U. S. Government

RESEARCH REPORTS

March 14, 1958
Vol. 29, No. 3

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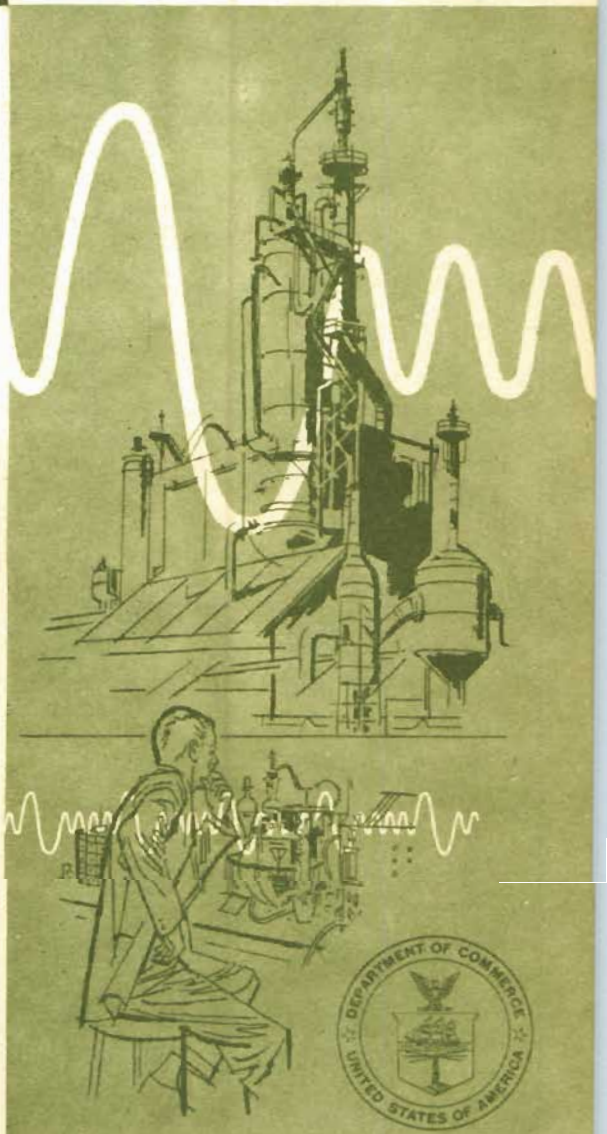

U. S. DEPARTMENT OF COMMERCE
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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

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Printed Reports Available from OTS Announced in This Issue

BIBLIOGRAPHY

Bibliography of boundary layer control, by Maurice H. Smith. Princeton University. James Forrestal Research Center. Library, Princeton, N.J. Jan 1955. 116p. Order from LC. Mi $6.00, ph $18.30. PB 126383

Literature search no. 6. Material listed by country of origin except for special subject categories. Includes subject and author indexes. 1. Boundary layer - Control - Bibliography

Bibliography on pressure die-casting equipment, by G.L. Cooper. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 10p. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 37 cents. PB 124579

S.O. code no. 91-3-2-87. 1. Die casting equipment - Bibliography - Gt. Brit. 2. AERE Inf/Bib 108

Chemically-active light metals; an annotated bibliography. Part I, by Milton R. Wolfson and others. U.S. Naval Ordnance Test Station, China Lake, Calif. Jul 1954. 204p. Order from LC. Mi $9.30, ph $31.80. PB 126707

A literature survey of the chemical, mechanical, and physical properties of chemically-active metals has been conducted in conjunction with the phase equilibria program of the Metallurgy Branch, Research Department. The open literature from 1907 to 1952 was covered. NOTS TM 1628.

Correlation of literature on the effect of testing temperature on the mechanical properties of wrought aluminum base alloys, by Helen R. Pritchard. U.S. Frankford Arsenal, Pittman-Dunn Laboratory, Philadelphia, Pa. May 1955. 117p graphs. Order from OTS. $3.00. PB 131346

A survey of the literature was conducted to determine the effect of testing temperature on the tensile properties, modulus of elasticity, hardness, and fatigue strength of wrought aluminum base alloys. At subatmospheric temperatures, the tensile and yield strengths, elongation, modulus of elasticity, hardness, and fatigue strength usually show an increase over their room temperature properties. As the temperature decreases below room temperature, there is no great change in ductility. In the majority of instances, the elongation shows a slight increase and the reduction of area, a slight decrease. At elevated temperatures, the tensile and yield strengths, modulus of elasticity, and fatigue strength decrease with increasing temperature, while the elongation and reduction of area increase. No hardness data were available at elevated temperatures. Project TB 4-202A. FALR 1268.

Gas-metal systems. Fourth annual report on Contract N6 onr-258, T.O. 11, 1 Nov 1949-30 Sep 1950. Carl A. Zapffe Associates, Baltimore, Md. Sep 1950. 29p. Order from LC. Mi $2.70, ph $4.80. PB 126341

Abstracts of publications on embrittlement of metals during electro-plating, pickling, and other operations in which exposure to hydrogen takes place. AD 109892.

Human factors, annotated bibliography on speech communications jamming, by R. J. Christman and W. J. Doherty. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Feb 1957. 19p. Order from LC. Mi $2.40, ph $3.30. PB 126618

This report is a non-critical compendium, in annotated bibliographical form, of recent literature relating to communications jamming from a human factors point of view. In addition to the principal section on the jamming of speech, two smaller sections provide partial coverage on intelligibility testing, and general intelligibility and jamming reports. AD 114273. Project 45031B. AF RADC TR 57-25.

Index to Air Force personnel and training research center 1955 technical documentary reports, by Marjorie M. Adams. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center, Lackland Air Force Base, San Antonio, Tex. Dec 1955. 61p. Order from LC. Mi $3.90, ph $10.80. PB 126705

1. Personnel, Flying - Performance - Bibliography
2. Personnel, Flying - Training - Bibliography
3. AF PTRC TN 55-84

Liquid metal heat transfer fluid. Review of literature, by J. L. Everhart. American Smelting and Refining Company. Central Research Laboratories, Barber, N.J. Nov 1948. 75p graphs, tables (part fold). Order from LC. Mi $4.50, ph $12.30. PB 130187

A literature survey is reported on the problem of developing a liquid metal heat transfer medium; the chief characteristics desired of such a medium include a melting point below 60°F, (or, if this be impossible without compromising other features, below 210°F), a vapor pressure less than one half atmosphere up to 1500°F, chemical inertness, no expansion at freezing, no tendency toward precipitation, and satisfactory heat transfer, heat removal and pumping properties. Tables, showing these characteristics for various elements from sodium to mercury, and for binary, ternary, quarternary and polynary eutectic alloys are compiled. ATI 58662. Report no. N-1. Contract N8 onr-644, NR 031-312.

Survey of heat transfer literature, by Milton Levy. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Jun 1957. 54p. Order from OTS. $1.50. PB 131305

An extensive heat transfer literature search was conducted which may offer a means of effecting satisfactory cooling under anticipated conditions of new vehicular engines. Ordnance project TB 5-8010A. D.A. project 593-28-001. APG CCL R 24.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Alkenylboranes. I: Preparation and properties of some vinyl- and propenylboranes, by T. D. Parsons, M. B. Silverman and D. M. Ritter. Washington. University. Dept. of Chemistry, Seattle, Wash. Apr 1957. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 128120

This paper presents the syntheses of some completely substituted alkenylboranes, an efficient method for their separation, a chemical proof of their structure, a preliminary measure of their acidity, and some related chemical reactions. AD 120463. Chem 40-27. Contract AF 18(600)-1541. AF OSR TN 57-110.

Complexes of ethers with diborane, by Henry E. Wirth and Franklin Massoth. Syracuse University. Dept. of Chemistry, Syracuse, N.Y. Nov 1955. 55f photos, diagrs, graphs, tables. Order from LC. Mi $3.30, enl pr $10.80. PB 130155

Phase diagrams were studied of the systems diborane-diethyl ether, diborane-methyl ethyl ether, diborane-dimethyl ether, diborane tetrahydrofuran, diborane-tetrahydropyran, diborane-perfluoroether and diborane-cyclo-C_4F_8O. Contract NOa(s)52-1023C. MCC 1023-TR-187.

Determination of the mechanism of the increase of viscosity of organosilicon compounds at high temperatures, by O. F. Senn. Stanford Research Institute, Stanford, Calif. Feb 1955. 73p photos, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 126192

Oxidation rates were determined for tetraphenoxysilane, tetra(2-ethylhexoxy)silane, hexa(2-butoxy) disiloxane, and a series of isomeric tetrapentoxysilanes. The rate of hydrolysis is affected largely by structure, being very rapid for tetraphenoxysilane, less rapid for tetra(2-ethylhexoxy)silane, and slow for branched tetrapentoxysilanes. AD 48278. Project 7340, Task 73404. See also PB 121717. Contents: Appendix I. Methods of synthesis. - Appendix 2. Recirculating all-glass oxidation apparatus. - Appendix 3. Statistical methods. - Appendix 4. Hydrolytic rate determination methods. Contract AF 33(616)-168. AF WADC TR 54-339.

Photochemical synthesis of organic fluorine compounds, by Joseph D. Park and John R. Lacher. Colorado. University. Dept. of Chemistry, Boulder, Colo. Nov 1957. 115p drawing, tables (fold). Order from OTS. $3.00. PB 131558

The purpose of this research work has been to synthesize organic and organo-metallic 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 two halogenated pentadiene. Several important four-membered fluorinated ring compounds have been synthesized and their cyclic ethers. To furnish adequate proof of structure and determine the position of unsaturation, the compounds have been halogenated. In the work on alcohols both 1, 2-difluoro-2chloroallyl alcohol and 1, 1-difluoro-2-bromoallyl alcohol have been synthesized. AD 142171. Project 7340, Task 73404. Covers work from 15 Nov 1955 - 14 Nov 1956 under Contract AF 33(616)-3266. AF WADC TR 56-590, Part I.

Preparation and characterization of 3-halo-2-propyn-1-ol, 1-halo-3-ethoxy-1-propyne and 1-bromo-3-phenoxy-1-propyne, by Lewis F. Hatch, Shih Hsi Chu and William E. Blankenstein. Texas. University, Austin, Tex. Sep 1956. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124665

The following compounds have been prepared during a continuation of a study on the preparation of haloacetylenes: 3-Bromo-2-propyn-1-ol; 3-Chloro-2-propyn-1-ol; 1-Bromo-3-phenoxy-1-propyne; 1-Bromo-3-ethoxy-1-propyne; 1-Chloro-3-ethoxy-1-propyne. These compounds have been characterized and structures assigned on the basis of their physical and chemical properties. AD 96797. AF OSR Chem 50-1. Technical note 30. Contract AF 18 (600)-430. AF OSR TN 56-452.

Toxicity of dichloro-difluoro methane, a new refrigerant, by R. R. Sayers, W. P. Yant, John Chornyak and H. W. Shoaf. U.S. Bureau of Mines. May 1930. 17p diagr, tables. Order from U.S. Bureau of Mines, Pittsburgh, Pa. PB 126466

Work done under a cooperative agreement between the U.S. Bureau of Mines and the Frigidaire Corp. 1. Methane, Dichlorodifluoro - Toxicity 2. Refrigerants - Toxicity 3. BM RI 3013

Plastics and Plasticizers

Branching reaction in polymerization of styrene and methyl methacrylate, by Maurice Morton, Irja Piirma and J. A. Cala. Akron. University. Rubber Research Laboratory, Akron, O. Apr 1957. 62p graphs, tables. Order from OTS. $1.75. PB 131094

The chain transfer activity of the following four compounds in the polymerization of styrene was measured: 2-methyl-2 propanethiol, 2-methylpropionitrile, 2-propanol and 2-methyl-2-propanol. This work was intended to measure the relative ease of formation of certain sulfur-, oxygen-, or carbon-headed free radicals and thus to establish the relative activity of these radicals in abstracting hydrogen from a given compound, as it may apply to the formation of branches on a polymer chain. Furthermore, measurements of the isotope effect with deuterium indicate that it is the hydroxyl hydrogen in the tertiary alcohol which are involved in the chain transfer. Hence some conclusions can be drawn concerning the reactivity of the corresponding radicals in abstracting hydrogen atom. A study has been carried out to determine the transfer constants of polystyrene and poly (methyl methacrylate) in the homopolymerization and graft copolymerization of styrene and methyl methacrylate. AD 118221. Project 7340, Task 70338. Covers work from Jan 1, 1953 - Dec 31, 1956 under Contract AF 33(616)-337. AF WADC TR 56-619.

Bulk compressibility of polymers at fabricating temperatures, by Bryce Maxwell and Shiro Matsuoka. Princeton University. Plastics Laboratory, Princeton, N.J. Oct 1956. 25p diagr, graphs. Order from OTS. 75 cents. PB 131334

All methods of fabricating plastic items from molding materials subject the polymer to high hydrostatic pressures. In order to properly design fabricating processes and to produce items of controlled density a knowledge of the effect of pressure on polymers is needed. The significance of the bulk compressibility as it pertains to the fabrication of plastics by injection molding is discussed. Dept. of the Army project 3-99-15-022. Signal Corps project 152B. Contract DA 36-039-sc-70154, NR 356-375, Contract report 4B. PU PL TR 43B.

Comparison of mechanical properties of flat sheet molded shapes, and postformed shapes of cotton-fabric phenolic laminates, by F.W. Reinhart, C.L. Good, P.S. Turner, and I. Wolock. U.S. National Bureau of Standards. Jan 1957. 60p photos, diagrs, graphs, tables. Order as TN 3825 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125700

Tests were conducted to determine the properties of flat sheets, molded shapes, and postformed shapes of cotton-fabric phenolic laminates. Most of the sheet materials showed directional variations in strength when tested parallel to, perpendicular to, and at 45° to the warp yarn in the face ply of the fabric. Industrial postforming decreased the strength of flat sections whereas laboratory postforming had no effect. NACA TN 3825.

Expansion characteristics of Marlex 20 and Marlex 50, by Hyman Marcus and Frank V. Zaleski. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jul 1957. 27p diagr, graphs, tables. Order from OTS. 75 cents. PB 131402

A suitable technique was developed for volume dilatometry of plastic materials and the thermal behavior of two commercial linear polyethylene plastics, Marlex 20 and Marlex 50, was observed. The dilatometers used were immersed in an electrically heated oil bath equipped with a motor-driven stirrer to insure a uniform temperature distribution. AD 130920. Project 7360, Task 73608. Covers work from May-Jun 1955. AF WADC TR 57-92.

High-temperature hydraulic swivel joints, by Harold E. Cleary. Altair, Inc., Mount Vernon, N.Y. Nov 1957. 16p photos, diagrs, graph, tables. Order from OTS. 50 cents. PB 131555

Results indicate that hydraulic swivel joints using flexible plastics such as Teflon for seals offer greater possibilities for development in high temperature usage than "O" ring type rubber packings. AD 142032. Project 1371, Task 13497. Contract AF 33(600)-30347. AF WADC TR 56-47.

Neutron absorption in glass-reinforced laminates, by D.G. Simons and E.P. Trounson. U.S. Naval Ordnance Laboratory, White Oak, Md. Jul 1956. 31p drawings, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127588

It has been determined that the glass content of reinforced plastics can be measured by the attenuation of a flux of thermal neutrons in passing through the plastic. The accuracy of the method is ±10% with a simple calibration procedure, and it can be greatly improved by calibration with laminates of the same thickness as the sample to be tested. NAVORD 4246.

Oxidative degradation of deutero-polystyrenes, by Harold C. Beachell and Spero P. Nemphos. Delaware. University, Newark, Del. Jul 1957. 45p graphs, tables. Order from OTS. $1.25. PB 131409

The oxidative degradation of duterated polystyrenes was studied in the temperature range between 185 and 237°C. Volumetric experiments of O_2 uptake by the polymers and infrared spectra were the means employed in product analysis and rate studies. The products of oxidation, (identical for all polymers), were carbonyl compounds with some hydroxyl and other groups also forming. The rate studies showed an activation energy of 26 kilocalories for O_2 uptake while the energy of carbonyl formation was approximately 45 kilocalories. The rate of oxidation was decreased in the isomers which have deuterium substituted on the alpha carbon, indicating that the formation of the hydroperoxide intermediate complex forms on this carbon and that the tertiary carbon-hydrogen bond breaking is the rate controlling process of the oxidation reaction. Ozonization studies on the deuterated polymer yielded similar results. AD 130860. Project 3044. Contract AF 33(616)-465. AF WADC TR 56-470.

Oxidative degradation of large molecules, by Harold Beachell. Delaware. University. Dept. of Chemistry, Newark, Del. Jun 1957. 43p graphs, table. Order from OTS. $1.25. PB 131384

Oxidative degradation studies have been made on several polymeric materials. Polyethylene, both low and high density, shows a slower rate of reaction for the Ziegler type (high density). The rate data can be interpreted by the Elovich equation for heterogenous reaction at a gas solid interface. In a similar manner polystyrene and deuteropolystyrenes were studied both by carbonyl development and oxygen adsorption. The results indicate a free radical mechanism via peroxide formation. Owing to the free radical nature of the process, the introduction of radicals by the irradiation of polymers with gamma radiation from Co-60 was undertaken. AD 130854. Project 3044. Contract AF 33(616)-465. AF WADC TR 57-406.

Phenolic ceramic molded materials with low coefficients of linear expansion for use in P-12 detonating plugs, by A. Fisher and Irving Silver. U.S. Naval Ordnance Laboratory. Apr 1956. 17p graphs. Order from LC. Mi $2.40, ph $3.30. PB 127600

Phenolic molding materials with low thermal coefficients of expansion were prepared by the incorporation in the resin of Stupalith A-2412, a ceramic powder having a negative coefficient of expansion. A decrease from 43×10^{-6} in/in/°C to 7.1×10^{-6} in/in/°C was effected through the addition of 83% filler by weight to the unfilled resin. Tensile and impact strengths were found to attain maximum values at about 40% filler concentration. Increased filler concentrations resulted in higher water absorption values and greater dimensional changes on water immersion. NAVORD 4133.

Preparation and characterization of a series of graft copolymers, by Sydney Axelrod. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Mar 1957. 21p graphs, tables. Order from OTS. 75 cents. PB 131333

The object was to synthesize and characterize a series of graft copolymers consisting of an alkylated polystyrene backbone and polymethyl methacrylate side-chains. Four graft copolymers were prepared and studied by viscometry, infrared absorption

spectroscopy, and elemental analysis. Ordnance project TB 2-0001. Dept. of the Army project 559-01-004. PATR 2395.

Utilization of plasticizers and related organic compounds by fungi, by H. Ebert and S. Berk. U.S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. May 1955. 33p photos, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127619

Project TB 4-911B. 1. Fungus - Growth - Tests 2. Plasticizers - Fungicidal properties 3. Plasticizers - Materials 4. Carbon compounds - Oxidation 5. FALR 1266

Paints, Varnishes and Lacquers

Corrosion prevention and protective coatings for steel piling, by A.L. Fowler, C.V. Brouillette and H. Hochman. U.S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Mar 1956. 16p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 130188

Nineteen paint coating systems and six flame-spray coatings were evaluated by suspending coated steel panels in Port Hueneme Harbor so that one part was continually under water, one part was in the tidal zone, and the remaining part was in the atmospheric or splash zone. Eight of these coating systems appear to merit further evaluation. The most durable system as determined by this 30-month test was a 5-coat vinylidene chloride-acrylonitrile copolymer resin, Saran, (Navy Formula No. 113). Project NY 450 004-2. NCEREL TN 260.

Research and development on magnetic films, by John Doherty. Servomechanisms, Inc. Mechaponents Division, Hawthorne, Calif. Oct 1957. 57p photos, diagrs, tables. Order from OTS. $1.50. PB 131557

This is the final report of a research and development contract on magnetic films. General objectives of this work are contributions to the knowledge of ferromagnetic materials and preliminary development of improved magnetic cores and memory units. Equipment for evaporation of metals and dielectrics by electron bombardment and a 60-cycle hysteresis tester for evaluating the magnetic films are described. Experimental tests on single and laminated films of iron-alloys and dielectrics are discussed. A description of fabrication techniques and testing of memory units and transformers is also presented. AD 142077. Project 4155, Task 41506. Contract AF 33(616)-3039, Final report. AF WADC TR 56-537.

Inorganic Chemicals

Boron hydrides and related compounds, by William H. Schechter, C.B. Jackson and Roy M. Adams. Second edition. Callery Chemical Company, Callery, Pa. May 1954. 224p diagrs, graph, tables. Order from LC. Mi $9.90, ph $34.80. PB 130154

A text on the subject covering boranes and their derivatives, borohydrides, boron-nitrogen and related compounds, basic boron chemicals, analysis, manipulations, hazards and storage, seven tabulated appendices citing basic physical and chemical data, and a bibliography of 794 references. AD 97584. Unclassified Feb 20, 1957. For 1st edition see PB 124518.

Critical assemblies of aqueous uranyl fluoride solutions. Part I: Experimental techniques and results, by W.G. Clarke, C.C. Horton and M.F. Smith. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 39p photos, diagrs, graphs, tables (part fold). Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.83. PB 124580

S.O. code no. 91-3-2-83. 1. Uranyl fluoride-water systems - Phase studies - Gt. Brit. 2. AERE R/R 2051

Development of inorganic polymer systems, by C Carlin F. Gibbs, Harold Tucker, George Shkapenko and John C. Park. B.F. Goodrich Co., Research Center, Brecksville, O. Sep 1957. 64p graph, tables. Order from OTS. $1.75. PB 131427

Previous difficulties in formation of aluminum-oxygen-silicon bonds were traced to exchange reactions. Reaction of aluminum halides with sodium silanolates has been found to lead to formation of aluminum-oxygen-silicon bonds in high yields with no evidence of exchange reactions. By this means, tristriphenylsiloxyaluminum and tristrimethylsiloxyaluminum have been prepared. Attempts to extend this principle to the preparation of polymers using difunctional aluminum halides and silanol salts have not resulted in formation of high polymers, but only polymers very low in molecular weight. AD 131036. Project 7340, Task 73404. Covers work from Dec 1955-Nov 1956 under Contract AF 33(616)-2744. AF WADC TR 55-453, Part 2.

Hydrazine decomposition flame, by Gregorio Millán and Segismundo Sanz. Instituto Nacional de Tecnica Aeronautica Estaban Terradas. Jun 1956. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124972

This report computes the propagation velocity of the laminar decomposition flame of a gas corresponding

to a kinetic scheme of chain reaction proposed by Adams and Stocks as a simplification of the kinetic scheme of the decomposition of hydrazine vapours. AD 97084. Contract AF 61(514)-734C. AF OSR TN 56-466.

Hydrides and borohydrides of light weight elements. Chicago. University, Chicago, Ill. Contract N6 ori-20, T.O. X. Order separate parts described below from LC, giving PB number of each part ordered.

Final report for Jul 1, 1946-Jun 30, 1947, by H.I. Schlesinger and A.E. Finholt. Aug 1947. 72p drawings, tables. Mi $4.50, ph $12.30. PB 126477

Work is reported on hydrides of boron, aluminum borohydride, aluminum hydride, sodium aluminum hydride, calcium aluminum hydride, lithium aluminum hydride, magnesium hydride, and methyl and ethyl metal hydrides and borohydrides. This is an extension of Contracts N173s-9058, N173s-9820 and N173s-10421. For other reports see PB 109214, 109541, 111421, 117823, 122939. Includes progress reports no. 24-27. NRL C 3147.

