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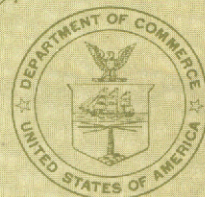
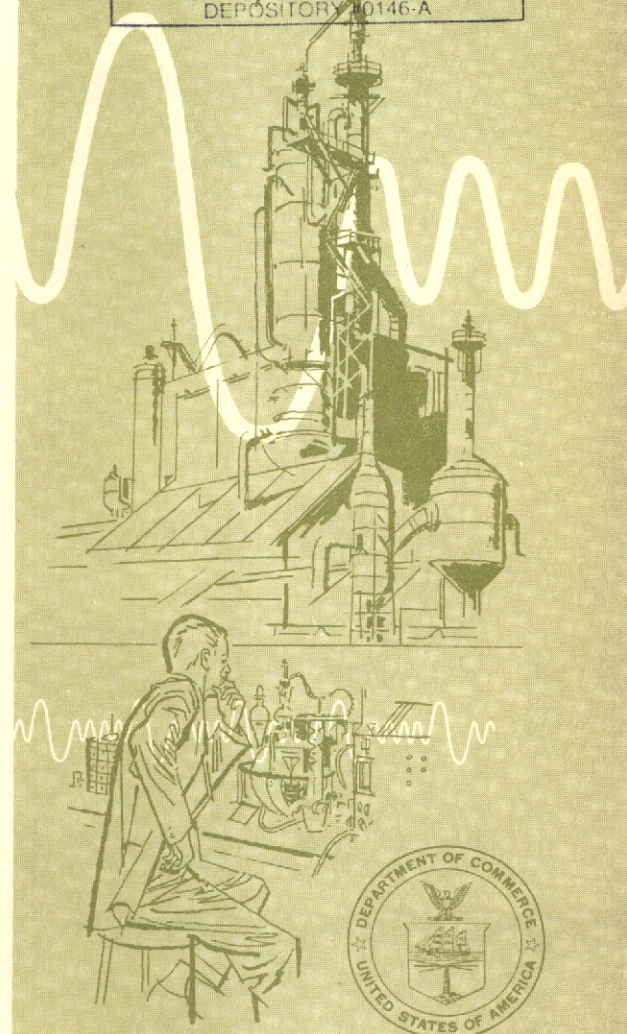
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## CARTOGRAPHY

Suitability factors of illustrative media, by Erwin Raisz. Virginia University. Virginia Geographical Institute, Charlottesville, Va. Apr 1954. 27p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 116854

The purpose of these tests was to check the suitability of drawing materials for various uses at small research centers. The aim was to design a simple practical set of tests to show the interaction of pens, inks, papers, and plastics under conditions simulating those in which cartographers and draftsmen actually use them, and to set up patterns for testing other like media. Contract Nonr-474(03), Project NR 088 007. Technical report no. 2.

## CHEMICALS AND ALLIED PRODUCTS

### Organic Chemicals

Conduction and breakdown in hexane, by W. B. Green. Massachusetts Institute of Technology. Laboratory for Insulation Research. Mar 1955. 40p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117140

Conduction currents in hexane, studied as a function of spacing, metal, and heat treatment of the electrodes over the field-strength range from 0 to 250 kv/cm, obey neither a field-enhanced thermionic emission nor the customary field emission relation. The most important factor determining the currents

appears to be a surface layer on the cathode. Contract N5ori-07801. MIT LIR TR 93.

Polydispersity and nucleation in aerosols. Progress report no. 2 covering the period Mar 1 to May 31, 1950, under Contract AF 19(122)-164, by Victor K. La Mer. Columbia University. Central Aerosol Laboratories, New York, N. Y. May 1950. 11p graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117364

Includes Final report on transmission method as a measure of polydispersity of sulfur hydrosols, by Mary Louise Young.

1. Aerosols - Dispersion
2. Aerosols - Nucleation
3. Hydrosols, Sulfur - Particle size - Determination
4. Sulfuric acid - Nucleating properties
5. Sodium chloride - Spectrographic analysis
6. Aerosols - Particle size - Measurement.

Preliminary observations on comparative tests of nitrocellulose fibers, by C. K. Hall and E. P. Csanady. U. S. Naval Powder Factory. Research and Development Dept., Indian Head, Md. Mar 1955. 26p photos, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117267

The type of grinding or pulping equipment, and the duration and severity of the grinding operation, affect the size and other physical characteristics of the fibers. Six lots of normal nitrocellulose with a nitrogen content of 12.0% were pulped to different degrees of fineness in two types of pulpers so that the effect of the resulting differences could be observed. Fineness, freeness, and microscopic examinations on nitrocellulose revealed no differences between the types of pulpers. NPF MR 92.

Some ethers of cellulose and starch, by Sven Sönnerskog. Royal Swedish Academy of Engineer-

ing Sciences. 1954. 73p photos, drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117119

Water soluble hydroxyethyl cellulose is obtained when one mole alkali cellulose is reacted with at least 2.75 moles ethylene oxide in the gaseous state or dissolved in an inert diluent such as aliphatic hydrocarbons. The lowest degree of substitution when water solubility occurs, is 1.0—1.2. The ethers obtained can be used for further reactions, for instance etherification with ethyl chloride, cyanoethylation with acrylonitrile or oxydation with nitrogen dioxide, to give cellulose derivatives of obvious technical interest. Chemistry including metallurgy series vol. 4, no. 4. Acta polytechnica 157.

Thermal decomposition of dinitrites. Part II: 1,3-Dinitrites, by Lester P. Kuhn, Robert V. Wright, Louis De Angelis. U. S. Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. May 1954. 6p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. FB 116961

The vapor phase decomposition of propane-1,3-dinitrite, butane-1,3-dinitrite, and pentane-2,4-dinitrite has been studied and the products have been identified. A secondary reaction occurs between the  $\text{NO}_2$  and the aldehyde which converts the former to NO and which destroys some of the latter. In mineral oil solution the reaction follows a different course and the dinitrite is converted to the diol. Dept. of the Army project no. 503-02-001. ORD project no. TB 3-0110. APG BRL M 784.

## Detergents

Properties of detergent solutions. Second technical report under Contract no. N6 onr 25130, Project no. NR 054 244: I. Adsorption of radioactive detergent. II. Heats of solution of detergents, by Eric Hutchinson, Lorraine Winslow, E. Wayne Tillay. Stanford University. Dept. of Chemistry, Stanford, Calif. Nov 1952. 75p drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116929

This study is concerned with two principal problems, viz. the adsorption of radioactive sodium tetradecyl sulfate at the air-solution surface, and determinations of the heats of solution of alkyl sulfates in water. For 1st report see PB 110773, for 3d report see PB 111459.

## Plastics and Plasticizers

Balloon materials evaluation. Technical report no. 5, 1 Sep 1954 to 30 Nov 1954, under Contract no. AF 19(604)-718, by L. W. Sheridan, C. D. Fitz and S. P. Jones. General Mills, Inc. Engineering Re-

search and Development Dept., Minneapolis, Minn. Dec 1954. 53p photos, drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117265

A study of thickness variation of nominal two mil polyethylene film was completed. Specifications were written for three mil polyethylene film. The strength of polyethylene seals, made on a new sealing machine, were evaluated. Methods of tensile tests for balloon material are discussed with special reference to Poisson's ratio. A Graves tensile tester was modified by the introduction of strain gauges and a conversion of the apparatus to a recording instrument. An attempt was made to examine the basic mechanism involved in methods of testing film toughness and a comparison was made between two different types of test equipment. Project 80013. AAF CRC TN 55-290.

Modeling of high-speed impact through the use of plastics, by M. E. Van Valkenburg. Utah. University. Dept. of Electrical Engineering, Salt Lake City, Utah. Mar 1955. 26p photos, diagr, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117266

The impact of high-speed plastic pellets on plastic targets has been studied for several materials. Metal-to-metal impacts have also been studied using pellets of various shapes and with passes ranging from 20 mg. to 5 grams. Technical report no. 3. OSR Project no. 409-040. Contract AF 18(600)-1217. Paper presented at the Rand High-Speed Impact Symposium, Santa Monica, Calif., Feb 1, 1955.

Study of the electromechanical, dielectric, and ceramic properties of ferroelectric sodium-cadmium-niobate. Final report, covering the period Jun 1, 1953 to May 31, 1954, under Contract Nonr 770(00), NR 385-408, by Marie Rose, Gerard T. Carter, Cameron G. Harmon, Jr., and Roland M. Gogolick. Horizons, Inc., Cleveland, Ohio. Jun 1954. 91p photos, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117134

The purpose of this investigation was to study the properties of the sodium-cadmium niobate ceramics (70-85%  $\text{NaNbO}_3 + 30-15\% \text{Cd}_2\text{Nb}_2\text{O}_7$  range) to determine the optimum materials and properties, and determine the necessary design constants. Specifically: (a) Investigation of the various ceramic preparation techniques, such as fluxing agents, firing cycle, and aging for reduction of dissipation factors. (b) Measurement of the important piezoelectric constants ( $d_{ij}$  and  $g_{ij}$ ), coupling factor ( $k_{ij}$ ) vs. temperature over range  $-30^\circ\text{C}$  to  $+100^\circ\text{C}$ . (c) Measurement of dielectric constant and dissipation factor from  $-40^\circ\text{C}$  to  $+300^\circ\text{C}$ .

Wärmebeständigkeit von Isolierstoffen (Heat strength of insulating materials), by G. Ehlers. Translated



and edited by F. A. Raven. Jan 1955. 26p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117032

Eighty insulating and plastic materials were subjected to a 90 day period of heat aging at temperatures ranging from 50° to 250°C. It was established that the change of weight occurring during this aging process permits conclusions concerning the temperature range to which the material in question provisionally remains effective for years in advance. The data on the heat strength thus obtained covering more protracted intervals of time were supplemented by mechanical and electrical measurements made on several of these materials in the course of aging. Translated from *Elektrotechnische Zeitschrift* no. 14, July 1954, p. 469-476. Report from Siemens-Schuckert Werke A. G., Nuremberg, Germany. NAVSHIPS T 570. STS 201.

## Chemical Engineering and Equipment

Levenstein HS plant - 1942 design. Ethylene unit. U. S. Chemical Corps. Research and Engineering Command, Army Chemical Center, Md. Nov 1942-1944. 68p and drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Photocopy and ozalid \$24.00. PB 117384

Contents: **Part I:** General information and requirements. - **Part II, section 2:** Bill of material. - **Part III:** Specification for installing and testing. - **Part IV:** Operating directive, ethylene unit. - **Appendix 4.** Analytical and test methods for control of plant products. - **Appendix 5.** List of factory supplies. - **Appendix 6.** List of raw materials used per unit, per day and per month. - **Appendix 7.** Consolidated cost estimate of equipment, installation, raw materials and product. - Drawings.  
1. Ethylene - Production.

## ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES

### Communication Equipment

Instruction book for Navy models ATE, ATF, ATG, ATH, and ARE, ARF, ARG, ARH aircraft radio equipment. Radio Corporation of America. RCA Victor Division, Camden, N. J. Dec 1942. 280p photos, fold drawings, diags (part fold), graphs, fold tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$35.25. PB 117124

Contract NXs-3405. Eng 208A.

1. Radio, Airborne - Manuals
2. ATE (Radio)
3. ATF (Radio)
4. ATG (Radio)
5. ATH (Radio)
6. ARE (Radio)
7. ARF (Radio)
8. ARG (Radio)
9. ARH (Radio)
10. RCA IB 25917-2.

Investigation of atmospheric radio noise. Progress report no. 6 under Contract no. AF 19(604)-876, 1 Oct-31 Dec 1954, by A. W. Sullivan, S. P. Hersperger, R. F. Brown, E. L. Aiton. Florida. Engineering and Industrial Experiment Station, Dept. of Electrical Engineering, Gainesville, Fla. Jan 1955. 42p photos, diagr, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116979

For 1st-2d reports see PB 113559 and PB 113764.  
1. Noise, Atmospheric - Measurement  
2. Simulators, Noise  
3. AAF CRC TN 55-164.

Restriction of communication over telling lines, by F. C. Frick. U. S. Air Force. Air Research and Development Command. Human Resources Research Laboratories, Bolling Air Force Base, Washington, D. C. May 1952. 9p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117048

1. Communication systems - Restrictive devices
2. AAF HRRL MR 22.

## Electronics

Analysis of a terminated-waveguide slot antenna by an equivalent circuit method, by Leopold B. Felsen. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Sep 1954. 66p diags, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116991

A symmetric rectangular slot cut in either the broad or narrow face of a rectangular waveguide is described in detail, both theoretically and experimentally. Contract no. AF 19(604)-890. PIB-333. PIB R-400-54. AAF CRC TN 54-390.

Analysis of the structural behaviour of guyed antenna masts under wind and ice loading. National Research Council of Canada. Division of Mechanical Engineering. Nov 1954. 123p photo, drawing, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.25, Photocopy \$16.50. Available for exchange from National Research Council of Canada, Ottawa, Canada. PB 116960

An analytic procedure is described for computing the distribution of bending moment, shear, axial load and deformation in the mast, and the loads in the guy wires, for a 3-level, 4-way guyed antenna mast erection subjected to wind load, ice accretion and loads applied by an antenna installation at the head of the mast. The computational procedure is described explicitly with examples, and permits the immediate use of normal computational aids. Contents: **Part I:** Structural analysis, by G. J. Schott and F. R. Thurston. - **Part II:** Wind loads, by P. J. Pocock. NRCC ME MM-238.

Backscatter field strength and field strength at distant points, by H. Pöeverlein. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Propagation Laboratory, Cambridge, Mass. Aug 1954. 18p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116987

A formula expressing the field strength of ionospherically reflected waves at distant points in terms of the observable backscatter field strength is obtained on the basis of a recently derived field strength law. Ionospheric data do not appear in the formula, but the unknown scatter coefficient of the ground does. AAF CRC TR 54-114.

Collinear antenna array with a section of two-wire line as coupling element, by Charles C. H. Tang. Harvard University. Cruft Laboratory. May 1954. 38p photo, drawing, diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117002

The problem of a symmetrical three-element collinear antenna array with a section of two-wire line as the coupling element between antennas is studied in order to obtain qualitatively the conditions under which the currents in the parasites are in phase with the currents in the driven antenna. The phase of the currents in the parasitic elements is reversed only when (1) the overall length of the section of two-wire line and the parasite is near an odd integral multiple of a quarter-wavelength, and (2) the position of the short-circuiting bar or tandem bridge on the section of line is about a quarter-wavelength away from the array. Contract N5ori-76, Task order no. 1, NR-078-011. HU CL TR 196.

Contouring equipment for round crystals. Final report, covering period 30 Mar 1950 to 15 Oct 1951, under Contract no. DA 36-039-sc-56, by William P. Wier, Jr. Bausch & Lomb Optical Co., Rochester, N. Y. Oct 1951. 60p photos. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.50. PB 111609

This report covers the development of a production process for the precision contouring of round quartz crystals. The function of the developed equipment is to grind a spherical bevel on flat round quartz crystals. The process is divided into three main divisions: blocking, machining, and measuring. A drawing and data list is appended. SIG Contract DA 36-039-sc-56, Final report.

Current distributions on cylinders excited by spherical waves, by Donald B. Brick. Harvard University. Cruft Laboratory. Dec 1954. 16p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117258

It is hypothesized that the transverse current distribution on a cylinder of infinite length and arbitrary

cross section due to a source in the far zone of the transverse cylinder dimension has only a local dependence on the incident field. It is also shown that the transverse distributions of the components of current which exist for normal incidence are identical to those on a larger cylinder at oblique incidence. Contract no. AF 19(604)-786. AAF CRC TN 55-171. HU CL SR 1.

Design study for control of wave resonances in resilient mountings. Engineering report no. 9 (Final) under Contract N7-onr-32904, Project NR-264-003, by Chester A. Arents. Illinois Institute of Technology. Dept. of Mechanical Engineering. May 1954. 24p photo, drawing, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117024

This study was developed to substantiate the supposition that a short  $d^*$ -distance will shift the wave resonance frequencies to a higher value; or that the  $d^*$ -distance can be such as to reduce the possibility of enemy detection to a minimum in the low frequency range. Cylindrical resilient mountings were designed and constructed and their transmissibility characteristics were obtained by laboratory tests. Alterations were made in the mounting to see how it might affect the  $d^*$ -distance in raising the frequency of the first wave resonance and its harmonics. For reports 5-6 see PB 113541 and PB 114929.

Determination of the scattering potential from the spectral measure function, by Irvin Kay and Harry E. Moses. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jan 1955. 62p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117016

By generalizing the method of Gelfand and Levitan it is shown that in many cases the potential can be obtained uniquely from the spectral measure function, if we specify the asymptotic behavior in some representation of the eigenstates of the total Hamiltonian  $H$  associated with the measure function.

Effect of discontinuities of dielectric constant on electrostatic fields near conductors, by S. N. Karp. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Dec 1954. 36p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116983

This paper contains an investigation of the effect of a local discontinuity of dielectric constant upon the singularity in field strength in the neighborhood of a geometrical singularity of a conductor. The work is compared to the electrostatic case. Contract no. AF 19(122)-42. NYU RR EM 71. AAF CRC TN 55-177.



Electromagnetic delay lines. Final report under Contract DA36-039-sc-5482, Feb 1951-Feb 1953, by H. G. Nordlin. Federal Telecommunication Laboratories, Inc., Nutley, N. J. Apr 1953. 197p photos, drawings, diagrs, graphs (1 fold), tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$7.25, Photocopy \$25.25. PB 117279

The objective of this development is to achieve a series of efficient, distributed-parameter, electromagnetic delay lines at several impedance levels with suitable band-pass characteristics up to approximately 100 megacycles per second. Functionally, these delay lines will also serve as flexible interconnecting cables between equipment or units requiring such delay. Specifically, three types of delay cables are desired, these to have impedances of 1000, 250, and 50 ohms, and time delays of 0.2, 0.1, and 0.05 microseconds per foot, respectively. Other details of the electrical and mechanical requirements set as a goal for this development project are given in Paragraph A of the appendix. Dept. of the Army project no. 3-26-00-602. Signal Corps project no. 32-2006-3 (C-0364202). SIG Contract DA36-039-sc-5482, Final report.

