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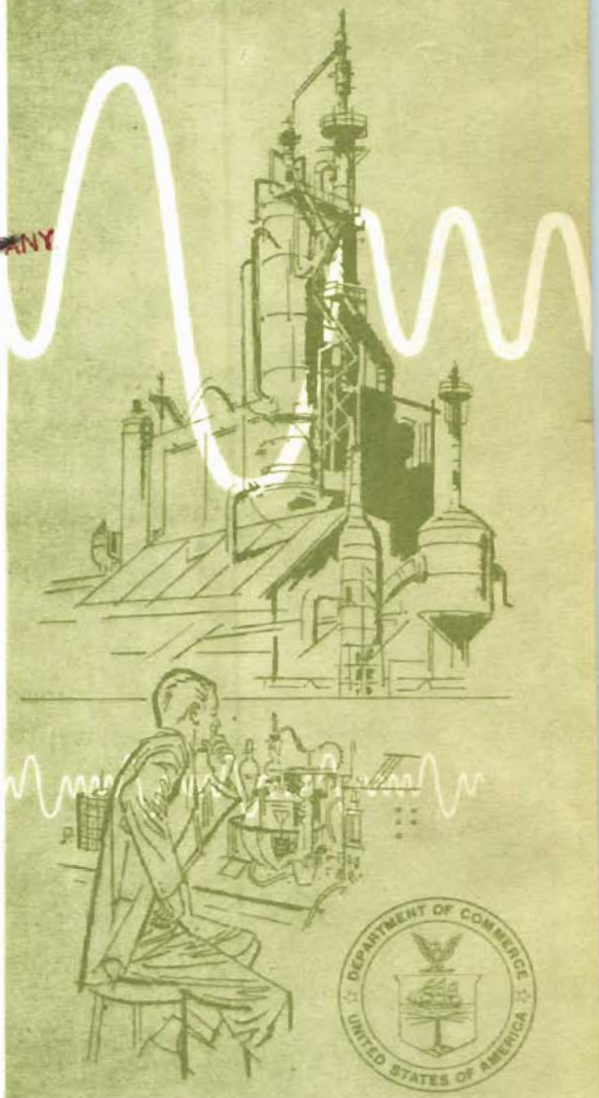
In this issue:



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Vol. 30, No. 2 Pp. 53-120 August 15, 1958

Contents

Printed Reports Available from OTS Announced in This Issue

BIBLIOGRAPHY

Annotated bibliography and critical review of voice communications, by Richard Trumbull and Clinton H. Maag. U.S. Office of Naval Research Psychological Sciences Division. Physiological Psychology Branch. Jan 1958. 123p graphs, tables. Order from OTS. $2.75. PB 131584

The bibliography reproduced in this document was issued to a number of authorities in this field, after which these men were called to a conference where they discussed the many aspects of voice communications. An edited version of this conference comprises about half of this document, and a summary which points out specific areas requiring further study and analysis completes the report. AD-152263. ONR ACR 26.

Human engineering bibliography, by Ivan N. McCollom and Alphonso Chapanis. San Diego State College Foundation, San Diego, Calif. Nov 1956. 136p. Order from LC. Mi $6.90, ph $21.30. PB 132333

Prepared for the Joint Services Steering Committee for the Human Engineering Guide to Equipment Design. Contains bibliographic items compiled by the San Diego State College Foundation and by the Human Factors Division of the U.S. Navy Electronics Laboratory in San Diego, and includes a bibliography developed by the Institute for Applied Experimental Psychology at Tufts University, Medford, Mass. Only items pertaining to human engineering design are included. Items were selected primarily on the basis of relevance and usefulness in actual design application. Contract Nonr-1268(01), NR 145-075, Technical report 15.

Literature on the photoproduction of pions, by Carol M. Newton. Stanford University. W.W. Hansen Laboratories of Physics. High-Energy Physics Laboratory, Stanford, Calif. Jul 1956. 20p. table. Order from LC. Mi $2.40, ph $3.30. PB 127460

Results of photoproduction experiments are discussed briefly. A tabulated reference to experimental papers is included. The bibliography consists of 89 articles appearing in various periodicals. Linear electron accelerator project. Contract N6 onr-25116, NR 022-026. SU HEPL 100.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Absolute absorption coefficients of benzene in the vacuum ultraviolet, by S.M. Bunch, G.R. Cook, M. Ogawa, and G.L. Weissler. University of Southern California. Dept. of Physics, Los Angeles, Calif. Mar 1957. 7p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 127206

1. Spectra, Ultraviolet - Absorption 2. Benzene - Absorption 3. Contract AF 19(604)-2049, Technical report no. 1.

Crystal structure of diphenyl sulfoxide, by S.C. Abrahams and H.J. Grenville-Wells. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1956. 22p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127282

1. Sulfoxide, Diphenyl - Crystal structure
2. Contract N5 ori-07801 3. MIT LIR TR 105

Lower aliphatic derivatives of hydrazine, by A.F. Graefe, P.M. Kohout, L.K. Moss, and E.M. Wilson. Aerojet-General Corporation, Azusa, Calif. Nov 1953. 26p table. Order from LC. Mi $2.70, ph $4.80. PB 132322

AD 21177. Report 674. 1. Hydrazine - Condensation products 2. Hydrazine - Derivatives - Preparation 3. Rockets - Fuels 4. Contract N7 onr-462, T.O. 3, NR 220-023

2-Nitro-2, 4, 4-trimethylpentane, by Nathan Kornblum and Willard J. Jones. Purdue University. Dept. of Chemistry, Lafayette, Ind. n.d. 3p table. Order from LC. Mi $1.80, ph $1.80. PB 126944

Date is 1956 or later. 1. Pentane, 2-Nitro-2, 4, 4-trimethyl - Synthesis 2. Contract AF 18(600)-310

Photochemical synthesis of organic fluorine compounds. Part II, covering the period 15 Nov 1956-14 Sep 1957, under Contract AF 33(616)-3266, by Joseph D. Park and John R. Lacher. Colorado. University. Dept. of Chemistry, Boulder, Colo. Mar 1958. 38p tables (folded). Order from OTS. $1.00. PB 131803

The purpose of this research work has been to synthesize organic and organometallic fluorine compounds with the major objective of obtaining monomers suitable for polymerization into elastomers, plastics, fluids and related material of high thermal and chemical stability. In conjunction with these aims, this Laboratory has synthesized a number of diols and cyclic fluorosilanes. Further work in the preparations of cyclic diols involving the dimerization reaction of fluoroölefins with alkenes containing functional groups has produced intermediates with interesting fluorescent properties. Initial investigation has been made of obtaining a monomeric unit with fluorine substitution of the aromatic nucleus. AD 151014. Project 7340, Task 73404. Covers work from 15 Nov 1956-14 Sep 1957. For Part 1 see PB 131558. Contract AF 33(616)-3266. AF WADC TR 56-590, Part 2.

Preparation and properties of alpha-fluoremethyl esters, by Clarence T. Mason. Tuskegee Institute. George Washington Carver Foundation, Tuskegee, Ala. Oct 1957. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 132129

AD 136639. AF OSR Chem 30-23. 1. Esters, Fluorinated - Preparation 2. Esters, Fluorinated - Properties 3. Contract AF 18(600)-779 4. AF OSR TN 57-653

Plastics and Plasticizers

Dilute solution properties of polyethyl methacrylate, by Suresh N. Chinai and Robert J. Samuels. U.S. Picatinny Arsenal. Samuel Feltman Laboratories, Dover, N.J. Apr 1956. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127013

The object was to establish a relationship between intrinsic viscosity and average molecular weight for polyethyl methacrylate in a non-ideal solvent, methyl ethyl ketone, and in an ideal solvent, 1:7 by volume methyl ethyl ketone/isopropanol. ORD project: TB 2-0001B. Dept. of the Army project: 559-01-004. PA TR 2279.

Effects of gamma radiation on linear polyethylene, by William B. Terrell and Jack T. Humphries. U.S. Air Force. Institute of Technology, Wright-Patterson Air Force Base, Dayton, O. and U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1958. 46p graphs, tables. Order from OTS. $1.25. PB 131700

Linear polyethylenes have recently been developed which have empirical chemical formulae identical to those of common polyethylenes, but which differ in the molecular arrangement of the polymer chain. The physical properties of two linear polyethylenes were measured before and after gamma irradiation to afford a comparison with conventional polyethylene. Measurements were made of the following properties as functions of total radiation dosage up to 10^9 roentgens: tensile strength, elongation, hardness, impact strength, specific gravity, water absorption, heat distortion temperature, dielectric constant, arc resistance, color, and infrared absorption. In addition, densities were determined as functions of both radiation dosage and temperature. AD 142343. Project 7360, Task 73608. Covers work from Sep 1955 - Oct 1956. AF WADC TR 56-515.

Effects of space charge in polymeric materials on mechanical and adhesive properties, by Selby M. Skinner, Edward L. Kern and Monica K. Park. Case Institute of Technology, Cleveland, O. Jan 1958. 133p photos, diagrs, graphs, tables. Order from OTS. $2.75. PB 131770

The effects of different materials, different surface preparation of the metal, different polymerization schedules, heterogeneity in the metal and in the polymer, the presence on non-mobile charge in the polymer, have been studied theoretically and in detail experimentally utilizing a number of techniques developed especially to overcome the great sensitivity of surface or interfacial electrical measurements to traces of impurity or variation in composition. The methods of measurement of the charge constituting the space charge are extended experimentally by use of electronic techniques, and vacuum conditions, and consideration is made of the effects of atmospheric discharge during the break of an adhesive bond. The use of the electrical potential trace at the break of the bond to study mechanical pulses and waves during the break is described. AD 150955. Project 7340, Task 70338. Contract AF 33(616)-3400. AF WADC TR 58-9.

Improved polysulfide polymers, report no. 9. Final report under Contract DA 44-109-qm-1431 for

the period 15 Nov 1953-31 Jan 1956, by E. C. Bobe. Thiokol Chemical Corporation, Trenton, N.J. Feb 1956. 47p graph, table. Order from LC. Mi $3.30, ph $7.80. PB 127357

The purpose of the work reported here was to prepare a silicone-containing polysulfide elastomer combining solvent resistance with good low temperature performance. Detailed explanations are made about the techniques evolved for the preparation of 1, 5-bis(chloromethyl)-3-vinyl-1, 1, 3, 5, 5-pentamethyltrisiloxane and 1, 5-bis(chloromethyl)-1, 1, 5, 5-tetramethyl-3, 3-diphenyltrisiloxane. The procedures for 1, 3-bis(chloromethyl)-1, 1, 3, 3-tetramethyldisiloxane, 1, 3, 5-tris(chloromethyl)-1, 1, 3, 5, 5-pentamethyltrisiloxane and 1, 5-bis(chloromethyl)-3-allyl-1, 1, 3, 5, 5-pentamethyltrisiloxane were standardized. The evolution of the present emulsion system for the sodium polysulfide reaction is carefully traced and the standardization of the sodium polysulfide procedure is outlined. Molecular weights of the polymers were determined by light-scattering and cryoscopic method, but only when a very low degree of cross-linking had been used. Some solubility tests were run on a silicone polysulfide polymer. QM project 7-93-15-004. For report 4 see PB 112988. Contract DA 44-109-qm-143, Report 9.

Inorganic polymers. Final report covering the period 15 Sep 1955-24 Jan 1956 and 13 Jul 1956-1 Oct 1956 under Contract Nonr-1650(00), by Gerhard Barth-Wehrenalp, Alexander Kowalski, and Clair Graver. Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Feb 1957. 53p table. Order from LC. Mi $3.60, ph $9.30. PB 132040

The object of this project was to find purely inorganic polymeric compounds and to investigate their stability and properties. In accordance with the original proposal, work was concentrated on derivatives of sulfur nitride. Due to the exploration nature of this project a literature survey on sulfur-nitrogen compounds has been made, which is presented in Section III. Pennsalt project no. 088989-9-56-40.

Evaluation of a vinyl plastisol composition for cosmetic glove use, by J. T. Hill. U.S. Army Prosthetics Research Laboratory, Walter Reed Army Medical Center, Washington, D.C. Dec 1956. 6p graph. Order from LC. Mi $1.80, ph $1.80. PB 132071

Technical report 5670. 1. Plastics, Vinyl - Uses 2. Plastics, Vinyl - Tests 3. Gloves, Cosmetic - Materials

Non-toxic vinyl plastisol composition (mitten plastisol), by J. T. Hill. U.S. Army Prosthetics Research Laboratory, Walter Reed Army Medical Center, Washington, D.C. Dec 1956. 2p. Order from LC. Mi $1.80, ph $1.80. PB 132070

Page 2 will not reproduce well. 1. Plastics, Vinyl

Plastic seals. Quarterly progress report no. 1 covering the period 31 May-31 Aug 1957 under Contract DA 36-039-sc-10527, by C. J. Broughton, Burgess Battery Company, Freeport, Ill. Sep 1957. 10p. Order from LC. Mi $1.80, ph $1.80. PB 132081

The purpose of this contract is to establish the production technique necessary to produce a plastic sealing material for dry batteries that will permit the molding and/or extruding of the material into discs which will include brass anode caps.

Polymer association. III. Molecular aggregation and intramolecular group association in dilute solutions of styrene-methacrylic acid copolymers, by Leo S. Chang and Herbert Morawetz. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N.Y. Sep 1955. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126845

The present investigation was undertaken to throw some light on the balance between intra-molecular group association and molecular aggregation in solutions of polymers carrying varying densities of strongly interacting groups. Solution viscosity data were obtained to show the effect of strongly associating groups, spaced at varying intervals along the molecular chain, both on the molecular configuration at high dilution and on molecular interaction at higher solution concentrations. Presented at the meeting of the American Chemical Society, Minneapolis, Minn., Sep 15, 1955. Abstract of a thesis, by L. S. Chang, Polytechnic Institute of Brooklyn, Jun 1955. Contract Nonr-839(02), NR 330-029, Technical report no. 4.

Preparation of simple and polymeric products from fluorinated olefins. Quarterly status report for the period 1 Feb-30 Apr 1955 (cumulative), under Contract no. Nonr-1614(00), by Francis E. Lawlor and John T. Barr. Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Jun 1955. 6p. Order from LC. Mi $1.80, ph $1.80. PB 127265

For other reports under this Contract see PB 124651 and 125926. 1. Olefins, Fluorinated - Copolymerization 2. Contract Nonr-1614(00), NR 356-358.

Technical papers. Symposium on Casting Resins, Washington, D.C. 1956. 1956. 360p photos, graphs, tables. Order from LC. Mi $11.30, ph $54.60. PB 126947

Contents: Encapsulating techniques for electronic equipment, by James L. Briggs and R. Calicchia. - Protective potting of glass vacuum tubes and ceramic components, by Asaf A. Benderly, J. W. Tidler, and B. Greene. - Problems encountered in the development of potted electronic devices for a specific ordinance application; a case history, by Robert H. Flack. - Casting resin investigations at Naval Ordnance Plant, by Clifford Brown. - Elastomeric pot-

ting compounds for aircraft electrical connectors, by Paul A. Mallard, C. Nadler, and J.H. Bowen, Jr. - Machines and techniques for applying multi-constituent casting resins, by John E. Sensi and P.J. Franklin. - Cast plastic sealing of platinum-clad anodes for cathodic protection of submarine hulls, by Frederick L. Downs. - Polysulfide liquid polymer and modified epoxy resin casting compounds, by Alan J. Breslau and K.R. Cranker. - Potting resins: Functions and requirements, by Nicholas J. DeLollis. - Polyurethane potting resins, by Markey H. Malootian. - Curing resins suitable for embedding electronic components, by Thomas D. Callinan. - Epoxy polybutadiene resins, by Cornelius G. Fitzgerald, A.J. Carr, M. Maienthal, and P.J. Franklin. - Preliminary survey of the properties of commercial plastisols and primers for plastisols, by Robert C. Ihling. - Control of chemical and physical factors in the application of casting resins, by Peter L. Nichols, Jr. - Thermal properties of encapsulating materials, by Erik G. Linden. - Effect of thermal shock on the shape and adhesion of various commercial compounds, by Matthew H. Riley. - Dielectric properties of several casting resins, by Robert W. Tucker, J.I. Cooperman and P.J. Franklin. - Effects of outdoor weather aging on encapsulating materials, by Erik G. Linden. - Corrosive effects of casting resins on bare copper wire, by Norman J. Doctor and P.J. Franklin. - Includes Symposium Report amendment no. 1, 1 Jul 1956. Seventeen of nineteen papers included in report will be published in Electronic Equipment, vol. 4, no. 7 (Jul 1956). Three reports will be reprinted in SPE Journal, vol. 12, no. 8 (Aug 1956).

Paints, Varnishes and Lacquers

Development of a coating, pretreatment for metals (wash primers), by F. Liberti. Vita-Var Corporation, Newark, N.J. Jul 1953. 54p tables. Order from LC. Mi $3.60, ph $9.30. PB 130867

This investigation is concnerned with the development and evaluation of a pretreatment coating for metal in a one package system, which can be applied by spray, dip or brush application, and have adequate dip tank stability. AD 28439. Covers work from 1 May 1953-30 Jun 1953. Project 8-93-14-002. Contract DA 44-009-ENG-1737, Report 1.

Effect of cadmium plating on SAE 4340 steel in the presence of stress concentrations at elevated temperatures, by E.M. Kennedy. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 41p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 131814

An investigation was carried out to determine the effect of cadmium plating on the tensile and stress rupture properties of high strength steel at elevated temperatures. Tests were conducted on SAE 4340 steel, and properties of this material were investigated in the annealed and heat treated conditions. The annealed material was investigated at 600°F and 611°F, effects on properties of the heat treated material were investigated at 500°F, 600°F and 611°F. The properties of cadmium plated steel in both conditions, annealed and heat treated, were compared with the properties of unplated steel subjected to the same test conditions. AD 151075. Project 7351, Task 73513. Covers work from 1 Mar-1 Jul, 1957. AF WADC TR 58-108, Part 1.

High-temperature electrical insulating inorganic coatings on wire, by Clifton G. Bergerson, Arthur L. Friedberg and others. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Mar 1958. 79p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.00. PB 131811

An investigation was undertaken to develop and evaluate high-temperature electrical insulating inorganic coatings for copper wire, and to develop methods for applying these materials to wire. Test procedures were developed for determining the dielectric strength, dielectric constant, and dissipation factor of experimental coatings on both sheet copper and copper wire. Certain coating compositions formulated in the alkali-B_2O_3-SiO_2 system were found to have the requisite dielectric properties at room temperature. Equipment was designed and constructed for continuously applying and firing vitreous coatings onto copper wire. The considerations relating to flexibility and dielectric properties of the coated wire are discussed. AD 151079. Project 7350, Task 73500. Covers work from Feb 1927-Jan 1958 under Contract AF 33(616)-3943. AF WADC TR 58-12, Part 1.

High-temperature insulation for wire, Part I, by J.D. Walton and J.N. Harris. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Mar 1958. 36p photos, tables. Order from OTS. $1.00. PB 131812

A literature survey was undertaken to review possible methods for use in developing an electrical insulating coating for the high temperature protection of wire. Ceramic-organic coatings were developed which cover the range from room temperature to 1300°F when applied directly to metal. Curing studies have shown that methods of curing resin-frit coatings is an important parameter in obtaining proper burn-out temperature of resins. Aluminum phosphate and silica were tested briefly as possible base coatings for the final ceramic-organic coating but adherence and corrosion problems caused this work to be discontinued. Several anodizing baths have been tried, among them boric acid, oxalic acid, and sulfuric acid. Among these, sulfuric acid seems to give the best anodized coating. AD 151062. Project 7350, Task 73500. Covers work from 1 Feb 1957-31 Jan 1958 under Contract AF 33(616)-3944. AF WADC TR 58-13, Part 1.

Platform storage exposure panels coated with protective strip (Hot dipping) JAN-C-149. Fifth report

under D.A. project 593-10-010, by H.R. Sheets, C.F. Pickett and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Feb 1955. 26p photos (part col), tables. Order from LC. Mi $2.70, ph $4.80. PB 127461

Ordnance project TB 4-672B. D.A. project 593-10-010. Color will not reproduce. 1. Coatings, Protective - Corrosion resistance 2. APG LSD 242

Preparation of protective coatings by electrophoretic methods, by Allan C. Werner and Robert J. Abelson. Vitro Corporation of America. Vitro Laboratories, West Orange, N.J. Feb 1958. 27p photos, tables. Order from OTS. 75 cents. PB 131726

Continues work from 1 Jul 1955 to 30 Jun 1956 under Contract AF 33(616)-3318, as summarized in WADC TR 56-521(PB 131062). Multilayer coatings of 80% nickel - 20% chromium and nickel-bonded columbium and titanium carbide provided good oxidation resistance and good erosion resistance. The ballistics impact resistance requirement was fulfilled by inclusion of a 50% dense, 80% nickel - 20% chromium layer. The effects of sintering and coating thickness on resistance to thermal shock were noted. Attempts to incorporate an intergranular diffusion barrier alloy layer for oxidation resistance at 2000°F proved unsuccessful, although a gold-chromium diffusion barrier layer proved resistant at 1800°F. The coating technique has been refined to permit application of a single layer in one operation instead of two. AD 150970. Project 7351, Task 73512. Covers work from Mar-Oct 1957 under Contract AF 33(616)-5002. For report of work from 1 Jul 1955-30 Jun 1956 see PB 131062. AF WADC TR 58-11.

Inorganic Chemicals

Absolute intensities for the ultraviolet δ-bands of of NO, by D. Weber and S.S. Penner. California. Institute of Technology. Daniel and Florence Guggenheim Jet Propulsion Center, Pasadena, Calif. Apr 1956. 8p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 126939

1. Nitrogen oxides - Spectrographic analysis
2. Contract Nonr-220(03), NR 015-401
3. CIT JPL TR 18

Characteristics of magnesium fluoride and P7 phosphors for radar PPI applications, by Albert W. Randall and Owen E. McIntire. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1953. 7p diagr, graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 132714

1. Radar, PPI - Components 2. Radar - Screens - Materials - Tests 3. Phosphors, Magnesium fluoride 4. CAA TDR 211

Chemistry of boron hydrides and related hydrides, by R.W. Parry, R.C. Taylor and others. Michigan. University. Dept. of Chemistry, Ann Arbor, Mich. Aug 1956. 187p diagrs, graphs, tables. Order from LC. Mi $8.40, ph $28.80. PB 132277

The types of coordination compounds formed by diborane with various Lewis bases have been explored and the reactions of such coordination compounds have been delineated. The hexammine metal (III) borohydrides have been prepared and the structure and chemistry of the "diammoniate of diborane" are shown. The decompositions of the borane adducts of the methyl hydroxylamines have been considered. The reduction of phosphorus trichloride by lithium aluminum hydride has been studied. Results of the diborane reaction are interpreted in terms of symmetrical and nonsymmetrical cleavage of the double-bridge bond in diborane. AD 97233. Project 3055, Task 70321. Contract AF 33(616)-8. AF WADC TR 56-318.

Development of an improved corrosion inhibitor for water-alcohol solutions, by Dwight B. Conklin, Brock G. Peacock, and James E. Cole. Wyandotte Chemicals Corporation. Research and Development Division, Wyandotte, Mich. Jul 1956. 82p photos, diagr, graphs, tables. Order from OTS. $2.25. PB 131781

A corrosion inhibitor was developed for use with alcohol-water injection fluid for aircraft engines. It inhibits corrosion of steel, stainless steel and aluminum alloys, is soluble in methanol, ethanol, water or mixtures of the liquids, and lowers surface tension of the mixtures. Although the inhibitor is chemically compatible with hard water solutions, inhibition efficiency is inversely proportional to water hardness. Solutions made with water of more than 100 parts per million hardness, requires an excessive amount of inhibitor for inhibition of corrosion. The inhibitor is a mixture of dicyclohexylammonium nitrite, urea and 1-nitropropane in an anhydrous methanol solution. Data gathered from initial screening of 150 corrosion inhibiting compounds is presented in detail. AD 97141. Project 7312, Task 73122. Covers work from Apr 1954-Jul 1955 under Contract AF 33(616)-2442. AF WADC TR 55-345.

Effect of chromic acid rinse on preservative compounds, by Linden H. Wagner. U.S. Arsenal, Rock Island, Ill. Nov 1956. 24p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 132048

Object was to determine whether the final chromic-phosphoric acid rinse used for phosphated items adversely affects the subsequently applied preservatives as to their ability to displace water and provide pro-

tection. Ordnance project TB 5-6010D, Report 7. DA project 593-21-055. RIAL R 56-3362.

Energy gap between the valence band and the conduction continuum in the alkali halides, by E. L. Jossem. Cornell University. Dept. of Physics, Ithaca, N.Y. Oct 1957. 15p graphs. Order from LC. Mi $2.40, ph $3.30. PB 132130

AD 136627. 1. Alkali metal halides - Absorption 2. Contract AF 18(600)-300, Technical report 9 3. AF OSR TN 57-640

Heat conductivity in polyatomic or electronically excited gases, by Joseph O. Hirschfelder. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Apr 1956. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 126949

The usual Eucken equation for the heat conductivity of a molecule with internal degrees of freedom is derived and improved. It is proved that this approximation is valid only if the electronic states are not metastable and if the coefficients of diffusion of all the molecular quantum states are equal. It is postulated that the abnormally large heat conductivity of N_2O and CO_2, at temperatures above 500°C, may be due to the existence of metastable states. Series 2, 5, 8. Contract N7 onr-285(11). WIS ONR 22.

