave outlook, by Lawrence A. Hughes, Ferdinand Baer, Gene E. Birchfield, and Robert E. Kaylor. Chicago University. Dept. of Meteorology. Feb 1955. 13p maps, diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117330

Contract no. AF 19(604)-1293. Technical report no. 11.

1. Hurricanes - Forecasting 2. AAF CRC TN 55-297.

Investigation of cyclone development. Chicago University. Dept. of Meteorology. Contract no. AF 19(604)-309. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Storm no. 1, by Sverre Petterssen and Dorothy Bradbury. Oct 1954. 69p diags, graphs, tables. Microfilm \$3.25, Photocopy \$9.00. PB 117340

A storm with a rapid rate development is investigated with a view to discovering predictable sequences of events that precede cyclogenesis at sea level. The vorticity equation is used to compute the vertical motions and the horizontal divergence in and around the storm. An attempt at accounting for the observed thickness changes as a result of horizontal advection and adiabatic (wet and dry) processes is made. The computed vertical velocities are compared with the observed patterns of precipitation. Technical report no. 5. Appendix I: Basic equations and methods of computation. AAF CRC TN 55-255.

Storm no. 3, by M. A. Estoque. Oct 1954. 31p diags, table. Microfilm \$2.50, Photocopy \$5.25. PB 117341

A selected case of cyclogenesis over the United States is analyzed. It is shown that the cyclone development near sea level may be anticipated by considering the vorticity advection aloft and the patterns of thermal advection between the level of non-divergence and the surface. The distributions of vertical velocity and horizontal divergence during the development have been investigated and compared with the patterns of clouds and precipitation. Technical report no. 7. AAF CRC TN 55-273.

Ionospheric research. Final report for period 25 Mar 1949 to 31 Jan 1955 under Contract no. AF 19(122)-44, by Robert E. Jones. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Jan 1955. 111p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.00, Photocopy \$15.25. PB 117351

The basic objectives are to extend existing theory and knowledge regarding the ionosphere, with primary emphasis on the lower ionosphere. The present contract is the successor to two earlier AMC contracts which dealt with the experimental probing of the ionosphere by long waves and the theoretical study of the physics of the ionosphere. The main body of the report outlines the various problems and shows the continuous development of the theory and its reconciliation with experiment data. Appendix contains list and abstracts of all reports published under this contract. AAF CRC TR 55-254.



Mean cross sections along 80°W. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Feb 1955. 44p drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 117299

In this report are presented mean cross-sections of temperature and of the westerly component of the geostrophic flow along the 80°W meridian from the North Pole to the Equator and from sea-level up to about 31 km. The positions of the mean tropopause are shown on the cross-sections. The period covered by most of the data is 1948 to 1951 inclusive. No. 5 in a series of background reports for AWS manual 105-50. AAF AWS TR 105-115.

Mean winds over the Marshall Islands, April 1951, by Julius Korshover. California. University. Institute of Geophysics, Oahu Research Center, Oahu, Hawaiian Islands. Dec 1954. 39p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$2.25.  
PB 117361

Scientific report no. 8 under Contract no. AF 19-(604)-546.

1. Winds - Marshall Islands 2. Winds - Velocities - Measurement - Marshall Islands 3. Tables, Meteorological 4. Atmosphere - Circulation - Marshall Islands.

Methods and results of upper atmosphere research, by J. Kaplan, G. F. Schilling, and H. K. Kallmann. California. University. Institute of Geophysics. Nov 1954. 168p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.50, Photocopy \$21.50.  
PB 117017

The various means of investigating the physical state of the upper atmosphere of the earth have been classified according to the source of information, e.g. rocket flights, meteor observations, sound propagation, etc. Each method has been described briefly and typical results concerning temperature, pressure, density, composition, and wind systems are given in the text as well as in form of tables and diagrams. Special emphasis has been placed on the distinction between results which come from direct measurements, and results which have been derived by methods where theories and hypotheses are involved without observations to prove the necessary assumptions. Literature references are part of each separate chapter. Contract no. AF 19(604)-111, Scientific report #3. Revision of Final report on Contract Cwb 7904 (June 1950). AAF CRC TN 55-251.

On the sources of errors affecting observations and measurements of corona line intensities, by Chung-Sung Yu. Harvard University. Harvard College Observatory. Solar Dept. May 1953. 45p diagr, drawings, graphs. Available from Library of Congress, Publication Board Project, Washington

25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 117327

Solar coronal observations have important research significance in fields ranging from cosmic ray changes to radio phenomena and meteorology. Both Climax and the Sacramento Peak station have been regularly obtaining and supplying the data on coronal line intensity. The coronagraph, the special instrument employed, is briefly described, and the methods of observation and visual reduction are presented. A number of sources of errors affecting the accuracy of the observations and measurements are discussed. ARDC Contract AF 19(604)-46. HU HCO SR 6.

Preliminary report on stellar scintillation, by William M. Protheroe. Ohio State University Research Foundation, Columbus, Ohio. Nov 1954. 137p photos, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75.  
PB 117018

A study of stellar scintillation has been made using the harmonic analysis technique. The present study differs from previous studies in that a magnetic tape recorder has been utilized in order to assure homogeneous samples of scintillation throughout an entire frequency analysis. The equipment and circuitry used in the measurements along with the observing and reduction technique are described. It is demonstrated that the uncertainty in the scintillation exceeds the probable error in the equipment by a considerable factor. Contract AF 19(604)-41, Scientific report no. 4. AAF CRC TN 55-168.

Relation between the structure of stellar shadow band patterns and stellar scintillation, by Geoffrey Keller. Ohio State University Research Foundation, Columbus, Ohio. Sep 1954. 28p photos, diags, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.  
PB 117233

Difficulties are encountered in attempting to obtain an instantaneous picture of the pattern of stellar shadow bands seen on the surface of a telescope objective. There is a close statistical relationship between these patterns and the scintillation of the total star light received. By observing scintillation through a diaphragm having two holes with variable separation between them, one can derive the Fourier spectrum of periodicities in the shadow pattern and the autocorrelation function of the pattern. A number of patterns and associated autocorrelation functions are illustrated. Joint scientific report 1 under Contract AF 19(604)-41 and AF 19(604)-964. AAF CRC TN 55-253. OSURF Proj 480. OSURF Proj 583.

Review of time and space wind fluctuations applicable to conventional ballistic determinations, by W. Baglinsky, N. Sissenwine, B. Davidson, H. Lettau. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Research Directorate, Cambridge, Mass. Dec 1954. 44p diags, graphs, tables. Available from Library of

Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 117146

In ballistic wind determinations, the assumption that wind soundings taken two hours apart at a single observation point are representative of conditions for the entire period over a distance equal to the maximum range of the projectile may at times be invalid. A general discussion of the problem is presented and quantitative results of some time and space wind variability investigations are given. AAF CRC TN 54-29. AAF GRD SG 63.

Sky noise measurements. Quarterly report no. 13 for the period Oct 1, 1954-Dec 31, 1954 under Contract no. AF 19(604)-41, by J. Allen Hynek. Ohio State University Research Foundation, Columbus, Ohio, Jan 1955. 4p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.  
PB 117323

For 9th-12th reports see PB 114492, 115053, 115553, 116387.

1. Stars - Scintillation 2. Winds - Velocity - Measurement 3. Noise, Atmospheric - Measurement 4. OSURF Proj 480, Report no. 13 5. AAF CRC TN 55-183.

Synoptic explanation of the climatological divisions in the central Pacific during the October season. California. University. Institute of Geophysics. Oahu Research Center, Oahu, Hawaiian Islands. Nov 1954. 35p maps, diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25.  
PB 117360

Scientific report no. 7 under Contract no. AF 19(604)-546.

1. Winds - Pacific Ocean 2. Winds, Geostrophic - Pacific Ocean 3. Winds - Direction - Pacific Ocean 4. Climatology - Research 5. Atmosphere - Circulation - Pacific Ocean.

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. 24p diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.  
PB 117120

Simple and practically useful formulae have been developed for the minimum electron density and for the time of the minimum. The variation of the electron density with time through the eclipse is demonstrated in several graphs. An approximate but very useful expression for the minimum electron density (minimum critical frequency) of a partial eclipse, of magnitude  $M$ , has been derived as a function of  $M$ . The error of this expression is not greater than the experimental error of the average ionospheric sounding equipment. Research Laboratory of Electronics, Report no. 31. Electrical engineering

series, vol. 4, no. 12. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 149. Acta polytechnica 158.

Thermodynamic structure of the outer solar atmosphere, by Satoshi Matsushima. Harvard University. High Altitude Observatory, Boulder, Colo. May 1954. 98p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75.  
PB 117202

In this thesis a special effort was made to develop the theory of the structure of an atmosphere in which departures from thermodynamic equilibrium are predominant. A theory of the phenomenon of self-absorption was also treated. Theoretical relationships were applied to the analysis of the hydrogen spectra observed at the 1932 and 1952 eclipses. All of the results showed good agreement within the estimated errors of the observations. Contract Nonr-393(01). Project NRL Req. 173/6443/53. Thesis - Utah University.

Variation of local liquid-water concentration about an ellipsoid of fineness ratio 10 moving in a droplet field, by Rinaldo J. Brun and Robert G. Dorsch. U. S. National Advisory Committee for Aeronautics. Apr 1955. 51p photo, drawings, diagrs, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.  
PB 117314

Analyses of trajectories of water droplets about an ellipsoid of revolution with a fineness ratio of 10 (10 percent thick) in flight through a droplet field, computed with the aid of a differential analyzer, indicate that the local concentration of liquid water at various points about an ellipsoid varies considerably and under some conditions may be several times the free-stream concentration. Curves of the local concentration factor as a function of spatial position were obtained and are presented in terms of dimensionless parameters that describe flight and atmospheric conditions. NACA TN 3410.

Winds over 100 knots in the northern hemisphere. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Jan 1955. 72p maps, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25.  
PB 117015

No. 6 in a series of background reports for AWS Manual 105-50.

1. Winds - Velocities 2. AAF AWS TR 105-121.

## MINERALS AND MINERAL PRODUCTS

Investigation into the effects of radiation on the physical properties of quartz. Final report, Jul 1, 1951 to Jul 30, 1953, under Contract DA36-039-sc-15350, by Clifford Frondel and C. S. Huribut, Jr.

Harvard University. Dept. of Mineralogy. Jul 1953. 54p photos, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.50. PB 111628

The main effort was concentrated on the problem of identifying the basic mechanisms by which the chemical composition of quartz varies, and determining the extent of the variation. The second line of work was concerned with measurement of the variations observed in certain physical properties of quartz, particularly the indices of refraction, brought about by irradiation with x-rays. A considerable part of our effort was put into the development of new, high-precision equipment for the purpose. Dept. of the Army project: 3-99-11-022. Signal Corps project: 33-142B (C-036401.1). SIG Contract DA36-039-sc-15350, Final report.