Annual technical report for the period 1 Aug 1955-31 Jul 1956, by H.I. Schlesinger. Aug 1956. 47p diagr, tables. Mi $3.30, ph $7.80. PB 128079

During the year the work on the conversion of hydrazine salts to the anhydrous, free bases and that on the behavior of diborane and related compounds toward hydrazine and methyl hydrazines was carried far enough for later publication, although some additional studies on the latter problem now seem desirable. Diboron tetrafluoride was prepared for the first time and was studied in sufficient detail for early publication. Much time was devoted to the continued study of the reaction of diboron tetrachloride and of diboron tetrafluoride toward unsaturated hydrocarbons and some of their halogen derivatives.

Notes on some binary systems containing uranium trifluoride, by R.W.M. D'Eye and F.S. Martin. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Nov 1956. 4p. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 18 cents. PB 124690

S.O. code no. 91-3-2-89. 1. Uranium fluorides - Crystal structure - Gt. Brit. 2. Uranium fluorides - Preparation - Gt. Brit. 3. Uranium fluorides - X-ray inspection - Gt. Brit. 4. AERE C/M 292

Production of chlorine from salt and sulfur, a report to the Special Committee on Chlorine for the Office of Production Management, by H.F. Johnstone. Illinois. University, Urbana, Ill. Jan 1942. 65p diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 130031

The object of this report is to correlate information obtained from several laboratories concerning the possibility of producing chlorine by non-electrolytic methods, especially from salt and sulfur. Includes cost estmates for various processes and pilot plants. Declassified Jan 10, 1958. Appendix A. General considerations of non-electrolytic methods of producing chlorine. - Appendix B. Chlorine and sodium sulfate from salt and sulfur, by Ralph Miller (Chemical Foundation, N.Y.)

Thermodynamic properties of carbon dioxide up to 1000°C 1400 bars II various energies, isochoric heat capacity and Joule -Thomson coefficient, by Donna Price. U.S. Naval Ordnance Laboratory, White Oak, Md. Aug 1955. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127900

The program of computation of thermodynamic functions from P-V-T data for carbon dioxide in the range 100°-1000°C and 50-1400 bars has been completed with the work of this report. Tables of internal energy, Helmoltz free energy, Gibbs free energy, kinetic energy, the Joule-Thomson coefficient, heat capacity difference, and isochoric heat capacity are given as functions of temperature and pressure. Detailed comparison is made of these data with those of others in the low temperature region. NAVORD 4086.

Ordnance Chemicals

Compilation of data on organic explosives, by A.H. Blatt. U.S. National Defense Research Committee. Feb 1944. 447f tables. Order from LC. Mi $11.10, enl pr $71.70. PB 130159

This report, which is a continuation of the work presented in OSRD no. 1085, is an attempt to make available in one place information on the explosive properties of those organic compounds which have been used or suggested for use as explosives, together with comparable information on the most important explosive mixtures. Revision and extension of OSRD 1085. Service directives NO-B10, OD-01. Catalog no. 10405. Unclassified 24 Jul 1957. Contract 8-360, OEMsr 741, Final report with Queens College. NDRC Div 8, Section 8.2. OSRD 2014.

Analytical Chemistry

Methods of separation of total rare earths in low-alloy constructional steels. Final technical report, by William A. Dupraw. Armour Research Foundation, Chicago, Ill. Nov 1955. 40p tables. Order from LC. Mi $3.00, ph $6.30. PB 126415

In ferrous alloys, direct precipitation of rare earth fluorides with fluoboric acid is not effective when the rare earth content is low. Total rare earths in quantities of 2-5 mg cannot be quantitatively recovered from 10g of iron. When more than 10 mg of rare earths are present, the recovery of the rare earths is far better, but not quantitative enough for analytical application. A possible approach to separating the rare earths in ferrous alloys is recommended for further investigations. Ordnance project no. TB 4-21. Contract DAI 11-022-ORD(P)-6. ARF Proj C-064. WAL R 120/73-1.

Vacuum-fusion analysis for oxygen in titanium, by W. R. Hansen, M. W. Mallett and M. J. Trzeciak. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Dec 1957. 28p photos, tables. Order from OTS. 75 cents. PB 121638

Two vacuum-fusion techniques, platinum bath and dry crucible, were checked by experimentation. A third technique, one using an iron bath, had previously been shown to yield results comparable to those obtained by the dry-crucible method. During the course of the work a new technique, platinum flux technique as applied to unalloyed titanium, and one alloy, Ti-6Al-4V, was determined by using standard samples. Studies on the reproducibility of analytical values made on three other alloys, Ti-8Mn, Ti-2Fe-2Cr-2Mo, and Ti-5Al-2.5Sn, indicated that satisfactory results could be obtained by both techniques. BMI TML R89.

Chemical Engineering and Equipment

NOL 100,000 psi adiabatic compressor: Preliminary tests, N_2 and CO_2 up to 30,000 psi, by G. T. Lalos. U.S. Naval Ordnance Laboratory, White Oak, Md. Apr 1956. 45p drawings, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127398

The NOL 100,000 Psi Adiabatic Compressor was operated up to a maximum pressure of 30,000 psi to investigate the operational characteristics of the adiabatic compressor and of the associated instrumentation. These tests, which were made using a diatomic (N_2) and a triatomic (CO_2) gas, showed that the pressure gage, volume camera, and synchronizing circuits perform satisfactorily up to the maximum attained pressure of 30,000 psi. In addition, these tests showed that a relatively large amount of gas leakage across the piston occurred during the compression cycle; this indicates a need for better sealing piston rings. NAVORD 4202.

Miscellaneous Chemicals

Mechanism and kinetics of the reaction between fuming nitric acid and/or its decomposition products and gaseous hydrocarbons, by Francis R. Taylor, Barbara G. Faunce, Nancy K. Asawa and Albert L. Myerson. Franklin Institute. Laboratories for Research and Development, Philadelphia, Pa. Jun 1957. 62p photos, diagrs, graphs. Order from OTS. $1.75. PB 131415

A study was made of the ignition properties of the propane-nitrogen dioxide system. This work was performed in three phases. The first was the determination of pressure-composition ignition limits at 400°C and 503°C according to the type of intensity-time flame pattern produced. The effects of nitric oxide, an important intermediate, carbon dioxide and argon on typical single and two-stage flames of this system and on the ignition limits were studied. The second phase consisted of the infrared analysis of the products. The third was the identification of transient species using flash ultraviolet absorption spectroscopy. Initial studies using flash ultraviolet spectroscopy have yielded valuable information as to the roles of NO_2, NO and OH in C_3H_8-NO_2 two-stage ignitions. AD 118105. Task 70323. Contract AF 33(616)-2456. AF WADC TR 57-138.

Research on electron energy states in transition metals. Final report for period Feb 1, 1956-Feb 1, 1957 under Contract AF 18(600)-1575, by Guy W. Lehman, and Ted G. Berlincourt. Atomics International, Canoga Park, Calif. Feb 1957. 31p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126024

The energy band structure of hexagonal close packed titanium has been worked out using a modified Slater-Koster LCAO approach for the 3d band and an effective mass approach for the 4s band. Hall effect measurements have been carried out on pure polycrystalline Ti and Cu between 1.2°K and room temperature. Magnetoresistance measurements have been carried out on pure polycrystalline Ti and on a single crystal of Ti containing Mn and Al impurity. AD 120499. AI 1889. Contract AF 18(600)-1575. AF OSR TR 57-25.

DETERIORATION STUDIES

Correlation of temperature-humidity tests. Part V: Phase IV tests, by Michael Frederick and Eugene Fornario. Newark College of Engineering, Newark, N.J. Dec 1953. 132p graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 126598

Plastic and metal specimens were subjected to four different temperature-humidity tests to establish the degree of correlation, deterioration effects and relative merits of these tests. The data and results of Phase IV tests are described. AD 27881. For parts 1 - 4 see PB 120688, 120689, 120690 and 120691. Contract AF 33(616)-261. AF WADC TR 53-107, Part V.

Corrosion of metals in tropical environments. Part II: Atmospheric corrosion of ten structural steels, by C. R. Southwell, B. W. Forgeson, and A. L. Alexander. U.S. Naval Research Laboratory. Dec 1957. 21p photos, graphs, tables. Order from OTS. 75 cents. PB 131175

Comprehensive corrosion data for ten structural steels exposed to inland and marine tropical atmospheric environments have been evaluated following an eight-year exposure period. The corrosion rates of unalloyed low-carbon and low-alloyed steels exposed in the marine atmosphere are compared with those of similar steels following exposure to marine atmosphere at Kure Beach, North Carolina. Comparison of corrosion damage for a mild carbon steel exposed with millscale and with a pickled surface is shown. Tropical corrosion rates of unalloyed carbon steel, low-alloy steels containing nickel and chromium, and four proprietary low-alloy steels are compared with that of copper-bearing steel. A comprehensive evaluation of the measured and observed corrosion damage is given for all ten steels in both atmospheric environments. NRL R 5002.

ELECTRICAL MACHINERY

Communication Equipment

Frequency response of condenser microphone at increased atmospheric pressures, by Charles E. White. U.S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Mar 1955. 27p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124555

Calibration of the condenser microphone in a steel pressure chamber, using a white noise signal source and the principle of reciprocity, showed a decrease of sensitivity of 4.0 to 7.0 db., depending upon frequency, as the pressure was increased from atmospheric to 125 psi. absolute. AD 72943. Vol XIV, no. 1. NMRI Proj NM 002-014.06.02. NAV MRL 261.

Human factors, annotated bibliography on speech communications jamming. See entry under Bibliography on page 117. PB 126618

Nonmetallic ferromagnetic materials and devices, by John M. Blank, Robert W. Johnston, Harold W. Katz, Gerald G. Palmer and Nathan Schwartz. General Electric Co. Defense Electronics Div., Syracuse, N.Y. Oct 1957. 143p photos, diagrs, graphs, tables. Order from OTS. $3.75. PB 131559

The work presented in this report describes the effort expended in the various areas of ferrite development covered by the subject contract. These areas include the development of ferrite materials for high power applications, low signal applications, and dynamic magnetostrictive applications for operation in the temperature range -65°C to -250°C; and a high frequency, narrow band (30mc) modulated delay line. AD 142104. Project 4155, Task 41640. Contract AF 33(616)-3339. AF WADC TR 57-123.

Electronics

Back transients in semiconductor diodes, by C. G. Dorn. U.S. Naval Ordnance Laboratory, Corona, Calif. Apr 1956. 17p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126193

This report is designed to clarify the effect of back transients in the operation of semiconductor diodes. Back transients are discussed in relation to circuit parameters and system bandwidth. The transient effect may be predicted if quantitative tests are made on the diodes to be used. Based on these predictions, the effect may be minimized when the test data is intelligently applied to circuit design. NOLC R 325. NAVORD 4573.

Concerning the effect of surface active substances on polarographic currents, by R. W. Schmid and Charles N. Reilley. North Carolina. University. Dept. of Chemistry, Chapel Hill, N.C. Mar 1957. 40p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126698

Surface active materials have a marked effect upon electrode processes, and a systematic investigation of various ways by which this action takes place in polarography is reported. Oscillographic current-time curves during the life of single mercury drops are studied in detail. AD 120476. AF OSR Chem 40-17. UNC-Chem no. 9, CNR. Contract AF 18 (600)-1160. AF OSR TN 57-121.

Conductivity of electrolyte vs time curves as a measure of corrosion tendency in simulated vehicle cooling systems, by M. Levy. U. S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen Proving Ground, Md. Jan 1957. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 130192

Control experiments were conducted to determine the effect of corrosion of the various metals encountered in the automotive cooling system on the conductivity of the coolant environment. Various coolant materials were tested in simulated vehicle cooling system units, conductivity of electrolyte measurements taken periodically and conductivity time data plotted. Ordnance project no. TB 5-8010A, Report no. 23. D.A. project no. 593-28-001. APG CCL R14.

Development of a high sensitivity multiplier phototube, by D. A. Bly. Radio Corporation of America. R.C.A. Tube Division, Lancaster, Pa. Oct 1957. 33p drawing, diagrs, graphs. Order from OTS. $1.00. PB 131561

The multiplier phototube described here has cathode sensitivity over 100 μ a/l primarily in the blue similar to S-11, stable output over four hours of continuous operation, rugged antivibration construction, moderate gain, low dark current high collection efficiency, and uniformity over large areas of the cathode. The tube is particularly well suited for detection of a weak signal against a high background. Many of the individual features and the combination of characteristics are new in a production-type multiplier phototube. AD 142076. Project 4410, Task 41609. Summarizes research from Jul 1, 1955 - Jan 31, 1957. Contract AF 33 (600)-30121. AF WADC TR 57-179.

Development of sandwich construction inorganic radomes, by T.M. Giles, N. Tallan, P.S. Hessinger and J.O. Everhart. Ohio State University Research Foundation, Columbus, O. Contract AF 33(600)-27567. Project 4158, Task 41538. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I. Aug 1957. 59p tables. $1.50. PB 131408

Low-density ceramic core materials were produced by two techniques, mechanical and firebloating. Mechanically bloated foam compositions are given herein. It was found that ball clay yields the strongest foams but the most difficult to foam. In all cases, replacement of the ball clay decreased the strength but did not greatly influence the other properties. The most promising foam developed has a density of 22 lbs/ft^3, a modulus of rupture of 185 psi, a dielectric constant of 1.42 and a loss tangent of 0.0020, the latter two being measured at 9.4 Kmc. Firebloating of raw or fritted wollastonite bodies or glasses with graphite and/or alkaline earth sulfates-sulfides were studied. It was found that residual carbon influences the electrical loss but can be oxidized from the foam. The most promising foam-body developed had a density of 22 lbs/ft^3, a dielectric constant of 1.505 and a loss tangent of 0.0026 at 9.4 Kmc. AD 130994. Summarizes research from Jul 1954-Jul 1956. AF WADC TR 57-209, Part I.

Part II. Aug 1957. 45p photo, graphs, tables. $1.25. PB 131406

The sandwich properties of mechanically bloated wollastonite covered with zircon skins were investigated. It was found that the strength, thermal shock resistance and stability were not suitable for radome applications. Foamed wollastonite as a core material has excellent electrical properties but thermally and mechanically is inferior. Fire-bloated shapes of Corning pyrex No. 7740 glass containing small additions of lampblack were successfully fabricated. Truncated, 30° cones, 13 inches high were produced. Other bloating agents were studied and although there are many which will work, none are as controllable and uniform as lampblack. AD 130995. AF WADC TR 57-209, Part II.

Dielectric properties of photoconducting phosphors. Final report under Contract N6 onr-26312, by J.J. Dropkin. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. May 1952. 47p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126125

AD 159203. Covers the period Jun 19, 1949-May 15, 1952. 1. Phosphors - Dielectric properties 2. Contract N6 onr-26312, NR 015-310, Final report

Digital pulse-width modulation, by John C. Bellamy, S. Clifford Henjum, Robert F. Bosshart and Eugene A. Reich. Cook Electric Company. Cook Research Laboratories, Chicago, Ill. Sep 1956. 50p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124694

The results of a search for more efficient means of telemetering quantitative data are presented here. This work was undertaken to explore the possibilties of a technique for transmitting continuous data that would enable efficiencies analogous to the saving of recording space achieved with "unitary" and "incremental" notations for continuous data. It has resulted in the formulation of a digital pulse-width technique of modulating telemetering carriers which is applicable to transmissions of alphabetical text messages as well as all kinds of quantitative data. The theory underlying these investigations, the experiments performed to determine the effects of transmission characteristics, and an analysis of possible applications to various kinds of meteorological data are presented in that order. Cook project P-826. Scientific report SR 75-1. Contract AF 19(604)-1385. AF CRC TN 56-867.

Diversity improvement in frequency-shift keying for Rayleigh fading conditions, by John N. Pierce. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Communications Laboratory, Bedford, Mass. Sep 1956. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 125556

The error rate in a baud-synchronous f.s.k. signal in the presence of receiver or thermal noise is shown to have a negative exponential dependence on signal power in the absence of fading. If fading with Rayleigh statistics occurs, the error goes inversely as signal strength resulting in a large in-

crease of probability of baud error, and implying the need for some form of diversity reception. Four methods for combining the outputs of any number of receivers are considered and analytical expressions derived for the error probability. The results are also applicable to other binary orthogonal baud systems that meet certain requirements. Results are applicable to space, frequency and polarization diversity. AD 110105. AF CRC TR 56-117.

Electrostatically focused laminar flow electron beams, by William M. Mueller. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Microwave Tube Group, Berkeley, Calif. Aug 1957. 77p diagrs, graphs, tables. Order from OTS. $2.00. PB 131404

It would be desirable in designing an electron stream to be able to determine analytically the electrode shapes necessary to produce a given beam. A procedure for accomplishing this is developed on the basis of the assumption of laminar flow. An equation is derived from Maxwell's Equations, the equation of continuity, and the force equation which relates the shape function and the potential on the axis of the stream. Exact solutions are obtained for the special cases of (1) parallel flow; (2) constant axial potential (the beam spread case); (3) beam diameter decreasing exponentially with distance; (4) beam diameter decreasing algebraically with distance. In addition, approximate solutions for two types of periodic beams are discussed, the first having a boundary with a sinusoidal variation and the second an axial potential which varies sinusoidally. An experimental tube was designed to produce one of the periodic beams studied. Perveance of the gun was approximately 20 per cent below the design value, but transmission was nearly 100 per cent with very small collection by the various electrodes and little secondary emission. AD 131060. Project 4156, Task 41570. Contract AF 33(616)-3278. AF WADC TR 57-148.

General problems of broadband amplification in the microwave frequency range, by H.M. von Foerster. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Electron Tube Research Section, Urbana, Ill. Mar 1955. 9p. Order from LC. Mi $1.80, ph $1.80. PB 125574

The research work carried out under the auspices of this contract was concentrated on three major areas: 1) the thermodynamics of the pure electron gas, 2) analysis of UHF-modulated electron beams, 3) general problems connected with the production of submillimeter waves. Continued under Contract Nonr-1834(08). Formerly Contract N6 ori-07156, NR 373-162. Contract N6 ori-071, T.O. XIX, NR 073-162, Final report.

Hydrostatic pressing of alumina radomes, by William D. Anderson. Gladding, McBean and Company, Los Angeles, Calif. Nov 1957. 21p photos. Order from OTS. 75 cents. PB 131565

This investigation has been concerned with the development of an alumina body containing more than 93-percent alumina and the development of techniques to fabricate half wave length solid wall radomes from this body, using hydrostatic pressing as a means of forming. It has also been concerned with the development of equipment and handling techniques necessary to process the product throughout the entire operation. AD 142215. Project 4158, Task 41647. Contract AF 33(616)-3136. AF WADC TR 57-345.

Industrial preparedness study of diffused junction silicon high speed computer diode. Third quarterly progress report 1 Nov 1956 to 31 Jan 1957, under Contract DA 36-039-sc-70274, by S.H. Barnes, R.H. Fuller, C.E. Maiden, M.E. McMahon and B. Rappaport. Pacific Semiconductors, Inc., and Ramo-Wooldridge Corp., Culver City, Calif. Jan 1957. 55p photos, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 127635

Product status and work aimed at solving problems of producibility, characteristics, and reliability are discussed. The state of readiness of product, tooling, and equipment for qualification sample preparation and pilot production is described. Report 3000: 3-9-Q.

Industrial preparedness study on silicon junction crystal diodes, by William E. Harding and Melvin Klein. Radio Receptor Company, Inc., Brooklyn, N.Y. Contract DA 36-039-sc-70264. Order separate parts described below from LC, giving PB number of each part ordered.

Fourth quarterly progress report for the period 17 Dec 1956 to 16 Mar 1957. Apr 1957. 52p drawing, diagr, graphs, tables. Mi $3.60, ph $9.30. PB 127604

The purpose of this Contract is to establish production designs of a silicon junction crystal diode and manufacturing facilities for its pilot line production.

Fifth quarterly progress report for the period 17 Mar 1957 to 16 Jun 1957, by William E. Harding and Melvin Klein. Jun 1957. 26p drawings, diagr, graphs, tables. Mi $2.70, ph $4.80. PB 128270

Aluminum wire welding machine has been put into operation. Preproduction qualification approval samples have been tested and submitted. A revised specification is given. Work has begun on a new batch aluminum alloying process.

Interim progress report for the period 1 Feb 1954-30 Jun 1955 under Contract N6 ori-71, T.O.XI, NR 356-341, by K.B. Oldham. Illinois. Engineering Experiment Station, Urbana, Ill. Dec 1955. 37p tables. Order from LC. Mi $3.00, ph $6.30. PB 124517

The primary purpose of the investigations was the development of conducting materials that will satisfactorily resist corrosion when used as anodes in various aqueous solutions. Such substances would be potential substitutes for the noble metals which are extensively employed in electrochemical preparations. Phosphides of the transition metals have been studied. AD 72938.

Ionospheric effects on positioning of vehicles at high altitudes, by W. Pfister and T.J. Keneshea. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Ionospheric Physics Laboratory, Bedford, Mass. Mar 1956. 80p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 127056

The purpose of this report is to determine the effects of the ionized layers of the earth's atmosphere upon radio waves used in the positioning of high altitude vehicles. The presence of free electrons at altitudes above 90 km will cause a radio wave to be deviated from its normal straight line path. For a given angle of incidence at the ionized medium, the amount of deviation depends upon the wave frequency and the electron density of the region. As a result of this deviation, errors will be introduced into the determination of the position of a vehicle in this ionized region. AD 98777. AF GRD SG 83. AF CRC TN 56-203.

Lattice II. Tenth progress report covering the period Dec 31, 1955 to Feb 29, 1956, under Contract DA 36-039-sc-42582, by E. Banks. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Mar 1956. 18p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 127127

Magnetic measurements have been made on single crystals grown from melts containing BaO, Fe_2O_3, and Al_2O_3 or Ga_2O_3. Crystals from melts containing very small amounts of Al_2O_3 or Ga_2O_3 had properties essentially identical with those of $BaO \cdot 6 Fe_2O_3$. At a higher Ga_2O_3 concentration, a large decrease in magnetization was observed. New preparations were made with chromium and vanadium substituting for part of the Fe in $BaO \cdot 6Fe_2O_3$. All were strongly attracted to a magnet. New preparations of ternary selenides have been made from mixtures of the elements corresponding to $CuFeSe_2$ Fe_2AlSe_3 and $CuAl_2Se_3$. None of these products is magnetic. Signal Corps project no. 152-B. Dept. of the Army project no. 3-99-15-022. For 1st-9th and final reports see PB 126177-126178, 127128, 127121-127125 and 124312.

Network properties of circulators based on the scattering concept, by Milton A. Treuhaft. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Dec 1955. 29p drawing, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 126691

By treating the scattering matrix as an operator, it is possible to relate the properties of circulators to the cyclic substitutions of group theory and the oriented 1-circuits of topology. The body of knowledge made available by these two branches of mathematics is shown to yield precise definitions of circulator performance. Useful results in treating the symmetries, interconnections and cascade combinations of circulators are found by further application of group theory and topology. AD95276. Dept. of the Army project no. 3-14-03-053. Signal Corps project no. 435F. Parts of this report will not reproduce. Contract DA-36-039-sc-56729. PIB 383. PIB R 453-55.