Ionic conductivity and diffusion in alkali halides, by E. A. Giess. New York State College of Ceramics, Alfred, N.Y. Sep 1957. 64p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132155

AD 136604. 1. Alkali metal halides - Diffusion 2. Alkali metal halides - Conductivity 3. Contract AF 18(600)-1448 4. AF OSR TN 57-614

Low temperature heat capacities of inorganic solids VI: Decaborane, $B_{10}H_{14}$ from 14° to 305°K, by Eugene C. Kerr, Nathan C. Hallett and Herrick L. Johnston. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, O. Jul 1950. 9p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 130948

The heat capacities of decaborane have been measured in the range 14° to 305°K, and the derived thermodynamic functions have been calculated and tabulated at integral values of the temperature over this range. The entropy at 298.16°K is 42.48 ± 0.1 E.U. ATI 94786. Contract N6 onr-225, T.O. IX, NR 058-061. OSURF TR 309-7.

Measurements of the viscosity of gas mixtures, by William A. Strauss. and Rudolph Edse. Ohio State University. Dept. of Aeronautical Engineering. Rocket Laboratory, Columbus, O. Aug 1957. 22p diagr, graphs, tables. Order from OTS. 75 cents. PB 131573

The dynamic viscosities of methane-air, methane-oxygen, and hydrogen-nitric oxide gas mixtures were measured in a capillary viscosimeter which was calibrated with several pure gases of known coefficients of viscosity. An additional check of the accuracy of the measurements was performed by repeating the determination of the coefficient of viscosity of hydrogen-oxygen mixtures for which values can be found in the literature. From the good agreement between these measurements and the data listed, it can be concluded that the present measurements are quite accurate. AD 142082. Project 6-(2-3058), Task 70331. Contract AF 33 (616)-2833. AF WADC TR 57-484.

Mechanism of the catalytic decomposition of hydrogen peroxide by silver, by R. L. Wentworth. Massachusetts Institute of Technology. Division of Industrial Coorperation, Cambridge, Mass. May 1951. 45p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 130939

The chemistry of silver and the literature on the catalytic decomposition of aqueous hydrogen peroxide solutions, by silver have been reviewed, and experimental work reported. It has been found that metallic silver and argentous ion are present during the catalysis. The conditions necessary for initiation of catalysis with silver in the presence of sodium hydroxide and rates of decomposition with both colloidal and massive silver metal have been determined. ATI 105780. DIC project: 6552. Contract N5 ori-078(19), NR 223-008. MIT DIC R 32.

Photolytic action of x-rays on AgCl and AgBr crystals, by Simpei Tutihasi. Rochester. University. Institute of Optics, Rochester, N.Y. Oct 1957. 7p graphs. Order from LC. Mi $1.80, ph $1.80. PB 132128

AD 136646. 1. Crystals, Silver chloride - Photographic properties 2. Crystals, Silver bromide - Photographic properties 3. Contract AF 18(600)-688 4. Contract AF 18(600)-193 5. AF OSR TN 57-656

Study of the oxides of silver. First technical report for the period 25 Jun - 31 Dec 1955, under Contract Nonr-1682(01), NR 359-364, by T.P. Dirkse. Calvin College. Dept. of Chemistry Grand Rapids, Mich. Jan 1956. 19p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127252

A literature review of the silver oxides is presented. Studies on the stability of the silver (II) oxide were made and are reported. The evidence seems to lead to the conclusion that the silver (II) oxide prepared electrolytically is not exactly the same as that produced chemically. Contract Nonr-1682(01), NR 359-364.

Thermodynamic properties of hydrogen gas from near zero degrees to 6000°K, by H. L. Johnston, L. G. Savedoff, and J. Belzer. Ohio State University Research Foundation, Columbus, O. May 1949. 19p tables. Order from LC. Mi $2.40, ph $3.30. PB 130863

Thermodynamic properties of hydrogen gas were computed for temperatures ranging from near 0° to 6000°K, using the most recent physical and spectroscopic constants. The major part of the high temperature calculation was performed using a modification of the summation method adapted to punched card use. The effect of the rotational cut-off on the thermodynamic properties was studied and found to be negligible below 3500°K and not applicable below 4500°K. The thermodynamic properties of hydrogen were also computed for a modified form of the rotational energy equation. These results are somewhat higher than those obtained from the standard formula, but only at elevated temperatures. ATI 85537. Contract N6 onr-225, T.O. 12, NR 058-005. OSURF Proj 316, Technical report no. 2.

Thermodynamic properties of the H_2O molecule from spectroscopic data, by Leonard Glatt, Joan H. Adams, and Herrick L. Johnston. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, O. Jun 1953. 33p tables. Order from LC. Mi $3.00, ph $6.30. PB 130866

The spectroscopic analysis of H_2O vapor has been reviewed and the thermodynamic properties of an ideal gas composed of H_2O molecules computed and tabulated between 1° and 6000°K. The values listed in the tables include the effect of nuclear spin and were computed for equilibrium mixtures of ortho and para constituents. Only the ground electronic state was considered. AD 13782. Contract N6 onr-225, T.O. 12, Nr 058-005, Technical report. OSURF TR 316-8.

Thermodynamic properties of titanium halides in molten salt systems, by P. Herasymenko. New York University. College of Engineering. Research Division, New York, N.Y. Nov 1955. 29p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126984

A simplified apparatus for collecting vapors which are in equilibrium with solid or molten salts is described. The apparent total concentrations of titanium atoms in the vapor over solid titanium dichloride were found to be of the same order of magnitude as the corresponding values derived in recent thermodynamic estimates by Skinner and Ruehrwein, and Sanderson and MacWood. Contract NOnr-285(13), NR 037-066, Technical report no. 2.

Vacuum adiabatic absorption of HCl in water (U), by Howard Gross and Herbert Wolf. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Sep 1956. 29p diagr, graphs, tables (1 fold). Order from LC. Mi $2.40. ph $3.30. PB 127375

Hydrogen chloride gas was absorbed adiabatically in water producing an aqueous acid solution ranging in concentration from 32% by weight to 35.8% by weight. Project 4-92-03-013-02. CC CWL R 2054.

Analytical Chemistry

Apparatus for the vacuum oven method for moisture and volatiles at 55°C, by Joseph Cohen and Wilmer White. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Dec 1956. 10p photos, tables. Order from LC. Mi $1.80, ph $1.80. PB 130875

1. Volatile substances - Determination 2. Moisture - Determination - Testing equipment 3. FALR S 5424

Colorimetric test for NO_2 (U), by Charles Gelman, Robert M. Gamson, and Harold Klapper. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Jul 1956. 14p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127376

Dry papers treated with certain aromatic amino compounds were found to detect colorimetrically small amounts of NO_2 in air. Thus, p-anisidine-treated papers detected 0.06 mmg. NO_2 in air. Other types of compounds sensitive to NO_2 include benzidine, diphenylamine, and α-naphthylamine. Project 4-08-06-030-01. CC CRL R 495.

Determination of hydrogen in magnesium by combustion, by M. Codell and G. Norwitz. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Feb 1957. 10p diagr. Order from LC. Mi $1.80, ph $1.80. PB 132049

The difficulties of determining hydrogen in magnesium are discussed. An improved combustion method is proposed. An all glass apparatus is used. Argon is used to control the combustion and prevent suck back of gases from the laboratory atmosphere. FALR S 5463.

Estimation of exposure to carbon monoxide by breath analysis, by Peter E. Sturrock and George Kitzes. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 15p photos, graphs, tables. Order from OTS. 50 cents. PB 131828

A semiquantitative screening method for determination of carbon monoxide poisoning in human subjects is presented. The method is based upon measurement of the carbon monoxide concentration of the

breath with the National Bureau of Standards' colorimetric carbon monoxide-indicating gel. AD118274. Proj 7159, Task 71803. AF WADC TR 57-291.

Gravimetric determination of aluminum in titanium alloys, by E. F. Jacobson and W. K. Murray. U.S. Arsenal, Watertown, Mass. Nov 1955. 14p tables. Order from LC. Mi $2.40, ph $3.30. PB 127378

A method for the gravimetric determination of aluminum in titanium alloys has been tested for precision and accuracy, and for the interference of common alloying elements. Dept. of the Army project no. 593-08-021. O.O. project no. TB 4-15. WAL R401/252.

Hydrogen in titanium and titanium alloys, by Dean N. Williams. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. May 1958. 114p photos, graphs, tables. Order from OTS. $2.50. PB 121643

A large amount of research has been devoted to the attainment of a more complete understanding of the behavior of hydrogen in titanium and titanium alloys. This information is reviewed and correlated in the present report. Contract AF 18(600)-1375. BMI TML 100.

Postmortem carbon monoxide analysis: Significance of tissue blood content, by Anton Tamas and Jane McElroy. U.S. Air Force. Air Research and Development Command. Wright-Patterson Air Force Base, Dayton, O. Nov 1957. 19p photo, graphs, tables. Order from OTS. 50 cents. PB 131725

Proper interpretation of the results of a postmortem tissue analysis for carbon monoxide is essential to the Flight Surgeon investigating major aircraft accidents. The pitfalls and shortcomings of the present technique of extrapolating presumed human in vivo blood carbon monoxide levels from data obtained by rat experimentation are described. Data are presented which indicate the necessity for relating carbon monoxide tissue analyses to the tissue blood content. AD 142150. Project 7159, Task 71803. AF WADC TR 57-686.

Results of oxygen and hydrogen analyses of special titanium samples by the vacuum fusion method, by W. J. McMahon. U.S. Arsenal, Watertown, Mass. May 1954. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 127347

Determinations of oxygen and of hydrogen in titanium by the vacuum fusion method have been successfully undertaken. Precision of the results is comparatively good. It appears that industrial standards for such analyses can be established through co-operative efforts. Dept. of the Army project no. 593-08-021. O.O. project TB 4-15. WAL R 401/223.

Correlation of vapor-liquid equilibrium data for binary systems containing hydrogen chloride by means of activity coefficients, by Manfred Lichtenstadter and William H. Manogue. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Apr 1956. 38p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126821

Empirical correlations of vapor-liquid equilibria of HCl in dimethyl hydrogen phosphite and diisopropyl hydrogen phosphite are presented for solutions where the mole fraction of HCl is less than 0.5. Project 4-92-03-013-02. CC CRL R 646.

Final report under Contract N6onr-241, I, for the period 1 Oct 1946 to 31 Dec 1955, by W. A. Noyes, Jr. Rochester. University. Dept. of Chemistry, Rochester, N.Y. Jan 1956. 16p. Order from LC. Mi $2.40, ph $3.30. PB 127253

Studies relating to the photochemical primary processes in the following molecules have been conducted during the term of this contract: methyl n-butyl ketone, acetone, diethyl ketone, biacetyl, di n-propyl ketone, ethylene oxide, mercury dimethyl, beta propiolactone, methyl iodide (sensitized), ketene. Contract N6onr-241, I, Final report.

Fluorine containing chelate compounds, by Glenn R. Buell. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1958. 15p tables. Order from OTS. 50 cents. PB 131809

The purpose of this work was to study the feasibility of preparing liquid chelate compounds. The thermal stability of certain chelate compounds led to their study as possible liquid base stock materials. Several fluorinated diketones were chelated with metal ions and their melting points studied to determine the effect of the fluorine on the physical properties of the molecule. Only one liquid was obtained and all compounds exhibited high vapor pressure. AD 150984. Project 7340, Task 73404. AF WADC TR 57-764.

On the properties of some mixtures of fused salts, by Tormod Forland. Pennsylvania State University. College of Mineral Industries, University Park, Pa. Jun 1956. 128p diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 127368

It is the object of this paper to describe the properties, particularly the thermodynamic properties, of mixutres of fused salts on the basis of various structural models for the fused mixtures. Four idealized models are considered, and thermodynamic functions are derived on this basis. Contract N6onr-269, T.O. 8, NR 032-264. PSC SMI TR 69.

Reductive cleavage of ferrocene, by Daniel S. Trifan and Louis Nicholas. Princeton University. Plastics Laboratory, Princeton, N.J. Jul 1956. 22p diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 127228

Dept. of the Army project 3-99-15-022. Signal Corps project 152B. 1. Ferrocene - Derivatives - Synthesis 2. Friedel - Crafts - reaction 3. Contract DA 36-039-sc-70154, Report 3a 4. PU PL TR 42A

Solid state properties and catalytic activity. Eighteenth periodic status report for the period 1 Oct-30 Dec 1955, under Contract N6 onr-27018, by Hugh Taylor. Princeton University. Dept. of Chemistry, Princeton, N.J. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 127251

For reports 9-17, 19 see PB 114084, 115107, 116327, 117473, 118386, 119034, 120035, 124885, and 125931. 1. Catalysts, Oxidation 2. Chemisorption

Study of the mechanism of flame extinguishment by aluminum chloride, by Joseph B. Levy and Raymond Friedman. Atlantic Research Corporation, Alexandria, Va. Oct 1957. 21p diagr, graphs, table. Order from OTS. 75 cents. PB 131698

Data showing the reduction of normal burning velocity of methane-air mixtures with increasing additions of prevaporized aluminum chloride are presented herein, these data having been obtained with apparatus built in the course of this study. Experimental techniques are also fully described. The results are analyzed and compared with other pertinent studies, and it is tentatively concluded that aluminum chloride dust extinguishes flames by first vaporizing and then reacting chemically with the flame by unknown reactions apparently similar to those of elemental chlorine or carbon tetrachloride. AD 142271. Project 6075, Task 61331. Covers work from Feb 11 - Oct 18, 1957 under Contract AF 33(616)-3527. AF WADC TN 58-1.

ELECTRICAL MACHINERY

Communication Equipment

Annotated bibliography and critical review of voice communications. See entry under Bibliography on page 56. PB 131584

Applicability of magnetic-drum information storage to the CAA teletypewriter circuits, by Francis J. Gross. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1954. 17p photos, map, diagrs, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 132720

1. Teletypewriters - Circuits 2. Drums, Magnetic 3. Data storage systems 4. CAA TDR 233

Multichannel telegraph monitor TH-19()/FG. Final report covering period 5 Jun 1953-30 Apr 1956, under Contract DA 36-039-sc-52689, by L. Carver, J.R. Yoder and H. Levick. Stelma, Incorporated, Stamford, Conn. May 1956. 81p photos, diagrs (1 fold), graphs. Order from LC. Mi $4.80, ph $13.80. PB 127486

Report on development of suitable circuitry leading to the design of a ten channel telegraph monitor having automatic distortion measuring and alarm features. Signal Corps project 543G. Contract DA 36-039-sc-52689, Final report.

Reversible properties of ferromagnets: I. Theory of the expected variation of the reversible susceptibility with magnetization. II. Comparison of theoretical and experimental susceptibility curves. III. Summary, by Dale M. Grimes. Michigan. University. Engineering Research Institute, and Dept. of Electrical Engineering. Solid State Devices Laboratory, Ann Arbor, Mich. Dec 1956. 58p diagr, graphs. Order from LC. Mi $3.60, ph $9.30. PB 126868

Using a statistical model, equations are developed for the variation of the reversible susceptibility both parallel with and normal to the biasing magnetization as a function of the magnetization assuming that the susceptibility arises by domain rotation. The results are contrasted with previous results based upon domain-wall motion. It is concluded that the theory points out a new technique for the separation of the origins of the susceptibility. Equations are also given for the expected variation of the differential magnetostriction with magnetization both parallel with and normal to the field and for both domain-wall motion and domain rotation. An expression is given for the susceptibility matrix arising from domain rotation as a function of magnetization. AD 97082. Part II not included. Solid State Devices Laboratory Technical Report no. 1. Contract AF 18(603)-8. MU ERI Proj 2495-I-T. MU ERI TR 1. AF OSR TN 56-464.

Electronics

C-band video receiver. Final report under Contract AF 19(604)-1282. International Telephone and Telegraph Corporation. Federal Telecommunication Laboratories, Nutley, N.J. May 1955. 54p photos, drawing (fold), diagrs (part fold), graphs (part fold). Order from LC. Mi $3.60, ph $9.30. PB 127444

The specific problem involved in this program was

the development of a video receiver to operate in the 4500- to 5000-mc frequency band. The general properties required were high gain, good sensitivity, and low noise figure. The design target for this receiver was a 15-db noise figure, or better, over a 500-mc band, with a 40-db gain. This is expected to produce 0.6 microwatt as the second detector. Contract AF 19(604)-1282, Final report. AF CRC TR 57-173.

Current distribution in magnetically focused modulated electron beams, by Donald K. Winslow. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Apr 1957. 61p photo, drawing, diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 127482

The work described here relates directly to a number of theoretical and experimental investigations of space-charge effects in electron beams. AD 117058. Contract N6 onr-25123, NR 373-361. Contract AF 19(604)-1494, Scientific report 8. AF CRC TN 57-364. SU ML R 380.

Diffraction of plane electromagnetic waves on a conducting cylinder, by A.S. Goriainov. Translated by Morris D. Friedman. Oct 1956. 7p graph. Order from LC. Mi $1.80, ph $1.80. PB 127447

AD 110165. Translated by Lincoln Laboratory, Massachusetts Institute of Technology, from Doklady, AN USSR, 1-09, 477-480, 1956, under Contract AF 19(122)-458. 1. Waves, Electromagnetic - Diffraction - Russia 2. Cylinders - Reflective effects - Russia 3. Contract AF 19(122)-458

Electronic component parts research for 500°C operation. Part I, by Morton E. Goldberg and Harlan G. Hamre. Armour Research Foundation, Chicago, Ill. Feb 1958. 111p graphs, tables (part fold). Order from OTS. $2.50. PB 131815

This study was made to determine the feasibility of operating electronic components at an ambient temperature of 500°C. Major emphasis was placed on operation at that temperature, rather than operation over a temperature range or determining upper temperature limits in cases where 500°C is known to be beyond the capabilities of given materials and fabrication techniques. Extensive experimental evaluation of inorganic dielectrics performed as a part of this study has shown that forsterite, several alumina ceramics, boron nitride and some types of mica exhibit lower over-all dissipation factors at 500°C than the other dielectric materials tested. AD 142350. Project 4155, Task 41543. Covers work from 1 Apr-31 Dec 1956 under Contract AF 33(616)-3549. AF WADC TR 57-362, Part 1.

Industrial preparedness study on diffused semiconductor devices. Final feasibility report for the period 25 Jun 1956-15 Feb 1957, under Contract no. DA 36-039-SC-72705, by J.D. McCotter and C.G. Thornton. Philco Corporation, Philadelphia, Pa. Mar 1957. 64p photos, drawing, diagrs, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 127428

The essential processes of blank preparation, diffusion, electrochemical machining, and micro-alloying which are utilized in the fabrication of the graded base switching transistor have been successfully demonstrated in the laboratory. The results of the study indicate that it is possible to further develop the techniques and equipment discussed in this report in order to adapt these techniques and equipment to the requirements of large-scale production methods. Philo H-2761.

Industrial preparedness study of diffused semiconductor devices. Interim report for the period 1 Jul-31 Dec 1956, under Contract DA 36-039-SC-72694, by Earle L. Steele, Robert R. Rutherford, and others. Motorola, Inc., Semiconductor Products Division, Phoeniz, Ariz. Jan 1957. 103p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 127427

The object of this study is to utilize diffusion techniques in fabricating semiconductor devices for some specific applications. In the present phase of the contract, the aim is to engineer production designs, and manufacture and submit sample quantities. The current phase of the contract calls for work on five devices. Four of these are high frequency germanium transistors and one is a high power silicon transistor.

Industrial preparedness study for direct veiwing storage tubes, covering the period 1 Aug-31 Aug 1957, under Contract DA 36-039-sc-72717, by M.P. Wilder. Allen B. Du Mont Laboratories, Inc. Cathode Ray Tube Division, Clifton, N.J. Sep 1957. 37p photos, drawings, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 132075

1. Tubes, Storage - Circuits 2. Tubes, Storage - Design

Industrial preparedness study on hydrogen thyratron tubes type VC 1257, by A.E. Gordon. Kuthe Laboratories, Inc., Newark, N.J. Contract DA 36-039-sc-70288. Order separate parts described below from LC, giving PB number of each part ordered.

Report no. 13 covering the period 1 Jul-31 Jul 1957. Aug 1957. 4p diagr. Mi $1.80, ph $1.80. PB 132073

1. VC 1257 (Hydrogen thyratron tube)
2. Vacuum tubes, Thyratron-hydrogen - Tests

Report no. 14 covering period 1 Aug-31 Aug 1957. Sep 1957. 3p. Mi $1.80, ph $1.80. PB 132074

1. VC 1257 (Hydrogen thyratron tube)
2. Vacuum tubes, Thyratron-hydrogen - Tests

Industrial preparedness study on silicon junction crystal diodes. 6th quarterly progress report for the period 17 Jun-16 Sep 1957, under Contract DA 36-039-sc-70264, by William E. Harding and Melvin Klein. Radio Receptor Company, Inc., Brooklyn, N.Y. Oct 1957. 21p graphs. Order from LC. Mi $2.70, ph $4.80. PB 132079

In a batch alloying process the rectifying junction and the base connection are formed simultaneously. An aluminum wire is used for the junction. The base has been modified to a gold plated Kovar disc alloyed to the silicon die by means of a thin intervening gold disc. This base structure is designed to minimize cracking by use of the thermally matched Kovar-silicon combination with a minimum amount of gold between. For 4th and 5th reports see PB 127604 and 128270.

Industrial preparedness study on surface-barrier transistors. Final report for the period 29 Jun 1954-1 Jun 1957, under Contract DA 36-039-sc-46640, by J.D. McCotter and C.G. Thornton. Philco Corporation, Philadelphia, Pa. Jul 1957. 241p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $37.80. PB 132072

This report describes in detail the fabrication process for surface-barrier transistors. Included are specifications of the pilot plant, estimated maximum pilot production, cost breakdown of materials required, detailed procedure for the preparation of the chemical solutions used, detailed specifications of fabrication equipment and detailed figures as to yield for each operation in the process.

Industrial preparedness study for transistor manufacturing device 2, by C.M. Chang. Sylvania Electric Products, Inc. Semiconductor Division, Woburn, Mass. Contract DA 36-039-sc-72719. Order separate parts described below from LC, giving PB number of each part ordered.

Report for the period 1 Jul 1956-31 Mar 1957. Mar 1957. 45p drawings, diagr, graphs, table. Mi $3.30, ph $7.80. PB 127426

Investigations during Phase 1 of the contract show that mass production of a germanium core driver which may be required to pass light currents (in the neighborhood of half an ampere) in its applications, based on present design, is feasible. Fabrication problems are discussed. Distributions of device characteristics are given and proposed specifications are written.

Quarterly report covering period 1 Apr-30 Jun 1957. Jul 1957. 23p drawings, diagrs, graphs, tables. Mi $2.70, ph $4.80. PB 132077

The hermetic seal problem has been partially solved. Beta stability has been improved by a change in encapsulation process. Greater control was achieved in alloying and electrolytic etching.

Industrial preparedness study for voltage tunable magnetron type Z-5118. 3rd quarterly progress report covering the period 1 Dec 1956-28 Feb 1957, under Contract DA 36-039-sc-70278, by D.J. Hodges. General Electric Co., Power Tube Dept., Schenectady, N.Y. Mar 1957. 20p photo, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 127494

1. Z-5118 (Magnetron) 2. Vacuum tubes, Magnetron - Tunable 3. Vacuum tubes, Magnetron - Cathodes

Inspection instructions for electron tubes, by H.E. Thomas. U.S. Armed Services Electro-Standards Agency, Fort Monmouth, N.J. Oct 1955. 120p diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 127468

This manual is for use in conjunction with Military Specification MIL-E-1, and presents information pertaining to inspection procedures, sampling plans and criteria for determining the acceptability of those electron tubes covered by the above specification and for use by the Armed Services. MON 120-56.

Investigations of rhenium for electron tube applications, by C.T. Sims, N. Sandler, and others. Battelle Memorial Institute, Columbus, O. Contract AF 19(604)-1741. Task 46310. Order separate reports described below from LC, giving PB number of each part ordered.

3rd quarterly progress report covering the period 1 Jan-31 Mar 1957. Apr 1957. 16p photos, graph, tables. Mi $2.40, ph $3.30. PB 132104

Rhenium-coated tungsten wire was prepared by deposition of a 7-mil rhenium coating onto a 15-mil tungsten wire by thermal dissociation of rhenium pentachloride. The coating was sound and uniform, but possessed a rather rough as-deposited surface which could be made smooth by swaging. Fabrication studies of binary rhenium alloys containing molybde-

num, tungsten, carbon, and thoria were continued. Metallurgical evaluation of Re-0.85ThO_2 wire utilized in this work as a thermionic emission cathode was conducted. The tungsten wire coated with rhenium by halide decomposition was also studied. Variation in flashing temperature for this cathode was also studied, and indicated that some thoria is reduced at temperatures as low as 1980 C. AD 117028. AF CRC TN 57-186.

