

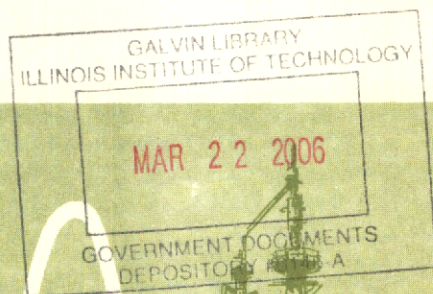
U. S. Government

RESEARCH REPORTS

June 14, 1957

Vol. 27, No. 6

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Alumina-Base Cermets

Thermal Buckling

Loaded Dielectric Foams

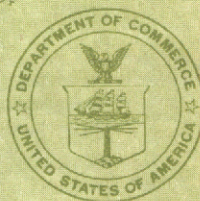
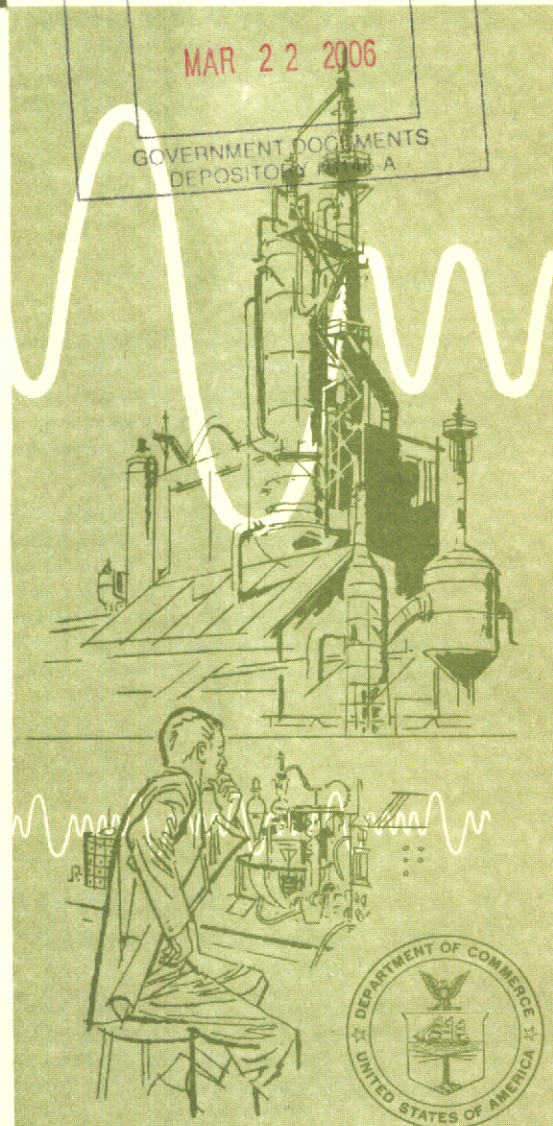
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U. S. DEPARTMENT OF COMMERCE

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APPAREL

Accustomization and indoctrination studies relating to cold weather living and the use of Quartermaster clothing and equipment, by Arthur J. Riopelle. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Aug 1956. 82p graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 124638

This report describes the development and application of a cold weather information survey which was designed to evaluate the soldiers' knowledge of correct principles and practices of cold weather living. Emphasis is placed on those concepts which deal primarily with Quartermaster items of issue. Several experiments were performed in order to determine the effectiveness of various aspects of military experience. Implications for the development of training doctrine are pointed out. Project reference: 7-95-20-003A. Appendixes include questionnaires used and an analysis of answers to the clothing and equipment survey. Contract DA-44-109-qm-1129. QMC EP TR 32.

BIBLIOGRAPHY

Survey of the literature on the electrodeposition of molybdenum, by T. T. Campbell and A. Jones. U. S. Bureau of Mines. Jul 1955. 8p. Order from LC. Mi \$1.80, ph \$1.80. Also available from U. S. Bureau of Mines, Office of Publications, Pittsburgh 13, Pa. PB 124152

1. Molybdenum - Electrodeposition - Bibliography
2. BM IC 7723.

CARTOGRAPHY

Deformation classes of conformal mappings, by Louis A. Schmittroth, Jr. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Aug 1955. 55p. Order from LC. Mi \$3.60, ph \$9.30. PB 125307

AD 72661. Dept. of the Army project: 5899-01-004. Ordnance Research and Development project: TB2-001. Office of Ordnance Research project: 1323.

1. Mapping, Conformal - Theory 2. Mathematical equations and solutions 3. Contract DA-04-200-ORD-343 4. SU AMSL TR 2.

Geodetic distance and azimuth computations for lines under 500 miles. U. S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. Jun 1956. 94p diags, tables (part fold). Order from LC. Mi \$5.40, ph \$15.30. PB 124647

This report is a study of various methods of computing geodetic distance and azimuth. Lines in various latitudes at different azimuths were used for testing the methods. Methods were evaluated for simplicity, rapidity, and accuracy (within an allowable error of ten feet in distance and one-tenth of a degree in azimuth). No lines longer than 500 miles were studied. AF ACIC TR 59.

Photo mechanical vignetting. U. S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. Jan 1955. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 124795

The photo mechanical procedure described herein was developed to eliminate the excessive man-hours required to air brush or hand-tone vignettes on aeronautical charts. The mechanical procedure was also developed in an attempt to eliminate inconsistencies in quality and control existing in the present manual method. AF ACIC TR 61.

Plastic engraved aeronautical video plates. U. S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. Dec 1955. 22p photos, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 124648

The technique described in this report provides, through application of the negative scribing technique, for the complete production of aeronautical video plates without involving photo-mechanical means for reproduction. It is felt that this technique will (1) greatly enhance the accuracy of these plates by facilitating the location of the site coordinates at the precise center of the video plate, (2) reduce the cost of production through elimination of camera reproduction, (3) considerably increase their longevity through the use of plexi-glass instead of glass, and (4) afford the users the possibility of making minor corrections in their field units through utilization of a correction kit. AF ACIC TR 72.

Preparation of molded relief mosaics by photogrammetric methods, by Allen C. Gunn. U. S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. May 1956. 28p

photos, diags. Order from LC. Mi \$2.70, ph \$4.80. PB 124797

This technical report provides a technique for producing and photo sensitizing relief models under field conditions. It is concluded that the procedure outlined in this report enables field units to prepare in a relatively short time rough relief models useful as briefing and mission planning material. AF ACIC TR 63.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Effects of various morphine-n-allylnormorphine ratios on behavior, by Bernard Weiss. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Mar 1956. 7p graph, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 124541

1. Morphine - Psychological effects 2. Drugs - Physiological effects 3. AF SAM R 56-4.

Organic Chemicals

On the anhydrous reduced halides of zirconium and hafnium, by Edwin M. Larsen and James J. Leddy. Wisconsin. University. Dept. of Chemistry, Madison, Wis. Aug 1955. 21p diagr, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 123133

A study was made of reactions of the type $M(s) + 3MX_4(g) = 4MX_3(s)$, where M refers to zirconium or hafnium, and X refers to F, Cl, Br, or I. It was the purpose of this work to obtain more definite information regarding these reduced compounds, particularly with regard to their X-ray data. A convenient preparative method was devised which involved reacting M with MX_4 at high temperatures and pressures. Metallic zirconium and hafnium were chosen as the reactants in order to least complicate the analytical and X-ray procedures. Contract N7 onr-28504, T. O. 4, NR 052-177, Technical report no. 9. NP-5743.

Synthesis of aliphatic thiols and aliphatic sulfonic acids, by A. R. Gilbert, L. W. Beck and J. K. Wolfe. U. S. Naval Research Laboratory. Apr 1946. 18p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 123397

Unclassified 15 Dec 1953.

1. Thiols, Aliphatic - Synthesis 2. Sulfonic acids, Aliphatic - Synthesis 3. NRL P 2820.

Systems formed by zirconium and hafnium tetrachloride with acetonitrile and isoamyl ether, by Edwin M. Larsen and LaVerne E. Trevorrow. Wisconsin. University. Dept. of Chemistry, Madison, Wis. Aug 1955. 12p diagr, graph, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 122959

Amperometric titrations of alizarin S with 10^{-4} M zirconium and hafnium solutions in 0.1 M perchloric acid show that the insoluble compound initially formed redissolves upon the addition of excess metal ion. The stoichiometry at the endpoints for these two species depends upon the age of the metal ion solution. The ultraviolet and visible absorption spectra of aqueous solutions of these complexes are the same. From the amperometric and spectral data, it is concluded that a metal ion is chelated by a quinoid oxygen and the alpha phenolic oxygen. Based on a thesis by LaVerne E. Trevorrow. For other reports under this contract see PB 114077, 117919, 123133, 122958-122959. Contract N7 onr-28504, T. O. 4, Technical report no. 8.

Plastics and Plasticizers

Approach to the synthesis of a polyamide plastic with hydrophilic properties, by Ezra L. Totton. North Carolina State College. Dept. of Chemistry, Durham, N. C. Jun 1956. 16p. Order from OTS. 50 cents. PB 121473

From the lactone of D-glucaric acid the di-p-toluidide of D-glucaric acid, the di-p-hydroxyanilide of D-glucaric acid, the tetra-O-acetyl-di-p-toluidide of D-glucaric acid, and the hexa-O-acetyl-di-p-hydroxyanilide of D-glucaric acid have been prepared. These compounds have not been described in the literature. Project 7340, Task 70317. Contract AF 33(616)-409. AF WADC TR 56-117.

Chemical resistance of plastics. U. S. Bureau of Ships. Mar 1954. 475p tables. Order from OTS. \$9. PB 121133

25 representative plastics and 15 chemical agents were investigated and data on tests reported in tabular form. NAVSHIPS 250-346.

Dynamic stress distribution surrounding a running crack, a photoelastic analysis, by A. A. Wells and D. Post. U. S. Naval Research Laboratory. Apr 1957. 29p photos, diagrs, graphs. Order from OTS. 75 cents. PB 121987

A photoelastic analysis is described for the dynamic stress of a plate of Columbia resin (CR-39) in tension. By using the photoelastic fringe multiplication method, it was possible to obtain adequate numbers of isochromatic fringes with models 1/8 inch thick, without the blurring at the

root of the crack which results from using thicker models. A multiple-spark technique of the type originated by Schardin was employed, and full frames of successive events were recorded on a stationary photographic plate. In addition, individual principal stress distributions were determined for running cracks in similar models by means of an optical interferometer and spark illumination. Measurements of terminal crack velocity compared well with calculated values, but observed rates of acceleration were smaller than calculated. NRL R 4935.

Evaluation of the dielectric characteristics of polyethylene titanate blends some titanate bodies and miscellaneous plastic materials, by A. Fisher and I. Silver. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1956. 47p photos, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125539

The dielectric constant and dissipation factor for various concentrations of polyethylene-titanate blends have been measured at 36 and 300-600 megacycles. The effect of the type of titanate, firing cycle, particle size, concentration and molding techniques were among the variables studied. Criteria for the reproduction of dielectric characteristics for polyethylene titanium dioxide blends have been established. Confirmation of Lichtenecker's Law relating dielectric constant of a mixture to the volume concentrations of the components was obtained. Dielectric data were also obtained for commercially produced nylon and polyethylene titanate blends, color-graded teflon, miscellaneous plastics and several low loss waxes. A polyethylene-strontium titanate blend, approximately 95% by weight of ceramic powder was noted as having a dielectric constant of 70 and percent dissipation factor of 0.33. Significant in regard to very highly loaded blends in this concentration range is the fact that increased molding pressure results in an important increase in the dielectric constant. NAVORD 4096.

Investigation of the torsional properties of plastics, by E. B. Sharp and Bryce Maxwell. Princeton University. Plastics Laboratory, Princeton, N. J. Aug 1951. 26p drawings, diagr, graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 124333

The torsional behavior of cellulose acetate, cellulose acetate-butyrate, polystyrene, methyl methacrylate and wood-flour filled phenolic has been investigated. These studies together with tensile tests on the same materials supply the data required for the measurement of the elastic constants; shear modulus (G), Young's modulus (E) and Poisson's ratio (μ). The theoretical relationship between these three constants has been studied and compared with the measured values at various temperatures. Dept. of the Army Project 3-99-15-022. Signal Corps Project 32-152B. This report appeared in Modern Plastics,

Loaded dielectric foams, by George E. Niles. Emerson and Cuming, Inc., Canton, Mass. Dec 1956. 51p photos, graphs, tables. Order from OTS. \$1.50. PB 121897

It is concluded that practical foams of adjusted dielectric constant can be made in closed bulk mold. The product can then be cut to shape or cut into strips and molded to shape, as in constructing the core of a radome. Because of the factors of speed of foaming, viscosity, rate of flow, etc., it is difficult to fill the annular space in a radome with liquid resin and allow it to foam in place and obtain uniformity of filling, of bulk density and of dielectric constant. Methods have been developed to control the rate of foaming which results in a more uniform product. AD 110686. Project 4158, Task 41646. AF WADC TR 56-261. Contract AF 33(616)-2966.

Tensile impact properties of some plastics, by Bryce Maxwell, James P. Harrington and Robert E. Monica. Princeton University. Plastics Laboratory, Princeton, N. J. Jan 1952. 30p drawing, diagrs, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 124336

The studies of the tensile impact properties of high-polymers reported in PB 107880 for polymethyl methacrylate have been continued on a rigid vinyl chloride-acetate copolymer, two formulations of ethyl cellulose, wood flour filled phenolic and nylon. Critical velocities similar to those found in methyl methacrylate were also found in the rigid vinyl and cellulose formulations. The nylon also exhibited two critical velocities but these differed from those previously found in that the energy to break showed sharp peaks at these velocities rather than the sudden drops found in the other materials. As would be expected the phenolic material did not show any critical velocity. The effect of plasticizer content on the tensile impact strength and critical velocity have been investigated and it has been shown that as the plasticizer content is increased the energy to break increases and the critical velocity is shifted to higher rates. Dept. of the Army Project 3-99-15-002. Signal Corps Project 32-152B. Continues studies reported in PB 107880. This report appeared in the Society of Plastics Engineers Journal, Dec 1952. PU PL TR 24A. Contract DA 36-039-sc-133, Report 6A.

Paints, Varnishes and Lacquers

Some aspects of the electrodeposition of titanium and zirconium coatings, by R. M. Creamer, D. H. Chambers, and C. E. White. U. S. Bureau of Mines. Dec 1954. 41p tables. Order from LC. Mi \$3.30, ph \$7.80. Also

1. Electroplating - Solutions 2. Titanium - Electrodeposition 3. Zirconium - Electrodeposition 4. Coatings, Zirconium - Electrodeposition 5. Coatings, Titanium - Electrodeposition 6. BM RI 5093.

Inorganic Chemicals

Boron analysis. Progress report for 1953-1954 and summary of 1952-1954 studies on chemistry of boron hydrides and toxicity of boranes, by William H. Hill and Joseph L. Svirbely. Pittsburgh. University. Graduate School of Public Health. Sep 1954. 116p graphs, tables. Order from LC. Mi \$6, ph \$18.30. PB 125391

The reports contain data on the toxicity and mechanism of action of boron hydrides, and on analytical problems involved in this field. Extensive testing of chemical reactions to determine such data is tabulated. CC MLCR 42. Contract DA 18-108-CML-3910.

Chemistry of boron hydrides, by William H. Hill. U. S. Chemical Warfare Laboratories. Directorate of Medical Research, Army Chemical Center, Md. Dec 1956. 16p. Order from LC. Mi \$2.40, ph \$3.30. PB 125537

The work done under this contract for the past year comprised various phases of chemistry in the field of boron hydrides, such as the development of new and the improvement of old methods of analysis, and the determination of boron levels of biological materials, such as tissues, urine, blood and bile of animals used as controls in toxicological investigations. Summary of work done during 1954-1955 under Chemical Corps Contract no. DA 18-108-CML-5415, order no. 4-7132. CC CWL TM 27-6.

Chemistry of zirconium and hafnium. Final report, by Edwin M. Larsen. Wisconsin. University. Dept. of Chemistry, Madison, Wis. Aug 1955. 20p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 123124

The object of this program was not to develop separation methods for zirconium and hafnium per se, but rather to search out any significant differences between these elements by making parallel studies on certain aspects of their chemistry. The fields investigated can roughly be divided into the following groups: aqueous chemistry, including pH of precipitation, extraction with various beta diketones, behavior with cation exchange resins, and the polarographic investigation of the alizarin S-metal ion reaction; and anhydrous chemistry, the anhydrous tetrahalides as Lewis acids, the nature of addition compounds with

tetrahalides, their distribution between two immiscible Lewis bases, and the reduced halides of these elements. In addition, the preparation and properties of the solid chelate compounds of certain beta diketones were investigated. For Technical reports no. 5-6, 8-10 see PB 114077, 117919, 122958-122959. Contract N7 onr-28504, T. O. 4, Final report.

Chlorosulfonation of silanes and related reactions,
by C. G. Overberger and F. M. Beringer.
Polytechnic Institute of Brooklyn. Dept. of
Chemistry, Brooklyn, N. Y. Jan 1957. 37p
tables. Order from OTS. \$1. PB 121973

The aim of this work was the synthesis of polar organosilicon monomers capable of polymerization to synthetic rubber. The polar groups would be expected to decrease the solubility of the silicone rubber in organic solvents as well as increasing the transition temperature. The synthesis of a suitable polar organosilicon monomer has not yet been effected. Results, some of which represent progress toward the desired goal, are summarized. AD 110712. Project 7340, Task 73404. Contract period from Jun 1, 1955 - May 31, 1956. AF WADC TR 56-326. Contract AF 33(616)-2997.

Cryoscopic heat of fusion of ammonium nitrate, by
A. G. Keenan. Illinois Institute of Technology.
Dept. of Chemistry, Chicago, Ill. Dec 1955.
14p drawing, graphs, table. Order from OTS.
50 cents. PB 121552

Freezing-point depression data have been measured for fused salt systems, with Li, Na, K, Rb, Cs, Tl and Ag nitrates as solutes and NH_4NO_3 as solvent, in the concentration range 0.5-4.0 mole per cent and temperature range 160-170°C. The reproducibility of the data is within $\pm 0.02^\circ$. The results show interesting correlation with ionic radii and structure. The data are interpreted to indicate that there is no solid solution formation in the case of the Li, Na and Ag nitrates, without recourse to actual analysis of the solid phase. These solutions are, in fact, very close to ideal and the data yield a value of 1.53 kcal. mole⁻¹ for the latent heat of fusion of ammonium nitrate. AD 82005. Project no. Chem. 40-18. AF OSR TN 56-91. Contract AF 18(600)-1148.

Determination of carbon, hydrogen and nitrogen in organoboron compounds and of boron and carbon in boron carbides, by P. Arthur and R. Annino. Oklahoma Agricultural and Mechanical College, Stillwater, Okla. Mar 1956. 34p drawings, diagrs, tables. Order from LC.
Mi \$3, ph \$6.30. PB 125392

Micro dry combustion procedures were modified to permit better determinations of C in organoboron compounds, of N₂ in amine-boron trifluoride complexes, and of B and C simultaneously in boron carbides. Boron and carbon in boron carbides were determined simultaneously by burning at 1400°C in

an induction furnace. The carbon was measured by absorption of the resulting CO₂ on Ascarite and B by titration of the boric oxide formed. CCC-1024-TR-179.

Electrode processes. Texas. University. Dept. of Chemistry, Austin, Tex. Contract Nonr-375 (04), Project NR 051-312. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report no. 1: Interaction of chromium (VI) anions with chromium metal surfaces, by L. O. Morgan and S. Kottle. May 1955. 62p drawing, diagrs, graphs, tables. Mi \$3.90, ph \$10.80. PB 124061

Experiments have been carried out in which electrode potential changes have been correlated with adsorption of chromium(VI) anions on chromium metal surfaces. Three different classes of metal surface were recognized: (1) active surfaces, such as those obtained upon removal subsequent treatment, (2) passive surfaces, which were produced by treatment of active metal with boiling nitric acid, and (3) etched surfaces, produced from either active or passive metal by treatment with hydrochloric acid. For Technical reports no. 3-5 see PB 123225, 123467, 123735.

Technical report no. 3: Aqueous chromium (III) sulphate solutions. II: Ion exchange separation of solution species, by L. O. Morgan and Jeffrey Gipson. Aug 1955. 22p graphs, tables. Mi \$2.70, ph \$4.80.
PB 123225

Solution species in aqueous chromium (III) sulfate solutions were separated into fractions by elution from Dowex-50 with ammonium nitrate solution. Four fractions were clearly recognized in solutions which were aged under various conditions: (1) neutral species having the approximate composition $\text{Cr}_2(\text{SO}_4)_3$, (2) positively charged, but nearly neutral species of the same composition, (3) hydrolyzed species, probably polymeric, having low charge, (4) more highly charged and less complex hexaquo and hydrolyzed species. Sulfate was found to be definitely associated with only the first two fractions listed. Thus, no uniform sulfate-containing species may be postulated for such solutions. AD 70819. For Technical reports no. 1, 4-5 see PB 124061, 123467, 123735.

Technical report no. 5: Anodic platinum losses in chlorate electrolytes, by W. H. Philipp and L. O. Morgan. Sep 1955. 24p graph, tables. Mi \$2.70, ph \$4.80.
PB 123735

Radioactive platinum 197 was used as a tracer in the examination of factors in-

fluencing anodic platinum losses in aqueous chlorate and perchlorate electrolytic solutions. Losses were greatest in the presence of chlorides and were probably attributable to the formation of soluble oxychlorides by reaction of chloride ions with platinum (IV) oxide or platinum (VI) oxide at the electrode surface. Losses were negligibly small in chlorate solutions in the absence of chloride ions.

Heats of solution of boron hydrides and derivatives in liquid ammonia; the heat of ammoniation of the hydrogen bridge structure in boron hydrides, by J. R. Sinclair, L. V. Coulter and A. G. Cole. Boston University, Boston, Mass. Mar 1956. 13p table. Order from LC. Mi \$2.40, ph \$3.30. PB 125535

Heat of solution of diborane diammoniate, pentaborane, decaborane and dimethylaminodiborane in liquid ammonia were determined. From these values and the heats of formation of the boron hydrides at 240°K, were calculated the heats of formation of boron hydrides in ammonia. In addition, the heat of solution of liquid diborane in ammonia was calculated to be -29.2 kcal./mole. From the heats of mixing of the liquid boron hydrides with liquid ammonia were derived the heats of solvation per bridge hydrogen, the values of which appear to be dependent on the nature of the particular bridge structure involved. The values obtained for the heats of solution and solvation of the boron compounds are interpreted in the light of the known structures of these compounds. CCC-1024-TR-177.

Kinetics of the pyrolysis, hydrolysis and oxidation of boranes and alkyl boranes, by H. J. Galbraith and J. F. Masi. Callery Chemical Company, Callery, Pa. Nov 1955. 32p graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 125390

An extensive investigation was made of the literature reports on kinetic studies of the pyrolysis, oxidation and hydrolysis of boranes and alkyl boranes. Some ninety sources were evaluated; of these, sixteen contained pertinent and fundamental information and are surveyed here. No general conclusions have been forthcoming from the consideration of this body of literature; for this reason the various studies are reported individually with criticisms and comparisons where warranted. CCC-1024-TR-150.