## ORDNANCE AND ACCESSORIES

Improper packing of 4.2 inch chemical mortar ammunition, by James W. Hensley and Harry E. DeHart. U. S. Chemical Warfare Service. 41st Chemical Laboratory Co. Aug 1944. 7p photos, drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117290

1. Mortars, Chemical - Ammunition - Packing
2. CWS 41 CM TR 34.

Six year storage program tests, packaged items, by G. F. Martin. U. S. Arsenal, Rock Island, Ill. Jan 1955. 172p photos, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.75, Photocopy \$22.75. PB 117326

Ordnance project no. TB 5-1101B, Report no. 5A. Dept. of the Army Project no. 591-07-001.  
1. Packaging materials - Tests 2. Package cushioning - Materials - Tests 3. Packaging - Methods - Tests 4. RIAL R 54-4415.

## PACKING AND PACKAGING

Packaging requirements for bearings. Part 15: Performance of volatile corrosion inhibitors for packaging antifriction bearings (series N-N), by A. A. Mohaupt and R. K. Stern. U. S. Forest Products Laboratory, Madison, Wis. Jul 1954. 29p photos, table. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75. PB 111650

Bearings with or without an oil film were sealed in tin cans or flexible, water vaporproof pouches with 1 of 6 VCI materials and subjected to a 3-week cyclic exposure plus 60 days of storage at 120° or 160°F. and 92 percent relative humidity. Under all test conditions, the inhibitor consisting of a kraft paper impregnated with sodium nitrite, urea, and

monoethanolamine benzoate gave the best results. A kraft paper impregnated with an amine salt also protected the bearings from corrosion under all conditions, except when used in a pouch exposed to 160°F. Better results were obtained with certain inhibitors in tin cans than with the same inhibitors in pouch packages. Contract no. AF 18(600)-103. AAF WADC TR 53-38, Part 15.

## PERSONNEL APTITUDE TESTING

Analysis of peer ratings: I. Assessment of reliability of several question forms and techniques used at the Naval Officer Candidate School, by George J. Suci, T. R. Vallance, and Albert S. Glickman. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1954. 28p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117430

The effects of two variables believed to influence the reliability of peer ratings were studied: the extent to which the rater likes or dislikes the ratee, and the level of objectivity demanded by the rating questionnaire. In addition, several techniques of obtaining peer ratings were compared. These were the paired comparison method, the ranking method, the method of selecting upper and lower segments, and the method of comparing each person with a person who serves as standard. Contract Nonr 890(01). Officer Personnel Research Program. NAVPERS TB 54-9.

Comparative validation of two radio code tests when used with the Airman Classification Battery in selecting radio operator trainees, by John A. Creager. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Nov 1954. 16p graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117325

Project no. 7700, Task no. 77014.  
1. Personnel, Radio - Selection 2. Radio - Codes - Tests 3. Airman Classification Battery 4. Ability tests 5. AAF PTRC TR 54-65.

Development of short alternatives for a valid classification test, by Helen Tomlinson. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center, Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 22p diags, graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117301

Two four-part chart-reading tests and two three-part dial-reading tests were administered to samples of new airmen. The data were analyzed to determine the merits of these tests as predictors of the airman

classification test, dial and table reading. The chart-reading tests proved better predictors than the dial-reading tests. Two or three of the chart-reading subtests predicted dial and table reading scores better than either of the dial-reading tests and only a little less efficiently than the total chart-reading score. Project no. 7700, Task no. 77008. AAF PTRC TR 54-80. References attached.

Effect of training on absolute estimation of distance over the ground, by Eleanor J. Gibson and Richard Bergman. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 34p photo, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117309

Improvement in absolute judgment of distance occurred as a result of training even though none of the distances presented for judgment were repeated. Training tended to correct constant errors of both overestimation and underestimation in the experimental group. Learning curves showed that this shift occurred very quickly. Variable error was reduced from pretest to posttest in both the experimental and the control groups, but the reduction was greater for the experimental group. The function relating true distance to estimated distance was shown to be linear. Contract no. AF 33(038)-22373, Cornell University. Project no. 7706, Task no. 77116. AAF PTRC TR 54-95.

Inquiry into the problem of predicting achievement, by Robert M. W. Travers. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 36p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117307

This report analyzes the general nature of the problems faced by those engaged in aptitude measurement and considers various ways of overcoming obstacles. In the development of a theoretical structure, the stimulus-response type of theory is preferred. Project no. 7703, Task no. 77070. AAF PTRC TR 54-93.

Symposium on scientific and specialized manpower. U. S. Research and Development Board. Committee on Human Resources. Panel on Manpower. Jun 1953. 143p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.00, Photocopy \$19.00. PB 116950

Contents: The situation in the U.S.S.R., by M. H. Trytten. - U. S. requirements for scientific and specialized personnel, by John F. Hilliard. - Current trends in U. S. colleges and universities: Production of engineers, by Henry H. Armsby. - Current trends in U. S. colleges and universities: Production

of scientists, by Herbert S. Conrad. - Fellowship program of the National Science Foundation, by Bowen Dees. - Industrial scholarship program, Union Carbide and Carbon Corporation, by Arthur V. Wilker. - Military education programs, by Annie Gilbert. - Quality and quantity of potential students, by Dael Wolfe. Recent production and distribution of highly educated scientists in the U. S., by Douglas E. Scates. - Characteristics of our present resources of scientific and specialized personnel, by Helen Wood. - Problems in estimating demand for scientific and specialized manpower, by Harold Goldstein. - Discussion. - Bibliography. RDB HR-HMP 200/1.

Tables for predicting success from stanines, by Mary Agnes Gordon. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 8p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117346

These tables have been used for several years for constructing expectancy charts to show the expected success of trainees at different aptitude levels. The method has proved acceptable. Project no. 7702. AAF PTRC TR 54-124.

## PHOTOGRAPHIC AND OPTICAL GOODS

Boreal fringe areas of marsh and swampland, a photo-identification key for the summer (foliage) season, by Merle P. Meyer. Oklahoma. University. Research Institute. Apr 1954. 105p photos. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. PB 116917

Contract no. Nonr-982(01), Project no. NR 387 008. Technical report no. 2. For report no. 1 see PB 115830.

1. Photography, Aerial - Interpretation 2. Marshes - Vegetation.

Determination of beach conditions by means of aerial photographic interpretation, by D. R. Lueder and W. H. Rockwell. Cornell University. School of Civil Engineering, Ithaca, N. Y. Contract N6onr, Task order 11, Project no. NR 257 001. Technical report no. 6. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Vol. I: Relations between beach features and beach conditions. Jun 1954. 96p photos, diags, graphs, tables. Microfilm \$4.50, Photocopy \$12.75. PB 117377

1. Photography, Aerial - Interpretation  
2. Beaches - Trafficability 3. Sands, Beach - Grain size - Measurement 4. Profiles, Beach.



**Vol. II: Variation and stability of beach features (including an appendix on wave tank tests).** Jun 1954. 100p graphs, tables. Microfilm \$4.50, Photocopy \$12.75. PB 117377s2

1. Photography, Aerial - Interpretation
2. Beaches - Trafficability
3. Profiles, Beach - Stability
4. Sands, Beach - Tank tests.

**Vol. III: Photographic gray tones as an indication of the size of beach materials.** Jun 1954. 64p photos, graphs, tables. Microfilm \$3.25, Photocopy \$9.00. PB 117377s3

1. Photography, Aerial - Interpretation
2. Sands, Beach - Grain size - Measurement
3. Profiles, Beach
4. Beaches - Trafficability.

**Vol. IV: Cone penetrometer as an index of beach supporting capacity (moisture, density and grain-size relations).** Jun 1954. 58p diags, graphs, tables. Microfilm \$3.00, Photocopy \$7.75. PB 117377s4

1. Photography, Aerial - Interpretation
2. Sands, Beach - Analysis
3. Penetrometers
4. Beaches - Trafficability.

**Vol. V: A method for estimating beach trafficability from aerial photographs.** Jun 1954. 80p. Microfilm \$3.75, Photocopy \$10.25. PB 117377s5

1. Photography, Aerial - Interpretation
2. Beaches - Trafficability.

**Electromagnetic theory of the Luneberg lens, by Henry Jasik.** U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Nov 1954. 65p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117451

The electromagnetic theory of the two-dimensional Luneberg lens is formulated by considering the center of the lens as being identical with the origin of a cylindrical coordinate system. The field is then expressed as an infinite harmonic series whose coefficients contain a combination of Hankel functions and confluent hypergeometric functions. Solutions are obtained for a number of different types of sources. Numerical results are obtained for a particular size of lens. The theory of the three-dimensional lens is formulated briefly and the nature of the problems involved in obtaining a solution is discussed. Thesis - Polytechnic Institute of Brooklyn. Supplementary note: Theory of the geodesic analog of the Luneberg lens. AAF CRC TR 54-121.

**Essay key for the photo identification of farm crops at several intervals during the growing season in Northern Illinois. Part VI: Identification of farm crops on selected aerial photographs, by Clyde F. Kohn. Part VI: Conclusions regarding the aerial photo identification of farm crops in northern Illinois, by Clyde F. Kohn.** Northwestern University.

Dept. of Geography, Evanston, Ill. Mar 1954. 55p photos. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116364

Technical report no. 3 under Contract no. N7onr 45-005, Project no. NR 387-005. For Parts IV-V see PB 114102-114103.

1. Photography, Aerial
2. Photography, Aerial - Interpretation
3. Crops - Photography, Aerial.

**Submarine photography in Puget Sound, by James A. Gast and Wayne V. Burt.** Washington. University. Dept. of Oceanography, Seattle, Wash. May 1954. 15p photos, drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117126

Technical report no. 33 under Contract N8onr-520/III, Project NR 083 012.

1. Photography, Underwater - Puget Sound
2. WU OR 54-19.

**Trafficability and navigability patterns of the Louisiana coastal marshlands, by James P. Morgan.** Louisiana State University. Coastal Studies Institute, Baton Rouge, La. May 1954. 42p maps (part fold). Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117206

The body of the report consists of two sets of maps which depict respectively trafficability and navigability. The first group of three maps simply separates high, firm, potentially trafficable land of various types from low marsh and swamp. The second set differentiates water bodies of various depths. Most of the extremely shallow streams, lakes, bays and ponds have been excluded from the maps so that the deeper, more important waterways are emphasized. Technical report no. 4 under Contract N7onr 35608, NR 388 002.