Excitation of surface waves in multilayered media, by Alan F. Kay. Technical Research Group, New York, N. Y. Oct 1954. 64p diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116989

The excitation of surface waves in three dimensional, multilayered media with arbitrary electromagnetic parameters is related to the characteristics of the source antenna. The source field is first represented as a continuous spectrum of plane and evanescent waves, a Fourier integral which converges in a half space. A solution for a single incident wave is obtained in the usual fashion by postulating reflected and transmitted waves in each layer, uniquely determined by the boundary conditions at each interface and the radiation condition at infinity. Superposition of the solutions for each wave in the spectrum of the source field then is proved to yield the total field solution. Examples of the excitation efficiency of dipoles and uniformly illuminated apertures are worked out. Some general results about the poles and residues for the cases of 1 and 2 interfaces are also given. Contract no. AF 19(604)-1126. Final report no. 1. AAF CRC TR 55-153.

Field representations in general cylindrical regions, I, by Nathan Marcuvitz. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Nov 1954. 28p diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116978

The knowledge of a complete set of vector modes in cylindrical waveguides containing inhomogeneous media not necessarily bounded by perfect conductors permits the transformation of Maxwell's field equations into ordinary transmission-line equations. The determination of the electromagnetic fields produced

by arbitrary currents in such regions is thereby reduced to a conventional network problem. Contract AF-19(122)-42. NYU RR EM-69. AAF CRC TN 55-160.

Field strength near the skip distance, by H. Poeverlein. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Propagation Laboratory, Cambridge, Mass. Jan 1955. 17p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117262

1. Ionosphere - F-layer - Ionization 2. Waves, Electromagnetic - Reflection - Ionosphere 3. Magnetic fields - Theory 4. AAF CRC TR 54-104.

Index of regular reports, texts and manuals. Massachusetts Institute of Technology. Radiation Laboratory. Jan 1944. 83p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117131

This index not only contains a list of the first 400 regular reports, but also of manuals no. 100-136, and texts no. 1-14, issued during about the period covered by these reports. It contains, in addition, an author index and an analytic subject index of these regular reports, manuals and texts. Contract OEMsr-262. MIT Rad Lab 400. NDRC Div 14.

Index of regular reports, special reports, manuals, and texts. Continuation. Massachusetts Institute of Technology. Radiation Laboratory. Nov 1945. 138p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75. PB 117132

Report 800 is a continuation of Report 400. It contains a numerical index, author index, and subject index of reports no. 401-799, special reports 1-62, manuals no. 137-230, and texts no. 15-18, issued during the period extending roughly from Sep 1943 to Sep 1945. The internal group reports are not included. Contract OEMsr-262. MIT Rad Lab 800. NDRC Div 14.

Investigation of high-power klystrons. Status report, 1 Dec 1953 to 28 Feb 1954. Stanford University. Microwave Laboratory, Stanford, Calif. May 1954. 15p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117109

1. Vacuum tubes, Klystron - Design 2. Vacuum tubes, Traveling wave - Theory 3. Waves, Electromagnetic - Generation 4. SU ML R 238.

Investigations and development of broadband single slot waveguide hybrid couplers. Final report, Dec 15, 1950 to Oct 30, 1952, under Contract no. DA 36-039-sc-5427, by H. J. Riblet. Microwave Development Laboratories, Inc., Waltham, Mass.

Oct 1952. 32p drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116997

This final progress report describes the work done in improving the design of broad band single slot waveguide hybrid couplers. In particular, design parameters and curves are given which enable one to design hybrid couplers which cover the frequency range 8200 - 14,100 mc/s in four steps. Three of these are in waveguide .450" x .900" inside dimensions while the fourth uses a waveguide whose internal dimensions are .622" x .311". Dept. of the Army proj no. 3-26-00-602. Signal Corps proj no. 32-2006-3. SIG Contract DA 36-039-sc-5427, Final report.

Low frequency propagation studies. Quarterly technical report no. 6, Sep 15 - Dec 15, 1954, under Contract AF 19(604)-795, by Robert A. Helliwell, Stanford University. Radio Propagation Laboratory, Stanford, Calif. Dec 1954. 24p photos, drawings, diags, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$4.00. PB 117019

Routine recordings of virtual height were made on 100 and 310 kc. Changes were made in the programming of the C-3 ionospheric recorder to facilitate measurement of sporadic-E reflection coefficient. New low-noise whistler receiving equipment was placed in operation. Improvements in the wind measuring equipment were completed and routine recordings were started. For 1st-4th reports see PB 113101, 113328, 114485, 115745. AAF CRC TN 55-165.

Method of improving the efficiency of klystrons, by Richard H. Winkler. Stanford University. Microwave Laboratory, Stanford, Calif. May 1954. 53p drawings, diags, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117108

A collecting device was designed, built, and tested which was capable of recapturing energy from the electron beam following the output gap of a klystron and feeding this energy into the pulse transformer such that the over-all efficiency of the klystron was increased. A single-electrode collector recaptured 23 per cent of the beam power. It was expected that a double- or triple-electrode collector would improve on this but the tests did not indicate any improvement. It is felt the difficulty is due to the extremely rapid spreading of a beam following the output gap. Contract N6onr 25123 (NR 073 361). SU ML R 235.

Microwave absorption studies, by Dudley Williams. Ohio State University Research Foundation, Columbus, Ohio. 1954. 69p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117234

This report summarizes work done on the absorption of microwave radiation under this contract and its predecessor, Contract W28-099-ac-179. The first technique used for observing absorption lines in the present study involved the use of a saw-tooth voltage wave or "sweep" of frequency  $f_s$  applied to the reflector electrode of a microwave oscillator tube in the manner initially described in this country by Good. The second spectrometer developed used double-reflector modulation. During the latter part of the work, a ground-based squarewave Stark modulation system was used. A Zeeman modulation spectrograph was used for studies of paramagnetic salts. Contract no. AF 19(122)-13, Scientific report 2. Appendix consists of reprints from Review of Scientific Instruments and Physical Review of articles on research under this contract. AAF CRC TN 55-275.

Microwave noise study. Quarterly report no. 3 under Contract AF 19(604)-1158, Aug 1, 1954 - Nov 1, 1954, by Winston M. Gottschalk and David Middleton. Raytheon Manufacturing Co. Research Division, Waltham, Mass. Nov 1954. 58p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116995

A fairly complete theory of the direct detection method of measuring the noise output of a microwave oscillator has been obtained. Measurements of the noise properties of several tubes have been made. Results of measurement on two commercial klystrons and two types of carcinotrons (backward-wave oscillators) are reported here. A thorough series of measurements of the electronic admittance of operating magnetrons has been made and will continue. These measurements are a study of the effects of space charge on tube noise and the interaction of electron swarms and electromagnetic fields in crossed electric and magnetic fields. AAF CRC TN 55-159.

Multicolor storage tube, by Sidney T. Smith. Hughes Aircraft Co., Culver City, Calif. Aug 1954. 14p drawings, diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116957

Multicolor storage tubes have been made by modification of direct-viewing storage tubes. A perforated mask placed between the electron guns and storage surface allows electrons from one writing gun to strike only certain storage-surface areas which are in register with a color phosphor on the viewing screen. Likewise, the perforated mask allows electrons from the second writing gun to strike only certain other storage surface areas which, in turn, are in register with a second color phosphor printed on the viewing screen. Thus, simultaneous writing and storage of electrical signals in two or more colors can be achieved. Contract no. AF 33(616)-2177, Project no. 4156, Task no. 41748. Summarizes work from 1 July 1953 to 31 Aug 1954. AAF WADC TR 54-538.

Note concerning a gyroelectric medium, by Charles H. Papas. California Institute of Technology. Electrical Engineering Dept., Pasadena, Calif. May 1954. 17p diagr. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 117105

The fact that a homogeneous electron gas when immersed in a uniform magnetostatic field becomes electrically anisotropic, i.e., gyroelectric, is placed in evidence. The permeability of the gas remains equal to that of free space, but its dielectric constant is transformed to a dyadic or tensor upon application of the magnetostatic field. The properties of the dielectric tensor are such that a plane electromagnetic wave propagating through such a medium undergoes a Faraday rotation. This rotation is the dual of the Faraday rotation produced by gyromagnetic media. The dielectric tensor of the electron gas is deduced and the Faraday rotation constant is calculated. Technical report no. 4 under Contract Nonr 220(14), NR 071-262.

Prediction of the response of a smoothing circuit whose input is known only at discrete points, by G. Trevor Williams. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1954. 8p diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.  
PB 116963

Dept. of the Army project no. 503-03-018. ORD project no. TB 3-0102.  
1. Circuits, Smoothing - Theory 2. APG BRL M 806.

Radiation of electromagnetic signals from aircraft, by J. T. Bolljahn. Stanford Research Institute, Stanford, Calif. Dec 1954. 18p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 116993

Brief descriptions are given of the various investigations that have been undertaken on the research program conducted under Contracts AF 19(604)-266 and AF 19(604)-1296. The individual descriptions are grouped under four general categories, namely: studies of particular antenna types, experimental studies, theoretical studies, and instrumentation. The relationship of this work to the other work of the Radio Systems Laboratory and to the aircraft antenna development program of the Air Force is discussed. Contract AF 19(604)-266. SRI Proj 591, Final report. AAF CRC TR 55-152.

Radiation pattern synthesis with annular apertures, by Robert W. Bickmore. California University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. May 1954. 52p photos, drawings, diagrs, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.  
PB 117107

Part 1 of this paper treats with the radiation of aper-

tures made up of discrete annular elements and an analytical determination of the required excitation of these elements. In Part 2 the actual production of this excitation is considered in some detail. Report no. 26 on Contract N7 onr-29529. UC IER Series 60, Issue 112.

Reflection and refraction of electromagnetic waves by a dielectric slab between dielectric media, by W. Elwyn Williams. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Dec 1954. 18p diagr. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 116982

The general problem considered is the reflection and refraction of an arbitrary electromagnetic wave by a dielectric slab between two different media. Explicit expressions are obtained for the radiation field in terms of the incident radiation field. These expressions are valid when the point of observation is not too near the plane interface. The method is extended to cover the case of one surface deviating slightly from a plane. Contract no. AF 19(122)-42. NYU RR EM-70. AAF CRC TN 55-175.

Research in physical electronics. Quarterly report no. 9, under Contract no. AF 19(604)-524, for the period 15 Sep 1954 - 15 Dec 1954, by Ladislav Goldstein and Heinz von Foerster. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Electron Tube Research Section. Jan 1955. 48p photos, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 116980

Continuation of research under Contract AF 19(122)-5 and Contract AF 19(600)-23.  
1. Oscillography, High speed 2. Electrons - Collisions 3. Electron beams - Electromagnetic effects 4. Resonance, Electromagnetic 5. AAF CRC TN 55-166.

Research on electromagnetic reflections from surfaces of complex shape, by R. D. Kodis. Harvard University. Contract AF 19(604)-786. Order parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Report no. 5. Sep 1954. 21p diagrs, graph. Microfilm \$2.25, Photocopy \$4.00. PB 116977

1. Waves, Electromagnetic - Scattering  
2. Green's function 3. Cylinders, Circular - Reflective effects 4. Optics, Geometrical - Theory 5. AAF CRC TN 54-383.

○ Report no. 6. Dec 1954. 4p. Microfilm \$1.50, Photocopy \$1.50. PB 116994

1. AAF CRC TN 55-153.

Research services and investigations on subminiature multielement diodes and bistable elements for microtronic circuits. Final report under Contract AF 19(604)-55, for period Oct 23, 1953 to Dec 23, 1954, by E. B. Dale, M. W. Aarons, M. Pobere-skin, J. E. Gates and C. S. Peet. Battelle Memorial Institute, Columbus, Ohio. Dec 1954. 22p photo, diagr, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117104

The first 2 years' work dealt principally with the preparation of germanium single crystals of known and reproducible impurity content and with basic experiments relating to the electrical characteristics of point-contact devices. The third year's work has been principally concerned with the mechanical aspects of point-contact devices, and the studies have been extended to comprehend the related gold-bonded devices. Special techniques have been developed for using radioactive tracers to follow the transfer of impurities during forming and bonding. Work on the growth of silicon single crystals has also been carried along, as has a program of development of methods for obtaining specifically doped gold wire of otherwise high purity. For 7th-9th and 1st summary reports see PB 112039, 113558, 114246, and 115054. AAF CRC TR 55-150.

RF problems of multilobe radars, by K. O. Holmes. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. RF Components Laboratory, Cambridge, Mass. Dec 1954. 15p photos, diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117235

Some unique rf problems have resulted from the experimental multilobe radars constructed at the Air Force Cambridge Research Center. These problems in general, concern the generation and/or control of various rf signals that are associated with the local oscillator. Brief descriptions of several of these problems and their solutions are presented. AAF CRC TR 54-116.

Services and materials for laboratory investigation of equipment and techniques for crystals. Final report under Contract no. W36-039-sc-32153, modification no. 4, covering the period Jun 1, 1946 to Apr 15, 1949, by Clifford Frondel, Cornelius S. Hurlbut, Richard Collette, Wilbur M. Draisin. Baird Associates, Inc., Cambridge, Mass. Apr 1949. 42p photos, drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117147

The purposes of the investigation have been: (1) To synthesize tourmaline, and so far as pertinent to the work to define the regions of temperature, pressure and composition in which tourmaline is stable; (2) To develop means whereby synthetic tourmaline crystals of sufficiently large size for industrial applications can be obtained; and (3) To develop methods for the salvage of large natural crystals of tourmaline that

are worthless because of cracks and flaws. The methods of synthesis employed have principally involved crystallization from water solutions contained in steel pressure bombs at temperatures up to 650°C and pressures ordinarily in the range from 1500 to 5000 pounds per square inch. We have developed temperature regulating apparatus, various types of steel pressure bombs, and electric furnaces for heating the bombs. Dept. of the Army project: 3-99-11-022. Signal Corps project: 142B. SIG Contract W36-039-sc-32153, Final report. See also PB 102233 for final report on earlier contract.

Short electrical breakdowns. 2: Radiation time-lags in short oscillating spark discharges, by Heinz Fischer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. RF Components Laboratory, Cambridge, Mass. Sep 1954. 17p photos, diagrs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116986

Systematic investigations in the oscillating spark discharge prove that the radiation maximum in the unresolved spectrum occurs approximately at the time when the spark current,  $i$ , has its maximum. Radiation time lags,  $\Delta t_1$ , as they are observed, quite frequently result from improper techniques of current measurements due to the influence of  $di/dt$ . For Part 1 see PB 116505. AAF CRC TR 54-100A.

Some spin wave properties of ferrimagnetic and antiferromagnetic simple cubic crystals, by J. S. Kouvel and Harvey Brooks. Harvard University. Cruft Laboratory. May 1954. 51p diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117001

The main purpose of this paper is a semiclassical spin wave treatment of certain "bulk" properties (namely, the specific heat and saturation magnetization at low temperatures) of a simple cubic ferromagnetic or antiferromagnetic crystal; the results will also be amenable to at least qualitative comparison with experiment. For the sake of simplicity, this study is confined to a simple cubic single crystal which we postulate to have a single axis of magnetic anisotropy (along a cube edge) instead of the cubic anisotropy generally associated with such a crystal. The effects of a uniform magnetic field applied along the anisotropy axis are studied for both ferromagnetic and antiferromagnetic cases; moreover, for the latter case, the situation in which the field is applied perpendicular to the anisotropy axis is also considered. Contract N5ori-76, Task order no. 1, NR-071-011. HU CL TR 198.

Spring-finger reactive post for waveguide, by A. C. Hudson. National Research Council of Canada. Radio and Electrical Engineering Division. Sep 1954. 14p drawings, diagrs, graphs. Available from National Research Council of Canada, Ottawa, Canada. \$.10. PB 116826



1. Wave guides, Rectangular - Design - Canada
2. Wave guides, Rectangular - Posts - Canada
3. Wave guides, Rectangular - Components - Canada
4. NRCC 3409 5. NRCC ERB 345.

Study of the generation and detection of electromagnetic waves in the millimeter wave region. Report no. 2 under Contract AF 19(604)-1115, Sep 1, 1954 to Nov 30, 1954, by J. H. Rohrbaugh. New York University. Washington Square College of Arts and Science. Physics Dept. Nov 1954. 14p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116990

This report contains: 1. The result of preliminary experiments on a modification of the procedure for making in-guide bolometers. 2. The current status of the spectrometer reconstruction. 3. Some data regarding the effect of variations in magnetic field orientation on the harmonic production of a magnetron. 4. The present status of the ultra-high-speed spark source experiment. AAF CRC TN 54-387.

Thermodynamics and statistics of the electron gas. Part 3: Thermodynamics of the electron flow. Part 4: Determination of the electron temperature, by T. N. Chin, Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Electron Tube Research Section, Urbana, Ill. Jun 1954. 86p photos, drawings, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117074

Contract N6-ori-71, Task XIX, NR 073-162.  
 1. Flow, Electron 2. Electrons - Temperature  
 3. Electrons - Motion - Theory 4. Electrons - Temperature - Measuring equipment 5. Flow, Anisotropic 6. Flow, Isotropic 7. Gases, Ionized - Dynamics 8. Gases, Ionized - Temperature - Measurement.