Luminescence of potassium iodide, by K. J. Tee-garden. Rochester. University. Institute of Optics. Jun 1956. 22p graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 125536

When single crystals of potassium iodide are cooled to -160° C and illuminated with light absorbed in the first fundamental band they luminesce with a quantum yield between .5 and 1. The excitation and emission spectra of this luminescence is indepen-

dent of the impurity content of the crystals but may depend somewhat on their perfection. Some extension of conclusion may be made on other pure salts. AD 89485. AF OSR TN 56-275. Contract AF 18-600-193.

On vanadic vanadates (Sui vanadicovanadati), by G. Canneri. Translated and edited by F. A. Raven. May 1956. 31p graphs. Order from LC. Mi \$3, ph \$6.30. PB 122942

By the name vanadic vanadates is understood those definite compounds resulting from the combination of vanadates with alkaline vanadites. Consideration of the analogy that such combinations have to the so-called tungsten bronzes stimulated the author to study the forms of combination between pentavalent and tetravalent vanadium, given the multiplicity of forms which appear in tungsten bronzes. The phenomena which accompanies the formation of such compounds and the generation of oxygen is also studied. Translated from Gazzetta Chimica Italiana, vol. 58, 1928, pp. 6-25. NAVSHIPS T 609. STS 235.

Phase rule study of the system zinc-oxide chromium trioxide-water at 25°C, by A. E. Woodward, E. R. Allen and R. H. Anderson. Rutgers University. School of Chemistry, New Brunswick, N. J. Dec 1955. 31p diagrs, tables. Order from LC. Mi \$3, ph \$6.30. PB 124812

A complete phase diagram study at 25°C. has provided evidence for the existence of four compounds: $2\text{ZnO} \cdot \text{CrO}_3 \cdot \text{H}_2\text{O}$, $1.5\text{ZnO} \cdot \text{CrO}_3 \cdot 3\text{H}_2\text{O}$, $\text{ZnO} \cdot \text{CrO}_3 \cdot 2\text{H}_2\text{O}$ and $\text{ZnO} \cdot 2\text{CrO}_3 \cdot 2\text{H}_2\text{O}$ which have the same $\text{ZnO}:\text{CrO}_3$ molar ratios as those reported previously. Contract Nonr-494(06), NR 036-013.

Preparation and properties of titanium tetrabromide, by J. M. Blocher, Jr., R. F. Rolsten, N. D. Veigel and I. E. Campbell. Battelle Memorial Institute, Columbus, Ohio. Jul 1955. 30p drawings, graphs, tables. Order from OTS. \$1. PB 121542

High-purity TiBr_4 has been prepared by direct synthesis with high-purity materials, followed by distillation. Measurements were made of certain properties of interest in the extractive metallurgy of titanium where TiBr_4 is a potential intermediate. The following results were obtained: melting point, heat capacity of solid, heat capacity of liquid, heat of fusion, heat capacity of vapor, standard entropy of vapor, vapor pressure of liquid, boiling point, heat of vaporization, grain-molecular weight by vapor density, density of liquid, viscosity of liquid. The results are critically compared with the limited data in the literature. Contract Nonr 1120(00) Technical report no. 1.

Self diffusion of sodium and ionic conductivity in NaCl-CaCl₂ crystals, by J. O. Thomson. Illinois, University, Urbana, Ill. Feb 1956. 32p diagr, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 122413

The diffusion of sodium ions in sodium chloride containing small, known concentrations of calcium chloride has been measured as a function of temperature. This data is compared with the ionic conductivity of the crystals. The association of calcium ions with positive ions to form complexes appears to be much smaller than is theoretically expected. This conclusion must be accepted with reservation since the behavior of the data is not in complete agreement with the predictions of the association theory. AD 81051. AF OSR TN 56-59. Contract AF 18(600)-662.

Studies of the properties of liquid fluorine, nitrogen trifluoride and perchloryl fluoride, by Roger L. Jarry. Pennsylvania Salt Mfg. Co. Research and Development Dept. Whitmarsh Research Laboratories, Wyndmoor, Pa. Dec 1956. 9p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 124777

This research project was concerned with the determination of various physical properties of liquid fluorine, nitrogen trifluoride and perchloryl fluoride. The densities of liquid fluorine were measured over the temperature range 67 to 103°K. For nitrogen trifluoride and perchloryl fluoride, determinations were made of the liquid density over the temperature ranges 78 to 170°K. and 131 to 234°K. respectively. Vapor pressure for these two compounds was measured to the critical region, and their critical temperatures determined. In addition, for perchloryl fluoride, data on the viscosity and surface tension were taken over a limited range. AD 110311. Summarizes previous reports: AF OSR TN 55-286, AF OSR TN 56-498 and PB 122957 and 123952. AF OSR TR 56-50. Contract AF 18(600)-761, Final report.

Studies on boron hydrides. Ninth annual technical report of investigations on water-reactive chemical compounds, by Anton B. Burg. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Nov 1955. 32p tables. Order from LC. Mi \$3, ph \$6.30. PB 125424

During the past year efforts to find easier ways to make the phosphinoborane polymers have met with some success, for there are now three new methods which can be carried out without especially elaborate techniques. The search has led at the same time to a new type of N-P compound which, in forming trimeric dimethylphosphinoborane by reaction with diborane, gives also a thermally stable high polymer. Covers period from Nov 1, 1954 through Oct 31, 1955 under Contract N6 onr-238, T. O. I, NR 356-050. For 7th-8th reports see PB 114674 and 118544.

Thermodynamic properties of magnesium diboride and magnesium tetraboride, by David White and

Robinson M. Swift. Syracuse University. Dept. of Chemistry, Syracuse, N. Y. Jan 1956. 42p photos, diagr, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125425

An apparatus was constructed to measure the heat capacity of solids from 18° to 305°K. The heat capacities of magnesium diboride (MgB₂) and magnesium tetraboride (MgB₄) were measured in this temperature range. The values of heat capacity, entropy, enthalpy, and free energy have been tabulated at integral values of temperature. No relationship was found among the vibration frequencies characteristic of the two compounds. MCC-1023-TR-193.

Toxicology of boron hydrides (U), by George J. Levinskas. U. S. Chemical Warfare Laboratories. Directorate of Medical Research, Army Chemical Center, Md. Dec 1956. 28p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125538

Subacute and chronic inhalation studies were conducted with pentaborane. The former, at 1.0 p.p.m. resulted in the death of several animals within four weeks (20 exposures). The chronic study was conducted at 0.2 p.p.m. of pentaborane for approximately six months. Physiological and pathological effects are given. Summary of work done during 1954-1955 under Chemical Corps Contract no. DA 18-108-CML-5415, order no. 4-7132. CC CWL TM 27-7.

Analytical Chemistry

Autoradiographic study for the distribution of thorium in magnesium alloys, by Kurt Wolfberg and George John. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1956. 44p photos, drawings, graphs, tables. Order from OTS. \$1.25. PB 121975

An autoradiographic study of magnesium alloys containing 3% and 13% thorium has been performed. The stripping film method was slightly modified because of the extreme reactivity of magnesium. The results show qualitatively that a large percentage of the thorium is located in or very near to the grain boundaries. AD 110571. Project 7360, Task 73609. Covers work from 1 Apr 1955 - 16 Mar 1956. Appendix is Technical Note WCRT 55-16: Microautoradiographic determination of thorium distribution in magnesium-base alloys, by B. A. Raby. Feb 1955. AF WADC TR 56-409. AF WADC TN WCRT 55-16.

Development of a micro method for the determination of aliphatic aldehydes, by Earl W. Malmberg and Boris Weinstein. Ohio State University. Dept. of Chemistry and Ohio State Uni-

versity Research Foundation, Columbus, Ohio.
Nov 1956. 33p photo, graphs, tables. Order
from OTS. \$1. PB 121996

The object of this investigation is the development of a method for the determination of aliphatic aldehydes in microgram quantities. Six of the methods in the literature which showed the greatest promise were investigated experimentally. The test which gave the most satisfactory sensitivity and general performance was with 2-(p-phenylazo)phenylhydrazine sulfonic acid. One new method of synthesis of the reagent and a major revision of the preparative method in the literature was required before the test could be made consistent and sufficiently sensitive. The experimental conditions for the test and methods of scrubbing samples from the air were investigated. The oxidation of a synthetic lubricant based on di(2-ethylhexyl) sebacate was investigated to show the nature of the carbonyl compounds which might be expected. Project 7159, Task 71803. AF WADC TR 56-516. Contract AF 33(600)-30287.

Micro lubricant test methods. Part V: High temperature viscosity, by John B. Christian. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1957. 10p photo, table. Order from OTS. 50 cents. PB 121995

This report introduces a small scale method of analysis for the determination of viscosity at high temperatures (550°-700°F). Its application is especially important in instances where only minute quantities of sample are available. The small scale replica of the modified Ostwald Viscometer employing 1.5 milliliters of sample was used in the test method described. A bath solution composed of the nitrates of lithium, potassium, and sodium has been substituted for the usual oil bath and has proved to be satisfactory. AD 118048. Project 3044, Task 73314. Covers work from Apr-Aug 1956. For Parts 1-4 see PB 121355, 121386, 121443 and 121849. AF WADC TR 55-449, Part V.

Reproducibility of viscosity determinations at 77°F., by W. E. Whybrew and P. Borgstrom. U. S. Naval Research Laboratory. Mar 1935. 72p tables. Order from LC. Mi \$4.50, ph \$12.30. PB 122795

Unclassified.

1. Oil fuel - Viscosity - Research 2. NRL P 1127.

X-ray spectroscopy of solids, by C. H. Shaw. Ohio State University Research Foundation, Columbus, Ohio. Jan 1956. 75p diagrs, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 125304

A review of the field, covering 354 cited references. After an historical introduction to X-ray diffraction

and a description of the instrumentation used, the report discusses spectra of the K-, L-, and M- series, giving emission and absorption spectra for aluminium, argon, copper, potassium chloride, and zirconium. Based on a paper presented in Oct 1955 before the Symposium of the American Society for Metals held at Philadelphia. Reprints are available from Ohio State University Research Foundation, Dept. of Physics and Astronomy, Columbus, 10, Ohio. Contract N6 onr-22521, NR 017-606, Technical Report 4. OSURF Proj 384.

Miscellaneous Chemicals

Solid state properties and catalytic activity. Seventeenth periodic status report for the period 1 Jul 1955-30 Sep 1955 under Contract N6 onr-27018, by Hugh Taylor. Princeton University. Dept. of Chemistry, Princeton, N. J. Sep 1955. 4p. Order from LC. Mi \$1.80, ph \$1.80. PB 124885

The object of the task order is to study: 1. The importance of defect structures in catalysis, 2. The role of impurity centers in oxide matrices on the chemical and catalytic properties of various oxide and alloy systems, 3. The influence of withdrawing oxide ions from oxides to produce defect structures from the standpoint of catalytic activity of the solids formed. For 9th-15th reports see PB 114084, 115107, 116327, 117473, 118386, 119034 and 120035.

Survey of fundamental knowledge of mechanisms of action of flame-extinguishing agents, by Raymond Friedman, and Joseph B. Levy. Atlantic Research Corporation, Alexandria, Va. Jan 1957. 100p tables. Order from OTS. \$2.50. PB 121853

The report is based on the pertinent scientific literature up to May 1956 as well as visits to laboratories and investigators active in research on flames. The topics discussed here include methods of flame extinguishment, the current status of knowledge of uninhibited and inhibited gaseous flames, the action of inhibitors, and the burning of liquids and solids including the inhibition thereof. The bibliography contains 345 references. AD 110685. Task 61331. Covers work from Apr 1 - Nov 28, 1956 under Contract AF 33(616)-3527. AF WADC TR 56-568.

ELECTRICAL MACHINERY

Communication Equipment

Detection and location of concealed microphone wires, by Raymond C. Waddel and James P.

Parker. U. S. Naval Research Laboratory. Sep 1942. 13p photos, diagrs. Order from LC. Mi \$2.40, ph \$3.30. PB 122743

Unclassified 1 July 1946.

1. Microphones, Concealed - Detection 2. Wiring, Concealed - Detection 3. NRL O 1950.

Electronics

Backward wave amplifier, a voltage tunable microwave amplifier, by Daniel G. Dow. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1955. 16p diagrs, graphs. Order from OTS. 50 cents. PB 121797

A new form of microwave amplifier known as the backward-wave amplifier has recently become feasible due to new discoveries. This electron tube is capable of covering a wide band of frequencies, but is actually a narrow band filter which is tunable by varying the anode voltage. In addition to the filtering effect, the tube can have as much gain in the pass band as the better known traveling-wave amplifier. The history of the backward-wave amplifier is briefly discussed, its present status is outlined, and possibilities for future work are suggested. AD 110456. Project 4156. AF WADC TN 55-566.

Bright display equipment for surveillance radar, by Albert W. Randall and Jack S. Marshall. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 12p photos, diagr, graphs, table. Order from LC. Mi \$2.40, ph \$3.30. PB 123573

Techniques and equipment used to provide a bright display of radar information are described in this report, together with a technical evaluation of the results obtained from experimental equipment. Performance requirements for the display equipment are discussed, with consideration being given to the operational requirements. An analysis is made of the characteristics and limitations of the equipment. CAA TDR 173.

Common-base transistor equivalent circuits for wideband application, by J. M. Mathias. Stanford University. Electronics Research Laboratory, Stanford, Calif. Dec 1955. 50p diagrs, graphs, table. Order from OTS. \$1.25. PB 121752

The problem of choosing a transistor equivalent circuit of practical usefulness for wideband, low-pass (video) amplifiers is studied experimentally. The calculated response of several equivalent cir-

cuits of varying complexities are compared with the actual measured response. Approximate formulas are found which enable the cutoff frequency of such an amplifier to be calculated for all values of source and load resistance. An instrument was developed to measure accurately the phase response of the transistor amplifier. This resulted in a device, with a high input impedance, that could measure the relative phase shift between a reference signal and the low-level collector signal at frequencies from the audio range up to 10 Mc. Contract N6 onr 251(07), NR 373-360. SU ERL TR 94.

Comparison of a hydrogen thyratron modulator with the Peterson coil modulator of the Mark 8 radar, by P. F. Ordnung. U. S. Naval Research Laboratory. Jul 1945. 20p photos, diagrs, graphs, table. Order from LC. Mi \$2.40, ph \$3.30. PB 122784

Unclassified 15 Dec 1953.

1. Thyratons, Hydrogen - Evaluation 2. Modulators, Hydrogen - Evaluation 3. Radar - Components - Evaluation 4. Mark 8 (Radar) 5. NRL R 2574.

Development of an improved "station location" or "Z" marker antenna system, by J. C. Hromada and Thomas A. Kouchnerkavich. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1941. 27p photos, diagrs, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 123546

Reprinted 1943.

1. Antennas, Dipole - Design 2. Indicators, Position - Design 3. Radio stations - Location 4. CAA TDR 31.

Development of the antenna (identification) Mark 1 Mod O, by P. A. Lentz, A. D. Hammes and R. J. Adams. U. S. Naval Research Laboratory. Mar 1945. 43p photos, drawings (1 fold), diagrs, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 123362

Unclassified 15 Dec 1953.

1. Antennas, Radar - Design 2. NRL R 2486.

Diffraction and shielding effects of radar screens, by A. W. Randall and Roger L. Williams. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Mar 1957. 12p photos, diagr, graphs. Order from OTS. 50 cents. PB 121918

This report describes the results of tests to determine the effectiveness of shielding screens for surveillance radars in reducing the strength of ground-clutter signals in critical areas. Although the scope of the experimental tests was

very limited, it was found that properly designed screens can provide a worthwhile reduction in ground-clutter signal strength in areas where the subclutter visibility performance of the radar is inadequate. CAA TDR 299.

Direction finder requirements for submarines with special reference to the use of the SV radar reflector, by J. O. Spriggs and H. D. Arnett. U. S. Naval Research Laboratory. Apr 1946. 42p photos, diagrs, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 122783

Unclassified 15 Dec 1953.

1. Radio direction finders - Submarines 2. Radar - Reflectors - Design 3. NRL R 2689.

Electron tube operation as influenced by temperature and voltage, by Thomas H. Briggs. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1956. 91p drawing, diagr, graphs, tables. Order from OTS. \$2.50. PB 121798

A review of factors influencing tube reliability is undertaken primarily from the point of view of temperatures. Consideration is given to each tube part and the normally used materials, their design and processing. From these basic effects, the influences of tube operation and environment are reviewed as regards tube performance. For optimum tube performance and reliability it is shown that: a) heater and cathode temperatures should be maintained as closely as possible to published design centers; b) other electrode and environmental ambient temperatures should be as conservative as possible; c) no sharp line of demarkation exists between good and poor conditions, but all effects must be considered statistically; d) recognition of the physics involved in tube operation can yield improved circuit and applications reliabilities of as much as several orders of magnitude. AD 110455. Project 4156. AF WADC TR 56-53.

Equipment for radio transmission of electrical strain gauge data, by G. C. Schleter. U. S. Naval Research Laboratory. Aug 1939. 10p diagrs, table. Order from LC. Mi \$1.80, ph \$1.80. PB 122807

Unclassified 15 Dec 1953.

1. Radio transmitters - Design 2. Data - Transmission equipment 3. NRL R 1556.

Evaluation of model FSB frequency shift keyer for Naval use, by A. L. Goepfinger and M. Burmeister. U. S. Naval Research Laboratory. Jan 1946. 44p photos, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 123346

Unclassified 15 Dec 1953.

1. Radio transmitters - Tests 2. NRL R-2748.

Experimental counterrotating marker beacon, by H. J. Cory Pearson and Marcus S. Gilbert. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1952. 9p photos, diagrs, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 123571

1. Radio beacons - Design 2. Lights, Approach - Design 3. CAA TDR 160.

Field electron emission, by Russell D. Young and Earl C. Cooper. Pennsylvania State University. Dept. of Physics. Field Emission Laboratory, University Park, Pa. Jul 1956. 91p photos, diagrs, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 123961

Boron is found to be strongly bonded to the tungsten substrate as indicated by activation energies of 2.8 electron volts for surface migration and 6.2 electron volts for disappearance. The activation energy of pure molybdenum for surface migration is 3.1 electron volts and for the silicon deposit 2.5 electron volts for surface migration and about 4.0 electron volts for evaporation. AD 94853. Contents: Part I. Study of adsorption on boron on tungsten, by Russell D. Young. - Part II. Study of silicon deposits on molybdenum, by Earl C. Cooper. AF OSR TN 56-317. Contract AF 18-(600)-672, Technical report no. 2.

Heater-cathode leakage investigations. Second quarterly report covering period May 1 - Aug 1, 1956, under Contract AF 19(604)-1734, by Paul E. Carroll, Julius Cohen, Paul Cutler and J. V. Florio. Sylvania Electric Products, Inc. Product Development Laboratories, Kew Gardens, N. Y. Aug 1956. 31p photo, diagrs, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 124715

The purpose of the present experimental program is three-fold: 1. To obtain a phenomenological description of heater-cathode leakage under typical life test conditions of military tube types. 2. To determine the nature and relative importance of mechanisms responsible for heater-cathode leakage and to investigate the physical and chemical parameters governing the important heater-cathode leakage mechanisms. 3. To utilize the experimental findings through specific recommendations concerning (a) the use of improved materials, (b) the use of improved processing and aging, and (c) the use of operating conditions to minimize the detrimental effects of heater-cathode leakage. Report YF 56(B7-3028-2). AF CRC TN 56-794. Contract AF 19(604)-1734.

Higher-order radiative corrections to electron scattering, by D. R. Yennie and H. Suura. Stanford University. Dept. of Physics, Stanford, Calif. Nov 1956. 15p diagrs. Order from LC. Mi \$2.40, ph \$3.30. PB 124917

The higher-order radiative corrections are examined in the infrared region, and Schwinger's conjecture regarding the functional dependence of these corrections on the energy resolution is proved. Stanford report 545-19. Project: R-357-40-3. Contract AF 18(600)-545. SU DP TR 19. AF OSR TN 56-560.

Investigation of methods for improving the temperature compensation of Eclipse, type 1001 and 1317 a. c. carbon pile voltage regulators, by John P. Berner and A. T. McClinton. U. S. Naval Research Laboratory. Jan 1946. 10p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 123347

Interim report E-2737. Unclassified 15 Dec 1953.
1. Regulators, Charging 2. Voltage regulators, Carbon pile 3. NRL E 2737.

L band repeater for use with the radar Mark 4, by W. R. Faust. U. S. Naval Research Laboratory. Nov 1945. 16p photos, drawings, diags, graph. Order from LC. Mi \$2.40, ph \$3.30. PB 122777

Unclassified 15 Dec 1953.
1. Mark 4 (Radar repeater) 2. Radar - Repeaters - Theory 3. Radar - Repeaters - Design 4. NRL R 2673.

Long persistent exponential decay phosphors, by James F. Elliott. General Electric Co. Electronics Laboratory, Syracuse, N. Y. Feb 1956. 57p graphs, tables. Order from OTS. \$1.50. PB 121527

The results of the project to develop a cathode-ray phosphor having a long persistent exponential decay characteristic with a time constant of the order of 0.5 sec to 2.5 sec or a phosphor having a concave downward decay characteristic with a similar decay time are reported. The effort was directed toward the development of a long persistent exponential decay phosphor. The decay and emission characteristics of phosphors using a strontium, barium, or calcium silicate matrix and rare earth elements as activators are reported. A phosphor having the desired decay properties was not found. Project no. 4156. Summarizes research from Feb 1, 1955 through Jan 31, 1956 under Contract AF 33(616)-399. AF WADC TR 56-118.

Measurement of the transmission characteristics of shipboard antenna systems (USS New York, USS Texas, and USS Arkansas), by M. L. Leppert and Oscar Norgorden. U. S. Naval Research Laboratory. Sep 1940. 50p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 120400

Unclassified 31 Aug 1955.
1. Antennas, Shipborne - Radiation patterns - Measurements 2. NRL R 1652.

Multiposition coaxial switch, by J. W. Burkert. U. S. Naval Research Laboratory. Aug 1946. 10p photo, fold drawing, graph. Order from LC. Mi \$1.80, ph \$1.80. PB 123335

Unclassified 15 Dec 1953.
1. Coaxial lines - Switches - Design 2. NRL R 2935.

Phase retardation design curves for solid lossless dielectric panels, by Eino J. Luoma. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1956. 27p graphs. Order from OTS. 75 cents. PB 121783

This report contains a series of graphs of phase retardation design curves for solid lossless flat dielectric sheets. The thickness of the flat dielectric sheets is plotted as a function of incidence angle for both perpendicular and parallel polarization and for the following constant phase retardation values: 45° , 90° , 135° , and 180° . The curves are plotted for a series of dielectric constants. For reference purposes on the same graphs the thickness of the flat sheets are plotted as a function of incidence angle for the following cases: 1) with the electrical thickness equal to 90° , the transmission efficiency is a minimum for both polarizations, 2) with the electrical thickness equal to 180° , the transmission efficiency is a maximum for both polarizations, 3) with the electrical thickness equal to 135° , the transmission efficiency is again a minimum for both polarizations, and 4) with the electrical thickness equal to 360° , the transmission efficiency is again a maximum for both polarizations. The graphs are intended for use as a design tool by radome designers. AD 110514. Project 4158, Task 41540. AF WADC TR 56-116.