On basic existence theorems in network synthesis. IV: Transmission of pulses, by M.V. Cerrillo and E.F. Bolinder. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Aug 1952. 177p drawings (part fold). Order from LC. Mi $8.10, ph $27.30. PB 126337

Project 8-102B-0. DA project 3-99-10-022. See PB 108831 for Part 3. 1. Transformations (Mathematics) 2. Networks, Electrical - Mathematical analysis 3. Pulse transmission 4. Contract DA 36-039-sc-100 MIT RLE TR 246

Polar semiconductors, by W.W. Scanlon. U.S. Naval Ordnance Laboratory, White Oak, Md. Nov 1955. 19p graphs. Order from LC. Mi $2.40, ph $3.30. PB 127418

The chemical and physical properties of polar semiconductors are reviewed and illustrated by characteristics of the family of compounds, PbS, PbSe and PbTe. NAVORD 4262.

Radar meteorological studies. Final report, 19 May 1955 to 19 May 1956, by H.W. Hiser and W.L. Freseman. Miami University. Marine Laboratory and Radar Research Laboratory, Coral Gables, Fla. May 1956. 60p photos, diagrs. Order from LC. Mi $3.60, ph $9.30. PB 129689

The purpose of this research is to make quantitative comparisons between 10-cm and 5-cm radars for meteorogical use and to study subtropical weather by the use of both PPI and RHI radar scope data. The subtropical weather studies include severe storms and any other weather occurences, observed on the radars, that are deemed worthy of analysis. ML-13044. Report 56-16. Contract NOas 55-620-d, Final report.

Scattering properties of wide slots in a parallel-plate transmission line, by A.J. Simmons. U.S. Naval Research Laboratory. Sep 1957. 62p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $10.80. PB 127753

1. Transmission lines - Slots 2. Transmission lines, Parallel-plate 3. NRL R 4991

Simplified procedures for reciprocity calibration, by A.A. Janszen. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Sep 1947. 32p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126815

The basic theory underlying the application of the repicrocity theorem to the calibration of electro-acoustic transducers is presented, and a set of procedures is described by means of which a significant calibration of an unknown electro-acoustic transducer can be obtained by reciprocity methods, utilizing ordinary six-inch diameter cone-type loudspeakers as source and reversible elements. The results of such a calibration are listed, as well as the individual operations which are involved when the supplementary equipment is of a type to be found in the average laboratory. The results are accurate to within 1 db. Contract N5ori 76, T.O. X. HU ARL TM 1.

Some aspects of crystal performance in a new microwave receiver, by George E. Hambleton. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Jun 1956. 37p photos, diagrs, graphs, table. Order from OTS. $1.00. PB 131335

A new receiver has been investigated and described in some detail in this report. The principal advantage is the elimination of the 1-f noise which is generated by the input tubes of a video amplifier at low modulation frequencies. With these same modulation frequency demands, which are essentially aimed at pulse fidelity, in microwave pulse reception, the new receiver should give a 12 db increase in sensitivity over a crystal video type. An important step toward receiver miniaturization has been indicated, and additional work leading to the design of an optimum r-f system is comtemplated. Signal Corps project no. 323A. Dept. of the Army project no. 3-19-03-031. SCEL ER 1182.

Statistical theory applied to communication through multipath disturbances, by Robert Price. Massachusetts Institute of Technology. Research Laboratory of Electronics and Lincoln Laboratory, Cambridge, Mass. Sep 1953. 71p photos, drawing, diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 125559

This work is concerned with the synthesis and evaluation of integrated communication systems constructed specifically to perform in the presence of channel disturbances of the form encountered in multipath propagation. Identical with a thesis, Massachusetts Institute of Technology. MIT LL TR 34. MIT RLE TR 266.

Study of an open rectangular waveguide partly filled with a stratified dielectric, by R.I. Barnett, Jr. and C.T. Tai. Ohio State Research Foundation, Columbus, O. Sep 1956. 12p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 124718

In this report a theoretical study is carried out to determine the phase velocity of a wave being propagated in an open rectangular waveguide of infinite height, whose bottom portion has been filled with dielectric material either of the discretely variable type or the continuously variable type. AD 98805. Contract AF 19(604)-1725. OSURF Proj. 678-1. AF CRC TN 56-599.

Techniques for application of electron tubes in military equipment, by Rex S. Whitlock. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1957. 558p drawings, diagrs, graphs, tables. Order from OTS. $7.00. PB 111644r2

This technical report presents tube information primarily from the point of view of the electronic designer as a guide in the application of electron tubes. In Part I tube properties are discussed. These are grouped according to ratings, characteristics essential in circuit operation, and properties detrimental to circuit operation. Part II discusses the tube properties in relation to circuit design. It includes a check list for use of the circuit designer to insure coverage of all important design factors. Part III contains numerical data and special design considerations for specific tube types. Part IV presents product distribution curves derived from life test records where available. The concepts of specification control, operation within ratings, and tolerance of characteristics are emphasized throughout. Supersedes earlier editions (PB 111644 and PB 111644r). Project no. 4156. AD 142061. AF WADC TR 55-1, Rev.

Theory of switching. Bell Laboratories' report no. 9 covering period 1 May 1954-1 Oct 1954, by Robert Burns, Dolores Diorio and others. Harvard University. Computation Laboratory, Cambridge, Mass. Oct 1954. 210p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 128022

For reports 1-8, 10-15 see PB 112812-112821, 112952, 122115-122116, 122820 and 128023. Contents: Section I. Survey of the theory of coding systems, by Robert Ashenhurst and Anthony Oettinger. Section II. Multiple coincidence magnetic storage systems, by Robert Ashenhurst and Robert Minnick. Section III. Multiple-output switching

circuits, by Peter Calingaert. Section IV. Etched magnetic matrix storage systems, by Robert Minnick. Section V. Modular output wires, by Robert Minnick. Section VI. Higher dimensional magnetic core systems, by Robert Ashenhurst. HU BL 9.

Transport phenomena in polyatomic gases, by C.S. Wang Chang and G.E. Uhlenbeck. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jul 1951. 48p. Order from LC. Mi $3.30, ph $7.80. PB 127689

Report CM-681. 1. Sound - Dispersion - Theory 2. Boltzman equations 3. Gases - Ionization - Theory 4. Gases - Kinetic theory 5. Contract NOrd-7924, Task UMH-3F 6. MU ERI Proj M-604-6

Generators, Motors, Transmission

Gated multiple light pulse generator, by R.D. Drosd. U.S. Naval Ordnance Laboratory, White Oak, Md. May 1956. 21p drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127587

An instrument is described which produces .25 microsecond flashes of light at the crystal controlled rate of 200,000 per second. Each flash of light is bright enough to be photographed on Super XX film using an f/4.5 lens at unity magnification. The pulses can be gated to start at any desired time and last for any desired duration. Calibration of a rotating mirror camera with a writing speed of 1300 meters per second is described. NAVORD 3928.

Micronic capacitor, by R.F. Hoeckelman, C.W. Hoornstra and M. Yang. Model Engineering and Manufacturing, Inc. Courter Products Division, Boyne City, Mich. Aug 1957. 62p diagrs, graphs, tables. Order from OTS. $1.75. PB 131433

Dielectric films have been made by the thermal evaporation of silicon monoxide. The coatings were partially oxidized to give strong non-porous films. The process variables were systematically studied to improve the mechanical stability and the electrical properties of the film. Silicon oxide base capacitors were prepared and packaged in dry atmospheres. The electrical properties of the packaged units were determined from -40°C to 200°C. AD 131059. Project 4155, Task 41618. Contract AF 33(600)-22909. AF WADC TR 57-22.

Power supply for zone electrophoresis, electrodialysis and general use, by Charles M. Proctor. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Tex. Apr 1955. 13p drawing, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126689

A power supply is described that can be used with constant current or inverse current regulation or as an unregulated supply. In its present form the supply will give up to 300 volts and 30 ma regulated output. The unregulated outputs are 30 or 45 ma at the voltages characteristic of condenser and choke input filters, about 310 and 240 volts respectively at full load. A and M project 24, Reference 55-17T. Contract N7-onr-48702, NR 083-036.

Study of an ac servo amplifier employing a chopper demodulator, by Richard H. Peery. Johns Hopkins University. Applied Physics Laboratory, Silver Spring, Md. Jun 1955. 84p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 129632

A servo amplifier has been designed for the purpose of driving a dc servo-motor. Not only does this amplifier retain the advantages of ac amplification, but it also decreases the time delay resulting from demodulation and filtering. The reduction of the generated ripple voltage is accomplished by the employment of a square-wave carrier signal with a synchronous chopper used for detection. This procedure permits the reduction of the filter time constant with its associated time delay. Thesis: University of Maryland. Contract NOrd-7386. Bumblebee Series Report no. 236.

Study of miniature engine-generator sets. Ohio State University. Dept. of Mechanical Engineering, and Ohio State University Research Foundation, Columbus, O. Contract AF 18(600)-192. Order separate parts described below from OTS, giving PB number of each part ordered.

Part III: Design procedure of small high-speed dc generators, by Kwan Y. Tang and Otto Laster. Mar 1956. 53p photos, diagrs, graphs. $1.50. PB 131508

A procedure has been developed which will be helpful in the design of 120-volt, 12,000 rpm, d-c flat-compounded generators of ratings from 35 to 400 watts. This procedure includes the usual basic generator equations, empirical curves, and empirical relations. The method outlines the steps in estimating the dimensions of the armature and field laminations, the stack length, the armature winding, the number of commutator bars and brushes, the shunt and series field coils and the predicted curves of terminal voltage versus load current. AD 130938. AF WADC TR 53-180, Part III.

Part IV: Investigation of altitude and low temperature performance; starting, cooling, carburetion, controls systems; and noise reduction, by Owen E. Buxton, Jr., Richmond A. Gooden, Arthur W. Leissa and Charles F. Sepsy. Oct 1956. 117p photos, diagrs, graphs, tables. $3.00. PB 131509

This report deals with various performance parameters associated with miniature engines. Performances under low temperature and low pressure ambients are discussed. Design considerations and suitabilities dealing with starting, cooling, carburetion, and control systems are presented. Results of exploratory tests on noise control, as well as recent engine experience on two new test engines, concludes this period report on the project. AD 130939. Project 6-(1-6058), Task 60266. Covers work from Jan 1954 through Sep 1956. AF WADC TR 53-180, Part IV.

Study of the effects produced by asymmetries in the two-helix backward-wave amplifier, by Wilbur H. Watson. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1957. 50p photos, drawing, diagrs, graphs. Order from OTS. $1.25. PB 131412

This study was undertaken in an effort to explain gains which were measured in some early two-helix traveling-wave tubes when they were operated with one helix on the fundamental and other helix on the minus one space harmonic. A series of measurements and calculations were carried out to determine whether asymmetries in the tube could be a cause of this apparent coupling between the two space harmonics. In the study of a circumferential non-uniformity, measurements were made using a tube with a shuttered electron gun so that a portion of the electron beam could be removed. Also, gain expressions were derived and calculations were made for a tube with a portion of the beam removed. On the basis of these measurements and calculations, it is concluded that the inter-space harmonic gains measured in these earlier tubes were principally due to a small misalignment of the electron beam and the helix. It was found that a misalignment of one or two thousandths of an inch, in a tube with helices of one-half inch diameter, could produce positive gains because of the resultant coupling between the forward and backward space harmonics. AD 130876. Project 4156, Task 41570. Contract AF 33(616)-3278. AF WADC TR 57-72.

Miscellaneous

Investigation of the suitability of the open-cell type of battery ventilation for use aboard submarines, by J.J. Lander. U.S. Naval Research Laboratory. Aug 1945. 82p graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 123384

Unclassified Jan 29, 1947. 1. Submarines - Batteries - Ventilation 2. Batteries, Storage - Ventilation 3. NRL P-2675

Possible use of relatively thick glass mat separators in aircraft storage batteries, by M.H. Boyer and R.A. Friend. U.S. Naval Research Laboratory. Oct 1945. 44p photos, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123376

These studies consisted of comparative performance tests on two types of batteries, identical in construction, but one containing glass mat separators and the other containing microporous rubber separators. The tests were mainly those required to demonstrate conformance to specification and are listed as follows: (a) Life tests; (b) Capacity at various rates of discharge; (c) Effect of vibration; (d) Effect of overcharge; (e) Capacity at extreme temperatures. Glass mat separators appear to be a fair substitute for microporous separators for emergency use, but care must be taken to compensate for their undesirable characteristics. If the pore size can be reduced to prevent shorting of cells, it will result in better batteries than those containing microporous separators. NRL P 2630.

Unconventional electrical power sources, by Attie L. Betts and Paul A. McCollum. Oklahoma Agricultural and Mechanical College. School of Electrical Engineering, Stillwater, Okla. Sep 1954. 74p photos, diagrs, graphs, tables. Order from OTS. $2.00. PB 131411

Research covered by this report has been directed toward gaining information concerning the theoretical and practical limitations and capabilities of generating electrical power by means other than rotating machinery, conventional batteries, or radio active devices. Data and theory is presented on Workman-Reynolds effect, emission, pyro-electricity, thermopiles, thermomagnetic generators, ion exchange membrane, fuel cells, electrokinetic transducer, electrostatic devices, oscillating electromagnetic induction, piezoelectricity, magnetostriction, and photovoltaic generators. A major portion of the findings resulted from a library search. A limited amount of experimental and theoretical work was performed to verify and extend existing information. AD 63967. Project 6058, Task 60280. Covers work of the 1st year of activity of a proposed 4 year program of research. For Part 2 see PB 131218. Contract AF 33(616)-2237. AF WADC TR 54-409.

FOOD AND KINDRED PRODUCTS

Bacterial fermentation of spent sulfite liquor for the production of protein concentrate animal feed supplement, by Herman R. Amberg. Oregon. Engineering Experiment Station, Corvallis, Ore. Oct 1956. 57p diagrs, graph, tables. Order as Bulletin 38 from Oregon State Engineering Experiment Station, Corvallis, Ore. 50 cents. PB 124684

1. Culture media - Tests 2. Sulfite liquor, Waste - Fermentation 3. Sulfite liquor, Waste - Uses 4. O EES Bul 38

Physiological basis for various constituents in survival rations. Part I. The efficiency of young men under temperate conditions, by Frederick Sargent, II., Virginia W. Sargent, Robert E. Johnson and Stanley G. Stolpe. Illinois. University. Dept. of Physiology, Urbana, Ill. Jun 1954. 543p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $83.40. PB 128056

AD 47643. Covers period Jun 1952-Jun 1953. 1. Food rations, Survival 2. Personnel - Efficiency 3. Contract AF 18(600)-80 4. AF WADC TR 53-484, Part 1

FUELS AND LUBRICANTS

Acetylenic compounds for rocket fuels, by F.G. Bollo, G.D. Roddick, R.C. Morris, G.W. Conklin and J.L. Van Winkle. Shell Development Company, Emeryville, Calif. n.d. 107f photos, diagrs, graphs, tables. Order from LC. Mi $5.70, enl pr $18.30. PB 130158

The purpose was to develop a cheap, high performance liquid rocket fuel, hypergolic with WFNA. Over 200 compounds were screened for ignition ch characteristics. Tables giving the compounds screened, their structure and typical physical properties are included. Covers work from Apr 1951-Jan 1952. S-13353. Appendix: A.-Table of compounds screened for possible use as liquid rocket fuels. Appendix B. - Methods of synthesis.- Appendix C. - Calculation of specific impulse table of contents of calculation details - Appendix D. - Evaluation test methods - Appendix E. - Texicity reports on several compounds. Contract NOa(s)51-709c, Final report.

Basic factors in the formation and stability of non-soap lubricating greases, by John J. Chessick and Albert C. Zettlemoyer. Lehigh University, Bethlehem, Pa. Jun 1957. 52p graphs, tables. Order from OTS. $1.50. PB 131233

This project is aimed at the determination of the fundamental factors in the formation of non-soap greases, and the relation of these factors to their thermal, chemical and mechanical stability. The vehicle-thickener interface was early recognized as the seat of important properties of several oils and the surface characteristics of a variety of thickening agents were measured. These properties of the oils and solids were correlated with the behavior of grease systems formulated with them. Modification of the interfacial region by water and its effect on grease building by inducing flocculation was then investigated. These and related data were used to develop a mechanism for the flocculation of hydrophobic and hydrophilic solids in grease vehicles to form non-soap gels. Further studies of the influence of heptyl additives, their benzene analogues, as well as more complex additives were carried out. In addition, rheological measurements of a number of thickener solids in several grease vehicles were made. AD 130808. Project 3044, Task 73310. Covers work from 15 Apr 1956-31 Dec 1956 under Contract AF 33(616)-2440. AF WADC TR 55-240, Part 3.

Compartmented fuel tanks, by W.M. Carter, O.W. Gard and W.W. Walton. Kentucky. University, Lexington, Ky. Nov 1953. 74p drawings (2 fold), diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 128132

A study on compartmented fuel tanks has been made to determine the optimum number of compartments which gives maximum leakage protection for minimum weight. Design criteria have been established to evaluate various arrangements, and several designs have been studied. From the results of this analysis the two most promising styles were selected for further study. These are the cellular type and the vertical tube type. One of each has been designed and detailed. AD 102325. Project no. 3084, Task no. 3-0272. Contract AF 33(600)-22876. AF WADC TR 55-337.

Continuous fuel sprays, by W.W. Hagerty. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jul 1954. 91p photos, drawings, diagrs, graphs, table. Order from LC. Mi $5.40, ph $15.30. PB 128259

This is a report of recent studies made on fuel sprays and fuel spray nozzles and of related combustion tests dealing with their performance. The mechanism by which sprays are formed and the dependence on physical variables were investigated. Theoretical and experimental results are presented. Recent development work on a new type of dual-flow nozzle is described. The principle of operation of the nozzle, some analytical work and the data obtained from tests on early models are given. Simplex nozzles designed according to methods developed were built and tested in a combustion chamber. The relation between mean drop size and both the starting and the steady state operation of a burner was investigated, and the data and interpretation are included. AD 47582. For Parts 1-3 see PB 118494, 109635 and 118495. Contract AF 33(616)-295. AF TR 6067, Part 4.

Development of a hydrolytically stable high temperature hydraulic fluid, by Robert L. Peeler and Steve A. Kovacich. California Research Corporation, San Francisco, Calif. Jul 1957. 67p drawing, graphs, tables. Order from OTS. $1.75. PB 131380

This report covers the first year's work on a contract to improve the hydrolytic stability of silicate based hydraulic fluids operating in the -65°F to 400°F temperature range. A literature search was made of the mechanism and factors affecting the rate of hydrolysis of alkoxysilanes. Steric effects

were found to be the most important factor. Silanes, disiloxanes, trisiloxanes, and miscellaneous silicates, having primary, secondary, and tertiary alkoxy, alkyl, and phenyl groups, were synthesized. These compounds were evaluated for hydrolytic stability at 400°F. AD 130915. Project no. 7331. Covers work from Mar 1, 1956 to Feb 28, 1957 under Contract AF 33(616)-3476. AF WADC TR 57-119.

Fluids, lubricants, fuels and related materials. Part V, by E. Erwin Klaus and Merrell R. Fenske. Pennsylvania State University. School of Chemistry and Physics, State College, Pa. Jul 1957. 251p drawing, diagr, graphs, tables. Order from OTS. $6.00. PB 131405

This report describes work carried out on a continuing project directed toward the development of improved hydraulic fluids and jet engine lubricants for use in the high temperature range of 400° to 700°F. With few exceptions these studies are equally applicable to hydraulic fluids and jet engine lubricants. Efforts have been concentrated on the study of mineral oils, hydrocarbons, and improved stability esters for application to high temperature systems. A number of new and improved test techniques have been developed or applied to the high temperature evaluation of hydraulic fluids and jet engine lubricants. A number of large scale blends designed for use in bench, mockup, and actual service equipment have been formulated for evaluation by WADC and industry. AD 130907. Project 7331, Task 73313 and Project 3044, Task 73314. For Parts 1-3 see PB 121508-121510. Covers work Jan-Dec 1956 under Contract AF 33(616)-2851. AF WADC TR 55-30, Part 5.

General system for calculating burning rates of particles and drops and comparison of calculated rates for carbon, boron, magnesium, and isooctane, by Kenneth Putnam Coffin and Richard Spohn Brokaw. U.S. National Advisory Committee for Aeronautics. Feb 1957. 57p diagr, graphs, tables. Order as TN 3929 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125698

A system with general equations for computing burning rates of small particles has been devised; the effects of diffusion, heat conduction, and dissociation are included. The equations have been applied directly to carbon and boron and reduced to simpler forms used previously for isooctane and magnesium. The simpler computations appear to give sufficient accuracy for many purposes. For the combustion of boron particles, three graphs permit rapid determination of burning rate for a wide range of ambient temperature and ambient partial pressure of oxygen. NACA TN 3929.

High temperature wear evaluation techniques and data, by Robert J. Benzing. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jul 1957. 24p photos, graphs, tables. Order from OTS. 75 cents. PB 131410

A general description is given of the modifications required to increase the operating temperature potential of the following four lubricant testers: Shell Four-ball Wear Tester used for evaluating the lubricity of fluids; Shell Roll Tester used to examine the effects of mechanical shearing on grease consistency; bearing endurance grease tester for evaluation of the high speed temperature performance of greases; and hydraulic fluid pump stand for determination of dynamic effects of circulation on shear stability of fluids. The British IAE gear machine, recently acquired for evaluation of the anti-scuffing properties of lubricants, is described. AD 130953. Project 3044, Task 73312. Covers work from Jan 1955 - Dec 1956. AF WADC TR 57-166.

Interaction of a free flame front with a turbulence field, by Maurice Tucker. U.S. National Advisory Committee for Aeronautics. 1956. 21p diagr, graphs, table. Order as NACA Report no. 1277 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 25 cents. PB 126005

Theoretical values are obtained for the root-mean-square flame-generated turbulence velocities and the attenuating pressure fluctuations resulting from a linearized interaction of a constant-pressure combustion front with a field of isotropic turbulence. The anisotropic flame-generated turbulence is found to be of about the same intensity as the incident turbulence. A brief discussion of turbulent flame speed is given. Supersedes NACA TN 3407 (PB 116932). NACA TN 3407, Revised. NACA 1277.

Measurement of detonation induction distances in hydrogen-oxygen and acetylene-oxygen-nitrogen mixtures at normal and elevated initial pressures and temperatures, by Loren E. Bollinger and Rudolph Edse. Ohio State University. Dept. of Aeronautical Engineering. Rocket Laboratory, Columbus, O. Jun 1957. 97p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.50. PB 131569

Detonation induction distances of hydrogen-oxygen mixtures have been measured in a 15-mm diameter tube for fuel concentrations ranging from 30 to 85 mol percent under initial pressure and temperature conditions of 1, 5, 10, and 25 atmospheres and 100°F and 1 and 10 atmosphere at 200°C. The predetonation length decreases with increasing initial pressure for all fuel concentrations investigated. The induction distance is reduced from 61 cm to 1 atm to 5 cm at 25 atm for a 60 percent fuel mixture when the initial temperature is 100°F. Increasing the initial temperature to 200°C lengthens the distance required to establish a detonation. However,

at 10 atm pressure the induction distance is practically independent of initial temperature for fuel concentrations between 50 percent and stoichiometric proportions. AD 130874. Project 7-(2-3058), Task 70175. Work continued under Contract AF 33 (616)-2078. AF WADC TR 57-414.