UHF filtering networks, by D. E. Mode. Lehigh University. Institute of Research, Bethlehem, Pa. Contract AF 19(604)-962. Order parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Scientific report no. 1, 1 Aug 1954 to 31 Oct 1954. Nov 1954. 29p diagrs, graph. Microfilm \$2.25, Photocopy \$4.00. PB 117236

Progress is reported on a system of hybrid networks and a dispersive element in a scheme for detecting a small shift in the frequency of a microwave carrier in the 3000 Mc. range. The idea of using the sidebands resulting from amplitude modulation of a high frequency signal generator has been investigated and found workable. A scheme involving a klystron oscillator modulated by a low frequency signal is reported. Limitations on the number of dispersive sections which may be employed in a filter structure are discussed. A bibliography of work in this general field is included. AAF CRC TN 54-375.

Scientific report no. 2, 1 Nov 1954 to 31 Jan 1955 Jan 1955. 36p photos, drawings, diagrs, graphs, tables. Microfilm \$2.50, Photocopy \$5.25. PB 117237

A 24 section band-pass filter has been employed as the dispersive network in one arm of the modulated klystron and it is indicated that this is about the practical limit for coaxial structures. The microwave band-pass filter program has been started and as it appears that this activity will have to contain the entire program, some mathematical work has been done. One set of computations showing the relation between bandwidth, center frequency, and skirt selectivity are included in this report. These are all expressed in terms of the loaded Q's of the elements of the filter. AAF CRC TN 55-174.

U. S. war surplus electronic equipment; a bibliography of radio conversion articles. Revised. U. S. Office of Technical Services. Nov 1951. 13p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116944

Compilation based on the original version prepared by Elizabeth and J. Henry Lugg for the Madison Public Schools, Madison, Wisconsin.

1. Electronic equipment - Bibliography 2. Radio equipment - Bibliography.

Visual message presentation. Scientific report no. 2 under Contract no. AF 19(604)-1039, Item I, Sep 1, 1954 through Feb 28, 1955, by S. H. Chang, H. L. Stubbs, L. O. Dolansky, L. G. Jones, J. Wiren, H. S. Littleboy, C. R. Howard. Northeastern University. Electronics Research Laboratory, Boston, Mass. Feb 1955. 71p photos, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117208

The research is directed toward the specification of important parameters of speech for visual-message purposes and for use in speech-compression systems. Electronically controllable low-pass and high-pass filters, using transistor negative-impedance converters, have been constructed for tracking the first and second formants of vocalic sounds. AAF CRC TN 55-178.

## Generators, Motors, Transmission

Application of Wheeler's formula to inductively coupled coils, by A. C. Hudson. National Research Council of Canada. Radio and Electrical Engineering Division. Sep 1954. 16p diagrs, graphs. Available from National Research Council of Canada, Ottawa, Canada. \$.10. PB 116819

1. Coils, Inductance - Design - Canada 2. Transformers, Radio frequency - Inductance - Canada  
 3. Wheeler's formula (Inductively coupled coils) - Canada 4. NRCC 3408 5. NRCC ERB-342.

Frequency meter adapter, by C. W. McLeish. National Research Council of Canada, Radio and Electrical Engineering Division. Mar 1954. 21p photos, drawings, diagrs. Available from National Research Council of Canada, Ottawa, Canada. \$.25. PB 116834

1. Adapters, Frequency meter - Design - Canada
2. Radio receivers - Adapters - Design - Canada
3. NRCC ERB-349 4. NRCC 3476.

Low-frequency high-power duplexer, by K. O. Holmes and J. Babakian. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate, Cambridge, Mass. Dec 1954. 12p photo, drawing. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116956

A duplexer using gas-filled glass envelopes in large coaxial cavities for the TR and ATR tubes has been designed and successfully used in the radar operating at a frequency of approximately 220 Mcps at a peak power of about 4 megawatts. An auxiliary TR cavity is used to obtain the attenuation necessary for the complete protection of the receiver. AAF CRC TR 54-117.

#### Miscellaneous

Annual report, 1954. National Research Council. Division of Engineering and Industrial Research. Conference on Electrical Insulation. Mar 1955. 84p photos, diagrs, graphs, tables. Available from NAS-NRC Publications Division, 2101 Constitution Ave., N. W., Washington 25, D. C. \$3.00. PB 116943

1. Benzene - Electrical properties
2. Gases - Electrical properties
3. Rubber, Synthetic - Electrical properties
4. Gases - Breakdown
5. Crystals, Alkali halide - Dielectric properties
6. Crystals, Barium titanate - Dielectric properties
7. Insulating materials - Radiation effects
8. Dielectrics, Fluid - Conductivity
9. Insulation, Electrical
10. Hydrocarbons, Liquid - Breakdown
11. Dielectrics - Losses - Measuring equipment
12. NRC 368.

Rules of similitude for magnetic amplifier systems, by L. A. Finzi and H. L. Durand. Carnegie Institute of Technology. Dept. of Electrical Engineering, Pittsburgh, Pa. Oct 1951. 5p diagr, graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116940

Rules of similitude are established which allow the prediction of the behavior of magnetic amplifier systems from suitable tests performed on an existing amplifier used as a model or analogue computer. The method includes cases in which model and prototype have different core materials and different circuitry. The study yields a tool for design purposes and supplies a basis for a rational classification and comparison of seemingly different amplifier circuit

arrangements. Technical report no. 9, under Contracts N7 onr 30306 and 30308, Project no. 075-272 and 275.

Technical report under Contract N8onr-66904.

Amherst College. Observatory, Amherst, Mass. May 1954. 36p photos, drawing, diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117003

In section 1 of the report is a description of the mechanical details of the Amherst College photoelectric photometer. In section 2 is a description of the measuring system which permits determining photocurrents either with a zero offset method or with the conventional measurement of voltage drop across a large input resistor. Section 3 includes a discussion of the design details of various power supplies and associated electronic apparatus. In section 4 is a discussion of the design of the D. C. amplifier used in the measuring system.

## FOOD AND KINDRED PRODUCTS

Possibility of utilizing high-energy cathode rays for the preservation and for complete sterilization of fruits, vegetables, and meats, to increase the present storage life of these commodities. Final report for the period Jul 1, 1953 through May 31, 1954, on Contract N140s-46199B, by Bernard A. Proctor, John T. R. Nickerson, and Samuel A. Goldblith. Massachusetts Institute of Technology. Dept. of Food Technology. May 1954. 57p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117196

1. Food - Radiosterilization
2. Food - Preservation - Effects of radiation
3. Radiation, Ionizing - Sterilizing effects.

## FUELS AND LUBRICANTS

Evaluation of corrosion inhibitors for use in aircraft fuels, by J. A. Krynitsky and R. L. Shuler. U. S. Naval Research Laboratory. Feb 1955. 32p photos, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00. PB 111624

The tests performed included the determination of ferrous corrosion inhibition activity, water extractability, fuel solubility, ash content, water tolerances, and compatibilities with gum inhibitors, ignition modifiers, gasoline dyes, and other inhibitors. NRL R 4496.

Ignition studies. Part IV: Relation of minimum ignition point to other ignition phenomena, by John W. Crellin, J. Enoch Johnson, and Homer W.

Carhart. U. S. Naval Research Laboratory. Jan 1955. 15p graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50. PB 111614

The minimum ignition point, defined as the lowest temperature for either cool flame ignition or hot ignition in oxygen, has been determined for a number of pure hydrocarbons and primary reference fuels. These ignition values are correlated with other available ignition criteria such as cetane number, octane number, cool flame position, and ignition delays in a constant-volume bomb. Differences due to hydrocarbon type are explained on the basis of temperature and pressure dependence. For Parts 1-3 see PB 106126, 111215, 111446. NRL R 4476.

Investigation of dielectric methods for the measure- of sea water in fuel oil, by T. D. Callinan, R. M. Roe, and J. B. Romans. U. S. Naval Research Laboratory. Feb 1955. 24p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117148

The dielectric constant, percent power factor, dielectric loss factor, and conductivity of a number of boiler fuels were evaluated as a means of measuring the sea water content of Navy Special fuel oils on shipboard. The necessity of using a dry reference sample is emphasized. NRL R 4488.

## HIGHWAYS AND BRIDGES

Lateral stability of bridge arches braced with transverse bars, by Lars Ostlund. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1954. 124p photos, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.25, Photocopy \$16.50. PB 117066

Accurate calculation of this stability is extremely complicated in practical work and it has therefore been the practice to be content with more or less approximate methods of calculation. The assumptions on which such approximate methods are based affect the result of the calculations and it has been found that the requisite rigidity of the arches may vary within wide limits, depending on the conditions in each particular case. Civil Engineering and Building Construction series vol. 3, no. 2. Acta polytechnica 160. Sweden. Kungl. Tekniska Högskolan. Handlingar Nr 84.

Parking requirements in zoning ordinances, by David R. Levin. Highway Research Board. 1955. 64p tables. Available from Highway Research Board, 2101 Constitution Ave., N. W., Washington 25, D. C. PB 117031

Supplement to Bulletin 24.

1. Automobiles - Parking
2. Zoning regulations
3. HRB Bul 99.

Shopping habits and travel patterns, by Alan M. Voorhees, Gordon B. Sharpe and J. T. Stegmaier. Presented at the thirty-fourth annual meeting, Jan 11-14, 1955. Highway Research Board. 1955. 26p photo, graphs, tables. Available from NAS-NRC Publication Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$.75. PB 117098

Supplement to Special Report 11, "Parking as a Factor in Business." (PB 113730).

1. Automobiles - Parking
2. Business centers - Decentralization
3. Shopping centers - Planning
4. Traffic control - Methods
5. HRB SR 11-B
6. NRC 273b.

Stabilization of soils. Presented at the thirty-third annual meeting, January 12-15, 1954. Highway Research Board. 1955. 57p photos, drawing, maps, diagr, graphs, tables. Available from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$.75. PB 116905

Contents: Effect of petrographic variations of southwestern Iowa losses on stabilization with portland cement, by R. L. Handy, D. T. Davidson, and T. Y. Chu. - Stabilization of bank-run gravel by calcium chloride, by Floyd O. Slate and A. S. Yalcin. - Strength of soil-cement as a function of degree of mixing, by Clyde N. Baker, Jr. HRB BUL 98. NRC 346.

## INSTRUMENTS

Calculation of the magnetic field in the ferromagnetic layer of a magnetic drum, by Olle Karlqvist. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1954. 29p diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117067

The magnetic field is calculated as having finite air-gaps in the recording head and finite permeability in the layer. A linear potential distribution between the corners of the recording head is found to be a satisfactory approximation for calculating the field and gives explicit expressions for the field. The results can be used to analyze the influence on the field of permeability and the geometric shape of the head. Sweden. Kungl. Tekniska Högskolan. Handlingar Nr 86. Acta polytechnica 161.

Computer components fellowship no. 347. Quarterly report no. 4, second series, Jul 1, 1954 to Sep 30, 1954, under Contract CLN AF 19/604/-943. Mellon Institute of Industrial Research, Pittsburgh, Pa. Sep 1954. 92p photos, drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117013

For Quarterly reports no. 1-3, second series, see PB 114377, PB 114976, PB 115560. Contents: I: Printed circuits via xerography, by Martin N. Haller.

II: Metal oxide and other insulating films, by A. Milch and R. T. Steinback. - IV: Transparent semi-conducting oxide films, by F. A. Schwertz and R. T. Steinback. - V: The frequency- and voltage-dependence of the brightness of electroluminescent phosphors, by F. A. Schwertz and J. J. Mazenko. - VI: Bistable optical elements, by A. Milch. AAF CRC TN 54-384.

Design and development of an estuarine current meter. Final report under Contract Nonr-248(37), ONR Project no. NR 083-038/7-28-52, by Foster H. Middleton and Wen-Hsiung Li, Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. May 1954. 69p photos, diags, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00.

PB 117004

The purpose of this project was to study various means for measuring the velocity of water, and to build one or more instruments that would accomplish the job according to the specifications of the contract. The two most important special specifications for this instrument were that it should operate unattended for a period of one week, and that its accuracy should be at least one per cent of full scale over the entire velocity range. The two general approaches to the problem that seemed most promising during this study program were the ultrasonic transmission method and the drag-disc method.

Design criteria for low-level second-harmonic magnetic modulators, by Earl Justin Kletskey. Massachusetts Institute of Technology. Servomechanisms Laboratory. Electronic Nuclear Instrumentation Group, Jun 1953. 60p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.

PB 117274

Major difficulties are encountered when d-c amplifiers are used to amplify low-level low-frequency signals to a frequency permitting conventional a-c amplification. This paper presents an analysis and design criteria for the magnetic modulator. Contract N5ori-07876, NR-025-164, Technical report no. 1. D.L.C. Project no. 6986. Based on author's thesis.

Development of E24 and E32 lightweight air compressors, by F. H. Whitney. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Dec 1954. 91p photos, drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75.

PB 117209

The object of this project is to develop a lightweight portable air compressor that can be easily man-packed in the field, and which has sufficient capacity for servicing portable and auxiliary mechanized flame throwers. The object of the work described in this report was to modify a commercial item or to design and/or develop a new item which satisfies the military characteristics for a lightweight portable

air compressor. Project 4-09-02-011. Appendix A: Recommendations for reduction of vibration in 4-cylinder air compressor, and other design changes (Study conducted at Cornell University at request of Bradley-Edlund Corp. of Courtland, N. Y., 4 Jan 1951). - Appendix B: Summary of data on tests conducted at Wright Field on the Walter Kidde type 1010 engine-driven air compressor. - Appendix C: Typical data sheet of pre-engineering tests conducted on Kidde compressor, Army Chemical Center, Md., 2 Nov 1950. - Appendix D: Report of conference held at Chemical Corps Chemical and Radiological Laboratories with representatives of all interested agencies, on further procedure for lightweight air compressor, Nov 1950. - Appendix E: Commercial engines and compressors considered as candidates for the E24 and E32 lightweight compressors. CC CRL R 342.

Digital differential analyzer CRC-105, by Barbara C. Bilsborough. U. S. Aberdeen Proving Ground. Ballistic Research Laboratory, Aberdeen, Md. Aug 1954. 51p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.

PB 116964

Part I deals with the type of operation one would like to achieve in a digital differential analyzer and gives a general idea of how the operation may be brought about. Part II is an attempt to explain the essential theory of the machine's operation from a logical rather than an engineering standpoint. It is designed to cover the theory only to the extent necessary or interesting to the coder. Part III deals in detail with various aspects of the preparation of problems and includes the complete coding of a sample problem. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007. APG BRL M 799.

Dynamic spectrum analyzer for Sacramento Peak, by Donald H. Menzel, James W. Warwick and Robert S. Lawrence. Harvard University. Harvard College Observatory. Solar Dept., Cambridge, Mass. Jan 1955. 20p photos, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116984

Contract AF 19(604)-146.

1. Antennas, Paraboloid - Design 2. Antennas, Rhombic - Design 3. Spectrum analyzers (RF) 4. Solar flares - Relation to radio noise 5. HU HCO SR20 6. AAF CRC TN 5-270.

Improved method for testing in torsion impact, by J. D. Corrie and J. M. McCaughey, Jr. U. S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Jun 1954. 22p photos, drawings, diags, graphs. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75.

PB 111613

A method is presented for obtaining torsion impact data by using the newly developed Kinetic Torsion Tester. With this method, it is possible to obtain



energy required to fracture, degrees of twist required to fracture, maximum torque, and a continuous record of torque vs time for each specimen tested. The fracture obtained is of the pure shear type. Project TS 1-16. FAL R 1211.

ORDVAC reversing leapfrog tests, by A. H. Payne. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1954. 16p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116971

Two new memory tests for the ORDVAC are described, one diagnostic, the other not. These tests work on an alternating background of ones or zeros in testing the memory, and it has been found that they require a more careful adjustment of the memory than either Leap III or the "Reversing" test. Flow charts and detailed coding are included. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL M 841.

"Pin-oscillograph" for measurement of detonation velocity, by E. F. Pound. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. May 1954. 8p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117021

An oscillograph and a typical pin setup used for detonation velocity measurements are described. This oscillograph displays a "zig-zag" sweep with small negative vertical time calibration markers. Contract no. N7-onr-45107, Project no. 357 239, Technical report no. XXXIII.

Simple method for the production of homogeneous water drops down to 1 micron radius, by Duncan C. Blanchard. Woods Hole Oceanographic Institution, Woods Hole, Mass. May 1954. 10p photo, drawing, graph. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117200

This report describes a simple method for the production of homogeneous water drops down to 2 microns diameter by forcing air through fine tips produced by drawing out a length of glass capillary tubing. The size of the bubble is a function of the bore diameter. Photographs are shown of the drops produced and their remarkable uniformity in size. The size of the drops is controlled by the bubble size, the larger bubbles producing the largest drops. Contract Nonr-798(00), NR-085-001, Technical report no. 8. Unpublished manuscript. WHOI Ref 54-27.

Simple modification of a standard centrifuge for use at temperatures up to 500° C with temperature measurement during operation, by J. R. Findlay and J. N. Gregory. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1954.

8p drawings, tables. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$40. PB 116941

1. M.S.E. "Minor" (Centrifuge) 2. Centrifuges - Design - Gt. Brit. 3. Centrifuges - Temperature - Measurements - Gt. Brit. 4. Atomic power - Research - Gt. Brit. 5. AERE C/M 217.

Stanford Mark II linear accelerator, by R. F. Post, N. S. Shiren, and K. L. Brown. Stanford University. W. W. Hansen Laboratories of Physics. High Energy Physics Laboratory, Stanford, Calif. May 1954. 18p diagr, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117151

The development of the Mark II electron linear accelerator, the second linear accelerator constructed at Stanford University, is described. Primarily intended to provide an intermediate milestone on the way toward the eventual construction of a 1-Bev machine, it was designed to be a prototype of one of the many sections of the larger machine. Electron energies up to nearly 40 Mev have been obtained, and peak beam currents of about 10 milliamperes in 1-microsecond pulses. Contract no. N6onr-25116, NR 022 026. SU HEPL 11.