## PHYSICS

### General

**Canonical equations for non-linearized steady irrotational conical flow, by G. H. Glese and H. Cohn.** U. S. Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. Jun 1953. 17p graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117252

Standard forms have been found for the equations of non-linearized steady conical flows in which the variation of entropy behind attached conical shocks has been neglected. The problem to find the flow around a given cone with attached conical shock involves an unknown boundary. With the aid of the standard form for the case in which the equations

are of elliptic type everywhere this problem has been restated in a form in which all boundaries are known. APG BRL M692.

Coefficient inequality for Schlicht functions, by

P. R. Garabedian and M. Schiffer. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jun 1954. 33p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117434

Contract Nonr 225(11), NR 041-086.

1. Mapping, Conformal 2. Schlicht functions  
3. Mathematical equations and solutions 4. SU  
AMSL TR 24A.

Degenerate unsteady compressible flows, by J. H.

Giese. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jan 1954. 33p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117250

Characteristic conditions are derived for non-linearized three dimensional compressible flows in which the entropy of any fluid particle remains constant. A number of problems which could be expected to lead to pseudo-stationary flows are outlined. Most, but not all, are well known problems that have been solved at least in linearized form. Dept. of the Army project no. 503-03-001 and 503-06-002. ORD project nos. TB 3-0108H and TB 3-0007K. APG BRL R 894.

Equations of motion for a completely ionized gas,

by R. H. Good, Jr. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Mar 1955. 35p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117284

The equations of motion are developed for a binary gas mixture consisting of a positive-ion component and a negative-ion component. Non-relativistic velocities and elastic collisions are assumed. The effects on the particles of an external gravitational field, external electromagnetic field, and an internal electromagnetic field produced by the rest of the ions in the gas are included. The paper is largely a review and discussion of the work of Westfold on this subject and ends with the equations of motion written down in detail. Contract no. AF 19(604)-1304. AAF CRC TN 55-250. PSC IRL SR 74.

Fluid mechanics and the transport phenomena, by

R. B. Bird, C. F. Curtiss, and J. O. Hirschfelder. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry. May 1954. 51p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117127

Issued jointly with the University of Wisconsin

Chemical Engineering Dept., under National Science Foundation grant G-356. University of Wisconsin-ONR-7. Contract N7onr-28511.

1. Dynamics, Fluid - Theory 2. Heat - Transference - Theory 3. Mass transference - Theory 4. Fluid mechanics.

Heat transfer and frictional effects in laminar boundary layers. Part 6: Effect of variable properties,

by Robert N. Thurston. Ohio State University Research Foundation, Columbus, Ohio. Sep 1953. 136p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75. PB 117445

The paper investigates some of the effects of the variation of fluid properties on boundary layer solutions when the pressure varies along the surface. The correspondence of boundary layer solutions for fluids having variable properties is extended in an approximate manner so as to include the effect of Prandtl number different from unity. A 91-page appendix includes a survey of information concerning the laminar boundary layer. Contract no. AF 33(038)-10834. AAF WADC TR 53-288, Part 6.

Infrared, a bibliography, by Clement R. Brown,

Mauree W. Ayton, Thomas C. Goodwin, and Thomas J. Derby. U. S. Library of Congress. Technical Information Division. Dec 1954. 374p. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$3.00. PB 111643

Includes all references to published literature on the subject issued from 1935 through 1951 which have been found in the sources listed. All material concerned with the scientific aspects of infrared radiation and its effects, and all technical applications with the exception of industrial heating and drying processes have been included. The infrared portion of the electromagnetic spectrum has been taken as the range from 0.8  $\mu$  to over 100  $\mu$ . Material on heat transfer theory and processes, as such, and most material of a popular nature, have been excluded. Several hundred items were obtained from a set of punch cards being compiled by the National Research Council Committee on Infrared Absorption Spectra and the National Bureau of Standards, and a set of punch cards on infrared spectra compiled by the United States Rubber Co.

New approach to non-equilibrium processes, by

Peter G. Bergmann and Joel L. Lebowitz. Syracuse University. Dept. of Physics, Syracuse, N. Y. Mar 1955. 33p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117356

This paper proposes a new model for the description of irreversible processes, which permits the construction of a Gibbs type ensemble and the employment of the general techniques of statistical mechanics. The internal dynamics of the system that is engaged in the process is assumed to be de-

scribed fully by its Hamiltonian. Its interaction with the driving reservoirs is described in terms of impulsive interactions (collisions). Contract no. AF 18(600)-459. Technical note P-7. Project no. R-357-40-10.

On finite sum equations for boundary value problems of partial difference equations, by Herbert Glantz and Eric Reissner. Massachusetts Institute of Technology. Committee on Machine Methods of Computation. Oct 1954. 29p diagr, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117321

Project DIC 6915. Contract N5 ori 60: Project for machine method of computation and analysis.  
1. Equations, Differential 2. Boundary layer - Theory 3. MIT CMMC TR 3.

On the numerical solution of hyperbolic systems of partial differential equations with two characteristic directions, by W. C. Carter and G. L. Spencer, II. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. May 1952. 46p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117246

To find bounds for the truncation error in the numerical solution by difference methods of the Cauchy problem for hyperbolic systems of partial differential equations with two characteristic directions, a careful examination is made of the details of H. Lewy's proof of convergence of the difference process to the actual solution. The conditions for the existence of a solution are relaxed, and then by considering the results of K. O. Friedrichs a general existence theorem slightly stronger than Friedrichs' is proved. Project TB 3-0108H. APG BRL R 813.

On the numerical solution of parabolic partial differential equations, by Werner Leutert. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Nov 1951. 20p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117244

Project no. TB 3-0007K.  
1. Equations, Differential 2. Mathematical equations and solutions 3. APG BRL R 769.

Periodic sampling of stationary time series, by John P. Costas. Massachusetts Institute of Technology. Research Laboratory of Electronics. May 1950. 9p diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117278

SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022.  
1. Electronics - Research 2. Mathematical equations and solutions 3. Time series (Statistics) 4. SIG Contract no. W36-039-sc-32037 5. MIT RLE TR 156.

Properties of the confluent hypergeometric function, by A. D. MacDonald. Massachusetts Institute of Technology. Research Laboratory of Electronics. Nov 1948. 30p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117190

SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022.  
1. Hypergeometric functions 2. Tables, Mathematical 3. SIG Contract no. W36-039-sc-32037  
4. MIT RLE TR 84.

Recursion relation for computing derivatives of least-square polynomials over moving-arcs, by George R. Trimble, Jr. U. S. Aberdeen Proving Ground. Ballistic Research Laboratory, Aberdeen, Md. Jul 1952. 13p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117247

The purpose of the present paper is to extend the method developed in BRL Report no. 778 so that any derivative can be computed using the recursion relation. The previous paper was also restricted to an odd number of points in the interval considered. The present paper considers both an even and an odd number of points. The method developed herein is being used at this time for computing the first derivative of least-square polynomials over moving-arcs on the ENIAC. APG BRL R 822.

Separation of Laplace's equation, by Raymond Moos Redheffer. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1948. 97p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117178

Contract no. W36-039-sc-32037.  
1. Electronics - Research 2. Mathematical equations and solutions 3. Laplace functions 4. SIG Contract no. W36-039-sc-32037 5. MIT RLE TR 68.

Solution by iteration of nonlinear integral equations, by Mark Lotkin. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1953. 16p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117248

For large classes of non-linear integral equations describing certain wave phenomena the well known method of successive approximations provides a feasible means of constructing a solution, securing its uniqueness, and, in the process, furnishing practical estimates of relevant magnitudes and errors. Furthermore, the method also lends itself quite easily to treatment on high speed computing machinery. These principal conclusions are illustrated and borne out by means of an appropriately chosen example. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL R 887.

Some analytical and practical aspects of Wiener's theory of prediction, by Robert Cohen. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1948. 109p diagrs, graphs (1 fold), tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00.

PB 117179

The performance of the Wiener predictor is shown to be closely connected to the behavior of the signal derivatives; in turn, this behavior is related to the structure of the signal autocorrelation curve in the immediate vicinity of the ordinate axis. Careful reproduction of this structure in the analytical work is the fundamental condition for an accurate predictor design. The expected performance of the predictor, measured by the "error", may be anticipated by noticing that: (a) a signal whose first derivative reaches infinite values is practically unpredictable; (b) prediction is possible if at least the first derivative of the signal remains finite; and (c) the quality of prediction increases when derivatives of increasing orders of the signal are constrained to remain finite. Contract no. W36-039-sc-32037. Thesis - Massachusetts Institute of Technology. For Wiener's theory see PB 39700. MIT RLE TR 69.

Theory of non-Newtonian flow. II: Solution system of high polymers, by Taikyue Ree and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jun 1954. 35p diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25.

PB 117371

The authors' theory developed in Part I is applied to solutions of polystyrene, polyisobutylene, X-518 GR-S rubber, and lime base grease with good agreement with experiment. The parameters,  $x_n/\lambda_n$  and  $\rho_n$  were calculated, and are tabulated; these parameters are proportional to the surface concentration and the relaxation time of the n'th group of flow units, respectively. The effects of the molecular weights of polymers, concentration, solvent, and temperature on these parameters are determined. Technical report XLIX. Contract N7-ONR-45101, Project NR 032-168. For Part I see PB 116856. UU ISRP TR 44.

## Nuclear

Absorption of negative pions in deuterium: Parity of the pion, by W. Chiniowsky and J. Steinberger. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. May 1954. 16p photos, drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117141

The reaction  $\pi^- + D \rightarrow 2N$  has been observed by detecting the two neutrons in coincidence with slow negative mesons incident on a liquid deuterium target. The observed angular correlation of the two neutrons confirms the identification of the process. The process is therefore not forbidden, and this fact

may be used to establish the odd relative parity of the pion and the nucleon. Joint ONR-AEC program under Office of Naval Research Contract N6-ori-110 Task no. 1; CU-66-54-ONR-110-1-Physics.

Basic mechanisms in radiobiology. III: Biochemical aspects. Proceedings of an informal conference held at Highland Park, Ill., May 13-15, 1954, edited by Harvey M. Patt. National Research Council. Committee on Nuclear Science. Subcommittee on Radiobiology. 1954. 165p diagrs, graphs, tables. Available from NAS-NRC Publications Office, 2101 Constitution Ave., Washington 25, D. C. \$1.50.