Procedure for investigating infra-red receiver performance with application to the CF-2 and CF-3 receivers, by R. Tousey. U. S. Naval Research Laboratory. Dec 1945. 16p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 123350

Unclassified 15 Dec 1953.
1. Infrared receivers - Performance - Tests 2. NRL H 2722.

Progress report of the National Research Council of Canada. Radio and Electrical Engineering Division. Limited supply available free from National Research Council of Canada, Radio and Electrical Engineering Division, Ottawa, Canada, or order separate parts described below from LC, giving PB number of each part ordered.

Jul - Sep 1955. Oct 1955. 27p photos, diagr, graph. Mi \$2.70, ph \$4.80. PB 122618

1. Dielectric research - Canada 2. Antennas - Research - Canada 3. Electromedical research - Canada 4. Radar - Research - Canada 5. Tubes, Electron - Research - Canada 6. Noise, Solar - Research - Canada 7. Navigational aids - Research - Canada 8. Musical instruments, Electronic - Research - Canada 9. Atmosphere, Upper - Research - Canada 10. Engineering, Electrical - Research - Canada 11. NRCC ERA 292.

Oct - Dec 1955. Jan 1956. 24p photos, graph. Mi \$2.70, ph \$4.80. PB 122617

1. Dielectric research - Canada 2. Antennas - Research - Canada 3. Electromedical research - Canada 4. Radar - Research - Canada 5. Tubes, Electron - Research - Canada 6. Noise, Solar - Research - Canada 7. Navigational aids - Research - Canada 8. Musical instruments, Electronic - Research - Canada 9. Atmosphere, Upper - Research - Canada 10. Engineering, Electrical - Research - Canada 11. NRCC ERA 297.

Receiver and transmitter (ROM) interference tests, by P. A. Guarino, R. P. Owen and R. E. Davis. U. S. Naval Research Laboratory. Oct 1945. 37p graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 122775

Unclassified 15 Dec 1953.

1. Radar - Interference - Tests 2. NRL R-2664.

Report on test of maintenance of true bearing attachment for model YG homing beacon equipment, by H. R. Johannessen. U. S. Naval Research Laboratory. Dec 1943. 46p photos, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 120735

Date of test 16 Oct-12 Nov 1943. Unclassified 15 Dec 1953.

1. Radar - Homing devices 2. Radar - Beacons - Components 3. Indicators, Bearing - Tests 4. NRL R 2194.

Research in gaseous electronics. Final report covering the period Sep 23, 1954-Jun 23, 1956 under Contract AF 18(600)-1239, by K. G. Hernqvist, R. W. Peter and A. D. Sutherland. Radio Corporation of America. RCA Laboratories Div. David Sarnoff Research Center, Princeton, N. J. Jun 1956. 79p photos, diags, graphs, table. Order from OTS. \$2. PB 121805

This contract covers research on the initiation and maintenance of high current density gas discharges from solid and liquid cathodes for use in rectifiers and high power tubes. Emphasis was placed on the study of the properties of mercury pool cathodes and analogous properties of solid cathodes. Arcs

are classified according to the emission mechanism. A summary of characteristic properties of non-thermionic arcs, based on a literature survey is presented. Mechanisms of emission are discussed in view of new experimental results from work under this contract. AD 96229. Project R 115-032. S. O. 13115. AF OSR TR 56-34.

Results of acceptance tests of model AN/ART-13A radio transmitting set, by V. O. Smallwood, H. Petrowitz and R. C. Miedke. U. S. Naval Research Laboratory. Dec 1945. 52p photo, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 123342

Unclassified 15 Dec 1953.

1. Radio transmitters - Tests 2. NRL R 2710.

Servo drive for stabilized turntable, by Howard M. Ikerd. U. S. Naval Research Laboratory. Aug 1946. 13p photos, fold diags. Order from LC. Mi \$2.40, ph \$3.30. PB 123334

Unclassified 15 Dec 1953.

1. Scanners, Electronic - Design 2. Servo-mechanisms - Uses 3. NRL R 2934.

Some fundamentals of A-J design for radar receivers, by T. H. Chambers. U. S. Naval Research Laboratory. Apr 1946. 52p. Order from LC. Mi \$3.60, ph \$9.30. PB 123355

Plates listed as nos. 1-24 not included in report. Unclassified 23 Mar 1954.

1. Radar - Receivers - Design 2. NRL R 2508.

Study of the generation and detection of electromagnetic waves in the millimeter wave region. Scientific report no. 3 for the period 1 Dec 1955-2 Feb 1956 under Contract AF 19(604)-1115, by J. H. Rohrbaugh. New York University. Washington Square College of Arts and Sciences. Physics Dept. Mar 1956. 65p diags, graph, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 123401

For 1st-4th reports see PB 116645, 116990, 117767 and 119237. Contents: - I. Spectrometer, by Charles Pine and William Zoellner: - A. Complete first order spectrum from the 0.200 Greig-Ferguson Grating. - B. Final modifications in the cell. - C. Dielectric properties of liquids. - II. Bolometers, by William C. Zoellner. - III. Spectrometer reinstrumentation, by Charles Rosenbaum. - IV. Lattice absorption in the infrared, by Jacob Neuberger. - A. The diatonic chain with anharmonic interactions. - B. Sodium chloride crystal. - C. NaCl crystal with anharmonic forces. AF CRC TN 56-375.

Theoretical analysis of the possibilities of direction finding on induction fields from power lines,

by M. G. Cheney and J. R. Snow. U. S. Naval Research Laboratory. Jul 1945. 13p graphs. Order from LC. Mi \$2.40, ph \$3.30.

PB 122785

Unclassified 15 Dec 1953.

1. Radio direction finders - Evaluation 2. Radio direction finding - Theory 3. NRL R-2575.

Thermal image tube, by Jay Burns. Chicago. University. Chicago Midway Laboratories, Chicago, Ill. Jun 1956. 61p diagr, graphs. Order from LC. Mi \$3.90, ph \$10.80. PB 124111

Two methods of reading surface potentials are analyzed in sufficient detail to show that they are, in principle, capable of reading potential differences as small as one millivolt. A third method, aberration modulation, is also discussed qualitatively. Sufficient data were not available to evaluate this technique thoroughly, however. In principle, it appears that both detection and measuring techniques are available, or under development, which on the basis of present knowledge should make feasible a thermal image tube capable of giving a picture of substantially television quality having sufficient sensitivity to permit detection of objects differing by as little as one degree from background temperature. CML-56-TN-P108-2. First interim report under Contract AF 18(603)-9. Continuation of work begun under Contract AF 33(038)-25913.

Time delay relay. Final report under Contract no. DA-36-039-sc-22 covering period Dec 1949 through Nov 1952, by F. B. Foody. General Electric Company. General Engineering Laboratory, Schenectady, N. Y. Sep 1954. 101p photo, drawing (1 fold), diagrs, graphs, tables. Order from LC. Mi \$5.70, ph \$16.80.

PB 124798

This report describes the development of a new type of time delay relay. All known types of timing elements were considered with respect to the specifications; models were built around several types. The development was unsuccessful in meeting all the requirements of the specifications, but a new type of thermal timing element was evolved. Dept. of the Army project: 3-26-00-600. Signal Corps project: 32-2006-3.

Miscellaneous

Brief survey of various sea water cells, by T. P. Dirkse. U. S. Naval Research Laboratory. Nov 1945. 16p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 120761

1. Sea water - Uses 2. Electrolytic cells - Silver oxide-magnesium 3. Electrolytic cells - Cuprous chloride-magnesium 4. NRL P 2711.

Tests of high voltage cable connectors for RG-17/U, -18/U, -19/U and -20/U cables, by H. D. Roess. U. S. Naval Research Laboratory. Jan 1946. 21p photos, diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 123348

Unclassified 15 Dec 1953.

1. Cables, Electric - Connections 2. NRL R 2732.

FOOD AND KINDRED PRODUCTS

Effect of gamma radiation on odor, color and vitamins of meat. Final report under Contract DA 19-129-379 for the period 1 Jul 1955 - 30 Jun 1956, by Betty M. Watts, Harvy Lewis and Russel Johnsen. Florida State University, Tallahassee, Fla. Jul 1956. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 125394

Objectives of this Contract were: (1) To study the effects of gamma rays on off-odor and color in cured meats with special reference to the role of reducing substances (sulfhydryl groups and ascorbic acid) and curing ingredients (nitrite and smoke constituents). (2) To determine the loss of a number of B vitamins in fresh beef, lamb, veal and pork and on cured pork irradiated with gamma rays at dosages ranging from 5×10^4 to 2.5×10^6 rep. Methods and experimental data are given. References attached. Florida State University project no. 7-84-01-002-5535, Report no. 3. Contract DA 17-129-qm-379, Final report.

Humpy chafer as a pest in stores, by Friedrich Zacher. Jun 1949. 17p. Order from LC. Mi \$2, ph \$2.75. PB 97462

1. Pest control - Germany 2. Insects - Geographical distribution - Germany 3. FIAT TR 1260.

Irradiation of lipid-protein systems. Final report under Contract DA 19-129-QM-405 for the period 31 May 1955-31 May 1956, by Albert Weinstock and E. J. Hawrylewicz. Armour Research Foundation, Chicago, Ill. Jun 1956. 25p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125395

The work accomplished in the last period (from 1 April to 31 May 1956) is presented in detail and would normally constitute the progress report. This phase of the report is found in Part I. The summation of the work reported in the six reports during the course of the year is in Part II of this report. Armour Research Foundation Project no. 7-84-01-002 S532, Report no. 6. Contract DA 19-129-qm-405, Final report.

FUELS AND LUBRICANTS

Combustion studies of astrophysical significance.

I: Survey of the general mechanics of flame propagation, and of relevant experimental techniques, by G. V. Marr. University of Western Ontario. Dept. of Physics, London, Ontario, Canada. May 1956. 60p diagrs, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 124837

A general description of hydrocarbon/oxygen pre-mixed flames is presented here. The concepts of flame stability and flame temperatures are discussed and the mechanics of the combustion of stationary flames are considered. In particular the relevant hydrodynamic equations are formulated and the approximate solutions suggested by various authors are presented. A review of some of the more important experimental techniques used to determine parameters such as temperature and burning velocity is given, and attempts to compare measurements with the predictions of approximate theories are also discussed. The relative importances of diffusion of free radicals and of heat, in the maintenance of stationary flames are compared. AF CRC TN 56-484. Contract AF 19(122)-470, Scientific report no. 23.

Evaluation tests of arylurea-silicone greases in aircraft equipment, by Herbert Schwenker.

U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1956. 26p tables. Order from OTS. 75 cents.

PB 121915

Several types of arylurea-silicone greases have been evaluated in various types of test equipment. Some of the tests were conducted with actual aircraft components, while other tests consisted of mock-ups of various aircraft systems. Arylurea-silicone greases gave good performance in the following high temperature applications: airframe oscillatory bearings, electric motor bearings, low speed roller bearings, instrument bearings. Arylurea-silicone greases did not function satisfactorily in screw jack actuator applications and in high speed ball bearings. The type of application, equipment design, materials used in construction, and the surrounding environment all were found to be significant factors influencing the success or failure of arylurea-silicone greases to function as lubricants. AD 110634. Project 3044, Task 73310. Covers work from Jan 1953 to Nov 1956. AF WADC TR 56-475.

Investigation of jet flameholders, by Robert H.

Eustis and Charles L. Mraz. Stanford Research Institute. Dept. of Physics, Stanford, Calif. Apr 1956. 60p photos, drawings, diagrs, graphs, tables. Order from OTS. \$1.50. PB 121574

A program has been undertaken to study the effect of fluid jets in stabilizing combustion in a pre-mixed stream. The parameters investigated were injection angle of the stabilizing jet (transverse or opposed), jet pressure, jet tube diameter, jet fluid composition, and jet air temperature. Successful flame stabilization was obtained with jets directed against the main flow, but transverse jets were ineffective as stabilizers for the conditions investigated. Of much greater significance to flameholding capacity is the composition of the flame-holding jet. The jet mixture was varied by mixing natural gas with the air, and the stoichiometric jet mixture showed markedly better stability limits than either rich or lean mixtures. The jet temperature also had an important effect on stability limits, providing improved stability at higher temperatures. A water channel study was made in which the flow was made visible by the introduction of dye streamers. Photographs included in this report illustrate the effects of various parameters on the jet penetration and configuration. Theoretical analyses have been made to predict the water channel results and thus to provide an understanding of the processes involved. AD 97142. Project 3012, Task 70176. AF WADC TN 56-316. Contract AF 33(616)-2938.

Lubricating properties of certain synthetic fluids,

by S. Fred Calhoun. U. S. Arsenal, Rock Island, Ill. Sep 1953. 23p tables. Order from OTS. 75 cents. PB 121881

The object of this investigation was to evaluate comparatively, by means of the Shell Four Ball wear tester, the Falex load bearing tester and the Cincinnati Stick Slip tester, certain synthetic fluids which are or may be used as fluid lubricants, or in making greases. Forty-six synthetic fluids, two petroleum oils and ten greases made from some of these fluids were evaluated comparatively. Antiwear characteristics, coefficients of friction and pressure properties were determined. Project TB 5-4010E. D/A Project 593-21-053. Report no. 8. RIAL R 53-3630.

Mechanism of generation of pressure waves at

flame fronts, by Boa-Teh Chu. U. S. National Advisory Committee for Aeronautics. Oct 1956. 20p diagrs, graph. Order as TN 3683 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124358

A study has been made of the pressure waves generated at a flame front. An analysis is included of the performance of a flame front and an equivalent heater in producing the pressure waves. NACA TN 3683.

Relation between burning velocity and quenching

distance, by A. E. Potter, Jr. and A. L. Berlad. U. S. National Advisory Committee for Aeronautics. Nov 1956. 19p graphs, tables. Or-

der as TN 3882 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124426

The product of burning velocity and quenching distance is proportional to a term which has the character of a thermal diffusivity and a term which increases with the activation energy of the flame reaction. The quotient of burning velocity and quenching distance is proportional to the average flame reaction rate and to terms which are mildly dependent on the flame reaction activation energy and the transport properties. NACA TN 3882.

Similarities in combustion, by Albert E. Weller and Ralph E. Thomas. Battelle Memorial Institute, Columbus, Ohio. Jun 1956. 63p graphs. Order from OTS. \$1.75. PB 121442

This report presents the results of an investigation of the possibility of extending the applications of dimensional analysis and of similarities in the field of combustion problems. The presentation has been divided into three parts. The first part discusses the background of dimensional analysis and of similarities from the classical or historical view. The second part presents a development of the intuitive concepts of dimensional analysis and of similarities in mathematical terms. The third part is a review of published work in which dimensional analysis and similarities were applied to combustion problems and related phenomena. A discussion of the difficulties found in such applications and of techniques by which it may be possible to avoid these difficulties is given. A bibliography of the literature on dimensional analysis, similarities, and their applications is included. Project 3012, Task 70334. AF WADC TR 55-132. Contract AF 33(038)-12656.

Spreading characteristics of lubricating oils. Part I: Effects due to the presence of saturated and unsaturated aliphatic acids, by W. A. Zisman. U. S. Naval Research Laboratory. Feb 1940. 40p diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 123313

Unclassified. For Part II see PB 109453.

1. Lubricating oils - Analysis 2. Acids, Aliphatic - Effects on lubricating oils 3. Lubricating oils - Surface tension 5. NRL P 1595.

Thermal equation for flame quenching, by A. E. Potter, Jr. and A. L. Berlad. U. S. National Advisory Committee for Aeronautics. 1956. 9p. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 15 cents. PB 124467

A thermal quenching equation is derived; the equation is essentially an extension of a previously proposed diffusional concept. By proper choice of the rate-controlling chemical reaction, the equation becomes suitable for use with rich as well as lean fuel-air mixtures. The equation was tested, using

published quenching-distance data for propane-oxygen-nitrogen flames, which include the effect of oxygen-nitrogen ratio, equivalence ratio, pressure, and initial temperature. Supersedes TN 3398 (PB 116724). NACA 1264.

HIGHWAYS AND BRIDGES

Flexible pavement design correlation study, presented at the thirty-fifth annual meeting, Jan 17-20, 1956. Highway Research Board. 1956. 43p graphs, tables. Order from National Research Council, Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. 75 cents. PB 124699

1. Pavements, Flexible - Design 2. Road materials - Research 3. HRB Bul 133 4. NRC 423.

Highway engineering training programs for professional and preprofessional employees, an analysis, by Robley Winfrey and Jack R. Hutchins. Highway Research Board. 1957. 26p tables. Order from National Research Council, Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. 60 cents. PB 124701

1. Engineering, Highway - Training 2. HRB SR 24 3. NRC 480.

Property studies of Alaskan silts in the Matanuska Valley, Big Delta, and Fairbanks areas. Progress report for the period 1 Jun 1954 - 1 Jun 1955 under Contract Nonr-530(04), by R. W. Stump, R. L. Handy, D. T. Davidson and C. J. Roy. Iowa. Engineering Experiment Station, Ames, Iowa. Dec 1955. 62p photos, maps, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 124241

Project 320-S.

1. Soils (Engineering) - Engineering properties - Alaska 2. Soils - Trafficability - Alaska 3. Soils (Engineering) - Particle size - Alaska 4. Soil surveys - Alaska 5. Contract Nonr-530(04).

INSTRUMENTS

Attaching thermocouples by capacitance welding, by Harold Bernstein. U. S. Naval Gun Factory, Washington, D. C. Apr 1955. 8p photos, drawings, diagr, graphs, tables. Order from OTS. 50 cents. PB 121901

A method for the attachment of thermocouples to workpieces is described. The thermocouple wires are individually welded to the workpiece by dis-

charging a bank of charged capacitors. Weld characteristics are controlled by means of a potentiometer. The welder is portable and operates off standard power supply. NAVORD 4854. NGF -T-21-55.

Automatic pressure recording system employing twelve point pressure switch FR-186 BWT-310, by F. L. Osborn. Boeing Airplane Co., Seattle, Wash. Mar 1954. 21p photos, graphs (2 fold). Order from LC. Mi \$2.70, ph \$4.80.

PB 125303

A description is given of the components of the automatic pressure recording system, the sequence of operation and method of control of the stepping pressure switch, and the results obtained using this system. The data produced with the automatic pressure recording system consisted of approximately 13,000 pressure points in 18 hr of tunnel fan-on time; this compared favorably with manometer data when operating time is considered. About 300 man-hours of computing time were eliminated with this type data presentation. AD 81755. Boeing Airplane Co. Document no. D-14799.

Automatic radar equipment MK 12 MOD 2, gun director MK 37, computer MK 1 system operation with and without a manually controlled computer equalizer, by Charles F. White. U. S. Naval Research Laboratory. Oct 1945. 45p diags, graphs (part fold), tables. Order from LC. Mi \$3.30, ph \$7.80. PB 122774

Unclassified 15 Dec 1953.

1. Computers, Ballistic - Components 2. Computers, Electronic - Components 3. Fire control equipment 4. Radar equipment - Design 5. NRL R-2657.

Cascade impactor for determining the drop-size distribution of fuel mists, by J. L. Harp and J. M. Pilcher. Battelle Memorial Institute, Columbus, Ohio. Nov 1955. 34p photos, drawing, diags, graphs, table. Order from OTS. \$1. PB 121814

This report covers the development of an instrument for use in determining the drop-size distribution of finely divided fuel sprays. With the Battelle No. 7 cascade impactor, sprays can be classified into seven fractions having known size limits. The maximum size of droplet that may now be classified satisfactorily has been extended to approximately 80 microns. Procedures are given for calibrating the cascade impactor which is capable of rapid, accurate, and reproducible results provided drop size does not exceed about 80 microns. The procedure for designing the Battelle No. 7 cascade impactor is outlined with particular emphasis on the problem of minimizing the surface loss of droplets. AD 110484. Project 3012, Task 70334. AF WADC TR 55-428. Contract AF 33-(038)-12656.

Celestial altitude differential computer, by A. M. Weber. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1949. 6p photo. Order from LC. Mi \$1.80, ph \$1.80. PB 123566

1. Computers, Astronomical 2. CAA TDR 89.

Deceleration probe for measuring stagnation pressure and velocity of a particle-laden gas stream, by Jules L. Dussourd and Ascher H. Shapiro. Massachusetts Institute of Technology. Department of Mechanical Engineering. Gas Turbine Laboratory. May 1955. 36p photo, diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 124068

The measurement of the stagnation pressure and, from this, the velocity of the gas phase, in a stream of gas laden with liquid droplets or solid particles is investigated theoretically and experimentally. The theoretical findings are checked by the testing of a series of experimental probes of varying geometry in an air stream carrying water droplets. Satisfactory agreement exists between theory and experiment. It is shown that a practical probe can be built to give a negligible error in the measurement of stagnation pressure in the range of variables investigated. Further it is found possible, with simple modifications, to adapt the experimental probe conveniently to the local measurement of other stream properties, namely, the mass rate of flow per unit area of particles, the particle size, and the particle velocity. Aerothermopressor project. DIC-5-6985. Based on a thesis submitted by Jules L. Dussourd. Contract N5ori-07878.

Development of shock mounting for fire alarm thermostats, by G. K. C. Hardesty, G. Pida and D. T. Scuderi. U. S. Naval Research Laboratory. Aug 1946. 52p photos, drawings (1 fold), graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 123385

Unclassified 15 Dec 1953.

1. Mounts, Thermostat - Design 2. NRL B 2789.

Dynamic system studies. Chicago. University. Advisory Board on Simulation, Chicago, Ill. Project 7060. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 5: Analog computation, by F. W. Fratten. Sep 1956. 78p diags, graphs, tables. \$2. PB 121578

Recently available analog computer components and systems are described and their characteristics discussed. No comparisons or evaluations are made, since their design and utilization is at present in an empirical state of development. For Parts 1, 2, 4,

7-8, 13-14 and 16 see PB 121596-121597, 121658, 121598-121599, 121577, 121706. AD 97268. AF WADC TR 54-250, Part 5. NOL Corona Report 173. Contract MIPR-(33-616)-54-154.

Part 6: Operation and maintenance procedures for analog computers, by W. R. Allen. Sep 1956. 126p photos, diagrs, graphs, tables. \$3.25. PB 121792

Getting useful results from analog computation calls for careful study of (1) the limits of the problem representation, (2) purpose to which computational results will be put, (3) suitability of the computer for the problem, and (4) methods for preventing and discovering malfunctions on the part of both operating staff and computer. Appendix 1. An application of waiting line theory to a simple spare parts inventory problem, by D. Minden and W. R. Allen. - Appendix 2. Adjoint method in analog computation, by F. B. Wright, Jr. - Appendix 3. High speed analog computer in system engineering, by F. A. Barnes, J. L. Connors, R. J. Phagan, D. Wellinger. AF WADC TR 54-250, Part 6. Contract AF 33(038)-15068, Suppl. 2 and 11.

Evaluation of an experimental magnetic tape recording accelerometer, by Henry H. Wood, Jr. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. May 1956. 18p photo, drawings, diagr, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 125389

This report presents the results of the evaluation of the accelerometer, its limitations, and the applications to which it will be put to eliminate the trial and error approach to mechanical design of RADC electronic equipment. The signal from the recorder can be used in acceleration analysis. AF RADC-TN-56-105.