Survey of high-speed printers for digital computer output, by Robert J. Rossheim and Nelson M. Blachman. U. S. Office of Naval Research. Mathematical Sciences Division. Aug 1952. 20p photos, drawings, diags, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$50. PB 111615

Some current and anticipated applications of automatic digital computers require the printing of computer output at high speeds comparable with the speed of generation of output. If it is required to increase the printing speed by a factor of 10, 100, or 1000, one must look to the recent developments in high-speed printing. Some basic considerations to keep in mind are the printing device, the space available, the delivery allowable, and the reliability required. The accompanying table presents detailed characteristics of the various printers discovered to be available or under development. It is intended to make possible the comparison of high-speed printers with regard to their suitability from the point of view of the foregoing considerations.

Symposium on automatic programming for digital computers, Navy Mathematical Computing Advisory Panel, 13-14 May 1954. U. S. Office of Naval Research. May 1954. 159p photos, diags, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$4.00. PB 111607

Contents: Automatic programming: Definitions, by Grace Murray Hopper. - Analytical differentiation by a digital computer, by Harry G. Kahrmanian.

Compiler method of automatic programming, by Nora B. Moser. - Editing generators, by John Waite. - New York University compiler system, by Roy Goldfinger. - Application of automatic coding to logical processes, by Frances E. Holberton. - The M.I.T. systems of automatic coding: Comprehensive, summer session, and algebraic, by Charles W. Adams and J. H. Laning, Jr. - Interpretive routines in the ILLIAC library, by David E. Mueller. - Planning universal semi-automatic coding, by Saul Gorn. - Automatic programming and its development on the MIDAC, by J. H. Brown and John W. Carr, III. - General discussion, by Stanley Gill. - Automatic programming on the Burroughs Laboratory computer, by Hubert M. Livingston. - IBM speed-coding and other automatic-programming systems, by John W. Backus and Harlan Herrick. - The LMO edit compiler, by Merritt Elmore. - Programming for the IBM 701 electronic data processing machine with repetitively used functions, by Allen Keller and Richard A. Butterworth. - Discussion of the Keller-Butterworth paper. - Summary, by Grace Hopper. - Bibliography.

Theory of moist air heat exchanger, by Gösta Brown. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1954. 34p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117110

In heat exchangers, in which humid air is cooled or air is heated and the heat exchanger's surface is kept moist, part of the heat is carried away by water which is condensed or evaporated. A method is indicated for the calculation of such heat exchangers, on the basis of the values which hold good when the heat exchange takes place in the absence of condensation and evaporation. Physics and applied mathematics series, vol. 2, no. 11. Sweden. Kungl. Tekniska Högskolan. Handlingar nr. 77. Acta polytechnica 147.

Triple-address coding for the NAREC, by J. S. Seward. U. S. Naval Research Laboratory. Mar 1955. 15p diagr, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117259

An order code has been devised which provides orders to compute directly several of the commonly used functions. The triple-address form of code has been used so that each instruction specifies a complete step. Since the computer cannot interpret these instructions directly, an interpretive routine is read into the computer along with the triple-address program to reformulate the specified operations in terms of the single-address order code of the NAREC. NRL R 4507.

## LUMBER AND WOOD PRODUCTS

Properties and uses of tropical woods, IV, by Frederick F. Wangaard, Arthur Koehler, and Arthur F. Muschler. Yale University. School of

Forestry, New Haven, Conn. Apr 1954. 190p photos, tables. Available from Yale University, School of Forestry, 205 Prospect St., New Haven 11, Conn. \$1.00. PB 116772

Technical report no. 4 to the Office of Naval Research, Contract N6 ori 44/XV, Project NE 330-001. Tropical woods, no. 99, Apr 1, 1954.

1. Wood - Mechanical properties 2. Wood - Uses.

Properties of American beech in tension and compression perpendicular to the grain and their relation to drying, by Eric L. Ellwood. Yale University. School of Forestry, New Haven, Conn. 1954. 99p photos, diagr, graphs, tables. Available from Yale University, School of Forestry, 205 Prospect St., New Haven, Conn. \$1.50. PB 116675

Bulletin no. 61.

1. Beech - Mechanical properties 2. Beech - Compression 3. Beech - Tension tests.

## MEDICAL RESEARCH AND PRACTICE

Biological and medical aspects of ionizing radiation. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Contract AF 33-(038)-27353. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Acetylation of sulfanilamide by X-irradiated animals, by Kenneth P. DuBois, Glays J. Cotter, and Donald F. Petersen. Dec 1954. 7p tables. Microfilm \$1.50, Photocopy \$1.50. PB 117159

The influence of X-irradiation on the ability of animals to acetylate sulfanilamide was investigated by administering daily doses of the drug to irradiated rats and guinea pigs and measuring the urinary excretion of free and acetylated sulfanilamide. Measurements of the blood levels of sulfanilamide at frequent intervals after administration of the drug indicated no difference in the rate of absorption or duration of retention of this drug in irradiated and normal rats. AAF SAM Proj no. 21-3501-0005, Report no. 21.

Effect of high-intensity X-radiation on velocity of nerve conduction, by Herbert B. Gerstner, John S. Orth, and Everett O. Richey. Oct 1954. 13p diags, graphs, tables. Microfilm \$2.00, Photocopy \$2.75. PB 117100

Conduction velocity of isolated sciatic nerves was determined prior to and at 1, 2, and 4 hours following exposure to various doses of X-radiation. In bullfrog nerves, doses in excess of 75,000 r (75 kr) caused a decrease in conduction velocity; doses above 300 kr abolished nerve conduction within one hour following irradiation. Rabbit nerves had a higher radiosensitivity than frog nerves. Doses in excess of 45

kr caused complete block within one hour following exposure. Statistical appendix, by William F. Taylor. AAF SAM Proj no. 21-3501-0005, Report no. 18.

Effect of whole body X-irradiation on a natural inhibitor of carboxypeptidase, by Robert N. Feinstein and John C. Ballin. May 1954. 8p graphs, tables. Microfilm \$1.50, Photocopy \$1.50.

PB 117158

Whole body X-irradiation of mice, rats, and rabbits at the LD<sub>50</sub> range increases the activity of certain tissue cathepsins. Liver, kidney, and intestine were the tissues tested. The possibility is suggested that the reduction of carboxypeptidase inhibitor in blood cells may serve as a basis for determining, within 24 hours of the exposure, whether or not an individual has received a lethal dose of ionizing radiation. AAF SAM Proj no. 21-3501-0005, Report no. 9.

Color signal systems for the red-green color blind:

An experimental test of the three-color signal system proposed by Judd, by Louise L. Sloan and Adelaide Habel. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1955. 10p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.

PB 117164

An experimental investigation is made of Judd's proposed three-color code for instrument panel lights. The adequacy of these specifications is tested using both normal and color deficient subjects. It is shown that if certain specific limiting conditions are met as to the luminance, subtense, and chromaticity of the light signals, all normal observers and a majority of color deficient observers can make the necessary identifications. Possible explanations for the poor performance of some but not all protanopes are discussed. AAF SAM R 55-20.

Hemoglobin metabolism and the regulation of erythrocyte production and destruction. Annual progress report under Contract Nonr 266-16, NR 122-124, covering period Jan 1, 1953 to Dec 31, 1953, by Irving M. London. Columbia University, New York, N. Y. Apr 1954. 5p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.

PB 116898

1. Hemoglobin - Metabolism 2. Erythrocytes - Production 3. Erythrocytes - Destruction 4. Blood - Metabolism.

Influence of drugs, motivation, and job design upon work decrement, by Robert B. Payne and George T. Hauty. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jan 1955. 14p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117103

One hundred forty-four subjects received preliminary training on a complicated compensatory pursuit task involving simulated aircraft instruments and controls, then continued work for four hours under 36 combinations of four pharmacological treatments, three error feedback treatments, and three motivational treatments. Treatment effects were appraised in terms of task proficiency and subjective dispositions, and the functional connection between these outcomes was explored. Previous results were confirmed and extended. AAF SAM R 55-16.

Method for the collection of separate submaxillary and sublingual salivas in man, by Leon H.

Schneyer. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1955. 5p photo, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.

PB 117102

The construction and use of a relatively simple appliance for the collection of separate submaxillary and sublingual fractions are described. Chemical and anatomical evidence are presented that separate secretions are in fact obtained by the use of this appliance. Contract no. AF 18(600)-623. AAF SAM Proj no. 21-1603-0006, Report no. 1.

Ontogeny of heart proteins as revealed by serological techniques. Final report under Contract Nonr 170(00), Project NR 164-013, for period 1 Jul 1950 to 15 Jan 1954, by Charles L. Leone. Kansas University, Lawrence, Kansas. Apr 1954. 5p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.

PB 116896

The experimental results make possible the following propositions: (1) Serum proteins arise from three sources: (a) Yolk proteins, (b) blood islands, and (c) early blood cells. (2) Myosin probably is derived through a series of enzymatic reactions. (3) Actin may be considered a coenzyme or prosthetic group of the enzyme myosin, which results in the formation of the contractile complex, actomyosin. (4) There is a functional precursor to the actomyosin molecule.

Pulmonary effects of rapid changes in oxygen tension. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jan 1955. 18p photo, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117101

The following respiratory and circulatory changes were observed: (1) an increase in integrated mean pulmonary artery pressure; (2) no significant change in left atrial pressure; (3) a trend toward an increase in heart rate; (4) an increase in cardiac output measured 5 minutes after hypoxia by the dye dilution method and by the pulse contour method; and (5) a lowered oxygen uptake measured 5 minutes after on-

set of hypoxia over a 5-minute period. Contents: A: Influence of hypoxia on the pulmonary circulation of nonnarcotized dogs, by G. G. Nahas, M. B. Visscher, G. W. Mather, F. J. Haddy, H. R. Warner. - B: Influence of acute hypoxia on the pulmonary circulation of sympathectomized and adrenalectomized dogs, by G. G. Nahas, G. W. Mather, J. D. M. Wargo, W. L. Adams. AAF SAM Proj no. 21-1204-0001, Report no. 4-5.

Studies on gas exchange applicable to flying personnel, by R. L. Riley, R. H. Shepard, J. E. Cohn, D. G. Carroll and B. W. Armstrong. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Contract AF 18(600)-435. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

The maximal diffusing capacity of the lungs. Sep 1954. 17p graphs, tables. Microfilm \$2.00, Photocopy \$2.75. PB 117162

A method is described in which the maximal diffusing capacity of the pulmonary membrane is estimated quantitatively. The method involves exposure to the combined stresses of hypoxia and exercise utilizing the low oxygen method described by Lilienthal et al. in 1946. The findings suggest that maximal values for diffusing capacity were achieved and that this variable decreases with age. AAF SAM Proj no. 21-1201-0014, Report no. 3.

The maximal diffusing capacity of the lung in normal male subjects of different ages. Sep 1954. 10p graphs, tables. Microfilm \$1.50, Photocopy \$1.50. PB 117160

The maximal diffusing capacity of the lung for oxygen was determined in 21 normal subjects ranging in age from 17 to 76 years. There is a significant decrease in maximal diffusing capacity with age. The findings are of interest in relation to the nature of the aging process. It is not unlikely that the changes in the capillary bed of the lung in relation to age are similar to those occurring in other organs. The data presented and the regression equation derived therefrom provide normal standards with which to compare findings in patients with pulmonary disease. AAF SAM Proj no. 21-1201-0014, Report no. 4.

Studies in speech, hearing and communication. Final report under Contract no. W 19 122 ac-14, by J.C.R. Licklider, K. N. Stevens and J.R.M. Hayes. Massachusetts Institute of Technology. Acoustics Laboratory. Sep 1954. 87p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 116988

The period of the contract was 1 July 1948 to 31 December 1953. The main area of investigation was "speech compression." The aim was to learn enough about the nature of speech and about the process of hearing to make it possible to communicate verbal information in a way that would use less time, less

bandwidth, or less signal power than is required for ordinary speech communication. Investigations were made also in aural presentation of information. AAF CRC TR 54-159.

Survey of literature bearing on perceptual aspects of the effectiveness of visual aids, by Joseph Church. Cornell University, Ithaca, N. Y. Jan 1952. 22p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117047

1. Visual aids
2. Visual perception - Theory
3. AAF HRRL MR 16.

## METALS AND METAL PRODUCTS

Advisory report on bibliography on the damping of metals, by Howard C. Cross. Battelle Memorial Institute, Columbus, Ohio. Feb 1946. 19p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117365

1. Metals - Damping capacity - Bibliography
2. WMC M-659
3. OSRD 6603.

Cooperative investigation of relationship between static and fatigue properties of wrought N-155 alloy at elevated temperatures, by NACA Subcommittee on Heat-resisting Materials. U. S. National Advisory Committee for Aeronautics. Apr 1955. 92p photos, drawings, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117070

Extensive data are given relating properties of N-155 alloy under static, combined static and dynamic, and completely reversed dynamic stress conditions. Time periods for fracture ranged from 50 to 500 hours at room temperature, 1,000<sup>o</sup>, 1,200<sup>o</sup>, 1,350<sup>o</sup>, and 1,500<sup>o</sup> F. Duplicate data were obtained from as many types of fatigue testing machines as could be arranged. NACA TN 3216.

Fundamental studies related to the origin and creep of metals. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Contract N7onr-29516, NR 039-009. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Eleventh technical report: Effect of the structure of dislocation boundaries on yield strength, by Jack Washburn. May 1954. 64p photos, diags, graphs. Microfilm \$3.25, Photocopy \$9.00. PB 117028

The contributions of three types of dislocation array to the strength of zinc crystals were studied. They were: (1) a pair of pure edge dis-



location boundaries, (2) a complex array of pure tilt boundaries, (3) an array of screw dislocations in the slip plane produced by a twist about the c-axis. The strengthening effects of all these substructures were found to be dependent on the temperature to which the crystal had been heated subsequent to introduction of the array of dislocations by plastic bending or twisting. An annealing temperature close to the melting point was necessary to develop an appreciable strengthening effect. In all cases the yield strength was raised; the sharpness of the yield was decreased; but the slope of the linear part of the stress strain curve characteristic of hexagonal crystals was unchanged by the introduction of dislocation arrays. UC IER Series 27, Issue 11.

Twelfth technical report: Low temperature creep of zinc single crystals, by Choh Hsien Li, Jack Washburn, Earl R. Parker. May 1954. 28p drawing, diags, graphs. Microfilm \$2.25, Photocopy \$4.00. PB 117029

Creep of zinc in the temperature range from  $-45^{\circ}$  to  $0^{\circ}$  C was investigated by means of spherically shaped single crystal shear specimens. The initial part of the creep curves could be represented by the equation  $E - E_0 = A \log t$  where  $E$  is the creep strain,  $E_0$  is the instantaneous strain,  $A$  is a constant and  $t$  is the time. However, the latter part of the plot usually curved upward. The time at which the creep curve deviated from the logarithmic creep, defined as the transition time, was found to be temperature dependent. The activation energy associated with the transition time was about 19,000 cal/mole; it was independent of the applied stress. This suggested that diffusion was the rate controlling factor governing the transition time. UC IER Series 27, Issue 12.

Intergranular corrosion of high-purity aluminum in hydrochloric acid. II: Grain-boundary segregation of impurity atoms, by M. Metzger and J. Intrater. U. S. National Advisory Committee for Aeronautics. Apr 1955. 34p diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117094

The experimental results are analyzed by reference to a distribution function, obtained by statistical mechanical methods, which gives the equilibrium fraction of certain sites in the boundary which are occupied by solute atoms in terms of the interaction energy for the segregation of the solute atoms at these sites. NACA TN 3282.

Magnetization of some alloys of nickel and the collective electron theory of ferromagnetism, by A. Arrott. Carnegie Institute of Technology. Dept. of Physics. Laboratory for Magnetics Research, Pittsburgh, Pa. May 1954. 116p drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.00, Photocopy \$15.25. PB 117145

An investigation of the magnetic properties of copper-nickel and chromium-nickel alloys and their relation

to the 3d-band has been carried out. Measurements of magnetization at temperatures between room temperature and liquid helium temperatures have been made for a range of compositions near that for which ferromagnetism vanishes. A new technique for measuring magnetizations at these temperatures is described. Measurements of magnetization of copper-nickel alloys of 58 and 63 atomic per cent copper and of chromium-nickel alloys of 15 and 20 atomic per cent chromium are reported. The results of measurements on copper-nickel alloys support the theoretical model presented here. The chromium-nickel data give added information concerning the transition from ferromagnetism to non-ferromagnetism in solid solutions. Technical report no. 3. Contracts N7onr 30307, Project NR 018-603 and Nonr 633(00), Project NR 019-306. Thesis - Carnegie Institute of Technology.

Measurement of the physical and chemical properties of sodium-potassium alloy. Quarterly progress report no. 3, by R. R. Miller, C. T. Ewing, R. S. Hartman and H. B. Atkinson, Jr. U. S. Naval Research Laboratory. Apr 1947. 30p drawings, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117012

The alloys of potassium and sodium are under study as a heat-transfer medium. Physical and chemical properties, together with measurements of heat-transfer coefficients on an engineering scale, are being investigated. Included are recent results on viscosity, boiling temperatures, freezing temperatures, phase separation, handling, and other pertinent data. Where results are given on the property, a description of the current apparatus and methods is also presented. Appendix: Methods of handling, storing, shipping and transferring liquid KNa alloys, by R. E. Lee, R. C. Werner and R. A. Tidball, Mine Safety Appliances Co., Callery, Pa. Jan 1947. For 2d, 7th, 9th reports see PB 113079-113080, 112970. NRL C-3105.

Plastic deformation of aluminum single crystals at elevated temperatures, by R. D. Johnson, A. P. Young and A. D. Schwöpe. U. S. National Advisory Committee for Aeronautics. Apr 1955. 76p photos, drawings, diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117069

Results are presented of constant-stress creep tests, constant-load-rate tests, and constant-load creep tests. The effect of crystal orientation on the operative slip system was determined. The effect of small amounts of prestraining was studied and two high-resolution X-ray techniques were used to detect and follow the strain. Light and electron microscopy were used to study the complex nature of slip bands and kink bands on specimens deformed at elevated temperatures. NACA TN 3351.