Thixotropy of lubricating greases at room temperature, by F.S. Meade. U.S. Arsenal, Rock Island, Ill. Oct 1949. 29p graphs, tables (1 part fold). Order from LC. Mi $2.70, ph $4.80. PB 127696

Project TB 5-4501, Report 4. 1. Lubricating oils - Thixotropic properties 2. Thixotropic materials - Breakdown 3. RIAL R 49-1549.

HIGHWAYS AND BRIDGES

Bituminous resurfacing. Highway Research Board. 1956. 46p photos, drawing, diagr, graphs, tables. Order as Publication 410 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 75 cents. PB 125950

This bulletin presents several papers each dealing with one or more problems encountered in bituminous resurfacing. The first paper concerns the resurfacing of an old and widened pavement. The second one describes the steps in preparing an existing concrete pavement for resurfacing. Condition surveys of bituminous resurfacing over concrete pavement are described in the third paper. The last paper describes some current practices and research on controlling reflection cracking. Presented at the thirty-fourth annual meeting, Jan 11-14, 1955. HRB Bul 123. NRC 410.

Chemical and mechanical stabilization. Highway Research Board. Jan 1956. 115p photos, map, diagr, graphs, tables. Order as Publication 418 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $2.25. PB 124740

Presented at the thirty-fifth annual meeting, 17-20 Jan 1956. 1. Soil stabilization 2. Engineering, Highway 3. HRB Bul 129 4. NRC 418

Expressway law, an analysis. Highway Research Board. 1957. 114p photos, map, diagrs, tables. Order as Publication 482 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $4.00. PB 126059

1. Road laws 2. Road laws - Bibliography 3. HRB SR 26 4. NRC 432

Highway laws, a symposium. Highway Research Board. 1957. 60p. Order as Publication 437 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.00. PB 126056

Presented at the thirty-fifth annual meeting, 17-20 Jan 1956. 1. Road laws 2. NRC 437 3. HRB Bul 145

Highway research review, no. 4A: A summary of national activities reported by the Highway Research Correlation Service. Highway Research Board. Feb 1957. 79p. Order as Highway Research Review no. 4A, 1957 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.60. PB 126054

1. Roads - Research

Joint and crack sealing. Highway Research Board. 1956. 29p photos, tables. Order as Publication 429 from NAS-NRC Publications Office, 2101 Constitution Ave, N.W., Washington 25, D.C. 60 cents. PB 126075

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Pavements, Concrete - Joints - Sealing 2. Pavements, Concrete - Maintenance and repair 3. HRB Bul 138 4. NRC 429

Median design: Effect on traffic behavior. Highway Research Board. 1956. 31p photos, maps, drawings, diagrs, graphs, tables. Order as Publication 428 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 60 cents. PB 126076

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956.
Two reports on research studying the effects of different types and widths of median dividers on traffic behavior and accidents are contained in this bulletin. The first of these papers gives the results of observations and comparisons made in New York State. The other report, prepared at the Yale University Bureau of Highway Traffic, gives an analysis of accident experience involving various widths of traversable medians on limited access highways. The influence of trees planted in a median is discussed. HRB Bul 137. NRC 428.

Night visibility, 1956. Highway Research Board. 1956. 86p photos, diagrs, graphs, tables. Order as Publication 438 from NAS-NRC Publication Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.60. PB 126060

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. For earlier reports see PB 103855, 105845, 108433 and 115403. 1. Night vision 2. Roads - Lighting 3. HRB Bul 146 4. NRC 438

Pressure-deformation measurements in earth. Highway Research Board. 1956. 58p photos, drawings, diagrs, graphs, tables. Order as Publication 433 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. PB 126053

Presented at the thirty-fifth annual meeting, Jan 17-20, 1956. 1. Soils - Pressure - Measurement 2. HRB Bul 141 3. NRC 433

Road roughness and slipperiness, some factors and test methods. Highway Research Board. 1956. 88p photos, drawings, diagrs, graphs, tables. Order as Publication 431 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.60. PB 126074

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Pavements - Roughness - Skid resistance 2. Roads - Surface treatment - Anti-skid 3. Skids - Tests 4. Pavements - Slipperiness - Tests 5. HRB Bul 139 6. NRC 431

Some cost data on prestressed concrete bridges. Highway Research Board. 1956. 39p photos, drawings, tables. Order as Publication 436 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 80 cents. PB 126058

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Bridges - Construction -Cost 2. Bridges, Concrete - Prestressed 3. HRB Bul 144 4. NRC 436

Symposium on highway shoulders. Highway Research Board. 1957. 33p photos, drawings, tables. Order as Publication 486 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 75 cents. PB 126009

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Roads - Shoulders 2. HRB Bul 151 3. NRC 486

INSTRUMENTS

Automatic data reduction system: Amplitude-distribution and correlation analyses, by Allan Shapiro. U.S. Naval Research Laboratory. Dec 1957. 12p photos, diagrs, table. Order from OTS. 50 cents. PB 131395

A useful description of many forms of radio and radar data may be obtained from amplitude-distribution and correlation analyses. The Wave Propagation Branch of the Naval Research Laboratory has assembled a data reduction system to perform these analyses automatically, using data recorded on film as input. This report describes the general features of the entire data reduction system, with a detailed description of certain units not discussed in other publications. NRL R 5059.

Continuous current monitoring instrumentation for encapsulating resin investigation, by J.A. Aukward and R.W. Warfield. U.S. Naval Ordnance Laboratory. Feb 1956. 17p photos, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126538

A strip electrode sample cell together with continuous current monitoring instrumentation which records graphically the conductivity of an encapsulating resin throughout the current process is described. This instrumentation has proved to be useful in estimating the degree of cure, in determining the frequency and temperature dependence of a resin's electrical parameters with degree of cure, curing cycle, curing agent, fillers, and component loading. NAVORD 4247.

Correction of non-linearity in electromagnetic weighing devices, by T.L. Smith. U.S. Aberdeen Proving Ground. Ballistic Research Laboratory, Aberdeen, Md. Feb 1956. 5p drawing. Order from LC. Mi $1.80, ph $1.80. PB 125589

A coil carrying d.c. current in the air-gap of a permanent magnet affects the flux density across the air-gap; hence the resulting force on the coil is not exactly proportional to the current. Methods of correcting this non-linearity are discussed, by a compensating series coil or a double magnet structure. Dept. of the Army project: 5B0306004. ORD project: TB 3-011B. APG BRL TN 1058.

Dynamic measurement of resolver electrical errors. Rensselaer Polytechnic Institute, Troy, N.Y. Dec 1954. 72p drawing, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 126165

A test set is described in which the output voltage of a resolver rotating at a slow uniform speed is demodulated with a synchronous switch. After filtering, the rotation frequency component is rejected leaving the error, which is measured by a recording instrument. Synchronizing the switch in quadrature permits the quadrature voltage to be measured. A transformation ratio tester is discussed. The equipment required is described in detail and operating instructions included. Resolver testing time is a small fraction of that required using static test methods. AD 71501. Dept. of the Army project no. 518-05-003. ORD project no. TR 5-5058B. Contract DA 36-038-ord-5247, Task B, Final report.

Electroacoustic phase shift in loudspeakers, by C. A. Ewaskio. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jun 1948. 27p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126590

Direct measurements of envelope delay ($d\beta/d\omega$) have been obtained for a series of commercial loudspeakers. The modulation phase-shift method of Nyquist and Brand has been adapted for direct indication of envelope delay by utilizing a direct-reading electronic phasemeter. By suitable choice of modulating frequency the phase shift of the modulation envelope (between electrical input and sound pressure on the loudspeaker axis) in degrees gives the envelope delay directly in milliseconds. Pressure-amplitude curves measured under the same conditions provide data for a preliminary attempt to interpret the correlation between delay response and pressure response. Contract N5 ori-76, T.O. X, NR 011-049. HU ARL TM 2.

Evaluation of hot hardness measuring techniques and the development of a hot micro-hardness tester, by L. F. Whitney, G. W. Webb, and R. A. Gulick. Comstock & Wescott, Inc., Cambridge, Mass. Oct 1954. 122p photos, drawings (part fold), diagrs. Order from LC. Mi $6.30, ph $19.80. PB 126492

A study was made of all known hardness measuring methods, the techniques that have been employed for micro-hardness testing and for hot hardness testing. Although no suitable apparatus was found, it was concluded after extended preliminary experiments had answered certain critical questions that a micro-hardness tester could be built that would operate at 1250°F and would permit an indentation to be made located with nearly the same degree of accuracy as at room temperature. A special model Tukon tester was equipped with a suitable temperature-controlled furnace, mechanical stage, atmosphere purifying equipment, measuring microscope and other adjuncts to accomplish the purpose. A Knoop diamond indenter and a hydrogen atmosphere were employed. D.A. Project 593-08-024. Ordnance project TB4-161A. Contract DA 19-020-ORD 439. WAL R 372/19-28.

Magnetostriction probe hydrophone, by F.B. Blake, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jun 1949. 24p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 126565

The construction and calibration of a very small magnetostriction hydrophone designed for the measurement of relatively high sound pressures in liquids is described. Development and testing as a general-purpose instrument are incomplete, but it is believed that with suitable modifications this device would prove useful in other applications. Among its attractive advantages are simplicity and low cost. Contract N5 ori-76, T.O. X, NR 014-903. HU ARL TM 8.

New technique for drop-size distribution determinations, by A.P. Roy Choudhury and W.F. Stevens. Princeton University. James Forrestal Research Center, Princeton, N.J. Aug 1955. 14p photo, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127634

AD 67774. Submitted to the American Institute of Chemical Engineers. 1. Jet propulsion - Research 2. Drops, Liquid - Size - Distribution - Measuring equipment 3. Drops, Liquid - Size - Measurement - Methods 4. Atomization devices - Evaluation 5. Project Squid 6. Contract N6 ori-105, T.O. 3, NR 098-038 7. PU FRC TR NIT-2-M

NOL controlled temperature vibration test equipment type 6A, by W.C. Brueggeman. U.S. Naval Research Laboratory. Jun 1956. 16p photos, drawings, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127599

A test facility known as the NOL controlled temperature vibration test equipment has been developed by the Vibration Test Design Section and constructed by the NOL Technical shop. It was designed for use inside the large NOL walk-in temperature chamber and provides a means for performing vibration tests on large heavy items of ordnance at controlled temperatures within the range obtainable in this chamber. The machine is portable to the extent that it may be wheeled in and out of the chamber on demountable casters. The entire machine, except the table top, is thermally insulated and room air may be circulated inside the machine to maintain components at a safe temperature. NAVORD 4310.

Procedure for the use of the platinum resistance thermometer as a temperature standard, by R.L. LeMar. U.S. Arsenal, Rock Island, Ill. Jun 1954. 18p photos, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126455

Gives a detailed procedure for the use of the platinum resistance thermometer and associated apparatus for the accurate measurement of temperature. Equations relating the ohmic resistance of the platinum coil to t°F are included. Mercury-in-glass thermometers and a copper-constantan thermocouple were calibrated at various temperatures between (-65F) and (250 F). Ord. Project TB 5-6010A, Report no. 25. D.A. Project 593-21-055. RIAL R 54-2085.

Radar observer training devices, by Ralph M. Heintz. Stanford Research Institute, Stanford, Calif. Contract AF 18(600)-550. SRI Proj 778. Order separate parts described below from LC, giving PB number of each part ordered.

Interim engineering report 1, covering period 2 Jan 1953-31 Mar 1954. Oct 1954. 70p photos, drawings, diagrs. Mi $3.90, ph $10.80. PB 126464

This report describes the results of the first phase of a program of research on the technical aspects of recording and reproducing radar signals. Particular emphasis has been placed upon the development of experimental devices for use in radar observer training. During the period covered by this report the chief objective has been the design and construction of an experimental video recording system for use with the AN/APS-23 radar.

Fifth quarterly progress report, covering period 1 May to 31 Jul 1954. Nov 1954. 14p photos, graphs. Mi $2.40, ph $3.30. PB 126463

This report covers the analysis of the basic problem and reasons for preference of the present system over other methods of video and photographic recording. In its present form the equipment consists of two major units: (1) An airborne recording unit which records photographically an intensity modulated cathode-ray tube trace on a continuously moving 35-mm film, maintaining a direct relationship between antenna rotation and film travel. (2) A playback unit which scans the recorded information and derives from it a video signal which is fed to a synchronized radar indicator. Rotation of the indicator deflection yoke is determined by film travel.

Ray patterns of the Sperry rapid ray tracer, by Robert A. Lufburrow. Woods Hole Oceanographic Institution, Woods Hole, Mass. Mar 1956. 53p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 125579

The Sperry Rapid Ray Tracer is described briefly, and the method of deriving the data masks is outlined. After a general description of interpreting ray patterns, a series of ray patterns is presented together with the data from which the patterns were derived. Contract Nonr-891(00), NR 086-002. WHOI Ref 56-19.

Simplified automatic data plotter, by Henry B. Riblet. Johns Hopkins University. Applied Physics Laboratory, Silver Spring, Md. May 1956. 27p photos, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 129400

This report describes the simplified automatic data plotter, its performance characteristics, and its uses primarily for the recording of telemetering data. The SADAP, which automatically plots function versus real time, eliminates the need for reading and replotting manually. Contract NOrd-7386. Bumblebee Series Report no. 253.

Three dimensional hyperbolic tracking system, by J.E. McGolrick, P.A. Trout, K.J. Meese and D.E. Gerster. U.S. Naval Ordnance Laboratory, White Oak, Md. 118p photos, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 127401

The status of the Torpedo Tracking System at the termination of the project is described. A brief history and theory of operation is given. The report outlines the principal components of the system, their state of development and remaining problems. System errors from various sources are analyzed. Recommendations for future tracking systems are made. NAVORD 4297.

Use of a free molecule probe in high speed rarefied gas flow studies, by J.A. Laurmann and D.C. Ipsen. California. University. Institute of Engineering Research. Division of Mechanical Engineering, Berkeley, Calif. Oct 1957. 47p photo, drawing, diagr, graphs, tables. Order from OTS. $1.25. PB 131571

The feasibility of using a free molecule wire probe for the study of two dimensional gas flows of low density has been investigated for two flow configurations, namely, the leading edge regions of a wedge and a flat plate at zero angle of attack and at nominal Mach numbers of 4 and 6. The results obtained gave a clear picture of the nature of the flow, the shock wave position and boundary layer being easily discernible from the change in temperature and heat transfer coefficient of the wire. AD 142109. Project 1363, Task 70124. Contract AF33(616)-2878, Final report. AF WADC TR 57-440.

Video frequency modulation detector, by M.W.P. Strandberg. Massachusetts Institute of Technology. Radiation Laboratory, Cambridge, Mass. Apr 1945. 6p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 127029

A double triode frequency modulation detector having the qualities of good gain and phase response is described. The advantage of such a circuit over the common double diode circuits for triggered automatic frequency control circuits is examined. MIT Rad Lab 53. NDRC 14-53.

LEATHER AND LEATHER PRODUCTS

Fungicidal treatments for leather, by S.H. Ross and S. Berk. U.S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. Jul 1956. 25p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127618

Project TB 4-821F. 1. Leather - Fungus proofing 2. Leather - Mildew proofing - Tests 3. Leather - Preservatives 4. Phenolic compounds - Fungicidal properties 5. FALR 1335

LUMBER AND WOOD PRODUCTS

Installation of wood block finish flooring by adhesive bonding, by William S. Brown. Building Research Advisory Board. May 1956. 42p map, table. Order as Publication 443 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington, 25, D.C. $1.50. PB 125000

Reprinted by the Building Research Institute, National Research Council. Conducted by the Building Research Advisory Council for the Federal Housing Administration under Contract HA-fh-646, Amendment no. 1. 1. Floors and flooring, Wood - Installation 2. NRC 443

Survey of the properties and uses of tropical American woods, 1947-1955. Final report, by Frederick F. Wangaard. Yale University. School of Forestry, New Haven, Conn. Dec 1955. 16p. Mi $2.40, ph $3.30. PB 126130

This report summarizes the survey of an investigation of the properties of tropical American woods. The study has been concerned chiefly with the determination of density, green and air-dry strength properties, and shrinkage of 126 timber species of Central American, West Indian, or South American origin. For 104 of these species information has been presented relative to its sources, availability, the general characteristics of the wood, decay resistance, and air-seasoning characteristics, together with an evaluation of each wood with respect to its present or potential utilization. Covers work from 1947 to Aug 15, 1955. Contract N6 ori-44, T.O. XV, NR 330-001.

MACHINERY

Bibliography on pressure die-casting equipment. See entry under Bibliography on page 116. PB 124579

Evaluation test of Royal Zenith 29 press, by Stephen W. Gibson. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Aug 1957. 32p photos, diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 130182

This report describes engineering tests of the Royal Zenith 29 single-color offset press utilizing conventional lithographic principles. Tests were: (1) familiarization, (2) specification compliance, (3) operation, (4) installation operation in van, (5) road tests, and (6) determination of road-test effects. DA project 8-35-01-101. ERDL R 1490-TR.

MATHEMATICS AND STATISTICAL ANALYSIS

Admissibility of semigroup structures on continua, by R.J. Kock and A.D. Wallace. Louisiana State University. Mathematics Dept., Baton Rouge, La. n.d. 18p. Order from LC. Mi $2.40, ph $3.30. PB 126631

The purpose of this note is to investigate the structure of certain compact connected semigroups S which satisfy $S^2 = S$. Supported by funds from the National Science Foundation and the Office of Scientific Research. Date is 1955 or later. Contract AF 18(603)-89. AF OSR TN 56-590.

Asymptotic behavior and uniqueness of plane subsonic flow, by R. Finn and D. Gilbarg. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. May 1956. 69p diagr. Order from LC. Mi $3.90, ph $10.80. PB 126697

This paper establishes asymptotic properties of subsonic flows defined in a neighborhood of infinity, and these results are applied to the derivation of the force and moment formulas of gas dynamics, to the proof of uniqueness of subsonic flows past a profile, and to the proof of the complete expansion of a subsonic flow infinity. The asymptotic properties of solutions of the flow equation appear as a special case of more general results concerning nonlinear elliptic equations, and are presented in this context. Contract Nonr-225(11), NR 041-086. SU AMSL TR 50.

Elastic, plastic stresses in free plate with periodically varying surface temperature, by Halil Yüksel. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Apr 1957. 20p diagr, graph. Order from LC. Mi $2.40, ph $3.30. PB 126026

The paper concerns a free plate that consists of an elastic, perfectly plastic material and is subjected to a harmonically varying temperature at one face, while the other face is kept at a constant temperature and the edge is perfectly insulated. The thermal stresses associated with the steady temperature oscillations are analyzed, and the development of plastic regions is discussed. Ordnance project: TB 3-0122. Dept. of the Army project: 503-06-005. Contract DA 19-020-ord-798. APG BRL TR 30.

Experimental information on two-dimensional detached shock waves, by Morton Alperin. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. May 1950. 30p photos, drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126813

The present report is a summary of the design and

construction of a wind tunnel suitable for experimentation on flows involving detached shock waves. Some details regarding its dimensions and performance are given in Section II. The experimental program undertaken at this Laboratory was confined to the investigation of the detached shock wave created by so-called two-dimensional bodies. A detailed discussion of this investigation, together with the results obtained, is presented in Section III. Section IV contains a comparison of these experimental data with several theoretical methods of calculating various parameters involved in flow of this type. ORDCIT Project. Includes errata dated 17 May 1951. Contract W-04-200-ORD-455. CIT JPL PR 4-44.

Further tabulation of kinetic energy matrix elements, by John B. Lohman. Brown University. Metcalf Research Laboratory, Providence, R.I. Feb 1951. 25p tables. Order from LC. Mi $2.70, ph $4.80. PB 126389

AD 194055. Technical report no. 17. 1. Energy, Kinetic 2. Matrix theory 3. Contract N6 ori-88, T.O. 1, NR 019-102.

Multi-level continuous sampling acceptance plans for attributes. Stanford University. Dept. of Industrial Engineering, Stanford, Calif. Jun 1956. 104p graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 126472

This manual provides plans for inspection by sampling techniques which make use of multi-level continuous sampling based upon attributes. The plans are designed for application to expensive inspection and test areas, or where lot accumulation is not feasible, for the purpose of reducing the cost of inspection. The plans presented herein may be applied to the inspection of any items for which the opportunity for cost reduction warrants the sampling risks associated with the plans. These plans may affect costs and therefore may require contractural coverage. Proposed AMC manual 74. Contract AF 33(600)-30017.

New table of Mie scattering functions for spherical particles. Part IV: Values of amplitude functions a_m and b_m for refractive index n=1.486 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, Cambridge, Mass. Mar 1956. 254p tables. Order from OTS. $6.00. PB 131550

Tables are given for the real and imaginary parts of the complex amplitude functions a_m and b_m. They are the basic values for the computation of Mie scattering coefficients. The computations have been carried out with the IBM 701 electronic data processing machine. AD 98770. For Parts 2-3, 5-6 see PB 114180, 121905, 131172 and 131282. AF GRD P 45. AF CRC TR 56-204.

On pseudo-analytic functions and elliptic equations, by Edwin H. Farr. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. Apr 1956. 51p. Order from LC. Mi $3.60, ph $9.30. PB 126695

The theory of pseudo-analytic functions introduced recently by L. Bers can be looked upon either as a pure function theory or as a tool to apply to elliptic differential equations in two variables. Throughout this paper, both points of view are considered. In Part I, the so-called similarity principle is used to develop certain properties of pseudo-analytic functions which are suggested by corresponding properties of analytic functions. Some results are given about the gradient of solutions of the elliptic equation. In particular, it is shown that the gradient of the Green's function for a simply connected domain does not vanish. Part II considers only the elliptic equation. More results are obtained about the Green's function, and some aspects of the normal derivative of solutions of the elliptic equation are given which extend the work of Lichtenstein. AD 96689. Dept. of the Army project no. 599-01-004. ORD project no. 223, TB2-0001. CIT ORD - 6D-TR25. Contract DA 36-061-ord-490, Technical report no. 26.

On sequential designs for maximizing the sum of n observations, by R.N. Bradt and S. Karlin. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Oct 1955. 30p. Order from LC. Mi $2.70, ph $4.80. PB 124511

Certain aspects of the type of problem known as the "Two-armed Bandit" are considered. One is allowed n plays and a sequential design, or strategy, is desired. Results are applied, in the final section to obtain the optimal procedure in a certain industrial inspection problem. Contract N6 onr-251, T.O. III, NR 042-993. SU AMSL TR 38.

On subsonic flow past a paraboloid of revolution, by Carl Kaplan. U.S. National Advisory Committee for Aeronautics. Feb 1957. 21p graphs, tables. Order as TN 3700 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125693

The Janzen-Rayleigh method is utilized for the calculation of the velocity potential for steady subsonic compressible flow past a paraboloid of revolution. Formulas are obtained for the fluid velocity at the solid boundary and along the axis of symmetry and are compared numerically with corresponding formulas for the two-dimensional parabolic cylinder. NACA TN 3700.

Slow oscillation of a thin finite disk in an infinite fluid, by A.G. Azpeitia and G.F. Newell. Brown University. Division of Engineering, Providence, R.I. Feb 1957. 51p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 126030

The small amplitude oscillation of a thin disk of finite radius suspended in an "infinite" fluid is considered with a view toward its use as a viscometer. The fluid motion is analysed under the assumption that the boundary layer thickness of the fluid is small compared with the radius of the disk but large compared with the thickness of the disk. Formulas are obtained relating the frequency and decrement of oscillation to the density and viscosity of the fluid. AD 120420. AF 891/8. Contract AF 18 (600)-1548, Technical report no. 8. AF OSR TN 57-77.