PB 117347

Contents: I. Direct effect of radiations on proteins, viruses, and other large molecules, by Ernest C. Pollard. - II. In Vitro effects of radiations on molecules of biological importance, by E. S. G. Barron. - III. Cellular biochemistry, by Frederick G. Sherman. - IV. Enzyme and related effects in the intact cell, by Kenneth P. Dubois. - V. Changes in nucleic acid metabolism as a result of radiation, by Charles E. Carter. NRC NSS 17. NRC 367.

Experimental study of the  $\mu$ -meson mass and the vacuum polarization in mesonic atoms, by S. Koslov, V. Fitch, and J. Rainwater. Columbia University, New York, N. Y. May 1954. 5p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.

PB 117142

1. Mesotrons - Polarization 2. Atomic power - Research.

Liberation of electrons by fast neutral helium atoms from a tungsten surface, by H. W. Berry and R. C. Abbott. Syracuse. University. Institute of Industrial Research. Dept. of Physics, Syracuse, N. Y. Jun 1954. 43p drawings, diagrs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.

PB 117411

Technical report under Contract Nonr-313(00).

1. Atomic power - Research 2. Electrons - Emission 3. Electrons - Measuring equipment 4. Tungsten - Electron emission 5. Helium - Bombardment.

Orbital stability in a proton synchrotron, by N. H. Frank and R. Q. Twiss. Massachusetts Institute of Technology. Research Laboratory of Electronics. Feb 1948. 29p photos, drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 117174

Contract no. W36-039-sc-32037.

1. Synchrotrons, Proton - Theory 2. SIG Contract no. W36-039-sc-32037 3. MIT ERL TR 58.

Photoprotons from coablt, by M. Elaine Toms and William E. Stephens. Pennsylvania. University.



Dept. of Physics, Philadelphia, Pa. Jun 1954. 14p graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117436

The charged particles ejected from a thin cobalt foil by the bremsstrahlung X-rays from a 24 Mev betatron have been observed in nuclear emulsions. Initial results were reported in Bull. Am. Phys. Soc. 1954. Rept. no. 7 under Contract N6 24914-3.

Quarterly progress report no. 6 under Contract AF 18(600)-997, by Fay Ajzenberg. Boston University. Dept. of Physics, Boston, Mass. Mar 1955. 3p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117280

1. Atomic power - Research 2. Neutrons - Energy measurements 3. Targets, Radiation - Preparation.

Research on the size and shape of large molecules and colloidal particles. Technical report no. 4: The determination of spherical particle size distributions from turbidity spectra, by A. F. Stevenson. Wayne University. Dept. of Chemistry, Detroit, Mich. n.d. 8p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117380

Present report relates to techniques of studying hetero-disperse systems of particles using optical and mathematical approaches. Contract N7onr 736 (00), Project no. NR 330-027.

Rotational absorption spectrum of HDO, by M. W. P. Strandberg. Massachusetts Institute of Technology. Research Laboratory of Electronics. Sep 1948. 10p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117191

SIG Project no. 102B. Dept. of the Army Project no. 3-99-10-022.

1. Water, Heavy - Spectra 2. SIG Contract no. W36-039-sc-32037 3. MIT RLE TR 85.

Variational treatment of atomic scattering, by Maurice C. Newstein. Massachusetts Institute of Technology. Committee on Machine Methods of Computation. Feb 1955. 90p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117322

Borowitz and Friedman included a stationary expression for exchange scattering which differed from the one given here, reducing to an indeterminate expression in the case of a Born type field and hence being unsuitable for convenient calculation. Boyet and Borowitz performed calculations with the stationary expression for direct scattering for forward angle scattering, and this choice of incident energies was taken to match theirs so as to have an additional check on the calculations for the particular case of

forward angle scattering without exchange. In the paper by Boyet and Borowitz they used the second cross-section up to a factor of two. However, it is shown in this thesis that this procedure is not legitimate, and the resultant total cross-sections are off by an order of magnitude from those given here. Technical report no. 4. Contract N5 ori 60: Machine methods of computation and numerical analysis Project DIC 6915. MIT CMMC TR4.

## PHYSIOLOGY

Body composition in the desert, by Paul T. Baker. U. S. Army. Quartermaster Research and Development Command. Environmental Research Branch, Quartermaster Research & Development Center, Natick, Mass. Mar 1955. 27p photos, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117338

A study was made of the effect of a desert climate on gross morphology. A total of 83 men was measured before reporting for duty and at intervals during duty at Yuma Test Station in Arizona, in 1953. Of these, 29 were X-rayed before and after this duty for a more careful analysis of body composition. It was found that there was a fat loss without significant body weight change. Roentgenographic plates of the arm and thigh indicated a fat loss and muscle increase. This finding was the same as was noted for groups performing similar tasks at Yuma, Arizona in 1952. Project reference: 7-79-01-002G. QMC EP TR 7.

## PSYCHOLOGY

Analysis of two problem-solving activities, by Robert M. Gagne. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 17p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117270

This bulletin describes and analyzes two problem-solving activities, equipment trouble shooting and aerial photo interpretation. The specific subject of investigation is the behavioral characteristics which appear to separate these tasks from routine, habitual activities. Speculation based on this analysis leads to the conclusion that the intervening variables involved in both tasks are essentially similar. AAF PTRC TR 54-77.

Annotated bibliography of reports issued by the Psychological and Engineering Laboratories, the Johns Hopkins University, under Contract N5-ori-166, Task order I. (Report nos. I-165, 15 Aug 1946-30 Apr 1953), compiled by Judith T. Parker,

T. R. Austin, H. J. Bond, and P. D. Bricker. Johns Hopkins University. Institute for Cooperative Research. Psychological Laboratory. Sep 1953. 106p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. PB 117339

Report no. 166-1-170.

1. Psychological research - Bibliography 2. Visual research - Bibliography 3. Motor reactions - Bibliography 4. Simulators - Bibliography.

Application of linear and curvilinear joint functional regression in psychological prediction, by Joe H. Ward, Jr. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 33p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117302

The purpose was, first, to develop prediction equations which assume (a) linear, (b) squared, and (c) second-order parabolic joint functional relations among independent variables; and, second, to compare these complex equations with the multiple regression method by applying the equations to a problem of predictions. Project no. 503-001-0015. AAF PTRC TR 54-86.

Autocorrelation analysis of gross learning scores, by David A. Grant and Noel F. Kaestner. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 15p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117308

The course of learning is described by a series of measures of performance, and like any time series, the learning series may be described in terms of autocorrelation analysis, Fourier analysis, or other standard time series techniques. If a time series consists of random variations in a stationary state, the time averages are the same as the statistical averages, and a detailed analysis is possible. Contract AF 33(038)-23294. Project no. 7708, Task no. 77141. AAF PTRC TR 54-94.

Behavior of individuals and personnel systems in the surveillance functions of an air defense direction center. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Aircraft Observer Research Laboratory, Mather Air Force Base, Calif. Project 7712, Task no. 77207. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Part I: Experimental method, by Robert K. McKelvey and Jay D. Cohen. Dec 1954. 34p photo, diags, graphs, tables. Microfilm \$2.50 Photocopy \$5.25. PB 117319

This report describes research techniques employed to facilitate the development of objective measures of performance and descriptions of the job behavior of personnel carrying out the air surveillance functions of the Aircraft Control and Warning (AC&W) System. It is part of a more general program of research designed to apply similar analyses to other functions of AC&W operating teams. AAF PTRC TR 54-98.

Part II: Distribution of voice communications at four critical crew positions, by Robert K. McKelvey. Dec 1954. 9p diags, tables. Microfilm \$1.50, Photocopy \$1.50. PB 117320

The data presented in this paper are based upon fifteen 24-minute samples of the activities of Aircraft Control and Warning (AC&W) operators in each of four positions in the surveillance section: a scope operator position (S<sub>1</sub>) requiring the operator to scan 180° of the plan position indicator (PPI) presentation at intermediate ranges; another scope operator position (S<sub>2</sub>) requiring the operator to scan the opposite half of the PPI presentation at intermediate ranges; a plotter position (P) where the entire board was manned by a single plotter; and a teller/recorder were combined. The 15 operators were rotated among these positions so that each operator was observed for 24 minutes in each job. AAF PTRC TR 54-99.

Comparison of circle counting to three methods of repeat transmission of three-digit numbers, by Henry M. Moser, John J. Dreher, and Sol Adler. Ohio State University Research Foundation, Columbus, Ohio. Dec 1954. 13p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117060

Contract AF 18(600)-316, Report no. 19.

1. Communications, Audio 2. Speech - Intelligibility 3. OSURF Proj 519, Report no. 19 4. AAF CRC TR 54-90.

Discrimination of random series of stimulus frequencies as a function of their relative and absolute values, by John P. Hornseth and David A. Grant. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center, Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 21p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117304

Two experimental techniques were used in determining the discrimination function: (1) the method of sequential judgments in which the subject is required to make a judgment as to which of two stimuli will be presented and then to observe whether or not the judgment was correct; and (2) a modified method of constant stimuli in which the subject is required to report after a sequence of presentations of the stimuli whether the two stimuli were presented equally

often or whether one stimulus was presented more frequently than the other. Contract no. AF 33(038)-23294, Univ. of Wisconsin. Project no. 7708, Task no. 77142. AAF PTRC TR 54-76.

Effect of code group word position upon errors, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Oct 1953. 12p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 117077

Contract AF 18(600)-316.

1. Codes, Aural - Audibility 2. Alphabets - Analysis  
3. Speech - Intelligibility 4. OSURF Proj 519, Report no. 4.

Effects of concurrent use of two alphabets, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Nov 1953. 17p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 117078

Contract AF 18(600)-316.

1. Psychological tests 2. Alphabets, Phonetic  
3. OSURF Proj 519, Report no. 5.

Effects of stress on performance in a dominant and non-dominant task, by Charles W. Simon. Antioch College, Yellow Springs, Ohio. Jun 1954. 48p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 117359

Considerable research has been expended to discover instrument designs requiring for their successful operation a response pattern used most frequently by the majority of the population. Substituting such designs for others on which operators apparently perform at a comparable level only after extensive training has usually been justified by the hypothesis that under stress, operator performance tends to retrogress less when dominant response patterns are required. The hypothesis was tested in the experiment reported here. Contract no. W33-038-ac-19816. AAF WADC TR 54-285.

Leadership acts. I: Investigation of the relation between possession of task relevant information and attempts to lead, by John K. Hemphill, Pauline N. Pepinsky, Reuben N. Sheertz, William E. Jaynes, and Charlotte A. Christner. Ohio State University Research Foundation. Personnel Research Board, Columbus, Ohio. 1954. 155p drawings, diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.25, Photocopy \$20.25. PB 117425

This report describes the first of a series of projected experiments designed to test a theory of leadership and small group behavior. Research conducted by the staff of the Laboratory prompted the

development of a tentative theory by Dr. John K. Hemphill. The experimental testing of this theory is thus viewed as an extension of the previous empirical work, but also represents a decided change from the pattern of previous research activities. Contract N6 ori-17, Task order III, NR 171 123. Appendixes: - A. Proposed theory of leadership in small groups, by John K. Hemphill. - B. Observer's procedures - C. Experimenter's procedures. - D. Descriptions of tasks. - E. Relevant and non-relevant information materials. - F. Testing procedures.