# METEOROLOGY AND CLIMATOLOGY

Absolute calibration of a low brightness source, by G. G. Shepherd. Saskatchewan University. Physics Dept. (1954)? 16p drawing, graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116862

A description is given of a low brightness source for use as a secondary standard for a scanning spectrometer. The procedure used for its absolute calibration against a black body source is discussed. This will enable absolute values to be given to the intensity of auroral features and the sodium D lines in the twilight flash. Contract no. AF 19(122)-152. Scientific report no. AR-16. AAF CRC TN 55-266. SASK AR-16.

Atmospheric window, 16 to 24 microns, and the second fundamental of nitrous oxide, by Arthur Adel. Arizona State College, Flagstaff, Ariz. Mar 1952. 15p photos. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116789

Contract no. AF 19(122)-198, Scientific report HA-3. 1. Spectroscopy, Infrared 2. Atmosphere, Upper - Spectrographic analysis 3. Atmosphere, Upper - Water vapor content 4. Nitrogen oxides - Determination.

Balance requirements of the general circulation, by V. P. Starr and R. M. White. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Dec 1954. 68p map, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116900

The balances of angular momentum, energy and water are examined on the basis of hemispherically distributed observations of wind, temperature and moisture for the entire year 1950. The function of various kinds of organized atmospheric circulations in maintaining these balances is brought out through the analysis of the data. The results lead to a clearer understanding of the physical processes which are important in the maintenance of the general circulation. The angular momentum balance is examined first. The energy and water balances for the northern hemisphere are presented and discussed. AAF CRC TR 54-205. AAF GRD P35.

Convection associated with the release of latent heat of sublimation, by R. H. Douglas and J. S. Marshall. McGill University. MacDonald Physics Laboratory. "Stormy Weather" Research Group. Dec 1954. 33p photos, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117064

When ice crystals grow in an environment containing water vapour in excess of ice-equilibrium, latent heat of sublimation is released into the air, and vertical motions occur. In an isothermal atmosphere only the vapor excess at that temperature is available for precipitation, and vertical development is of the order of a few hundred feet. If, however, a temperature lapse exists, a much greater mass of vapor is sublimed, and vertical development may be of the order of several thousand feet. Contract no. AF 19(122)-217. MW-19. AAF CRC TN 55-282.

Effect of wind shear and falling precipitation, by K. L. S. Gunn and J. S. Marshall. McGill University. MacDonald Physics Laboratory. "Stormy Weather" Research Group. Dec 1954. 32p photo, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116871

Contract AF-19(122)-217.

1. Precipitation - Analysis - Canada 2. Raindrops - Size - Distribution - Canada 3. Rain and rainfall - Measurements - Canada 4. Rain and rainfall - Velocity - Canada 5. AAF CRC TN 55-277 6. MW 18

Frequency of selected low temperatures in Alaska, by Fernand de Percin and Sigmund J. Falkouski. U. S. Army. Quartermaster Research and Development Command. Environmental Research Branch, Quartermaster Research & Development Center, Natick, Mass. Feb 1955. 70p graphs, maps, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117023

1. Temperature - Alaska 2. QMC EP-6.

Grating solar spectrum between 5.6 microns and 1.9 microns, by Arthur Adel. Arizona State College, Flagstaff, Ariz. Jan 1952. 62p photos, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116788

Contract no. AF 19(122)-198, Scientific report HA-2. 1. Atmosphere, Upper - Spectrographic analysis 2. Spectroscopy, Infrared 3. Carbon monoxide - Determination.

Investigation of the ionosphere utilizing sounding rockets. Report no. 6A, 1 Oct 1950 through 30 Nov 1950, under Contract AF 19(122)-36, by W. Cullen Moore. Boston University. Upper Atmosphere Research Laboratory, Boston, Mass. Feb 1951. 57p photos, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116770

1. Ionosphere - Research 2. Rockets, Upper air - Equipment 3. Rockets, Upper air - Firing - Tests 4. Blossom IV-G (Rocket).

Ionosphere propagation research. Technical report no. 2-1 under Contract AF 19(604)-712 for period Apr 1, 1954 to Oct 1, 1954, by L. C. Edwards. Raytheon Manufacturing Co., Waltham, Mass. Nov 1954. 40p photo, map, diags (part fold), graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116992

To date, the effort under contract items 4 and 5 has been largely devoted to the selection, preparation and installation of suitable equipment for data collection. A study of predicted ionospheric conditions was undertaken to determine the proper operating frequencies and the range to a proposed beacon installation site. A 20-kilowatt pulse transmitter was converted for operation at 3,310 megacycles at the South Dartmouth Field Station. Two beacon transponders, one operating at 12,730 megacycles and the other at 3,310 megacycles have been prepared. At South Dartmouth, a 12,730 megacycle polarimeter antenna, consisting of two half-wave dipoles, one vertical and one horizontal, has been designed, constructed and erected, and a two-channel receiver has been modified for 12,730 megacycle operation in conjunction with the polarimeter antenna. For reports no. 1-2 see PB 113979, and PB 115740. AAF CRC TN 55-150.

Ionospheric ionization associated with sudden ionospheric disturbances, by A. P. Mitra. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Mar 1954. 63p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116699

The basic problem of the nature, origin, and distribution of the excess ionization produced by the enhanced solar ultraviolet radiation during a flare is studied. For this purpose a concerted effort is made, for the first time, to correlate all the different ionospheric phenomena that are associated with the ultraviolet radiations of a solar flare, including the sudden geomagnetic effects. A tentative model of the flare ionization is given and its implications indicated. Contract no. AF 19(122)-44. PSC IRL SR 60.

Ionospheric research: Meteor ionization and the nighttime E layer, by M. Nicolet. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Nov 1954. 29p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116910

The nighttime E-layer has been studied by examining data obtained by classical ionospheric recorders, in order to consider the possibility of an ionization effect due to meteor atoms. The presence of ionization of the order of  $10^4$  electrons  $\text{cm}^{-3}$  maintained throughout the night demonstrates that the laws of daytime E-layer recombination are not applicable at night. Several suggestions are made for future study of the problem so that more detailed knowledge of the behavior of meteor atoms can be formulated. Contract no. AF 19(122)-44. AAF CRC TN 54-295. PSC IRL SR 72.

Marine meteorology: Growth of rain in warm clouds, by Raymond Wexler. Woods Hole Oceanographic Institution, Woods Hole, Mass. May 1954. 27p graphs, diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117199

Observations and theory of rain from warm clouds are reviewed. An analysis of the role of giant sea nuclei in these clouds indicates that there is a critical nucleus size which can become the largest raindrops, while larger nuclei become smaller raindrops. A theoretical analysis is made of the production of rain in warm clouds. The theory is applied to the mean data taken by Blanchard in orographic rain in Hawaii. Mean liquid water contents of about  $1 \text{ g m}^{-3}$  and updraft velocities of about  $1 \text{ m sec}^{-1}$  in light rain and about  $3 \text{ m sec}^{-1}$  in heavy rain are found. Contract Nonr-27702 (NR-082-021), Technical report no. 28. Unpublished manuscript. WHOI Ref 54-32.

Mean contours, isotachs, and isotherms over the northern hemisphere at the 300-, 200-, and 100 mb levels, January, February, July and August 1949. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Nov 1954. 97p maps, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 116671

No. 7 in a series of background reports for AWS Manual 105-50. For no. 4 see PB 113343. Numerical material used for construction of the maps came from the General Circulation Project. (Contract no. AF 19(122)-48 with University of California). 1. Maps, Contour 2. Weather forecasting 3. Winds, Geostrophic 4. Atmosphere, Upper - Temperature - Measurement 5. Isotherms 6. AAF AWS TR 105-128.

Mechanism of fading of 150 kc pulses, by R. B. Banerji. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Nov 1954. 32p graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116909

A statistical theory of fading due to random absorption of downcoming waves has been worked out. Comparison of this with the theory of random scattering indicates a major point of difference which can be distinguished experimentally. The statistical theory has been extended to yield a method for the measurement of the height of the irregularities which give rise to the fading. Contract no. AF 19(122)-44. AAF CRC TN 54-294. PSC IRL SR 71.

Near-infrared transmission through synthetic atmospheres, by John Nelson Howard, Darrell E. Burch and Dudley Williams. Ohio State University. Dept. of Physics and Astronomy, Columbus,

Chio. Dec 1954. 247p photos, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$31.50. PB 116959

The present study is concerned primarily with the problem of molecular absorption, by water vapor and carbon dioxide, and its dependence on concentration, pressure, and temperature. RF Project 535. Contract AF 19(604)-516, Scientific report 1. AAF CRC TN 55-264.

Night cloud cover in New Zealand and its effect on auroral frequencies, by G. W. McQuistan and B. L. Frankplt. Carter Observatory, Wellington, N. Z. n.d. 13p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116698

Contract no. AF 64(500)-1.

1. Radiation, Auroral - Measurements - New Zealand 2. Clouds - Distribution, Nocturnal - New Zealand 3. AAF CRC TN 54-291.

Nighttime lower ionosphere as deduced from a theoretical and experimental investigation of coupling phenomena at 150 kc/sec, by R. W. Parkinson. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Dec 1954. 68p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116911

The final results of the experimental program for the investigation of coupling phenomena at 150 kc/sec, which covered a period of some ten months in all, are presented. Conclusions are obtained, from a comparison of the theoretical results and experimental data, regarding the shape of the nighttime D layer in the coupling region and its seasonal and diurnal variations. Recommendations for future work, as suggested by this investigation, are outlined. Contract no. AF 19(122)-44. AAF CRC TN 55-268. PSC IRL SR 73.

Nocturnal recombination processes in the lower ionosphere, by A. P. Mitra. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Sep 1954. 80p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116700

This report deals specifically with the nocturnal recombination processes over a height range of 80-120 km. Theoretical interpretation of these results is based fundamentally on the idea, first put forward by Nicolet, that an appreciable number of an atomic ion of low ionization potential exists in the lower ionosphere. While the positive molecular ion disappears rapidly through dissociative recombination with electrons, the positive atomic ions disappear very slowly. Contract no. AF 19(122)-44. PSC IRL SR 68.

On the formation and structure of downdrafts in cumulus clouds, by Joanne Starr Malkus. Woods Hole Oceanographic Institution, Woods Hole, Mass. Aug 1954. 18p diagrs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 115029

Contract N6onr-27702 (NR-082-021). Technical report no. 31. Unpublished manuscript.

1. Clouds, Cumulus - Downdrafts 2. Downwash (Aerodynamics) - Theory 3. WHOI Ref 54-56.

On the mean meridional circulation in low latitudes of the Northern Hemisphere in winter and the associated meridional and vertical flux of angular momentum, by E. Palmén. California University. Dept. of Meteorology, Los Angeles, Calif. Dec 1954. 41p diagr, map, graphs; tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116843

Scientific report no. 9 under Contract AF 19(122)-48. Papers in meteorology no. 29.

1. Atmosphere - Angular momentum 2. Eddy currents - Effects 3. AAF CRC TN 55-261.

Refractometer measured tropospheric index-of-refraction profiles (Southern California coastal areas) volume III, by C. M. Crain and C. E. Williams. Texas University. Electrical Engineering Research Laboratory. Aug 1954. 26p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116697

Contracts AF 18(600)-113 and AF 19(604)-494.

1. Troposphere - Refractive index 2. Waves, Electromagnetic - Measurement 3. Refractometers, Microwave - Operation 4. TU EERL 6-06 5. AAF CRC TN 54-193.

Some factors affecting the vehicular trafficability of snow, by R. W. Gerdel, W. H. Parrott, M. Dimond, and K. J. Walsh. U. S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ind. Dec 1954. 15p photos, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116996

The drawbar pull and hill-climbing potentials of three lightweight snow tractors were measured and associated with some of the properties of the snow. The relationship between certain meteorological phenomena and vehicular trafficability was investigated also. During the winter there was a direct relationship between air temperature and trafficability while during the spring tests the relationship was inverse. The presence of free water in the snow during warm periods in the spring appeared to be the cause of the reversal in the relationship between air temperature and trafficability. SIPRE RP 10.

Studies of transfer processes in the lower atmosphere, by J. E. Vehrencamp. California. University. Dept. of Engineering, Los Angeles, Calif. Apr 1954. 56p photos, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116901

An experimental investigation of the transfer of momentum at the boundary has been made for air flowing over a level grass surface. The drag on the surface exerted by the wind and the variation of mean wind speed with height in the lowest 8 meters were measured. An electronic shear-stress meter and 3-cup anemometers were used to determine the drag and wind speeds, respectively. Contract no. N 6-0nr-275, Task Order VI, Project no. NR-082-036. UC DE R 54-28.

Study of certain problems in the field of absorption of microwave energy in the atmosphere. Quarterly progress report VI under Contract AF 19(604)-831, for period Oct 16, 1954 - Dec 31, 1954, by Edwin K. Gora. Providence College, Providence, R. I. Jan 1954. 3p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116955

For reports 1-4 see PB 112611, 113557, 115001, 115056.

1. Atmosphere, Upper - Ozone - Microwave absorption  
2. Radio waves - Absorption - Theory  
3. Atmosphere, Upper - Ozone - Spectrographic analysis  
4. AAF CRC TN 55-157.

Study of ionospheric winds. Scientific report no. 2 under Contract AF 19(122)-476: Notes on the evaluation of ionospheric winds from radio fading records, by Donald G. Yerg. Puerto Rico. University. College of Agriculture and Mechanic Arts, Mayaguez, P. R. Aug 1954. 65p diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116851

1. Ionosphere - Research  
2. Ionosphere - Turbulence  
3. Winds, Ionospheric - Measurement  
4. Radio-waves - Attenuation - Ionosphere.

Summary of atmospheric electrical data at selected land and sea stations, 1951-1953, by G. F. Schilling and P. L. Childress. California. University. Institute of Geophysics. Nov 1954. 345p graphs, maps, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$44.00. PB 116868

Contract no. AF 19(122)-254, Scientific report no. 8.  
1. Atmosphere - Electrical properties  
2. AAF CRC TN 55-276.

Thermal structure and vertical motion in the lower stratosphere (Eighth background report to AWS manual 105-50). U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington,

D. C. Dec 1954. 40p maps, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116793

Originally prepared in 1951 by Dr. Adam Kochanski, Dept. of Meteorology, Univ. of California at Los Angeles, under the direction of Dr. Jacob Bjerknes under Contract AF 19(122)-48.

1. Winds, Stratospheric - Velocity  
2. Stratosphere - Temperature - Measurement  
3. AAF AWS TR 105-129.

Upper level temperature fields associated with east coastal cyclogenesis, by Edwin L. Fisher. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Apr 1954. 32p maps. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116916

During the course of an investigation of the formation of cyclones in the east coastal region of the United States, considerable attention has been given to the structure of the upper level temperature fields. In this paper several case studies of east coastal cyclogenesis are presented with particular emphasis on the analysis of the temperature distributions at the 500 and 200 mb levels. Some theories of cyclogenesis are reviewed, and the possible applications of upper level temperature analysis to forecasting are discussed. Contract no. Nonr-285-(09) Technical paper no. 1.

## MINERALS AND MINERAL PRODUCTS

Construction features and physical properties of thermo-con cellular concrete as used for residential housing, by William R. Lorman. U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Dec 1954. 93p photos, drawings, diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 116692

Three experimental dwellings were constructed using Thermo-Con, a form of portland-cement expanded (foam) concrete, which is pumped into the various retaining (molding) forms in definite successive stages to control required volume expansion and subsequent hardening. Time and cost data for this construction are compared with those of conventional structural materials, and the physical properties of Thermo-Con are discussed. Project YD 400-1. Technical memorandum M-092. NCEREL M-092.

Growth of oriented crystals of layer minerals (mica). Final report for period Apr 15, 1951 to Apr 14, 1952 under Contract Nonr 446-(00), by Herbert Packer. Horizons, Inc., Cleveland, Ohio. May 1952. 19p photos, drawings, diagrs. Available from Library of Congress, Publication Board



Project, Washington 25, D. C. Microfilm \$2.00,  
Photocopy \$2.75. PB 117275

Because of cadmium iodide's low melting point, it has been used in experiments to determine some of the factors controlling the orientation of mica layers during their growth. It was possible to use crucibles made of Pyrex glass which could easily be fabricated in the various shapes required. Variations in furnace design were also tried in an effort to discover the most favorable environmental conditions for growing large books of crystal. A degree of success has been achieved in growing good cadmium iodide crystals, using the Bridgman method with a cylindrical crucible, but results were not consistently reproducible. Narrow cross-sectional crucibles generally gave considerably larger books of crystal. In conjunction with a rectangular cross-section furnace, this method could be used for growth of thin books of fairly large area.

## ORDNANCE AND ACCESSORIES

Stresses and strains in nosing of tubes, by E. T. Onaf and W. Prazer. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Aug 1954. 8p diagr, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117137

A mathematical analysis of stresses and strains during the formation of an ogive nose at the end of a tubular shell by pressing the tube into a suitably formed die. Contract DA 19-020-ORD-798. Dept. of the Army project 503-06-005. Ordnance project TB 3-0122. GDAM DA798/15. GDAM TR 15.

Use of volatile corrosion inhibitors as a preservative medium for long term storage of ordnance material. Addendum IV: Results after five years of exposure, by R. E. Johnson. U. S. Arsenal, Rock Island, Ill. Jan 1955. 31p photos, drawings, diagrs, graphs, tables. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00. PB 111608

After five years in storage, two volatile corrosion inhibitors and three petrolatum type corrosion preventives employed in packaging stored ordnance material were comparatively evaluated for the long term protection of gun and howitzer tubes, hydropneumatic recoil rods and cylinders, sintered iron specimens, and non-ferrous specimens. Dept. of the Army project 591-07-001. Ordnance project TB 5-1101C, Report no. 8. RIAL R 55-82.