Tables of characteristic functions for solving boundary-value problems of the wave equation with application to supersonic interference, by Jack N. Nielson. U.S. National Advisory Committee for Aeronautics. Feb 1957. 245p diagrs, graphs, tables. Order as TN 3873 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125694

Tables are presented containing 69,000 values of a set of characteristic functions of two variables which first arose in problems of supersonic wing-body interference. The functions solve boundary-value problems of the second kind for the wave equation in three dimensions with circular cylindrical boundaries or problems of the unsteady heat-conduction equation in two space dimensions with circular boundaries. The functions themselves have the physical significance of cylindrical pressure waves. The tables have extensive use in problems of aerodynamic interference at supersonic speeds. NACA TN 3873.

Twisted spherical shell, by Michael Sadowsky and John R. Crawford. Rensselaer Polytechnic Institute. Dept. of Mechanics, Troy, N.Y. Jun 1955. 26p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126134

This report contains: 1. Statement of the problem; 2. The stress function F in torsion; 3. Polar stress components and displacements; 4. Solution of the problem in the form of an infinite series; 5. Stress distribution; 6. Discussion; 7. Bibliography. Contract Nonr 591(02), NR 064-405, Technical report no. 9.

Variance of the number of mutual choices in sociometry, by Leo Katz and Thurlow R. Wilson. Michigan. University, Ann Arbor, Mich., and New Mexico. University, Albuquerque, N. Mex. Apr 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 125591

The variance of the number of mutual dyads in a sociometric situation where each member of a group chooses independently and at random is derived for unrestricted numbers of choices per group member, as well as for a fixed number of choices. The distribution of the number of mutuals is considered. SRC MSU RM-19. Contract N5ori-0760. Contract Nonr 785.

MEDICAL RESEARCH AND PRACTICE

Antigenic and cultural properties of nocardia, by Morris Frank Shaffer and John Donald Schneidau, Jr. Tulane University. Dept. of Microbiology, New Orleans, La. n.d. 71p tables (part fold). Order from LC. Mi $4.50, ph $12.30. PB 125560

The cultural and serologic data presented herein demonstrate some of the broader relationships that exist within the genus Nocardia and between Nocardia and Mycobacterium. The relative value of differential cultural data is judged with respect to (1) stability of the characteristic described and (2) relationship to the serologic groupings. Contract Nonr-1546(00), NR 131-151, Final report.

Bile pigment in the blood, by A.A. Hijmans van den Bergh. U.S. Chemical Corps. Medical Laboratories, Army Chemical Center, Md. Apr 1954. 72p tables. Order from LC. Mi $4.50, ph $12.30. PB 126340

This translation of van den Bergh's classic monograph, "DER GALLENFARBSTOFF IM BLUTE," into the English language hardly does justice to the masterpiece composed by its author in the original German. However, it merits far more than mere historic interest, since it provocatively presents the fundamental concepts, to which reference has unfortunately too seldom been made, of a still dynamic aspect of medical research in which a reorientation seems indicated. Translated from the German by Stephen Kalmar and edited by Norman W. Elton. CMLRE-ML-52. CC MD SR 40.

Effect of wind velocity and particle size on nasal penetration of aerosols, by Gabrielle Asset, Williams Farnum and Stella Ryan. U.S. Chemical Corps. Chemical Warfare Laboratories. Directorate of Medical Research, Army Chemical Center, Md. Jul 1957. 13p drawings. Order from LC. Mi $2.40, ph $3.30. PB 129367

Under the conditions of the experiment, it was found that nasal penetration was greater in the case of the smaller particle size and at the lower wind velocity. Project no. 4-08-02-016-01. CC CWL R2136.

Fundamentals of Arctic and cold weather medicine and dentistry, by H.B. Eisberg and J.E. Owens. U.S. Bureau of Medicine and Surgery. Research Division. Aviation Branch. 1949. 210p photos, tables. Order from LC. Mi $9.30, ph $31.80. PB 126333

1. Medicine - Arctic regions 2. Dentistry - Arctic regions 3. NAVMED 1307 4. NMRI Proj NM 013-009

Immunochemical criteria of purity of proteins and polysaccharides. Annual progress report for period 1 Jan-31 Dec 1955, under Contract Nonr 266(13), NR 120-100, by Elvin A. Kabat, Mary E. Carsten and Peter Z. Allen. Columbia University, New York, N.Y. Jan 1956. 4p. Order from LC. Mi $1.80, ph $1.80. PB 124619

The objectives were: 1. To evaluate existing methods and to develop new immunochemical methods for establishing purity of proteins and polysaccharidies. 2. To study fundamental mechanisms of antigen antibody combinations. 3. To correlate structure of polysaccharides with immunochemical specificity.

Limitations of subjective symptomatology in the prevention and treatment of heart disease, by Ashton Graybiel and Richard Lawrence, Jr. U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Oct 1955. 17p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126637

Subjective symptoms referable to the heart are rarely due to heart disease as such but to the effects of disease on the function of the heart. Moreover, the decrease in activity with increasing age tends to mask the symptom of cardiac incompetence. All patients with heart disease require expert advice on guiding their activities and must not rely solely on how they feel. NMRI Proj 001 107 105, R11.

Nutritional requirements of mammalian viruses. Terminal report, by Randall L. Thompson and E. Campaigne. Indiana. University, Bloomington, Ind. Feb 1956. 5p table. Order from LC. Mi $1.80, ph $1.80. PB 126606

Certain chemical compounds are effective antiviral agents against certain virus infections in certain hosts inoculated in specific ways. However, the effectiveness of the agent depends on: 1) the structure of the compound; 2) the nature of the virus; 3) the nature of the host; and 4) the nature of the method of inoculation. Covers period from May 1, 1950-Sep 30, 1955 under Contract N6 onr-18009, NR 134-718.

Physiological properties of plasma substitutes. Stanford University. Dept. of Physiology, Stanford, Calif. Contract N6 onr-25137. Order separate parts described below from LC, giving PB number of each part ordered.

Interim technical report: Muscle, by George A. Feigen. Dec 1955. 94p. Mi $5.40, ph $15.30. PB 124545

The problems discussed represent certain phases of the molecular physiology of muscle on which definite advances were made in the past two or three years. There has been no attempt to isolate them in time, and a certain amount of earlier work has been reiterated for the sake of presenting the complete narrative.

Annual interim progress report and interim technical summary report on high altitude studies, 1954-1955, by George A. Feigen, I.L. Trapani and Mary S. Hurd. Dec 1955. 60p tables. Mi $3.60, ph $9.30. PB 124544

This report summarizes progress in three distinct lines of investigation: the physical-chemistry of glycerol pectate, the immunochemistry and suspension stability of papain-treated erythrocytes, and the hematological and cardiovascular changes occuring in rats undergoing adaptation to mountain altitudes. The studies are ancillary to the central problem under investigation, which is the relationship between the physico-chemical constitution of expander materials and their physiological behavior. The preliminary studies are nearly complete and the results are displayed by sex and by strain, for various periods of altitude stress, in the appended tables. During the course of these studies it became apparent that in man, at least, the return to sea-level often represents a severe stress, the proportions of which can be a great as those of mountain-sickness, and it is for this reason that we have studied the physiological changes displayed by mountain bred rats upon their removal to sea-level.

METALS AND METAL PRODUCTS

Analysis of the post buckling behavior of a slender column and its use in ductility measurement of materials, by K. Tong. Syracuse. University. Research Institute. Metallurgical Research Laboratories, Syracuse, N.Y. Jan 1955. 16p graphs. Order from LC. Mi $2.40, ph $3.30. PB 126416

Describes the testing setup, gives a mathematical analysis of the problem, and graphs showing the results of tests. Contract DA 30-115-ord-376, Final report no. 5. WAL R 893/154-15.

Bimonthly progress report on development of substitute alloys for high temperature use, by J. Salvaggi and G.J. Guarnieri. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Contract NOa(s)-52-368-c. Order separate parts described below from LC, giving PB number of each part ordered.

Apr 1954. 15p graphs, tables. Mi $2.40, ph $3.30. PB 129684

Creep studies of three 30-pound heats, with compositions based on the three most promising alloys previously developed, are being conducted at 1500°F following initial solution treatment at 2300°F. Spot checks indicate a slightly higher solution temperature of 2350°F as necessary to equal maximum 100-hour rupture strengths previously reported for the 1500°F test temperature. Stress-rupture tests at 1500°F of a type 316 stainless steel with 0.15% carbon and nickel variations of 12, 15, and 20% indicate no advantage to be gained from using nickel contents above 12% for material solution treated at 2300°F. CAL KA-797-M-10.

Jun 1954. 15p photos, graphs, tables. Mi $2.40, ph $3.30. PB 129685

Addition of tungsten to a 17 Cr- 15 Ni- 2.5 Mo- 0.15 C- 0.15 B- 0.80 Ti stainless steel was found to stabilize the microstructure, resulting in a combination of strength and ductility not previously achieved. The 1500°F, 100-hour rupture strength of 18,500 psi obtained for this series was accompanied by a rupture ductility of 8%. CAL KA-797-M-11.

Casting of titanium and titanium base alloys. Final report. Armour Research Foundation, Chicago, Ill. Apr 1954. 34p photos, drawings, tables. Order from LC. Mi $3.00, ph $6.30. PB 126708

An induction furnace was used for melting the titanium in a graphite crucible. Zircon shell molds coated with a heavy layer of colloidal graphite have been found to give castings with a fine surface finish. A major source of difficulty in producing sound castings was the entrapment of the mold atmosphere (mostly argon) by the incoming metal and gases formed by thermal decomposition of the mold binder blowing into the cavity or casting. Titanium-2% iron and titanium-1.2% iron-0.8% vanadium alloys have been found to have good casting characteristics. However, due to impurity pick-up the ductility of cast specimens made with these alloys has been found to be negligible. Covers period 19 Nov 1952 - 31 Mar 1954. An extension of Contract Nobs 54299. Contract Nobs 61229. ARF Project B-046, Final report.

Chemically-active light metals. See entry under Bibliography on page 116. PB 126707

Correlation of literature on the effect of testing temperature on the mechanical properties of wrought aluminum base alloys. See entry under Bibliography on page 116. PB 131346

Development of a corrosion resistant magnesium alloy. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Contract AF 33(616)-2917. Project 7351, Task 73514. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Development of magnesium alloys for better corrosion resistance, by M. Balicki, C. D'Antonio and A. Kravic. Aug 1957. 38p photos, diagrs, graphs, tables. $1.00. PB 131443

A novel way for finding alloys of magnesium with better corrosion resistance has been evolved. This scheme relies upon alloying magnesium with elements which, owing to their lower surface tension, are expected to concentrate on the surface and thus alter the corrosion behavior. From a number of elements having a lower surface tension than magnesium the following: Hg, Pb, Ge, In, Bi, Sn, Cd, Ca have been added to it to form very pure, dilute, binary alloys. The preliminary results obtained in general, however, indicate that magnesium alloys containing Sn, Sb, Ge, Cd, and In compare favorably with pure magnesium in the QQ-M-151A Salt Spray Test. AD 131018. Covers work from May 1955-Sep 1956. AF WADC TR 54-241, Part I.

Part II: Surface tension data of elements, by V.P. Siuta and M. Balicki. Aug 1957. 51p graphs (1 fold), tables. $1.50. PB 131444

Experimental and estimated values of surface tension of 75 elements have been gathered. The unique collection was of value in elucidating the magnesium alloying program. Correlations for estimating surface tension values of elements have been scrutinized, augmented and used. Extensive bibliography on the subject of surface tension is presented. AD 131010. Covers work from May 1955-Sep 1956. AF WADC TR 57-241, Part 2.

Effect of composition on the M_S and decomposition temperatures in stainless steels, by F.C. Monkman, F.B. Cuff and N.J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. n.d. 18p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125891

The martensite reaction has been followed in simple 18-8 type stainless steel alloys by means of electrical resistivity. A linear equation has been determined using the method of least squares relating the alloy composition and the temperature at which martensite is first observed to form during cooling. The decomposition of martensite at elevated temperatures has been investigated, using electrical resistivity measurements; and the decomposition products have been examined metallographically. Date is 1955 or later.

Effect of frequency and temperature on fatigue of metals, by S.R. Valluri. U.S. National Advisory Committee for Aeronautics. Feb 1957. 15p diagrs, graphs. Order as NACA TN 3972 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125705

Phenomenological considerations applied to a standard-linear-solid physical model indicated that for particular temperatures there are corresponding frequencies of fatigue stressing above which the fatigue behavior changes. It is suggested that at room temperature the critical frequency is above that usually encountered in engineering practice. NACA TN 3972.

Effect of nitrogen and vacuum degassing on the properties of a cast aluminum-silicon-magnesium alloy (Type 356), by R.K. Owens, H.W. Antes and R.E. Edelman. U.S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. May 1957. 25p photos, diagr, graphs, tables. Order from OTS. 75 cents. PB 131351

A study was made of the relative efficiencies of vacuum and nitrogen degassing of type 356 aluminum alloy. For a given degassing time, more hydrogen was removed by nitrogen degassing; however, the degassing time necessary to produce completely sound metal was the same for both degassing treatments. The tensile properties of this alloy were insensitive to the methods of degassing. The effects of gas content and porosity on the ultimate and yield strength were determined for virgin and remelted heats. To be published in the 1957 Transactions of the American Foundrymen's Society, Ordnance Project TB 4-15. FALR 1388.

Effects of inelastic action on the resistance to various types of loads of ductile members made from various classes of metals. Part VII: Inelastic behavior of aluminum alloy I-beams with elliptic-type web section cutouts, by Will J. Worley and Fred D. Breuer. Illinois. Engineering Experiment Station. Dept. of Theoretical and Applied Mechanics, Urbana, Ill. and Convair, San Diego, Calif. Dec 1957. 31p photos, diagrs, graphs, tables. Order from OTS. $1.00. PB 131556

This continuation was undertaken to investigate the fully plastic bending behavior of aluminum alloy I-beams with elliptic-type web section cutouts. As in the two earlier reports, the mechanism method of analysis employing the upper bound theorem was used in predicting the ultimate loads of the various beams. The I-beams were loaded as simple beams with center loading. The mathematical relations were developed to enable solution by means of an electronic digital computing machine, the Illiac. The results obtained on the Illiac indicated that a diamond shape web section cutout was the most favorable type for resisting fully plastic bending. Tests were conducted which substantiated the results obtained on the Illiac. AD 142217. Project 7360, Task 73605. Covers work from Feb - Jul 1957 under Contract AF 33(616)-2753. For Parts 1 - 6 see PB 131028, 131061, 131182, 131245, 131252 and 131373. AF WADC TR 56-330, Part 7.

Gas-metal systems. See entry under Bibliography on page 116. PB 126341

High temperature project. Temple University. Research Institute, Philadelphia, Pa. Contract N9 onr-87301. Order separate parts described below from LC, giving PB number of each part ordered.

Seventh progress report, 1 Jul 1952 - 1 Jan 1953, by J.B. Conway and A.V. Grosse. Jan 1953. 28p drawings, graphs. Mi $2.70, ph $4.80. PB 126907

Experimental work concerned combustion of fine aluminum powder in air, combustion of silicon powder, combustion of powdered carbon, atomization and combustion of molten aluminum, radiation measurements on the oxy-aluminum flame, and operation of the oxy-aluminum flame under pressure. AD 41543.

Ninth progress report, 1 Jul 1953 - 1 Jan 1954, by J.B. Conway and Maurice S. Kirshenbaum. Jan 1954. 35p drawings, tables. Mi $3.00, ph $6.30. PB 126906

Experimental work concerned combustion of titanium powder and calcium powder, ignition temperatures of metals, and the mechanism of combustion of metals. AD 43649. For 8th and final reports see PB 118900, 121024.

Investigation of Fe-Mn-Cr-N-C system for heat resistance and oxidation resistance between 1200F and 2000F, by Chi-Mei Hsiao and Edward J. Dulis. Crucible Steel Company of America, Pittsburgh, Pa. Nov 1957. 158p photos, drawing, diagrs, graphs, tables. Order from OTS. $4.00. PB 131563

A comprehensive study of wrought Cr-Mn-C-N steels was conducted with the objectives, (1) of developing outstanding elevated-temperature steels that contain a minimum amount of strategic alloying elements, and (2) of advancing the existing knowledge of this new type of steel. Based on the results of the present investigation, phase boundaries of the base compositions of stable austentic Cr-Mn-C-N steels have been established, and the effects of these elements and of V, W, Mo, and Cb on the microstructures, and the room-and elevated-temperature properties of the steels have been evaluated. A nomograph was prepared to facilitate the designing of the base compositions of these steels,

and the estimating of their room- and elevated-temperature properties. AD 142086. Project 7351, Task 73512. Covers work from Jan - Dec 1956 under Contract AF 33(616)-3318, Phase 1. AF WADC TR 57-242.

Investigation of mechanical properties and physical metallurgy of aircraft alloys at very low temperatures. Part V: Mechanical properties of metals and plastic laminate at low temperatures, by M.G. Fontana, S.M. Bishop and J.W. Spretnak. Ohio State University Research Foundation, Columbus, O. Dec 1953. 75p photos, drawings, diagr, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 128210

Covers: (1) Tensile and notched fatigue tests at -253°C on 24S-T4, 75S-T6, NE(SAE) 8630 steel, titanium, and 18-8 stainless steel type 304. (2) Tensile compression, and fatigue tests at room temperature and -196°C on a glass-fabric-polyester resin laminate. Also (3) Harness, tensile and impact tests and dilatometric measurements over the range room temperature to -253°C. AD 27726. For Parts 1 and 4 see PB 98635 and 112768. Contract AF 33(038)-15698. AF TR 56-62, Part V.

Investigation of molybdenum and molybdenum-base alloys made by powder-metallurgy techniques, by W.L. Bruckart, C.M. Craighead and R.I. Jaffee. Battelle Memorial Institute, Columbus, O. Jan 1955. 172p photos, diagrs, graphs, tables. Order from LC. Mi $8.10, ph $27.30. PB 127913

Studies were made of molybdenum and of molybdenum-base binary and ternary alloys prepared by powder-metallurgy techniques; hydrogen sintering and vacuum sintering of the following addition elements were studied: Al, B, Be, C, Cb, Co, Cr, Fe, In, Mn, Ni, P, S, Si, Sn, Ta, Th, Ti, V, W, and Zr. The evaluation of the alloys made with these elements included investigations of room-temperature strength, hardness, bend ductility, hot hardness, creep characteristics, and resistance to recrystallization. The following oxides were studied as additions to molybdenum: Al_2O_3, BaO, CaO, CeO_2, Cr_2O_3, MgO, SiO, SrO, ThO_2, and ZrO_2. AD 63281. Project 7351, Task 70646. For other reports under this Contract see PB 108066-108067, 108096 and 108773. Contract AF 33(038)-12641. AF WADC TR 54-398.

Investigation of three ferritic steels for high-temperature application, by A. Phillip Coldren and James W. Freeman. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Apr 1957. 117p photos, diagrs, graph, tables. Order from OTS. $3.00. PB 131069

An investigation was carried out to survey the relationships between microstructure and properties at 700° to 1100°F for low-alloy, hardenable steels. A Ni-Cr-Mo (SAE 4340) and two Cr-Mo-V ("17-22-A"S and "17-22-A"V) steels were studied. The results correlate properties with microstructure for three temperatures of isothermal transformation in the pearlite region and three in the bainite region. Oil-quenched and normalized structures were included for comparison. The properties were evaluated for structures when tempered to both the 300 and 350 Brinell hardness levels. Data for the "17-22-A"V steel in the form of a TTT diagram obtained to establish heat-treating condition is included. These data are supplemented by similar studies for continuous cooling down to rates simulating the air cooling of a 6-inch round. The results are correlated and analyzed in the report. AD 118204. Project 7351, Task 73512. Covers work from Sep 15, 1955 - Dec 15, 1956 under Contract AF 33(616)-3239. AF WADC TR 57-40.

Liquid metal heat transfer fluid: Review of literature. See entry under Bibliography on page 117. PB 130187

Mechanism and kinetics of age hardening in Mg-Li alloy systems, by J.B. Clark. Dow Chemical Company, Midland, Mich. Oct 1957. 54p photos, diagrs, graphs, tables. Order from OTS. $1.50. PB 131567

The habit plane of a Widmanstätten precipitate of the LiZn phase in the cubic lithium-magnesium solid solution of a 5at%Li, 45at%Mg, 50at%Li, the precipitation of the MgLiZn phase in the cubic lithium-magnesium solid solution, and the lattice of the transition structure were studied. Debye-Scherrer, metallographic and mechanical property studies were made on a series of Mg-Li-Al-In and Mg-Li-Zn-In alloys to ascertain whether the large disregistry between the matrix and the age hardening precipitates in Mg-Li-Al alloys could be reduced by addition of indium. Little reduction in disregistry was observed and the alloys exhibited no properties of commercial significance. AD 142107. Project 7021, Task 70608. Covers work from Nov 1955-Mar 1957 under Contract AF 33(616)-3177. AF WADC TR 57-405.

Oxidation of copper to Cu_2O+CuO, by Donald W. Bridges, John P. Baur, Gretta S. Baur and W. Martin Fassell, Jr. Utah. University. Dept. of Metallurgy, Salt Lake City, Utah. Nov 1955. 17p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126194

Oxygen free-high conductivity copper was oxidized to CuO and Cu_2O over the temperature range 600-1000°C in pure oxygen (0.026-20.4 atm). Correlation of weight gained and time, also temperature correlation, were obtained by mathematical equations. Technical report no. 11. Dept. of the Army project no. 599-01-004. ORD project nos.: TB 2-0001 and TB 4-161. Dept. of the Army project no. DA 593-08-024. Contract DA 04-495-ord-237. WAL R 370/18-21. For reports nos. 4-7 under Contract DA 04-495-ord-237 see PB 123815 - 123818.

Polarization characteristics of metals in some automotive coolant materials, by M. Levy. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen Proving Ground, Md. Jan 1957. 47p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 130193

Anodic and cathodic polarization measurements were made of steel-copper couples in tap water and 30% ethylene glycol environments treated with various inhibitor materials. Prior to this, galvanic corrosion current-time data were obtained with the steel-copper couples in the same media. The data obtained indicate the following materials to act primarily as anodic polarizers in both tap H_2O and 30% ethylene glycol media: borax (1.0%, 2.0%); sodium nitrite (1.0%, 1.5%); triethanolamine (1.5%); sodium chromate (0.1%, 0.25%); sodium silicate (0.8%); sodium benzoate (1.5%). This increased anodic polarization caused a marked reduction in the current flow between the anodic and cathodic members. Although amines are generally considered to adsorb at cathodic areas and interfere with the reactions there, the data obtained indicate triethanolamine in concentration of 1.5% functions primarily as an anodic polarizer in tap H_2O and 30% ethylene glycol media. Sodium citrate and hydroquinone in the concentrations considered behave as corrosion accelerators in tap water and 30% ethylene glycol environments by preventing polarization of the anode. Ordnance project no. TB 5-8010A, Report no 22. D.A. project no. 593-28-001. APG CCL R 13.