Letter-digit interaction, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Feb 1954. 15p graphs, tables (2 fold). Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 117081

Contract AF 18(600)316, Report no. 8.

1. Articulation tests 2. Speech - Intelligibility  
3. Numerals - Intelligibility 4. OSURF Proj 519, Report no. 8.

Mathematical analysis of the human operator in a closed-loop control system, by C. E. Walston and C. E. Warren. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 94p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117310

This research bulletin presents a mathematical analysis of human behavior under conditions requiring transfer of information gained visually to manual output. An electronic pursuit apparatus was specially constructed to present simple and compensatory tracking tasks which could be scored quantitatively as well as qualitatively. Using the technique of autocorrelation, it was determined that the apparatus was a good first approximation to the human operator in the tracking task, and that the operator's behavior could be expressed in mathematical terms. Contract no. AF 33(038)-10528, Ohio State Univ. Project no. 7707, Task no. 77133. AAF PTRC TR 54-96.

Number telling and digit pronunciation, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Feb 1954. 15p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117080

Contract AF 18(600)316, Report no. 7.

1. Speech - Intelligibility 2. Numerals - Intelligibility  
3. Articulation tests 4. OSURF Proj 519, Report no. 7.

Preliminary Mayday-SOS comparison, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Feb 1955. 4p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117055

Contract AF 18(600)-316.

1. Speech - Intelligibility 2. OSURF Proj 519, Report no. 21 3. AAF CRC TN 55-52.

Reactions to limited interpersonal contacts: A preliminary analysis and classification, by Thornton B. Roby and Seymour Rosenberg. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 23p diagr. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117306

This study attempts to analyze the contact-judgment process in such a way as to suggest experimental operations leading initially to the improvement of self-selection as an assembly expedient, and ultimately to a more exact understanding of the nature of reactions to interpersonal contacts as a general phenomenon in social psychology. Project no. 7713, Task no. 77231. AAF PTRC TR 54-85.

Research on the language of voice procedures: Comparison of the United States-United Kingdom and International Civil Aviation Organization phonetic alphabets, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Contract AF 18(600)-316. Order parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Part I Jun 1953. 13p tables. Microfilm \$2.00, Photocopy \$2.75. PB 117079

1. Alphabets, Phonetic - Comparison 2. International Civil Aviation Organization phonetic alphabet 3. Speech - Intelligibility 4. OSURF Proj 519, Report no. 6.

Part II: Technical aspects. Jun 1953. 69p photo, diagr, graphs, tables. Microfilm \$3.25, Photocopy \$9.00. PB 117076

1. Speech - Intelligibility 2. International Civil Aviation Organization phonetic alphabet 3. Psychoacoustic tests 4. Alphabets, Phonetic 5. OSURF Proj 519, Report no. 3, Part II.

Sentence elements and listener response, by Henry M. Moser, John J. Dreher, and Robert E. Patterson. Ohio State University Research Foundation, Columbus, Ohio. Aug 1954. 21p diagr, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117056

Contract AF 18(600)316, Report no. 10.

1. Speech - Intelligibility 2. Articulation tests 3. OSURF Proj 519, Report no. 10 4. AAF CRC TR 54-80.

Standard pronunciation of the modified ICAO alphabet, by Henry M. Moser and John H. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Dec 1954. 9p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117059

Contract AF 18(600)316, Report no. 18.

1. Alphabets - Phonetic 2. Speech - Intelligibility 3. International Civil Aviation Organization 4. OSURF Proj 519, Report no. 18 5. AAF CRC TR 54-89.

Studies in group norms: The perception of group attitudes as related to criteria of group effectiveness, by Leonard Berkowitz. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Nov 1954. 24p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117303

Measures of aircrew members' perceptions of the task-oriented motivation of their fellow crew members were obtained for four classes shortly before the completion of training. In addition, attitude scales were administered measuring the crew members' motivation to have an effective crew and the liking of the crew members for each other. Criteria of crew effectiveness were also obtained, based on either instructor ratings or the incidence of task-avoidance behaviors (sick calls, aborts, and absences from scheduled military formations). Project no. 7713, Task no. 77220. AAF PTRC TR 54-62.

Survey of research on spatial factors, by Gordon V. Anderson, Benjamin Fruchter, Herschel T. Manuel and Philip Worchel. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 63p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117316

This research bulletin provides an outline and an evaluation of the progress of this research from the early factor analysis studies of Spearman and Kelley to the present. While only one space factor was identified in the earlier studies, there are now known to be additional factors. From a consideration of the findings of 57 spatial tests, it is proposed that there are probably four spatial ability factors: rotation, manipulation, orientation, and kinesthetic. Bibliography attached. Contract no. AF 33(038)-11046, Univ. of Texas. Project no. 503-002-0001. AAF PTRC TR 54-84.

Symposium on research in group behavior. U. S. Research and Development Board. Committee on Human Resources. Panel on Human Relations and Morale. Feb 1952. 103p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. PB 116948

Contents: Measurement of unit or small-group effectiveness, by Donald Baier. - Performance criteria for small military units, by M. D. Havron. - Effects of group pressure upon the modification and distortion of judgments, by S. E. Asch. - Longitudinal studies of air crews and air-crew members, by J. K. Hemphill. - Motivation, theory and measurement, by D. C. McClelland. - Human factors in Air Force Base efficiency, by Nicholas Demerath, E. W. Noland and Gordon Blackwell. - A social psychological study of the decision - making conference, by D. G. Marquis, H. S. Guetzkow, and R. V. Heyns. - Research on military management problems in isolated detachments, by D. C. Miller. - Human relations problems of squadrons, by G. W. Baker. - Method for studying the relationship between communication structure and attitudes in complex organizations, by E. H. Jacobson. - Conclusions and recommendations, by Dwight W. Chapman, Jr., David B. Turman, and Robert Cohen.

Three-digit number telling and repetition methods, by Henry M. Moser, John J. Dreher and Sol Adler. Ohio State University Research Foundation, Columbus, Ohio. Aug 1954. 31p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117057

The three-digit number, being usually a precise quantity, finds widespread use with precision vectoring and tracking apparatus and demands a high degree of accuracy in its transmission. Inasmuch as there are three common ways of telling and nine ways of repeating three-digit numbers, this study is presented to answer the problem of which procedure is most effective. Contract AF 18(600)316, Report no. 11. AAF CRC TR 54-81. OSURF Proj 519, Report no. 11.

Transfer in tracking behavior between two levels of speed, by Douglas H. Lawrence and W. Richard Goodwin. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas, Dec 1954. 14p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117268

This bulletin tests the hypothesis that, on a tracking task which is varied with respect to the speed of target presentation, a subject practicing at a low target presentation speed may transfer a greater amount of skill if he is permitted to choose the point at which transfer to higher speed is made than he would if the transfer point were predetermined for him. Results obtained from 54 subjects appear to confirm the hypothesis. AAF PTRC TR 54-70.

Two-digit number transmission by voluntary stuttering, by Henry M. Moser, John J. Dreher, and Sol Adler. Ohio State University Research Foundation, Columbus, Ohio. Sep 1954. 10p graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117058

Contract AF 18(600)316, Report no. 12.  
1. Communications, Audio 2. Speech - Intelligibility  
3. Stuttering, Voluntary 4. OSURF Proj 519, Report no. 12 5. AAF CRC TR 54-82.

## RUBBER AND RUBBER PRODUCTS

Proceedings, Joint Army-Navy-Air Force Conference on Elastomer Research and Development, the Pentagon, Jan 12 and 13, 1954, sponsored by the Office of the Quartermaster General, conducted by the Advisory Board on Quartermaster Research and Development. Sep 1954. 148p photos, diags, graphs, tables. Available free from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. PB 117130

For 1st-3d Navy conferences see PB 116149-116151.  
1. Rubber - Research 2. Rubber, Synthetic - Conferences 3. Rubber, Synthetic - Research 4. Rubber - Deterioration 5. Conference on Elastomer Research and Development, 1954 6. National Research Council. Advisory Board on Quartermaster Research and Development 7. NRC 370.

## TRANSPORTATION EQUIPMENT

### Aeronautics

#### Aircraft

Review of the Air Force materials research and development program, by Mary M. Sokas. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1954. 105p. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.75. PB 111648

130 technical reports issued during the period 1 Jul 1953 - 30 Jun 1954 are abstracted. These reports cover the areas of metallurgy, textiles, petroleum products, structural materials, rubbers, plastics, packaging, protective treatments, and analysis and measurements. Also listed are 17 reports issued during 1 Jun 1951 - 30 Jun 1953, which were not included in WADC Technical Report 53-373. As a final summary, a numerical index of all the technical reports issued during the period Aug 1928 - Jun 1954 is provided. Supplement 1 to WADC TR 53-373 (PB 111537). Abstracts of Technical reports issued from 1 Jul 1953-30 Jun 1954. AAF WADC TR 53-373, Supplement 1.



Evaluation tests of Decca Airfield control radar-type 424, by Cyril M. Edmunds. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Jan 1955. 20p photos, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117352

1. Radar, PPI - Tests
2. AAF RADC TR 55-6.

Self-excited, alternating-current, constant-temperature hot-wire anemometer, by Charles E. Shepard. U. S. National Advisory Committee for Aeronautics. Apr 1955. 29p photo, drawings, diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117313

1. Anemometers, Hot wire - Design
2. Anemometers, Hot wire - Operation
3. Air flow - Heat transference - Calculation
4. NACA TN 3406.

Preliminary investigation of a submerged air scoop utilizing boundary-layer suction to obtain increased pressure recovery, by Mark R. Nichols and P. Kenneth Pierpont. U. S. National Advisory Committee for Aeronautics. Apr 1955. 72p photos, diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117382

1. Ducts, Air - Design
2. Boundary layer - Control
3. NACA TN 3437.

Water-mist separation in cabin air-conditioning systems, by Slegfried Hasinger. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Equipment Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1953. 29p photos, drawing, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$ .75. PB 111645

To determine the most practical method of removing water mist from aircraft cabins, three separation systems were tested: (1) cyclone separation, (2) filter separation, and (3) electrical precipitation. Cyclones proved to be impractical because of their size and pressure drop. Filters were found to require very little space but tended to be very sensitive to droplet size; in addition, they clogged rapidly with ice under freezing conditions. Experiments with electrical precipitation showed that this system eliminated many of the drawbacks of the other two systems; however, it was inferior to the filter in regard to size and complexity. AAF WADC TR 53-324.