Ferroelectric devices, by Eugene Wainer and Edward F. Mayer. Horizons, Inc., Cleveland, Ohio. Dec 1956. 143p photos, diagrs, graphs, tables. Order from OTS. \$3.75. PB 121974

Presented in the report are the results obtained in the course of constructing and evaluating a ferroelectric d. c. modulator. The modulator was shown to be of limited effectiveness but was instrumental in suggesting several other practical ferroelectric devices. This investigation is discussed in considerable detail. Presented in a discussion form are several other ferroelectric devices, namely, a second-harmonic dielectric amplifier, a novel type of ferroelectric memory system including the signal advantages of random access, non-destructive readout, high storage density and discrimination; and a ferroelectric frequency tripler with a calculated efficiency of approximately 90% in each stage. A considerable

portion of the effort was directed towards the investigation of ferroelectric systems, together with the effect of impurities upon their properties. The major portion of this material work was conducted with ceramic materials and X-ray crystallographic data, the results of which together with metallographic data are presented in the analysis of these nonlinear systems. A portion of this work was directed towards the preparation and evaluation of single crystals of various complex ferroelectric systems. AD 97124. Project 4155, Task 41523. Appendix I - Raw materials employed in preparing dielectric materials. Appendix II - Second-harmonic dielectric amplifier theoretical analysis. AF WADC TR 56-362. Contract AF 33(616)-3041.

Solution of laminar flame problems by use of the analog computer, by James E. Broadwell and John R. Sellars. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jun 1956. 41p diagr, graphs, tables. Order from OTS. \$1.25. PB 121711

The eigenvalue problems consisting of the differential equations and boundary conditions describing hydrazine and ozone decomposition flames are solved on the electronic analog computer and the results compared, where possible, with those of Hirschfelder, Curtiss, and Campbell and with those of von Karman and Penner. The conditions at the "cold boundary" are discussed from a viewpoint that takes account of the initial development of the flame. The study shows the analog computer to be a convenient and accurate tool for the solution of steady-state flame propagation problems of the type considered. Attempts to make use of the computer in the solution of the initial (unsteady) development problem were not successful. AD 110477. Project 3012. AF WADC TR 56-290. Contract AF 33(616)-2409, Task 70322.

Summary of the technical minutes of the Signal Corps Engineering Laboratories radiac symposium 14-16 Sep 1949: Ionization chamber instruments and techniques. Supplement. U. S. Camp Evans Signal Laboratory, Belmar, N. J. Sep 1949. 12p diagrs, graphs. Order from LC. Mi \$2, ph \$2.75. PB 106271s

Supplement to PB 106271. Contents: A projected ion chamber survey meter of very low voltage and logarithmoidal response, by Marvin G. Schorr (Tracerlab, Inc.).

Symposium on advanced programming methods for digital computers, Washington, D. C., Jun 28, 29, 1956, under the joint sponsorship of Navy Mathematical Computing Advisory Panel and Office of Naval Research. U. S. Office of Naval Research. Navy Mathematical Computing Advisory Panel. Oct 1956. 83p diagrs, graphs, table. Order from OTS. \$2.25. PB 121670

Contents: The interlude, 1954-1956, by Grace M. Hopper. - Automatic coding principles, by Joseph M. Wegstein. - Development of common language automatic programming systems, by Charles E. Thompson. - Production of large computer programs, by H. D. Bennington. - Share; a study in the reduction of redundant programming effort through the promotion of inter-installation communication, by Fletcher Jones. - Advanced programming techniques with smaller computers, by John W. Carr, III, and B. Arden. - Computing at Los Alamos, Group T-1, by Max Goldstein. - Coding for the Maniac, by Mark Wells. - Proposed advanced coding system for UNIVAC-LARK, by Frances E. Holberton. - RCA approach to automatic programming for commercial problems, by John H. Waite, Jr. - The pact compiler for the 701, by R. G. Selfridge. - Automatic digital encoding system II, by E. K. Blum. - On a property of natural language and its use for the design of improved machine languages), by Robert Serrell. ONR ACR 15.

Test of tracking accuracy of gun director MK 37 with radars MK 28 MOD O and MK 22 MOD O, by M. S. McVay. U. S. Naval Research Laboratory. Jun 1945. 66p graphs (part fold.) Order from LC. Mi \$3.90, ph \$10.80. PB 122649

Unclassified 15 Dec 1953.

1. Fire control equipment - Tests 2. NRL R 2550.

Type test of AN/ASG-10 toss bombing device, by I. W. Fuller and M. L. Burnett. U. S. Naval Research Laboratory. Nov 1945. 17p photos, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 122782

Final report. Unclassified 15 Dec 1953.

1. AN/ASG-10 (Bombing equipment) 2. Instruments, Fire control - Tests 3. Fire control equipment - Tests 4. Bombs, Aerial - Aerodynamic tests 5. NRL R 2694.

LUMBER AND WOOD PRODUCTS

Shoe lasts of glue-laminated wood, by Earl R. Bill. Gamble Bros., Inc. Dec 1953. 49p photos, diagr, tables (1 fold). Order from LC. Mi \$3.30, ph \$7.80. PB 125795

The objectives of this contract were to: 1. Select types of wood and adhesives suitable for shoe lasts. 2. Determine adhesive application methods and curing conditions. 3. Compare horizontal and vertical laminates for producing laminated shoe lasts best suited for service in manufacturing shoes. 4. Determine minimum economical size requirements for manufacturing laminated shoe last blocks. 5. Prepare laminated shoe lasts for service tests in manufacturing shoes. A schedule of lasts and block sizes is presented. Contract DA-44-109-qm-562, Final report.

MEDICAL RESEARCH AND PRACTICE

Effect of glycine in immersion hypothermia, by William R. Beavers and Benjamin G. Covino. U. S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Sep 1956. 15p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124785

The results presented herein indicate that agents which increase thermogenesis may be of practical importance in hypothermia. The data show that glycine is capable of delaying the time required to attain a lethal hypothermic state and of augmenting the rate of rewarming in dogs already rendered hypothermic. AF AAL Proj 8-7954, Report no. 1.

Effect of the Dock cigarette smoking test on the ballistocardiogram; a survey of a "normal" male population, by Murray Strober. U. S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Texas. May 1956. 7p graph, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 124610

A ballistocardiographic cigarette test survey was performed on 2,736 male subjects at the Smoky Hill Air Force Base. The majority of the subjects had a normal ballistocardiogram after smoking. The survey revealed that the incidence of abnormal tracings after smoking increased thirtyfold between the ages of 30 and 60. Abnormal responses were also noted in the obese group regardless of age. The purpose of the project was to see whether or not the test could detect asymptomatic coronary disease in those persons engaged in hazardous duties. While it is unlikely that the smoking test will detect all cases of asymptomatic coronary disease, it may discover cases not detectable by other available means. AF SAM R 56-56.

Incidence, nature and extent of injury in crash landings and bailouts, by David R. Perry and Lidie C. Dyer. U. S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Nov 1956. 103p tables. Order from LC. Mi \$5.70, ph \$16.80. PB 124787

The primary purpose of the survey was to determine the incidence, nature and extent of injury during a crash landing or as a result of the emergency use of a parachute. The data will be further analyzed to establish the effects of terrain, weather, and type of aircraft upon the number and extent of injury in each of the two situations. AF AAL Proj 8-7956, Report no. 1.

Measured visual acuity as a function of phenomenal size, by Earl A. Alluisi. Ohio State University. Laboratory of Aviation Psychology, Columbus, Ohio. Oct 1955. 19p diagrs, table. Order from LC. Mi \$2.40, ph \$3.30. PB 124728

The usual definition of visual acuity implicitly assumes that acuity is independent of phenomenal size as long as the test object subtends a constant visual angle at the retina. Evidence from some previous studies indicates, however, that measured visual acuity might be bettered when the test object is made to appear larger even though its objective size on the retina remains constant. The present study was designed to test this notion. AD 90914. Project 7186, Task 71551. Based on thesis - Ohio State University. AF WADC TR 55-384.

Studies on dark adaption. Experiments I, II, III:

The pre-exposure tolerance of the human fovea adapted to different brightness levels, including darkness. Final report for period 1 Sep 1952 to 30 Aug 1953, under Contract AF 30(602)-199, by Joseph W. Wulfbeck, Dorothea J. Crook and Patricia I. McBride. Tufts College. Institute for Applied Experimental Psychology, Medford, Mass. Oct 1954. 41p photo, diagr, graphs, table. Order from LC. Mi \$3.30, ph \$7.80.
PB 125305

The effect on foveal dark adaptation of pre-exposure of the eye for brief durations to light of relatively low brightnesses was investigated. Monocular measurements were made of both absolute brightness sensitivity (RL) and difference or contrast sensitivity (DL), using a one degree square, centrally fixated test patch. The course of dark adaption as measured by the RL was investigated. Likewise the course of dark adaptation following ten minutes' exposure to each of three adaptation levels of 0.010, 0.10, and 1.0 ft-L. The effect of these adaptation levels alone was also studied. AD 54558. Part I-II are also in Journal of the Optical Society of America, v. 46, 1956, p. 67-71 and p. 266-269. AF RADC TR 54-88. Contract AF 30(602)-199, Final report.

METALS AND METAL PRODUCTS

Alumina-base cermets. Ohio State University Research Foundation, Columbus, Ohio. Contract AF 33(616)-472. Project 7350, Task 70634. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 2, by Charles A. Hauck, Earnest W. Deadwyler and Thomas S. Shevlin. Mar 1956. 44p photos, drawings, diagrs, tables. \$1.25.
PB 121253

Studies were conducted on five new alumina-base cermets, the metal content ranging from 50 to 95% by volume. Alloys investigated include: 80Ni-20Cr, 65Co-30Cr-5Mo, 66Ni-18Cr-16Fe, 76Cr-24Ti, and an 18-8 type stainless steel. Details include fabrication techniques and test results. Wettability

studies of alumina by various alloys are described. Flame holder test segments were fabricated and the techniques described. Summarizes work during the period 1 Apr 1954 to 1 Feb 1955. AF WADC TR 54-173, Part 2.

Part 3, by Charles A. Hauck, John C. Donley, and Thomas S. Shevlin. Mar 1956. 46p photos, drawing, graphs, tables. \$1.25.
PB 121461

Studies are reported on two alumina-base cermets with an alloy content ranging from 50 to 95% by volume. The alloys investigated are 80Ni-20Cr and Haynes Stellite 31. Three additional alumina-base cermets containing 80Ni-20Cr and 76Cr-24Ti alloys and silicon are described. A fundamental study was started on the wettability of Al_2O_3 by metals and alloys by introducing active metals as wetting agents. Some of the materials appeared promising. The details of procedure and results are given. Covers work during the period 1 Feb 1955 to 1 Feb 1956. AF WADC TR 54-173, Part 3.

Applications, properties and fabrication of Thermenol type alloys, by J. F. Nachman and W. J. Buehler. U. S. Naval Ordnance Laboratory. May 1956. 52p photos, graphs, tables (1 fold). Order from OTS. \$1.50. PB 121098

The properties of Thermenol (Fe-Al-Mo) a non-strategic high temperature and magnetic alloy, are discussed. These include hardness, tensile, stress-rupture, corrosion, oxidation resistance and magnetic properties at room temperature and elevated temperature. Preparation of the alloy and methods of hot and cold working are also described. Suitable applications for a material of this type are listed. NAVORD 4237.

Charge distribution and characteristic temperature of metallic lithium from X-ray scattering at 300° and 100°K, by Paul L. Splitstone and P. M. Harris. Ohio State University Research Foundation, Columbus, Ohio. Apr 1956. 31p photo, graphs, tables. Order from LC. Mi \$3, ph \$6.30.
PB 123950

The Laue-Bragg scattering of single crystals of metallic lithium has been measured at 100° and 300°K. From these results a characteristic temperature, $(H) = 325^{\circ}K$, was derived. Electron density computations suggest no appreciable charge concentration between nearest neighbor atoms. The early part of this work was supported under Contract N6 onr 225-17 (NR 017, 408). Contract AF 19(600)-769, Technical report 1. AF CRC TN 56-235. OSURF Proj. 567, Technical report 1.

Corrosion and its prevention at bimetallic contacts, by A. J. Murphy. Gt. Brit. Inter-Service

Metallurgical Research Council. Dec 1955.
11p tables (1 fold). Order from British Information Services, 30 Rockefeller Plaza, New York 20, N Y. 32 cents. PB 123758

Robinson, Andrew J. Griest, Alvin M. Sabroff and Paul D. Frost. Battelle Memorial Institute, Columbus, Ohio. Jan 1957. 78p photos, graphs, tables. Order from OTS. \$2. PB 121942

S. O. Code no. 70-732.

1. Corrosion, Electrolytic - Prevention - Gt. Brit.
2. Metals - Corrosion prevention - Gt. Brit.

Corrosion properties of various materials in high temperature waters, by C. J. Lancaster and W. L. Williams. U. S. Naval Engineering Experiment Station, Annapolis, Md. Jan 1953. 22p photos, drawing, tables. Order from OTS. 75 cents. PB 111963

Results are presented for a number of experiments which concern the corrosion behavior of selected alloys in various high temperature waters. The following tests were included: (a) Static tests of prestressed Inconel and Type 302 stainless steel coil springs in 500°F degassed distilled water. (b) Static tests of chromium plated K-Monel panels in natural sea water at 120°F and 500°F. (c) Static stress-corrosion tests of Type 347 stainless steel in 470°F synthetic boiler feed water solutions. (d) Dynamic stress-corrosion tests of fourteen materials at 11 ft/sec velocity in 500°F distilled water containing 20 to 30 ml/l of oxygen. NAV EES 4A(23)966870.

Design properties of high-strength steels in the presence of stress concentrations. Part II: Axial-load fatigue properties of high-strength steels, by B. B. Muvdi, G. Sachs and E. P. Klier. Syracuse University, Syracuse, N. Y. Dec 1956. 46p photos, drawings, graphs, tables. Order from OTS. \$1.25. PB 121883

Iron-base alloys containing a minimum iron content of 45%, a minimum carbon content of 0.50%, a chromium content of not less than 20%, and between 27 and 32% nickel, part of which may be replaced by cobalt, can develop a creep-rupture strength at 1600° to 1800°F approaching that of the cobalt-base alloy H.S. 21 when they are strengthened by not more than 5% additions of Cb, Ta, Mo, and W in certain combinations and relative concentrations. These high-creep-rupture-strength iron-base alloys are equal to H.S. 21 in oxidation resistance at 2000°F, but inferior to the former in short-time cold and hot tensile strength, in cold ductility, and in resistance to thermal shock and thermal fatigue. The possibility of improving the latter by lowering the carbon content and compensating the resulting decrease in rupture strength with suitable modifications in composition has not been explored. AD 110619. Project 7360, Task 73605. Covers work from Sep 1, 1955 - Aug 1956 under Contract AF 33(616)-2413, Supplemental agreement 2(55-1448). AF WADC TN 55-290, Part II.

Development of a heat-treatable titanium alloy having adequate formability, by Herbert A.

A series of 27 experimental alpha-beta titanium alloys were melted, forged, rolled to sheet, and evaluated as potential formable and heat-treatable sheet alloys. Formability was evaluated by true stress-true strain tensile data and by bend tests. In general, the solution temperature had greater effect than alloy composition on the relative formability of the alloys in the as-quenched condition. However, several compositions appeared to offer greater promise than the others from the standpoints of formability and ability to be aged, after forming, to a high strength level. A Ti-3Fe-3Mo-2Al alloy was of particular interest. AD 110737. Project 7351, Task 73510. Covers work from May 1955-July 1956 under Contract AF 33-(616)-2901. Appendix A. Melting of experimental alloys. - Appendix B. Tensile and flow properties of the alloys evaluated. AF WADC TR 56-545.

Development of cast iron-base alloys of austenitic type for high heat-resistance and scale-resistance, by F. Eberle, J. H. Hoke, and W. E. Leyda. Babcock and Wilcox Company. Research Center, Alliance, Ohio. Jan 1957. 99p photos, diagrs, graphs, tables. Order from OTS. \$2.50. PB 121950

In this report are presented the results of axial-load (completely reversed) fatigue tests on Tricent (Inco), Cru. SHS-260 and Super TM-2 steels heat treated to strength levels between approximately 250,000 and 300,000 psi. The fundamental effects of several variables on the fatigue properties of these steels are discussed and evaluated. These variables included the notch sharpness or the stress concentration, the strength level and the specimen orientation. AD 110716. Project 7351, Task 73512. Covers work from Jun 1955-Jul 1956 under Contract AF 33-(616)-2413. AF WADC TR 56-395, Part 2. Contract AF 33(616)-2362, Supplemental agreement 4(56-445).

Effect of microstructural variables and interstitial elements of the fatigue behavior of titanium and commercial titanium alloys, by Charles B. Dittmar, G. William Bauer, and Dillon Evers. Mallory-Sharon Titanium Corporation, Niles, Ohio. Jan 1957. 96p photos, graphs, tables. Order from OTS. \$2.50. PB 121972

The effect of microstructure on the fatigue behavior of the commercial alloys Ti-5Al-2.5Sn, Ti-6Al-4V, and Ti-3Mn complex has been investigated. Microstructure was found to have little effect on the endurance limit of these alloys unless the structure was extremely coarsened or embrittled. The effect of interstitial contents representative of the basis for commercial tita-

nium specification, i.e. .07% N₂, .20% O₂, .20%C taken singly or grouped together, has been investigated for unalloyed titanium and the commercial alloys Ti-5Al-2.5Sn, Ti-6Al-4V, and Ti-3Mn Complex. Titanium and the three titanium alloys investigated generally show increased or unchanged fatigue life at all of the interstitial contents specified above. AD 110726. Project 7351, Task 73510. Covers work from 1 Apr 1955 - 31 Mar 1956 under Contract AF 33(616)-2922. AF WADC TR 56-304.

Effect of strain rate and temperature on the plastic deformation of high purity aluminum, by T. A. Trozera, O. D. Sherby and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Dec 1955. 22p graphs (1 fold). Order from LC. Mi \$2.70, ph \$4.80.

PB 124813

The effect of temperature and strain rate on the stress-strain curves of aluminum were obtained over the ranges of temperatures, T , from 78° to 818°K and strain rates, $\dot{\epsilon}$, from 0.0035 to 600 per hour. UC IER Series 22, Issue no. 44. Contract N7 onr-295, T. O. II, NR 031-048.

Effect of various heat treatment cycles upon the mechanical properties of titanium alloys with various interstitial levels, by Benjamin F. Hadley, G. William Bauer and Dillon Evers. Mallory-Sharon Titanium Corp., Niles, Ohio. Mar 1957. 220p photos, drawings, graphs, tables (1 fold). Order from OTS. \$5.50.

PB 131009

The effect of various heat treatments on the mechanical properties of 5/8" diameter bar from four titanium alloys of five interstitial content levels each was determined. Three major types of heat treatment were employed: (1) a solution treatment and age cycle, (2) a step quench cycle and (3) a solution treatment, isothermal transformation cycle. Three hundred hour creep tests were performed on some materials. The elevated temperature tensile properties, room temperature notch strength, and Charpy impact data of material of interstitial level 4 were determined. Beta transi, T-T curves and end quench curves were determined for all material. The effect of section size on the mechanical properties and the heat treatment response of the Ti-5Al complex alloy was determined. AD 118118. Project 7351, Task 73510. Covers work from 1 Jan 1955 - 30 Jun 1956 under Contract AF 33(616)-2795. AF WADC TR 56-580.

Electrical resistivity of nickel-palladium alloys, by A. W. Overhauser and A. I. Schindler. U. S. Naval Research Laboratory. Apr 1957. 7p graphs. Order from OTS. 50 cents.

PB 121902

The concentration dependence of the residual resistivity of Ni-Pd alloys might be expected to obey

a simple Nordheim law since the number of holes in the d band and the number of electrons in the s band are approximately independent of composition. Measurements have indicated, however, that the maximum resistivity occurs at 70 atomic percent Pd instead of at 50 percent. This behavior can be explained by the spin dependence of electron scattering processes associated with the fact that the alloys with greater than 3 percent Ni are ferromagnetic. NRL R 4920.

Evaluation of the quality and uniformity of the titanium mill products received by the aircraft industry during 1956, by F. J. Gillig and L. W. Smith. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Mar 1957. 75p tables. Order from OTS. \$2. PB 121625

A survey was conducted to evaluate the quality and uniformity of titanium sheet and forgings reaching the aircraft industry during 1956. Visits were made to four titanium producers, four jet-engine companies, and sixteen fabricators of airframe components. Data of value to this report were obtained from two jet-engine companies and fifteen fabricators of airframes or airframe components. Some data on material produced about 2 years earlier, but only recently tested, was obtained from a third engine maker, and is included as an appendix to this report. Appendices A-L list companies visited during the survey and summarize their titanium experience. BMI TML R66.

Field effect and surface conductance on germanium, by S. R. Morrison, R. Sun and John Bardeen. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Jan 1955. 28p diagr, graphs. Order from OTS. 75 cents. PB 121339

The effect of a transverse electric field on the conductance of a filament (called the field effect) has been measured, in addition to the conductance and change in contact potential with light. The method employed in these studies is to change the energy bands at the surface by changing the gaseous ambient. The properties of the surface are then measured as a function of the band structure. The ambients used have been ozone and dry and wet oxygen. Technical report no. 5 under Contract no. N6 ori-07140, NR 072-161.

Final report under Contract DA 36-039-sc-56718, by W. H. Bauer and K. M. Merz. New Jersey Ceramic Research Station, Rutgers University, New Brunswick, N. J. Mar 1955. 6p tables. Order from LC. Mi \$1.80, ph \$1.80.

PB 124191

This is the fourth and final report of a project dealing with the low temperature formation of ferromagnetic spinels. This investigation showed that a variety of powders of a definite composition can be produced by coprecipitation techniques. In

general, the coprecipitated materials compared favorably with the oxide mix. Since only the initial permeability was measured a complete evaluation is impossible. However, the NaCO₃ precipitate which utilized ferrous chloride and the oxalate powder seemed to be the most promising of these materials. AD 70830.

Fracture characteristics of copper-base alloys, by N. C. Howells and E. A. Lange. U. S. Naval Research Laboratory. Apr 1957. 12p photos, graphs, tables. Order from OTS. 50 cents. PB 121933

The fracture characteristics of fifteen Navy copper-base alloys have been investigated. Results of drop-weight tests and Charpy V tests conducted at temperatures between 210°F and -300°F show the fracture relationships of copper-base alloys to be different from those of steel in that a Charpy V energy level of 10 ft-lb does not indicate a brittle condition for copper-base alloys. Only a copper-base alloy with abnormally low-tensile elongation value, less than 2%, fractured in a brittle manner. However, the ductility of high-tensile manganese bronze becomes very low at temperatures below -100°F. The interrelationships between Charpy V energy, tensile elongation, and notch ductility for these alloys are discussed. NRL R 4925.