4th quarterly progress report covering the period 1 Apr-30 Jun 1957. Jul 1957. 20p photos, graphs, tables. Mi $2.40, ph $3.30. PB 132111

Fabrication studies of binary rhenium alloys containing molybdenum and tungsten were continued. A W-30.5Re alloy and a Mo-51Re alloy were successfully fabricated to 0.040-inch rod by rod rolling. Rhenium containing various amounts of carbon was evaluated for fabricability. Tungsten, rhenium, and rhenium-coated tungsten wires, which have been exposed to an atmosphere containing carbonaceous gases, were evaluated to determine the rate of inward carbon diffusion and the extent to which rhenium protects tungsten from carburization. Initial results of a recrystallization study of W-30.5Re alloy show the recrystallization range to be between 1600 and 1800C. AD 133646. AF CRC TN 57-595.

Low anode voltage thyratron, by William J. Kearns and John O. Pehek. General Electric Co. Power Tube Dept., Schenectady, N.Y. Mar 1958. 78p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.00. PB 131777

During early stages of the work, cathodes of thoria on tantalum, nickelate, tantalum, Philips L, and lanthanum hexaboride were designed and fabricated for use in bell jar investigations and in developmen tal tube structures. Experimental diodes and triodes with both hollow and cylindrical cathodes were built and evaluated as were three Schumann grid tubes. Investigations of rubidium vapor as the gas atmosphere in a low anode voltage thyratron included studies of surface ionization and impact ionization in ion injector tubes, in large diodes, and in small diodes and thyratrons, culminating in the successful development of a 2.5-ampere ceramic thyratron with less than four volts arc drop and capable of stable operation for at least 4000 hours. The concluding portion of the program dealt with further investigations of the observed ability of a low negative grid voltage (20 volts) to interrupt the DC discharge in a rubidium vapor atmosphere. Also included is a report on materials technology developed for use with alkali vapors. Project 4150, Task 41658 (transferred from project 4156, Jun 1957). Covers work Jun 1951-Jan 1957 under Contract AF 33(038)-23585. AF WADC TR 57-422.

On optimum linear antennas, by V.L. Pokrovskii. Translated by Morris D. Friedman. Feb 1957. 13p diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 127448

AD 110299. Translated from Radiotekh i Elektr., AN USSR, vol. 1, p. 593-600, 1956, by Lincoln Laboratory, Massachusetts Institute of Technology under Contract AF 19(122)-458. 1. Antennas - Current distribution - Theory - Russia

Reliability stress analysis for electronic equipment, edited by John A. Connor. Radio Corporation of America. Engineering Standards and Services Section. Revised. Oct 1956. 181p diagrs, graphs, tables. Order from OTS. $3.00. PB 131678

Presents basic techniques and numerical values required to calculate the reliability risk accumulated in the process of making electronic design commitments in the matter of component-part selection and application stress. Revision of material issued earlier as TR 1606. TR 1100. Components application review monograph no. 3. NAVSHIPS 900-193.

Research in high-power beam tubes. Scientific report no. 5 for the period 15 June-15 Sep 1956 under Contract AF 19(604)-1494. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Sep 1956. 15p photo, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 126945

In summary the projects have progressed as follows: (1) The investigation of assembly techniques continues in the cross-wound helix project. The fundamental problem is the support of ring-bar structures inside a metal envelope by means of ceramic disks. (2) Use of the cavity-probe device for study of the bunching phenomena in Brillouin-focused beams has provided a considerable amount of excellent data on the distribution of r-f current density in the klystron beam (under both small and large signal conditions, and for a wide range of parameters). (3) Construction of the velocity spectrograph has been completed, and initial calibration measurements have been made. AD 98807. For Scientific reports 1-4 see PB 123410, 123411, 123400, 125154. SU ML R 332. AF CRC TN 56-752.

Simulation study for the period 1 May - 31 Jul 1956, under Contract no. AF 19(604)-1572. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories, New York, N.Y. Aug 1956. 93p photos, diagrs (part fold), graphs (1 fold). Order from LC. Mi $5.40, ph $15.30. PB 126905

The simulator allows the following characteristics of radar system and the target to be accurately controlled: target scintillation, amplitude and spectrum; antenna beam pattern, beam width and scanning rate, receiver noise figure and bandwidth; transmitter

pulse width and repetition frequency. The simulator video output can be fed directly to a PPI or "A" scope for presentation or to an automatic device for further processing. An instruction manual for this simulator is included as Section II of this report. A method is presented for designing optimum track-while-scan predictors using a non-mean-square error criterion. This method is directly applicable to those cases where the tracking errors during turns are large compared with the errors during straight line flight. Track-while-scan systems with low scan rate usually satisfy this criterion. The filter design procedure is outlined. AD110178. CU-3-56-AF-1572-EE. Project Lion. Progress report P 7/133. For 1st, 2nd, 4th and 6th reports see PB 118824, 118857, 122375, 123416, 125099. Continues work under Contract AF 30(635)-2815. AF CRC TN 56-980.

Studies leading to the development of a radio interference filter for overhead power lines. Interim report on project NY411 002, by J. C. Senn. U.S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Jan 1957. 31p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 127479

This report presents the initial studies conducted to develop a radio interference filter suitable for high voltage power line applications. A unique distributed loss filter is proposed and experimental data are presented. Project NY411 002. NCEREL M 117.

Generators, Motors, Transmission

All-transistor d.c. voltage regulator, by Gerald M. Ford. U.S. Naval Ordnance Plant. Engineering Dept., Indianapolis, Ind. Mar 1955. 35p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 130965

This report describes the all-transistor voltage regulator which was developed at this station to replace the carbon pile regulator Mk 1, Mod O in applications demanding precise voltage regulation. Embodied in the report are sections concerning specifications, theory of operation, and test results. NAVORD 3156.

Industrial preparedness study for precision, high stability resistors. 3rd quarterly progress report covering period 1 Feb-30 Apr 1957, under Contract DA 36-039-sc-72730, by H. W. Aschinger. Polytechnic Research and Development Company, Inc., Brooklyn, N.Y. May 1957. 10p. Order from LC. Mi $1.80, ph $1.80. PB 127491

1. Resistors - Manufacture 2. Resistors - Materials

Industrial preparedness study, low-noise traveling-wave amplifier. Quarterly progress report no. 2 for the period Oct 1, 1956-Dec 31, 1956, under Contract DA 36-039-sc-72733, by M. Nowogrodzki. Radio Corporation of America. Tube Division, Harrison, N.J. Jan 1957. 25p diagrs (part fold), table. Order from LC. Mi $2.70, ph $4.80. PB 127465

Object of this study was to design and develop tooling and equipment for the manufacture and test of low-noise, S-band, traveling-wave amplifiers; to conduct a pilot run demonstrating the applicability of the equipment; and to perform a mobilization study for the tube type.

Investigation and development of "high voltage, low current vibrator." Final report for the period 15 Apr 1952-1 Oct 1955, under Contract DA 36-039-sc-15469, by Albert A. Goffstein and Charles G. Compton. American Television and Radio Co., St. Paul, Minn. Nov 1955. 235p photos, drawings (1fold), diagrs, graphs, tables. Order from LC. Mi $10.20, ph $36.30. PB 127477

The work represented in this report covers investigations leading to the development of a light weight extremely small vibrator for converting low DC potentials at low current. In addition, this report pertains to investigations leading to the development of five vibrator test circuit power supplies utilizing the sub-miniature vibrator, as developed. DA project 3-27-07-063. SC project 2016s.

Low-noise backward-wave amplifier (VA-191) development program, by K. R. Evans and W. L. Rorden. Varian Associates, Palo Alto, Calif. Jan 1958. 41p drawings, diagr, graphs. Order from OTS. $1.25. PB 131822

Several trial designs, based upon various considerations of the specifications, have been attempted. A schedule for performing the calculations is evolved based on several predetermined parameters. Low-noise gun designs are considered, with some discussion of theory. Predicated magnetic field calculations for various conditions of perturbations are given. Some discussion is devoted to application of permanent magnets to this tube. Project 4156, Task 41533. Contract AF 33(616)-3521. AF WADC TN 57-324.

Test data on task IV: Resistors, wirewound, variable (precision type), data taken between Mar 1953 and May 1954 under Contract DA 36-039-sc-42536. Battelle Memorial Institute, Columbus, O. Jun 1954. 274p graphs, tables. Order from LC. Mi $11.10, ph $42.60. PB 127267

Report consists of tables and graphs, no text. Dept. of the Army project no. 3-72-01-000. Signal Corps project no. 32-4312A. 1. Resistors, Wire-wound - Tests

Miscellaneous

Progress report no. XVII under Contracts N5ori-07801 and DA-19-020-ORD-3429, by A. von Hippel. Massachusetts Insitute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Jun 1955. 79p photo, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 127257

Covers work done during the period on conduction and breakdown in gases, liquids and solids; ferroelectrics; ferromagnetics; dielectric spectroscopy; structure determinations of crystals (tellurium tetrabromide, orthorhombic sulfur and diphenyl sulfoxide, TiO, KBr, and others). Publications from Dec 1, 1954 to June 1, 1955, papers published in journals and presented at technical meetings are listed. For reports 8-16 and 18 see PB 102421, 104335, 106079, 106886, 108282, 109929, 114956, 117412, 118878 and 125870.

Study, standardization of specifications for insulated cable, by Robert E. Barbiere, Philip M. Costanzi and Bruce Compton. Radio Corporation of America. R.C.A. Service Company, Inc., Government Service Dept., Camden, N.J. Dec 1957. 244p diagrs, graph, tables. Order from OTS. $3.50. PB 131805

The standardization study of specifications for multiconductor cables was designed to eliminate duplications and minor variations in cable materials, constructions, and test procedures, and to incorporate the results of the standardization in a single specification that would supersede all the specifications under study. AD 151096. Project 4155, Task 41530. Contract AF 33(616)-3690. AF WADC TR 57-423.

FUELS AND LUBRICANTS

Bacterial activity in JP-4 fuel, by Sam Bakanauskas. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 21p tables. Order from OTS. 75 cents. PB 131813

Studies were made with sludge samples obtained from tanks used to store JP-4 fuel, a kerosene-type fuel used in USAF jet aircraft. Results of these studies indicated the following: 1. Sludge was caused by bacteria, and by products resulting from bacterial metabolic activity. 2. JP-4 fuel, and additives (corrosion and gum inhibitors) approved for USAF use in JP-4 fuel, are not bacteriostatic agents. JP-4 fuel, and some additives were found to be nutritive for bacteria. 3. A 1.5-2.0% concentration of potassium tetraborate, by weight, in water bottoms of JP-4 storage tanks can produce bacteriostatic conditions within the tank. AD 151034. Project 7312, Task 73124. Covers work from Sep 1956-Dec 1957. AF WADC TR 58-32.

Development of a high temperature aircraft hydraulic fluid, by N.W. Furby, R.O. Bolt, R.L. Peeler, and J.M. Stokely. Standard Oil Company of California, San Francisco, Calif. Dec 1954. 108p photos, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 132108

The requirements for a high temperature hydraulic fluid possessing favorable viscosity, volatility, lubricity and thermal stability led to the investigation of silicon containing compounds as possible new base materials to meet this demand. Studies conducted by the California Research Corporation have resulted in the synthesis of a number of siloxanes and disiloxanes in an effort to develop a finished fluid that would meet the requirements set forth in the program. Data are presented on compounds synthesized and on evaluation of fluid blends. AD 59527. Project 7331, Task 73313. Contract AF 33(038)-9831. AF WADC TR 54-191.

Fundamentals of gear lubrication. Final report prepared under Contract no. 53-356-c- amendment no. 14 for the period Jun 1956-Jun 1957, by V.N. Borsoff and R. Lutwack. Shell Development Co., Emeryville, Calif. Jul 1957. 128p photos, diagr, graphs (part col.), tables. Order from LC. Mi $6.30, ph $19.80. PB 132839

Subjects investigated were: 1. Effect of viscosity on load carrying capacities of oils. 2. Effect of hardness on gear performance. 3. Effect of length of contact on load carrying capacity. 4. Scoring performances of oils in the speed range between 20,000 and 30,000 rpm. 5. Performances of gears and gear lubricants at high temperatures between 400°F and 600°F. 6. Effect of speed on gear wear. 7. Scoring performances of WADC oils GTO-38 and reference oil "B." 8. Studies of extreme pres sure lubrication. Includes a brief review of work performed during the four year period and final theoretical and practical conclusions. S-13728. Color will not reproduce. Covers work from Jun 1956-Jun 1957 under Contract NOas53-356c, Amendment 14.

Investigation into the use of heterocyclic compounds as lubricant additives, by George B. Butler, O. Lee Gordon and Louis A. Haynes. Peninsular Chemresearch, Inc., Gainesville, Fla. Aug 1955. 61p table. Order from LC. Mi $3.90, ph $10.80. PB 132107

A literature survey and synthesis program were carried out in order to prepare various nitrogen and sulfur, selenium, or oxygen-containing heterocycles for evaluation as antioxidant, antiwear and extreme pressure additives for lubricants, hydraulic fluids and greases. In addition, a number of organoselenium compounds of the selenide and diselenide type

were synthesized, primarily for evaluation as high-temperature oxidation inhibitors. Solubilities of the prepared compounds in various referenced fluids were determined. AD 93162. Project 7340, Task 73404. Covers work from Apr 1954-Apr 1955 under Contract AF 33(616)-2391. AF WADC TR 55-187.

Investigations of the electrical and physical characteristics of aircraft fuels, by Richard E. Johnson and Floyd A. Andrews. Minneapolis-Honeywell Regulator Company. Aeronautical Division, Minneapolis, Minn. Jan 1956. 101p photos, diagr, graphs (1 fold), tables. Order from LC. Mi $5.70, ph $16.80. PB 132244

Continued use of the capacitance type of fuel-quantity gage in modern aircraft has necessitated a study to determine whether significant fuel characteristics are changing for the older fuel grades and to determine the characteristics of the newer fuel grades. Measurements were made to dielectric constants, densities, and dissipation factors on 144 samples of aviation fuel, grades 91/96, 100/130, 115/145, and JP-4. This report summarizes the results of the investigation and includes a statistical analysis of the data. AD92585. Project 1374, Task 73698. Covers work from May 1954-Mar 1955 under Contract AF 33(616)-2504. AF WADC TR 55-219.

Polynuclear aromatic compounds for high temperature lubricants, by Charles F. Raley, Jr. Southwest Research Institute, San Antonio, Tex. May 1956. 54p tables. Order from LC. Mi $3.60, ph $9.30. PB 132124

Aryl phosphate esters investigated possessed the most promising high-temperature properties of those examined. Compositions prepared by reacting two or three different phenols with the proper amount of $POCl_3$ were also investigated. A total of nine fluids were prepared which possessed a liquid range of at least -20 to 800°F. Many of the compounds and compositions prepared, including others not meeting this liquid range, are considered to have potential use value. Several generalizations were drawn from the results of the over-all program. AD 101273. Project 7340, Task 73404. Covers work from Nov 1954-Dec 1955 under Contract AF 33(616)-276. For Part 1 see PB 130242. AF WADC TR 53-337, Part 3.

Quick test for the detection of deterioration in stored IMR propellant, by Norman E. Beach. U.S. Picatinny Arsenal, Dover, N.J. Dec 1956. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 130829

1. Fuels, Aviation - Storage 2. Propellants - Deterioration - Testing equipment 3. PA TR 2386

Synthetic lubricants, by D.W. McCready. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jun 1953. 97p photos, drawings, diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 130818

This project was established to study the possibility of synthesizing a pure compound to be used as a synthetic lubricant in aircraft engines operating at ambient temperatures ranging from -65 to 160°F. The syntheses of the 84 compounds prepared are described in this report. The viscosity-temperature characteristics and melting points of the compounds have been determined. Other physical properties such as density, vapor pressure, specific heat, thermal conductivity, etc., have been determined on some of the compounds. None of the compounds synthesized meets the viscosity specification of 65 cSt. at 210°F and 3000 cSt. at -65°F. The compounds which most nearly meet this specification and which show the greatest promise of meeting the specification are compounds having the "dumbell" structure with terminal cyclopentyl rings along with the thioether structure. AD 15927. Covers work from 9 Jun 1948 - 7 Oct 1952 under Contract W 33 (038)-ac-21457. Unclassified 24 May 1955. AF WADC TR 53-45.

INSTRUMENTS

Acceptance test of prototype optical velocity meter, by William H. Henkel, Jr. U.S. Air Force. Air Research and Development Command. Air Force Armament Center, Eglin Air Force Base, Fla. Jan 1957. 24p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132563

The purpose of this test was to determine whether or not the optical velocity meter, Model 1, meets the specifications set forth in Contract AF 08(616)-16, and to determine the feasibility of using the photoelectronic technique for measuring the velocities of individual projectiles at high repetition rates. AD 110856. Task 88587. Contract AF 08(616)-16. AF AC TR 56-91.

Concentric line power meter, by Dong Un Suh. Illinois. Engineering Experiment Station. Electrical Engineering Experiment Laboratory, Urbana, Ill. Jun 1956. 82p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 126785

This report represents the analysis and the experimental results obtained with a new type microwave power meter which permits a direct and absolute determination of the power of a microwave signal propagating through a coaxial line. Contract Nonr-1834(08), NR 373-162, Technical report no. 1.

Design of a beta-ray spectrometer, by Roger P. Vancour and Alfred J. Moses. U.S. Arsenal,

Watertown, Mass. Dec 1954. 21p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127457

O.O. project TB 2-0001. D/A project 599-01-004. 1. Spectrometers, Beta ray - Design 2. WAL R 844/18

Design of a particle size counter, by Martin Memolo. U.S. Chemical Corps. Chemical Warfare Laboratories. Directorate of Research, Army Chemical Center, Md. Mar 1957. 25p photos, fold drawing, diagr, table. Order from LC. Mi $2.70, ph $4.80. PB 132872

An accurate and relatively rapid method for assessing particle size distribution of an aerosol, is described. Using the device described herein, it is possible for one man to measure and record an average of fifty-six drops per minute, thus reducing the man hours per thousand drops to 0.3. CC CWL TM 15-9.

Design of total temperature probes, by D.H. Henshaw and D. F. Daw. Canada. National Aeronautical Establishment, Ottawa, Canada. Jan 1957. 115p photos, drawings (part fold), diagrs, graphs (part fold), tables. Order from LC. Mi $6.00, ph $18.30. PB 126980

1. Probes, Temperature - Design - Canada
2. NAEC LR 184

Development of fin positioning thruster, by H.D. MacDonald, Jr. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Mar 1957. 82p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 130876

Design studies have been conducted and test models of various type thrusters, to meet several specifications for positioning a fin, have been built, fired, and delivered. Project TS1-15-C197. FALR Memo 646.

Experimental straight-tube smoke generator (U), by F.H. Whitney and J. Clure. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Sep 1957. 31p photos, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 130967

Project 4-04-17-020-06. Covers work from Jul1954-Apr 1955. 1. Generators, Smoke - Design
2. Jet engines, Pulse jet - Tail pipes - Design
3. CC CWL R 2143

Infrared PbS photometer. Final report under Contract Nonr-1702(00), by W.A. Hiltner and G.P. Kuiper. Chicago. University. Yerkes Observatory, Williams Bay, Wis. Jul 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 127454

Describes an infrared photometer in which a lead sulfide photoconductive cell was used as the radiation receiver, and contains a report by Dr. G.P. Kuiper on observations made with this device.

Instructions for operating the Leco CD-10 conductometric carbon determinator, by William R. Sheehan. U.S. Arsenal, Watertown, Mass. Aug 1954. 17p photos, diagr, graph. Order from LC. Mi $2.40, ph $3.30. PB 127370

A detailed description of the operation of the Leco CD-10 Conductometric Carbon Determinator is given. The theory and a description of the equipment are included as pertinent information. DA project 593-08-023. O.O. project TB 4-121. WAL R 120/72.

Instrumentation for studies of the exploding wire phenomenon, by W.G. Chace and E.H. Cullington. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Advanced Research Laboratory, Bedford, Mass. Aug 1957. 42p photos, diagrs, graphs, table. Order from OTS. $1.25. PB 131839

Types of problems encountered in instrumenting an exploding wire experiment are discussed and some methods of solving such problems are delineated. A satisfactory method of controlling the experiment and its instruments, using a light beam isolating system, is described in detail. Also, satisfactory methods of measuring current and light intensity are fully described; the use of photography in recording EWP is discussed; an analysis is given of the type switch recommended; and a convenient scheme for operating two cathode ray oscillographs with simultaneous sweeps is described. AD 133842. AF GRD IGR 7. AF CRC TR 57-235.

Magnetic core memory unit for meteor burst communication systems, by Walter E. Jaye. Stanford Research Institute, Menlo Park, Calif. Dec 1956. 23p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126997

This report presents the description of a magnetic core memory unit which is being incorporated in a meteor-burst communication system. The principle of operation of a single memory core and of a coincident-current driven core matrix is explained. Contract AF 19(604)-1517. SRI Proj 1422, Scientific report no. 4. AF CRC TN 56-566.

Micro-programming, by Robert J. Mercer. California. University. Dept. of Mathermatics. Numerical Analysis Research, Los Angeles, Calif. Jun 1956. 26p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126893

Micro-programming is the technique of designing the control circuits of an electronic digital computer to formally interpret and execute a given set of machine operations, M_i, as an equivalent set of sequences of micro-operations, elementary operations that can be executed in one pulse time.

Miniature, direct-plotting pulse-frequency nomogram, by K. M. Chapman. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Nov 1957. 10p graphs, table. Order from OTS. 50 cents. PB 131672

A device is described for conveniently and inexpensively plotting event rates from time-based data records, such as heart rate from electrocardiograms, (ecg's), and discharge frequency from volleys of nerve impulses. Principles of design, construction of a prototype, and photographic duplication of copies in quantity are discussed. The use of the nomogram for plotting nerve impulse frequencies is illustrated. AD 142097. Project 7216, Task 71712. AF WADC TN 57-371.

Modifications and tests of radioactive probes for measuring soil mositure and density, by Paul F. Carlton, D.J. Belcher, T.R. Cuykendall and H.S. Sack. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. and Cornell University, Ithaca, N.Y. Mar 1953. 17p photos, diagrs, graphs, Order from LC. Mi $2.40, ph $3.30. PB 132709

1. Soils - Moisture content 2. Soils - Density - Measuring equipment 3. Probes, Radioactive - Tests 4. CAA TDR 194

Monthly progress report, July 1956, under Contract DA 36-034-ORD-1646, by Hans J. Maehly. Princeton. University. Institute for Advanced Study. Electronic Computer Project, Princeton, N.J. Aug 1956. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 127422

Project TB 3-0538. For other monthly reports see PB 118659-118660, 119072, 120319, 120321, 123155, 123170, 124105, 124164 and 126356. 1. Computers, Electronic - Coding 2. Contract Nonr-1358, NR 044-047

Numerical mathematics and computing mechanisms, by Sullivan G. Campbell. Duke University, Durham, N.C. Sep 1957. 64p. Order from LC. Mi $3.90, ph $10.80. PB 132158

AD 136572. 1. Computers - History 2. Computers, Analog 3. Computers, Digital 4. Mathematics, Applied 5. Contract AF 18(600)-1539 6. AF OSR TN 57-584

Photographic dosimetry. Final report for the period 15 Feb 1955-14 Feb 1956, under Contract DA 36-039-sc-64612, by H. F. Nitka. General Aniline and Film Corporation. Ansco Division. Physics Research Laboratory, Binghamton, N.Y. Mar 1956. 49p photo, drawing, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127445

Research and development work is described leading to the design and construction of a radiation dosimeter for field use indicating emergency gamma ray dosages between 50 and 450 roentgens without chemical processing. This has been achieved by using high speed photographic print-out paper in conjunction with a thallium-activated potassium iodine mono-crystal as intensifying screen. The response of the dosimeter is wavelength and rate-independent over wide ranges of practical significance. The evaluation can be made immediately after exposure. Dosages up to 500 roentgens can be measured.

Transient temperature sensing equipment, by Frank M. Flanigan and Juan O. Gonzalez. Florida. Engineering and Industrial Experiment Station. College of Engineering, Gainesville, Fla. Dec 1956. 154p photos, drawings (part fold), diagrs (part fold), graphs (1 fold), tables. Order from LC. Mi $7.50, ph $24.30. PB 132106

Instrumentation has been devised to measure the temperature transients occurring in the intake duct of a jet aircraft. A metal-film and wire-type resistance thermometer are used, as well as a rapid response thermocouple. Corrections for thermal lag and radiation are made mathematically from an analysis of the data as recorded by an airborne magnetic tape recorder and reproduced by a Miller recording oscilloscope. In addition, similar sensing instruments are to be calibrated at the Bureau of Standards using a transient temperature test facility located there. An approach to a method of measuring temperature transients by the change in the velocity of propagation of sound waves has been made. AD 116505. Project 8857. Covers work from 13 Jun 1955-15 Dec 1956 under Contract AF 08(616)-36. AF AC TN 57-18.