Principles and application of heat treatment for titanium alloys, by A.J. Griest and P.D. Frost. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Dec 1957. 132p photos, diagrs, graphs, tables. Order from OTS. $3.50. PB 121636

This report summarizes the state of the art of titanium heat treatment as of Spring, 1957. In the first section, the relationships between alloy constitution, microstructure, and properties obtained on heat treatment are discussed. The second section consists of a collection of property data for selected commercial alloys in the heat-treated condition. Room-temperature and short-time-elevated temperature data are presented for all of the alloys. When available, impact energy data, creep data, stress stability data, fatigue data, and hardenability data are included. The final section of the report discusses heat-treating practice including furnace characteristics, coatings for minimizing contamination and procedures for the control of distortion and flatness during heat treatment. Contract AF 18(600)-1375. BMI TML R 87.

Rapid loading properties of aircraft structural metals, by D.S. Wood and D.S. Clark. California Institute of Technology, Pasadena, Calif. Dec 1948. 229p photos, drawings (part fold), diagrs, graphs, tables. Order from LC. Mi $9.90, ph $34.80. PB 126709

Part I presents the design of equipment that has been constructed for studying the influence of rapid loading and the time at load on the strain-time relations of a specimen when subjected to tension. A general description of the machine and the details of the mathematical analysis required for the design is given. Each unit of the equipment is described in detail. The procedure for operating the equipment is presented. Part II presents the results of rapid load tension tests made on 0.19 percent carbon annealed steel, a type 302 stainless steel, an SAE 4130 steel normalized, and SAE 4130 steel quenched and drawn, a 24ST aluminum alloy, and a 75ST aluminum alloy. AD 43956. Contents. - Report no. 1, The design and construction of a hydro-pneumatic machine for rapid load tensile testing, 21 May 1947. - Report no. 2, final: The influence of rapid load and time at load on the tensile properties of several alloys, 30 Jun 1948. Contract W33-038ac-14102(15772). AF TR 5742. AF TSEAM M5233.

Recovery of aluminum from crude aluminum-silicon alloy by extraction with molten zinc, by Hillary W. St. Clair and D.D. Blue. U.S. Bureau of Mines. Aug 1949. 30p photo, diagrs, graphs, tables. Order from U.S. Bureau of Mines, Pittsburgh, Pa., as RI 4535. PB 126468

1. Aluminum - Recovery 2. Aluminum-silicon alloys - Refining 3. Aluminum - Purification 4. BM RI 4535

Rupture strength of several nickel-base alloys in sheet form, by James H. Dance and Francis J. Clauss. U.S. National Advisory Committee for Aeronautics. Apr 1957. 24p photos, diagr, graphs, tables. Order as TN 3976 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125708

The 100-hour rupture strengths of Inconel X, Inconel 700, Incoloy 901, Refractaloy 26, and R-235 at 1200° and 1350°F in both the annealed and heat-treated conditions were determined. Photomicrographs show that fractures are through the grain boundaries. Results are compared with published data for other sheet alloys and bar stock. NACA TN 3976.

Salt corrosion of titanium alloys at elevated temperature and stress. Progress report, by Mallory-Sharon Titanium Corporation, Pratt & Whitney Aircraft, Rem-Cru Titanium, Inc., Republic Steel Corporation and Titanium Metals Corporation of America. Battelle Memorial Institute, Titanium Metallurgical Laboratory, Columbus, O. Nov 1957. 57p photos, graphs, tables. Order from OTS. $1.50. PB 121637

This report describes a type of high-temperature corrosion of titanium alloys by sodium chloride which, in the presence of stress, may lead to

cracking. While this cracking has occurred so far only in laboratory tests, and research work is still in preliminary stages, it is the consensus that the available data should be reported now to the users of titanium. Appendix: Stress corrosion results for nonprotected commercial titanium alloys coated with sodium chloride. Contract AF 18(600)-1375. BMI TML R88.

Static strength of cross-grain 7075-T6 aluminum-alloy extruded bar containing fatigue cracks, by Walter Illg and Arthur J. McEvily, Jr. U.S. National Advisory Committee for Aeronautics. Apr 1957. 25p photos, diagrs, graphs, tables. Order as TN 3994 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125717

Cross-grain specimens of 7075-T6 aluminum-alloy extrusion containing fatigue cracks of various lengths were subjected to static tests to determine residual static strength. Small cracks resulted in disproportionately large reductions of static strength. The effects of biaxiality and ductility on notch sensitivity under static loading are discussed in appendixes. NACA TN 3994.

Status of high-strength steels for the aircraft industry, by R.J. Nekervis, C.H. Lund and A.M. Hall. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Jan 1958. 106p graphs, tables. Order from OTS. $2.75. PB 121639

In the course of a survey of 12 steel producers and 15 aircraft manufacturers, six major classes of steel were uncovered which show promise for application in aircraft for skins, particularly, and for other shapes such as bar stock, forgings, and castings. In the order of decreasing tensile strengths in the range room temperature to 800 F these are: (1) Hot-work tool steels; (2) Martensitic stainless steels; (3) Low-alloy hardenable steels; (4) Precipitation-hardenable semiaustenitic stainless steels; (5) Cold-rolled austenitic stainless steels; (6) Precipitation-hardenable austenitic stainless steels. Contract AF 18(600)-1375. BMI TML R 91.

Strength limitations of metals. Proceedings of the 1955 Sagamore Research Conference, Aug 24-26, 1955. Syracuse. University. Research Institute, Syracuse, N.Y. Contract DA 30-115-ORD-667. Order separate parts described from OTS; giving PB number of each part ordered.

Vol. I. Mar 1956. 204p photos, drawings, graphs, tables. $5.50. PB 131280

Contents: General problems of strength limitation: Introduction to the problem, by Col. A.P. Taber. - Requirements for strength increases in ordnance, by N.L. Reed. - Summary of strength-limitation phenomena, by G. Sachs. - Dislocation and strength, by P.B. Hirsch. - Fundamental factors which determine the strength of alloys: Effects of grain size, solid solution and other metallurgical factors on strength, by E.R. Parker. - Effects of transformations and precipitations on strength, by E.P. Klier. - Dependence of strength on loading speed and loading time, by D.S. Wood. - Factors limiting high strength and its application: Strength limitations under repeated loads, by E.D. 'Appolonia. - Section size effects, by J.D. Lubahan. - Effects of stress concentrations, fibering and residual stress, by Oscar Hoffman. - Effects of hydrogen on high-strength alloys, by V. Weiss. AD99248. MET 365-564F1.

Vol. II. Mar 1956. 200p photos, graphs, tables. $5.00. PB 131281

Contents: High-strength steels: Super-high strength steels for aircraft applications, by J.W. Sands. - Properties of high-strength steels at room and low temperatures, by Abe Hurlich. - High-strength steels for moderately-elevated temperatures, by W.F. Brown, Jr. - Crack propagation in high-strength steels, by G.R. Irwin. - High-strength nonferrous alloys: Titanium alloys, by S.V. Arnold. - Aluminum alloys, by E.H. Dix, Jr. - Magnesium alloys, by J.C. McDonald. AD 99249. MET 365-564F2.

Superficial corrosion attack on the surfaces of Alclad sheets, by John Easton. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1938. 15p photos, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 126528

1. Aluminum alloys - Corrosion tests 2. CAA TDN 14

V-notch Charpy impact testing of weld metal and heat-affected zone simultaneously, by William P. Hatch, Jr. and Carl E. Hartbower. U.S. Arsenal, Watertown, Mass. Dec 1955. 14p photos, diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 126527

The composite test is sensitive to variations in weld metal and heat-affected zone toughness, and to a seemingly minor variation in welding procedure. Therefore, the test provides, at least in part, a method for evaluating the relative notch-toughness characteristics of weld metal and heat-affected base metal in a natural enviroment. O.O. project TB 4-31. D/A project 592-05-007. WAL R 401/220.

Analysis and forecasting of wind field near the tropopause, by Walter J. Saucier. Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, College Station, Tex. Sep 1956. 118p map diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 125557

The report is divided into the following 4 parts: 1. Administrative analysis; 2. Abstracts and summarizing remarks on specific scientific studies on the project; 3. Jet stream studies not previously printed, and 4. Coordination with project jet stream. A&M project 57, Reference 56-29f. Contract AF 19(604)-559, Final report.

Characteristics of solar radiation reflected from desert soil, by Kinsell L. Coulson. California. University. Dept. of Meteorology, Los Angeles, Calif. Sep 1956. 41p photos, diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 125555

The results of measurements of the polarization and relative intensity of light reflected from desert soil are presented and discussed. Both polarization and intensity are found to vary with sun elevation, the altitude and azimuth of the observed point, and with wavelength. A neutral point of polarization of the reflected light has been found, the position of which has a systematic variation with sun elevation and wavelength. Contract AF 19(604)-1303, Scientific report no. 2. AF CRC TN 56-872.

Compendium of thunderstorm electricity, by S. E. Reynolds. New Mexico. Institute of Mining and Technology. Research and Development Division, Socorro, N. Mex. Oct 1954. 124p photos, drawing, diagrs, graphs, table. Order from LC. Mi $6.30, ph $19.80. PB 126161

Discusses cloud structure and circulation, electrical properties, charge separation mechanism, and control of thunderstorm electrification. Dept. of the Army project: 3-99-07-022. Signal Corps project: 172B. Contract DA 36-039-sc-42647.

Electrical theory of tornadoes, by Bernard Vonnegut. Arthur D. Little, Inc., Cambridge, Mass. May 1956. 38p diagrs, graph. Order from LC. Mi $3.00, ph $6.30. PB 126678

The ancient idea that tornadoes are a manifestation of thunderstorm electricity is examined in the light of our present knowledge. Modern theory and observations appear to support this idea. It is suggested that the electrical energy in a storm could cause the extraordinarily intense winds of a tornado by electrically heating a volume of air to a high temperature or by accelerating charge air in an electric field. C-59667. Contract Nonr 1684 (00), Partial final report no. 4.

Erosion of meteors and high-speed vehicles in the upper atmosphere, by C. Frederick Hansen. U.S. National Advisory Committee for Aeronautics. Mar 1957. 38p diagr, graphs, table. Order as TN 3962 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125691

Analytic relations for velocity, deceleration, size, and relative magnitude of luminosity of meteors are derived in parametric form. Comparison of the theory with observed meteor behavior indicates that a large fraction of the atmospheric bombardment energy is used in eroding meteor material. Erosion from large, high-speed vehicles in free-molecule flow is calculated and the mass loss is found negligible. NACA TN 3962.

Fission product radioactivity in the air along the 80th meridian, Jan - Jun 1957, by L.B. Lockhart, Jr., R.A. Baus, and I. H. Blifford. Jr. U.S. Naval Research Laboratory. Nov 1957. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 129034

The concentration of long-lived radioactive products (primarily fission products) in the air continues to remain considerably higher in the Northern than in the Southern Hemisphere. Among the more interesting developments, there has been obtained a definite inverse relation between the air concentration of radioactivity and rainfall during the dry and rainy seasons at Panama. The use of "radioactivity profiles" (plots of latitude vs fission product concentration) to represent a cross section of the average air concentrations of fission products along the 80th meridian for any given period offers a ready means to obtain the total burden of such activity in the atmosphere for such a period and to follow its increase or decrease with time. NRL R 5041.

Study of high-altitude wind research. Part I: Methods and bibliography, 12 Jun 1956-12 Jan 1957, by G.E. Hudson, S. Weisbrod, J.L. Heritage and J. Zane. Smyth Research Associates, San Diego, Calif. Jan 1957. 104f diagrs, maps, graphs, tables. Order from LC. Mi $5.70, enl pr $18.30. PB 130157

Various methods for investigating high altitude winds are reviewed and illustrated. Limitations of these methods are discussed and general conclusions regarding the high altitude winds are summarized. A comprehensive bibliography with 247 entries has been compiled and classified according to basic types of investigation techniques. SRA-30. Contract NOa(s) 56-1009c, Final technical report.

Study of small-scale atmospheric motion. Part II: Divergence and vorticity, by Holbrook Landers. Florida State University. Dept. of Meteorology, Tallahassee, Fla. Apr 1956. 36p maps, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 125592

Divergence and vorticity are computed for a small area of about 1/2 square mile from the changes in area and orientation of a triangle formed by three pilot balloons as they ascend. The magnitudes and vertical distributions of the divergence and vorticity are discussed. For Part I see PB 124890. Contract Nonr-1600(00), NR-082-071, Technical report no. 6.

Study of small scale modification of air passing over inhomogeneous surfaces, by Arnold H. Glaser, William P. Elliott and Albert J. Druce. Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, College Station, Tex. Jan 1957. 57p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 126686

The primary effort of the project was in the matter of internal boundary layers, and mathematical models for the momentum and thermal boundary layers were developed. The principle features of these mathematical solutions of the boundary layers are: the height of the momentum boundary layer is independent of wind speed, and the height of the thermal boundary layer is independent of wind speed and temperature difference. Some qualitative evidence was obtained to show that the equations derived were not out of line with the atmosphere. Also, although the equations derived for the boundary layer height were quite complex, a satisfactory approximation in the form of a 7/9 power law was found. Use of the theories of the internal boundary layer was made in discussing the horizontal variation of shearing stress and also the effect of the presence of an internal boundary layer on evaporation. A rotating arm temperature gradient instrument was developed which presented a continuous picture of the temperature structure on an oscilloscope. The design and circuitry of the instrument are presented in this report. AD 117129. A&M project 85, Reference 57-8F. Contract AF 19(604)-997, Final report. AF CRC TR 255.

Upper atmosphere research report. U.S. Naval Research Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

No. VIII: Prediction and location of rocket impacts at White Sands Proving Ground, by Homer E. Newell, Jr. Jun 1949. 18p drawings (part fold), table. Mi $2.40, ph $3.30. PB 126510

This report discusses the problems of rocket impact prediction and location as they apply to range safety and to recovery of research records. An approximate method for predicting the impact points of all types of rockets is considered, and a sound-ranging method for locating the impacts of small missiles is outlined together with results. Included is a brief discussion of the Naval Research Laboratory Rocket Impact Computer. Unclassified 15 Dec 1953. NRL P 3485.

No. X: Matrix telemetering system, by J.T. Mengel and others. Sep 1949. 89p photos, drawings, diagrs (part fold). Mi $4.80, ph $13.80. PB 126508

A thirty-channel matrix telemetering system of medium-high repetition rate has been developed by the Naval Research Laboratory for use in high-altitude rockets. The matrix system uses pulse position modulation and is synchronized by means of a coded triple-pulse preceding each group of data pulses. System operation is discussed and the operation of the particular units is described in detail. NRL R 3535.

No. XV: AN/FKR-1( )telemetering ground station improvement program, by Nolan R. Best. May 1952. 23p photos, diagrs (part fold). Mi $2.70, ph $4.80. PB 126509

After more than three years of use at White Sands Proving Ground, the AN/FKR-1 ( ) ground station for the Matrix Telemetering System (AN/DKT-2) has received general improvements as follows: (a) Improved monitor racks that incorporate new circuit developments and superior mechanical design have been installed. (b) Additional recording racks, which allow three channels per scope or six channels per nine-inch film to be recorded, have been added. (c) Provision has been made in the ground station to allow interchangeable operation with the Miniature Matrix Telemetering System, AN/DKT-7( ). (d) Record quality has been improved by the dynamic focusing of recording cathode-ray tubes and by the use of new optical equipment. Supplements NRL report 3535. NRL R 3992.

MINERALS AND MINERAL PRODUCTS

Clays and clay minerals. Proceedings of the fourth National Conference on Clays and Clay Minerals, Pennsylvania State University, University Park, Oct 10-13, 1955, edited by Ada Swineford, sponsored by the Committee on Clay Minerals of the National Academy of Sciences-National Research Council. 1956. 450p photos, drawings, diagrs, graphs, tables. Order as Publication 456 from NAS-NRC Publications Office, 2101 Constitution

Ave., N.W., Washington 25, D.C. $6.00. PB 124691

For 2d conference see PB 118242.
1. Clay - Congresses 2. Clay minerals - Congresses 3. Clay minerals - Synthesis 4. Montmorillonite 5. Sepiolite 6. NRC 456

Effect of pressure on the Curie temperature of polycrystalline ceramic barium titanate and dependence of the ratio of piezo-electric coefficients on density and composition of barium titanate ceramics, by Hans Jaffe, Don Berlincourt, J.M. McKee and H.H.A. Krueger. Clevite Research Center, Cleveland, O. May 1956. 12p graphs, tables. Order from LC. Mi $2.40. ph $3.30. PB 126679

Project 80112-G. 1. Barium titanate - Crystal structure 2. Barium titanate - Curie point 3. Barium titanate - Use in cermets 4. Ceramics, Barium titanate - Polarization 5. Ceramics, Barium titanate - X-ray inspection 6. Contract Nonr 1055 (00), Technical report no. 10.

Freeze-thaw durability of aggregate in concrete. Highway Research Board. 1956. 31p photos, diagr, graphs, tables. Order as Publication 435 from NAS-NRC Publications Office, 2101 Constitution Ave, N.W., Washington 25, D.C. 60 cents. PB 126057

Presented at the Thirty-fifth annual meeting, 17-20 Jan 1956. 1. Concrete aggregates - Durability 2. Concrete - Durability 3. HRB Bul 143 4. NRC 435

Mechanical and physical properties of barytes-colemanite concrete, by Gustave Edward Lundquist. North Carolina State College, Raleigh, N.C. 1952. 38p photos, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126898

Since barytes-colemanite concrete has all of the advantages of ordinary concrete plus the added advantages of greater density and better radiation attenuation properties, it is concluded that barytes-colemanite concrete in a useful and effective material for the shielding of a stationary nuclear reactor. Thesis-North Carolina State College. ATI 160-108.

Research investigations of magnetic material, permanent ceramic type, by Frank G. Brockman, Paul W. Beck, and Walter G. Steneck, Jr. Phillips Laboratories, Inc., Irvington-on-Hudson, N.Y. Contract DA-36-039-sc-56759. Dept. of the Army project no. 3-93-00-503. Signal Corps project 2005. Order separate parts described below from LC, giving PB number of each part ordered.

Third quarterly progress report, Feb 1, 1955 to Apr 30, 1955. May 1955. 22p diagr, graphs, tables. Mi $2.70, ph $4.80. PB 126091

Studies of the processing variables in the production of oriented (anisotropic) material were continued. Part of this is concerned with the actual measurement of the particle size distributions of powders used in the orienting process. The differential thermal analysis technique used in studies on the chemical reaction involved was changed to permit taking data at higher temperatures. One experiment was performed. Case no. 12-102. Continuation of work under Contract DA-36-039-SC-42503. For these reports see PB 113551-113554.

Final report, and eighth progress report Apr 1, 1954 to Jul 31, 1954. Aug 1954. 57p photo, graphs, tables. Mi $3.60, ph $9.30. PB 126093

Research and development work aimed toward the development of improved types of ceramic permanent magnets of the composition type $M^{II}O(Fe_2O_3)_6$, where M^{II} signifies divalent metals such as barium, lead, strontium or others. Case 1277. Work continued under Contract DA 36-039-sc-56759.

PACKING AND PACKAGING

Chemical Corps purchase description. Insert, packaging, fiberboard, corrugated, single and double faced; for general packing purposes. U.S. Chemical Corps. Jun 1955. 9p. Order from LC. Mi $1.80, ph $1.80. PB 130190

Proposed specification. Supersedes Army specification 19-10C dated 26 Jun 1944. No. 197-54-619. 1. Fiberboard - Specifications 2. Packaging materials - Specifications 3. MIL F

Investigation of shock waves developed during dynamic tests of cushioning materials, by Vern N. Smiley. U.S. Forest Products Laboratory, Madison, Wis. Aug 1957. 27p diagrs, graphs. Order from OTS. 75 cents. PB 131429

Certain irregularities of acceleration-time pulses were recorded during dynamic compression tests of package cushioning materials for determining their energy absorption characteristics. These irregularities were theorized to have been caused by shock wave oscillations in the material. The validity of this theory was checked by deriving mathematical expression based upon shock wave theory and then comparing theoretically expected results with actual test results. Sufficiently close agreement was found to prove that irregularities were caused by shock waves. A discussion

of the significance of shock waves in relation to cushioning performance is also made. AD 131019. Project 7312, Task 73127. Covers work from Jan 1956-Jun 1956 under Contract AF 33(600)53-4023. AF WADC TR 56-547.

Long-term storage tests of barrier material (third year), by Richard H. Devore. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. May 1957. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 128733

Ordnance Project TB 4-672. DA Project 591-07-001. 1. Barrier materials - Evaluation 2. Barrier materials - Storage 3. Ordnance materials - Preservation 4. PA TR 2419

PAPER AND ALLIED PRODUCTS

Investigation of pressure-sensitive sealing tape, by Theodore Fruchtman and Llewellyn M. Hagenbuch. U.S. Picatinny Arsenal, Dover, N.J. Oct 1956. 44p photos, tables. Order from OTS. $1.25. PB 131320

Pressure-sensitive paper tape was tested and found superior to the solvent-activated paper tape in current use for sealing cartons. Exposure tests were conducted in three localities and in a weatherometer. The tape was subjected to standard rough-handling tests and laboratory analyses. Based on data furnished by Picatinny Arsennal, a revised interim specification was issued (PPP-T-0076, 5 Dec 1954). AD 109123. Ordnance projects TB 4-672 and TB 4-621. Dept. of the Army projects 591-07-001 and 593-22-005. PATR 2357.

PERSONNEL APTITUDE TESTING

Conversion tables for selected airman classification battery scores and comparable scores on other selected service and civilian tests, by Donald B. Gragg and Howard J. Douglass. 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. Jun 1956. 36p tables (part fold). Order from LC. Mi $3.00, ph $6.30. PB 126626

The smoothed equipercentile method is employed. Tables are provided for converting scores in three aptitude areas under which all Air Force specialties may be assigned with seasonable accuracy, namely, the general, mechanical, and clerical aptitude areas. Project 7700, Task 77004. AF PTRC TN 56-89.

Radioman 1 & chief. U.S. Bureau of Naval Personnel. 1954. 437p photos, drawings, diagrs (part fold), graphs, tables. Order from LC. Mi $11.10, ph $66.60. PB 128080

Navy Training Course. 1. Personnel, Radio - Training 2. NAVPERS 10229-A

Report on job analysis, by Alan M. Kershner. U.S. Office of Naval Research.Psychological Sciences Division. Personnel and Training Branch. 1955. 75p. Order from LC. Mi $4.50, ph $12.30. PB 126730

A source of information and a guide in considering important research ideas for improving job analysis methods. ONR ACR 5.

PHOTOGRAPHIC AND OPTICAL GOODS

Electrophotographic processor using transfer of electrostatic images. Final summary report to the Haloid Company, by S.A. Hawk, F.D. Punnett, J.F. Byrne, H.C. Davis, L.E. Walkup, and R.M. Conklin. Battelle Memorial Institute, Columbus, O. Apr 1956. 51p photos, drawings, diagrs, graphs. Order from OTS. $1.50. PB 131336

The ultimate purpose of this work was to devise a laboratory model of a machine that would produce black-and-white positive prints from conventional photographic negatives. The machine was to use the electrophotographic techniques that are being called the TESI processes (Transfer of Electro Static Images). The electrostatic image is transferred by special techniques to the surface of a thin insulating sheet where the image is developed by unique methods. This report summarizes the experimental and theoretical work which preceded construction of the laboratory model as well as the processor itself. Contract DA 36-039-sc-64600, Final summary report.