Improving fatigue life of formed stainless steel hydraulic tubing by prestressing, by C. S. Yen and B. V. Whiteson. Douglas Aircraft Co., Inc., Santa Monica, Calif. May 1956. 57p photos, diagr, graphs, tables. Order from OTS. \$1.50. PB 121969

Tests of formed corrosion resistant steel tubing conforming to specification MIL-T-6845 were conducted to determine the effect of prestressing on the fatigue life. The forming was controlled so as to have either 5% or 10% of flattening in the formed portion. Prestressing consisted of applying a high hydrostatic pressure to the tubing after forming and before fatigue testing. It is found that prestressing improves the fatigue life of formed tubing under repeated pressure pulsing within certain limits. Prestressing also produces distortion or permanent deformation of tubing, which can make close tolerance parts unacceptable. Project 1371, Task 13500. Contents: Appendix I. Procedure for forming fatigue specimens. - Appendix II. Fatigue test data. - Appendix III. Calculation of weight saving. - Appendix IV. Reforming procedure and its effect on fatigue. - Appendix V. Conditions leading to "freezing" of end fittings. - Appendix VI. Tests for correcting tube information. AF WADC TR 56-120. Contract AF 33(616)-2280.

Influence of hydrogen on delayed failure in titanium alloys, by R. D. Daniels, E. L. Harmon, Jr. and A. R. Troiano. Case Institute of Technology. Dept. of Mechanical Engineering, Cleveland, Ohio. Feb 1957. 48p photos, drawings, graphs. Order from OTS. \$1.25. PB 121997

Notch geometry, strength level, hydrogen concentration and hydrogen distribution exerted an appreciable influence on delayed failure characteristics of a 4 Al - 4 Mn, titanium alloy. Hydrogen-induced delayed failure in sharply notched material occurred by a process of crack initiation and slow crack propagation. The average rate of crack growth was accelerated as the hydrogen content increased, and appeared to be independent of applied stress. The crack initiation and propagation process under certain conditions of stress was complicated by room temperature creep. A high concentration of hydrogen at the surface of a specimen was conducive to early crack formation, and crack growth rates appeared dependent upon inward diffusion of hydrogen from the surface. AD 118136. Project 7351, Task 70627. Covers work from Jan 3, 1955-Jan 3, 1957 under Contract AF 33(616)-2771. AF WADC TR 57-30.

Internal friction of copper and copper alloys, by Daniel Newson Beshers. Illinois. University. Dept. of Physics, Urbana, Ill. Nov 1955. 100p drawing, diagrs, graphs, tables (part fold.) Order from LC. Mi \$5.40, ph \$15.30. PB 124115

A graduate thesis on the technical literature and original experiments concerning internal friction or damping of oscillations in copper and copper-gold alloys of low concentration. Thesis - University of Illinois. Contract N6 ori-071(54), Technical report no. 3.

Investigation of intergranular oxidation in stainless steels and high-nickel alloys, by Clarence A. Siebert, Maurice J. Sinnott, Lynn H. DeSmyter and Harry M. Ferrari. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Oct 1956. 53p photos, graphs, tables. Order from OTS. \$1.50. PB 121795

Specimens from Chromel ASM, Hastelloy B, and commercial and vacuum-melted type 310 stainless steel alloys were oxidized for 100-hour periods in the stressed condition. Intergranular oxidation measurements were obtained microscopically. In general, the intergranular penetrations increased rapidly with stress after a certain minimum value was reached. This minimum value, denoted as the threshold stress, was determined for each alloy at various temperatures. The weight gained during oxidation was determined. It was found that most of the alloys tested followed the parabolic oxidation law. AD 110440. Project 1252, Task 73021. Covers work from Apr 30, 1955-June 30, 1956 under Contract AF 33(616)-353. AF WADC TR 55-470, Pt. 2.

Investigation of mechanical properties, corrosion resistance, and oxidation resistance of Thermol, an iron-aluminum-molybdenum alloy, by K. L. Kojola. U. S. Naval Gun Factory. Engineering Research and Evaluation Division.

Aug 1956. 29p photos, graphs, tables. Order from OTS. 75 cents. PB 121837

The purpose of this investigation on Thermenol was to obtain information concerning its mechanical properties at room and elevated temperatures, its resistance to corrosion (salt spray) and oxidation at elevated temperatures (scaling) as compared with that of known materials, its macrostructure and its microstructure. Technical report no. NFF-T-42-56. NAVORD 5190.

Investigation of the effects of hot-cold work on the properties of molybdenum alloys, by M. Semchyshen and Robert Q. Barr. Climax Molybdenum Company, Detroit, Mich. Jan 1957. 126p photos, graphs, tables. Order from OTS. \$3.25. PB 121976

Two alloys, molybdenum-0.28% niobium and molybdenum-0.50% titanium, were investigated from the standpoint of effect of fabrication variables on the degree of strain hardening and the resultant mechanical properties and on subsequent resistance to softening with exposure to elevated temperatures. Fabrication was accomplished either by rolling or forging. At the highest forging temperature investigated, 2400 F, specimens from the niobium alloy were less severely strain hardened than comparable specimens from the titanium alloy, owing to the relatively greater structure stability of the latter. A relationship was evolved between as-forged hardness and softening on exposure to elevated temperature only. Throughout the investigation, a consistent tendency was observed whereby the higher the working temperature, the higher the hardness, in direct contradiction to classic concepts. This apparently anomalous behavior was attributed to strain aging. AD 110708. Project 7351, Task 73512. Covers work from 1 Apr 1955-31 Jul 1956 under Contract AF 33(616)-2861. AF WADC TR 56-454.

Investigations of rhenium, by Chester T. Sims, Charles M. Craighead, Robert I. Jaffee, Donald N. Gideon, Wilbur W. Kleinschmidt, William E. Nexsen, Jr., Gordon B. Gaines, Francis C. Todd, Charles S. Peet, Danny M. Rosenbaum, Roger J. Runck and Ivor E. Campbell. Battelle Memorial Institute, Columbus, Ohio. Sep 1956. 86p photos, drawings, diagrs, graphs, tables. Order from OTS. \$2.25. PB 121653

A new method is reported for the preparation of high-purity rhenium metal powder by reduction of a hydrolyzed rhenium halide. Fabrication and consolidation of this material is discussed. The effect of thoria additions on rhenium fabricability are evaluated, and additional information on the hot and cold working of pure rhenium given. The electrical resistivity and specific heat of rhenium at room and elevated temperatures up to 2700 K are reported in detail. The electromotive forces generated by Re-Pt, Re-W, Re-Mo, and Re-Ta thermocouples were studied and the results are given. Mechanical

properties of several types of fabricated rhenium were measured and are discussed. These include tensile properties of annealed and cold-worked 10-mil strip, stress-rupture characteristics of 50-mil wire, work-hardening studies on rod, wire, sheet, and foil. The shear modulus of elasticity is reported and the temperature dependency of the modulus of elasticity up to 900 C given. Electronic studies reported include results of the effect of additions of 2.0 per cent thorium as ThO₂ on the thermionic emission and an evaluation of the photoelectric work function of pure rhenium. The stability of rhenium and tungsten filaments in contact with alumina at 1600 C, and the stability of rhenium, tungsten, and molybdenum in carbonaceous atmospheres were evaluated and the results are discussed. Rhenium and tungsten filaments were studied for resistance to thermal and mechanical shock. The resistance of rhenium to attack by molten metals was also evaluated and a discussion is included. Arc-melted platinum-rhenium alloys containing up to 10 per cent rhenium were studied for fabricability and properties. A successful method for fabricating alloys containing up to 2.0 per cent rhenium was developed and is discussed, and the results of resistivity, thermal emf, tensile strength and ductility, hardness, and oxidation resistance determinations on these alloys are given. The report also includes results of several investigations conducted outside Battelle at industrial or educational research establishments with rhenium supplied by this project. AD 97301. Supplement to PB 122857. Project 7080, Task 70659. AF WADC TR 54-371, Supplement 1. Contract AF 33(616)-232.

New high temperature intermetallic materials, by R. D. Grinthal. Firth Sterling, Inc. American Electro Metal Division, Yonkers, N. Y. Nov 1956. 65p photos, diagrs, graphs, tables. Order from OTS. \$1.75. PB 121891

Investigations of six ternary systems were conducted. Data on the effect of copper on physical properties, heat treatment and oxidation resistance of MoSi₂ is reported. Eleven compositions of the chromium-titanium-silicon system have been identified by X-ray diffraction methods, and some physical data are available at present. The titanium-aluminum-nickel system has been partially studied in the triangle at the center of the ternary diagram which includes NiAl, NiTi and TiAl. X-ray patterns and some physical data are reported, but this investigation is not yet completed. The chromium-titanium-copper system has been studied to determine the effect of copper addition on Cr₂Ti. X-ray patterns and physical data are reported along with oxidation properties. AD 110684. Project 7350, Task 70634. Covers work from 2 Sep 1955 through 2 Nov 1956 under Contract AF 33(616)-3198. For Parts 1-4 see PB 111413, 121018, 121019 and 121232. AF WADC TR 53-190, Part 5.

Research on effects of prestraining and notch sharpness on the notch strength of materials,

by G. W. Geil and Nesbit L. Carwile. U. S. National Bureau of Standards. Metallurgy Division. Oct 1956. 113p photos, drawings, graphs, tables. Order from OTS. \$3. PB 121782

A general study was made on the effect of pre-straining in tension at $+25^{\circ}\text{C}$ on the tensile properties at -196°C and $+100^{\circ}\text{C}$ of notched and unnotched specimens of (1) a commercially pure titanium, Ti-75A, and (2) a 4% Al, Mn titanium alloy, C130AM. Included in this general study were (1) a preliminary investigation on both materials to determine the effect of the notch sharpness (as varied by a change in root radius or notch depth) on the tensile properties, (2) a study of the combined effect of notch sharpness (as varied by a change in notch depth) and prestrain at $+25^{\circ}\text{C}$ on the tensile properties of notched specimens of these materials at -196° or $+100^{\circ}\text{C}$, and (3) a determination of the impact properties of Charpy V-notch specimens of both metals over the temperature range of -196° to $+300^{\circ}\text{C}$. AD 110436. Project 7360, Task 73605. Covers work from Apr 1, 1955-Jun 30, 1956 under Contract AF 33(616)-55-9. AF WADC TR 56-402.

Self-diffusion and interdiffusion in gold-nickel alloys, by J. E. Reynolds, B. L. Averbach, and Morris Cohen. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. Mar 1956. 36p graphs tables. Order from OTS. \$1. PB 121457

Measurements are described on the self-diffusion and interdiffusion coefficients in gold-nickel alloys as a function of composition and temperature. These data are combined with the thermodynamic properties of the gold-nickel system to test the validity of the Darken equation. This relationship is found to hold within the experimental accuracy of the measurements, and the results may be considered to demonstrate the concept that the chemical potential gradient is the driving force for the chemical diffusion process. The influence of the thermodynamic factor on the activation energy for interdiffusion is also shown. Project 7351, Task 70627. Appendix: Relationships between the activation energies for self and interdiffusion, by J. E. Hilliard. AF WADC TR 56-112. Contract AF 33-(038)-23281.

✓ Significant properties and characteristics of cold worked steels, a compilation and discussion of their engineering properties with emphasis on benefits and limitations in their use, by L. J. Ebert. Case Institute of Technology. Dept. of Metallurgical Engineering, Cleveland, Ohio. Jun 1955. 113p photos, graphs, tables. Order from OTS. \$3. PB 121662

A summary of engineering data on cold worked steels, including physical properties, residual stresses, directional effects, machineability, benefits, limitations, selection, applications, and a bibliography. WAL R 310/90-85. Contract DA 33-019-ORD-1464, Final report.

Structure and activity of catalytically active solids. Eighth technical report under Contract N7-onr-45003, by Louise E. Moore, Jean A. Sabatka and P. W. Selwood. Northwestern University. Dept. of Chemistry, Evanston, Ill. Aug 1955. 40p diagr, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 123224

For 7th report see PB 119931. Contents: I. Thermomagnetic analysis of catalytically active nickel, by Jean A. Sabatka and P. W. Selwood. - II. The influence of chemisorbed gases on the magnetization of catalytically active nickel, by Louise E. Moore and P. W. Selwood.

Survey of the literature on the electrodeposition of molybdenum (PB 124152). See entry under heading "Bibliography" on page 302.

Temper brittleness of boron-treated steel, by Samuel J. Rosenberg. U. S. National Bureau of Standards. Dec 1956. 66p graphs, tables. Order from OTS. \$1.75. PB 121889

Two series of steels, melted to the base composition of 8140, were studied to ascertain whether titanium and zirconium (present in many commercial boron addition agents) had any adverse effect upon the impact properties of the base steels, particularly with reference to temper brittleness. The results obtained indicate that with fully hardened steels tempered at 1200°F the presence of relatively small amounts of titanium as introduced into the test steels by the boron addition agents is sufficient to cause an impairment in the Charpy V-notch impact properties of the steels or an increased susceptibility to temper brittleness, or both. This was confirmed by the addition of titanium without boron. Similar effects, previously thought possible due to the presence of zirconium, were not observed. The zirconium additions, however, were very small, although within the range of residual amounts usually found in steels treated with addition agents containing zirconium. AD 110638. Project 7351, Task 73515. Covers work from Mar 1955-Jun 1956 under Contract AF 33(616)-55-8. Published as Research paper 2750 in U. S. Bureau of Standards. Journal of Research, Vol. 58, no. 4 (1957). AF WADC TR 56-396.

True stress-true strain properties of titanium and titanium alloys, by Eric B. Kula and Frank R. Larson. U. S. Arsenal, Watertown, Mass. Sep 1955. 90p photos, diagrs, graphs, tables. Order from OTS. \$2.25. PB 121833

Several heats each of a variety of titanium-base alloys, including five alpha and six alpha-beta compositions, were tested over a range of testing temperatures from -196°C to $+400^{\circ}\text{C}$, in both the mill-annealed and vacuum-annealed conditions to determine their true stress-true strain properties in tension, together with their chemical compositions and microstructures. WAL 401/259

supplements this report and is bound with it: Effect of vacuum annealing on the impact properties of titanium and titanium alloys. Apr 1956. O. O. project: TB 4-15. Dept. of the Army project: 593-08-021. WAL 401/259 adds results on impact properties of specimens from eleven heats of various titanium-base alloys. WAL 401/241 and WAL 401/259.

METEOROLOGY AND CLIMATOLOGY

Analysis of selected Project Jet Stream flight data, by K. C. Brundidge. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Aug 1956. 65p maps, diagrs, graphs, table. Order from LC. Mi \$3.90, ph \$10.80. PB 124693

This report consists of three parts. Part I describes B-47 Flight 24 in terms of isotach and isotherm patterns which provide such information as local time changes of the wind and temperature and patterns of divergence, vorticity and vertical motion. Part II is concerned with a statistical study of the magnitude of local wind speed changes, drawing upon information from six B-47 flights including Flight 24. An equation is presented which might have some prognostic value for wind forecasts over very short intervals of time. B-47 Flight 12 and B-29 Flight 13, which provide a three-dimensional picture of the jet stream, are discussed in Part III. A comparison is made of the jet streams studied in Parts I and III, leading to a brief discussion of the synoptic history of jet streams upon their arrival in the southerly latitudes. In addition, a description is given of a high-level stable layer occurring at the time of Flights 12 and 13 which seems to substantiate the theory of a thermally-indirect circulation just below the level of maximum winds. A & M Project 57 - Reference 56-23T. AF CRC TN 56-859. Contract AF 19(604)-559, Scientific report no. 10.

Components of the semidiurnal pressure oscillation, by W. Kertz. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Oct 1956. 36p diagrs, graph, tables. Order from LC. Mi \$3, ph \$6.30. PB 124227

1. Oscillations, Atmospheric 2. Atmosphere - Pressure - Harmonic analysis 3. Contract AF 19-(604)-1006, Scientific report no. 4 4. AF CRC TN 56-697.

Equations for the study of the energetics of the larger scales of atmospheric turbulence, by Barry Saltzman. Massachusetts Institute of Technology. Dept. of Meteorology. Jun 1956. 30p. Order from LC. Mi \$2.70, ph \$4.80. PB 124862

By considering the Fourier analysis of the planetary field of motion in the atmosphere it is possible to define "scales" of motion and to write equations which govern the behavior of these separate scales of motion. Specifically, an equation for the rate of change of the kinetic energy of a disturbance of a given wave number is presented. Such an equation, which includes the effects of the release potential energy, friction, and the transfer of energy among the various scales of eddies and the mean flow, can serve as a basis for studying the day-to-day variations of the spectral distribution of kinetic energy and for computing the "steady-state" atmospheric energy cycle in the domain of wave number, with the use of daily hemispheric data. General circulation project. AF CRC TN 56-498. Contract AF 19(604)-1000, Scientific report no. 5.

Report on a laboratory investigation of "precipitation static" interference as encountered on aircraft, by R. H. George. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1940. 85p photos, diagrs, graphs, table. Order from LC. Mi \$4.80, ph \$13.80. PB 123545

Reprinted 1942. Investigation conducted by the Electrical Division of the Experiment Station of Purdue University in cooperation with the Purdue Research Foundation. CAA TDR 29.

Research on atmospheric pressure changes: A case study of the fields of large-scale vertical velocity and horizontal divergence, by Geirmundur Arnason. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. May 1955. 72p maps, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 124070

This report presents a method for the objective computation of the fields of vertical motion and horizontal divergence. From this series it is hoped to obtain valuable information on atmospheric processes. MIT MET TR 16. Contract N5 ori-07804.

Standing semidiurnal oscillation in an atmosphere of variable depth, by B. Haurwitz. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Sep 1956. 21p graph. Order from LC. Mi \$2.70, ph \$4.80. PB 124230

In order to show how the large-scale oscillations of the atmosphere are modified by a meridional temperature gradient a fluid layer is considered whose depth varies with the latitude. The particular oscillation considered is the standing semidiurnal oscillation. Two different types of depth variations are discussed. It is also shown how both cases can be solved by an approximation method which can be extended to other models where a direct integration is not possible. Proj-

ect no. 299. AF CRC TN 56-694. Contract AF 19-(604)-1006, Scientific report no. 3.

Study of small-scale atmospheric motion. I: Local rate of ascent of the thirty-gram balloon, by H. Landers and Milton H. Sipple, Jr. Florida State University. Dept. of Meteorology, Tallahassee, Fla. Sep 1955. 23p graph, tables, diagr. Order from LC. Mi \$2.70, ph \$4.80. PB 124890

The preliminary work toward determining the magnitude and distribution of the horizontal divergence and the vertical component of the relative vorticity of the horizontal field of motion in a small area is reported. This consisted mainly of determining locally the rate of ascent of the thirty-gram balloon. Mean curves for the local ascensional rates at 1000 EST are compared with the assumed ascensional rate. Above the friction layer, the mean local ascensional rates are shown to be significantly greater than the assumed rate. AD 72988. Technical report no. 2. Contract Nonr-1600(00), NR 082-071.

MINERALS AND MINERAL PRODUCTS

Determining the usefulness of barium titanate material for memory devices in large scale digital calculators, by Charles F. Pulvari. Catholic University of America, Washington, D. C. Apr 1956. 86p photos, diagrs, graphs. Order from OTS. \$2.25. PB 121384

Results are presented for research on the production of ferroelectric materials and their properties, with particular interest in their use as information storage media. Static and dynamic polarization data and their dependency on pulse-amplitude and pulse-length are given. The technology of producing memory condensers is discussed and practical solutions are presented. Theoretical investigations on the switching properties of ferroelectrics have been carried out, keeping in mind the need of a better basic understanding of the physical picture during switching. For circuit analysis a mathematical approximation of the switching transient is given. Writing and reading modes are described and practical results obtained are presented. A method was developed for testing memory properties of bistable storage condensers with particular reference to matrix application. Typical data are plotted. An electrostatically operated multicondenser memory matrix has been produced using ferroelectric dielectric material. Project 7080, Task 70903. AF WADC TR 55-339. Contract AF 33(616)-106.

Synthetically bonded steel molding sands, by Howard F. Taylor and Robert F. Morey. U. S. Naval Research Laboratory. Mar 1941. 53p graphs, tables (1 fold). Order from LC. Mi \$3.60, ph \$9.30. PB 123302

Partial report. Unclassified.

1. Sands, Molding - Grain size 2. Bonding - Materials 3. Bentonite - Uses 4. NRL M 1705.

ORDNANCE AND ACCESSORIES

Effects of temperature on the resistance to impact penetration and hardness of soft homogeneous armor and face-hardened bullet-proof steel and a description of a new basic feature of impact penetration, by G. D. Kinzer. U. S. Naval Research Laboratory. Jun 1942. 47p diagrs, graphs, tables (1 fold). Order from LC. Mi \$3.30, ph \$7.80. PB 120678

Tenth partial report on light armor. Unclassified 15 Dec 1953.

1. Armor plate - Impact tests 2. Armor plate - Ballistic tests 3. Penetration - Armor 4. NRL O 1892.

Preliminary study of the frequency spectrum associated with the idealized beam rider missile, by L. O. Brown. U. S. Naval Research Laboratory. Feb 1947. 20p diagr, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 123333

Unclassified 24 May 1954.

1. Trajectories, Guided missile - Determination 2. Trajectories, Guided missile - Mathematical analysis 3. Missiles, Guided - Kinematics 4. Missiles, Guided - Spectrum analysis 5. NRL R 2930.

RDX, purchase description. Revised. U. S. Picatinny Arsenal, Dover, N. J. May 1954 - March 1956. 15p photo, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124882

Partial revision of PA-PD-416, 13 May 1954. This purchase description is for use pending revision of Specification JAN-R-398.

1. Hexogen - Specifications 2. Explosives, Plastic - Specifications 3. PATR PD 416.

PERSONNEL APTITUDE TESTING

Factor analysis of the report of officer effectiveness (form 77A), by Norman D. Bryant. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1956. 28p. Order from LC. Mi \$2.70, ph \$4.80. PB 124238

A general factor accounted for most of the correlation among the 54 items. In addition, five

group factors were tentatively defined by the relationships among separate clusters of the check list items. The group factors are interpreted as: I, conforming to the prescribed role of the responsible officer; II, proficiency in intellectual tasks; III, getting along with people; IV, proficiency in supervising personnel, and V, facility in communication. Project 7701, Task 77042. AF PTRC TN 56-77.

Mental qualification test for women of the Armed Forces, by Jane McReynolds. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1956. 12p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124239

Project 7717, Task 87001.

1. Women - Military aptitude tests 2. AF PTRC TN 56-87.

Procedures for evaluation of job performance in scientific research, by Marion F. Shaycoft and James W. Altman. American Institute of Research, Pittsburgh, Pa. Oct 1955. 79p tables. Order from LC. Mi \$4.50, ph \$12.30.

PB 124867

This report is concerned with two evaluation forms and with a procedure which involves giving the person to be evaluated an assignment which is ostensibly a part of his regular job but which has been designed to elicit specified critical behaviors. Conclusions are given. Project NR 153-146. Sixth report in a series of reports dealing with the evaluation and measurement of research performance. For 4th report see PB 104939.

Proficiency measure for temporal integration of components in a perceptual-motor task, by Mymon Goldstein. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Denver, Colo. Nov 1955. 19p graph, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124820

Project 7708, Task 77141.