Two-meter positive-ion beam electrostatic analyzer, by R.O. Bondelid and C.A. Kennedy. U.S. Naval Research Laboratory. May 1958. 75p photos, diagrs, graphs, tables. Order from OTS. $2.00. PB 131487

An electrostatic analyzer with a radius of curvature of two meters and a deflection angle of 90 degrees has been constructed, installed, and evaluated. It is used in conjunction with the NRL large Van de Graaff accelerator to provide a positive-ion beam of precisely known energy and highly resolved in energy. The analyzer has been used to determine the bombarding energies of several (p,γ) resonances and (p,n) thresholds. NRL R 5083.

Water velocity meter, by C. T. Lane. Yale University. Edwards Street Laboratory, New Haven, Conn. Jan 1955. 16p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127283

The construction and performance of an instrument, designed to measure velocities of flow in sea water, is described. It differs from previous meters in that it is able to measure true vector velocities rather than their magnitudes only. In addition, due to the extensive use of plastic materials, it is found that salt water corrosion and marine fouling difficulties are greatly reduced. The present instrument has a lower limit of sensitivity of approximately 0.1 knot. Technical report no. 40. Contract Nonr-609(02), NR 238-001.

MATHEMATICS AND STATISTICAL ANALYSIS

Asymptotic forms of Coulomb wave functions, II, by A. Erdélyi and C. A. Swanson. California. Institute of Technology. Dept. of Mathematics, Pasadena, Calif. 1955. 25p tables. Order from LC. Mi $2.70, ph $4.80. PB 127236

For Part I see PB 126347. 1. Coulomb functions 2. Equations, Differential functions 3. Airy stress 4. Asymptotic expansions 5. Contract Nonr-220(11), NR 043-121, Technical report 5

Construction of the envelopes of helomorphy of arbitrary domains, by H. J. Bremermann. Princeton University. Institute for Advanced Study, Princeton, N.J. Feb 1957. 32p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 126968

AD 115088. Project no. 47500. 1. Mathematical functions 2. Contract AF 18(600)-1109, Supplemental Agreement no. 4 (56-339) 3. AF OSR TN 57-49

Initial oxidation rate of metals and the logarithmic equation, by Herbert H. Uhlig. Massachusetts Institute of Technology. Dept. of Metallurgy. Corrosion Laboratory, Cambridge, Mass. n.d. 44p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127032

1. Metals - Oxidation 2. Flow, Electron - Mathematical analysis 3. Contract N5 ori-07815

Mathematical theory of plasticity based on slip, by H. Payne, S. J. Czyzak and W. Lucas. Detroit. University, Detroit, Mich. Sep 1957. 36p diagr, graph, table. Order from LC. Mi $3.00, ph $6.30. PB 132150

A mathematical method of predicting the polycrystalline stress-strain relationship from that of a single crystal. AD 136545. Contract AF 18(600)-1466. AF OSR TR 57-61.

Multiple range tests for correlated and heteroscedastic means, by David B. Duncan. North Carolina. University, Chapel Hill, N.C. Dec 1956. 18p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 126941

One purpose of this paper is to present a more complete method for extensions to tests of means necessarily sacrifices a little in simplicity but is more powerful, especially in cases in which the differences between the means have appreciably different variances. Another purpose is to indicate briefly the closeness of the properties of these complete tests of heteroscedastic and correlated means to those of the corresponding tests of homoscedastic and uncorrelated means. AD 115024. Institute of Statistics Mimeograph series, no. 161. Supported jointly by the Florida Agricultural Experiment Station, the U.S. Public Health Service and the U.S. Air Force through the Office of Scientific Research. Contract AF 18(600)-83. AF OSR TN 56-597.

On negative energy states in approximately relativistic wave equations, by Zeno V. Chraplyvy. St. Louis University, St. Louis, Mo. Dec 1956. 39p. Order from LC. Mi $3.00, ph $6.30. PB 126703

While the negative energy states are an essential feature of the relativistic quantum mechanics, they do not appear in non-relativistic theory. The purpose of the present investigation is to establish their role in "approximately relativistic" theories. AD 115064. Contract AF 18(600)-789, Technical report no. 4. AF OSR TN 57-29.

On the numerical solution of the transportation problem, by H. S. Houthakker. Stanford University. Dept. of Economics, Stanford, Calif. Dec 1954. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 126779

The problem is to find a flow matrix which minimizes shipping cost subject to the availability and requirement constraints. Contract N6 onr-251(33), NR 047-004. SU DE TR 15.

Research on applications in Fourier analysis. Final report covering period 1 May-30 Sep 1955, under Contract no. AF 18(600)-1189, by K. Chandrasekharan. Princeton University. Institute for Advanced Study, Princeton, N.J. Sep 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 132154

A study of Hecke's theory of modular functions and Dirichlet series led to an examination of the functional equation of the Riemann Zeta-function from the point of view of the uniqueness of its solutions. A classical theorem of Hamburger states that any

function which can be represented as a Dirichlet series, is subject to certain assumptions of regularity, and satisfies the functional equation, must be the Riemann Zeta-function. AD 74590. Project R-354-10-70. AF OSR TR 55-344.

Study of a family of Laves-type intermediate phases, by Rodney P. Elliott. Armour Research Foundation, Chicago, Ill. Jan 1957. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126700

Paramagnetic susceptibility measurements were made on binary and ternary Laves-type phases of constant atomic proportions of titanium and zirconium. Comparison of the susceptibiliteis of the binary compounds with the susceptibilities of the component elements indicates that the free electrons of the components are contributed directly to the compound lattice. Measurements of the ternary alloy susceptibilities indicate a nonlinear function with composition. This is indicative of a complex density of states vs energy curve precluding direct calculation of the component valencies. Paramagnetic trends of binary and ternary Laves compounds offer further proof that the free electron valency of the elements of the first transition series decrease es as atomic number increases. AD 120421. Covers period 15 Mar 1955-14 May 1956 under Contract AF 18(600)-1399. ARF Proj. B079, Final report. AF OSR TN 57-12.

Tables for estimating a proportion or a Poisson mean with prescribed precision, by Allan Brinbaum and Donald Guthrie. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jan 1956. 26p tables. Order from LC. Mi $2.70, ph $4.80. PB 126902

1. Tables, Mathematical 2. Variance - Analysis 3. Poisson's ratio 4. Statistical theory 5. Contract N6 onr-251(26), NR 042-002 6. SU AMSL TR 25

Variational principles in the mathematical theory of plasticity, by D.C. Drucker. Brown University. Division of Applied Mathematics, Providence, R.I. n.d. 28p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 127002

The fundamental definitions of work-hardening and perfect plasticity have been shown to have strong implications with respect to uniqueness of solution for elastic-plastic bodies. It is not surprising, therefore, to find that they lead rather directly to the variational principles as well. Perfect plasticity theory and both the incrementally linear theories for work-hardening materials are considered. The several counterparts of the minimum potential energy and the minimum complementary energy theorems are derived in a unified manner for stress-strain relations of great generality. Absolute minimum principles rather than relative are established. Date is 1956 or later. Contract Nonr-562(10), NR 064-406. GDAM C11-13. BU AM TR 13.

MEDICAL RESEARCH AND PRACTICE

Further investigations into the nature of hygroscopic expansion of dental casting investments, by W.N. Lawrence, K. Asgar, and F.A. Peyton. Michigan. University. School of Dentistry, Ann Arbor, Mich. n.d. 22p photos, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 126976

Date is 1955 or later. 1. Castings, Precision - Mechanical properties 2. Castings, Dental - Expansion 3. Dental research 4. Contract N6 onr-232, T.O. VIII, NR 180-360

Further study of Alaskan schistosomes, by Reinard Harkema. U.S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska and North Carolina State College. Div. of Biological Sciences, Raleigh, N.C. Nov 1955. 17p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 126474

Object was to determine the life history of the itch-producing schistosome cercaria prevalent in interior Alaska and to determine the degree of development of bird schistosomes in mammals. AF AAL Proj 22-1401-005, Report no. 3.

Prevalence of dental caries among native born and reared Oregon school children and the possible influence on it of certain ecological factors. Summary technical report for the period Jan to Dec 1956, under Contract Nonr-1533(00), by D.M. Hadjimarkos. Oregon. University. Dental School, Portland, Ore. Jan 1957. 2p. Order from LC. Mi $1.80, ph $1.80. PB 132011

1. Teeth - Caries - Research

Production, purification and possible surgical use of clostridial collagenase. Final technical report covering period 28 Feb 1953 to 31 May 1956, by R.E. Kallio. Iowa State University, Iowa City, Iowa. Jun 1956. 2p. Order from LC. Mi $1.80, ph $1.80. PB 126489

1. Collagen - Production 2. Contract N9 onr-938 (04), NR 135-217, Final report

Psychosocial and psychophysiologic studies of tuberculosis, by Thomas H. Holmes, Norman G. Hawkins, Edmund R. Clarke, Jr., Joy R. Joffee, and Charles E. Bowerman. U.S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Feb 1956. 24p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 126475

In these investigations, techniques from the socio-

logic, psychologic and physiologic disciplines have been used. No uniform method has been applied to all observations. Each experiment was evaluated in context by the method, or combination of methods, deemed most likely to yield information about the question asked. Formerly project 22-1301-0000. AF AAL Project 8-7951, Report no. 4.

Research in amino acid metabolism in surgery. Final report for period 1952-1955 under Contract Nonr-752(00), NR 105-004, by Charles H. Eades, Jr. Tennessee. University. School of Biological Sciences. Dept. of Biochemistry, Memphis, Tenn. Dec 1955. 83p tables. Order from LC. Mi $4.80, ph $13.80. PB 127018

The observations of the research indicate that the amino acid patterns excreted by patients undergoing surgery change as a result of the surgical trauma. Most of the amino acids increase in amount excreted following surgery but soon return to the normal pattern provided adequate amounts of high quality protein and sufficient calories are supplied both pre-operatively and post-operatively. The oral route of administering nutrients is preferred over the intravenous if the use of that route is at all feasible. Standardized diets yield more consistent returns to normal patterns than do diets that are not controlled.

Structure and antibiotic activity of peptides. Annual progress report for the period 1 Jan 1955 through 31 Dec 1955, under Contract no. N6onr-271, T.O. 1, by Bernard F. Erlanger and William V. Curran. Columbia University, New York, N.Y. Jan 1956. 6p tables. Order from LC. Mi $1.80, ph $1.80. PB 127191

1. Peptides - Synthesis 2. Antibiotics - Therapeutic properties 3. Contract N6onr-271, T.O. NR 124-260

Studies on the prevention of tooth decay. Final report under Contract N5 ori-07658, for the period 1 Dec 1952-31 Jan 1956, by James H. Shaw. Harvard University. School of Dental Medicine, Boston, Mass. May 1956. 4p. Order from LC. Mi $1.80, ph $1.80. PB 126987

Work continued under Contract Nonr-1866(01).
1. Teeth - Caries - Research 2. Dental research 3. Contract N5 ori-076(58), NR 180-026, Final report

METALS AND METAL PRODUCTS

Conference on welding engineering, arranged by Allan L. Tarr, 29 Apr - 1 May 1957. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. 1957. 461p photos, drawings, diagrs, graphs, tables. Order from OTS. $6.00. PB 131739

Contents: I. The development of welding for engineering fabrication, by J.H. Humberstone. - II. Factors in the selection of welding processes, by John J. Chyle. - III. Survey of welding codes; standards and specifications for welding, by Arthur Kugler. - IV. General philosophy for application of welding engineering, by Bela Ronay. - V. Defining quality of welding workmanship, by H.J. Bukowski. - VI. Research destructive test methods for weldability, by William L. Warner. - VII. Sampling and proof testing for weld acceptance, by P.J. Rieppel. - VIII. Storage and pressure vessels, by Fred L. Plummer. - IX. Welded bridges, by J.E. South. - X. Ship structure, by E.M. MacCutcheon. - XI. Design of hydraulic structures, by R.P. Hobson. - XII. A needed re-appraisal of welding potential in building framings, by Arsham Amirikian. - XIII. Engineering aspects of welding and arc cutting the aluminum alloys, by P.B. Dickerson. - XIV. Hardfacing, by R.T. Phillips. - XV. Surfacing by the thermo spray process, by Sam Tour. - XVI. Welding of the army package power reactor, by R.D. Robertson. - XVII. Research and experience in welded steel construction, by LaMotte Grover. - XVIII. The evaluation of laboratory fatigue studies of welded structures, by W.H. Munse. - XIX. Canadian welding codes and their administration, by R.M. Gooderham. - XX. European welding operations, by Clarence E. Jackson. - XXI. The use of steel castings in engineering weldments, by N.N. Breyer. - XXII. Considerations on the incorporation of steel castings in welded structures, by Samuel W. Gearhart, Jr. - XXIII. The army conservation-of-materials program and some conservation measures accomplished by welding, by William B. Spangler. - XXIV. A new concept of welded design for improved vibration control, by Omer Blodgett. - XXV. Problems encountered by government agencies in the design, fabrication, testing, and inspection of welded material for federal-aid highway bridges, by Nathan W. Morgan. - XXVI. When and why does aluminum fail, by Charles Bruno. - XXVII. Service failures encountered in Navy applications, by Harrison S. Sayre. - XXVIII. Welded ship construction and radiography, by R.D. Barer. - XXIX. Effect of welding on the notch toughness of a casualty material, by William P. Hatch, Jr. and Carl E. Hartbower. - XXX. The fusion zone as a major weldability concept in welding of high strength steels, by Julian S. Kobler. - XXXI. Oil storage tank failures at Fawley, England, by Harry Schwartzbart. - XXXII. Some problems encountered in the design, fabrication, and inspection of welded aircraft parts, by Robert E. Bowman. - XXXIII. Defective welding in items procured by government agencies, by H.J. Nichols. - XXXIV. Problems encountered by government agencies in the design, fabrication, testing, and inspection of welded material, parts, or constructions produced under government procurement contracts, by Randall W. Platten. - XXXV. Nondestructive testing procedures, by Alexander Gobus. - Sponsored by Corps of Engineer Research and Development Laboratories with the cooperation of other government agencies and research organizations.

Determination of the mechanical properties of a high purity lead and a 0.058 copper-lead alloy, by Thomas E. Tietz. Stanford Research Institute, Menlo Park, Calif. Apr 1958. 44p photos, drawing, graphs, tables. Order from OTS. $1.25. PB 131818

The mechanical properties of a high purity lead and a 0.058% copper-lead alloy were determined at test temperatures of 100, 175, 250, and 325°F. Tensile properties evaluated included the ultimate strength elongation, modulus of elasticity, proportional limit, and yield strength. Compression properties evaluated were the modulus of elasticity, proportional limit, and yield strength. Ultimate shear strength were determined. Stress-creep time curves were obtained for total strain values of 0.2, 0.5, 1.0, and 2.0%, for creep times of from 1 hour to 500 hours. The data obtained are summarized in graphical and tabular form. AD 151165. Project 2134, Task 73070. Covers work from Jul 1956-Sep 1957 under Contract AF 33(616)-3785. AF WADC TR 57-695.

Effect of aging on deposited weld and base plate, by Richard E. Oliver. U.S. Norfolk Naval Shipyard. Underwater Explosions Research Division, Portsmouth, Va. Dec 1955. 43p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127364

Open-ended cylinders with diametrically opposite, welded joints were fabricated of 1-in. -thick STS and 1-in. -thick HY80 steels. The joining welds were made with Grade 260 electrode, employing the "twin-arc" procedure of welding. After a period of aging, the cylinders were subjected to a series of explosion attacks until ruptured. The results of the investigations are given in this report. 5ND-NNSY P-18. Bu Ships project 724-014. NAVSHIPS UERD 9-55.

Effect of atmosphere on creep-rupture properties of a nickel-chromium-aluminum alloy, by P. Shahinian and M. R. Achter. U.S. Naval Research Laboratory. May 1958. 15p photos, graphs, tables. Order from OTS. 50 cents. PB 131735

The role of ductility in the effect of environment on creep and rupture properties was investigated employing a 76-percent nickel, 19-percent chromium, and 4-percent aluminum alloy. Creep-rupture tests were conducted primarily in air and in vacuum at 1300°, 1500°, and 1900°F. NRL R 5133.

Effect of heat treatment on the stability and creep resistance of Ti-Al-Mo alloy, by Harold L. Gegel. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jan 1958. 25p photos, diagr, graphs, tables. Order from OTS. 75 cents. PB 131673

An investigation was undertaken to observe the influence of heat treatment on stability of a Ti-Al-Mo ternary alloy. Tests show that the instability of the alloy is innocuous, and that transformation during testing helps to maintain the material strength. The creep resistance of the alloy was improved by heat treatment, and the stress-rupture properties were not deteriorated. A mechanism of embrittlement by heat treatment is discussed. AD 142283. Project 7351, Task 73510. Covers work from Feb-Oct 1957. AF WADC TN 57-396.

Effect of prior creep on mechanical properties of aircraft structural metals. Part II: 17-7PH alloy (TH 1050 condition), by Jeremy V. Gluck, Howard R. Voorhees, and James W. Freeman. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Apr 1958. 101p photos, drawings, diagr, graphs, tables. Order from OTS. $2.50. PB 131826

A study was carried out of the effect of exposure to elevated-temperature creep conditions on subsequent mechanical properties of aircraft structural metals. The present report considers a precipitation hardening stainless steel, 17-7PH(TH 1050 condition). Exposures were conducted for times of 10, 50, or 100 hours either unstressed or at stresses giving up to 3-percent total deformation at temperatures between 600° and 900°F. Following the exposures, short-time tensile, compression, or tension-impact tests were run at either room temperature or the temperature of exposure. The principal effects found were a loss in ductility in tensile tests and a substantial loss in compression yield strength after exposure to creep at 600°F. In general, remarkably little change in the other mechanical properties was found as a result of exposure to creep, with any such changes primarily confined to increases in strength. AD 151115. Project 7360, Task 73605. Covers work from 10 Jan-9 Nov 1957 under Contract AF 33(616)-3368, Suppl. 1 (57-850). For Part 1 see PB 131716. AF WADC TR 57-150, Part 2.

Effect of temperature on the magnetic properties of nickel-iron alloys, by J.J. Clark and J.F. Fritz. Westinghouse Electric Corporation, East Pittsburgh, Pa. Dec 1957. 37p diagrs, graphs, table. Order from OTS. $1.00. PB 131799

The effects of temperature variation on the d-c magnetic properties of six nickel-iron alloys are reported. Normal magnetization curves for various temperatures between -60°C and +250°C are presented, together with curves illustrating the behavior of saturation induction, remanence, and coercivity over this temperature range. A dependance of d-c magnetic properties of Hipernik V and Deltamax alloys on temperature cycling is also reported. AD 142267. Project 7021, Task 70651. Contract AF 33(616)-309. AF WADC TN 57-434.

Electrochemical mechanisms of noble-metal/hydrogen systems, Part II: Palladium, by J.P. Hoare,

G. W. Castellan, and S. Schuldiner. U. S. Naval Laboratory. May 1958. 44p graphs, diagrs. Order from OTS. $1.25. PB 131683

The hydrogen-producing reactions on a β-palladium cathode were investigated and mechanisms were determined. By means of a palladium bielectrode it was possible to determine mechanisms on the anode and cathode surface of α-palladium and to study the migration of protons through the bielectrode. The relation between the hydrogen content of palladium and the resistance and potential was determined. The equillibrium potential anomalies in the palladium/hydrogen system were resolved by showing that the potential-determining reaction for α-palladium is an equilibrium between hydrogen ions in solution and hydrogen dissolved in the metal whereas the potential-determining reaction on β-palladium is an equilibrium between hydrogen ions in solution and molecular hydrogen. It was also shown that when palladium is electrolytically charged with hydrogen its electrochemical behavior is different from that of palladium charged by exposure to hydrogen gas. The thermodynamics of these systems are discussed and a structural interpretation of the free energy relations is given. The mechanisms of the spontaneous solution of hydrogen in pure palladium in aqueous solution are given. For Part I see PB 131526. NRL R 5129.

Evaluation of cast welding of cermets to austenitic alloys, by R. S. DeFries and E. E. Reynolds. Allegheny Ludlum Steel Corporation. Research Laboratory, Watervliet, N. Y. Aug 1956. 30p photos, diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 132831

This final report covers the casting by the investment cast-welding process of cermet test pieces to austenitic alloys. Cast S-816 was selected as the best austenitic hub alloy because it had the best combination of strength and ductility which is essential for a rotor alloy. Sound cast-welded cermets to S-816 alloy test pieces were obtained with the 3-1/2 hour preheat at 1600°F and a pouring temperature of 2900 to 3000°F. This was determined from metallographic examination of the cast-welded joints and tensile tests conducted on cast welded test specimens. Index no. NS-013-119. Contract NObs-66230, Final report.

Fatigue strength reduction factors for inclusion in high strength steels, by H. N. Cummings, F. B. Stulen, and W. C. Schulte. Curtiss-Wright Corporation. Propeller Division, Caldwell, N. J. Apr 1958. 39p graphs, tables. Order from OTS. $1.00. PB 131816

Tentative values of fatigue strength reduction factors for non-metallic non-malleable inclusions in single-nucleus fractures of rotating beam specimens are determined by two methods. Data for the computations are taken from tests on 309 specimens of SAE 4340 and 4350 steel, of 140, 190, 230, 260 and 300 ksi UTS. Quantitative results are thought to be somewhere near the correct order of magnitude. Qualitatively, it is concluded that the values of the factors depend upon the size of the inclusions and upon the hardness level of the steel. Also, it is thought that for very small inclusions (less than 0.00025 inch) other inhomogeneites inherent in the steel itself dominate the failure of a specimen. AD 151162. Project 7360, Task 73604. Covers work from May 1953-Oct 1956 under Contract AF 33(616)-5182. AF WADC TR 57-589.

Fundamentals of brazing. 4th year final report covering the period 23 Jun 1955-23 Jun 1956, under Contract DA 11-022-ORD-957, by N. Bredzs and H. Schwartzbart. Armour Research Foundation, Chicago, Ill. Dec 1956. 76p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132166

The principal mechanism of transfer of filler metal through the filler metal-base metal interface is shown to be by grain boundary penetration which is a rapid process. The mechanism of grain boundary penetration and its inter-relationships with other metallurgical phenomena involved are explored theoretically, and experimentally, using metallography. Use of "diffusion bonding" for the joining of low carbon steel and drill rod yielded joints which were stronger than the base metal. Such joints in low carbon steel were shown to be ductile in bending. Ordnance project TB 4-31. ARF Proj B039.

Investigation of a new method for the determination of the coefficients of surface diffusion of metals. 9th quarterly progress report under Contract no. AF 18(600)-644, by Peter F. Mataich. Horizons, Inc., Cleveland, O. Nov 1955. 12p photo, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132220

Samples being studied range from annealed, oriented single crystal faces to highly worked surfaces which are practically amorphous in their structure. The problem of determining the effect of surface contaminants is being studied by examining samples with identically polished surfaces which have been cleaned by various surface cleaning methods. Project R-355-30-2. AD 75737. For 8th and final reports see PB 118399 and 121956.

Manual on the machining and grinding of titanium and titanium alloys, by Carl T. Olofson. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Aug 1957. 77p diagrs, graphs, tables. Order from OTS. $2.00. PB 121644

The purpose of this manual is to present information and data on various machining processes commonly employed for titanium. It is intended to serve as a guide or starting point from which machining recommendations for specific parts can be derived. Appendix A contains four tables: a list of titanium alloys and their producers, machinability ratings,

a list of tool materials used, and a table for converting speeds in surface feet per minute to revolutions per minute. Appendix Bdescribes the properties of titanium and their influence on machining behavior. Contract AF 18(600)-1375. BMI TML 80.

Metallurgical and mechanical characteristics of high-purity titanium-base alloys, by Frank C. Holden, Jerry A. Houck, Horace R. Ogden, and Robert I. Jaffee. Battelle Memorial Institute, Columbus, O. Apr 1958. 121p photos, diagr, graphs, tables. Order from OTS. $2.75. PB 131817

Studies have been made to establish the relationships between thermal history, microstructure, and mechanical properties for high-purity titanium-base alloys. These have included the following alloy systems: Ti-Al-Mo, Ti-O-Mo, Ti-C-Mo, Ti-O-Al-Mo, Ti-O-Mn, Ti-O-Cu, Ti-C-Cu, and Ti-Cu-Mn. Mechanical test data reported include tensile and flow properties, impact behavior over a range of temperatures, hardness, aging, and cooling-rate test data. The basic physical metallurgical principles involved here are discussed. AD 151125. Project 7351, Task 73510. Covers work from Mar 1956-Aug 1957 under Contract AF 33(616)-3469. AF WADC TR 57-694.

Nondestructive testing: Visual examination of welds and weldments, by C.H. Hastings. U.S. Arsenal, Watertown, Mass. Feb 1950. 14p photos, drawings. Order from LC. Mi $2.40, ph $3.30. PB 127340

Describes the procedure and application of the visual method of inspection as applied to welds and weldments. This manual is intended to discuss the subject as applied to all forms of welding. O.O. project no. TB 4-20. WAL project no. 14.19-M. WAL R 141/1.