Evaluation of soils and permafrost conditons in the territory of Alaska by means of aerial photographs, by Robert E. Frost. Purdue University. Engineering Experiment Station, Lafayette, Ind. Order separate parts described below from LC, giving PB number of each part ordered.

Vol. I. Sep 1950. 158p photos, map. Mi $7.50, ph $24.30. PB 126612

Includes Table of contents for volumes I and II. 1. Photography, Aerial - Interpretation - Alaska 2. Frozen ground - Properties - Alaska 3. Permafrost - Properties - Alaska 4. Soils (Engineering) - Frozen ground - Alaska

Vol. II. Sep 1950. 181p photos, maps (4 fold in pocket). Mi $8.40, ph $28.80. PB 126532

1. Soils - Alaska 2. Permafrost - Alaska 3. Photography, Aerial - Interpretation

Optical methods for examining the flow in high-speed wind tunnels. Part I: Schlieren methods, by D.W. Holder and R.J. North. Part II: Interferometer methods, by George P. Wood. Advisory Group for Aeronautical Research and Development. Nov 1956. 151p photos, drawings, diagrs, tables. Order as AGARDograph 23 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 126014

A review of the present state of knowledge concerning the use of schlieren, direct-shadow, and interferometer techniques for visualizing and photographing the flow in high speed wind tunnels, including methods in an early stage of development, or useful only in a limited range. Information on light sources and photographic materials is included. Summary in English and French. AGARDograph 23.

PHYSICS

General

Bibliography of boundary layer control. See entry under Bibliography on page 116. PB 126383

Boundary layer control by porous suction, by H.G. Lew and R.D. Mathieu. Pennsylvania State University. Dept. of Aeronautical Engineering, State College, Pa. Jun 1954. 124p graphs. Order from LC. Mi $6.30, ph $19.80. PB 126407

Contains history of theoretical work, incompressible flow, compressible flow, and a survey of work done by various researchers. Contract AF 18(600)-575, Technical report no. 3. AD 41436. AF OSR TN 54-203.

Heat transfer in slip flow, by R.L. Martino. Toronto. University. Institute of Aerophysics. Oct 1955. 165p graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 126414

The Raleigh approach was employed in a theoretical investigation of the effect of slip and temperature jump on the heat transfer characteristics of a flat plate in a compressible laminar flow for a constant initial surface temperature. The heat transfer parameters were matched to the Chapman-Rubesin results for steady flow in the continuum regime. These parameters appeared to differ by a factor of two from accepted theories for the limit of free-molecule flow, and in slip flow were found to be functions of both free-stream Mach number and the ratio of the constant initial surface temperature to the feee-stream temperature. AD 82234. UTIA R 35. Contract AF 18(600)-1185. AF OSR TN 55-443.

Measurement of acoustic impedance, by Osman K. Mawardi. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. May 1949. 75p photos, diagrs, graphs, tables. Order from LC. Mi $4.40, ph $12.30. PB 126832

A method is described to measure the acoustic impedance of a sample of material forming one boundary of a shallow cylindrical cavity, by determining the sound pressure produced when a known volume current is injected into the cavity from a high-impedance source. The volume current is effectively determined by observing the pressure when the cavity is rigidly terminated. The use of ring source suppresses the first radial mode of the cavity and extends the frequency limit set by uniformity of pressure by at least an octave. Contract N5ori 76, T.O. X, NR 014-903. HU ARL TM6.

Sound scattering by solid cylinders and spheres, by James J. Faran, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Mar 1951. 132p photos, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 126829

The theory of the scattering of plane waves of sound by isotropic circular cylinders and spheres is extended to take into account the shear waves which can exist (in addition to compressional waves) in scatterers of solid materials. Scattering patterns computed on the basis of the theory are shown to be in good agreement with experimental measurements of the distribution-in-angle of sound scattered in water by metal cylinders and spheres. Rapid changes with frequency in the distribution-in-angle of the scattered sound and in the total scattered energy are found to occur near frequencies of normal modes of free vibration of the scattering body. The dependence upon Poisson's ratio of the frequencies of the first few of these normal modes of free vibration is illustrated for both the cylindrical and spherical cases. ATI 194209. Contract N5 ori 76, T.O. X, NR 014-903. HU ARL TM22.

Steady laminar boundary over a flat plate with injection of a different gas, by S.F. Shen. U.S. Naval Ordnance Laboratory, White Oak, Md. May 1956. 31p. Order from LC. Mi $3.00, ph $6.30. PB 127404

The steady laminar boundary layer over a flat plate with injection of a foreign gas through the plate is

analyzed, including the diffusion flow and the effect on fluid properties due to the variation of the composition from point to point. The possibility of similarity solutions and an iterative scheme for such are discussed. Assuming the Prandtl number and the Schmidt number to be unity across the layer, and neglecting thermal diffusion the problem is reduced to the solution of an equivalent single-component boundary layer. This solution is proposed to serve as the initial approximation in the iterative procedure. NOL ARR 333. NAVORD 4235.

Summary of experiments and analysis for gas flow, heat transfer and friction in circular tubes, by W.M. Kays. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Jun 1954. 100p graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 126430

This report summarizes all of the work accomplished on this project on the heat transfer and flow friction behavior for gas flow inside circular tubes. A set of design curves are presented, giving both heat transfer and friction behavior in the Reynolds number range, 500 to 50,000, and including all of variables considered. AD 41805. Contract N6 onr-251, T.O. 6 (NR 090-104). SU ME TR 22.

Theoretical and experimental studies of liquid viscosity, concluding report by F.C. Collins. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Jul 1957. 36p diagrs, tables. Order from OTS. $1.00. PB 131403

A review of the theoretical background of this research is presented together with an analysis of the outstanding difficulties of the various theories of liquid viscosity. The present status of the rigid sphere model of liquid viscosity and its relationship to sonic velocity is reviewed. The experimental data relating to the viscosity and sonic velocity in a number of typical liquids are presented and tentatively evaluated in terms of the rigid sphere model of liquid viscosity. A brief description is given of the apparatus for measuring sonic absorption in liquids constructed during the term of this contract and being used in the field of liquid transport properties. AD 130871. Project 3044, Task 70313. For Part 1 see PB 121758. Contract AF 33(616)-373, Final report. AF WADC TR 57-413.

Nuclear

Alpha ionization damage as a cause of low helium ratios, by Patrick M. Hurley. Massachusetts Institute of Technology. Dept. of Geology, Cambridge, Mass. Jun 1951. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 128168

The relationship between helium loss and the number of alpha particles per milligram has been established for zircon and sphene for use in approximate age measurements on these minerals. Theoretical curves have been derived that appear to represent the process fairly well, and permit age estimates to be made even on material that is severely damaged. Contract N5 ori-07829.

Comparison of solutions to the one-velocity neutron diffusion problem, by L.A. Beach, R.B. Theus, P. Shapiro, R.C. O'Rourke, W.R. Faust and B. Lepson. U.S. Naval Research Laboratory. Dec 1957. 49p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 129100

By Fourier transform techniques the exact solutions of the one-velocity neutron diffusion problem have been derived for plane isotropic, plane parallel monodirectional, and plane parallel bidirectional source terms. These exact solutions in terms of Fourier inversion integrals were numerically evaluated upon the NAREC to give the angular distribution of the scattered intensity, total scattered intensity, and total intensity. By solving the integrals by contour integration in the complex plane, asymptotic solutions were obtained which are good approximate solutions for deep penetrations and problems with little absorption. Moment method solutions were derived and evaluated to be in good agreement with the exact solutions for symmetric source and intensity functions. Monte Carlo estimates can be obtained that correctly account for source asymmetries and boundary discontinuities and which can be extended to at least 20 mean free paths utilizing suitable bias techniques such as the exponential transformation. NRL R 5052.

Containment study of the Enrico Fermi fast breeder reactor plant, by E.M. Fisher and W.R. Wise, Jr. U.S. Naval Ordnance Laboratory. Oct 1957. 31p diagrs, tables. Order from OTS. $1.00. PB 131583

A study has been made on the ability of the Enrico Fermi fast breeder reactor plant to contain a nuclear excursion equivalent to the violence produced by 1000 pounds of TNT. The results of the study indicate that the reactor plant can contain shock waves developed in the air and in the sodium and also fragments from the cylindrical covering materials surrounding the reactor core. The rotating shield plug, however, is a serious hazard when projected by the gun action of the internal blast pressure in the reactor compartment. This problem is analyzed and a recommendation has been made to lessen the danger. NAVORD 5747.

Pion-deuteron scattering in the impulse approximation, by Ronald M. Rockmore. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N.Y. Apr 1956. 57p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 125934

Joint ONR-AEC program. Thesis - Columbia University. CU-111-ONR-1-Physics. 1. Mesotrons - Scattering - Theory 2. Deuterons - Scattering - Theory 3. Contract N6ori-110, T.O. 1 4. Nevis 26 5. R-134 6. CU-111

Quarterly progress report no. 13 under Contract AF 18(600)-997. Boston University. Dept. of Physics, Boston, Mass. Dec 1956. 7p. Order from LC. Mi $1.80, ph $1.80. PB 125933

For report no. 8 see PB 119177. 1. Atomic power - Research 2. Contract AF 18(600) 997, Report no. 13.

Technical report no. 2 under Contract Nonr 595(02). Maryland. University. Institute of Molecular Physics, College Park, Md. Mar 1956. 10p. Order from LC. Mi $1.80, ph $1.80. PB 125566

1. Atomic power - Bibliography 2. Molecular theory - Bibliography 3. Contract Nonr-595(02), Technical report no. 2

Thallium 204 beta-excited X-radiography, by J.G. Kereiakes and G.R. Kraft. U.S. Army Medical Research Laboratory, Fort Knox, Ky. Jul 1956. 19p photos, drawings, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126731

Thallium 204 can be used as a source for beta-excited x-radiography. X-radiographs of a mouse, fabricated paraffin hand and a dosimeter compare favorably with those of a previously used Sr 90-Y-90 source. The use of a 2 mm active diameter source resulted in a great improvement in definition of the radiographs. Scintillation spectrometer studies of the energy spectrum of x-radiation from the Tl source shows a good 70 kev peak suitable for diagnostic radiography. Subtask under Biological and Medical aspects of ionizing radiation, AMRL Proj. 6-59-08-014, Subtask: Effects of ionizing radiation. AMRL R 251.

Vectorial charge displacement, by D.C. Peaslee. Purdue University, Lafayette, Ind. Oct 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 125558

The consequences are examined of recognizing an extreme symmetry between the nucleon and cascade particle. The simplest formalism for expressing this symmetry is to take the charge displacement number $a = q - I_z$ for heavy particles as the z-component of a second, independent vector in charge space. This scheme makes evident the possibility of two independent charge conjugation operators C and C' for heavy particles; it also has suggestive applications to the θ_1, θ_2 scheme and the π-e decay problem. Experimental tests for vectorial Δ appear remote. AD 87526. Contract AF 18(600)-1579. AF OSR TN 56-212.

PHYSIOLOGY

High altitude balloon dummy drops. Part I: Unstabilized dummy drops, by Raymond A. Madson. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1957. 46p photos, graphs. Order from OTS. $1.25. PB 131572

The characteristics of instrumented dummies carried aloft to predetermined altitudes were studied during the free fall in unstabilized situations. These dummies were observed to assume an altitude permitting spins about a transverse axis, and the angular velocities recorded on acelerometers exceeded rates compatible with human tolerance. This study justifies further tests to develop a method of stabilizing a man descending from high altitudes. AD 130965. Project 7218, Task 71719. AF WADC TR 57-477, Part I.

Mask-to-mask studies in paralyzed human subjects employing prototype mask-to-mask resuscitator for use in contaminated atmospheres, by James O. Elam, Elwyn S. Brown and others. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Dec 1956. 47p drawings, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126418

The physiology underlying the method of artificial respiration by means of expired air of another person was investigated. The results demonstrated the efficiency of design features in a device for applying the method in the field in contaminated atmospheres. Improper technic of using the mask-to-mask resuscitator was also studied, and the resulting recommendations were explicit concerning the rate and depth of breathing of the operator while executing the method. The importance of training in resuscitation management was emphasized. Project 4-08-02-018-04. CC CWL R 2082.

PSYCHOLOGY

Acquisition and retention of odor identifications, by S. MacLeod, P.J. Bersh, H.I. Freeman, A.W. Leavitt and V.W. Weekman, Jr. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Jan 1957. 30p photos, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126623

This report concerns a study of human capability for the learning and retention of odor identifications as dependent on the number and kind of odorants to

be identified. Fifteen odorants were metered into a chamber where they were sniffed by groups of four or five subjects at one time. Different groups of subjects were trained to identify different numbers of these stimuli, aided by their written associations. Retention tests were then given at various intervals during a five-week period. Findings of the the experiments are discussed. AD 97901. Project 4585. AF RADC TR 57-7.

Aspects of the autonomous personality: I. Manifest anxiety, by Marshall B. Jones. U.S. Naval School of Aviation Medicine, Naval Air Station Pensacola, Fla. Nov 1953. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 126467

A positive and significant correlation between authoritarianism as measured by the California F. Scale, Form 40-45, and manifest anxiety as measured by the Taylor Manifest Anxiety Scale is reported. Two independent samples of Naval Aviation Cadets were used as subjects. In both samples, substantially the same results were obtained. The results support the clinical description of the authoritarian and, at the same time, suggest a neurotic component in the authoritarian personality structure. NMRI Proj NM 001-058.25.03.

Comparative information-handling performance with symbolic and conventional Arabic numerals: Verbal and motor responses, by Earl A. Alluisi and Hugh B. Martin. Ohio State University. Laboratory of Aviation Psychology, and Ohio State University Research Foundation, Columbus, O. Apr 1957. 18p diagr, graphs, tables. Order from OTS. 50 cents. PB 131562

It may sometimes be more economical to display numerical information not with the conventional Arabic numerals, but with symbolic numerals consisting of simple figures that are relatively easy to generate electronically. One such set of symbolic numerals (generated from an eight-element straight-line matrix) was used in the present study along with a set of conventional numerals (AND-10400). The purpose of the study was to compare the information-handling performance of subjects in making verbal (number-naming) and motor (key-pressing) responses to the two sets of numerals. AD 118160. Project 7192, Task 71569. AF WADC TR 57-196.

Driver characteristics. Highway Research Board. May 1957. 42p photos, diagrs, graphs, tables. Order as Publication 487 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 80 cents. PB 126008

This bulletin contains four papers. The first, on "Personal Characteristics of Chronic Violators and Accident Repeaters," describes the findings of 2-1/2 years of operation of the New Jersey Accident Prevention Clinic, set up by the Motor Vehicle Division in October 1952. The second deals with "Dyanmic Visual Fields," particularly with regard to vehicle accident experience, driver training, vehicle design, and highway planning. A third paper describes the first phase of a special study at Iowa State College on "Effect of Rest Pauses and Refreshment on Driving Efficiency." The fourth paper, a report by the Committee on Road User Characteristics, presents a pilot study investigation of information on driver behavior and other factors from reports of "near accidents." Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. HRB Bul 152. NRC 487.

Effect of rate and phrasing on intelligibility of air messages, by Henry M. Moser, John J. Dreher and Sol Adler. Ohio State University Research Foundation, Columbus, O. May 1956. 14p. Order from LC. Mi $2.40, ph $3.30. PB 126346

Tests indicate that normal habitual speaking rate and grouping delivery performed consistently better than the spaced method in communicating complete thoughts. Project no. 7681. Contract AF 19(604)-1577. AF CRC TN 55-68. OSURF Proj 664, Technical report no. 29. OSURF TR 29.

Effect of varying degrees of projection on test scores, by Edward J. Wallon and Wilse B. Webb. U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Feb 1956. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 126643

Two projective tests (the Picture-Frustration test and a sentence completion test) were modified into a multiple-choice form. These tests were given in three ways: the projective test alone, the multiple-choice alone, and the projective test given and the subjects required to watch their responses to the multiple-choice form. The "objectification" resulted in a marked increase in "socially acceptable" responses. However, the joint administration of the tests more closely approximated the purely projective response. NMRI Project 001 108 100, Report no. 12.

Man-machine dynamics, by Jerome H. Ely, Hugh M. Bowen and Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. Nov 1957. 119p drawings, diagrs, graphs. Order from OTS. $3.00. PB 131576

This report identifies and discusses factors affecting human performance in tracking and in watch-keeping (vigilance) tasks, and makes recommendations toward improving the performance of such systems. Whenever these recommendations are the direct outgrowth of published research, the appropriate studies are cited. Other recommendations have been developed by the authors from their own experiences. AD 131082. Project 7180, Task 71501. Sponsored by the Joint Army-Navy-Air-Force Steering Committee of the U.S. Dept.

of Defense. Chapter VII of the Joint Services' Human engineering guide to equipment design. Includes Bibliography of 116 items. AF WADC TR 57-582.

Noncontinuity as a consequence of stimulus-response relationships, by Claude B. Elam, and Percy C. Reed. U.S. Air Force. School of Aviation Medicine, Randolph Field, Texas and Texas.University. Radiobiological Laboratory, Austin, Tex. Aug 1956. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126619

Thirty-one rhesus monkeys were divided into four groups and tested on the Wisconsin apparatus. For group 1, color and form were successively presented. For group 2, color differences were simultaneously presented while form was successively presented. For group 3, color differences were successively and form differences simultaneously presented. For group 4, color and form were simultaneously different. After each animal had achieved a criterion of 20 correct responses in 24 trials, all groups were shifted to a second phase in which form relationships were the same as in the first phase, but color differences were eliminated. In a final phase the animals had to transfer to a nonapproach problem having the same relationship of relevant stimulus elements as the first phase. Results support the response-adoption hypothesis. AF SAM R 56-64.

Symposium on Air Force human engineering, personnel, and training research, edited by Glen Finch and Frank Cameron, held under the auspices of the Division of Anthropology and Psychology, National Academy of Sciences - National Research Council, at the request of Headquarters, Air Research and Development Command, U.S. Air Force. Nov 14-16, 1955, Washington 25, D.C. 1956. 321p photos, diagrs, graphs, tables. Order as Publication 455 from NAS-NRC Publications Office, 2101 Constitution Ave., Washington 25, D.C. $4.00. PB 128317

Most of the papers presented have been issued as AF PTRC TN 56-5 - TN 56-26, AF RADC TN 55-302, AF WADC TR 55-378 and AF WADC TN 55-423. 1. Psychology, Applied 2. Personnel, Flying - Training 3. AF ARDC TR 56-8 4. NRC 455

Timed phrases (Psychological studies of training techniques), by John W. Black. Kenyon College, Gambier, O. n.d. 10p. Order from LC. Mi $1.80, ph $1.80. PB 126419

SDC Human Engineering Project 20-K-2. 1. Communication, Voice - Training 2. Psychological research 3. Contract N7 onr-411, T.O. 1 4. SDC TR 411-1-5

RUBBER AND RUBBER PRODUCTS

Improved structural adhesives for bonding metals, by H.C. Engel. Bloomingdale Rubber Co. Jul 1954. 43p graph, tables. Order from LC. Mi $3.30, ph $7.80. PB 126551s

The work of improving the structural metal-to-metal adhesive formulation that was previously developed under Contract AF 33(038)-21669 is presented. Shear strength test data of aluminum joints bonded with experimental modifications of the adhesive formulation and with experimental curing cycles and assembly procedures are listed. The strength data is the basis on which the conclusions are made as to the best formulation, its degree of stability, and the optimum conditions for bonding which result in the best strength properties. AD 35725. Supplement to PB 126551. Contract AF 33(600)-23194. AF WADC TR 52-156 Suppl. 1.

STRUCTURAL ENGINEERING

Location and m-factors of vapor barriers within insulated buildings (an analytical approach), by R.J. Zablodil. U.S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Mar 1956. 21p photos. Order from LC. Mi $2.70, ph $4.80. PB 130189

One vapor barrier located near the warm surface of an insulated wall may not prevent the condensation of water vapor when outside temperatures enter into the sub-zero range. This condensation destroys the heat-resistant function of the insulation. The addition of properly located vapor barriers of correct permeance will control the movement of vapor and prevent condensation within the insulation. This report is a technical analysis of the problem of controlling condensation in structures subjected to sub-zero ambient temperatures. Project NY 450 010. NCEREL TN N 263.

Research and development leading to the establishment of ultrasonic test standards for aircraft materials, by A.D. Guinn, R.D. McKown, J.C. Folz and W.C. Hitt. Ultrasonic Testing and Research Laboratory. Oct 1957. 133p photos, diagrs, graphs, tables. Order from OTS. $3.50. PB 131564

Very little information has been available for use by engineering personnel interested in setting up ultrasonic inspection and testing reference standards for use in determining the acceptability of aircraft materials. Since the ultrasonic method of inspection and testing of aircraft materials is now widely employed, a very definite need exists for test standards for use in determining the acceptabil-

ity of aircraft materials undergoing this method of inspection and testing. While this research program was somewhat limited in its scope, it is believed that the data collected will provide the basis for the establishment of ultrasonic test standards for the aircraft materials studied. AD 142034. Project 7360, Task 73606. Covers work from 15 Apr 1956 - 15 Apr 1957 under Contract AF 33(616)-3363. AF WADC TR 57-268.

Thermal stress analysis for aircraft structures. Part I: Theory and methods of analysis, by Bruno A. Boley and Jerome H. Weiner. Columbia University. Institute of Air Flight Structures, New York, N.Y. Aug 1955. 199p diagrs, graphs. Order from LC. Mi $8.70, ph $30.30.

This report presents the basic theory and some methods of analysis in the fields of heat transfer, thermoelasticity and thermoineelasticity. AD 97339. Project 1350(U), Task no. 13605. Contract AF 33(616)-2071. AF WADC TR 56-102, Part I.

TEXTILES AND TEXTILE PRODUCTS

Investigation of the mechanical properties of hard fibers with reference to their use in cordage structures, by Milton M. Platt. Fabric Research Laboratories, Inc., Boston, Mass. Feb 1951. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 126576

Gives the wet out properties of henequin, sisal, sansevieria, and domestic abaca; and the effects of 2-1/2 years of aging in a dry atmosphere on tenacity and elongation. Case no. C47736. For Report no. 2 and Final report see PB 118672 and 121044. Contract N7 onr-421, T.O. I, Technical report no. 4.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Comparative evaluation of aircraft seating accomodation, by R.F. Schlecta, E.A. Wade, W.K. Carter and J. Forrest. Tufts University. Sociology Dept. Bio-Mechanics Laboratory, Medford, Mass. Apr 1957. 121p photos, drawings, graphs, tables. Order from OTS. $3.25. PB 131560

Three inter-related purposes were accomplished: (1) A series of seats currently in use in operational aircraft were comparatively tested for adequacy in limiting pilot and crew fatigue and discomfort. (2) Several subjective methods of comfort testing were devised and evaluated to determine efficient and economical means of seat evaluation. (3) The test data were analyzed for basic information about the nature and progression of seating discomfort. AD 118097. Project 7215, Task 71724. Contract AF 33(616)-3068. AF WADC TR 57-136.