1. Personnel, Fire control - Ability tests 2. Psychomotor tests - Rating scales 3. AF PTRC TN 55-35.

PHYSICS

General

Algebraic tables for a numerical transform calculus, by Samuel Thaler and Rubin Boxer. U. S. Air Force. Air Research and Development Com-

mand. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Aug 1956. 20p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124640

The use and preparation of algebraic tables are described for a method of analyzing linear and nonlinear systems. A discussion is given on the solution of a general case problem; algebraic steps are shown and a convenient arrangement of the numeric calculation is suggested. Synthetic division using nonlinear systems, and also linear systems with constant and time varying coefficients is discussed. A sample computation is given to illustrate the use of the tables described in the report. AD 97716. Project 45163. AF RADC TN 56-281.

Characteristics of turbulence in a boundary layer with zero pressure gradient, by P. S. Klebanoff. U. S. National Advisory Committee for Aeronautics. 1955. 21p diagr, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 124459

The results of an experimental investigation of a turbulent boundary layer with zero pressure gradient are presented. Measurements with the hot-wire anemometer were made of turbulent energy and turbulent shear stress, probability density and flattening factor of u-fluctuation, spectra of turbulent energy and shear stress, and turbulent dissipation. The importance of the region near the wall and the inadequacy of the concept of local isotropy are demonstrated. Attention is given to the energy balance and the intermittent character of the outer region of the boundary layer. Also several interesting features of the spectral distribution of the turbulent motions are discussed. Supersedes TN 3178 (PB 114830). NACA 1247.

Coefficients of univalent functions, by Zeev Nehari. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. Apr 1956. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 122425

It is shown that the truth of Littlewood's conjecture $|a_n| \leq 4/d(n)$, $f(z) \neq d(z) < 1$, would follow from the proof of the asymptotic result $\limsup_n \frac{A_n}{n} = 1$. AD 86583. Contract AF 18(600)-1138, Technical report no. 11. AF OSR TN 56-14.

Development of a mathematical theory of plasticity based on slips, by T. H. Lin. Detroit. University. Research Institute of Science and Engineering, Detroit, Mich. Aug 1956. 52p diagrs, graphs, table. Order from LC. Mi \$3.60, ph \$9.30. PB 124110

Part I of this report gives the development of a plasticity theory considering latent hardening effect. Calculated results by this theory for four

different cases are shown. Part II gives a method derived to analyze elastic and plastic strains of a crystal and to give successive active slip systems and their amounts of slips. An illustrative example of this method is shown in a previous technical note AFOSR-TN 56-307 (PB 124806). Active slip systems and sums of slips of crystals of different orientations under uniaxial loading were calculated by the method given in Part IIa and T. N. 56-307. The calculated active slip systems and the sums of slips of different crystals are tabulated in Part IIb. AD-96-043. AF OSR TR 56-31. Contract AF 18(600)-1466.

Determination of influence coefficients, by S. Levy. Advisory Group for Aeronautical Research and Development. Feb 1956. 8p. Order as Agard Report 41 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124473

The method of consistent deformations for determining influence coefficients of delta wings is reviewed. A discussion is given of computational difficulties which may arise in applying this method. A review is given of strain energy and differential equation methods for computing influence coefficients. Presented at the Third Meeting of the Structures and Materials Panel, Apr 10-17, 1956, Washington, D. C. AG 41.

Discrete compensation of sampled-data and continuous control systems, by E. I. Jury and W. Schroeder. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Dec 1955. 82p diagrs, graphs. Order from LC. Mi \$4.80, ph \$13.80. PB 122417

This paper presents a method of compensation, to be applied to continuous as well as to sampled-data systems, which reduces to zero any overshoot or error after a prescribed finite time. This prescribed response can be accomplished using the modified z-transform which yields the systems response for all instants of time. UC IER Series 60, Issue no. 154. AF OSR TN 55-445. Contract AF 18(600)-1521.

Economic design of X charts used to maintain current control of a process: Model I, by Acheson J. Duncan. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Oct 1955. 30p graph, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124825

This paper establishes a criterion that measures approximately the average net income of a process under surveillance of an X chart when the process is subject to random shifts in the process mean. The paper shows how to determine the sample size, the interval between samples, and the control limits that will yield approximately maximum average net income. Numerical examples of

optimum design are studied to see how variation in the various risk and cost factors affect the optimum. SU AMSL TR 24. Contract N6 onr-25126, NR 042-002.

Enclosed quantum mechanical systems, by T. E. Hull and R. S. Julius. University of British Columbia. Dept. of Mathematics, Vancouver, B. C., Canada. May 1956. 11p graph. Order from LC. Mi \$2.40, ph \$3.30. PB 122964

A brief description is given of the eigenvalue problems associated with enclosed quantum mechanical systems and of some attempts to deal with these problems. Another method is developed which leads to a general asymptotic formula for the eigenvalues. This formula yields a simple asymptotic approximation to the eigenvalue in each particular case, once the eigenfunction of the corresponding unrestricted system is known. Contract AF 18(600)-1517. AF OSR TN 56-209.

Multi-decision problems for the multivariate exponential family, by Donald R. Truax. Stanford University. Dept. of Statistics, Stanford, Calif. Aug 1955. 46p diagrs, table. Order from LC. Mi \$3.30, ph \$7.80. PB 123126

In recent years a great deal of work has been done toward developing the theory of statistical decisions when the data are distributed according to some frequency function belonging to the univariate exponential family. It has been possible to characterize minimal complete classes of procedures for many important problems. The purpose of this paper is to investigate various problems when the underlying distribution belongs to the multivariate exponential family. A geometric approach is taken to these problems which is intended to be an aid to the intuition. Contract N6 onr-251, T. O. III, NR 042-993. SRI TR 32.

On possible similarity solutions for three-dimensional incompressible laminar boundary layers. II: Similarity with respect to stationary polar coordinates, by Howard Z. Herzig and Arthur G. Hansen. U. S. National Advisory Committee for Aeronautics. Nov 1956. 16p table. Order as TN 3832 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124391

Solutions of mainstream flow patterns for three-dimensional, laminar, incompressible thin-boundary-layer flows (over flat or slightly curved surfaces) having similarity with respect to stationary polar coordinates in the plane of the surface are derived. The solutions are summarized in a table. NACA TN 3832.

On the calculation of shallow shells (K raschetu pologikh obolochek), by S. A. Ambartsumyan. Dec 1956. 11p diagr. Order as TM 1425 from

National Advisory Committee for Aeronautics,
1512 "H" St., N. W., Washington 25, D. C.
PB 124456

Two simultaneous equations of V. Z. Vlasov for the stresses and deflections of shallow shells are stated and somewhat simplified for application to the problems of uniform and concentrated loading on a shell bounded by a coordinate rectangle. Numerical results are given. The lines of curvature are used as coordinates. Translated from *Prikladnaia matematika i mekhanika*, v. 11, 1947, p. 527-532, by S. Reiss. NACA TM 1425.

On the theory of anisotropic shallow shells (K teorii anizotropnykh plogikh obolochek), by S. A. Ambartsumyan. Dec 1956. 11p tables. Order as TM 1424 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124455

Simultaneous equations for both the stress function and the deflection function of an anisotropic shallow shell are developed and reduced to a single eighth-order equation for each function. The lines of curvature are used as coordinates. Translated from *Prikladnaia Matematika i Mekhanika*, v. 12, 1948, p. 75-80, by S. Reiss. NACA TM 1424.

On the theory of thin shallow shells (K teorii tonkikh plogikh obolochek), by A. A. Nazarov. Dec 1956. 7p. Order as TM 1426 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124457

The equations for a shallow shell are set up in "almost Cartesian coordinates" using a tensor approach. These equations are then reduced to two simultaneous fourth-order equations for the deflection and a stress function analogous to Airy's. Translated from *Prikladnaia matematika i mekhanika*, v. 13, 1949, p. 547-550, by S. Reiss. NACA TM 1426.

Operational calculus for numerical analysis, by Samuel Thaler and Rubin Boxer. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Sep 1956. 21p graph, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124641

The approximate Laplace transforms, termed Z-forms, useful in the numerical solution of linear, time-varying, and nonlinear differential equations are derived in the time domain. It is shown that the integrating operators derived in the frequency domain are equivalent to some of the methods available in the field of numerical analysis. Conditions of validity for the numerical techniques are indicated. Included is the application of the method to a time-varying problem in analysis, and to a problem in network synthesis. AD 97761. Project 45163. AF RADC TN 56-307.

Pohlhausen-type, laminar, incompressible boundary layer solution, by Kenneth R. Cramer. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1956. 44p graphs, tables. Order from OTS. \$1.25. PB 121983

A relatively complete review and comparison of the existing Pohlhausen-type, laminar, incompressible boundary layer solutions is presented. An integral-type solution is developed on the basis of Timman's velocity profiles. The accuracy of this method is determined by comparing the results obtained from example problems, with exact solutions and experimental results. It is recommended that either Thwaites' solution or the proposed solution be employed for determining the boundary layer parameters for flow over arbitrarily-shaped bodies AD 118114. Project 3066, Task 70151. Thesis - Ohio State University. AF WADC TR 56-569.

Problem of the isolated lot, by Eugene L. Grant and Gerald J. Lieberman. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. May 1955. 37p diagr, tables. Order from LC. Mi \$3, ph \$6.30. PB 124087

Military Standard 105A and the standards that preceded it require the selection of a quality standard designated as the acceptable quality level (AQL). An isolated lot is defined as one in which the consumer's protection against accepting products of unsatisfactory quality is thought to depend entirely on the inspection plan for the particular lot. This report discusses the isolated lot problem under the assumption that for any product subject to acceptance inspection, one figure has been stated as the quality standard applicable to each group of quality characteristics (or to single quality characteristics) of the product. It is assumed that this quality standard has been expressed in terms of percentage of defectives or as defects per hundred units. SU AMSL TR 9.

Quarterly report, Oct-Dec 1955. Massachusetts Institute of Technology. Acoustics Laboratory. Feb 1956. 31p photos, diagrs, graphs, table. Order from LC. Mi \$3, ph \$6.30. PB 122427

1. Acoustic research 2. Sound - Scattering
3. Sound - Absorption - Gases 4. Sound - Propagation - Measurements.

Spreading characteristics of a jet expanding from choked nozzles at Mach 1.91, by Morris D. Rousso and L. Eugene Baughman. U. S. National Advisory Committee for Aeronautics. Dec 1956. 27p photos, drawings, diagr, graphs. Order as TN 3836 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124394

Total-temperature surveys were made to determine the gross spreading of jets expanding from axisymmetric convergent and convergent-divergent nozzles. The nozzles were located in the base of conically boattailed bodies of revolution. Surveys were made between the nozzle exit and a station 8 nozzle diameters downstream of the jet exit for jet pressure ratios from 2.5 to 0.16. Supersedes RME51L19. NACA TN 3836.

Theoretical and experimental studies of liquid viscosity cell theory of liquids, by F. C. Collins. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Oct 1956. 36p diagrs, tables. Order from OTS. \$1. PB 121758

A review of the theoretical background of this research is presented together with preliminary experimental data. The review includes a discussion of the principal approaches to the viscosity problem in the published literature and a development of an approximate relation between the viscosity and acoustic properties of the liquid. Experimental data are given for a number of representative liquids. A refinement of the viscosity theory is outlined. AD 110471. Project 3044, Task 70313. AF WADC TN 56-255, Part 1. Contract AF 33-(616)-373.

Ultrasonic propagation in liquids under high pressures, by G. J. Holton. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Dec 1948. 109f photos, diagrs, graphs, tables. Order from LC. Mi \$5.70, enl pr \$18.30. PB 125453

The problem under discussion is the velocity and attenuation of ultrasonics in liquids at various temperatures and high pressures. This report deals with the development of the apparatus and the method of measurement, the data obtained therewith, and a brief theoretical treatment of the data. Thesis - Harvard University. HU ARL TM 3. Contract N5 ori-76, T. O. X, NR 014-903.

Nuclear

Cloud chamber study of the secondary particles from locally produced penetrating showers, by Norman Frederick Harmon. Washington University. Dept. of Physics, St. Louis, Mo. Sep 1955. 72p photos, drawing, diagrs, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 124886

The present experiment was undertaken as an attempt to throw more light on the decay processes that had been observed as well as to investigate any new decay processes that might manifest themselves. The source of high energy primary particles was to be the cosmic ray beam, so a detector of locally produced high energy penetrating showers was used. In order to be able to detect

effectively low energy photons and low energy secondaries from particles reaching the end of their range in the chamber, thin lead plates (1/4") were used in the chamber. Technical report no. 20. Thesis - Washington University. Contract N6 onr-202, T. O. III, NR 021-046.

Electronic structure of molecules. Some recent developments, by Roy McWeeny. Massachusetts Institute of Technology. Solid-State and Molecular Theory Group. May 1955. 124p diagr, graphs, tables. Order from LC. Mi \$6.30, ph \$19.80. PB 124069

This report originated in a series of lectures given during May 1954 on molecular theory and stationary solutions of the electronic eigenvalue problem, with special emphasis on recent developments and semi-empirical theories. It includes: I. Orbital theories; II. Description of electrons in molecules; III. Spin eigenfunctions and matrix elements; IV. The variation process; V. Applications to conjugated molecules; VI. Application to simple saturated molecules. Supplemental to Technical report no. 3 (PB 124549). MIT SMT TR 7. Contract N5 ori-07856.

Fallout protection afforded by standard enlisted men's barracks, by C. W. Malich and L. A. Beach. U. S. Naval Research Laboratory. Mar 1957. 23p graphs, table. Order from OTS. 75 cents. PB 121778

The shielding properties of standard Navy enlisted men's barracks have been calculated for the gamma radiation associated with fallout from nuclear weapons. Potential improvements in shielding have been investigated. NRL R 4886.

PHYSIOLOGY

Comparative physiology of thermal insulation, by Donald R. Griffin, Harold T. Hammel and K. S. Rawson. U. S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Aug 1956. 63p diagr, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 124784

Part I deals with studies of the heat transfer through the skin and fur of living mammals. Part II describes extensive measurements of the thermal conductivity or insulation of a variety of mammals' pelts, fresh, dried and tanned, together with a few measurements of artificial fur-substitutes. AF AAL Proj 8-7951, Report no. 6.

Effects of blast phenomena on man, by Donald H. Eldredge, a critical review with a selected bibliography prepared with the assistance of

Shirley K. Hirsh. Armed Forces - National Research Council Committee on Hearing and Bio-Acoustics, St. Louis, Mo. Jun 1955. 27p.
Order from LC. Mi \$2.70, ph \$4.80.

PB 124247

The review and bibliography are not intended to be exhaustive. They include the material and the information judged by Dr. Eldredge to be most useful and significant for future workers on problems of blast. Contract Nonr-1151(01), NR 140-069. CHABA 3.

Physiology of load-carrying. XI: Observations on the Korean A-frame, by Farrington Daniels, Jr. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Development Center, Natick, Mass. May 1956. 25p photos, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124865

An analysis of design features and principles applicable in the field of heavy load carrying was made from 35 mm still pictures and 16 mm movies. Several illustrations are included for purposes of clarity. It is suggested that the Korean A-Frame is a highly functional device for transport of heavy loads. For Parts 1, 8-9 see PB 113460, 122896 and 122899. QMC EP TR 29.

PSYCHOLOGY

Attitude differences among disparate Air Force specialties, by Carson Y. Nolan. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1956. 18p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124237

Mean scores for 5 groups, derived from eight short attitude scales, were compared. The scales included: affective feeling toward NCOs, economic opportunity in the Air Force, feeling of security in the Air Force, NCO leadership, Air Force ideology, job satisfaction, amount of supervision desired on the job, and authoritarianism. A single item was used to obtain an expression of reenlistment intent. Certain biographical information data were also examined. Project 7950, Task 79507. AF PTRC TN 56-88.

Comparative study of the attitude of student groups in advanced flying training, by John T. Lanzetta and Dorothy M. Knoell. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Oct 1955. 28p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124821

This study employed attitude measures as criteria of the effectiveness of Project Tiger. The project had as its ultimate objective the production of combat-ready jet pilots. Accordingly, this investigation appraised not only level of motivation but also the direction and extent of attitudinal changes during the program at eight Crew Training Air Force (CTAF) bases. Project 7731, Task 77427. Project Tiger. AF PTRC TN 55-30

Effect of variations in control-display ratio during training on transfer to a low ration, by Marty R. Rockway, Gordon A. Eckstrand and Ross L. Morgan. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1956. 17p graphs, tables. Order from OTS. 50 cents. PB 121886

The present study was designed to investigate the relationship between amount of transfer of a two dimensional tracking skill and degree of physical similarity between training and test control-display (C/D) ratios. Each of three groups of subjects received training using one of three different C/D ratios. Following training, all groups were tested while using the lowest (i. e., most sensitive) of the three ratios. The experimental results were as follows: (a) During training, tracking performance was a function of the C/D ratio employed. (b) Practice with all of the training ratios produced significant positive transfer to the test ratio. (c) The differences among the groups during the test period were not statistically significant. Experimental data were collected at Ohio State University. AD 110640. Project 7197, Task 71635. Contract AF 13(600)-78. AF WADC TR 56-10.

Effects of noise and fatigue on a complex vigilance task, by Harry J. Jerison and Shelley Wing. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio and Antioch College, Yellow Springs, Ohio. Jan 1957. 21p diags, graphs, tables. Order from OTS. 75 cents. PB 121985

Nine volunteer male undergraduates with normal hearing were required to monitor three clocks simultaneously, and to respond when a clock hand made a double jump (about once a minute for each clock). During a two-hour control session in quiet (83 db) no significant changes in performance level occurred. During another two-hour session in which the noise level was raised to 114 db after the first half hour, the subjects' performance was not changed significantly until the final half hour of work. At that time performance in the noise session became significantly worse. These results support conclusions based on other types of monitoring tests, that performance involving vigilance suffers under noise stress. They do

not confirm findings of other laboratories that a monitoring task worked at for two hours in relative quiet will show measurable performance decrements. AD 110700. Project 7193, Task 71614. AF WADC TR 57-14. Contract AF 18(600)-50.

Evaluation of methods of keying psychological tests for prediction of external criteria, by Philip H. DuBois, Jane Loevinger, and Thomas L. Smith, Jr. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1956. 29p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124224

The four objectives of this study were: to develop tests by four methods of empirical selection from a pool of heterogeneous items; to develop tests by homogeneous clustering of the same pool of items; to compare the effectiveness of the tests in predicting an external criterion; and to devise computing techniques for handling large masses of item data by means of punched cards. Project 7702, Task 77062. AF PTRC TN 56-65.

Evaluation of test items measuring motor abilities, by Jack A. Adams. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas. May 1956. 28p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124225

Forty-six simple motor test items were developed to span a wide range of motor abilities with two major ability classifications represented: (a) dexterity and manipulative, and (2) gross muscular strength and coordination. The relative predictive value of these test items, as compared with four complex psychomotor tests and the Aircrew Classification Battery, was studied using the following criteria: (1) success in primary pilot training, and (2) success in reciprocal engine mechanics, hydraulic mechanics, and aircraft electricians technical schools for airmen. Project 7700, Task 77010. AF PTRC TN 56-55.

Relation between conformity and problem solving, by Charles Y. Nakamura. Stanford University. Dept. of Psychology, Stanford, Calif. Aug 1955. 38p tables. Order from LC. Mi \$3, ph \$6.30. PB 123125

This study is concerned with the relation between tendency to conform and achievement in problem solving. The approach is in keeping with the increasing interest in the relation between problem solving and various personality or non-intellectual variables. Impetus in this direction has been provided, in part, by the fact that individual differences are repeatedly found in problem solving types of

tasks which are not accounted for by differences in general intelligence as measured by the conventional tests. Thesis - Stanford University. Contract N6 onr-25125, NR 150-149, Technical report 11.

Relationships between magnification and course frequency in compensatory aided tracking, by J. H. Bowen and R. Chernikoff. U. S. Naval Research Laboratory. Apr 1957. 7p diagr, graphs, tables. Order from OTS. 50 cents. PB 121876

This study systematically manipulated three linear and one nonlinear magnifications of tracking error in combination with three complex target courses of increasing frequencies in a compensatory aided tracking task. When taken with the results of previous work comparing pursuit and compensatory displays, the present study shows that the beneficial effects of magnification occur at low and intermediate course frequencies, while the use of a pursuit display effectively lowers error at intermediate- and high-frequency levels. NRL R 4913.

Transfer effects between automatically paced and self-paced training schedules in a perceptual-motor task, by Charles O. Nystrom, Robert E. Morin, and David A. Grant. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, Texas. Dec 1953. 18p photo, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124283

In the sense of using two transfer tests, this research bulletin reports on two parallel experiments that deal with the effect of the pacing variable when subjects are trained on self-paced or automatically paced tasks and then tested on either automatically paced or self-paced tasks. In attempting to predict the experimental results, two factors were considered: (a) the amount of training, and (b) the generalization that transfer is greatest between identical situations or tasks. Project no. 512-024-0001. AF HRRC RB 53-66. Contract AF 33(038)-23294.

Visual principles for training by television, by Robert Jackson. U. S. Office of Naval Research. Special Devices Center. Human Engineering Division, Port Washington, N. Y. n.d. 28p diagrs. Order from OTS. 75 cents. PB 121931

Effective training by television depends upon an understandable TV picture. Poor images on TV receivers are often caused by the design of the materials being shown. This study discovered why some training devices are easy to see on television and why some are difficult to see. Thirty-one principles of visual design were dis-

covered to affect the clarity of a TV picture. They are listed and described in the text. SDC TR 20-TV-2.

RUBBER AND RUBBER PRODUCTS

Bonding materials, metallic mating surfaces: Low RF impedance, by V. Pulsifer. Armour Research Foundation, Chicago, Ill. Jan 1954. 63p photos, drawing, diagrs, graphs, tables. Order from OTS. \$1.75. PB 111930

The objective of work done on this project was to develop a gasket material which will prevent radio frequency energy from escaping at joints in closed containers. The material to be developed is also required to form a gas-tight joint. Metal elements imbedded in rubber were made and tested. Results of this investigation with various materials and their RF conductivity revealed certain design principles which are involved in successful gasket performance. Appendix: Design and construction of a 3Mc shielded oscillator for testing gaskets. Contract AF 33-(038)-23583.

STRUCTURAL ENGINEERING

Analysis of the stability and ultimate compressive strength of short sheet-stringer panels with special reference to the influence of the riveted connection between sheet and stringer, by Joseph W. Semonian and James P. Peterson. U. S. National Advisory Committee for Aeronautics. 1956. 20p photo, diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C., as NACA Rept. 1255. 20 cents. PB 124461

A method of strength analysis of short sheet-stringer panels subjected to compression is presented which takes into account the effect that the riveted attachments between the plate and the stiffeners have on the strength of panels. An analysis of experimental data shows that panel strength is highly influenced by rivet pitch, diameter, and location and that the degree of influence for a given riveting depends on the panel configuration and panel material. Supersedes TN 3431 (PB 117009). NACA 1255.

Bending of orthogonally stiffened cylindrical shells, by W. H. Hoppmann, II. Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. Sep 1955. 24p photos, diagrs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 123968

The flexure theory of orthogonally stiffened plates treated as uniform plates of homogeneous

orthotropic material has been extended to the case of the flexure of stiffened shells. It is shown how elastic constants or compliances determined from experiments on stiffened flat plates may be used in the analyses of the deformation of similarly stiffened shells. AD 71796. Contract N onr-248(12), Technical report 10.