## PERSONNEL APTITUDE TESTING AND JOB TRAINING

Analysis of CPS-5 scope operator and recorder activity, by David Holt. U. S. Air Force. Human Resources Research Laboratories, Bolling Air Force Base, Washington, D. C. n.d. 7p diagr, graph,

tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117044

1. Radar - Scopes 2. CPS-5 (Radar) 3. Personnel, Radar - Performance 4. AAF HRRL MR 1.

Development of an alternate form of the Navy Officer Classification Battery, by William G. Mollenkopf. Educational Testing Service, Inc., Princeton, N. J. May 1954. 35p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116998

Following specifications, staff members of the Educational Testing Service have developed an alternate form of the Navy Officer Classification Battery, and an additional form of the Mechanical Comprehension Test of this battery. Test questions were tried out at the U. S. Naval School, Officer Candidate, at Newport. Item difficulty and item discrimination indices were then derived, and constituted an important element in the process of selecting items for use in the alternate forms of the tests. Contract no. Nonr-694(00). NAVPERS TB 54-6.

Efficiency of the Minnesota teacher attitude inventory for predicting interpersonal relations in a naval school, by Tolan L. Chappell and Robert Callis. Missouri. University, Columbia, Mo. May 1954. 21p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116999

The purpose of this study is to test the efficiency of a measuring instrument to predict the ability of a military instructor to effect harmonious interpersonal relations in the classroom. In recent years psychologists have begun to focus their attention upon interpersonal relationships in the classroom as well as in other situations. Technical report no. 5 on Contract NONR 649(00).

On the distribution of Wald's classification statistic, by Harman Leon Harter. Michigan State College, East Lansing, Mich. n.d. 20p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117273

1. Personnel - Classification.

Relation between seat location and performance on two radio code tests using loud speaker administration, by John A. Creager and Howard M. Dettler. 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. 11p diagr, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117264

Project no. 7700, Task no. 77014.

1. Personnel, Radio - Performance - Tests 2. Ability tests - Effect of seat location 3. AAF PTRC TR 54-64.

Relationship of officer personnel to promotion board decisions, by David Holt and Robert J. Wherry. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Jan 1954. 83p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117043

1. Officer performance records - Evaluation 2. AAF HFORL TN 54-12.

Research on the language of voice procedures: Air defense training aids, by Henry M. Moser and John J. Dreher. Ohio State University Research Foundation, Columbus, Ohio. Jun 1953. 31p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117075

Contract AF 18(600)-316.

1. Personnel, Communications - Training 2. Communications, Auditory 3. Speech - Intelligibility 4. OSURF Proj 519, Report no. 2.

Review of research on military instructor problems. U. S. Research and Development Board, Committee on Human Resources. Apr 1953. 24p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116949

1. Instructors, Military - Training 2. Instructors, Military - Training - Bibliography 3. RDB HR 202/3.

Technique for selecting test items to increase differential prediction in a diagnostic test, by Dorothy E. Green. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Jan 1954. 10p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117042

1. Personnel, Flying - Tests 2. Psychological tests 3. AAF HFORL TN 54-9.

Training methods research. Annual progress report. George Washington University. Human Resources Research Office, Washington, D. C. Dec 1954. 41p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116976

1. Military training - Methods.

## PHOTOGRAPHIC AND OPTICAL GOODS

Determination of density gradients near shock waves from shadowgraphs, by Raymond Sedney and Nathan Gerber. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1954. 23p photos, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116975

A theoretical study is made of the width of the shadow (dark band) of a shock wave produced by light passing through an axially symmetric disturbance. A method involving a comparatively easy computation is derived in detail for obtaining the shadow thickness in terms of the change in the refractive index and its gradient across the boundary of the shock wave. A method is suggested for finding the density variation within a given shock wave by use of shadowgraph measurements, together with the Rankine-Fugoniot equations and equations derived here. Dept. of the Army project no. 503-03-001. ORD project no. TB3-0108J. APG BRL R 920.

Image formation by reflecting telescopes, by Paul D. Jose and John B. Crozier. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jul 1954. 34p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116969

The images formed by Cassegrain and by Dall-Kirkham telescope systems are computed by an exact ray tracing procedure. In particular, the image at the prime focus of the Cassegrain is treated in some detail. Because of the computational labor involved in obtaining a large number of points of the images, the ray tracing was carried out by high speed computing techniques. Dept. of the Army project no. 503-06-011. ORD project no. TB 3-0538. APG BRL M 831.

Triangulation of non-synchronous fixed camera data, by Duane Brown. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. May 1954. 12p diagr, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116966

A method is developed for intersecting unsynchronized rays from fixed camera observations when time information is unknown. A comparison is made with another method from both theoretical and computational standpoints. Adjustment of random observational errors is discussed and is illustrated by a numerical example. APG BRL M 785.

# PHYSICS

## General

Complex convexity, by H. J. Bremermann. Stanford University. Dept. of Mathematics, Stanford, Calif. May 1954. 60p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.

PB 117027

The first part of the present paper is a contribution to the theory of regions of holomorphy. In particular, one (characteristic) property of regions of holomorphy is elaborated, the "pseudo-convexity." In the second part we study the pseudo-convex regions and pluri-subharmonic functions for their own sake. Contract N6ori-106, Task order 5 (NR-043-992). SU AMSL TR 38.

Determination of the first two moments of sample order statistics from populations having various percent defective, by O. P. Bruno and A. Golub. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1954. 14p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116965

A theoretical treatment is presented for the determination of the 1st two moments of the  $i$ th order statistic in samples of size  $n$  drawn from normal populations containing various percentages of defectives. Tables are presented for the 1st two moments of all order statistics in samples of size  $n = 2$  to 10 drawn from normal populations containing percent defective  $/p = 0.01 (0.01) (0.10)/$ . Dept. of the Army project no. 503-06-002. CRD project TB 3-0007L. APG BRL M 792.

Graphic method for estimating the significance of differences between proportions or percentages, by Robert L. Petersen. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Jan 1954. 9p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50.

PB 117040

1. Graphic methods
2. Sampling (Statistics)
3. Statistical methods
4. AAF HFORL TN 54-6.

Improvement of accuracy in integration, by Mark Lotkin. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Apr 1954. 20p diagr, graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116973

The numerical integration of systems of ordinary differential equations is discussed in this report. A

general method is devised which purports to increase the accuracy obtainable in the process of integration, while at the same time reducing the amount of computational labor usually required. The proposed scheme is shown to work quite efficiently in a number of critical examples. Dept. of the Army project no. 503-06-002. ORD project no. TB3-0007K. APG BRL R 912.

Inequalities for a classical eigenvalue problem, by Robert Weinstock. Stanford University. Dept. of Mathematics, Stanford, Calif. May 1954. 29p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 117035

Contract N6ori-106, Task order 5 (NR-043-992). Technical report 37.

1. Mathematical equations and solutions
2. Mathematical functions
3. SU AMSL TR 37.

Informational content of polar coordinates, by E. T. Klemmer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C. Oct 1954. 13p diagr. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117063

1. Coordinates, Polar - Measurements
2. Plotting boards
3. AAF CRC TR 54-54.

Limits of economy of material in shells, by E. T. Onat and W. Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Sep 1954. 14p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117138

The paper is concerned with the limits of economy of material in cylindrical shells under axially symmetric loading. The shell material is supposed to be rigid, plastic and to obey Tresca's yield condition and the associated flow rule. The criterion of failure adopted is that used in limit analysis. It is shown that a design based on the membrane theory of shells does not, as a rule, achieve the greatest possible economy of material. Contract DA-19-ORD-798. Dept. of the Army project 503-06-005. Ordnance project TB 3-0122. GDAM DA 798/16. GDAM TR 16.

Modification of Meissner's method of graphical integration, by W. H. Pell. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Dec 1954. 20p diags, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 117139

Contract DA 19-020-ORD-798. Dept. of the Army project 503-06-005. Ordnance project TB 3-0122.

1. Graphic methods 2. Equations, Differential - Non-linear 3. GDAM DA-798/17 4. GDAM TR 17.

Nonlinear differential - difference equation of growth, by W. J. Cunningham. Yale University. Dunham Laboratory of Electrical Engineering, New Haven, Conn. May 1954. 62p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 117030

Certain physical phenomena appear to be described by an equation of growth in which the growth rate of a quantity depends in part upon the value of that quantity at some earlier time. Methods of obtaining exact solutions for this sort of equation are unknown. Approximate solutions for the equation are obtained by several analytical methods. Examples of solutions for particular values of the parameters are obtained with an analog computer. Contract Nonr-433-(00), Report no. 5.

On the choice of mesh in the integration of ordinary differential equations, by Boris Garfinkel. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Apr 1954. 17p table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116972

The optimum mesh at point  $x$  is defined here as the interval,  $h(x)$ , which minimizes the time of integration of an ordinary differential equation while maintaining a prescribed bound of the error. An attack upon the problem of constructing such a mesh is carried out here with the aid of the calculus of variations. The Euler equations are derived and discussed, and the results are extended to a system of differential equations. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL R 907.

Some applications of gradient methods, by Joseph W. Fischbach. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1954. 20p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116968

The methods of steepest descent and conjugate gradients are discussed and applications are given to the following: the solution of a system of linear algebraic equations and the associated problems of matrix inversion, the solutions of least squares problems, a set of complex linear equations, ordinary and partial differential equations. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL M 828.

Spatial triangulation by the condition of intersection, by Hellmut Schmid. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1954. 9p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116974

Generally, the determination of the spatial coordinates of a target point is the specific purpose of a triangulation. The present report shows that this determination is not essential in developing a triangulation procedure. Rather, the concept of triangulation is interpreted as merely the condition of intersection of corresponding rays. The derived general conditional equation serves as the basis for a least squares adjustment and may be applied to any triangulation problem - relative or absolute - for any type of directional measurements. Dept. of the Army project no. 503-03-0007. ORD project no. TB3-0838. APG BRL R 915.

Study of parameters in a differential equation related to blast, by Mark C. Breiter. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1954. 11p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116967

A study of the effect of blast on structures involves the solution of a particular type of ordinary second order linear differential equation expressing angle of deformation as a function of time, and the determination of certain regions for the parameters which appear in the equation. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007. APG BRL M 822.

Surface instabilities on pulsating gas bubbles, by Ralph Hugh Pennington. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. May 1954. 80p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117149

The present work is an attempt to develop the theory of the surface instability of a pulsating gas bubble in a manner which is sufficiently general to cover some of the points which have not previously been considered. In particular, rotational flow and viscous flow are allowed. A first order perturbation technique is used, so questions involving the growth of disturbances to amplitudes beyond the range of the perturbation theory cannot be answered. However, whenever these questions are important, we point out what behavior might be expected on the basis of what is known about plane Taylor instability. Contract Nonr-255(11), NR-041-086. SU AMSL TR 22.

Symmetrization in the theory of functions, by W. K. Hayman. Stanford University. Dept. of Mathematics, Stanford, Calif. Aug 1950. 39p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116939

Contract N6-ori-106 Task order 5 (NR-043-922).  
1. Mathematical functions - Theory.

Tables for computing informational measures. U. S. Air Force. Air Research and Development Com-

mand. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C. n.d. 40p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117061

1. Tables, Mathematical 2. AAF CRC TR 54-50.

Tables of scattering functions for spherical colloidal particles. Wayne University. Chemistry Dept., Detroit, Mich. Contract Nonr 736(00), Project NR 330-027. 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, by William J. Pangonis and Wilfried Heller. May 1954. 58p tables. Microfilm \$3.00, Photocopy \$7.75. PB 117034

Technical report no. 2.

1. Waves, Electromagnetic - Scattering - Tables  
2. Particles, Charged - Scattering - Tables  
3. Tables, Mathematical.

Part II, by Wilfried Heller. Jun 1954. 19p tables. Microfilm \$2.00, Photocopy \$2.75. PB 114756

Technical report no. 3.

1. Tables, Mathematical 2. Particles, Charged - Scattering - Tables.

Teoriya obratimnykh i neobratimnykh treshchin v tverdykh telakh (Theory of reversible and nonreversible cracks in solids), by Y. I. Frenkel. Translated by S. Reiss. Apr 1955. 15p diags, graphs. Available from National Advisory Committee for Aeronautics, 1512 "R" St., N. W., Washington 25, D. C. PB 117085

The Griffith crack theory is reviewed and certain shortcomings of this theory are discussed. A new description for the shape of a crack is given which takes into account the atomic structure of material. Through consideration of the total energy of the system and the shape of the crack, expressions for crack behavior are derived which are considered to remedy the defects of the Griffith theory. Translated from Zhurnal Tekhnicheskoi Fiziki, Vol. 22, no. 11, Nov 1952, pp. 1857-1866. NACA TM 1387.

Ultrasonic propagation in solid materials. Interim research report no. 2, Sep 30, 1954 to Jan 2, 1955, under Contract no. AF 19(604)-1095. Andersen Laboratories, Inc., West Hartford, Conn. Jan 1955. 13p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116981

The equipment and test instrumentation were developed and constructed, and cancellation was accomplished using the 2500 microsecond delay line which was reassembled for optimum characteristics. The performance of the cancellation equipment, as shown in preliminary testing, indicates that it is possible to

construct an MTI cancellation system using considerably fewer tubes and circuits than the present types. Using pulse shapes suggested by the contract administrators 40 decibel cancellation was accomplished with a 6 tube system. This system required manual gain and repetition rate controls whose automatic counterparts will be developed during the remainder of the contract. For 1st report see PB 116609. AAF CRC TN 55-169.

Vibration damping, by P. H. Geiger. Michigan University. Engineering Research Institute, Ann Arbor, Mich. Oct 1950. 47p photo, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 117367

Contract N6onr-23211, Project NR 261 020. University project no. M788.

1. Vibration - Damping 2. Vibration - Damping - Materials 3. Noise - Elimination.

Wave motion in a rotating Couette flow of a viscous fluid, by Shih-Kung Kao. Johns Hopkins University. Dept. of Civil Engineering, Baltimore, Md. Dec 1954. 24p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116985

With the assumption of non-divergent horizontal flow a certain class of solutions of the non-linear hydrodynamical equations are obtained for a viscous Couette flow on an earth whose variation of Coriolis parameter with latitude is constant. Pressure field, geostrophic deviation, and meridional transports of westerly momentum and energy are obtained for such a flow system. For reasonable values of the constants for atmospheric systems the geostrophic deviations have been estimated, and may differ from the actual wind speed by one order of magnitude. Scientific report no. 1. Contract no. AF 19(604)-916. AAF CRC TN 55-282.

Wave propagation in ring springs, by E. H. Lee and A. J. Wang. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Aug 1954. 21p diags, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117136

A mathematical treatment of wave propagation in double ring-shaped compression-loaded springs. When an axial compressive load is applied, sliding occurs along conical surfaces so the inner rings are compressed while the outer rings are extended. Contract DA 19-020-ORD-798. Dept. of the Army project 503-06-005. Ordnance project TB3-0122. GDAM DA 798/14. GDAM TR 14.

## Nuclear

Absorption of negative  $\mu$  mesons in carbon, by Thomas N. K. Godfrey. Princeton University.



Palmer Physical Laboratory and U. S. Naval Ordnance Laboratory. May 1954. 100p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117203

The report is divided into 5 chapters: 1. Nuclear absorption of  $\alpha$  mesons. 2. Apparatus. 3. Operation. 4. Analysis of the data. 5. Interpretation. Technical report no. 13 under Contract N6onr-270-II. Thesis - Princeton University. Bibliography attached.

Annual progress report, 33d, June 1, 1953 to May 31, 1954. Massachusetts Institute of Technology. Laboratory for Nuclear Science. May 1954. 191p photo, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$7.25, Photocopy \$25.25. PB 117033

Contracts AT (30-1)-905 and N5ori-07806.

1. Atomic power - Research 2. Cosmic radiation 3. Cyclotrons 4. Synchrotrons 5. Nuclear chemistry 6. Nuclear physics 7. Particles, Charged - Scattering 8. Detectors, Gamma ray - Design 9. Radiation counters 10. Cloud chambers - Design.

Electron-induced showers, by Asher Dale Kantz. Stanford University. W. W. Hansen Laboratories of Physics. High-Energy Physics Laboratory, Stanford, Calif. May 1954. 93p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117026

A scintillation crystal probe has been used to study the longitudinal and radial distribution of energy loss in showers induced by electrons of energy of 185 Mev. The shower structure was studied in carbon, aluminum, copper, tin and lead. This study will serve, therefore, as a check on the results from the Monte Carlo method of shower production. The Monte Carlo calculations for this energy region are quite different from the calculations made by conventional shower theory, and are shown to be in fair agreement with this experiment. Another objective of this experiment is the study of the feasibility of a "total absorption spectrometer" for high-energy particle detection, by the use of large-volume scintillators. Technical report under Linear Electron Accelerator Project, Contract no. N6 onr-25116, NR 022 026. SU HEPL 17.

Electronic component failures at Harwell, Jan - June 1953, by R. L. Elliott. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1954. 37p tables. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$1.25. PB 116942

1. Electronic equipment - Components - Failures - Gt. Brit. 2. Atomic power - Research - Gt. Brit. 3. AERE EL/R 1536.

Electronic states of molecules. I: Automatic computation of the electronic wave functions, by R. C. Sahni. University of Western Ontario. Dept. of Physics. Feb 1955. 24p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117276

Contract no. AF 19(122)-470. Scientific report no. 19.

1. Molecular theory - Canada 2. Atomic power - Research - Canada 3. Molecules - Vibration - Theory - Canada 4. Molecules - Rotation - Theory - Canada.