Design and performance of throttletype fuel controls for engine dynamic studies, by Edward W. Otto, Harold Gold and Kirby W. Hiller. U. S. National Advisory Committee for Aeronautics. Apr 1955. 39p photo, diags, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117315

1. Engines, Aircraft - Throttles
2. Engines, Aircraft - Fuel systems
3. Flow, Fluid - Theory
4. NACA TN 3445.

#### Training and Training Devices

Instructor-crew influence on attitude formation in student crews, by John T. Lanzetta and William W. Haythorn. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 17p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117305

Project no. 7713, Task no. 77235.

1. Crew, Air - Psychological factors
2. Personnel, Flying - Training
3. Instructors, Aviation - Evaluation
4. AAF PTRC TR 54-79.

Prediction of the trainability of "slow learners" from tests with a symbolic and nonsymbolic content, by Evan W. Picrel. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 16p (drawing, diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117272

This is a study of the assumption that problem-solving tests of general ability in which the material is presented concretely (by means of pictures) are more effective in predicting the trainability of limited-aptitude airmen than are problem-solving tests in which the material is presented symbolically (in terms of words). A concrete form and a symbolic form were developed for each of two problem-solving tests and were administered to 213 limited-aptitude airmen. AAF PTRC TR 54-82.

Transfer in burst control habits, by Walter Lesiw. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 17p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117271

The purpose of the present study is twofold. From a practical standpoint, the investigation is concerned with a determination of the effects of differential burst control practice upon gun camera triggering performance. Of theoretical interest is the effect of reversal of practice stimulus and response relationships (burst-rest ratios) upon performance in the transfer task (gun camera triggering). The position taken predicts negative transfer in at least some aspect of transfer task performance. AAF PTRC TR 54-81.

### Aerodynamics

Analysis of errors introduced by several methods of weighting nonuniform duct flows, by DeMarquis D. Wyatt. U. S. National Advisory Committee for Aeronautics. Mar 1955. 41p drawing, diagrs, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116934

1. Ducts, Nonuniform - Flow - Theory
2. Pipe - Flow - Theory
3. Diffusers, Intake - Flow - Theory
4. NACA TN 3400.

Analysis of the stability and ultimate compressive strength of short sheet-stringer panels with special reference to the influence of riveted connection between sheet and stringer, by Joseph W. Semonian and James P. Peterson. U. S. National Advisory Committee for Aeronautics. Mar 1955. 49p photos, drawings, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117009

1. Panels, Stiffened - Compression tests
2. Connections, Riveted - Analysis
3. Loads, Structural - Compression
4. Aluminum alloys - Compression
5. NACA TN 3431.

Analytic determination of the discharge coefficients to flow nozzles, by Frederick S. Simmons. U. S. National Advisory Committee for Aeronautics. Apr 1955. 16p drawing, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117087

1. Nozzles - Flow - Theory
2. Hydrodynamics - Theory
3. NACA TN 3447.

Application of the generalized shock-expansion method to inclined bodies of revolution traveling at high supersonic airspeeds, by Raymond C. Savin. U. S. National Advisory Committee for Aeronautics. Apr 1955. 71p photos, diagrs, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117238

1. Flow, Supersonic - Theory
2. Bodies of revolution - Aerodynamics
3. Mach number - Effect
4. NACA TN 3349.

Compressible laminar boundary layer with heat transfer and arbitrary pressure gradient, by Clarence B. Cohen and Eli Reshotko. U. S. National Advisory Committee for Aeronautics. Apr 1955. 44p photos, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117093

1. Thwaites' correlation
2. Heat - Transference - Aerodynamics
3. Boundary layer, Laminar - Flow - Pressure gradients
4. Boundary layer, Laminar - Flow - Heat transfer
5. NACA TN 3326.

Description of the transonic model tunnel, Arnold Engineering Development Center, by Hugh E. Gardenier. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. May 1955. 25p photo, drawings, graphs. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75. PB 111670

This is a continuous-flow wind tunnel. The test section is 12-in. square and 37-1/2 in. long. Mach numbers between 0.75 and 1.20 can be set in infinitely small increments and will be extended to 1.6. Reynolds number varies over the Mach number range. All four test-section walls are of perforated metal and are detachable. Both pressure and force tests on aircraft models can be made in the TMT. Multimanometers and strain-gage balance readout on self-balancing potentiometers were installed for pressure and force measurement, respectively. Contract no. AF 18(600)-1233. AAF AEDC-TR-54-70.

An experimental investigation of the base pressure characteristics of non-lifting bodies of revolution of Mach numbers from 2.73 to 4.98, by John O. Reller, Jr. and Frank M. Hamaker. U. S. National Advisory Committee for Aeronautics. Mar 1955. 45p photos, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117007

Formerly RM A52E20.

1. Mach number - Effect
2. Reynolds number - Effect
3. Velocity, Supersonic - Measurement
4. Bodies of revolution - Pressure distribution
5. Flow, Supersonic - Pressure distribution
6. Flow, Viscous - Pressure distribution
7. NACA TN 3393.

Experimental study of orifice coefficients, internal strut pressures, and loads on a small oleopneumatic shock strut, by James H. Walls. U. S. National Advisory Committee for Aeronautics. Apr 1955. 24p photos, drawings, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117095

1. Struts, Shock - Stresses
2. Loads, Landing - Impact
3. NACA TN 3426.

Exploratory investigation of an airfoil with area suction applied to a porous, round trailing edge fitted

with a lift control vane, by Robert E. Dannenberg and James A. Weiberg. U. S. National Advisory Committee for Aeronautics. Apr 1955. 55p photos, diagrs, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. FB 117312

1. Airfoils - Lift - Effect of suction
  2. Airfoils - Suction
- NACA TN 3498.

Flight measurements of base pressure on bodies of revolution with and without simulated rocket chambers, by Robert F. Peck. U. S. National Advisory Committee for Aeronautics. Apr 1955. 18p photo, diagrs, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117239

1. Bodies of revolution - Pressure distribution - Measurement
2. Bodies of revolution - Pressure distribution - Effect of rocket chambers
3. NACA TN 3372.

Hydrodynamic tares and interference effects for a 12-percent-thick surface-piercing strut and an aspect-ratio-0.25 lifting surface, by John A. Ramsen and Victor L. Vaughan, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1955. 21p drawing, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117090

1. Struts - Interference
2. Wings - Interference
3. Wing profiles - Drag
4. Reynolds number - Effect
5. Hydrodynamics
6. NACA TN 3420.

Investigation of the turbulent boundary layer on a yawed flat plate, by Harry Ashkenas and Frederick R. Riddell. U. S. National Advisory Committee for Aeronautics. Apr 1955. 58p photos, drawings, diagrs, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117088

1. Plates, Flat - Boundary layer, Turbulent - Measurement
2. Boundary layer, Turbulent - Measurement
3. Yawing moments
4. Airplanes - Skin - Friction - Measurements
5. NACA TN 3383.

Laminar boundary layer behind shock advancing into stationary fluid, by Harold Mirels. U. S. National Advisory Committee for Aeronautics. Mar 1955. 26p diagrs, graph, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116935

1. Shock waves - Boundary layer
2. Boundary layer, Laminar - Aerodynamics
3. Dynamics, Fluid - Theory
4. Flow, Laminar - Theory
5. NACA TN 3401.

Matrix methods for determining the longitudinal-stability derivatives of an airplane from transient flight data, by James J. Donegan. U. S. National Advisory Committee for Aeronautics. 1954. 22p.

diagrs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117300

Formerly TN 2902 (PB 108788).

1. Airplanes - Maneuverability
2. Stability, Longitudinal - Dynamic tests
3. Wings - Loads
4. Tail surfaces - Loads
5. Mathematics, Applied - Aerodynamics
6. Matrix theory
7. Airplanes - Flight tests
8. NACA 1169
9. NACA TN 2902 Revised.

Method of controlling stiffness properties of a solid-construction model wing, by Norman S. Land and Frank T. Abbott, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1955. 21p photo, diagrs, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117240

1. Wings - Stiffness
2. Wings - Model tests
3. NACA TN 3423.

On slender delta wings with leading-edge separation, by Clinton E. Brown and William H. Michael, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1955. 28p drawings, diagrs, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117097

1. Wings, Triangular - Aspect ratio
2. Wings, Triangular - Leading-edge separation
3. Wings, Triangular - Lift distribution
4. Wing theory
5. Mach number - Effect
6. NACA TN 3430.

Simplified method for calculating aeroelastic effects on the roll of aircraft, by John M. Hedgepeth, Paul G. Waner, Jr. and Robert J. Kell. U. S. National Advisory Committee for Aeronautics. Mar 1955. 26p diagrs, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117005

1. Airplanes - Rolling - Analysis
2. Galerkin method (Mathematics)
3. Aeroelasticity - Calculation
4. NACA TN 3370.

Static stability of fuselages having a relatively flat cross section, by William R. Bates. U. S. National Advisory Committee for Aeronautics. Mar 1955. 29p diagrs, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117008

1. Fuselages - Stability - Wind tunnel tests
2. Stability, Directional - Static tests
3. NACA TN 3429.

Statistical study of wing lift at ground contact for four transport airplanes, by Dean C. Lindquist. U. S. National Advisory Committee for Aeronautics. Apr 1955. 17p graphs, table. Available from National Advisory Committee for Aeronau-

tics, 1512 "H" St., N. W., Washington 25, D. C.  
PB 117241

1. Wings - Lift
2. Airplanes, Transport - Loads
3. Loads, Landing - Impact
4. NACA TN 3435.

Theoretical calculations of the pressure, forces, and moments due to various lateral motions acting on thin isolated vertical tails with supersonic leading and trailing edges, by Kenneth Margolis. U. S. National Advisory Committee for Aeronautics. Mar 1955. 43p diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.  
PB 117006

1. Airplanes - Stability - Effect of tail
2. Flow, Supersonic - Theory
3. Stability, Directional - Dynamic tests
4. Stability, Lateral - Dynamic tests
5. Tail surfaces - Loads
6. Damping derivatives - Stability
7. Loads, Aerodynamic - Elasticity
8. NACA TN 3373.

#### Rockets and Jet Propulsion

Assessment of a proposed jet engine icing test bed for simulating high speed flight, by D. A. J. Millar. Canada. National Aeronautical Establishment. Feb 1955. 39p photo, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117260

Appendix A: Simplified working equations for calculating the flow characteristics of a jet engine exhaust - driven ejector.