Creep behavior of structural joints of aircraft materials under constant loads and temperatures, by Leonard Mordfin and Alvin C. Legate. U. S. National Advisory Committee for Aeronautics. Jan 1957. 53p diagrs, graphs, tables. Order as TN 3842 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124399

The results of 55 creep and creep-rupture tests on structural joints are presented. Methods are described by which the time to rupture, the mode of rupture, and the deformation of joints in creep may be predicted. These methods utilize creep data on the materials of the joint in tension, bearing, and shear. NACA TN 3842.

Design manual for spherical air supported radomes, by Walter W. Bird and Murray Kamrass. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Revised. Mar 1956. 153p photos, diagrs, graphs. Order from LC. Mi \$7.50, ph \$24.30. PB 124793

The Radome Design Manual has been revised to incorporate information accumulated since its publication. Methods of analysis have been revised based on latest load and stress information determined in recent wind tunnel tests. A section covering the loading of the tower has been added. The latest information on new materials and equipment is summarized and the latest approved maintenance procedures are outlined. As this Manual includes all pertinent information from the original Design Manual, no reference need be made to the original publication. As in the earlier edition, basic design data are summarized and presented in Appendix I in the form of charts and graphs. The solution to a typical design problem is also outlined in Appendix I. Revision of Report UB-664-D-1 issued in 1950. CAL UB-909-D-2. Contract AF 30(602)-976.

Fatigue-crack-propagation and residual-static-strength results on full-scale transport-airplane wings, by Richard E. Whaley, M. J. McGuigan, Jr. and D. F. Bryan. U. S. National Advisory Committee for Aeronautics. Dec 1956. 57p photos, diagrs, graphs, tables. Order as TN 3847 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124401

Results are presented of fatigue-crack propagation during fatigue tests on the wings of C-46 airplanes. Results are also presented of the

residual static strength of these wings after fatigue test. The propagation curves along with an explanation of the crack growth are presented for each wing. Curves also show the trends that occur with changing load levels. The loss in static strength is also shown and is compared with the calculated strength and the results of small specimen tests. NACA TN 3847.

(PB 115122), TN 3200 (PB 115220), TN 3460 (PB 118019). NACA 1251.

Thermal buckling, by Frederick V. Pohle and Irwin Berman. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N. Y. May 1956. 37p diagr. Order from OTS. \$1.
PB 121512

The general problem of thermal buckling is illustrated by the particular case of a simple supported rectangular plate. The relevant mathematical theorems, due to Kamke, are stated in the Appendix. A stress distribution is assumed for which an exact solution to the buckling problem is possible. Approximate solutions are obtained by means of the energy method, by solution of the differential equation by Fourier series, and by solution of the homogeneous integral equation for the problem. The integral equation is equivalent to the differential equation and the boundary conditions; it is necessary that the Green's function be known explicitly. The methods are discussed with particular attention to the choice of the most appropriate method to use in the problem of the thermal buckling of a cylinder. Project no. 5-(1-1347) and 6-(1-1347), Task no. 70131. AF WADC TR 56-270. Contract AF 33(616)-3214.

Induction heating and theory in the solution of transient problems of aircraft structures, by N. J. Hoff, Frederick V. Pohle, Irwin Berman, I. Mirsky, S. Lederman, V. Wagle and Burton Erickson. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N. Y. Aug 1956. 198p photos, drawings, diagrs, graphs, tables. Order from OTS. \$5.
PB 121573

The purpose of the research program is the development of methods to simulate the effect of aerodynamic heating upon structures of supersonic and hypersonic airplanes and missiles. The work includes both the development of experimental techniques and a theoretical investigation of the conditions involved. AD 97210. Project 1347, Task 70131. Continues work described in AF WADC TR 55-291 (PB 121326). AF WADC TR 56-145. Contract AF 33(616)-2788.

Plastic design and thermal stresses, by William Prager. Brown University. Division of Applied Mathematics, Providence, R. I. Mar 1956. 15p diagrs. Order from LC. Mi \$2.40, ph \$3.30.
PB 124915

A mathematical approach with application initially to a simply indeterminate beam. Extension to more complex structures is indicated briefly. To be presented at the Conference on the Plastic Theory of Structures, University of Cambridge, Dept. of Engineering, Sep 19-21, 1956, Cambridge, England. Contract Nonr-562(10), NR 064-406. GDAM TR 12. GDAM C 11-12.

Stress analysis of circular semimonocoque cylinders with cutouts, by Harvey G. McComb, Jr. U. S. National Advisory Committee for Aeronautics. 1955. 57p diagrs, graphs, tables. Order as NACA Rept. 1251 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 45 cents.
PB 124460

A method is presented for analyzing the stresses about cutouts in circular semimonocoque cylinders with flexible rings. The method involves the use of so-called perturbation stress distributions which are superposed on the stress distribution that would exist in the structure with no cutout in such a way as to give the effects of a cutout. The method can be used for any loading case for which the structure without the cutout can be analyzed and is sufficiently versatile to account for stringer and shear reinforcement about the cutout. Supersedes TN 3199

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Determination of aircraft terminal velocities, by G. M. Goldman. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1948. 60p diagrs, graphs, tables (part. fold.) Order from LC. Mi \$3.60, ph \$9.30.
PB 122384

The purpose of the research was: (1) To investigate present conditions relative to the calculation of terminal velocity for high speed aircraft. (2) To devise a requirement for terminal velocity calculations for future high speed aircraft design criteria. A comprehensive study was made of present and proposed methods of calculation of terminal velocity for high speed aircraft of the fighter type. This type was chosen at most representative of the airplanes likely to attain a terminal velocity. ATI-23880. Page 34 of text is blank. MCREXAS-4515-12-2. AF TSEAC MR-4515-12-2.

United States Air Force parachute handbook. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Equipment Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1956. 339p photos, drawings, diagrs, graphs (part fold), tables (part fold). Order from OTS. \$6. PB 121934

This handbook is a collection of information, test results, and other technical data pertaining to the application, design, construction, and testing of parachutes, parachute systems, and accessories. AD 118036. Project 6078. AF WADC TR 55-265.

Instruments

Development of an instrument for measuring aircraft cockpit visibility limits, by Thomas M. Edwards. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1952. 10p photos, diagr. Order from LC. Mi \$1.80, ph \$1.80. PB 123570

1. Visibility - Measurements - Photographic methods
2. Cameras, Binocular - Design
3. Cockpits - Visibility - Measuring equipment
4. CAA TDR 153.

Evaluation of flight fire protection means for inaccessible aircraft baggage compartments, by L. A. Asadourian. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1951. 34p photos, diagrs, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 123552

1. Fire detectors - Airplanes - Tests
2. Fire extinguishers - Airplanes - Evaluation
3. Fire prevention - Airplanes
4. CAA TDR 146.

Performance characteristics of ring cascade-type thrust reversers, by Jack G. McArdle. U. S. National Advisory Committee for Aeronautics. Nov 1956. 52p photos, drawings, diagrs, graphs, table. Order as TN 3838 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124420

1. Cascades (Aerodynamics) - Tests
2. Brakes, Aircraft
3. NACA TN 3838.

Rapid determination of core dimensions of cross-flow gas-to-gas heat exchangers, by Anthony J. Diaguila and John N. B. Livingood. U. S. National Advisory Committee for Aeronautics. Dec 1956. 19p photos, graphs, tables. Order as TN 3891 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington, 25, D. C. PB 124434

1. Heat exchangers - Cores - Design
2. Heat - Transference
3. NACA TN 3891.

Engines and Propellers

Charts for estimating performance of high-performance helicopters, by Alfred Gessow and Robert J. Tapscott. U. S. National Advisory Committee for Aeronautics. 1956. Order as NACA Rept. 1266 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 30 cents. PB 124469

Theoretically derived charts are presented for use in predicting profile-drag-thrust ratios of rotors having hinged blades with 0° , -8° , or -16° twist. The charts are considered applicable to rotor-operating conditions in which high tip-speed ratios or large rotor angles of attack are encountered; however, they do not include the effects of compressibility. Limit lines showing the conditions of onset of stall are presented, and the effects of blade twist on the stall limits are discussed. Supersedes TN 3323 (PB 116277) and TN 3482 (PB 118359). NACA 1266.

Investigation of supersonic diffuser instability, by Alan C. Brown. University of Southern California. Engineering Center, Los Angeles, Calif. Nov 1956. 92p fold photos, drawings, graphs (1 fold). Order from LC. Mi \$5.40, ph \$15.30. PB 125111

It has been known for some considerable time that flow instabilities exist in supersonic diffusers, particularly in the subcritical range of mass flows. Subcritical operation means essentially that air is being spilled around the lip, and the normal shock is standing outside the intake. As maximum compression occurs when the intake is running in the critical condition, it is obviously desirable to have a margin of stable flow about this position to allow for speed and altitude changes. Several investigations have been made on particular models, usually over restricted mass flow ranges. The purpose of this report is to attempt to encompass a complete mass flow range with a selection of models covering a variety of geometrical features, in an effort to correlate and analyze the different types of oscillation which may be observed. AD 115038. Project: R-352-40-1120. Contract AF 18(600)-1167, Final report. USC EC 41-101. AF OSR TR 57-1.

Training and Training Devices

Effectiveness of four instructional methods at different stages of a course, by Slater E. Newman and Richard W. Highland. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Training Aids Research Laboratory, Chanute Air Force Base, Ill. Jun 1956. 29p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124211

Because of serious shortage of well-qualified instructors and the requirement for training large numbers of technical specialists in a short time, potential uses of mass communication media for replacing some function of the instructor must be explored. The purpose of this study was to evaluate the effectiveness with which some of these media might be used in promoting student learning of technical information. Project 7715, Task 77270. AF PTRC TN 56-68.

Survey of training characteristics of the B-52 flight simulator, by David C. Killian. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Aircraft Observer Research Laboratory, Mather Air Force Base, Calif. Jun 1956. 31p tables. Order from LC. Mi \$3, ph \$6.30. PB 124220

An earlier survey of qualitative personnel requirements information (QPRI) needs showed the desirability of a study of the B-52B flight simulator to determine what additional functional characteristics might be incorporated in the B-52C and B-52D simulators to improve their training capabilities. This report summarizes for the record all the pertinent information gathered in that study. Project 7713. AF PTRC TN 56-69.

Systematic observation of instructor behavior, by Joseph E. Marsh. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. May 1956. 30p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124221

Project 7950, Task 77243.

1. Instructors, Aviation - Psychological tests
2. Instructors, Aviation - Evaluation
3. AF PTRC TN 56-52.

Airports and Airways

Broad band blue lighting system for radar approach control centers: Evaluations and refinements based on three years of operational use, by Conrad L. Kraft. Ohio State University. Laboratory of Aviation Psychology, and Ohio State University Research Foundation, Columbus, Ohio. Aug 1956. 105p photos (1 col.), diags, graphs (part col.), tables. Order from OTS. \$2.75. PB 121968

This report contains detailed specifications for the installation and use of a Broad Band Blue (selective chromatic) lighting system for radar approach control centers. This lighting system provides (a) sufficient light for scope observers, maintenance personnel, and other individuals to work simultaneously in the operations room, thus allowing 24 hour-a-day operations, and (b) an element of

flexibility that allows the scope observer the option of increasing his visual sensitivity, through dark adaptation, without decreasing the light provided for the work of other personnel. In this report the varied requirements of a lighting system are stated, the relevant psychophysiological and physical facts are summarized, the Broad Band Blue and alternative lighting systems are critically evaluated, and the results of extensive operational suitability tests of the proposed system are given. The philosophy and theoretical framework of this system is applicable to other types of radar control centers, though minor modifications may be needed to meet special requirements that are different from those of radar air traffic control. AD 118090. Project 7192, Task 71596. Work initiated under Contract AF 33(616)-3612. Color will not reproduce. AF WADC TR 56-71. Contract AF 33(616)-3612.

Development of fan-type ultra-high-frequency radio markers as a traffic control and let-down, by Henry I. Metz. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1938. 11p photos, map, diags. Order from LC. Mi \$2.40, ph \$3.30. PB 123554

Reprinted 1942. Formerly Report no. 5, Safety and Planning Division, Bureau of Air Commerce. 1. Airports - Air traffic control 2. Radio markers, Fan-type (UHF) - Design 3. Radio transmitters (UHF) - Design 4. CAA TDR 5.

Aerodynamics

Aeroelastic problems of airplane design, by H. G. Klüssner. U. S. National Advisory Committee for Aeronautics. Nov 1956. 51p tables. Order as TM 1402 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124451

Translation from Zeitschrift für Flugwissenschaften, v. 3, no. 1, Jan 1955, p. 1-18. 1. Aeroelasticity - Germany 2. Loads, Aeroelasticity - Theory - Germany 3. NACA TM 1402.

Analysis of particle motions for a class of three-dimensional incompressible laminar boundary layers, by Arthur G. Hansen and Howard Z. Herzig. U. S. National Advisory Committee for Aeronautics. Nov 1956. 22p diags, graphs, tables. Order as NACA TN 3840 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124397

1. Flow, Three dimensional - Theory
2. Boundary layer - Aerodynamics
3. Boundary layer, Laminar - Flow
4. NACA TN 3840.

Analytical determination of the natural coupled frequencies and mode shapes and the response to oscillating forcing functions of tandem helicopters, by George W. Brooks and John C. Houbolt. U. S. National Advisory Committee for Aeronautics. Dec 1956. 45p diagr, graphs, tables. Order as TN 3849 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124403

1. Helicopter blades - Bending moments
2. Helicopters - Vibration - Mathematical analysis
3. Helicopter blades - Pitching moments
4. Helicopters - Loads
5. Helicopters - Rotors, Tandem - Vibration
6. NACA TN 3849.

Average properties of compressible laminar boundary layer on flat plate with unsteady flight velocity, by Franklin K. Moore and Simon Ostrach. U. S. National Advisory Committee for Aeronautics. Dec 1956. 36p diagr, graphs, tables. Order as TN 3886 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124429

1. Flow, Compressible - Theory
2. Flow, Laminar - Theory
3. Boundary layer, Laminar - Flow
4. Boundary layer, Laminar - Heat transference
5. NACA TN 3886.

Base pressure at supersonic speeds on two-dimensional airfoils and on bodies of revolution with and without fins having turbulent boundary layers, by Eugene S. Love. U. S. National Advisory Committee for Aeronautics. Jan 1957. 65p photos, drawing, diagrs, graphs. Order as TN 3819 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124384

1. Bodies of revolution - Pressure distribution - Theory
3. Airfoils - Pressure distribution - Theory
3. Flow, Supersonic - Theory
4. NACA TN 3819.

Comparison of calculated and experimental load distributions on thin wings at high subsonic and sonic speeds, by John L. Crigler. U. S. National Advisory Committee for Aeronautics. Jan 1957. 46p drawings, graphs, table. Order as TN 3941 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124450

1. Mach number - Effect
2. Loads, Aerodynamic - Theory
3. Wings - Span lift distribution
4. NACA TN 3941.

Distribution of normal component of induced velocity in lateral plane of a lifting rotor, by Walter Castles, Jr. and Howard L. Durham, Jr. U. S. National Advisory Committee for Aeronautics. Dec 1956. 26p diagrs, tables. Order as TN

3841 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124398

1. Equations of motion
2. Rotors - Flow measurement
3. Helicopters - Rotors - Velocity, Induced
4. Helicopters - Stability, Lateral
5. NACA TN 3841.

Effect of propeller location and flap deflection on the aerodynamic characteristics of a wing-propeller combination for angles of attack from 0° to 80°, by William A. Newsom, Jr. U. S. National Advisory Committee for Aeronautics. Jan 1957. 45p drawings, diagrs, graphs. Order as TN 3917 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124477

1. Propellers - Aerodynamics
2. Airplanes - Models - Wind tunnel tests
3. Flaps, Slotted - Aerodynamics
5. NACA TN 3917.

Effects of vertical fins near the nose of the fuselage on the directional and damping-in-yaw stability derivatives of an airplane model under steady-state and oscillatory conditions, by M. J. Queijo and Evalyn G. Wells. U. S. National Advisory Committee for Aeronautics. Dec 1956. 54p photo, drawing, diagrs, graphs, table. Order as TN 3814 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124380

1. Damping derivatives - Stability
2. Airplanes - Fins - Effect
3. NACA TN 3814.

Experimental determination of the range of applicability of the transonic area rule for wings of triangular plan form, by William A. Page. U. S. National Advisory Committee for Aeronautics. Dec 1956. 22p photos, drawing, graphs, tables. Order as TN 3872 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124423

1. Mach number - Effect
2. Wings, Triangular - Drag - Tests
3. Wings, Triangular - Lift - Tests
4. Flow, Transonic - Measurements
5. Flow, Transonic - Theory
6. NACA TN 3872.

Experimental droplet impingement on several two-dimensional airfoils with thickness ratios of 6 to 16 percent, by Thomas F. Gelder, William H. Smyers, Jr. and Uwe von Glahn. U. S. National Advisory Committee for Aeronautics. Dec 1956. 79p photos, diagrs, graphs, tables. Order as TN 3839 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124396

1. Drops, Liquid - Impingement on airfoils
2. Ice formation
3. NACA TN 3839.

Experimental steady-state yawing derivatives of a 60° delta-wing model as affected by changes in vertical position of the wing and in ratio of fuselage diameter to wing span, by Byron M. Jaquet and Herman S. Fletcher. U. S. National Advisory Committee for Aeronautics. Oct 1956. 20p drawing, diagr, graphs, table. Order as NACA TN 3843 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124400

1. Damping derivatives - Stability 2. Wings, Triangular - Wind tunnel tests 3. Wings, Triangular - Stability - Effect of wing position 4. Wings, Triangular - Stability - Effect of fuselage 5. NACA TN 3843.

Flight investigation of a roll-stabilized missile configuration at varying angles of attack at Mach numbers between 0.8 and 1.79, by Jacob Zarovsky and Robert A. Gardiner. U. S. National Advisory Committee for Aeronautics. Jan 1957. 36p photos, drawing, graphs, table. Order as TN 3915 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124448

Supersedes RML50H21.

1. Mach number - Effect 2. Missiles, Rocket propelled - Stability 3. Controls, Automatic - Flight tests 4. NACA TN 3915.

Instrument flight trials with a helicopter stabilized in attitude about each axis individually, by Seymour Salmirs and Robert J. Tapscott. U. S. National Advisory Committee for Aeronautics. Jan 1957. 17p photo, diagr, graphs, table. Order as TN 3947 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124479

1. Helicopters - Performance - Tests 2. Helicopters - Stability 3. Helicopters - Flight tests 4. Helicopters - Controls, Automatic 5. NACA TN 3947.

Investigation at subsonic speeds of several modifications to the leading-edge region of the NACA 64A010 airfoil section designed to increase maximum lift, by Ralph L. Maki and Lynn W. Hunton. U. S. National Advisory Committee for Aeronautics. Dec 1956. 50p diagrs, graphs, table. Order as TN 3871 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124422

1. Flaps, Aircraft - Leading edges 2. Airfoils - High lift devices 3. Airfoils - Lift 4. Wings - Lift - Effect of leading edge 5. NACA TN 3871.

Investigation of flight flutter testing techniques, by Martin D. Schwartz and Donald L. Wrisley.

Massachusetts Institute of Technology. Dept. of Aeronautical Engineering. Dec 1950. 189f photos, diagrs, graphs, tables. Order from LC. Mi \$8.40, enl pr \$30.30. PB 125428

Attempts have been made to predict flutter speeds on the basis of subcritical flight test data, complemented by theoretical and experimental information. The approaches which have been employed are summarized in chapter II. An extensive survey of available literature relating to flight flutter testing was undertaken. Those methods which showed greatest promise of possible development were selected for further investigation. The theoretical justification and background for each of the selected approaches was carefully considered. A comparative experimental investigation was set up to evaluate the relative merits of the most promising approaches from the viewpoint of applicability, practicability, and safety by applying them to a model in a wind tunnel. A survey trip was made visiting most of the aircraft companies and government research installations which are interested in the development of flight flutter techniques and equipment. The ultimate objective was to recommend particular techniques for use in flight flutter testing, dependent on the quality of data required, the modes to be investigated, the type of flutter indicated, and the relative abruptness with which the instability is expected to develop. For supplement see PB 125428s. Contract NOA(s)-10921, Final report.

Supplement. Sep 1951. 86f photos, graphs, tables. Order from LC. Mi \$4.80, enl pr \$15.30. PB 125428s

The primary purpose of the supplementary phase of the program was the application of the selected techniques to model configurations in which the flutter investigation should be more difficult, in order to determine the extent to which the techniques are of use. There were three other aspects of the extended program; the feasibility of performing calculations based on the theoretical development of the initial phase, other possible excitation techniques, and the possibility of applying statistical methods to the collection of data or to the analysis of data resulting from flight flutter tests. Supplement to PB 125428. Contract NOA(s)-10921, Supplementary report.

Investigation of the aerodynamic characteristics of a model wing-propeller combination and of the wing and propeller separately at angles of attack up to 90°, by Richard E. Kuhn and John W. Draper. U. S. National Advisory Committee for Aeronautics. 1956. 42p photos, diagrs, graphs, tables. Order as NACA Rept. 1263 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 35 cents. PB 124466

Replaces TN 3304 (PB 115909).

1. Angle of attack - Lift coefficient
2. Wings - Aerodynamics
3. Wings - Wind tunnel tests
4. Propellers - Wind tunnel tests
5. Propellers - Pitch
6. Propellers - Slipstream
7. Airplanes - Models - Wind tunnel tests
8. NACA 1263.

Minimum-drag ducted and closed three point body of revolution based on linearized supersonic theory, by Hermon M. Parker. U. S. National Advisory Committee for Aeronautics. Dec 1956. 20p graphs, table. Order as TN 3704 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124359

1. Bodies of revolution - Drag - Effect of duct design
2. Bodies of revolution - Aerodynamics
3. Flow, Supersonic - Theory
4. NACA TN 3704.

Oblique-shock relations at hypersonic speeds for air in chemical equilibrium, by W. E. Moeckel. U. S. National Advisory Committee for Aeronautics. Jan 1957. 18p graphs, table. Order as TN 3895 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124437

1. Mach number - Effect
2. Flow, Hypersonic - Aerodynamics
3. Shock waves - Mathematical analysis
4. NACA TN 3895.

On boattail bodies of revolution having minimum wave drag, by Keith C. Harder and Conrad Rennemann, Jr. U. S. National Advisory Committee for Aeronautics. 1956. 11p graphs, table. Order as NACA Rept. 1271 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 15 cents. PB 124470

Supersedes TN 3478 (PB 118364).

1. Bodies of revolution - Drag - Theory
2. Bodies of revolution - Aerodynamics - Theory
3. Ward's drag equation
4. Flow, Supersonic - Measurements
5. Parker's drag equation
6. NACA 1271.

On the kernel function of the integral equation relating lift and downwash distributions of oscillating wings in supersonic flow, by Charles E. Watkins and Julian H. Berman. U. S. National Advisory Committee for Aeronautics. 1956. 20p diags, graphs. Order as NACA Rept. 3438 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 124462

Supersedes TN 3428 (PB 117579).