Final report under Contract no. N6onr-23813, Project no. NR-072-281. University of Southern California. Dept. of Physics, Los Angeles, Calif. May 1954. 56p diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117106

Contents: Studies in cold cathode discharges in magnetic fields, by John Backus. - Ion energies in a cold cathode discharge in a magnetic field, by Norman E. Huston. - Mechanism for sputtering in the high vacuum based upon the theory of neutron cooling, by Frank Keywell. (Reprinted from Physical Review, vol. 87, no. 1, p. 160-161, July 1, 1952).

Microwave spectrum of the ozone molecule, by Edwin K. Gora. Providence College. Dept. of Physics, Providence, R. I. Jan 1955. 90p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117020

The frequencies and intensities of all the absorption lines of ozone, from which a measurable contribution to microwave absorption in the frequency domain between 0 and  $11 \text{ cm}^{-1}$  is to be expected, have been determined. In this domain about 200 lines had to be taken into consideration. For the calculation of the transition frequencies standard methods have been employed, but for the calculation of the intensities a new computational procedure has been developed. Contract no. AF 19(604)-831, Technical report no. 1. AAF CRC TN 55-158.

Molecular theory of the viscoelastic behavior of noncross-linked elastomers, by William G. Hammerle. Textile Research Institute, Princeton, N. J. May 1954. 98p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117128

The purpose of this thesis is to develop a theory of the mechanical properties of noncross-linked polymers at temperatures above the glass transformation. The relationship between this theory and the dielectric dispersion of polar polymers is also discussed. Technical report no. 11 under Contracts Nonr-09000 and Nonr-09001.

Thermal convection in a long cell containing a heat generating fluid, by W. Murgatroyd. Gt. Britain. Ministry of Supply. Atomic Energy Research Establishment. Nov 1954. 20p diags, graphs, tables. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$.75.

PB 117037

1. Atomic power - Gt. Brit. 2. Thermal convection - Gt. Brit. 3. Reactors - Heat transfer - Gt. Brit. 4. Profiles, Laminar - Gt. Brit. 5. Convection (Forced) - Heat transfer - Gt. Brit. 6. AERE ED/R 1559.

Transition probabilities of molecular band systems.

XIV: r-Centroids: "Average" internuclear separations associated with molecular bands, by W. R. Jarmain and R. W. Nicholls. University of Western Ontario. Dept. of Physics. Mar 1955. 24p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117277

Contract no. AF 19(122)-470. Scientific report no. 20.

1. Atomic power - Research - Canada 2. Molecular theory - Canada 3. Molecules - Vibration - Theory - Canada 4. Graphic methods.

X-ray emission from high voltage hydrogen thyratrons, by Bernard Reich and Sol Schneider. U. S. Camp Evans Signal Laboratory, Belmar, N. J. Jun 1953. 15p photos, diags, graphs, tables.

Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117263

The purpose of this report is to present data on the quality and quantity of x-rays emanating from three types of hydrogen thyratrons. In addition shielding recommendations for operating personnel are presented. SCEL TM M-1518.

## PSYCHOLOGY

Assimilation of sequentially-encoded information.

III: Serial position analysis, by Irwin Pollack.

U. S. Air Force. Air Research and Development Command. Human Resources Research Laboratories, Bolling Air Force Base, Washington, D. C. Sep 1952. 16p graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117049

For Parts 4-5 see PB 113164, and 114841.

1. Information - Theory 2. Memory - Tests 3. AAF HFORL MR 25.

Certainty: Generality and relation to manifest anxiety.

by Wirt M. Wolf. Stanford University. Dept. of Psychology, Stanford, Calif. May 1954. 17p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117207

Two problems dealing with certainty in human behavior have been investigated: 1) the generality among some measures of certainty and 2) the relation of some certainty measures to a measure of manifest anxiety. Subjects were normal young adult females of university level scholastic ability who volunteered for the experiment. The results on the first objective indicated only minimal evidence for any generality to certainty as measured. The results on the second object offered only limited support to expected inverse relationships between measures of certainty and anxiety. Contract Nonr-225(01), NR 150-087, Technical report no. 3.

Extension of the algebra of classes for the association of ideas. Documentation, Inc., Washington,

D. C. Apr 1954. 6p diags. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116928

Contract no. Nonr-1305(00), Technical report no. 4.

1. Words - Association 2. Psychiatric tests.

Factor analysis of memory ability, by H. Paul

Kelley. Princeton University. Dept. of Psychology. Educational Testing Service, Princeton, N. J. Apr 1954. 200p drawings, maps, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$7.25, Photocopy \$25.25. PB 116869

The purpose of this study is to investigate the area in the memory domain concerning relatively immediate intentional retention. On the basis of hypotheses regarding the nature of four memory factors, a battery of 27 memory tests was constructed. Contract N6onr-270-20, Project NR 150-088.

Human engineering in the national defense. U. S.

Research and Development Board. Committee on Human Resources. Panel on Human Engineering and Psychophysiology. Jun 1953. 15p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116951

1. National defense 2. Psychology, Applied 3. RDB HR-HPS 205/1.

Investigation of concept formation in transfer of

training, by William H. Melching, Jackson B. Reid, and Sylvan J. Kaplan. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Dec 1954. 13p photos, graph, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116703

The experiment was designed to investigate the method of solution used by monkeys in a series of visual discriminations. It was found that monkeys can transfer to a series of new discriminations provided they have had two or more experiences mastering tasks involving similar but not identical stimulus pairs. The findings were interpreted as

indicating that "concept formation" was operative in the solution of the tasks, and that "learning set" alone was inadequate to account for the transfer demonstrated. AAF SAM Proj no. 21-3501-0003, Report no. 13.

Need analysis research project. Annual technical report under Contract N7-onr-463, NR172-363, by D. C. McClelland. Wesleyan University, Middletown, Conn. May 1954. 7p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117025

1. Psychological tests 2. Psychology, Social.

Periodic status report XXIII, period 15 Nov 1953-15 May 1954, under Contract N5ori-76, Project order II, NR 142-201. Harvard University. Psycho-Acoustic Laboratory. May 1954. 22p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117201

Summary of research completed and in progress. The results of most of the laboratory's research are now being published in scientific journals. A list of reports and their PNR numbers is included at the end of the report. PN M-58.

Preparation of manual dictionaries of association. Documentation, Inc., Washington, D. C. Apr 1954. 12p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116927

Contract no. Nonr-1305(00), Technical report no. 5.  
1. Words - Association - Dictionaries 2. Psychiatric tests.

Psychiatric screening of flying personnel. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

An empirical evaluation of the SAM personality-sketch test, by Anne Anastasi, John P. Foley, Jr., and Harold Sackman. Apr 1954. 54p diags, graphs, tables. Microfilm \$3.00, Photocopy \$7.75. PB 116902

An investigation to determine whether this experimental psychiatric screening test, based on self-concepts and self-ratings, provides objectively scorable characteristics which may serve as valid predictors of subsequent adjustment to flight training, particularly to screen adjustment failures. A scoring key, developed empirically on a criterion sample, discriminated significantly on a cross-validation sample at a confidence level between .02 and .05 and a revised key, requiring further cross-validation, is recommended. AAF SAM Proj 21-0202-0007, Report no. 6.

Research on the personal inventory test, by David K. Trites. Nov 1954. 15p tables. Microfilm \$2.00, Photocopy \$2.75. PB 117163

The Personal Inventory is a forced-choice test composed of 20 pairs of statements. Item analysis indicated 12 of the pairs discriminated between 46 satisfactorily adjusted and 46 unsatisfactorily adjusted aviation cadets. Application of a cutting score to the score distribution of all cases, except the experimental sample, screened 13 percent of the total group. Seventy-two percent of these were identified correctly as failures. These findings indicate that the test will probably be useful in a battery of psychiatric screening devices. AAF SAM Proj no. 21-0202-0007, Report no. 8.

Psychological aspects of survival, a study of survival behavior, by E. Paul Torrance. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Jan 1954. 93p drawings. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 117038

1. Survival - Psychological aspects 2. Psychology, Applied 3. AAF HFORL MR TN 54-4.

Supplement: Teaching the psychological aspects of survival, by E. Paul Torrance. Jan 1954. 20p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117038s

1. Survival - Training 2. Survival - Psychological aspects 3. AAF HFORL MR TN 54-4A.

Rate of handling information: The effect of forced intermittency in a key pressing task, by E. T. Klemmer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C. Dec 1954. 10p graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116808

1. Keying systems - Use in psychomotor tests  
2. Psychomotor tests 3. Hands - Dexterity  
4. Machines, Punching - Operation 5. AAF CRC TR 54-53.

Relationship between group experimental level of aspiration measures and self-estimates of personality, by Henry N. Ricciuti and Douglas G. Schultz. Educational Testing Service, Inc., Princeton, N. J. May 1954. 26p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117133

The difference between each performance and the following aspiration, averaged over all trials, was the principal level of aspiration measure used. Contract Nonr-694(00), Project NR 151-113.

Role of human engineering in national defense: Recommendations for increased effectiveness. U. S. Research and Development Board. Committee on Human Resources. Panel on Human Engineering and Psychophysiology. May 1951. 15p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116946

1. National defense 2. Psychology, Applied 3. RDB HR-HPS 107/1.

Sociometric studies of combat air crews in survival training, by Mario Levi, E. Paul Torrance, and Gilbert O. Pletts. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Nov 1953. 40p photos, drawings, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 117039

1. Survival - Psychological aspects 2. Crew, Air - Psychological factors 3. AAF HFORL TN 54-5.

Some factors influencing the effects of audience participation on learning from a factual film, by Donald N. Michael under the direction of Nathan Maccoby, edited by A. A. Lumsdaine. Boston University. School of Public Relations and Communications. Division of Research. Dec 1951. 51p diags, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 117046

Contract no. AF 33(038)-22944, Preliminary report. 1. Motion pictures, Educational - Audience participation 2. Learning - Psychological factors 3. AAF HRRL MR 13A Revised.

Studies in abstractive generalization: Comparison between performance of the macaque and the human adult on the same problem, by George Gentry, Sylvan J. Kaplan, and Ira Iscoe. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Nov 1954. 10p photos, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 117099

The performances of eight monkeys and forty human adults were compared on two tests of learning. When provided with the opportunity to learn one of the tasks by either rote memory or by a rational principle, the human subjects selected the latter method. The performances of the monkeys on the two tasks did not differ significantly. The results suggested an inability on the part of the monkey for abstractive generalization. AAF SAM Proj no. 21-3501-0003, Report no. 12.

Studies in aircrew composition. Study no. 3: Combat leader behavior of B-29 aircraft commanders, by Andrew W. Halpin. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Sep 1953. 27p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117041

Contracts AF 33(038)-10105, and AF 18(600)-27. For Parts 1-2 see PB 113160, 107897, 113161-113162.

1. Crew, Air - Psychological factors 2. Leadership 3. Officer performance records 4. AAF HFORL TN 54-7.

Study of the temporal changes in the organization of retention, by Howard Brand. Connecticut. University, Storrs, Conn. Apr 1954. 17p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116913

The present study is primarily concerned with the application of Bousfield's method to the question of whether or not there are changes in the organization of the recall of words over successive retention tests. "Organization" is used in this study to mean the occurrence of clusters of related words in recall. Contract Nonr-631(00), Technical report no. 9.

Symposium on techniques for the measurement of group performance, 13-15 Oct 1952. U. S. Research and Development Board. Committee on Human Resources. Panel on Human Relations and Morale. Oct 1952. 39p diagr. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116947

Contents: Foreword. - Criteria of group effectiveness in small teams, by Fred E. Fiedler. - Squad criteria, by Richard Christie. - Emotionality and work as related to productivity of human relations training in small groups, by Herbert A. Thelen. - Some theoretical considerations for group behavior, by William C. Shutz. RDB HR-HML 200/2.

## RUBBER AND RUBBER PRODUCTS

Analysis of natural and synthetic rubber by infrared spectroscopy, by H. L. Dinsmore and D. C. Smith. U. S. Naval Research Laboratory. Aug 1946. 140p photo, drawing, diags, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$5.75, Photocopy \$17.75. PB 116704

1. Rubber - Absorption spectra 2. Rubber, Synthetic - Absorption spectra 3. Spectroscopy, Infrared - Uses 4. NRL R-2861.

## STRUCTURAL ENGINEERING

Plastic-rigid theory of the response of beams to air blast loading, by Frank J. Allen and F. Rally. U. S. Aberdeen Proving Ground. Ballistics Research Laboratory, Aberdeen, Md. Jul 1954. 31p diagrs, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25.

PB 116962

This report presents a "plastic-rigid" theory of cantilever and simply-supported beams subjected to air blast loading. The equations of motion are derived and the theoretical deformations found. Theoretically predicted permanent deformations are compared to experimentally determined permanent deformations of thin rectangular cross-section metal beams subjected to air blast load. The theory predicts correctly the occurrence of localized regions of plastic deformation, but does not accurately predict the amount of this deformation. However, the results suggest a modification of the theory which is expected to be in better agreement with experiment. Dept. of the Army project no. 503-04-002. ORD project no. TB 3-0112J. APG BRL M811.

Response of simple beams with a central mass to a constant force applied instantaneously at the center, by H. P. Gay. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1954. 11p diagr, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116970

The Laplace transform has been used to determine the motion of simple beams with a mass at the center when a constant force is applied at the center. Solutions for both hinged and fixed ends are given. The results indicate that for ratios of beam mass to central mass up to two-thirds, the system approximates an ideal spring-mass system reasonably well except for high frequency acceleration components. Dept. of the Army project no. 503-05-014. ORD project no. TB 3-2226(Air). APG BRL M 837.

Simple calculation of deformation and stress in the shell of thin-walled cylindrical vessels, by Karl I. Karlsson. Royal Swedish Academy of Engineering Sciences. 1954. 28p diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 117068

In a thin shell the tangential shearing stresses play a dominant part in sustaining the load as compared with the flexural stresses. This is shown as also the comparative ease of estimating them in some cases of practical design. It is further shown how the reaction is distributed (and concentrated) in supports designed as cradles. Acta polytechnica 162.

## TRANSPORTATION EQUIPMENT

### Aeronautics

#### Aircraft

Circumferential distribution of propeller-slipstream total-pressure rise at one radial station of a twin-engine transport airplane, by A. W. Vogeley and H. A. Hart. U. S. National Advisory Committee for Aeronautics. Apr 1955. 25p photos, drawings, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 117089

1. Airplanes, Transport - Flight tests 2. Propellers - Slipstream - Deflection 3. Interference, Propeller - Tests 4. NACA TN 3432.

Personnel and situational factors in aircraft accidents. Conference proceedings, Feb 15-16, 1953, edited by Kenneth S. Teel and Philip H. DuBois. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories, Bolling Air Force Base, Washington, D. C. Sep 1953. 101p. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00.

PB 117036

1. Airplanes - Accidents - Congresses 2. Airplanes - Accidents - Human factors 3. AAF HFORL MR TN 54-5.

Personnel factors in aircraft accidents: Development and evaluation of methods of collecting and collating pertinent data, by Philip H. DuBois and Wilse B. Webb. Human Relations Research Foundation, St. Louis, Mo. Nov 1953. 53p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.

PB 117051

Contract AF 33(038)-21915.

1. Airplanes - Accidents - Human factors 2. Coding devices 3. AAF HFORL TR 54-3.

Prediction of accident rates from basic design features of USAF aircraft, by Robert F. Simmons, Neil D. Warren, Irwin L. Rodman, Robert R. Morman. Psychological Services, Inc., Los Angeles, Calif. Jan 1954. 39p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25.

PB 117054

Contract AF 18(600)-447.

1. Airplanes - Accidents 2. Airplanes - Accidents - Human factors 3. Airplanes - Design 4. AAF HFORL TR 54-8.

Studies of aircraft accident causation utilizing the index of accident exposure, by Neil D. Warren, Robert F. Simmons, Irwin L. Rodman, and Robert R. Morman. Psychological Services, Inc., Los Angeles, Calif. Jan 1954. 84p graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 117053

Contents: Report A: Field testing the Index of Accident Exposure. - Report B: Accident hazards of Air Force missions. - Report C: The Index of Accident Exposure applied to USAF commands. - Report D: Relation of duty assignment to pilot accident rate. - Report E: Relations of pilot exposure and experience to accidents. AAF HFORL TR 54-7.

#### Instruments

Appareil de mesures de la corrélation dans le temps et l'espace. (Apparatus for measurements of time and space correlation), by A. Favre, J. Gaviglio, and R. Dumas. Translated by A. Favre. Apr 1955. 21p photos, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117084

Translated from La Recherche Aeronautique no. 31, Jan-Feb 1953, p. 37-44. A communication to the 8th International Congress on Theoretical and Applied Mechanics, Istanbul, Aug 1952.

1. Autocorrelation - Equipment - France 2. Time intervals - Measurements - France 3. Flow, Turbulent - Theory - France 4. Anemometers, Hot wire - Uses - France 5. NACA TM 1371.

Counters for airborne use, by Melvin J. Warrick. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1954. 13p photos. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50. PB 111564

This report presents an integrated survey and interpretation of psychological research relevant to the design of counters for use on airborne equipment. The merits and demerits of a counter as compared with other methods of presenting information in typical applications are discussed. Such design problems as the speed and direction of rotation of a counter and the location and mode of operation of its associated control are analyzed in detail. AAF WADC TR 54-266.

Flight testing by radio remote control: Flight evaluation of a beep-control system, by Howard L. Turner, John S. White and Rudolph D. Van Dyke, Jr. U. S. National Advisory Committee for Aeronautics. Mar 1955. 55p photos, diagrs, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117010

Formerly RM A52A29.

1. Remote control systems - Tests 2. NACA TN 3496.

Two miniature temperature recorders for flight use, by John V. Foster. U. S. National Advisory Committee for Aeronautics. Apr 1955. 14p photos, drawing, diagrs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117096

Descriptions are given for two types of temperature recorders suitable for use with thermocouples on fighter-type aircraft. One is an electromechanical self-balancing potentiometer type; the other uses electronic feedback to achieve fast balance. NACA TN 3392.