1. Jet engines - Icing - Testing equipment - Canada
2. Jet engines - Wind tunnel tests - Canada
3. Thrust ejectors - Flow - Calculation - Canada
4. NAEC LR 124.

Theory of the jet syphon, by B. Szczeniowski. U. S. National Advisory Committee for Aeronautics. May 1955. 49p diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.  
PB 117391

1. Flow, Jet mixing - Theory
2. Thrust augmentors
3. Montreal. University, Montreal, Canada
4. NACA TN 3385.

#### Marine Transportation

Determination and distribution of lignin in marine sediments, by Richard G. Bader. Washington. University. Dept. of Oceanography, Seattle, Wash. May 1954. 15p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117125

Technical report no. 31 under Contract N8onr-520/III, Project NR 083 012.

1. Sedimentation, Marine
2. Lignin - Distribution
3. WU OR 54-17.

Effects of underwater explosions on elastic structures in water, by Eric Enhamre. Sweden. Kungl. Techniska Högskolan, Stockholm. 1954. 80p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117112

Physics and applied mathematics series, vol. 3, no. 12.

1. Damage, Underwater explosion - Sweden
2. Structures - Elasticity - Sweden
3. Engineering, Electrical - Research - Sweden
4. Acta polytechnica, 150
5. Sweden. Kungl Tekniska Högskolan. Handlingar 82.

Method for measuring the damping of surface waves by wave absorbers, by Howard R. Reiss. U. S. David W. Taylor Model Basin. Mar 1955. 27p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117261

A method of determining the effectiveness of wave absorbers is proposed in which measurements are made in a testing basin after an energy equilibrium has been established between a wavemaker and the sources of wave energy dissipation. Proof is presented to show that such equilibrium will be established, and the energy balance in the basin is separated into the proportions of the surface wave energy lost to each of the wave-damping agencies present. These losses are expressed in terms of absorption coefficients, and it is shown how these coefficients may be determined experimentally. DWTMB 896.

Notes on the wind-driven ocean circulation, by Gerhard Neumann. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. May 1954. 59p photos, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117143

Contract Nonr-285(12).

1. Oceans - Motion
2. Oceanography - Research
3. Meteorology - Research.

Preliminary note on the time scale in North Atlantic circulation, by L. V. Worthington. Woods Hole Oceanographic Institution, Woods Hole, Mass. May 1954. 12p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117198

Recent observations show that the temperature and salinity relationship of the North Atlantic central

water mass has changed significantly during the fifteen year period 1935-1950. This evidence, coupled with a reassessment of certain budgeting problems which arise from the exclusive use of the circulation theorem, points to a rapid turnover of water from the surface to mid-depths. It is shown that the North Atlantic Deep Water has suffered a loss of oxygen in the last twenty years; from this it is surmised that the bulk of this water was formed during the period of catastrophic cold from 1810 to 1820. Contract N6-onr-27701, NR-083-004. Unpublished manuscript. WHOI Ref 54-34.

Quieting of outboard motors (Relevant to project SAC 52), submitted by H. L. Ericson. Harvard University. Electro-Acoustic Laboratory. Oct 1945. 72p photos, diags, maps, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116733

Contract OEMsr-658. O.S.S. Project SAC-52. Contents: The silent-engine, by H. L. Ericson, Feb 1945. - Tests on silenced outboard engines at Naples, Florida, by H. L. Ericson. Mar 1945. NDRC Div 17.3. OSRD 6188.

Selective annotated bibliography on wind waves and swell, by Mollie P. Kramer. American Meteorological Society, Washington, D. C. Nov 1954. 50p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116853

Meteorological abstracts and bibliography, Vol. 5, no. 11, p. 1300-1337.

1. Waves - Bibliography 2. AAF CRC TN 55-278.

Small scale tests of ship frame corners (Results of tests on celluloid models). Progress report no. 2, by L. C. Maugh. Michigan University. Dept. of Engineering Research, Ann Arbor, Mich. Nov 1941. 49p photos, drawings, diags (part fold). Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117383

Project M 342 for David Taylor Model Basin. For final report see PB 117363.

1. Ship models - Tests 2. Ship models - Testing equipment 3. Ship models - Stress analysis 4. Gages, Strain - Uses 5. MU ERI Proj M 342, Report no. 2.

Source solution for short crested waves, by J. C. MacCamy. California University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Apr 1954. 21p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116912

A Green's function for the boundary value problem arising in the diffraction of short-crested waves around obstacles of bounded cross section is presented. The diffraction problem is formulated in a precise way which assures the existence and unique-

ness of a solution. Two problems of interest in the theory of surface waves, the production of waves by a moving partition, and the reflection from a horizontal strip are studied by means of the Green's function. Numerical results are obtained for the first problem and indications of numerical procedures given for the second. In particular, the strip problem is so formulated as to make possible the application of the variational methods of Schwinger. Contracts N7onr-295(28) and Nonr-222(18). UC IER Series 61, Issue 5. UC IER Series 3, Issue 352.

Study of flushing in the Delaware model, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Apr 1954. 144p drawings, diags, graphs, maps, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.00, Photocopy \$19.00. PB 116886

Eight separate tests were made on the model by introducing a known volume of dye and tracing the changes in the distribution of the dye by photometric analysis of samples. Considerable reduction of data was necessary to compensate for the adsorption and the body of this report will deal only with the reduced data. Several appendices have been included. Contract Nonr 248(30), Project NR 083-070 and Contract Nonr 248(07), Project NR 084-005. Technical report VII. Reference 54-4.

Theoretical study of zonally uniform oceanic flow, by N. P. Fofonoff. Brown University. Dept. of Oceanography, Providence, R. I. May 1954. 42p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117150

A mathematical model of a zonally uniform ocean is constructed in order to investigate the steady circulation and the nonhomogeneous distribution of density maintained by elementary thermodynamic processes. A simplified system of equations is derived from the general system of hydrodynamic equations representing the model by neglecting small terms in the equations. The different types of flow are illustrated by diagrams showing the streamlines of the meridional circulation and the distribution of isopycnals in a meridional section. The vertical distributions of the zonal velocity component for the different types of flow are also compared. Contract N7onr-358(11), NR-083-050, Technical report no. 4.

Transportation geography, by Edward L. Ullman, with the collaboration of Harold M. Mayer. Washington University, Seattle, Wash. Mar 1954. 25p maps. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116390

Reproduced from American Geography: Inventory and prospect (P. E. James and C. F. Jones, editors), chapter 13, pp. 310-332. Contract no. Nonr-477-(03), Report no. 9.

1. Transportation - Geographic aspects 2. Trade routes.



Wave forces on piles: A diffraction theory, by R. C. MacCamy and R. A. Fuchs. U. S. Beach Erosion Board, Dec 1954. 20p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116606

1. Structures, Marine - Shock resistance
2. Waves, Ocean - Diffraction - Theory
3. Waves, Ocean - Pressure - Measurement
4. ENG BEB TM 69.

Wave instrumentation. Final report, by R. L. Wiegel. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 20p graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117294

During the period of the wave instrumentation contract, (1 Sep 1949 - 15 Jun 1954), studies were made of many of the phenomena connected with water gravity waves. Emphasis was given to the development, testing and operational use of instruments for making field measurements. Connected with this, were the problems of interpreting the information supplied by the instruments. This led to the field of statistical study of ocean waves. In the course of these studies many observations were made which, in turn, led to detailed studies of particular phases. Several of these studies led to research contracts to work on a specific problem. Contract N7 onr-295(28). UC IER Series 3, Issue 372.

Wind effect on shallow bodies of water with special reference to Lake Okeechobee, by Hans R. Kivisild. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1954. 147p graphs, map, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.00, Photocopy \$19.00. PB 117065

This paper deals with the problem of surges and set-up as a function of time. It is an extension of the investigations made by Professor Bo Hellström in 1941. Interrelationships have been established between wind velocities, wind set-up, seiches, and lake, bay, or river bottom topography in shallow water. The dynamic theory is applicable for a steady set-up as well as for rapid variations, as occurring during hurricanes. Civil Engineering and Building Construction series, vol. 3, no. 1. Sweden. Kungl. Tekniska Högskolan, Stockholm. Handlingar 83. Acta polytechnica 159.

## MISCELLANEOUS

Aspects of the regional geography of Bornholm, Denmark, by Lawrence M. Sommers. Michigan State College. Dept. of Geography, East Lansing, Mich. May 1954. 61p maps, tables (part fold). Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117195

Final report on Contract no. Nonr-1209(00), NR 388-012.

1. Industries - Bornholm, Denmark
2. Geography, Economic - Bornholm, Denmark.

Case study data on productivity and factory performance: Coal-burning space heaters. U. S. Bureau of Labor Statistics. Dec 1954. 114p photos, drawings, diagr, graphs, tables. Available from U. S. Bureau of Labor Statistics, Washington 25, D. C. PB 116630

1. Heaters, Coal - Manufacture
2. BLS R 78.

Character and significance of sound production among fishes of the western North Atlantic, by Marie Poland Fish. Rhode Island. University. Narragansett Marine Laboratory, Kingston, R. I. Apr 1954. 115p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.00, Photocopy \$15.25. PB 116899

Contract Nonr-396(02), Technical report no. 5. Oceanic biology project, Reference no. 54-7. Yale University. Peabody Museum of Natural History. Bingham Oceanographic Collection, New Haven, Conn. Bulletin, Volume XIV, Article 3.  
1. Noise, Fish - Analysis- 2. Noise, Biological - Analysis.

Comparative anatomy of the mouth parts of mesostigmatid mites, by G. W. Wharton. Maryland. University. Dept. of Zoology, College Park, Md. May 1954. 3p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117205

In the suborder Mesostigmata twenty-four gnathosomal structures have been named, defined and their homologies established. All these structures except for the stylI are present in each group of the Mesostigmata. Final report under Contract N7-onr-45506, NR 132-022, for period 1 Jul 1950 through 31 May 1954.

Ecological and neurological study of the tropical leaf-cutting ant (Atta), by Edward S. Hodgson. Columbia University. Barnard College. May 1954. 8p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117194

Final report under Contract Nom 1218(00), NR 160-238 for period 1 Jun 1953 to 14 May 1953. Photograph described is not included.

1. Insects - Nervous system
2. Ants, Leaf-cutting.

# ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

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

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

Reproduction in whole or part of any report listed herein is encouraged by the U. S. Atomic Energy Commission, subject to the approval of authors or originating sites. General inquiries from the industrial press about AEC-developed information should be directed to the Industrial Information Branch, Atomic Energy Commission, Washington 25, D. C.