Report on adhesive bonding of titanium, by H.E. Pattee, G.E. Faulkner and P.J. Rieppel. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Jun 1958. 31p graphs, tables. Order from OTS. $1.00. PB 121646

This report summarizes the available information on the adhesive bonding of titanium. The experience previously gained in adhesive development, joint design, surface preparation, bonding procedures, and evaluation methods is being applied to the adhesive bonding of titanium. Contract AF 18 (600)-1375. BMI TML 104.

Research in electrical properties of intermetallic compounds. Final report for the period 1 May 1953 - 30 Jun 1954, under Contract AF 18(600)-774, by Tien-Shih Liu and Renato Bobone. Horizons Incorporated, Cleveland, O. Jul 1954. 50p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 130839

Reports on the preparation and electrical measurements of Ni-Al alloys and Ni-Al-Cu ternary alloys in the cubic B region. The measurements show that the locus of minima of the resistivity for the Ni-Al-Cu ternaries is to be found within a strip containing the transition line from non-defect to defect structures. A qualitative explanation of the main features in the electrical behavior of the alloys, based on the Brillouin zone theory, is presented. AD 40535. Project R 355-10-11. Contract AF 18 (600)-774, Final report. AF OSR TR 54-20.

Stress-strain relations in the plastic range, a survey of theory and experiment, by D.C. Drucker. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Dec 1950. 305p drawings, diagrs, graphs, table. Order from LC. Mi $11.10, ph $47.10. PB 130767

This report considers stress-strain relations for metals in the plastic range. It contains a summary and critical evaluation of both experimental and mathematical results obtained by many investigators. The emphasis throughout is on the correlation and analysis of experimental data and the development of the simplest mathematical theory which will be of practical use to the stress analyst. An extensive annotated bibliography is appended. ATI 117720. Contract N7onr-358, T.O. 1, NR 041-032. GDAM A 11-S1.

Studies and comparison of the properties of high temperature alloys melted and precision cast both in air and in vacuum, by Milo J. Stutzman. Westinghouse Electric Corporation. Aviation Gas Turbine Division, Kansas City, Mo. Mar 1958. 113p photos, graphs, tables. Order from OTS. $2.50. PB 131807

Mechanical properties at high temperature of two cobalt and two nickel base alloys were tested as cast in air and in vacuum and with an argon atmosphere. Effects of melting and casting procedures upon the gas contents, tensile properties at room and elevated temperatures, stress-rupture properties, and oxidation resistance was studied. AD 151035. Project 7351, Task 73512. Covers work from 13 Apr 1956-13 Oct 1957 under Contract AF 33(616)-3468. AF WADC TR 57-678.

Study of fundamental factors affecting corrosion of magnesium alloys and adhesion and protective effects of coatings. Final report covering the period 27 May through 26 May 1956, under Contract DA 19-129-QM-391, by S.E. Rohowetz. Bjorksten Research Laboratories, Inc., Madison, Wis. May 1956. 127p photos, drawing, diagr, tables. Order from LC. Mi $6.30, ph $19.80. PB 132153

The following factors contribute to the characteristic pitting type corrosion: (1) The presence of areas of composition discontinuity (CD areas) on the surface of the alloys. These areas contain cathodic

impurities such as iron, copper, nickel, and manganese and higher concentrations of the aluminum and zinc alloying constituents than the surrounding areas. (2) The presence of micropores which connect the surface with a cathodic embedment surrounded by a high aluminum-zinc area as in the surface CD areas. (3) The presence of mill scale and mill defects which develop surface cavities with high corrosion rated. (4) Concentration of the action of corroding media at small areas of metal exposed by flaws such as pinholes in pretreatments of paint or resin coatings on alloy surfaces. Contract DA 19-129-QM-391, Final report.

Study of physical characteristics of thin film resistance elements, by David William Moore. Servomechanisms, Inc., Mineola, N.Y. Dec 1957. 47p photos, graphs, tables. Order from OTS. $1.25. PB 131703

This is the final technical report on an investigation of the physical characteristics of thin film resistance elements. Practically all of this work has been done with Nichrome films. However, some measurements have been made with evaporated nickel-titanium and evaporated carbon films. The results of this work indicate that slow oxidation and strain due to unequal contractions of film and substrate on cooling from the deposition temperature are factors mainly responsible for the instability of the Nichrome films. The nickel-titanium and evaporated carbon films were not suitable for evaluation. AD 142324. Project 6-(8-4155), Task 71643. Contract AF 33(616)-3453, Final technical report. AF WADC TR 57-371.

Summary of compressive-creep characteristics of metal columns at elevated temperatures, by R. L. Carlson and G.K. Manning. Battelle Memorial Institute, Columbus, O. Apr 1958. 62p photo, graphs. Order from OTS. $1.75. PB 131825

A summary of an extensive study of the creep buckling of metal columns is presented. The column behavior prior to collapse is described and the column action at the time of buckling is interpreted in terms of stability. Solutions to creep buckling are discussed. An application of the time-dependent tangent-modulus method to four structural metals indicates that estimates are consistently conservative for small values of column imperfection. Imperfection variations were generally observed to have a very marked effect on the column lifetime. The possible existence of a lower column-load limit below which time-dependent collapse will not occur is discussed. AD 151114. Project 7360, Task 73605. Covers work from 1 Feb 1950-1 Dec 1955 under Contract AF 33(616)-3317. AF WADC TR 57-96.

Temperature variation of intensity of magnetization in thin nickel films, by A.M. Eich. Case Institute of Technology. Dept. of Physics, Cleveland, O. Jun 1956. 29p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126921

The manner in which the intensity of magnetization of thin nickel film varies with temperature and film thickness was studied with the use of a magnetization hysteresis loop tracer. Films of thickness 35 A to 1350 A were studied from approximately 10°K to room temperature. Contract N6 ori-273(03), NR 017-611. ONR TR 18.

Tensile bar shell mold for light alloys, by K.L. Herrick and R.C. Harris. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Feb 1956. 25p photos, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126974

A tensile bar mold design for the shell molding process has been developed using the principles of fluid flow. This design causes the metal stream entering from opposite ends of the tensile far mold cavity to join at the grip end of the bar. Tensile properties of 356, 220, 40E, and 195 alloy were evaluated at 1400°, 1325°, and 1250°F pouring temperature and with four different riser sizes. Properties of 356, 220, and 40E cast in shell molds were found to be equal to or slightly better than the tensile properties of the alloys when cast in green sand molds. Properties of 195 cast in shell molds were significantly lower than the tensile properties of 195 when cast in green sand molds. Project: TB4-2020. FAL R 1307.

METEOROLOGY AND CLIMATOLOGY

Easterly jet stream in the tropics, by P. Koteswaram. Chicago. Universtiy. Dept. of Meteorology, Chicago, Ill. May 1956. 44p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 126975

1. Meteorology, Tropical - Research 2. Winds, Tropical - Analysis 3. Contract N6 ori-020(36), NR 082-120

Effect of hydrostatic pressure on velocity of shear deformation of single crystals of ice, by G.P. Rigsby. U.S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. May 1957. 10p photos, diagrs, graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 132087

Apparatus was built for deforming ice crystals under hydrostatic pressures up to 350 atmospheres. Single crystals were placed in the mounts in such a way that the deformation occurred by gliding on the basal glide plane. It was found that the shear strain rate increased as the pressure was increased at constant temperature, but that the rate is practically independent of hydrostatic pressure when the difference between the ice temperature and the melting point is kept constant. DA project 8-66-02-004. SIPRE project 22.1-8. SIPRE RR 32.

Hailstone impact tests on aircraft structural components, by Pell Kangas. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1950. 23p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132698

1. Hail - Effect on aircraft 2. Hail - Impact tests 3. CAA TDR 124

Particle-size distribution of pulverized snow, by H.H.G. Jellinek and W. Schlueter. U.S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. May 1957. 12p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132086

A microscopic method for the determination of particle-size distributions of pulverized snow was worked out. The measurements were made by means of a filar micrometer eyepiece, the snow particles being on a ruled glass slide, which was submerged in silicone oil to prevent evaporation. DA project 8-66-02-004. SIPRE project 22.1-6. SIPRE RR 29.

Reaction of atmospheric gases induced by vacuum ultraviolet radiation. Final report under Contract AF 19(604)-2049, by G.L. Weissler. California. University. Dept. of Physics, Los Angeles, Calif. Oct 1957. 5p. Order from LC. Mi $1.80, ph $1.80. PB 132082

1. Gases, Atmospheric - Reactions

Research on astrophysical topics. Final report under Contract Nonr-668(06), NR 016-102, for the period Sep 1, 1953-Dec 31, 1955, by M. Savedoff. Jun 1956. 4p. Order from LC. Mi $1.80, ph $1.80. PB 127237

Lists articles resulting from work under this Contract. Consists mainly of paper on "Observational consequences of O star formation."

Study of the particle size distributions of aerosols from light scattering measurements, by T.L. Gilbert. Armour Research Foundation, Chicago, Ill. Nov 1956. 55p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 126727

A critical inquiry into the general problem of calculating the particle size distribution of a polydisperse aerosol from light scattering measurements alone is presented. Scientific report no. 1; Report no. 6. Contract AF 19(604)-1428. ARF Proj A060.

Tables of atmospheric precipitable water, by Glen E. Martin and Walter E. Pearson. U.S. Naval Avionics Facility. Research and Test Dept., Indianapolis, Ind. Jan 1957. 242p diagr, tables. Order from LC. Mi $11.10, ph $37.80. PB 132621

1. Tables - Meteorological 2. Precipitation - Measurements 3. Atmosphere - Moisture content - Mathematical analysis 4. NAFI TP 9

Technique for summarizing information in the sea level pressure pattern, by J. Leith Holloway, Jr. and Max A. Woodbury. Pennsylvania. University. Institute for Cooperative Research, Philadelphia, Pa. Apr 1955. 40p maps, tables. Order from LC. Mi $3.00, ph $6.30. PB 127250

Mean sea level pressure deviations from normal are computed over the United States and adjacent areas given various categories of precipitation occurring at New York City the following day. These results are based on data from twelve Decembers from 1920 through 1931. These mean deviations are used as a basis of a technique for summarizing the information contained in the sea level pressure pattern. The resulting summary variables are used in deriving a discriminant function for forecasting precipitation categories at New York City. Technical report 2 of the Meteorological Statistics Project. For Technical report 1 see PB 120150. Contract Nonr-551(07), NR 082-113.

Vertical motion and weather, 1-31 Jan 1953, by Albert Miller. Pennsylvania State University. College of Mineral Industries. Dept. of Meteorology, University Park, Pa. Jan 1957. 77p graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 126900

Forecast large-scale vertical motion is now available as one product of the numerical integration (by electronic computer) of the equations of motion. The purpose of this research was to find how useful the knowledge of the future field of large-scale motion should be as a predictor of cloudiness and precipitation. Technique employed was explained in Scientific report no. 1, (PB 119206). AD 110228. Mineral Industries Experiment Station no. D-47. Contract AF 19(604)-1025, Scientific report no. 2. AF CRC TN 56-868.

MINERALS AND MINERAL PRODUCTS

Cermet preparation by reactions in the iron-aluminum-oxygen system, by Alfred Siede and Arthur G. Metcalfe. Armour Research Foundation, Chicago, Ill. Oct 1957. 43p photos, diagrs, graphs, table. Order from OTS. $1.25. PB 131820

The objective of this work was to investigate whether better bonding and finer distribution of aluminum oxide in a metallic matrix could be achieved by this method, and whether this improved structure would have properties superior to those produced by conventional methods. This reactive sintering process has been studied for this system by the use of metal-

lography, thermal analysis, and mechanical testing. AD 142252. Project 7-(8-7350), Task 70634. Covers work from 1 Oct 1956-30 Sep 1957 under Contract AF 33(616)-3195. ARF Proj B 090. AF WADC TR 57-761.

ORDNANCE AND ACCESSORIES

Empirical orthogonal functions and statistical weather predictions, by Edward N. Lorenz. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Dec 1956. 52p maps, table. Order from LC. Mi $3.60, ph $9.30. PB 126724

The sea-level pressure field over the United States and southern Canada, as represented by observations at 64 stations, has been analyzed. The possible use of empirical orthogonal functions in nonlinear statistical forecasting, and in dynamic forecasting, is discussed. AD 110268. Statistical forecasting project, Scientific report no. 1. Contract AF 19(604)-1566, Scientific report no. 1. AF CRC TN 57-256.

Mechanism of recrystallization and of sintering, by W.A. Weyl and D.P. Enright. Pennsylvania State College. School of Mineral Industries, State College, Pa. Aug 1951. 31p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132110

With the rapidly increasing importance of the production of highly refractory materials, such as pure oxides, nitrides, borides and carbides, a basic study and a better understanding of recrystallization and sintering phenomena seems to be desirable. It is the object of this report to give an atomistic explanation for the different sintering behavior of the oxides of magnesium and of zinc. ATI 158704. Contract N6 onr-269, T.O. 8, NR 032-265. PSC SMI TR 36.

Radiation-sensitive alkali-barium glass for possible use as a dosimeter, by Carol J. Koerbel. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Nov 1955. 67p drawing, diagr, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 127358

The possibility of utilizing a color changing glass, which would possess characteristics of both the crystal and the liquid, has been recognized. Alkali-barium glass has been evaluated for use as a visual dosimeter. Theoretical and experimental data indicated that the color change resulting from irradiation was dependent only upon the absorption of electromagnetic energy, a photo-process, and was not appreciably dependent upon a subsequent thermal process. Signal Corps project 196A. D.A. project 3-99-04-031. SCEL TM 1715.

Establishment of vibration and shock tests for missile electronics as derived from the measured environment, by Charles E. Crede and Edward J. Lunney. Barry Controls, Inc., Watertown, Mass. Dec 1956. 145p photos, diagrs, graphs, tables. Order from OTS. $3.75. PB 131047

The ultimate objective of the study is to recommend laboratory tests which are appropriate for qualifying electronic equipment and components for service in such environments. The report includes data on ten operational missiles as gleaned from formal reports and from test results made avialable informally. A considerable part of the report is devoted to a discussion of the theory necessary to convert the data to a common form suitable to effect comparisons. Consideration is given to the characteristics of random vibration, and its simulation in the laboratory. Finally, the report makes specific recommendations on vibration and shock testing specifications considered to simulate the actual environmental conditions encountered during flight. AD 118133. Project 4148, Task 41772. Covers work from 1 Jul 1953-15 Sep 1956 under Contract AF 33(616)-2188. AF WADC TR 56-503.

Evaluating audio warning displays for weapon systems, by Dwight E. Erlick and Darwin P. Hunt. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1957. 28p graph. Order from OTS. 75 cents. PB 131442

The problem areas discussed relate to the determination of the criticality of events, the human and equipment characteristics involved in the selection of audio warning displays and the task dimensions essential to evaluate audio waring displays. Operational and research implications are discussed for a two step audio warning display; the first step being designed to bring about detection, maintain attention, and identify a general category; the second, to isolate the specific malfunction within the category. Consideration is also given to a general program of research to evaluate some of the foregoing problems. AD 118189. Project 7189, Task 71570. AF WADC TR 57-222.

Single generalized chart of detonation parameters for gaseous mixtures, by Robert G. Dunn and Bernard T. Wolfson. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1957. 17p graphs, tables. Order from OTS. 50 cents. PB 131458

This chart is a graphical presentation of generalized equations derived directly from the classical equations of detonation. This represents an improvement of the generalized charts previously presented by the authors in that the detonation parameters for gaseous mixtures are now presented on a single Mollier-type diagram rather than of a series of such diagrams, thereby eliminating the necessity for interpolation between charts. The chief usefulness of the generalized chart is to provide a means for visualization of relationships among the detonation parameters for all gaseous mixtures on a single diagram. Two brief examples of the application of the generalized chart are given. AD 130906. Project 3012, Task 70164. AF WADC TN 57-263.

PHYSICS

General

Basic approach to shock front analysis, by Ph. J. Theodorides. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Jan 1957. 33p. Order from LC. Mi $3.00, ph $6.30. PB 126802

This report is a basic approach to shock-front analysis for a non-monatomic fluid. Initial conditions provide for molecular vibration but molecules are not to dissociate, ionize, nor radiate appreciably. The basic equations for tri-axial flow are set on trimerous viscosity, and specialized for steady, uni-axial flow. A new governing equation is derived for the shock-front. Though explicitly continuous, the proposed theory harmonizes with kinetic picture by expressing accordingly the non-linear viscosity and the specific heats, the latter inferring quantum dynamics as to vibratory modes. AD 115099. Expanded version in English of a paper presented by the author before a Joint Conference of Committees on Fluid Dynamics Research in Gottingen, Germany, Oct 7, 1955. Published in ZAMM Sonderheft 1956, pp 38-46. Contract AF 18(600)-428. UM BN 93. AF OSR TN 57-59.

Bio-physics in Europe, by S. A. Talbot. Johns Hopkins University, Baltimore, Md. Apr 1957. 45p. Order from LC. Mi $3.30, ph $7.80. PB 127880

The subjects of this inquiry were: 1) The scope and scientific philosophy of the field of biophysics in the thinking of European biophysicists responsible for teaching and research programs. 2) The content and activity of teaching and research in medical biophysics as practiced now in several European universities. 3) The progress of professional consciousness and action among European biophysicists. AD 113006. Contract AF 18(600)-1180. AF ARDC TN 57-2.

Conservation of charge in Einstein's generalization of gravitation theory, by James L. Anderson and Parviz Merat. Maryland. University. Dept. of Physics, College Park, Md. Apr 1955. 9p. Order from LC. Mi $1.80, ph $1.80. PB 127041

The consequences of λ-invariance in Einstein's new modified field theory are investigated. It is shown that, as a consequence of this proposed invariance, it is possible to replace the antisymmetric part of the metric tenor with a four-potential. By further postulating invariance of the theory under a gauge transformation of the theory, it is possible to arrive at a quantity which can be interpreted as a current density four vector. Covers work from Mar 1, 1955-Apr 15, 1955 under Contract Nonr-594(00), NR 017-610. UM TR 15.

Deformation of elastic paraboloidal shells of revolution, by C. Nevin De Silva. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Feb 1956. 20p graphs. Order from LC. Mi $2.40, ph $3.30. PB 126871

This paper, using the theory of shells of revolution given recently by Naghdi, is concerned with the axisymmetric problem of thin elastic paraboloidal shells of revolution which includes the effect of transverse shear deformation. Following the general scheme, an asymptotic solution is obtained for paraboloidal shells of uniform thickness and is valid at the apex of the shell. In the limit, these results reduce to the predictions of the classical theory of H. Reissner-Meissner. Solutions are given by both theories for a specific example, namely a second degree paraboloidal shell loaded uniformly over a small region about the apex when the open edge is clamped. Project 2150. Contract Nonr-1224(01), NR 064-408, Technical Report no. 5. MU ERI Proj 2150-5-T.

Elastic, plastic bending of a simple supported circular plate under a uniformly distributed load, by Bekir Tekinalp. Brown University. Division of Applied Mathematics, Providence, R.I. Dec 1955. 12p graphs. Order from LC. Mi $2.40, ph $3.30. PB 127054

The paper is concerned with the bending moments and deflections of a uniformly loaded and simply supported circular plate that is made of an incompressible elastic, plastic material. The analysis is simplified by assuming that any plate is either entirely elastic or entirely plastic. This assumption is practically fulfilled for a sandwich plate; for a solid plate it represents a first approximation to the actual diagram of bending moment versus curvature. Contract Nonr-562(10), NR 064-406. GDAM C 11-6. BU AM TR 6.

Electrical cleanup of gases. Quarterly report for the period Jan 1956-Mar 1956, under Contract no. AF 18(600)-1049, by L. J. Varnerin, Jr. and J. H. Carmichael. Westinghouse Electric Corporation.

Research Laboratories, Pittsburgh, Pa. Apr 1956. 6p diagr, graphs. Order from LC. Mi $1.80, ph $1.80. PB 127247

Research report 71F089-R8. For reports 1-7 and 9 on this contract see PB 116569-116571, 117718, 118391, 119370, 120232, 127247, 124846, and 125915. 1. Gases - Ionization - Measurement 2. Vacuum tubes, Tetrode - Design

Heat and momentum transfer from the wall of a porous tube, by Stuart W. Churchill and Harry E. Stubbs. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Mar 1957. 77p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 126863

Heat and momentum transfer from the wall of a porous tube to a fluid stream flowing in the tube were investigated analytically and experimentally. The investigation was limited to conditions where the main stream in the tube was turbulent and where a secondary flow, small relative to the primary, passed inwards or outwards through the porous wall. This small flow through the wall modified the usual velocity field in the tube and consequently the heat and momentum flux from the wall. AD 115001. Project 2323, Task no. 77519. Contract AF 18(600)-1335, Final report. MU ERI Proj. 2323-9-F. AF OSR TN 56-58.

New tables of Mie scattering functions for spherical particles. Part I: Values of amplitude functions a_m and b_m for refractive index n=1.33 and for size parameters a=0(0.1)30, by Rudolf Penndorf and Bernice Goldberg. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Bedford, Mass. Mar 1956. 258p tables. Order from OTS. $4.00. PB 131547

New computations were planned with three objectives in mind, namely computations: (1) for refractive indices of atmospheric particles and particles used in our laboratory work, (2) in small increments for radii up to particle sizes which occur in the atmosphere (up to r = 3μ for visible light), and (3) for small increments in angular direction to determine the angular distribution of the scattered light more accurately. AD 98767. AF CRC TR 56-204(1). AF GRD P 45.

On axially-symmetric subsonic flow of a compressible fluid, by John Hardy. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. May 1955. 96p diagr. Order from LC. Mi $5.40, ph $15.30. PB 127256

This work is concerned with axially-symmetric, subsonic flow of a compressible fluid. The existence and uniqueness of such flows for certain classes of domains is exhibited. These flows are characterized by the fact that they minimize certain integrals so that the direct method of the calculus of variations is applicable. Recently, using different techniques, M. Shiffman and L. Bers have shown that there exist unique, two-dimensional, subsonic flows. The technique utilized in this paper parallels that of Shiffman. The partial differential equation for the flow is the Euler equation for a certain variational integral. Contract Nonr-225(11), NR 041-086. SU AMSL TR 39.

On limit analysis of plates, by Walter Schumann. Brown University. Division of Applied Mathematics, Providence, R.I. Feb 1957. 21p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 126886

An attempt is made to generalize the work of Hopkins and Prager on the load carrying capacities of circular plates to non-symmetrical cases. The material of the plates is assumed to obey Tresca's yield criterion. The technique of limit analysis is used to determine upper and lower bounds on the limit load. Upper bounds on the limit loads in non-symmetrical cases have also been obtained by Rzhanitsyn. Only in very artificial examples has it been found possible to obtain the actual moment distribution and deformation mode during collapse. Ordnance project TB 3-0122. Dept. of the Army project 503-06-005. Contract DA 19-020-ORD-798. BU AM TR 29. GDAM 798/29.

Plastic bending of an eccentrically loaded column, by William E. Boyce. Brown University. Division of Applied Mathematics, Providence, R.I. Jun 1956. 28p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126860

This paper treats of the behavior of a rigid, work-hardening column compressed by eccentric axial loads. A piecewise linear theory of plasticity is used to analyze the lateral displacements which occur as the loads are slowly increased. In particular, a sudden stiffening effect shortly after the onset of plastic flow is noted and explained. Contract Nonr-562(10), NR 064-406. BU AM TR 15. GDAM C 11-15.

Tables of scattering functions for spherical colloidal particles, by Wilfried Heller. Wayne University. Dept. of Chemistry. Computation Laboratory, Detroit, Mich. Contract Nonr-736(00), NR 330-027. Order separate parts described below from LC, giving PB number of each part ordered.

V: Electronic computations. Jan 1956. 37p tables. Mi $3.00, ph $6.30. PB 127255

For Parts 1-3, appendix and supplement to Part 1, see PB 117034, 114756, 117787, 123015, 123739. 1. Tables, Mathematical 2. Particles, Charged - Scattering - Tables

VI. May 1956. 25p tables. Mi $2.70, ph $4.80. PB 126973

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

Theory for base pressures in transonic and supersonic flow, by H.H. Korst, R.H. Page, and M. E. Childs. Illinois Engineering Experiment Station. Dept. of Mechanical Engineering, Urbana, Ill. Mar 1955. 76p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 132184

A theory for base pressures in transonic and supersonic flow is developed using a physical model composed of simplified flow components. The model is based on the concepts of interaction between dissipative flow regions with the adjacent free stream and the conservation of mass in the dead-air region. AD 61544. Some pages will not reproduce well. Contract AF 18(600)-392. ILU EES ME TN 392-2. AF OSR TN 55-89.

Nuclear

Absolute beta measurement of mixed nuclides (U), by Fletcher Gabbard, Arnold Berman and David L. Rigotti. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Mar 1956. 26p photos, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126913

Report describes the applicability and efficiency of an absolute beta counting system for sources composed of mixed radionuclides. It includes a description of the physical setup necessary for such a study, a comparison of results with the theoretical results of standard sources, and a discussion of the problem of self-absorption and self-scattering in the sample. Project 4-12-10-007-02. CC CRL R 561.