#### Engines and Propellers

Analytical determination of effect of water injection on power output of turbine-propeller engine, by Albert C. Ross and Merle C. Huppert. U. S. National Advisory Committee for Aeronautics. Mar 1955. 30p graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116936

1. Engines, Turbine propeller - Air flow 2. Turbines, Gas - Cooling 3. Coolants, Engine - Flow 4. Engines, Turbine propeller - Effect of water injection 5. NACA TN 3403.

Effect of control stiffness and forward speed on the flutter of a 1/10-scale dynamic model of a two-blade jet-driven helicopter rotor, by George W. Brooks and Maurice A. Sylvester. U. S. National Advisory Committee for Aeronautics. Apr 1955. 39p photo, drawings, diagrs, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117092

1. Helicopters - Rotors - Models - Tests 2. Wings, Rotating - Vibration 3. Helicopter blades - Operation 4. Helicopters - Aerodynamics 5. NACA TN 3376.

Method for the design of hub shroud profiles of centrifugal impellers of given blade shape, by Kenneth J. Smith and Joseph T. Hamrick. U. S. National Advisory Committee for Aeronautics. Mar 1955. 37p diagrs, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116933

1. Flow, Compressible - Heat transfer 2. Flow, Mixed - Heat transfer 3. Impellers, Centrifugal - Design 4. Compressors, Centrifugal - Blades - Design 5. NACA TN 3399.

Note on secondary flow in rotating radial channels, by James J. Kramer and John D. Stanitz. U. S. National Advisory Committee for Aeronautics. 1954. 14p diagrs, graphs. Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$.20. PB 116906

Revision of NACA TN 3013 (PB 112192).  
1. NACA 1179 2. NACA TN 3013 Rev.



## Operations

Study of normal accelerations and operating conditions experienced by helicopters in commercial and military operations, by Marlin E. Hazen. U. S. National Advisory Committee for Aeronautics. Apr 1955. 34p photos, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 117071

1. Helicopters - Operation
2. Helicopters - Landing
3. Helicopters - Acceleration
4. Helicopters - Landing loads
5. Gust loads
6. NACA TN 3434.

## Training and Training Devices

Conference report of the Technical Advisory Board. U. S. Air Force. Air Research and Development Command. Human Factors Operations Research Laboratories. Personnel Research Directorate. Dec 1953. 151p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.25, Photocopy \$20.25.

PB 117052

A board of technical advisors selected from a number of universities was appointed through a contract with Washington University, St. Louis, Missouri to provide specialized technical assistance to the Personnel Research Directorate. The reports presented here are the outgrowth of seven years experience in research and development on selected personnel and training problems in the operational commands - Strategic Air Command, Military Air Transport Service and Air Defense Command. AAF HFORL TR 54-4.

Ground-simulator study of the effects of stick force and displacement on tracking performance, by Stanley Faber. U. S. National Advisory Committee for Aeronautics. Apr 1955. 22p photo, drawings, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 117091

1. Simulators, Flight - Operation
2. Stability, Longitudinal - Static tests
3. Control sticks - Tests
4. Tracking - Operator response - Measuring equipment
5. NACA TN 3428.

Human frequency response studies. Interim report, by Ezra S. Krendel and George H. Barnes. Franklin Institute. Laboratories for Research and Development. Jun 1954. 81p photos, diagrs, graphs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50.

PB 117121

Linearized open loop human transfer functions or "descriptive functions" have been measured using random forcing function inputs to pilots flying an F-80A simulator. Four jet pilots served as subjects. The results are phase and amplitude characteristics of the pilots for aileron and elevator control in re-

sponse to visual signals displayed on a CRO. The pilot's "transfer functions" for aileron and elevator control were clearly different. Contract no. AF 33-(038)-10420. AAF WADC TR 54-370.

Pre-release evaluation of story board and script of AF training film project 19081: "Maneuverability of the F86A", by John V. Zuckerman, Milton Jacobs and James S. Duva. U. S. Air Force. Human Resources Research Laboratories, Bolling Air Force Base, Washington, D. C. Nov 1951. 36p diagrs. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25.

PB 117045

Report no. II to writers of aircraft familiarization films.

1. Motion pictures, Educational - Evaluation
2. F86A (Airplane)
3. Personnel, Flying - Training
4. AAF HRRL MR 11.

Survey of on-the-job training procedures in the Air Defense Command, by Roger M. Bellows and Alfred F. Smode. Personnel Research Center, Inc., Detroit, Mich. Jan 1954. 45p tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.

PB 117050

1. Personnel, Flying - Training
2. AAF HFORL TR 54-2.

## Aerodynamics

Aerodynamic characteristics of NACA 0012 airfoil section at angles of attack from 0° to 180°, by Chris C. Critzos, Harry H. Heyson and Robert W. Boswinkle, Jr. U. S. National Advisory Committee for Aeronautics. Jan 1955. 21p graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 116373

1. Wind tunnels, Low speed - Tests
2. Airfoils - Aspect ratio
3. Airfoils - Wind tunnel tests
4. Angle of attack - Coefficients
5. Reynolds number - Effect
6. Mach number - Effect
7. NACA TN 3361.

Analysis of laminar forced-convection heat transfer in entrance region of flat rectangular ducts, by E. M. Sparrow. U. S. National Advisory Committee for Aeronautics. Jan 1955. 42p diagrs, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 116370

1. Ducts, Rectangular - Heat transference
2. Ducts, Rectangular - Inlet pressure
3. Ducts, Rectangular - Velocity profiles
4. Boundary layer - Aerodynamics
5. Karman-Pohlhausen method (Boundary layer computation)
6. Prandtl number - Effect
7. Nusselt number - Effect
8. Graetz number - Effect
9. Heat transference - Aerodynamics
10. Heat exchangers - Performance
11. NACA TN 3331.

Axially symmetric shapes with minimum wave drag, by Max A. Heaslet and Franklyn B. Fuller. U. S. National Advisory Committee for Aeronautics. Feb 1955. 46p diags, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116687

1. Cylinders, Circular - Drag 2. Bodies of revolution - Drag 3. Mach number - Effect 4. Flow, Axial - Measurement 5. NACA TN 3389.

Compressible laminar boundary layer with fluid injection, by George M. Low. U. S. National Advisory Committee for Aeronautics. Mar 1955. 31p graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116812

1. Heat - Transference - Aerodynamics 2. Boundary layer, Laminar - Stability 3. Plates, Porous - Cooling 4. Mach number - Effect 5. Coolants, Engine - Flow characteristics 6. NACA TN 3404.

Experiments on turbulent flow through channels having porous rough surfaces with or without air injection, by E. R. G. Eckert, Anthony J. Diaguila and Patrick L. Donoughe. U. S. National Advisory Committee for Aeronautics. Feb 1955. 45p photos, drawings, diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116652

1. Surfaces, Porous - Transpiration 2. Surfaces, Porous - Friction 3. Coolants, Engine - Flow characteristics 4. Flow, Turbulent - Incompressibility 5. Flow, Turbulent - Testing equipment 6. NACA TN 3339.

Free-flight measurements of turbulent-boundary-layer skin friction in the presence of severe aerodynamic heating at Mach numbers from 2.8 to 7.0, by Simon C. Sommer and Barbara J. Short. U. S. National Advisory Committee for Aeronautics. Mar 1955. 48p photos, drawings, diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116799

1. Boundary layer, Turbulent - Skin friction coefficients 2. Heat - Transference - Aerodynamics 3. Flow, Supersonic - Measurements 4. Flow, Turbulent - Measurements 5. Airplanes - Skin - Friction - Measurements 6. NACA TN 3391.

Low-speed wind-tunnel investigation of a triangular sweptback air inlet in the root of a 45° sweptback wing, by Arvid L. Keith, Jr. and Jack Schiff. U. S. National Advisory Committee for Aeronautics. Jan 1955. 65p photos, diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116510

1. Wings, Sweptback - Wind tunnel tests 2. Ducts, Air - Design 3. Ducts, Air - Inlet pressure 4. Ducts, Air - Wind tunnel tests 5. NACA TN 3363.

Note on the drag due to lift of rectangular wings of low aspect ratio, by Edward C. Polhamus. U. S. National Advisory Committee for Aeronautics. Jan 1955. 24p graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116369

1. Wing theory 2. Wings, Rectangular - Drag 3. Wings, Rectangular - Aspect ratio 4. Wings, Rectangular - Lift 5. NACA TN 3324.

One-dimensional calculation of flow in a rotating passage with ejection through a porous wall, by E. R. G. Eckert, John N. B. Livingood and Ernst I. Prasse. U. S. National Advisory Committee for Aeronautics. Mar 1955. 31p photo, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116813

1. Walls, Perforated - Air flow 2. Heat - Transference - Aerodynamics 3. Mach number - Effect 4. Coolants, Engine - Flow characteristics 5. NACA TN 3408.

Prediction of downwash behind swept-wing airplanes at subsonic speed, by John DeYoung and Walter H. Barling, Jr. U. S. National Advisory Committee for Aeronautics. Jan 1955. 104p diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116466

1. Wings, Swept - Downwash 2. Wings, Swept - Wake 3. Downwash (Aerodynamics) - Calculation 4. Stability, Longitudinal - Static tests 5. NACA TN 3346.

Prediction of losses induced by angles of attack in cascades of sharp-nosed blades for incompressible and subsonic compressible flow, by James J. Kramer and John D. Stanitz. U. S. National Advisory Committee for Aeronautics. Jan 1955. 45p diags, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116365

1. Angle of attack - Coefficients 2. Flow, Incompressible - Theory 3. Flow, Subsonic - Theory 4. Cascades (Aerodynamics) - Theory 5. Compressors - Flow - Theory 6. Turbines, Flow - Theory 7. NACA TN 3149.

Similar solutions for the compressible laminar boundary layer with heat transfer and pressure gradient, by Clarence B. Cohen and Eli Reshotko. U. S. National Advisory Committee for Aeronautics. Feb 1955. 67p diags, graphs, tables. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116650

1. Stewartson's equations (Compressible laminar boundary layer) 2. Boundary layer, Laminar - Flow - Pressure gradient 3. Boundary layer,

Laminar - Flow - Heat transfer 4. Heat - Transference - Aerodynamics 5. Flow, Compressible - Heat transfer 6. Flow, Laminar - Heat transfer 7. NACA TN 3325.

Turbulent-heat-transfer measurements at a Mach number of 2.06, by Maurice J. Brevoort and Bernard Rashis. U. S. National Advisory Committee for Aeronautics. Mar 1955. 21p drawings, graphs, table. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116797

1. Nozzles - Air flow 2. Heat - Transference - Aerodynamics 3. Flow, Supersonic - Measurements 4. Flow, Turbulent - Measurements 5. Mach number - Effect 6. Reynolds number - Effect 7. Rockets - Heat transfer 8. NACA TN 3374.

Wind-tunnel test technique for measuring the dynamic rotary stability derivatives including the cross derivatives at high Mach numbers, by Benjamin H. Beam. U. S. National Advisory Committee for Aeronautics. Jan 1955. 35p photos, diagsr, graphs. Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116507

1. Stability, Dynamic - Mathematical analysis  
2. Stability, Dynamic - Measuring equipment  
3. Wind tunnel tests - Methods 4. Damping derivatives - Stability 5. Mach number - Effect 6. NACA TN 3347.

## Marine Transportation

Cruise XII, 16 Jul-6 Aug 1952, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Apr 1954. 50p fold map, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116897

A continued study of physical and chemical structure of the Chesapeake Bay in tabular form. Section A: Salinity, temperature, current, and meteorological data. Section B: Chemical data. Contract Nonr 248(20), Project NR 083-016, and Contract Nonr 248(30), Project NR 083-070. Reference 54-5. Data report 18.

Current studies of the Eastern Cayman Sea, by Allyn C. Vine, John A. Knauss, Gordon H. Volkman. Woods Hole Oceanographic Institution, Woods Hole, Mass. May 1954. 77p diagsr, maps, graphs, tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 117197

This report is divided into three parts. The first describes the techniques which were used on ATLANTIS Cruise 184 to measure the overall current pattern of the Eastern Cayman Sea. Of particular interest was the extensive use of free floating drogues and anchored buoys to measure subsurface currents. The speci-

fic gear, from wire clamps to aviator's parachutes, is shown. A modification of the Pritchard current cross for use from a drifting ship is described. The second part deals with the current picture. The third part describes miscellaneous related observations made during the cruise. Contract Nonr-1158(00), NR 087-031. Unpublished manuscript. WHOI Ref 54-35.

Deposition of salts from sea water by frigid concentration, by Kurt H. Nelson and Thomas G. Thompson. Washington. University. Dept. of Oceanography, Seattle, Wash. Apr 1954. 34p drawings, graphs, table. Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00. PB 111606

The order of formation of solid phases when sea water freezes has been investigated down to a temperature of  $-40^{\circ}\text{C}$ . About 88 percent of the water present in the original quantity of sea water is transformed into ice before the first salt crystallizes. Sodium sulfate decahydrate, the first salt formed, begins to separate at  $-8.2^{\circ}\text{C}$ . and the sulfate concentration in the brine decreases markedly. When the temperature of the system reaches  $-22.9^{\circ}\text{C}$ ., sodium chloride dihydrate precipitates in large quantities. There is a decrease in the concentrations of magnesium and potassium in the brine below  $-36.0^{\circ}\text{C}$ . when potassium chloride and magnesium chloride dodecahydrate precipitate. The last of the brine probably solidifies at a temperature slightly below  $-54^{\circ}\text{C}$ . Contract N8onr-520/III, Project NR 083012, Technical report no. 29. WU OR 54-13.

Development of instrumentation techniques for measuring periscope vibration, by A. N. Ciaffardini. U.S. Naval Research Laboratory. Nov 1947. 18p photos, graphs, table. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 117011

This report covers the work done to date on the development of instrumentation and techniques for measuring quantitatively the vibration occurring in submarine periscopes while proceeding at periscope depth. As a result of the work done, two methods have been developed, both of which give quantitative measurements with reasonable accuracy. One method gives the actual mechanical vibration at the tip of the periscope in terms of frequency and amplitude; the other gives the optical vibration of the whole system in terms of the angular displacement of the field of view. Each of these methods can be used independently or simultaneously. A correlation between the optical motion and mechanical motion can be obtained. NRL S-3195.

Small scale tests of ship frame corners (Results of tests on brass models and summary of all tests). Final report, by L. C. Maugh. Michigan. University. Dept. of Engineering Research, Ann Arbor, Mich. Apr 1942. 23p photos, drawings, graphs (2 fold), tables. Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 117363

Project M342 for David Taylor Model Basin.  
1. Ships - Models - Tests 2. MU ERI Proj M342, Final report.

# SELECTED LIST OF ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

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

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

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

## Chemistry and Chemical Engineering

Corrosion of zirconium I. Surface area determination and sample preparation study, by A. Burtron Johnson and George Richard Hill. Technical report number XV. Institute for the Study of Rate Processes. University of Utah, Dec 1954. Contract no. AT(11-1)-82. 14p. Microfilm \$2.00, Photocopy \$2.75. AECU-3000

The liquid-vapor equilibria of the system bromine pentafluoride-bromine trifluoride, by Ray D. Long. Argonne National Laboratory. Mar 1955. Contract W-31-109-eng-38. 129p. Microfilm \$5.25, Photocopy \$16.50. ANL-5405

Manual of special materials analytical laboratory procedures, compiled by James H. Patterson. Argonne National Laboratory. Mar 1955. Contract W-31-109-eng-38. 90p. Microfilm \$4.00, Photocopy \$11.50. ANL-5410

Reaction of hydrogen with uranium, by W. M. Albrecht and M. W. Mallett. Battelle Memorial Institute. Feb 1955. Contract no. W-7405-eng-92. 22p. Microfilm \$2.25, Photocopy \$4.00. BMI-982

Ames Laboratory analytical procedures for determination of impurities in calcium metal, by Charles V. Banks and Bernard D. LaMont. Ames Laboratory. Mar 1955. Contract W-7405 eng-82. 17p. Microfilm \$2.00, Photocopy \$2.75. ISC-584

Viscosities of the binary gas mixtures, methane-carbon dioxide and ethylene-argon, by W. M. Jackson. K-25 Plant. Carbide and Carbon Chemicals Company, Oak Ridge, Tenn. Mar 1955. Contract W-7405-eng-26. 14p. Microfilm \$2.00, Photocopy \$2.75. K-1191

The continuous detection of hydrogen or hydrogenous materials in gases, by L. P. Pepkowitz. Knolls Atomic Power Laboratory. Apr 1955. Contract No. W-31-109 Eng-52. 7p. Microfilm \$1.50, Photocopy \$1.50. KAPL-1300

Some statistical aspects of X-ray fluorescence spectrometry, by W. S. Horton. Knolls Atomic Power Laboratory. Apr 1955. Contract No. W-31-109 Eng-52. 14p. Microfilm \$2.00, Photocopy \$2.75. KAPL-1312

The exchange reaction between substituted benzyl iodides and potassium iodide. IV, p-Iodobenzyl iodide, by Milton Kahn and J. L. Riebsomer. University of New Mexico. Mar 1954. 11p. Microfilm \$2.00, Photocopy \$2.75. LA-1873UNM

Apparatus for determining the physical properties of solutions at elevated temperatures and pressures, by J. R. Helks, M. K. Barnett, L. V. Jones, and W. C. McCluggage. Mound Laboratory. Jan 1953. 28p. Microfilm \$2.25, Photocopy \$4.00. Contract No. AT-33-1-GEN-53. MLM-799 (Rev.)

A modified Joliot apparatus for the study of electro-deposition of polonium. Information report, by W. H. Power. Mound Laboratory. Oct 1953. Contract No. AT 33-1-GEN-53. 13p. Microfilm \$2.00, Photocopy \$2.75. MLM-909

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