## Chemistry and Chemical Engineering

Spectrophotometric determination of uranium with thiocyanate. Topical report, by Michael A. DeSesa and Oscar A. Nietzel. Atomic Energy Division. Raw Materials Development Lab., American Cyanamid Co., Winchester, Mass. Jul 1954. Contract no. AT(49-1)-533. 19p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$.15. ACCO-54

A modified method of radiochemical activity analysis, by F. S. Voss. Carbide and Carbon Chemicals Co., K-25 Plant, Oak Ridge, Tenn. Feb 1951. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 13p. \$.10. AECD-3132

A radiochemical study of fission yields in the region of shell perturbations and the effect of closed shells in fission, by Alexis C. Pappas. Lab. for Nuclear Science. Mass. Inst. of Tech., Cambridge, Mass. Sep 1953. 201p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$1.00. AECU-2806

Photochemistry of uranyl compounds, by Eugene Rabinowitch. Information Division. Argonne National Lab., Lemont, Ill. Jan 1954. Contract no. W-31-109-eng-38. 98p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$.50. ANL-5202

Saturation of vapor in a Knudsen effusion oven, by R. J. Thorn. Argonne National Lab., Lemont, Ill. Mar 1955. Contract W-31-109-eng-38. 10p. Microfilm \$1.50, Photocopy \$1.50. ANL-5417

Thermal conductivity of metal composites, by E. B. Masters. ANP Project. General Electric Co., Cincinnati, Ohio. Jan 1954. 6p. Microfilm \$1.50, Photocopy \$1.50. APEX-186

Industrial application of gross fission products. Quarterly progress report - Oct-Dec, 1952, Job 24. Vitro Corp., New York City, N. Y. Feb 1953. Contract no. AT-(30-1)-850. 43p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$.25. KLX-1385

The determination of free acid in plutonium solutions, by Maynard E. Smith. Los Alamos Scientific Lab. Univ. of Calif. May 1955. Contract W-7405-ENG. 36. 26p. Microfilm \$2.25, Photocopy \$4.00. LA-1864

Absorbancy studies of polonium complexes in chloride solutions, by D. J. Hunt. Mound Lab. Jun 1954. Contract no. AT 33-1-GEN-53. 23p. Microfilm \$2.25, Photocopy \$4.00. MLM-979

Determination of biphenyl in the presence of polyphenyls - water solubility method, by Louis Silverman and Mary Shideler. Nuclear Engineering and Manufacturing. North American Aviation, Inc., Downey, Calif. May 1955. Contract AT-11-1-GEN-8. 26p. Microfilm \$2.25, Photocopy \$4.00. NAA-SR-1153

Chemistry of the pyrolysis of p-terphenyl, by Louis Silverman and others. Nuclear Engineering and Manufacturing. North American Aviation, Inc., Downey, Calif. May 1955. Contract AT-11-1-GEN-8. 28p. Microfilm \$2.25, Photocopy \$4.00. NAA-SR-1203

The separation and determination of scandium. Spectrophotometric method using Alizarin red S, by A. R. Eberle and M. W. Lerner. New Brunswick Lab. Apr 1955. 24p. Microfilm \$2.25, Photocopy \$4.00. NBL-106

Effect of gamma radiation on chemical reactions. III. Preliminary investigation of vapor-phase polymerization of ethylene at room temperature and atmospheric pressure - progress report no. 3, 2nd quarter, 1952. Dept. of Chemical Engineering. Yale Univ., New Haven, Conn. Jul 1952. Contract no. AT(30-1)-1173. 14p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$.10. NYO-3310

The corrosion resistance of various stainless steels in aqueous solutions in the presence of Dowex #50 resin, by Arnold R. Olsen. Reactor Technology Division. Oak Ridge National Lab., Oak Ridge, Tenn. Nov 1950. Contract no. W-7405-eng-26. 16p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$.10. ORNL-804

Radioisotope production and process development. Annual report for 1954, by A. F. Rupp. Oak Ridge National Lab. Carbide and Carbon Chemicals Co. May 1955. Contract no. W-7405-eng-26. 11p. Microfilm \$2.00, Photocopy \$2.75. ORNL-1861

The use of radioactive carbon in a study of 3-phenylcyclohexyl and related systems, by Howard J. Schaeffer. Oak Ridge National Lab. Carbide and Chemicals Co. Contract no. W-7405-eng-26. 58p. Microfilm \$3.00, Photocopy \$7.75. ORNL-1882

The photosynthetic cycle, by Melvin Calvin. Univ. of Calif., Rad. Lab., Berkeley, Calif. Mar 1955. Contract no. W-7405-eng-48. 48p. Microfilm \$2.75, Photocopy \$6.50. UCRL-2924

Chemistry Division quarterly report Dec 1954, Jan, Feb 1955. Univ. of Calif., Rad. Lab., Berkeley, Calif. Mar 1955. Contract no. W-7405-eng-48. 80p. Microfilm \$3.75, Photocopy \$10.25. UCRL-2932

The liquid ammonia chemistry of baron, by William L. Jolly. Univ. of Calif. Rad. Lab., Livermore Site, Livermore, Calif. Apr 1954. Contract no. W-7405-eng-48. 17p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$15. UCRL-4332

The synthesis and properties of styrene-d<sub>2</sub>, by Eugene R. Bissell. Univ. of Calif. Rad. Lab. Livermore Site, Livermore, Calif. Mar 1955. Contract no. W-7405-eng-48. 5p. Microfilm \$1.50, Photocopy \$1.50. UCRL-4472

### Engineering

Electromagnetic pump for liquid metals, by A. H. Barnes, F. A. Smith, and G. K. Whitham. Reactor Engineering Division. Argonne National Lab., Lemont, Ill. Jul 1949. Contract no. W-31-109-eng-38. 20p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$15. AECD-3431

A radiation shield block, by J. O. Billups. North American Aviation, Inc., Downey, Calif. n.d. Contract AT-11-1-GEN-8. 15p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$10. AECU-134

The current efficiency of medium temperature fluorine cells, by S. Katz, G. H. Montillon, T. Lee, J. J. Finley, and M. R. Hertz. K-25 Plant. Carbide and Carbon Chemicals Co., Oak Ridge, Tenn. May 1955. Contract W-7405-eng-26. 14p. Microfilm \$2.00, Photocopy \$2.75. K-1213

### Geology and Mineralogy

An investigation of the Chattanooga Black Shale of Tennessee as a source of uranium. Progress report - Jul 1, 1954 to Dec 31, 1954. Univ. of Tenn., Knoxville, Tenn. Jan 1955. Contract no. AT(40-1)-1337. 17p. Microfilm \$2.00, Photocopy \$2.75. ORO-138

### Health and Safety

Incorporation of orotic acid-2-C<sup>14</sup> and cytidine-C<sup>14</sup> into nucleic acids of normal and irradiated chick embryos, by Paul S. Lavik. Western Reserve Univ., Cleveland, Ohio. Apr 1955. Contract W31-109-eng-78. 14p. Microfilm \$2.00, Photocopy \$2.75. NYO-4918

Studies on the nature of the protective actions of  $\beta$ -mercaptoethylamine and cysteine against X-rays and a nitrogen mustard, by Paul R. Salerno and Hymer L. Friedell. Western Reserve Univ., Cleveland, Ohio. Apr 1955. Contract W31-109-eng-78.

11p. Microfilm \$2.00, Photocopy \$2.75. NYO-4921

Health Physics Division semiannual progress report for period ending Jan 31, 1955, by K. Z. Morgan. Oak Ridge National Lab. Carbide and Carbon Chemicals Co. May 1955. Contract no. W-7405-eng-26. 32p. Microfilm \$2.50, Photocopy \$5.25. ORNL-1860

Nucleoprotein fractions from various embryonic tissues. A comparison of physicochemical characteristics and biological activity in tissue culture, by Roman J. Kutsky, Rodes Trautman, Miriam Lieberman, and Relda M. Cailleau. Univ. of Calif. Rad. Lab., Berkeley, Calif. Apr 1955. Contract no. W-7405-eng-48. 15p. Microfilm \$2.00, Photocopy \$2.75. UCRL-2948

The relationship of the cell surface to electrolyte metabolism in yeast, by Aser Rothstein. The Univ. of Rochester. Apr 1955. Contract W-7401-eng-49. 72p. Microfilm \$3.75, Photocopy \$10.25. UR-382

The determination of fluoride in urine, by Frank A. Smith and Dwight E. Gardner. The Univ. of Rochester. Apr 1955. Contract W-7401-eng-49. 21p. Microfilm \$2.25, Photocopy \$4.00. UR-390

The acute toxicity and retention of orally administered polonium<sup>210</sup> in the rat, by R. J. Della Rosa, R. G. Thomas, and J. N. Stannard. The Univ. of Rochester. Apr 1955. Contract W-7401-eng-49. 11p. Microfilm \$2.00, Photocopy \$2.75. UR-392

Alkali metals area safety guide, by Preston L. Hill. Carbide and Carbon Chemicals Co., Y-12 Area, Oak Ridge, Tenn. Aug 1951. Contract no. W-7405-eng-26. 29p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$20. Y-811

### Instrumentation

A continuous airborne alpha contamination alarm and recorder, by C. L. Pleasance, T. R. Cartmell, and John F. Gifford. Hanford Atomic Products Operation, Richland, Wash. Jun 1953. Contract no. W-31-109-eng-52. 30p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$20. HW-26503

Instrumentation and Controls Division semiannual progress report for period ending Jan 31, 1955, by C. J. Borkowski. Oak Ridge National Lab. Contract no. W-7405-eng-26. 22p. Microfilm \$2.25, Photocopy \$4.00. ORNL-1865

Instruction manual for UCRL portable vapor detector model 1EPS, by C. S. Presenz. Univ. of Calif. Rad. Lab., Berkeley, Calif. May 1952. Contract no. W-7405-eng-48. 15p. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$15. UCRL-1853

Eddy-current bridge for measurement of skin losses, by Quentin A. Kerns. Univ. of Calif. Rad. Lab., Berkeley, Calif. Apr 1955. Contract no. W-7405-eng-48. 10p. Microfilm \$1.50, Photocopy \$1.50. UCRL-2946

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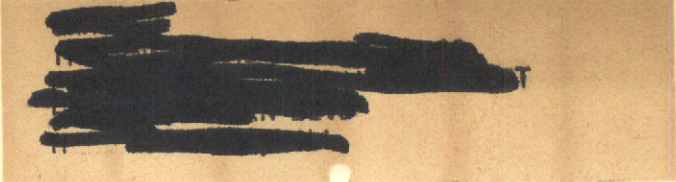
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