Coherent neutron scattering cross-section of V^{51}, by A.W. McReynolds and R.J. Weiss. U.S. Arsenal, Watertown, Mass. May 1951. 8p graphs. Order from LC. Mi $1.80, ph $1.80. PB 127458

O.O. Project TB 4-121. 1. Radio-vanadium - Cross sections 2. Atomic power - Research 3. Neutrons - Scattering - Measurement 4. WAL R 844/12

Complete set of dispersion relations for a class of fixed source meson theories, by Richard E. Norton and Abraham Klein. Pennsylvania. University, Philadelphia, Pa. Mar 1957. 44p. Order from LC. Mi $3.30, ph $7.80. PB 126936

The structure of the transition matrices for all processes that can occur for a class of fixed source meson theories is studied. It is shown that the ratio of the residual matrix element to a suitable product of source functions processes those analytic properties, as a function of the total energy of the system, which permit dispersion relations to be stated. It is pointed out that the scheme does not admit a unique solution, and this is illustrated physically by exhibiting an extended class of Hamiltonians which yield the same dispersion relations, but which as a class, contain more coupling constants than make their appearance in the dispersion relations. AD 120488. Technical note no. 6. Contract AF 18 (603)-60. AF OSR TN 57-132.

Energy distribution of neutrons produced by a thermonuclear reaction, by W.R. Faust and E.G. Harris. U.S. Naval Research Laboratory. May 1958. 6p. Order from LC. Mi $1.80, ph $1.80. PB 132453

Calculations are made to determine the energy distribution of neutrons produced in a thermonuclear reaction. Approximations as to the width and shift of the distribution function as well as the reaction rate are also made. NRL R 5131.

Equation for the self absorption of beta and gamma rays, by Arthur Kant. U.S. Arsenal, Watertown, Mass. Jun 1956. 9p diagr, graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 127459

O.O. project TB 2-0001. D/A project 599-01-004. 1. Beta rays - Absorption 2. Gamma rays - Absorption 3. WAL R 842/56

Final report under Contract no. N5ori-14703: Van de Graaff generator program and mass spectroscopy program, by Alfred O.C. Nier and John H. Williams. Minnesota. University. Dept. of Physics, Minneapolis, Minn. Jun 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 127261

The initial objectives of the Van de Graaff generator project were to investigate with great care the scattering and interaction of protons and deuterons with neutrons, protons, deuterons, tritons, He^3 and He^4 in order to build up the body of accurate experimental data needed to assist in the theoretical interpretation of nucleon-nucleon forces and the interactions of "light-light" nuclei. Summarizes work up to Dec 31, 1954.

Inelastic and elastic scattering of 187-Mev electrons from selected even-even nuclei, by Richard H. Helm. Stanford University. W.W. Hansen Laboratories of Physics. High-Energy Physics Laboratory, Stanford, Calif. Feb 1956. 81p photo, diagr, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 126789

Within the known limitation of the Born approximation, it has been confirmed that the elastic scattering in the range of Z investigated here can be inter-

preted fairly well in terms of a nuclear radius and surface thickness. Measurement of the inelastic scattering angular distributions has been shown to be a promising method for investigating the properties of certain excited states, in particular those levels that give rise to electric transitions. Angular-momentum assignments are proposed for several levels where this was not known previously, and the transition widths or radiative lifetimes are calculated. Project: R-357-20-9. Thesis - Stanford University. Contract N6onr-25116, NR 022-026. Contract AF 18(600)-646. AF OSR TN 56-11. SU HEPL 40.

Literature on the photoproduction of pions. See entry under Bibliography on page 56. PB 127460

Paramagentic resonance absorption in uranium (III) chloride and the nuclear spin of the uranium isotope of mass 235, by Clyde A. Hutchison, Jr., P.M. Llewellyn, Eugene Wong and Paul Dorian. Chicago. University. Dept. of Chemistry, Enrico Fermi Institute for Nuclear Studies, Chicago, Ill. and Oxford. University. Clarendon Laboratory, Oxford, England. n.d. 6p. Order from LC. Mi $1.80, ph $1.80. PB 126878

Date is 1956 or later. 1. Atomic power - Research 2. Uranium chloride - Resonance - Absorption 3. Uranium chloride - Isotopes - Nuclear properties 4. Contract N6 ori-02027

Proceedings of the ANP Spectroscopy Information Metting held Aug 6-7 at Wright Air Development Center. ANP Advisory Committee for Nuclear Measurements and Standards. Feb 1958. 237p photos, diagrs, graphs, tables. Order from OTS. $3.50. PB 131773

This report is a compilation of the unclassified papers given at the ANP Spectroscopy Information Meeting held at Wright-Patterson Air Force Base, August 6 and 7, 1957. The subjects covered in these proceedings are instrumentation for gamma and neutron spectral measurements, treatment of experimental data, characteristics of scintillation crystals, and the use of beam collimators. AD 142342. Project 6002, Task 73075. Robert L. Brocklehurst, Secretary. AF WADC TN 57-298, Part 1.

"Shimming" an inhomogeneous magnetic field in nuclear resonance experiments by pulses, by B. Nelson and L. Goldmuntz. Technical Research Group, New York, N.Y. Jul 1956. 88p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 126870

The main result of this investigation is that there is a combination of "shimming" pulses that can be applied to a liquid sample that can make the line width of the sample independent of the degree of homogeneity of the external static magnetic field. In this report, "shimming" systems are discussed that operate only transiently over the longitudinal relaxation time of the nuclear sample. AD 95804. Contract AF 18(600)-1313. AF OSR TN 56-368.

PHYSIOLOGY

Effects of stress on uropepsin excretion, by R.H. Bonner. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright -Patterson Air Force Base, Dayton, O. Dec 1957. 15p graphs, tables. Order from OTS. 50 cents. PB 131708

A preliminary investigation of uropepsin changes in simulated flight stress is described. Twenty-three subjects were tested under conditions of prolonged positive G, crew confinement, exposure to high temperature-high altitude, and visual and auditory deprivation. Uropepsin changes are reported and an effort made to interpret and evaluate them. Modifications of the assay technique are also discussed. Project 7220, Task 71742. AF WADC TN 57-427.

Intracellular oxidative enzymes: Succinic dehydrogenase, DPN cytochrome c reductase cytochrome oxidase and catalase in oral, liver and brain cortex tissues, by Bertram Eichel and Arnold A. Swanson. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Jun 1956. 18p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126800

The submaxillary gland, tooth pulp, gingiva, tongue mucosa, liver, and brain cortex tissue homogenates of normal female rabbits were examined for protein, succinic dehydrogenase, DPN cytochrome c reductase, cytochrome oxidase, and catalase activity. Comparisons were made between each tissue to establish the relative concentration for each enzyme analyzed. AF SAM R 56-30.

Study of muscle forces and fatigue, by Paul A. Hunsicker. Michigan. University, Ann Arbor, Mich. Dec 1957. 55p photos, graphs, tables. Order from OTS. $1.50. PB 131722

The first phase of the research deals with the strength test results taken on 30 subjects, covering 120 strength tests. The subjects were seated in a simulated pilot-seat, and six movements were tested. The results are presented in percentile tables and graphic form. The next part of the study involves data on 25 subjects who were tested to determine the amount of strength possible in wrist pronation and wrist supination. The final phase of the research gives information on the strength-decrement over a 42-hour period in which the subjects were tested hourly. Several recommendations are offered. AD 131089. Project 7214, Task 71727. Contract AF 33(616)-3461. AF WADC TR 57-586.

Summary review of the influence of thermal radiation on human skin, by James D. Hardy. U.S. Naval Air Development Center. Aviation Medical Acceleration Laboratory, Johnsville, Pa. Nov 1954. 55p drawings, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 127280

The report is divided into the following sections: Introduction; optical characteristics of skin; thermal characteristics of skin; stimulating effects of thermal radiation; heat loss by radiation; and references. NMRI Proj NM 001 090.04.04. NADC MA 5415.

PSYCHOLOGY

Comparison of empirical and homogeneous keys in interest measurement, by Helen H. Gee and Kenneth E. Clark. Minnesota. University. Dept. of Psychology, Minneapolis, Minn. Feb 1956. 127p tables. Order from LC. Mi $6.30, ph $19.80. PB 126876

This report compares two general methods of scale construction by developing both types (homogeneous and empirical) using one set of items: those in the Navy Vocational Inventory. Empirical keys were constructed by procedures intended to maximize the heterogeneity of item content. Ten such scales were selected from 19 available ones by cluster analysis. Homogeneous scales were developed using procedures intended to give maximum homogeneity; these are those described by DuBois, Loevinger, and Gleser. Thesis by Helen H. Gee - Minnesota University. Contract Nonr-710(17), NR 151-248, Technical report no. 6.

Dynamic response of human operators, by Duane T. McRuer and Ezra Krendel. Control Specialists, Inc., Inglewood, Calif. and Franklin Institute. Laboratories for Research and Development, Philadelphia, Pa. Oct 1957. 268p photos, diagrs (1 fold), graphs, tables (part fold). Order from OTS. $4.00. PB 131823

This report presents the results of a concerted effort to arrive at a suitable mathematical description of human operator dynamic response. The investigation has been primarily concerned with operations in which continuous closed-loop control is exerted in a visual input, manual output tracking situation subjected to excitation by random appearing forcing functions. All of the quasi-linear describing function data obtained, including some presented for the first time, were curve-fitted to yield simple mathematical expressions which are descriptive of the linear portion of the operator's response for varying machine dynamics and forcing functions. AD 110693. Project 1365, Task 13554 and Project 7182, Task 71510. Contract AF 33(616)-3080. Contract AF 33(616)-2804. AF WADC TR 56-524.

Effect on transfer of varying stimulation during training, by Carl P. Duncan and Benton J. Underwood. Northwestern University, Evanston, Ill. Dec 1957. 41p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 131653

The effects of both variation and amount of training on transfer among perceptual-motor paired-associate tasks were studied. Different groups of subjects were trained with 1, 2, 5, or 10 tasks (different sets of stimuli) for 2, 5, or 10 days. Some additional groups were trained 2, 5, or 10 days with 10 different repairings of the responses with the stimuli of a given set. After training, all groups were tested for transfer to three (some to four) new sets of stimuli. AD 142134. Project 7179, Task 71638. Contract AF 33(616)-308. AF WADC TR 56-279.

Evaluation of stereoradiography as an ordnance inspection tool, by S.W. Carter. U.S. Arsenal, Watertown, Mass. Apr 1951. 28p diagr. Order from LC. Mi $2.70, ph $4.80. PB 127476

The initial phase of this program involved the production of approximately fifty steroradiographic pairs in an effort to investigate the importance of radiographic procedure and method of presentation upon the ability of an observer to appreciate the third dimension. A comprehensive examination of the literature has been made, and the findings employed in a discussion of the practical problems associated with stereoradiography. A section of this report contains information on the psychophysics of three-dimensional perception, which was considered pertinent to the subject of stereoradiography. O.O. project TB 4-21. WAL R 142/53.

Factor-analytic study across the domains of reasoning, creativity and evaluation. II: Administration of tests and analysis of results, by J.P. Guilford, N.W. Kettner and P.R. Christensen. University of Southern California. Psychological Laboratory, Los Angeles, Calif. Mar 1956. 27p tables. Order from LC. Mi $2.70, ph $4.80. PB 126880

The purpose of this study was to investigate factors that had been found previously in the areas of reasoning, creativity, and evaluation. The three major objectives were: (a) verification of factors, (b) clarification of the nature of the factors, and (c) derivation of information leading to the improvement of tests measuring the factors. Eleven factors from the previous studies were selected for further investigation. In addition verbalizing ability was hypothesized as a new factor (or group of factors). Alternate hypotheses were formulated for most of the factors under investigation. Fifty-seven tests were selected, adapted, or constructed to test these hypotheses and to help define reference factors. Studies of aptitudes of high-level personnel. For part I see PB 118648 (Report no. XI). Contract N6onr-23810. USC PL 16.

(Continued after Index)

Human engineering bibliography. See entry under Bibliography on page 56. PB 132333

Human tolerance to some of the accelerations anticipated in space flight, by Stuart Bondurant, Neville P. Clarke, William G. Blanchard, and others. U.S. Air Force. Air Research and Development Command Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1958. 19p diagr, graphs. Order from OTS. 50 cents. PB 131821

Selected studies of human tolerance to the linear accelerations which are anticipated in space flight have been reviewed. As defined in these studies, tolerance limit is determined by the loss of a critical faculty, i.e., ability to see, think, or exercise at least finger control. Tolerance times at g levels between 2 and 12 in various body positions are presented. The capacity of subjects to stand repeated peaks of acceleration similar to those encountered in multistage rocket vehicles has been explored. Tolerance times longer than any previously reported are obtained by immersion of the subject in water in the semi-supine position. AD 151172. Project 7216, Task 71712. AF WADC TR 58-156.

In-flight comparison of pilot performance on a standard USAF and experimental instrument panel, by John F. Gardner, Robert J. Lacey, Charles M. Seeger, and James E. Wade. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1957. 24p photos, diagr, graphs, tables. Order from OTS. 75 cents. PB 131652

Six USAF pilots each flew 48 Instrument Landing System approaches. Each pilot flew 24 approaches using a standard Air Force instrument panel and 24 approaches using an experimental panel that employed an aircraft reference type presentation that used the "principle of the moving part." For each series of 24 ILS approaches, half were flown using the ID-249 cross-pointer instrument, and half were flown using a Zero Reader instrument for primary glide path and localizer information. Results were inconclusive. Pilots did not report any consistent difficulty in going from panel to panel. Pilots expressed a preference for the standard panel. AD 118255. Project 7189, Task 71571. AF WADC TR 57-270.

Investigations of the exact relationship between photic intensity, wave number and certain other variables, on the one hand, and the frequency of seeing function on the other, by Donald R. Griffin. Harvard University. Biological Laboratories, Cambridge, Mass. May 1956. 5p. Order from LC. Mi $1.80, ph $1.80. PB 126969

1. Visual research 2. Vision - Contrast thresholds 3. Contract N5 ori-07642, NR 140-013

Listener response set to various test forms, by Henry M. Moser, John J. Dreher, John J. O'Neill, and Herbert J. Oyer. Ohio State University Research Foundation, Columbus, O. Oct 1956. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126702

This report is confined to some considerations of subjects' reactions to the physical setup of answer sheets for several kinds of test blanks in current use in speech reception investigations. AD 98821. Project no. 7681. Contract AF (604)-1577, Technical report no. 38. OSURF Proj. 664, Report no. 38. AF CRC TN 56-59.

Psychometric characteristics of officer effectiveness reports of OCS graduates, by Ernest C. Tupes. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Feb 1957. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 126862

USAF Officer Effectiveness Report scores covering the period 1949 through 1952 were obtained from the personnel files of nearly 1400 male graduates of USAF Officer Candidate School. These OERs were analyzed with respect to their means, standard deviations, and reliabilities. Reliability was estimated both for a single report and an average of several reports. A dichotomous score conversion was developed. AD 98923. Project no. 7719, Task no. 17009. AF PTRC TN 57-20.

RUBBER AND RUBBER PRODUCTS

Application of X-ray diffraction techniques, by Otto Renius. U.S. Arsenal, Detroit. Laboratories Division. Materials Laboratory, Center Line, Mich. May 1956. 14p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126737

The direction of stretch of rubber can be determined from the X-ray diffraction pattern and the pole figure of the rubber. The degree of stretch can be estimated from the pole figure of a rubber specimen. Recorder chart tracings indicate that no diffraction maxima occur when the sample is rotated more than forty degrees about its vertical axis. Dept. of the Army project no. 5 B7201004. DA R 3574.

Design data for O-rings and similar elastic seals, Part III, by Frank W. Tipton, George E. Trepus, James J. Hill, Ethel L. Schiavon, and Chester J. Dexieh. Boeing Airplane Company, Seattle, Wash. Apr 1958. 98p photos, diagrs, graphs, tables. Order from OTS. $2.25. PB 131802

This is a continuation of a study to gain knowledge of design data for O-rings and similar elastomeric seals. The literature survey on O-rings and seal design has been continued and enlarged to include the effects of irradiation and extreme low temperature on seal design. Low temperature tests, relaxation and volume change tests, screening tests, and functional tests have been conducted. The functional tests include pulsed annulus tests with various groove configurations and reciprocating shaft tests with and without different types of back-ups at room temperature and at elevated temperatures. AD 151181. Project 7340, Task 73405. Covers work from Jun 1-Dec 31, 1957 under Contract AF 33(616)-2867. For Part 1 see PB 121898. AF WADC TR 56-272, Part 3.

Investigation of condensation type elastomers. Part IV, covering the period 1 Dec 1956-1Nov 1957, under Contract AF 33(616)-2421, by George C. Schweiker, Burton S. Marks, Carl J. Verbanic, Blaine L. Lucas, and Edward V. Gouinlock. Hooker Electrochemical Company, Niagara Falls, N.Y. Feb 1958. 78p graphs, tables. Order from OTS. $2.00. PB 131800

The ultimate goal of the exploratory investigations described is the development of a rubber for special Air Force applications. Major requirements for such a material include good mechanical properties, high thermal stability (originally 350°F to higher), satisfactory performance at -65°F or lower, and resistance to aromatic fuels, synthetic ester-base oils, and hydraulic fluids. To this end, fluorine-containing condensation polymers are being investigated in an effort to discover and develop suitable new elastomers. This report describes the preparation, compounding, crosslinking, and properties of certain fluorine-containing polyester elastomers which appear to meet the goals outlined above. The report also describes the research performed on the synthesis of fluorine-containing difunctional starting materials, polyesters and nitrogen-substituted polyamides therefrom, and their characterization. AD 151009. Project 7340, Task 73404. Covers work from 1 Dec 1956-1 Nov 1957 under Contract AF 33(616)-2421. For Part 3 see PB 131178. AF WADC TR 55-221, Part 4.

STRUCTURAL ENGINEERING

Analysis of frameworks in the presence of steady creep, by P.G. Hodge, Jr. and B. Venkatraman. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Nov 1955. 31p diagrs, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 132215

This paper is concerned with the analysis of pin-jointed frame-works in which the deformations are caused exclusively by steady creep. By means of the elastic analogue the creep problem is first reduced to one in linear elasticity. The elastic analysis is then shown to depend upon the solution of one or more non-linear algebraic equations. Next, two distinct methods of finding approximate solutions are presented. Finally some examples are worked out by the exact and approximate analyses and the results compared. AD 81597. Task 17500. PIB AL 333. Contract AF 18(600)-1381. AF OSR TN 55-455.

Bending moment interaction curve for thin plates with arbitrary yield condition, by Burton Paul and P. G. Hodge, Jr. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Jun 1956. 7p. Order from LC. Mi $1.80, ph $1.80. PB 126773

In the investigation of the plastic behavior of plates, it is necessary to formulate the interaction curve for limiting values of the principal bending moments. Hopkins and Prager have shown that if the plate material satisfies Tresca's yield condition, the interaction curve for moments is similar to the yield condition for stresses. Other investigators have assumed without proof that the same similarity holds for the Mises and parabolic yield conditions. It is shown here that such is the case for any symmetric yield condition. Contract Nonr-839(11), NR 064-416. PIB AL 348.

Bounds on influence coefficients for circular cylindrical shells, by Eric Reissner and M.B. Sledd. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Dec 1956. 34p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 126861

This report considers a problem involving rotationally symmetric deformations of a thin elastic circular cylindrical shell of variable wall thickness and of finite or semi-infinite axial length. AD 110397. Project no. A-231, Report no. 1. Contract AF 18 (600)-1459. AF OSR TN 56-575.

TEXTILES AND TEXTILE PRODUCTS

Development and evaluation of webbing made from nylon "6", by Russell J. Neff. Phoenix Trimming Company, Chicago, Ill. Mar 1958. 54p graphs, tables. Order from OTS. $1.50. PB 131832

This investigation showed that the webbings manufactured from regular 210 denier type "6" nylon have slightly lower breaking strength and were susceptible to heat degradation at lower temperature than webbings presently being used by the Air Force which utilize the type "66" nylon. The webbings manufactured using the type "6" modified 840 denier yarn appeared to be equal in strength and superior

in their resistance to heat degradation up to a temperature of 300°F. AD 151090. Project 7320, Task 73201. Covers work from Jul 1956-Jul 1957 under Contract AF 33(600)-33484. AF WADC TR 57-538.

Influence of colorant systems on thermal protection Part I: Studies on a single-layer system. Part II: Studies on a 3-layer fabric system at one exposure level, by Alvin O. Ramsley and F.P. Tully. U.S. Army. Quartermaster Research and Development Command. Textile, Clothing and Footwear Division, Quartermaster Research and Development Center, Natick, Mass. May 1957. 61p photos, diagr, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 129544

This report considers the manner by which colorants control the rate of energy absorption and the consequences of this absorption at various levels of exposure in a single layer fabric system. A 3-layer system was studied to obtain further information for the design of a hot-dry combat uniform which would afford improved thermal protection. Experimental assemblies considered the effect of a resin bonded pigment system applied to a cotton poplin fabric, THPC treated, with inner layers of 9.3 oz/yd^2 dynel sateen and the standard T-shirt fabric. Time-temperature rise curves for assemblies exposed to 8.6 cal/cm^2 for 0.5 second were obtained with three assemblies as a function of spacing. Dynel appears to be useful as a spacer material up to an intensity of 8.6 cal/cm^2, when used in systems which are described. The advantage of the resin bonded pigment system appears to stem from the lower permeability of volatile decomposition production products and is possibly due to a decrease in direct transmission. Project 7-12-01-002C. QMC TSR 97.

Movement of water through apparel textile systems, by N.R.S. Hollies, H. Bogaty, C.J. Monego, and J.H. Donegan, Jr. U.S. Army. Quartermaster Research and Development Command. Textile, Clothing and Footwear Division, Quartermaster Research and Development Center, Natick, Mass. May 1957. 81p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 132922

Part I describes a number of laboratory methods considered useful in analyzing the movement of liquid water and water vapor in fabrics. The methods are applied to blended fabrics of various fiber materials made in a wide variety of constructions. The results indicate that it is the type of structure rather than the chemical nature of the fiber used in making the yarns or fabric which influences the overall response to water. Part II is concerned with the mechanisms of moisture transfer between layers of fabrics in an assembly. Project 7-93-18-018. QMC TSR 96.

Relationship between the structural geometry of a textile fabric and its physical properties, by Douglas P. Adams, Edward R. Schwartz and Stanley Backer. Massachusetts Institute of Technology, Cambridge, Mass. Feb 1957. 25p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 128414

A simplified nomograph has been designed to permit rapid solution of Peirce's geometric relationships for plain weaves. To illustrate use of the nomograph, several practical problems is cloth structure are presented and worked out in some detail. Advantages and limitations of the nomograph are discussed. Project 7-93-18-019A. QMC TSR 93.

Stress-strain relationships in yarns subjected to rapid impact loading. Part I: Equipment, testing procedure, and typical results, by Walter K. Stone, Herbert F. Schiefer, and George Fox. Part II: Breaking velocities, strain energies, and theory neglecting wave propagation, by Frank L. McCrackin, Herbert F. Schiefer, Jack C. Smith, and Walter K. Stone. Part III: Effect of wave propagation, by Jack C. Smith, Frank L. McCrackin, and Herbert F. Schiefer. U.S. National Bureau of Standards. Feb 1957. 64p photos, diagr, graphs, tables. Order from LC, Mi $3.90, ph $10.80. PB 128718

Equipment is described for elongating yarns by longitudinal impact at velocities ranging from 10 to 100 meters per second. The rate of straining at impact varies from about 100,000 to 500,000 percent per minute. A procedure is discussed for obtaining load-elongation curves for loading and for unloading of the specimen and for loading to rupture in a time interval of only a few milliseconds. The results of a typical loading and unloading test are presented. The behavior of a yarn specimen, which is fastened at one end to a head mass and at the other to a small tail mass, is analyzed for longitudinal impact of the specimen at the head. The analysis leads to a basic formula for "limiting breaking velocity," which is a characteristic property of the material and is independent of the dimensions of the specimen. A simple procedure is described for obtaining its value. The tensile behavior of a Hookean material, elongated by rapid impact at one end has been calculated, using a theory in which wave propagation is considered. As a result of these calculations, limits have been established on the applicability of a simpler theory (discussed in Part 2 of this report) in which wave propagation was neglected. Project 7-80-05-001. QMC TSR 95.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Determination of the air speed required to control landing gear fires, by Lyle E. Tarbell and Burnett C. Street. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1949. 11p photos, diagr, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 132694

1. Fire prevention - Airplanes 2. Landing gear - Fire prevention - Tests 3. CAA TDR 100

Development and test of pneumatic seat cushions: Experimental flight evaluation of prototype seat cushion assemblies, by Arthur I. Siegel and Fritz W. Stirner. U.S. Naval Air Material Center. Air Crew Equipment Laboratory, Philadelphia, Pa. Oct 1956. 33p col. graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 132148

Color will not reproduce. 1. Seats, Pilot - Cushions 2. Contract N 156s-33411 3. NAM AML 5225.1 4. NAMC ACEL 319

Ditching investigations of dynamic models and effects of design parameters on ditching characteristics, by Lloyd J. Fisher and Edward L. Hoffman. U.S. National Advisory Committee for Aeronautics. Feb 1957. 58p drawings, tables. Order as TN 3946 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 125661

1. Airplanes - Ditching 2. Airplanes - Models - Tests 3. Fuselages - Design - Effect on landings 4. NACA TN 3946

Review of aircraft external lighting activities, by Cecil B. Phillips and Alan L. Morse. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1953. 17p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 132717

1. Night flying 2. Airplanes - Lights - Navigation - Installation 3. CAA TDR 215

Instruments

Burner and test bench for evaluating aircraft fire and heat detectors, by J.J. Gassmann. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1953. 10p photos, diagrs, table. Order from LC. Mi $1.80, ph $1.80. PB 132718

1. Detectors, Fire - Testing equipment
2. CAA TDR 217

CAA type II automatic flight and navigation equipment, by John W. Watt and Logan E. Setzer. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1954. 30p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132726

1. Data storage systems 2. Computers, Navigational - Operation 3. CAA TDR 247

Description of the spray rig used to study icing on helicopters in flight, by D.L. Bailey. Canada. National Aeronautical Establishment, Ottawa, Canada. Jan 1957. 17p photos, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126979

1. Icing - Detection - Equipment - Canada 2. Helicopters - Icing - Canada 3. Spraying apparatus - Design - Canada 4. NAEC LR 186

Development of type NS-2 airborne data recorder, by W.B.M. Clark. Douglas Aircraft Company, Inc. Testing Division, Santa Monica, Calif. Feb 1958. 32p photos, diagrs (1 fold), tables. Order from OTS. $1.00. PB 131806

The development of a small, direct-writing, 20-channel data recorder designated Type-NS-2, especially for airborne use, is described. Means of recording certain aircraft environmental conditions well as physiological measurements of flight personnel are explained. The development of special transducers for measuring relative humidity and physiological temperatures is described. The influence of environmental changes on the accuracy of the recorder was determined and is reported. Operating, calibration and maintenance instructions are included. AD 142012. Project 7155, Task 71804. Drawings are listed but not included. Covers work from 30 Apr 1956-14 Feb 1957 under Contract AF 33(616)-3423, Phase 4A. AFWADC TR 57-603.