1. Wings - Aspect ratio
2. Mathematical functions
3. Flow, Supersonic - Calculations
4. Equations, Integral
5. Wings - Pressure distribution - Theory
6. NACA TN 3438.

Particular solutions for flows at Mach number 1, by Max A. Heaslet and Franklyn B. Fuller. U. S. National Advisory Committee for Aeronautics. Nov 1956. 32p diags, graphs. Order as TN 3868 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124419

1. Mach number - Effect
2. Flow, Subsonic - Theory
3. Flow, Supersonic - Theory
4. Boundary layer - Transition point
5. NACA TN 3868.

Results of two free-fall experiments on flutter of thin unswept wings in the transonic speed range, by William T. Lauten, Jr. and Herbert C. Nelson. U. S. National Advisory Committee for Aeronautics. Jan 1957. 20p photo, drawing, graphs, tables. Order as NACA TN 3902 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124444

Supersedes RML51C08.

1. Mach number - Effect
2. Flutter - Calculation
3. Flow, Transonic - Mach number effects
4. Airfoils - Compressibility effects
5. NACA TN 3902.

Section characteristics of the NACA 0006 airfoil with leading-edge and trailing-edge flaps, by Bruno J. Gambucci. U. S. National Advisory Committee for Aeronautics. Dec 1956. 17p photo, diagr, graphs, tables. Order as TN 3797 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124373

1. Mach number - Effect
2. Reynolds number - Effect
3. Airfoils - Lift
4. Airfoils - Pitching moments
5. Airfoils - Pressure distribution
6. NACA TN 3797.

Similarity rules for second-order subsonic and supersonic flow, by Milton D. Van Dyke. U. S. National Advisory Committee for Aeronautics. Jan 1957. 20p diags. Order as TN 3875 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124425

1. Janzen - Rayleigh solution (Aerodynamics)
2. Flow, Subsonic - Theory
3. Flow, Supersonic - Theory
4. NACA TN 3875.

Simplified method for estimating compressible laminar heat transfer with pressure gradient, by Eli Reshotko. U. S. National Advisory Committee for Aeronautics. Dec 1956. 16p diagr, graphs, table. Order as TN 3888 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124431

Some measurements of aerodynamic forces and moments at subsonic speeds on a wing-tank configuration oscillating in pitch about the wing midchord, by Sherman A. Clevenson and Sumner A. Leadbetter. U. S. National Advisory Committee for Aeronautics. Dec 1956. 37p photo, drawing, diagr, graphs, tables. Order as TN 3822 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124386

1. Bodies of revolution - Subsonic characteristics
2. Wings - Aspect ratio
3. Damping derivatives - Stability
4. Bodies of revolution - Wind tunnel tests
5. NACA TN 3822.

Some observations on maximum pressure rise across shocks without boundary-layer separation on airfoils at transonic speeds, by Walter F. Lindsey and Patrick J. Johnston. U. S. National Advisory Committee for Aeronautics. Nov 1956. 27p photos, graphs. Order as TN 3820 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124385

1. Airfoils - Pressure distribution
2. Boundary layer, Laminar - Flow
3. Flow, Transonic - Boundary layer
4. NACA TN 3820.

Some possibilities of using gas mixtures other than air in aerodynamic research, by Dean R. Chapman. U. S. National Advisory Committee for Aeronautics. 1956. 24p graphs, tables. Order as NACA Rept. 1259 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 124463

Supersedes TN 3226 (PB 114967).

1. Gases - Use in wind tunnels
2. Flow, Compressible - Measurement
3. Gases - Viscosity
4. Gases - Thermodynamic properties
5. NACA 1259.

Study of several factors affecting the stability contributed by a horizontal tail at various vertical positions on a sweptback-wing airplane model, by Gerald V. Foster and Roland F. Griner. U. S. National Advisory Committee for Aeronautics. Nov 1956. 28p drawings, diagrs, graphs, table. Order as TN 3848 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124402

Supersedes RML9H19.

1. Fuselages - Shape - Stability effects
2. Flaps, Split - Wind tunnel tests
3. Flaps, Aircraft - Leading edge - Flow
4. Flaps, Aircraft - Trailing edge - Flow
5. Stability, Longitudinal - Effect of tail
6. NACA TN 3848.

Theoretical investigation of the drag of generalized aircraft configurations in supersonic flow, by

E. W. Graham, P. A. Lagerstrom, R. M. Licher and B. J. Beane. Douglas Aircraft Co., Inc., Long Beach, Calif. Jan 1957. 112p diagrs. Order as TM 1421 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124454

SM-19181. Unedited by the National Advisory Committee for Aeronautics.

1. Flow, Supersonic - Theory
2. Airplanes - Drag - Theory
3. NACA TM 1421.

Turbulence in the wake of a thin airfoil at low speeds, by George S. Campbell. California Institute of Technology, Pasadena, Calif. Jan 1957. 63p graphs, table. Order as TM 1427 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124458

1. Reynolds number - Effect
2. Airfoils - Wake - Calculation
3. Flow, Turbulent - Velocity distribution
4. Airplanes - Buffeting
5. NACA TM 1427.

Rockets and Jet Propulsion

Effects of wing position and vertical-tail configuration on stability and control characteristics of a jet-powered delta-wing vertically rising airplane model, by Powell M. Lovell, Jr. and Lysle P. Parlett. U. S. National Advisory Committee for Aeronautics. Jan 1957. 35p photos, drawings, diagrs, graphs, table. Order as TN 3899 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124441

1. Airplanes, Jet propelled - Wind tunnel tests
2. Airplanes, Jet propelled - Stability
3. Wings, Triangular - Stability - Effect of tail
4. Wings, Triangular - Stability - Effect of wing position
5. NACA TN 3899.

Near noise field of static jets and some model studies of devices for noise reduction, by Leslie W. Lassiter and Harvey H. Hubbard. U. S. National Advisory Committee for Aeronautics. 1956. 14p photos, diagrs, graphs. Order as NACA Rept. 1261 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 124464

Supersedes TN 3187 (PB 114584).

1. Flow, Jet mixing - Pressure
2. Jet engines, Turbojet - Noise - Reduction
3. Noise, Exhaust - Elimination
4. NACA 1261.

Theory for stability and buzz pulsation amplitude in ram jets and an experimental investigation including scale effects, by Robert L. Trimpi. U. S. National Advisory Committee for Aero-

nautics. 1956. 26p photos, diagr, graphs, table. Order as NACA Rept. 1265 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 124468

Supersedes RML 53G28.

1. Diffusers, Supersonic - Tests 2. Diffusers, Supersonic - Theory 3. Reynolds number - Effect 4. Flow, One dimensional - Theory 5. Jet engines, Ramjet - Internal flow system 6. Flow, Compressible - Theory 7. NACA 1265.

Wind-tunnel investigation of an external-flow jet-augmented slotted flap suitable for application to airplanes with POD-mounted jet engines, by John P. Campbell and Joseph L. Johnson, Jr. U. S. National Advisory Committee for Aeronautics. Dec 1956. 47p drawings, graphs, table. Order as TN 3898 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124440

1. Stability, Longitudinal - Static tests 2. Flaps, Aircraft - Controls - Theory 3. Wing flaps, Slotted - Wind tunnel tests 4. Wings, Unswept - Flaps 5. Wings, Sweptback - Flaps 6. NACA TN 3898.

Marine Transportation

Effect of water conditions on the propagation of supersonic underwater sound, by E. B. Stephenson. U. S. Naval Research Laboratory. Dec 1940. 31p graphs. Order from LC. Mi \$3, ph \$6.30. PB 123278

Unclassified.

1. Sound, High frequency - Propagation in water 2. Sound, Underwater - Propagation 3. Sound, Underwater - Speed 4. NRL S 1670.

Marine microbiology. Semiannual progress report no. 9 covering the period Jan-Jun 1955 under Contract No. N6onr-275(18), by Claude E. ZoBell and Richard Y. Morita. California. University. Scripps Institution of Oceanography, La Jolla, Calif. Jun 1955. 24p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 123046

This report discusses: 1) The influence of various nutritional factors on the viability of microorganisms under pressure; 2) Effect of pressure on the stability of succinic dehydrogenase; 3) Effect of pressure on nitrate reduction. For reports nos. 6-8 see PB 115850, PB 117850 and PB 119427. UC SIO Ref 55-20. Contract N6onr-275(18), NR 135-020.

Measurement of vibration on the USS Franklin D. Roosevelt (CVB 42). Part II: SK, SX, & SR radar antenna masts, by Robert W. Conrad.

U. S. Naval Research Laboratory. Aug 1946. 13p photo, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 123336

Unclassified 15 Dec 1953.

1. Ships - Vibration - Measurements 2. Antennas, Shipborne - Supports - Vibration 3. NRL V 2937.

Model study of the run-up of wind-generated waves on levees with slopes of 1:3 and 1:6, by Osvald J. Sibul and Ernest G. Tickner. California. University. Wave Research Laboratory, Berkeley, Calif. Dec 1955. 22p photos, diagr, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. Also available free from Beach Erosion Board, 5201 Little Falls Road, N. W., Washington 16, D. C. PB 122586

The run-up, under wind action, of wind-generated waves on levees with slopes of 1:3 and 1:6 was studied in a laboratory wind tunnel. For the lower wind velocities the results indicate the same relative run-up values as found at the Waterways Experiment Station, Corps of Engineers, Vicksburg, Mississippi, where the tests were completed with mechanically generated uniform waves which were not affected by wind. For higher wind velocities, however, the run-up increases with increasing wind velocity and may reach double the value (above mean water level) of run-up where no wind is involved. Run-up on the 1:3 slope was found to be considerably higher than that on the 1:6 slope (by a factor of approximately 2.5), which confirms the trend as found at the Waterways Experiment Station using uniform waves. ENG BEB TM 67. Contract DA 49-055-eng-31.

Oceanographic research, final report covering period Mar 15, 1948 - Oct 31, 1955, under Contract N8onr-520/III, by C. A. Barnes and P. M. McLellan. Washington. University. Dept. of Oceanography, Seattle, Wash. Dec 1955. 45p. Order from LC. Mi \$3.30, ph \$7.80. PB 124814

Oceanographic research has been conducted by the University of Washington Department of Oceanography, Seattle, under contract with the Office of Naval Research for the period 15 March 1948 through 31 October 1955. This final report reviews the research accomplished, its present status, and contemplated lines of future study. Technical reports and unclassified special reports are listed and abstracted. A listing is also given of publications and theses which stemmed from contract work. Reference: 55-14. Contract N8onr-520/III, NR 083-012.

Photoelastic investigation of stress concentration inside plating of 10,000 ton cruiser, by H. B. Maris and J. A. Sanderson. U. S. Naval Research Laboratory. Mar 1936. 22p photos, drawings, diagrs. Order from LC. Mi \$2.70, ph \$4.80. PB 122697.

1. Ships - Plates - Stresses 2. NRL H 1251.

Quarterly progress report no. 35, for the period
Jan - Mar 1955. California. University.
Scripps Institution of Oceanography. May 1955.
17p map, graphs. Order from LC. Mi \$2.40,
ph \$3.30. PB 124064

SIO Ref.: 55-18. AD 71433.

1. Oceanography - Research 2. Oceans - Heat
distribution 3. Oceans - Water level 4. Sands,
Ocean bottom - Movement 5. Geology, Submarine
6. UC SIO 55-18.

Sand variation at Point Reyes Beach, California, by
P. D. Trask and C. A. Johnson. California.
University. Wave Research Laboratory, Berke-
ley, Calif. Oct 1955. 89p maps, graphs, tables.
Order from LC. Mi \$4.80, ph \$13.80. Also
available free from Beach Erosion Board, 5201
Little Falls Rd., N. W., Washington 16, D. C.
PB 122585

1. Sands, Beach - Grain size - Measurements
2. Sands, Beach - Movement 3. Contract DA-49-
055-eng-8 4. ENG BEB TM 65.

Scale model test of high-temperature high-pressure
steam piping DD692 class vessel, by T. E.
Pardue and L. A. Parsons. U. S. Naval Re-
search Laboratory. Jul 1945. 16p photos,
tables. Order from LC. Mi \$2.40, ph \$3.30.
PB 120763

1. Ships - Piping - Tests 2. NRL O 2588.

Steady-state cavity studies in a free-jet water
tunnel, by Morris W. Self and John F. Ripken.
Minnesota. University. St. Anthony Falls
Hydraulic Laboratory. Jul 1955. 45p photos,
drawing, graphs. Order from LC. Mi \$3.30,
ph \$7.80. PB 122241

A water tunnel with a 10-in. diameter test stream
directed vertically downward through an air-filled
chamber of variable pressure (free jet) has been
used to study steady-state cavities. This report
describes certain characteristics of the steady-
state cavities created by the selected bodies in-
cluding cavity shape, internal pressures, and re-
entrant internal jets. The cavity data are com-
pared with related work by Reichardt. AD 71800.
Project report 47. Contract N6onr-246, T. O. VI.

Stress distribution around openings in deck plating.
Brief report, by J. A. Sanderson and H. B. Maris.
U. S. Naval Research Laboratory. Oct 1936.
7p. Order from LC. Mi \$1.80, ph \$1.80.
PB 122694

Unclassified 3-31-49. Appendix not included.

1. Ships - Plates - Stresses 2. Deck openings -
Stresses 3. NRL H-1317.

Study of the physical capacity of the Naval supply
system, by Martin Shubik. Revised and edited
by J. W. Markham and W. J. Baumol. Princeton
University, Princeton, N. J. Nov 1955. 32p
tables. Order from LC. Mi \$3, ph \$6.30.
PB 124282

The purpose of the project is to develop concepts
and measurements of the "capacity" of Naval Supply
Depots, with several ultimate uses in mind: 1. To
provide data on the amount of new facilities, per-
sonnel, and equipment required for increases in
the level of supply activity. 2. To indicate where
excess capacity exists both in depot and branch or-
ganization. 3. To provide data for more efficient
allocation of missions to various depots. 4. To in-
dicate structural requirements for new depots. 5.
To provide measures for comparing the efficiency
of various depots, and of branches within depots.
6. To provide tested methods to be used in other
capacity studies. Economics Research Project NT
004002. Continuation of work begun under Contract
N140s-38812B. Contract N6 onr-27009.

Torque and power measurements on the propeller
shafts of the U.S.S. Dahlgren. Special trials
20-22, Oct 1941, by W. C. Hall. U. S. Naval
Research Laboratory. Nov 1941. 81p graphs
(1 fold), tables. Order from LC. Mi \$4.80, ph
\$13.80. PB 122674

1. Torque, Propeller - Measurement 2. Propellers,
Variable pitch 3. Dahlgren (USS) 4. NRL O-1806.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Sterilization of water by ozone under Arctic condi-
tions, by Robert S. Ingols and Robert H. Fetner.
U. S. Air Force. Arctic Aeromedical Labora-
tory, Ladd Air Force Base, Alaska. Sep 1956.
27p diagr, graphs, tables. Order from LC.
Mi \$2.70, ph \$4.80 PB 124786

Preliminary to the biological investigation, the
chemistry and kinetics of ozone solutions were
studied and an evaluation was made of the different
mensuration methods for ozone in solution. A com-
parison of the iodide, bromide and ferrous techni-
ques for the determination of ozone demonstrates
a good correlation of these methods. The impor-
tance of the use of bromide in the determination of
ozone is discussed. The biological effects of ozone
solutions have been tested and the lethal dose has
been determined. Under the conditions of these
experiments this lethal dose was 0.4 to 0.5 mg/l.
The comparative bactericidal activity of chlorine
was studied under the same experimental condi-
tions. A comparison of the bactericidal activity
of ozone and chlorine under the same conditions
emphasized the different mode of action of the
two agents. AF AAR Proj 8-7955.

MISCELLANEOUS

Proceedings of the Symposium on Preservation for Mobilization Requirements, 23, 24, 25 Oct 1956, Port Hueneme, Calif. U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Oct 1956. 524p photos, drawings, diagrs, graphs, tables. Order from OTS. \$8. PB 131007

Contents: Keynote address, by Glenn A. Great-house. - Part in-storage preservation plays in the over-all picture of national security, by Lloyd R. Worden. - Address by Rear Admiral Rawson Bennett. - Marine Corps approach to the storage of vehicles and major items, by Major A. F. Stockdale. - Department of the Army problems and requirements involved in the long-term preservation of vehicles and power-driven equipment, by H. M. Lovelace. - Requirements and problems involved in the long-term storage of construction equipment, by Captain E. J. Peltier. - Air Force contractual storage of vehicles and equipment, by Delamater Davis. - Canadian and United Kingdom military vehicle preservation practices, by J. W. Black. - Storage preservation of heavy earthmoving equipment, by James R. Sloan. - Preservation of power-driven Coast Guard equipment, by Forrest A. Tinsler. - Summary of studies on the preservation of materials in dehumidified storage, by C. E. Lund and M. L. Erickson. - Climatic effects on preservatives, by C. T. Engle. - Process of applying polytetrafluoroethylene (Teflon) coatings on metal surfaces, by George H. Burch. - Application of volatile corrosion inhibitors to internal combustion engines, by Norman N. Rudd. - Why train? by C. E. Calkins. - Some aspects of the preservation problem as related to specifications, by James M. Willette. - Corrosion inhibitors formed in situ, by T. J. Nussdorfer. - New preservative developments, by Clarence Haserot. - Preservation of electrical equipment, by R. M. Burns. - Review of antiozonant development, by W. D. England, and W. W. Rinne. - Teflon-operational lubricant and preservative coating, by Vincent G. Fitz-Simmons. - Fluorocarbon elastomer developments, by Fred W. Troester. - Quality evaluation of stored supplies, by John J. Riordan. - Review of the Villanova study of vehicle preservation, by G. N. Quam, D. Schwartz and W. Barnhurst. - Metallic coatings, by Charles L. Faust and William H. Safranek. - New developments with tetrafluoroethylene resins, by R. B. Fehr. - Organic coating for corrosion protection, by A. N. Laubscher and C. P. Larrabee. - Manufacturing quality control, by M. R. Fuller. - Thin metal film corrosion indicators, by David Roller. - Air supported hutments, by George A. Schwab¹ and. - Economics of dehumidified storage of vehicles, by G. W. Higgs. - Problems of D/H vehicle storage, by Irving Appelblatt. - Utilization of caves for storage, by Claude G. Wright. - D/H containers and shelters, by Milton Levy. - Deterioration of rubber by nuclear radiation, by John W. Born. - Evaluation

studies of NAVCERELAB test storage conditions, by Ronald J. Zablotil.

Report of NRL Progress. U. S. Naval Research Laboratory. May 1957. 60p. Order from OTS. \$1.25. Also available on annual subscription rate of \$10 a year in the U.S.A., foreign rate \$13 a year. PB 121967

Contents: Transparent cathodoluminescent screens, by C. Feldman. - Electron probe X-ray micro-analyzer, by L.S. Birks and E. J. Brooks. - NRL high-current photomultiplier, by J.D. Shipman and M.R. McCraven. - Scientific program: Problems accepted: Problem notes: Applications research: Performance of human element in man-machine system subjected to a series of task-induced stress situations.... Observing rate in a monitoring task Probabilistic model for use in tactical decision-making research. - Astronomy and astrophysics: Aerobee Hi development program concludes with highly successful launching of upper air research rocket which soared to 193 miles above sea level.... Performance of low-frequency transmitting antenna used in NRL studies of the ionosphere. - Chemistry: Relation of chemical constitution to the wetting and spreading of liquids on solids.... Corrosion of metals in tropical environments.... Hydrolytic modification of cellulose caprate.... Structures of the dialkyl phosphonates and some of their salts.... Trimethoxyboroxine found effective for the control and extinguishment of metal fires, especially fires on magnesium alloys used in aircraft.... Corrosive effects of protein-type foam-forming concentrates on common metals and dissimilar metal couples. - Mathematics: Vibration analysis of structural systems. - Mechanics: Dynamic stress distribution surrounding a running crack, a photoelastic analysis.... Changes in the thermoelectric power of gold after plastic deformation at liquid nitrogen temperatures.... Characteristics of liquid motion in a cylindrical tank.... Further studies of pulse-jet gas turbine combustors for Naval use. - Metallurgy and ceramics: Colorimetric method for determining as little as 0.002% magnesium in titanium and titanium base alloys.... Analysis of temperature coefficients of solubility in dilute liquid metal solutions.... Differential thermal analysis apparatus, used in the evaluation of ceramic materials, combines the advantage of high temperature operation (1575°C) and holders which do not react with the sample. - Nuclear and atomic physics: Inelastic scattering of 2.6 Mev neutrons from Fe⁵⁴, Fe⁵⁶, Fe⁵⁷, W¹⁸², and W¹⁸⁴.... On a self-consistent field method for a completely ionized gas. - Radio: Acoustical vibrations from rocket motor combustion processes.... Computed efficiencies of the monotron.... Mechanism of low-frequency peaks in the noise spectra of hot-cathode gas diodes. - Published reports. - Papers by NRL staff members. - Patents.

ATOMIC ENERGY COMMISSION REPORTS

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

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Biology and Medicine

Calculation of critical conditions for uranyl fluoride solutions, by Raymond Murray. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1947. 14p. Order from OTS. 30 cents. A-7.390.25

The effect of foreign body particles on infections in mice, by William E. Clapper and Grace H. Meade. Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mexico. Aug 1955. Contract AT(29-1)-1242. 21p. Order from OTS. 25 cents. AECU-3272

Five-year climatological summary July 1949 - June 1954, by Harry Moses and Jack H. Willett. Argonne National Lab., Lemont, Ill. n. d. Contract W-31-109-eng-38. 390p. Order from OTS. \$1.75. ANL-5592

Critical experiments for the Brookhaven medical reactor: Summary hazards report. Brookhaven National Lab., Upton, N. Y. Jun 1955. 24p. Order from OTS. 35 cents. BNL-2787

Critical parameters of a proton moderated and proton reflected slab of U-235, by J. K. Fox and L. W. Gilley. Oak Ridge National Lab., Oak Ridge, Tenn. Feb 1956. Contract W-7405-eng-26. 5p. Order from OTS. 25 cents. CF-56-2-63

Radiation incident of February 1, 1956. A preliminary report, by Dixon Callihan. Oak Ridge National Lab., Oak Ridge, Tenn. Feb 1956. Contract W-7405-eng-26. 7p. Order from OTS. 25 cents. CF-56-2-105

Cylindrical reactor dimensions of the water tamped enriched uranyl fluoride-water system as a function of concentration, by R. L. Macklin. Carbide and Carbon Chemicals Co. K-25 Plant, Oak Ridge, Tenn. May 1952. 17p. Order from OTS. 30 cents. K-905

General application of a theory of neutron interaction, by H. F. Henry, J. R. Knight, and C. E. Newlon. Union Carbide Nuclear Co. Union Carbide and Carbon Corp. Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn. Nov 1956. Contract W-7405-eng-26. 23p. Order from OTS. 35 cents. K-1309

A preliminary field survey of air cleaning activities at Atomic Energy Commission Facilities, September-November 1950, by August T. Rossano, Jr., Leslie Silverman and Melvin W. First. Feb 1951. Contract AT(30-1)-841. 45p. Order from OTS. 45 cents. NYO-1580

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