Dual-control course-line computer CAA type IA, by William A. Seibert, Alan L. Saunders and Logan E. Setzer. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1954. 10p photos, drawings, diagrs. Order from LC. Mi $1.80, ph $1.80. PB 132724

1. Computers, Navigational - Operation 2. Distance measuring equipment 3. CAA TDR 244

Evaluation of 100-channel distance measuring equipment, by R.C. Borden, C.C. Trout, and E.C. Williams. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1950. 12p photos, map, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132696

1. Distance measuring equipment 2. CAA TDR 119

Investigations of vertical displays of altitude information, by Robert C. Mengelkoch and Robert C. Houston. Illinois. University. Aviation Psychology Laboratory, Urbana, Ill. Project 6190, Task 71573. Contract AF 33(616)-3000. Order separate parts described below from OTS, giving PB number of each part ordered.

I: Comparison of a moving-tape and standard altimeter on a simulated flight task. Mar 1958. 31p photos, drawing, diagr, graphs, tables. $1.00. PB 131829

This experiment was designed to compare performance of experienced pilots on a standard altimeter and a vertical, moving tape altimeter on a specified series of flight tasks in a link trainer. Twenty subjects flew the series of maneuvers using each altimeter and deviations from desired altitudes were observed. AD 130828. AF WADC TR 57-384.

II: Effect of practice on performance of a simulated flight task using a moving-tape altimeter. Mar 1958. 28p photos, drawing, diagr, graphs, tables. 75 cents. PB 131830

Fourteen subjects used in the first study were given practice on the vertical display and then were retested. The results confirmed the original findings and again demonstrated, statistically, that reference to the standard altimeter makes greater precision of control possible than reference to the moving-tape display used. AD 130829. AF WADC TR 57-385.

III: Effect of an expanded scale on performance of a simulated flight task using a moving-tape altimeter. Mar 1958. 31p photos, drawing, diagr, graphs, tables. $1.00. PB 131831

It was concluded that, under the experimental conditions, performance on a moving-tape altimeter with a scale factor of 2.375 inches per thousand feet is essentially equivalent to performance on a standard altimeter. AD 142042. AF WADC TR 57-549.

Procedure for calibrating Collins 51R-1 navigation and BC733D localizer receivers, by Francis J. Gross and Max Kincaid. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1950. 19p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132697

1. Radio receivers - Calibration 2. Radio range (VHF) - Equipment 3. CAA TDR 122

Some effects of terrain on the null-reference glide path shape, by John W. Watt and Alan L. Saunders. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Aug 1952. 21p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132704

1. Landing, Instrument 2. Glide path equipment 3. Null indicators 4. CAA TDR 169

Engines and Propellers

Elevated temperature fatigue testing of turbine buckets. Part 2: Fatigue tests of turbine buckets under static axial and superimposed vibrational bending loads, by Albrecht Herzog. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1953. 54p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 132199

The fatigue investigation of turbine blades in a special device, permitting the application of static axial and superimposed vibrational bending loads by means of an electromagnet; were conducted at room temperatures. AD 13777. For Part 1 see PB 110186. AF TR 5936, Part 2.

Fire detection studies in the Convair-340 power plant, by L.A. Asadourian. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Nov 1954. 17p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132728

1. Fire detectors - Airplanes - Tests
2. CAA TDR 250

Instrumentation for acoustical evaluation of jet engine test cells, by Samuel Labate. Bolt, Beranek and Newman, Inc., Cambridge, Mass. Apr 1955. 144p photos, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 132245

The equipment and techniques have been designed expressly to utilize either the turbojet engine as a noise source or a supplementary noise source involving a small cannon firing 10 gauge blank shells. In addition to portable instruments for on-the-spot

analysis of sound pressure and vibration amplitude, twin-channel magnetic tape recorders are employed. Remote switching mechanisms used with this recording system allow noise samples from as many as 50 microphones to be obtained in as little as two minutes of engine running time. These recording techniques also make possible the use of an impulsive noise source, such as the cannon, in the evaluation of the acoustical properties of various components of an engine test facility. Project 7211, Task 71707. Contract AF 33(606)-2151. AFWADC TR 55-115.

Preliminary study of the application of steady-state detonative combustion to a reaction engine, by R. Dunlap, R.L. Brehm, and J.A. Nicholls. Michigan. University. Engineering Research Institute. Ann Arbor, Mich. Sep 1957. 24p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132127

A reaction type engine employing steady-state detonative combustion is considered. A simplified analysis treats the supersonic mixing of fuel and air together with the requirements necessary to achieve steady-state detonative combustion. Calculations of specific thrust and specific fuel consumption as functions of flight Mach number are made for hydrogen and acetylene fuels. The results of this study indicate that some supersonic diffusion of the air is necessary even though supersonic combustion exists. It is concluded that the speed range of air-breathing engines may be materially extended. AD 136648. Project 2284. Contract AF 18(600)-1199. MU ERI Proj 2284-15-T. AF OSR TN 57-657.

Airports and Airways

Development of interior painting and lighting for CAA facilities, by H.J. Cory Pearson and Marcus S. Gilbert. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1949. 12p photos, diagr, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 132684

1. Airports - Air traffic control centers - Lighting systems 2. Paints - Tests 3. CAA TDR 76

30-degree modified slope-line approach-light system, by Roy E. Warren and H.J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1951. 11p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132700

1. Lights, Approach - Design 2. Runways - Makers 3. CAA TDR 137

Use of the rational formula in airport drainage, by Raymond C. Herner, R.C. Mainfort, and R.L. Pharr. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1950. 57p photo, drawings, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 132699

1. Drainage, Surface 2. Airports - Drainage 3. CAA TDR 131

Aerodynamics

Experimental investigation of flutter in cascades with zero incidence and stagger, by Robert J. Vaccaro and Chi-Teh Wang. New York University. College of Engineering, New York, N.Y. Mar 1956. 128p photos, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 130997

Cascade flutter tests at zero incidence and stagger were performed in the seven by ten foot wind tunnel in the Daniel Guggenheim School of Aeronautics at New York University. The Reynolds number of the tests based on blade chord varied from .18 to $.39 \times 10^6$. A five-blade two-dimensional flutter mechanism was employed in which the blade physical constants were all varied independently. The rotary and translatory motion of each blade and the airspeed were recorded simultaneously by a recording oscillograph. The results obtained from the oscillogram included the critical velocity, the flutter frequency, the phase angle between the rotary and translatory motion of each blade, the amplitude ratio, and the phase angle between blades. AD 93396. Project 3066, Task 70150. Contract AF 33(616)-25. AF WADC TR 54-507.

Flutter characteristics of a T-tail, by G.E. Pengelley, L.E. Wilson, T.B. Epperson, and G.E. Ransleben, Jr. Southwest Research Institute. Dept. of Engineering Mechanics, Aeroelasticity Section, San Antonio, Tex. Nov 1954. 162p photos, diagrs, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 132278

A T-tail flutter model was designed, built and tested. The stabilizer of the model could be located at six different positions on the fin. The stabilizer rocking frequency, fuselage side bending and torsional frequencies, and rudder rotational frequency could all be varied. Tests involving various combinations of these four degrees of freedom as well as fin bending and torsion were conducted for various stabilizer locations. The stabilizer could be replaced by streamlined weights which simulated the stabilizer in weight, yawing moment of inertia and center of gravity location but not in roll inertia. Theoretical flutter analyses were conducted for six different model configurations with the number of degrees of freedom involved ranging from two to four. No aspect ratio corrections were employed in the analyses. AD 61591. Contract AF 33(038)-18404. AF WADC TR 52-162.

Flutter of a two-dimensional buckled plate with clamped edges in a supersonic flow, by J. G. Eisley. California Institute of Technology. Guggenheim Aeronautical Laboratory, Pasadena, Calif. Jul 1956. 45p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126884

The flutter of a two-dimensional buckled panel with clamped edges is studied both theoretically and experimentally. In the first part the flutter mode is described by a series expansion of functions which satisfy the boundary conditions for clamped edges. Quasi-steady linearized aerodynamics is used. Large deflections of the plate are considered. Numerical calculations have been made considering only the first two terms of the series expansion. AD 90008. AF OSR TN 56-296.

Generation of gusts in a wind tunnel and measurement of unsteady lift on an airfoil, by L. C. Garby, A. M. Kuethe, and J. D. Schetzer. Michigan. University. Dept. of Aeronautical Engineering Ann Arbor, Mich. Jun 1957. 53p photos, drawings, diagrs, graphs. Order from OTS. $1.50. PB 131450

Equipment for simulation of gusts was developed for a small wind tunnel 21 inches x 29 inches and, according to specifications developed in the small wind tunnel, a low turbulence wind tunnel with 5-foot x 7-foot test section was designed and constructed. Two methods were used to generate gust, a moving bump changing the boundary conditions along the wall and a venetian blind arrangement shedding vortex streets downstream. Measurements have been made on a constrained two-dimensional wing model and results analyzed. Comparison with theory was made where possible. The equipment is described in detail. AD 130984. Project 1363, Task 70132. Contract AF 33(616)-316. AF WADC TR 57-401.

Review of hypersonic research, by S. M. Bogdonoff. Princeton University. James Forrestal Research Center. Gas Dynamics Laboratory, Princeton, N.J. Feb 1958. 17p photos. Order from OTS. 50 cents. PB 131808

Summarizes previous research from 1954-1957 under Contract AF 33(616)-2547 and AF 33(038)-250 in the helium hypersonic tunnel described in PB 127278 at Mach numbers between 10 and 20. AD 142144. Project 7064, Task 70169. AF WADC TR 57-684

Supersonic panel flutter, by Yudell L. Luke and Andrew St. John. Midwest Research Institute, Kansas City, Mo. Jul 1957. 86p diagrs, graphs. Order from OTS. $2.25. PB 131446

The panel flutter equation for the finite aspect ratio, plate-membrane is presented. Specializations to the previously reported cases of infinite span, pure plate are indicated. The air forces are derived in a form convenient for computation and are shown to be especially amenable for the cases of infinite aspect ratio and pinned tip finite panels. General numerical results are obtained for the infinite aspect ratio, pure membrane and plate-membrane, and the finite aspect ratio pinned tip plate. The thickness required for aluminum panel stability is presented as a function of altitude and aspect ratio for the Mach number range 1.3 to 1.5. AD 118238. Project 6-(8-1366), Task 70171. Covers work from Apr 1955-Jul 1957 under Contract AF 33(616)-2897. Appendix I: - Solution of the membrane problem by perturbation. - Appendix II: - Equations used to derive engineering data from basic curves. AF WADC TR 57-252.

Theoretical and experimental analysis of cowling configurations for the reduction of the drag on a body of revolution with large cone angle, by Luigi Broglio. Rome. Universita. Scuola di Ingegneria Aeronautica. Instituto di Costruzioni Aeronautiche, Rome, Italy. Jun 1956. 47p photos, diagrs, graphs (part fold), table. Order from LC. Mi $3.30, ph $7.80. PB 126971

The possibility of reducing the total drag of a pointed body of revolution with large cone angle, using the favorable interference of a cowling ring is proved. Theoretical computations by the method of characteristics have been performed for both cases of the body alone and the body with the cowling. Experimental results are shown and discussed for various configurations and shapes of the cowling. AD 115053. SIAR graph no. 7. Contract AF 61(514)-816. AF OSR TR 57-2.

Two-dimensional wind-tunnel wall interference by small perturbation theory for a flapped airfoil section in incompressible flow, by Richard E. Wallace. Wichita. University. School of Engineering, Wichita, Kan. Dec 1953. 11p. Order from LC. Mi $2.40, ph $3.30. PB 126721

The results of Preston and Manwell are utilized in the manner of Allen and Vicenti to formulate interference equations for a flapped airfoil section in a closed wind tunnel. In the analysis the usual small-perturbation theory assumptions are used, so that the results are strictly valid only for airfoils at small angles of attack and with small flap deflections. Modifications are employed to account for thickness effects. Contract Nonr-201(01). UW ER 127.

Use of rheoelectrical analogies in aerodynamics, by L. C. Malavard. Edited by Wilbur C. Nelson. Advisory Group for Aeronautical Research and Development. Aug 1956. 182p photos, diagrs, graphs. Order from LC. Mi $8.40, ph $28.80. PB 126901

After a review of the principle of the rheoelectric analogy method, the equipment and experimental techniques are described, followed by an examination of the aerodynamic applications. AGARDograph 18.

Rockets and Jet Propulsion

Experimental track testing techniques and analysis: Development of a water brake recovery system, by Yasushi Hiroshige, Burdette Person, and Clifford T. Hurd. U.S. Air Force. Air Research and Development Command. Air Force Flight Test Center, Edwards Air Force Base, Edwards, Calif. Sep 1955. 48p photos, drawings, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 127487

Presents results of development tests conducted on two different designs of water brakes used for the recovery of rocket powered test vehicles operated at the Air Force Flight Test Center high speed track. AF FTC TR 55-38.

Introduction to a resistance thermometric method and qualitative metallic probe technique for rocket motor combustion analysis, by Gordon E. Zima. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Mar 1947. 36p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 130851

Progress report 9-18. 1. Rocket motors - Combustion chambers 2. Combustion chambers - Thermal measurements 3. Contract W-04-200-ORD-1482. CIT JPL 9-18.

Marine Transportation

Electrical process for removal of scale from vessels. Final report under Project 9-99-01-001, by A.W. Lyon. U.S. Transportation Corps Board, Fort Eustis, Va. May 1952. 71p photos, diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 132619

This report covers the development and improvement of equipment and procedures for application of the electrocoating and descaling process to the cleaning, coating, and preservation of steel structures. Tests showed that, by submerging a steel surface in sea water or similar solutions and passing an electric current through the electrolyte, a coating consisting of magnesium and calcium compounds is deposited on the surface. By regulating the proportion of these materials, a dense mixture is formed which has valuable corrosion-inhibiting properties. It was demonstrated that this protective coating could be indefinitely maintained by the application of a low-density electric current through the electrolyte. When heavily rusted surfaces were subjected to the process, a coating formed under the scale, loosening it, so that a large proportion dropped off, the remainder being readily flushed off with a fire hose.

Engineering study of the effects of the opening of the St. Lawrence seaway on the shipping industry. H.C. Downer & Associates, Inc., Cleveland, O. Mar 1958. 125p fold drawings, fold maps, graphs, tables (1 fold). Order from OTS. $2.75. PB 131736

The purpose of this study is to analyze the present conditions in the Great Lakes shipping industry and to forecast the future trends as affected by the opening of the St. Lawrence Seaway. For ease of consideration the scope of the study is divided into five major sections, namely: determination of the vessels most suitable for combined ocean, St. Lawrence Seaway, and Great Lakes service; determination of the effects of the opening of the St. Lawrence Seaway on present available Great Lakes vessels; an analysis of the ship replacement problems confronting the Great Lakes vessel operators; operational problems resulting from the opening of the Seaway; determination of the expected participation in the St. Lawrence Seaway trade. The statistics and back-up data, upon which the conclusions of Section I through V are based, and tabulated and briefly discussed in the appendices at the end of the study.

Hydroballistic studies. Supplement A to report 774 (final) covering the period 1 Nov 1954-30 Apr 1956, under Contract Nonr-869(00), by W.S. DeBear. Aerojet-General Corporation. Underwater Engine Division, Azusa, Calif. Jun 1956. 66p photos, drawing, diagrs (1 fold), graphs (1 fold). Order from LC. Mi $3.90, ph $10.80. PB 127498

Contract Nonr 869(00), was extended in November 1954 for the purpose of investigating the condensation of steam jets in high-velocity water-flow fields. This program, utilizing an Aerojet steam-water tunnel was to be directed toward the accumulation of data for the analysis of mass, momentum, and heat transfer in such systems. This report presents a summary of the work performed under this contract, a compilation of data obtained during the program, and a brief bibliography of investigations in related fields. ONR R 774, Suppl. A.

Marine meteorology: Turbulence measurements in a young cyclone over the ocean, by Andrew F. Bunker. Woods Hole Oceanographic Institution, Woods Hole, Mass. Feb 1956. 11p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126733

A flight was made through a young coastal storm with a PBY-6A aircraft equipped to measure both mean temperatures and rapid variations of the temperature and turbulent gust velocities. Low level observations were obtained which show the thermal structure of the cyclone and the magnitude of the turbulence, the shearing stresses and the heat flows. Unpublished manuscript. Contract Nonr-1721(00), NR 082-021, Technical report no. 39. WHOI Ref. 56-14.

Oceanography of Long Island Sound, 1952-1954, by Gordon A. Riley, Shirley A.M. Conover, Georgiana B. Deevey, Robert J. Conover, Sarah B. Wheatland, Eugene Harris, and Howard L. Sanders. Yale University. Peabody Museum of National History, New Haven, Conn. Feb 1956. 419p photo, drawings, maps, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $63.60. PB 126728

It is one of the long term aims of the Bingham Laboratory to accumulate detailed descriptive information on the populations and environmental characteristics of several representative localities within this region and to explain the ecological reasons for observed differences. The first products of this investigation are reported here, with papers on physical and chemical oceanography and various aspects of the biological problem. Bulletin of the Bingham Oceanographic Collections, Vol. XV.

Physical and chemical data for Puget Sound and approaches, Jan - Dec 1953, by Clifford A. Barnes and Eugene E. Collias. Washington. University. Dept. of Oceanography, Seattle, Wash. Mar 1956. 220p maps, tables. Order from LC. Mi $9.60, ph $33.30. PB 126877

This report tabulates physical and chemical observations made at various locations in Puget Sound and approaches. The observations were made at approximately 55 locations at monthly intervals during the period January through Dec 1953. Charts show the positions of the stations sampled. Values are given for temperature, salinity, dissolved oxygen and dissolved inorganic phosphate over a range of depths from the surface to the bottom as determined using accepted oceanographic techniques. Technical report 45. For earlier reports see PB 116280, 116034, 114973. Contract N8 onr-520, T.O. 3, NR 083-012. Contract Nonr-477(10), NR 083-012. Contract Nonr-477(01), NR 083-072. WU OR 56-1.

Report on geosim analysis according to Schoenherr line, by W.B. Hinterthan. U.S. David W. Taylor Model Basin, Washington, D.C. Jul 1956. 121p photos, drawings, graphs (fold), tables. Order from LC. Mi $6.30, ph $19.80. PB 130846

The report deals with the compilation and analysis of geosim resistance data for use by the Skin Friction Committee of the International Towing Tank Conference in its search for a new "Engineering" friction line. In determining the "Engineering" friction line careful considerations were given to some important points with a view to coordination between model basins to reach international agreement. Report to be submitted to Fall meeting of the American Towing Tank Conference, 1956. DWTMB 1064.

MISCELLANEOUS

Drosophila genetics. Final report covering the period 1 Jun 1952-31 Aug 1956, under Contract Nonr-816(01), by Harrison D. Stalker. Washington University. Dept. of Zoology, St. Louis, Mo. Nov 1956. 2p. Order from LC. Mi $1.80, ph $1.80. PB 132016

1. Drosophila - Genetic research

Effect of environmental condition on photosynthesis in marine algae. Final progress report for the period 1 May 1953 to 15 Apr 1955, under Contract Nonr-222(19), by J.A. Bassham and Melvin Calvin. California. University, Los Angeles, Calif. Jan 1955. 8p table. Order from LC. Mi $1.80, ph $1.80. PB 127040

It was found that in the presence of ideal physiological conditions (ample carbon dioxide, light, nutrient, etc.), small unicellular fresh water green algae photosynthesized at the greatest rate per unit volume of algae suspension. Larger or more complex algae forms photosynthesized at a much slower rate. A continuous culture apparatus was developed. A closed gas circulating system was developed with gas monitoring instruments to continuously measure and record O_2 and CO_2 changes in the system during photosynthesis and respiration. A technique for observing the absorption spectra of living cells was developed and used.

Final report on Contract Nonr-1305(00), with an annotated list of technical reports prepared and submitted to the Office of Naval Research, by Mortimer Taube. Documentation, Inc., Washington, D.C. Dec 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 130607

The contract was concerned with an analysis of a new concept of relationships between the terms, classes or ideas in an information system.

Minicard system: A case study in the application of storage and retrieval theory. Documentation, Inc., Washington, D.C. Nov 1956. 42p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 130247

1. Data storage systems 2. Indexing (Machine work) 3. Indexing - Theory 4. Contract Nonr-1305(00), Technical report no. 16

One-syllable words, by Henry M. Moser, John J. Dreher, and Herbert J. Oyer. Ohio State University Research Foundation, Columbus, O. Jun 1957. 133p tables. Order from LC. Mi $6.90, ph $21.30. PB 132061

This report presents a systematic listing of the monosyllabic words in American English. This list can be utilized in language studies, such as the frequency of occurrence of sounds alone, and in combination with other sounds. AD 110093. Contract AF 19(604)-1577, Technical report no. 4. OSURF Project 664, Technical report 41. AF CRC TN 55-56.

Recent developments in input-output analysis, by Tibor Fabian. California. University. Management Sciences Research Project, Los Angeles, Calif. Sep 1956. 17p. Order from LC. Mi $2.40, ph $3.30. PB 132544

Research report 51. Presented at the 31st annual meeting of the Western Economic Association.
1. Industry - Organization, control, etc.
2. Economics - Theory

Report of NRL progress. U.S. Naval Research Laboratory. Jul 1958. 52p. Order from OTS. $1.25. Also available at annual subscription rate of $10.00 a year in the U.S.A., foreign rate of $13.00 a year. PB 131918

Contents: Articles: Lubricating properties of monomolecular films absorbed on solid surfaces, by Elaine G. Shaffrin. - Radio channel section for interference-free operation, by J. Awramik, Jr. and W.M. Jewett. - Scientific program: Problem notes: Astronomy and astrophysics: Spectrographic solar instrumentation flown in IGY rocket (Aerobee-Hi) obtained data on the width and density of the Layman-alpha line of hydrogen... An aerograph for temperature and humidity soundings from aircraft. - Chemistry: Rapid determination of vanadium in Navy special fuel oil by x-ray fluorescence... Effect of float and normal charges on capacity and related characteristics of silver oxide-zinc alkaline storage batteries... Electromechanical mechanisms of noble-metal/hydrogen systems-electronic configuration and catalytic activity. - Electricity: Correlation of the thermodynamic and electrical characteristics of blast-cooled aircraft generators--procedure for the experimental evaluation of constant-speed blast-cooled ac generators. - Mechanics: Anelastic microstrain experienced by an SAE 1010 steel under three reloading patterns. - Metallurgy and ceramics: Cast age-hardenable austenitic steels... Effect of atmosphere on creep-rupture properties of powder metallurgy aluminum alloy... Creep of pure indium and pure lead... Behavior of some dissimilar metal couples in molten electrolytes... Zinc anodes for cathodic protection in sea water. - Nuclear and atomic physics: Diffraction studies of powdered gamma-Fe_2O_3... Half lives of N^{16}, Mg^{27}, Al^{28}, S^{37}, and Rh^{104m2}... Fast breeder reactor studies. -Radio: Information conversion by digital techniques... New x-band turnstile circulator functions as narrow-band, high-performance electronic switch or as wide-band duplexer... An automatic radar range moon tracking system... An airborne Lyman-alpha "humidiometer" for studying effects of atmosphere precipitation in radio transmission... Chronograph method of frequency comparison... Design of mirror-lenses for scanning. - Solid-state physics: Models for luminescence degradation in organic solids. - Published reports. - Papers by NRL staff members. - Patents.

Research of sensory stimuli influencing movements of fishes. Final report for the period 1 Oct 1950-30 Sep 1955 under Contract Nonr-175(00), NR 165-903, by Warren J. Wisby and Arthur D. Hasler. Wisconsin. University. Dept. of Zoology, Madison, Wis. Nov 1955. 21p tables. Order from LC. Mi $2.70, ph $4.80. PB 126788

Studies conducted under this contract have indicated that certain fishes, principally salmon, may be influenced in their movements by chemicals present in the stream waters. It was the goal of this project therefore, to investigate further the role and importance of the chemical senses in the lives of fishes as well as to explore possible practical applications of the information gained. Experiments were also conducted to determine other mechanisms of orientation in fishes where directional orientation was known to exist.

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.

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

Biology and Medicine

Biological cycles of fission products in aquatic systems as studied at the Pacific Atolls of Bikini and Eniwetok, by Lauren R. Donaldson. Washington. Univ., Seattle. 1954?. 8p. Order from LC. Mi $1.80, ph $1.80. AECU-3412

The induction and testing of somatic mutations in apples, grapes and other economic plants. Progress report for the period February 1, 1956 to January 31, 1957, by Charlotte Pratt and John Einset. New York. State Agricultural Experiment Station, Geneva. Contract AT-30-1-1541. 10p. Order from LC. Mi $1.80, ph $1.80. AECU-3413

The effects of radiation on development of the nervous system, by Samuel P. Hicks. New England Deaconess Hospital, Boston and Harvard Univ., Boston. Medical School. 1957. Contracts AT-30-1-1454 and At-30-1-901. 12p. Order from LC. Mi $2.40, ph $3.30. AECU-3612

Chemistry—General

Procedure for generation of boron trifluoride gas, by O. Swift. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jul. 1954. 1st. Rev. Dec. 11, 1954. Changed from Official Use Only Sep. 26, 1957. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-4251

A study of granular ion exchange. Summary report (for) December 1, 1952 to September 30, 1953, by J. A. Marinsky and W. D. Potter. Ionics, Inc., Cambridge, Mass. Jun. 1954. Subcontract 14-316. 26p. Order from LC. Mi $ 3.00, ph $6.30. AECU-3348

The reaction of hydrogen with a 50 weight percent alloy of uranium and zirconium between 542°C and 798°C. Research report 100FF1010-R1, by J. H. Singleton and others. Westinghouse Electric Corp. Research Labs., East Pittsburgh, Penna. Nov. 1956. 43p. Order from LC. Mi $3.30, ph $7.30. AECU-3630

Thermodynamic properties of nonstoichiometric nickel tellurides and of tellurium (thesis), by Robert E. Machol. Michigan. Univ., Ann Arbor. 1957. Contract AT-11-1-70. 138p. Order from LC. Mi $6.90, ph $21.30. AECU-3636

Results of x-ray diffraction phase analyses of fused salt mixtures, by R. E. Thoma. Oak Ridge National Lab., Tenn. Feb. 1958. Contract W-7405-Eng-26. 30p. Order from LC. Mi $2.70, ph $4.80. CF-58-2-59

Spectrochemical determination of uranium-235, by W. G. Jolley. Hanford Atomic Products Operation, Richland, Washington. Apr. 1958. Contract W-31-109-Eng-52. 9p. Order from OTS. 50 cents. HW-55666

Remote analytical facility operational experiences, by George A. Huff. Phillips Petroleum Company, Atomic Energy Division, Idaho Falls, Idaho. Apr. 1958. Contract AT-10-1-205. 10p. Order from OTS. 50 cents. IDO-14434

Preparation of boric acid from dimethyl ether—boron trifluoride complex, by Anthony Loverde. Hooker Electrochemical Co., Niagara Falls, N.Y. Apr. 28, 1954. Decl. Mar. 1957. Contract AT-30-1-1524. 14p. Order from LC. Mi $2.40, ph $3.30. NYO-1234

The preparation of biarsine, by Duward F. Shriver and William L. Jolly. University of California, Radiation Lab., Livermore Site, Livermore, California. Feb. 1958. Contract W-7405-Eng-48. 17p. Order from OTS. 50 cents. UCRL-5148

Nuclear studies in the rare earth region, by Kenneth S. Toth. University of California, Radiation Lab., Berkeley, California. Mar. 1958. Contract W-7405-Eng-48. 115p. Order from OTS. $2.50. UCRL-8192

The crystal structure of vanadyl bisacetylacetonate, by Richard Patrick Dodge. University of California, Radiation Lab., Berkeley, California. Mar. 1958. Contract W-7405-Eng-48. 27p. Order from OTS. 75 cents. UCRL-8225

Spectrographic determination of uranium in fuel plates, by N. E. Gordon, Jr. and others. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Aug. 28, 1951. Decl. Mar. 1957. 18p. Order from LC. Mi $2.40, ph $3.30. WAPD-C-38

Proposed procedures for chemical decontamination of PWR, Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Feb. 1957. 30p. Order from LC. Mi $2.70, ph $4.80. WAPD-PWR-CP-2719

Analysis of feed-and-bleed decontamination of a PWR coolant loop as per WAPD-PWR-CP-2719, by R. Lloyd. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Apr. 1957. 18p. Order from LC. Mi $2.40, ph $3.30. WAPD-PWR-CP-2836

Mixed red ion exchange resin ratio tests 10 parts cation to 1 part anion. Final report, by G. P. Simon and W. J. Singley. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jun. 1956. Contract AT-11-1-Gen-14. 8p. Order from LC. Mi $1.80, ph $1.80. WAPD-SFR-PD-113

The crystal structure of U_2Mo, by E. K. Halteman. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Sep. 1955. 10p. Order from LC. Mi $1.80, ph $1.80. WAPD-T-208

Resume of uranium oxide data—x, by J. Belle and L. J. Jones. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Aug. 1957. Contract AT-11-1-Gen-14. 81p. Order from LC. Mi $4.50, ph $12.30. WAPD-TM-73

Sample excitation for special investigations, by Sam Adams and others. Carbide and Carbon Chemical Corp. Y-12 Plant, Oak Ridge, Tenn. May 12, 1949. Decl. Mar. 1957. Contract W-7405-Eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. Y-435

Development of high density uranium dioxide powers, by Harvey T. Kite and David W. Smith. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. May 28, 1952. Decl. with deletions May 1957. Contract W-7405-Eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. Y-876(Del.)

The solid phases of alkali and uranium fluoride systems, by A. G. H. Andersen. Oak Ridge National Lab., Y-12 Area, Tenn. Oct. 1, 1952. Decl. Feb. 1957. Contract W-7405-Eng-26. 24p. Order from LC. Mi $2.70, ph $4.80. Y-F33-3

Chemistry—Radiation and Radiochemistry

The development and operation of the NRTS laundry, by John R. Bonnett. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Dec. 1955. Contract AT-10-1-205. 13p. Order from LC. Mi $2.40, ph $3.30. AECU-3176

Immunochemical studies on beryllium. Progress report to April 1957, by Sidney Belman and others. New York Univ. Bellevue Medical Center, New York. Inst. of Industrial Medicine. Contract AT-30-1-1664. 21p. Order from LC. Mi $2.70, ph $4.80. AECU-3426

The effect of radiation on chemical reactions. Final report, by Joseph J. Martin and Leigh C. Anderson. Michigan. Univ., Ann Arbor. Engineering Research Inst. Aug. 1957. Contract AT-11-1-162. 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3615

Preparation of radiation sources from fission products by the clay process, by J. E. Schoolmeester and J. J. Martin. Engineering Research Inst., University of Michigan, Ann Arbor, Mich. Aug. 1957. Contract AT-11-1-162. 16p. Order from OTS. 75 cents. AECU-3618

Chemical effects of nuclear transformations and their use in making labeled compounds, by J. B. Evans and others. Wisconsin. Univ., Madison. 1957. Contract AT-11-1-32. 24p. Order from LC. Mi $2.70, ph $4.80. AECU-3625

Chemistry division, Section C-1. Summary report for April, May, and June 1949. Argonne National Lab., Lemont, Ill. Aug. 3, 1949. Decl. with deletions Mar. 1957. Contract W-31-109-Eng-38. 37p. Order from LC. Mi $3.00, ph $6.30. ANL-4326(Del.)

Some radiation chemistry aspects of the corrosion of metals on irradiation, by W. L. Primak and L. H. Fuchs. Argonne National Lab., Lemont, Ill. Apr. 21, 1952. Decl. with deletions Mar. 1957. Contract W-31-109-Eng-38. 23p. Order from LC. Mi $2.70, ph $4.80. ANL-4763(Del.)

Chemistry division, Section C-11 summary report (for) October, November, and December 1952, by J. R. Gilbreath and O. C. Simpson. Argonne National Lab., Lemont, Ill. Aug. 14, 1953. Decl. Mar. 1957. Contract W-31-109-Eng-38. 72p. Order from LC. Mi $4.50, ph $12.30. ANL-5024(Rev.)

Radiochemical analysis of crud from the army package power reactor, by J. L. Zegger and others. Alco Products, Inc., Schenectady, N. Y. Feb. 1958. Contract AT-11-1-318. 34p. Order from LC. Mi $3.00, ph $6.30. APAE-26

Chemical research-radiation chemistry report for month ending September 11, 1943. Chicago. Univ. Metallurgical Lab. Decl. Feb. 1957. 27p. Order from LC. Mi $2.70, ph $4.80. CC-918

Chemical research-radiation chemistry report for month ending June 30, 1944. Chicago. Univ. Metallurgical Lab. Decl. Feb. 1957. Contract W-7405-Eng-37. 19p. Order from LC. Mi $2.40, ph $3.30. CC-1906

Chemical research-radiation chemistry report for period ending January 15, 1945. Chicago. Univ. Metallurgical Lab. Decl. Feb. 1957. Contract W-7405-Eng-37. 8p. Order from LC. Mi $1.80, ph $1.80. CC-1969

A precipitation process for the separation of radiobarium from irradiated MTR assemblies. Quarterly report (for) November 1951 through January 1952, by J. H. Pannell. Oak Ridge National Lab., Tenn. Jan. 31, 1952. Decl. Apr. 1957. Contract W-7405-Eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. CF-52-1-189

Comments on remote vs direct maintenance of radiochemical plants, by F. L. Culler. Oak Ridge National Lab., Tenn. Feb. 6, 1953. Decl. Oct. 1956. Contract W-7405-Eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-53-2-71

Physics and metallurgy division report for month of February 1946. Chicago. Univ. Metallurgical Lab. Feb. 27, 1946. Decl. Mar. 1957. Contract W-7401-Eng-37. 10p. Order from LC. Mi $1.80, ph $1.80. CP-3445

Radiation stability of carbon tetrachloride, by R. E. Olson and K. L. Adler. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jul. 12, 1954. Decl. with deletions Feb. 1957. Contract W-31-109-Eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. HW-32405(Del.)

Chemical effects of photonuclear reactions in the propyl bromides, by A. E. Richardson and A. F. Voigt. Ames Laboratory, Iowa State College, Ames, Iowa. Dec. 1956. Contract W-7405-Eng-82. 84p. Order from OTS. $2.25. ISC-855

Radiochemistry of the KAPL-30, run 5 fuel element test, by D. Dutina and W. C. Judd. Knolls Atomic Power Lab., Schenectady, N. Y. Jan. 1958. Contract W-31-109-Eng-52. 25p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-DOD-1

Remarks on the interaction of radiation with the walls of vessels as it affects the radiation chemistry of their contents, by Philipp H. Klein. Knolls Atomic Power Lab., Schenectady, N. Y. May 1956. Contract W-31-109-Eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-PHK-2

Semi-works development of the RaLa process, by W. K. Eister. Oak Ridge National Lab., Tenn. Sep. 20, 1949. Decl. Mar. 1957. Contract W-7405-Eng-26. 80p. Order from LC. Mi $4.80, ph $13.80. ORNL-231

ORNL RaLa process pilot plant development, by I. R. Higgins. Oak Ridge National Lab., Tenn. May 17, 1951. Decl. Mar. 1957. Contract W-7405-Eng-26. 39p. Order from LC. Mi $3.00, ph $6.30. ORNL-621

Chemical technology division, pilot plant section report for November 1950-January 1951, by H. K. Jackson. Oak Ridge National Lab., Tenn. Mar. 8, 1951. Decl. with deletions Mar. 1957. Contract W-7405-Eng-26, 37p. Order from LC. Mi $3.00, ph $6.30. ORNL-962(Del.)

Chemistry division quarterly progress report for period ending September 30, 1951. Oak Ridge National Lab., Tenn. Apr. 15, 1952. Decl. with deletions Mar. 1957. Contract W-7405-Eng-26. 109p. Order from LC. Mi $5.70, ph $16.80.
ORNL-1153(Del.)

ORNL metal recovery plant processing clementine reactor fuel elements. Terminal report, by J. L. Matherne. Oark Ridge National Lab., Tenn. Sep. 7, 1955. Decl. with deletions Feb. 1957. Contract W-7405-Eng-26. 19p. Order from LC. Mi $2.40, ph $3.30. ORNL-1941(Del.)

ORNL metal recovery plant: processing of ORNL graphite reactor fuel elements during the period July and August 1955, by R. E. Brooksbank, and others. Oak Ridge National Lab., Tenn. Nov. 11, 1955. Decl. Mar. 1957. Contract W-7405-Eng-26. 34p. Order from LC. Mi $3.00, ph $6.30.
ORNL-2015

Research on the radiation stability of organic fluids. Progress report (for) January 1, 1953 through September 30, 1953. California Research Corp., Richmond, Calif. Oct. 30, 1953. Decl. with deletions Feb. 1957. Contract AT-11-1-174. 105p. Order from LC. Mi $5.70, ph $16.80.
TID-5148(Del.)

Coincidence nuclear spectrometry with applications to europium-154 and europium-155 (thesis), by Jose O. Juliano. California. Univ., Berkeley. Radiation Lab. Apr. 1957. Contract W-7405-Eng-48. 105p. Order from LC. Mi $5.70, ph $16.80.
UCRL-3733

Several spallation reactions of uranium-238 plus helium-4, by Joseph A. Coleman. University of California, Radiation Lab., Berkeley, California. Feb. 1958. Contract W-7405-Eng-48. 32p. Order from OTS. $1.00. UCRL-8186

Transport and deposition tracer studies in a static autoclave, by T. S. DeFail and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Apr. 1957. 15p. Order from LC. Mi $2.40, ph $3.30. WAPD-ADC-115

Chemistry—Separation Processes for Plutonium and Uranium

Memorandum on uranium ore processing, by E. O. Brimm and A. J. Gailey. Union Carbide and Carbon Research Labs., Niagara Falls, N. Y. Nov. 1943. Changed from Official Use Only Jan. 31, 1957. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-3766

Experimentation on the extraction of uranium from western ores. 1. Pressure digestion tests with sodium carbonate and sodium bicarbonate. 2. Precipitation tests, by E. R. Saunders and M. C. Carosella. Union Carbide and Carbon Research Labs., Niagara Falls, N. Y. Dec. 1943. Changed from Official Use Only Jan. 23, 1957. 10p. Order from LC. Mi $1.80, ph $1.80.
AECD-3767

Experimentation on the extraction of uranium from western ores by leaching with sodium carbonate and sodium bicarbonate, by E. R. Saunders and M. C. Carosella. Union Carbide and Carbon Research Labs., Niagara Falls, N. Y. Dec. 1943. Changes from Official Use Only Jan. 23, 1957. 12p. Order from LC. Mi $2.40, ph $3.30.
AECD-3768

Chemical engineering division summary report for January, February, and March 1953. Argonne National Lab., Lemont, Ill. May 12, 1953. Decl. with deletions Feb. 1957. Contract W-31-109-Eng-38. 66p. Order from LC. Mi $3.90, ph $10.80. ANL-5039(Del.)

PYRO-MET plutonium flowsheet, by M. Levenson. Argonne National Lab., Lemont, Ill. Mar. 5, 1956. Decl. Mar. 1957. Contract W-31-109-Eng-38. 3p. Order from LC. Mi $1.80, ph $1.80.
ANL-ML-SL-1025

Recovery of thorium and uranium from monazite sands, by A. E. Bearse and others. Battelle Memorial Inst., Columbus, Ohio. Aug. 13, 1948. Decl. Feb. 1957. Contract AT-30-1-Gen-228. 40p. Order from LC. Mi $3.00, ph $6.30.
BMI-JDS-135

Recovery of thorium and uranium from monazite sands. Section 1 (of) quarterly report (for) November 15, 1948 to February 15, 1949, by A. E. Bearse and others. Battelle Memorial Inst., Columbus, Ohio. Feb. 16, 1949. Decl. Feb. 1957. Contract AT-30-1-Gen-228. 74p. Order from LC. Mi $4.50, ph $12.30.
BMI-JDS-169 Sect. 1

Recovery of thorium and uranium from monazite sands. Quarterly report (for) February 15, 1949 to May 15, 1949, by A. E. Bearse and others. Battelle Memorial Inst., Columbus, Ohio. Decl. Feb. 1957. Contract AT-30-1-Gen-228. 63p. Order from LC. Mi $3.90, ph $10.80.
BMI-JDS-188

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Off-center control rod flux and power distribution, by Jacob W. Zwick. General Electric Co. Aircraft Nuclear Propulsion Dept., Cincinnati. May 1957. 9p. Order from LC. Mi $1.80, ph $1.80. APEX-317

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Progress report for April, May, June 1956 to the United States Atomic Energy Commission. Dept. of Physics. Columbia Univ., New York. Nuclear Physics Labs. Contract AT-30-1-Gen-72. 50p. Order from LC. Mi $3.30, ph $7.80. CU-153

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Technical specifications for gamma scintillation monitors, by G. J. Alkire. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Sep. 1956. Contract W-31-109-Eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. HW-39821(Rev. 1)

Iodine^{131} gamma scintillation monitor. Interim report, by A. E. Smith and G. J. Alkire. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Nov. 1955. Contract W-31-109-Eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-39966

A radiation gauge for inspection of omre fuel plates, by H. Schlein. Atomics International. A division of North American Aviation, Inc. Canoga Park, California. May 1958. Contract AT-04-3-88. 20p. Order from OTS. 75 cents. NAA-SR-2040

Evaluation of radiation monitoring equipment. Information report on T-Spec 474938, by J. R. Horan. Westinghouse Electric Corp. Atomic Power Div., Idaho Falls, Idaho. Jul. 1955. Decl. Mar. 1957. 16p. Order from LC. Mi $2.40, ph $3.30. STR-IR-39

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Zirconium hazards research. Summary report no. 3655 (for) September 1, 1956 to August 31, 1957, by J. A. Herickes and others. Bureau of Mines, Pittsburgh. Aug. 1957. Contract AT-11-1-473. 58p. Order from LC. Mi $3.60, ph $9.30. AECU-3642

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The system zirconium–iron–tin. Summary report no. 4 (for) July 1, 1956–June 30, 1957, by Lee E. Tanner and David W. Levinson. Illinois Inst. of Tech., Chicago. Armour Research Foundation. Aug. 1957. Contract AT-11-1-315. 75p. Order from LC. Mi $4.50, ph $12.30. ARF-2068-4

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Effect of neutron radiation on notched bend and tensile properties of ASTM A-201A carbon steel, by R. L. Mehan and E. E. Baldwin. General Electric Company, Knolls Atomic Power Lab., Schenectady, New York. Nov. 1957. Contract W-31-109-Eng-52. 36p. Order from OTS. $1.25. KAPL-1874

Evaluation of test results on the two-tube (duplex) test steam generator no. 3, by E. Y. Stewart. General Electric Company, Knolls Atomic Power Lab., Schenectady, New York. Sep. 1957. Contract W-31-109-Eng-52. 30p. Order from OTS. $1.00. KAPL-1884

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Reactor metallurgy. Bettis Plant, Pittsburgh, Pa. Jan. 1958. Contract AT-11-1-Gen-14. 128p. Order from OTS. $2.75. WAPD-BT-6

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Progress report nuclear engineering department February 15-December 31, 1956, by Clarke Williams and others. Brookhaven National Lab., Upton, New York. May. 1958. 65p. Order from OTS. $2.00. BNL-434

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Progress report nuclear engineering department May 1 - September 30, 1957, by Clarke Williams and others. Brookhaven National Lab., Upton, New York. Jan. 1958. 80p. Order from OTS. $2.25. BNL-477

Quarterly progress report for MTR-ETR technical branches. Third Quarter-1957, by K. A. McCollom. Phillips Petroleum Co., Atomic Energy Division. Dec. 1957. Contract AT-10-1-205. 67p. Order from OTS. $2.00. IDO-16430

Progress report no. 26 (for) September 1-30, 1948. Knolls Atomic Power Lab., Schenectady, N. Y. Decl. Apr. 1957. Contract W-31-109-Eng-52. 97p. Order from LC. Mi $5.40, ph $15.30. KAPL-101

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Quarterly progress report for the period July 1, 1957 to September 30, 1957, by I. H. Coen and R. W. Garbe. Atomic Power Department, Westinghouse Electric Corp., Pittsburgh, Pa. Oct. 1957. Contract AT-30-3-222. 100p. Order from OTS. $2.50. YAEC-44

Radiation Effects on Materials

Effect of irradiation upon interdiffusion of stainless steel and uranium, by R. Weil and S. H. Paine. Argonne National Lab., Lemont, Ill. Jul. 1953. Decl. Jun. 1957. Contract W-31-109-Eng-38. 42p. Order from OTS. 25 cents. ANL-5346

Irradiation of the biphenyl, ortho-, meta-terphenyl eutectic, by D. R. de Halas. Hanford Atomic Products Operation, Richland, Wash. Feb. 1958. Contract W-31-109-Eng-52. 14p. Order from OTS. 50 cents. HW-54994

Progress report on the study of irradiated thorium, by R. G. Nisle and E. Fast. Phillips Petroleum Co., Atomic Energy Division. Aug. 1957. Contract AT-10-1-205. 22p. Order from OTS. 75 cents. IDO-16402

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Radioactive Waste

Decontamination of stainless steel, by F. Johnston and J. J. Katz. Atomic Energy Commission. n.d. Decl. Mar. 1958. 13p. Order from OTS. 50 cents. ANL-4970

Disposal of radioactive liquid wastes from the uranium recovery plant, by D. W. Rhodes and J. L. Nelson. Hanford Atomic Products Operation, Richland, Wash. Jun. 1957. Contract W-31-109-Eng-52. 34p. Order from OTS. $1.00. HW-54721

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Design and performance characteristics of magnetic jack-type control rod drive, by Joseph N. Young. Argonne National Lab., Lemont, Ill. Dec. 1957. Contract W-31-109-Eng-38. 83p. Order from OTS. $2.50. ANL-5768

Two-phase air-water flow phenomena, by Michael Petrick. Argonne National Lab., Lemont, Ill. Mar. 1958. Contract W-31-109-Eng-38. 90p. Order from OTS. $2.25. ANL-5787

Fused salts as thermonuclear reactor breeder blankets, by D. M. Gruen. Argonne National Lab., Lemont, Ill. Mar. 1958. Contract W-31-109-Eng-38. 8p. Order from OTS. 50 cents. ANL-5840

Calibration of rhenium-molybdenum and rhenium-tungsten thermocouples to 4000°F, by J. C. Lachman. General Electric, Atomic Products Division, Cincinnati, Ohio. Apr. 1958. Contract AT-11-1-171. 13p. Order from OTS. 50 cents. APEX-365

Design study of an advanced test reactor, by W. L. Carter and others. Oak Ridge School of Reactor Technology, Oak Ridge, Tenn. Aug. 1957. 201p. Order from OTS. $3.50. CF-57-8-5

Heat generation within the thermal shields and vessel wall of the Spert-III reactor, by V. C. Kobold. Phillips Petroleum Co., Atomic Energy Division. Mar. 1958. Contract AT-10-1-205. 18p. Order from OTS. 75 cents. IDO-16414

Spherical harmonic methods in slab geometry, by D. R. Metcalf and G. A. Cazier. Phillips Petroleum Co., Atomic Energy Division. Mar. 1958. Contract AT-10-1-205. 36p. Order from OTS. $1.25. IDO-16440

An estimate of the heat generation and distribution in the MTR, by R. A. Grimesey. Phillips Petroleum Co., U. S. Atomic Energy Commission. Mar. 1958. Contract AT-1-1-205. 18p. Order from OTS. 75 cents. IDO-16443

Theory of power transients in the Spert I reactor. Final report, by The Ramo-Wooldridge Corp. Phillips Petroleum Co., U. S. Atomic Energy Commission. Mar. 1958. Contract AT-10-1-205. 155p. Order from OTS. $2.75. IDO-16446

Reactivity perturbation of small test regions in a critical assembly, by John B. Sampson. Knolls Atomic Power Lab., Schenectady, N. Y. Oct. 1957. Contract W-31-109-Eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-JBS-10

Reactor safety conference October 31, 1957, by The American Nuclear Society and others. United States Atomic Energy Commission, Oak Ridge, Tenn. Apr. 1958. 43p. Order from OTS. $1.00. TID-7549(Pt.2)

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