Effect of interaction on landing-gear behavior and dynamic loads in a flexible airplane structure, by Francis E. Cook and Benjamin Milwitzky. U.S. National Advisory Committee for Aeronautics. 1956. 32p diagrs, graphs, tables. Order as NACA Report no. 1278 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 30 cents. PB 126002

Supersedes TN 3467(PB 118233). 1. Aerodynamics - Research 2. Landing gear - Impact loads 3. Loads, Aerodynamic - Theory 4. Loads, Landing - Impact - Theory 5. Loads, Structural - Dynamic - Theory 6. NACA 1278 7. NACA TN 3467, Revised

Instruments

Development of filters for 400°F and 600°F aircraft hydraulic systems, by David B. Pall. Micro Metallic Corporation. May 1956. 49p photos, drawings, tables. Order from LC. Mi $3.30, ph $7.80. PB 128057

The higher operating temperatures of airplanes currently in design, and others projected, required the development of ten micron hydraulic oil filters operating in the range from -65° to -600°F. A previously developed high area corrugated filter element was used. This element is made using fine woven wire cloth, "rigidized" by sintering. Housings of aluminum construction and suitable seals were developed and successfully passed a series of tests designed to check their suitability for use in airborne hydraulic systems in the range of -65 400°F. Housings of steel construction and suitable seals were developed for -65 to -600°F service. Proposed MS standard drawings for both -65 to 400°F and -65 to -600°F filters are included in this report. AD 106312. Project 1371, Task 13499. Covers period 25 Apr 1955-30 Apr 1956 under Contract AF 33(600)-29975. AF WADC TR 56-249.

Interconnection of electrical equipment and overall system layout in aircraft, by Parker Painter and Robert E. Dryden. Radiation, Inc., Melbourne, Fla. May 1955. 68p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 128136

This report is the final engineering evaluation of the electrical components which comprise the intercon-

necting circuitry of an aircraft electrical system. Materials evaluated and systems studied include the following: connecting devices and terminations, wire and insulation, interconnecting methods (terminal blocks, junction boxes, etc.), cable layout and segregation. AD 98351. Project no. 6060, Task no. 60372. Contract AF 33(616)-2360. AF WADC TR 55-242.

Tuned spot dampers for aircraft soundproofing, a feasibility and development study, by H. F. Reiher, R. N. Hamme and R. E. Hamilton. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Oct 1957. 183p diagrs, graphs, tables. Order from OTS. $4.75. PB 131574

The applicability of tuned spot dampers to aircraft soundproofing has been investigated and demonstrated by detailed sound transmission measurements in the potentially resonant range of frequencies for a simulated aircraft fuselage section. Design parameters for practical damper configurations have b3en investigated extensively by a free-vibration criterion of damping effectiveness, and correlations have been developed between the damping criterion, the response to steady-state excitation and the resonant sound transmission of panel structures. AD 131081. Project 1370. Covers work from Jan 1954 - Feb 1957 under Contract AF 33(616)-2333. AF WADC TR 57-519.

Engines and Propellers

Aeroelastic stability of helicopter rotors in hovering flight, by John Zvara. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory, Cambridge, Mass. Sep 1956. 138f photos, drawings, diagrs, graphs, table. Order from LC. Mi $6.90, enl pr $22.80. PB 130156

The aeroelastic stability of helicopter rotor blades in hovering flight is studied theoretically and experimentally with results which yield a number of interesting conclusions about the relative merits of existing aerodynamic theories as applied to different rotor configurations investigated. The experimental program utilizing a five foot diameter model rotor with two rectangular planform blades is described. The design of the model rotor is such that simple adjustments or modifications to the basic hub make it possible to test a fixed-at-root, articulated or teetering rotor. Results of tests made for the different hub configurations with a set of flexible blades and a set of rigid blades to investigate the effect of chordwise center of gravity location, chordwise feathering axis location, feathering axis in or out of the plane of the blade, coning angle and elastic feathering restraint, on the blade stability, are presented. A discussion of the three types of instabilities encountered in the test program, i.e., instantaneous rigid body pitch divergence, mixed flutter and pitch divergence, and classical bending-torsion type flutter, is included. Contract NO (a)s 55-322C. MIT ASRL 61-1.

Analysis of once-per-revolution oscillating aerodynamic thrust loads on single-rotation propellers on tractor airplanes at zero yaw, by Vernon L. Rogallo, Paul F. Yaggy and John L. McCloud, III. U.S. National Avisory Committee for Aeronautics. 1956. 32p photos, drawings, graphs, tables. Order as NACA Report no. 1295 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 30 cents. PB 126013

Supersedes NACA TN 3395 (PB 117601). 1. Yawing - Calculation 2. Thrust - Measurements 3. Loads, Structural - Theory 4. Propellers, Tractor - Tests 5. Wings - Flutter - Calculations 6. Interference, Nacelle - Theory 7. Interference, Propeller - Theory 8. NACA 1295 9. NACA TN 3395, Revised

Effect of chord size on weight and cooling characteristics of air-cooled turbine blades, by Jack B. Esgar, Eugene F. Schum, and Arthur N. Curren. U.S. National Advisory Committee for Aeronautics. Jan 1957. 37p diagrs, graphs, tables. Order as NACA TN 3923 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125701

1. Heat transference - Effect 2. Turbines, Gas - Blades - Cooling 3. Turbines, Gas - Blades - Temperature 4. Turbines, Gas - Blades - Effect of cord size 5. NACA TN 3923

Free-jet tests of a 1.1-inch-diameter supersonic ram-jet engine, by Joseph H. Judd and Otto F. Trout, Jr. U.S. National Advisory Committee for Aeronautics. Feb 1957. 24p photos, tables. Order as NACA TN 3906 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125699

Supersedes RM L51L18. 1. Jet engines, Ram-jet - Performance 2. Jet propulsion - Flight tests 3. NACA TN 3906

Full-scale investigation of several jet-engine noise-reduction nozzles, by Willard D. Coles and Edmund E. Callaghan. U.S. National Advisory Committee for Aeronautics. Apr 1957. 45p photos, drawings, graphs, tables. Order as TN 3974 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125707

1. Nozzles, Jet - Noise reduction 2. NACA TN 3974

Manual of instructions for measurement of propellers by gages, by Leonard L. Murray, H.H.

Gildner and J. A. Raidabaugh. U.S. Bureau of Ships. Dec 1946. 23p photos, drawings (part fold). Order from LC. Mi $2.70, ph $4.80. PB 128071

1. Propellers - Measurement 2. Gages - Uses 3. NAVSHIPS 250-554

Methods for obtaining desired helicopter stability characteristics and procedures for stability predictions, by F. B. Gustafson and Robert J. Tapscott. U.S. National Advisory Committee for Aeronautics. Feb 1957. 28p graphs, tables. Order as TN 3945 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125696

Supersedes RM 5430; RM 54g05. 1. Helicopters - Rotors - Stability 2. Helicopters - Rotors - Theory 3. Helicopters - Stability 4. NACA TN 3945

Survey of heat transfer literature. See entry under Bibliography on page 117. PB 131305

Training and Training Devices

Development and validation of the pilot instructor selection examination, by John A. Cox, Jr. and Raymond E. Christal. 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. Sep 1956. 29p tables. Order from LC. Mi $2.70, ph $4.80. PB 126625

AD 098889. Project 7701, Task 77036. 1. Instructors, Aviation - Evaluation 2. Instructors, Aviation - Psychological tests 3. AF PTRC TN 56-114

Index to Air Force Personnel and Training Research Center 1955 documentary reports. See entry under Bibliography on page 117. PB 126705

Predictability of creative expression in teaching, by M. H. Chorness and D. A. Nottelmann. 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. Dec 1956. 31p tables. Order from LC. Mi $3.00, ph $6.30. PB 126621

This study represents an extension of earlier research in which tests of fluency have been found to correlate with ratings of teacher success. In this study, an attempt was made to relate measures derived from Guilford's creativity test battery to aspects of creative behavior manifested in the teaching medium. The creativity tests call for a flow of responses in a manner somewhat similar to earlier fluency tests, with the exception that they have been augmented by scoring techniques for cleverness, ingenuity of response, and statistical uncommonness. As a subsidiary problem, the study was also concerned with determining whether a measure of intelligence was equally as capable as the creativity tests in predicting creative components of performance in the teaching medium. AD 098905. Project 7703, Task 77085. AF PTRC TN 56-130.

Prediction of first semester criteria at the Air Force Academy, by Raymond E. Christal and John D. Krumboltz. 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. Jan 1957. 10p tables. Order from LC. Mi $1.80, ph $1.80. PB 126622

AD 098920. Project 7719, Task 17009. 1. Personnel, Flying - Ability tests 2. AF PTRC TN 57-17

Transfer of training after part practice on a dual-control tracking apparatus, by Edward A. Bilodeau. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Operator Laboratory, Randolph Air Force Base, Tex. Sep 1956. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126198

This study compares the relative magnitudes of transfer among several part-practice schedules and evaluates the efficacy of different forms of part practice in motor skills. AD 098885. Project 7707, Task 27052. AF PTRC TN 56-110.

Aerodynamics

Boundary-layer transition at Mach 3.12 as affected by cooling and nose blunting, by Nick S. Diaconis, John R. Jack, and Richard J. Wisniewski. U.S. National Advisory Committee for Aeronautics. Jan 1957. 17p photos, diagrs, graphs. Order as TN 3928 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125692

1. Mach number - Effect 2. Reynolds number - Effect 3. Boundary layer - Transition point - Effect of leading edge 4. Boundary layer - Transition point - Effect of temperature 5. NACA TN 3928

Calculation of aerodynamic forces on slowly oscillating rectangular wings in subsonic flow, by A. I. Van de Vooren and E. M. De Jager. National Aeronautical Research Institute, Amsterdam, Holland. (Nationaal Luchtvaart-Laboratorium).

Jan 1956. 69p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 126696

A method is presented for the calculation of the aerodynamic forces on a slowly oscillating airfoil. The method is essentially a lifting surface theory which takes into account the unsteady effects due to the wake. Results are given as series containing terms of increasing powers in reduced frequency. The method has been applied to rectangular airfoils. It is shown that if the axis of rotation is ahead of the airfoil, the aerodynamic damping is much less than it would be according to quasi-steady theory. Instability is possible if the aspect ratio is larger than a certain value. This limiting aspect ratio decreased with increasing Mach number. AD 115078. C.C.L. Class D43. NLL-TNF .192. Contract AF 61(514)-879. AF OSR TN 57-40.

Compressible laminar boundary layer with heat transfer and arbitrary pressure gradient, by Clarence B. Cohen and Eli Reshotko. U.S. National Advisory Committee for Aeronautics. 1956. 18p graphs, tables. Order as NACA Report no. 1294 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents. PB 126003

Supersedes TN 3326 (PB 117093). 1. Thwaites' correlation 2. Heat - Transference - Aerodynamics 3. Boundary layer, Laminar - Flow - Pressure gradients 4. Boundary layer, Laminar - Flow - Heat transfer 5. NACA 1294 6. NACA TN 3326, Revised

Hypersonic facility of the Polytechnic Institute of Brooklyn and its application to problems of hypersonic flight, by Antonio Ferri and Paul A. Libby. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Aug 1957. 56p diagrs, graphs. Order from OTS. $1.50. PB 131566

The utilization of a hypersonic wind tunnel for experimental research on engineering problems connected with hypersonic flight is discussed. The hypersonic facility of the Polytechnic Institute of Brooklyn is described. The demonstrated capabilities of the first-stage or convection heater are presented and the concept of the second or compression stage is reviewed. Details of the facility especially those connected with nozzles, and experimental techniques are discussed. AD 130809. Project 1363, Task 70129. Abbreviated version of this report was presented by the first author at the 7th meeting of the AGARD Wind Tunnel and Model Testing Panel in July 1955, at Scheveningen, Netherlands. A modified version is to appear as an AGARD report of this meeting. Contract AF33 (616)-17, Final report. AF WADC TR 57-369.

Interaction of moving shocks and hot layers, by Robert V. Hess. U.S. National Advisory Committee for Aeronautics. May 1957. 65p diagrs, graphs. Order as TN 4002 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125660

1. Shock waves - Reflection - Boundary layer effects 2. Shock waves - Thermodynamics 3. NACA TN 4002

Lift hysteresis at stall as an unsteady boundary-layer phenomenon, by Franklin K. Moore. U.S. National Advisory Committee for Aeronautics. 1956. 12p diagr, graphs. Order as NACA Report no. 1291 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents. PB 126001

Supersedes TN 3571 (PB 118974). 1. Boundary layer, Laminar - Flow 2. Compressors - Blades - Aerodynamics 3. Airfoils - Lift coefficient 4. Stalling - Research 5. NACA 1291 6. NACA TN 3571, revised

Operational regions and bio-aerodynamic limitations of future aircraft escape systems, by Richard L. Geer. U.S. Air Force. Air Research and Development Command. Wright Air Development ment Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1957. 23p graphs. Order from OTS. 75 cents. PB 131577

The boundaries and conditions for practical flight within the atmosphere are delineated. The region where flight is practical is divided into areas of different escape requirements. Three figures are included to illustrate the various flight regions as a function of altitude and Mach number. AD131089. Project 7218, Tasks 71719 and 71750. AF WADC TR 57-590.

Quasi-cylindrical theory of wing-body interference at supersonic speeds and comparison with experiment, by Jack N. Nielsen. U.S. National Advisory Committee for Aeronautics. 1955. 58p diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 55 cents. PB 124966

Supersedes NACA TN 2677 (PB 106675) and NACA TN 3128 (PB 113850). 1. Wings - Interference 2. Wings, Rectangular - Pressure distribution 3. Loads, Aerodynamic 4. Flow, Supersonic - Theory 5. Wings - Aerodynamics - Theory 6. NACA 1252

Research on boundary layer characteristics in the presence of pressure gradients at hypersonic speeds, by Seymour M. Bogdonoff. Princeton University. Dept. of Aeronautical Engineering, Princeton, N.J. Jul 1955. 4p. Order from LC. Mi $1.80, ph $1.80. PB 125623

The primary work during the subject period was

placed on the study of leading edge effects on flat plates in the Mach number range from 11 to 15. Continued work has been carried out on bodies of revolution including both relatively blunt and slim sharp shapes. Work also has been continued on dissolving bodies in preparation for a final series of tests using bodies of many materials and different conductivities. Several modifications and improvements were made in the hypersonic wind tunnel, including the preliminary checking out of a higher Mach number nozzle. There has been some continued work on some preliminary gun studies to be used in conjunction with the hypersonic wind tunnel. AD 84370. Project: 54-610-185. Covers work from Mar 1, 1955 - Jun 1, 1955 under Contract AF 33(616)-2547. For later report see PB 126537.

Ring airfoil with deflected control surface in steady incompressible flow, by Johannes Weissinger. Karlsruhe. Technische Hochschule. Institut für Angewandte Mathematick, Karlsruhe, Germany. Jan 1957. 31p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126693

A short review of the report by Weissinger, issued as DVL-Bericht nr. 2, is given and new numerical material added. The reciprocity theorem of wing theory in the special form for ring airfoils is used in deriving formulae for the distribution of radial force and pitching moment along the circumference and for the total lift and pitching moment caused by the deflection of a control surface. The numerical results show a strong influence of ring shape on the effectiveness of the control surface. AD 115097. Contract AF 61(514)-904. AF OSR TR 57-8.

Sidewash in the vicinity of lifting swept wings at supersonic speeds, by Percy J. Bobbitt and Peter J. Maxie, Jr. U.S. National Advisory Committee for Aeronautics. Feb 1957. 49p diagrs, graphs. Order as TN 3928 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125704

1. Sidewash - Calculations 2. Flow, Supersonic - Theory 3. Wings, Swept - Aerodynamics 4. NACA TN 3928

Similar solutions for the compressible laminar boundary layer with heat transfer and pressure gradient, by Clarence B. Cohen and Eli Reshotko. U.S. National Advisory Committee for Aeronautics. 1956. 40p graphs, tables. Order as NACA Report no. 1293 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 40 cents. PB 126004

Supersedes TN 3325 (PB 116650). 1. Stewartson's equations (Compressible laminar boundary layer) 2. Boundary layer, Laminar - Flow - Pressure gradient 3. Boundary layer, Laminar - Flow - Heat transfer 4. Heat - Transference - Aerodynamics 5. Flow, Compressible - Heat transfer 6. Flow, Laminar - Heat transfer 7. NACA 1293 8. NACA TN 3325, Revised

Some experimental studies of panel flutter at Mach number 1.3, by Maurice A. Sylvester and John E. Baker. U.S. National Advisory Committee for Aeronautics. Feb 1957. 25p photos, diagrs, graphs, tables. Order as TN 3914 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125666

Supersedes RML 52I16. 1. Aeroelasticity - Calculation 2. Mach number - Effect 3. Panels - Stability 4. Flutter - Tests 5. NACA TN 3914

Theory for the lateral response of airplanes to random atmospheric turbulence, by John M. Eggleston. U.S. National Advisory Committee for Aeronautics. May 1957. 76p photo, diagr, graphs, tables. Order as TN 3954 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 126000

1. Airplanes - Buffeting 2. Gust loads - Mathematical analysis 3. Loads, Aerodynamic - Theory 4. Stability, Dynamic - Theory 5. Stability, Lateral - Theory 6. NACA TN 3954

Use of interfering flow fields for the reduction of drag at supersonic speeds, by Antonio Ferri and Joseph H. Clarke. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Mar 1956. 75p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 126681

A general outline is given of possibilities for favorable wave interference between supersonic aircraft components. The interference between a three-dimensional wing with swept leading edges and a small reflecting surface in biplane arrangement is discussed in terms of linearized flow theory. The method is applied to several biplane configurations of practical interest. It is shown that the drag of the wing can be greatly reduced or that the volume near the root section of the wing can be considerably increased without penalty in drag. The three-dimensional biplane is then discussed from the practical point of view. AD 88030. Project no. R-352-30-11. Contract AF 18(600)-694. PIB AL 304.

Rockets and Jet Propulsion

Environment of an earth satellite, by R. Griffith, W. Nordberg, and W.G. Stroud. U.S. Signal Corps Engineering Laboratories, Ft. Monmouth, N.J. Revised. Nov 1956. 44p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126090

This report is a collection of graphs, tables, and other data relevant to the environment of an earth satellite. It represents an attempt to summarize briefly in a single volume information that is widely scattered and to some extent unpublished. The intent in preparing this report is to assist those actively considering the problems pertinent to satellite research. Signal Corps task no. 172A. Dept. of the Army task no. 3-99-07-021. SCEL TM M 1747.

Rocket research report. U.S. Naval Research Laboratory. Order separate reports described below from LC, giving PB number of each report ordered.

No. XIV: Viking 9 firings, by Milton W. Rosen, James M. Bridger, and Richard B. Snodgrass. Oct 1954. 44p photos, drawings (part fold), graphs, tables. Mi $3.50, ph $7.80. PB 129128

The ninth Viking rocket, launched at White Sands Proving Ground, New Mexico on December 15, 1952, carried a payload of 765 pounds to an altitude of 135 miles. Although powerplant performance was good, the bulk mixture ratio to which propellants were loaded was in error, which caused a shortening of the burning period, a large excess of oxygen, and a reduction in the peak altitude. Trajectories, obtained from data provided by rocket-borne and range instrumentation, are compared in the Appendix. NRL R 129128.

No. XVI: Vibration in the Viking 9 rocket, by M.W. Oleson and C.B. Cunningham. Nov 1954. 75p photos, drawings, graphs, tables. Mi $4.50, ph $12.30. PB 129127

Five vibrational velocity pickups and one microphone were installed in Viking 9 for its static test and flight firing. Telemetered signals from these pickups were recorded and later analyzed. NRL R 4440.

Scientific objectives and observing methods for a minimum artificial earth satellite, by L.G. deBey, W.W. Berning and others. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1955. 162p photos, drawings (part fold), graphs. Order from LC. Mi $7.80, ph $25.80. PB 126710

The problems of systematic and accurate observations of a proposed minimum earth satellite have been studied. Limitations imposed by scientific objectives of a satellite vehicle, size of the vehicle, kinds of orbits possible, existing instrumentation technology and the suitability of instrumentation sites have been considered. It is concluded that a combination of optical and electronic observing methods is required to satisfy the program objectives. Moveover, such a combination appears to be compatible with the imposed limitations. D.A. Project no. 5B0306011. Ord. Research and Development Project TB3-0538. APG BRL R 956.

Marine Transportation

Direct shear stress and velocity profile measurement in an air stream with a mechanical standing wave boundary, by G.H. Moore and A.D.K. Laird. California. University. Institute of Engineering Research. Dept. of Engineering, Berkeley, Calif. Jul 1956. 47p photos, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125903

Data on direct measurement of surface shear stress and velocity profiles for conditions of flat surface, stationary waves and standing waves, was obtained from a mechanical wave model installed in a wind tunnel. Submitted under Research Grant from the National Research Foundation, NSF-G1703. UC IER Series 98, Issue no. 1.

Roll-on, roll-off sea transportation; proceedings of the symposium, 19 Nov 1956. Maritime Cargo Transportation Conference, 1956, Washington, D.C. 1957. 56p graphs, tables. Order as Publication 471 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.25. PB 126047

Convened as part of a program undertaken at the request of the Departments of Defense and of Commerce. Contents: Symposium "orientation," by E.G. Fullinwider. - Principles of trailership operation, by R.P. Delrich. - Numerical illustration of trailership operations, by V.A. Lewison. - Why we chose roll-on, roll-off, by Leslie M. Rudy. - Shoreside facilities for roll-on, roll-off and other special purpose ships, by Howard J. Marsden. - Notes on the design of roll-on, roll-off ships, by Hollinshead de Luce. - Trailer ship, today and tomorrow, by Eric Rath. - Defense interest in roll-on, roll-off vessels, by W.W. Outerbridge. NRC 471.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Effect of automatic sequence clothes washing machines on individual sewage disposal systems, by Harold Horowitz. Building Research Advisory Council. Mar 1956. 30p tables. Order as Publication 442 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.50. PB 124999

Reprinted by the Building Research Institute, National Research Council. Conducted by the Building Research Advisory Board of the Federal Housing Administration under Contract HA-fh-646, Amend-

ment no. 1. 1. Sewage disposal systems 2. Washing machines, Automatic - Waste disposal 3. Contract HA-fh-646, Amendment no. 1 4. NRC 442

MISCELLANEOUS

Growth rates of the urban population: Changes and their measurement, by Hilda Hertz and Carl Hammer. U.S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Feb 1953. 40p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126706

This paper is concerned with the application of certain mathematical tools to counts and measurements in urban demographic investigations. The relatively simple methods presented in the memorandum are sufficiently accurate to determine for an organized time series the most recent inflection point in terms of population trends, that point at which positive change in rate turns into negative change. A simple method for interpolation is given, permitting the equidistant spacing of points within a given time series based upon non-equi-distant observations. AF HRRI RM 5.

Proceedings: Fifth annual meeting of the Agricultural Research Institute, Oct 15-16, 1956. National Research Council. Division of Biology and Agriculture. Agricultural Research Institute. 1956. 118p photos. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. (Free) PB 126006

1. Agricultural cooperative associations
2. Agricultural research - Congresses

Properties and geologic occurrence of silt deposits in the Matanuska Valley, Alaska, by R.L. Handy R.W. Stump, D.T. Davidson, C.J. Roy and L.A. Thomas. Iowa Engineering Experiment Station, Ames, Iowa. Jun 1956. 106p photos, maps, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 126023

Petrographic analysis of several samples indicates that the silts have a mineral composition similar to that presently being carried by both the Matanuska and Knit Rivers. The silts may be composed of as much as 50 percent slate and/or phyllite rock fragments. Quartz is another abundant constituent. Differential thermal and X-ray analysis indicates chlorite is the dominant clay mineral, although some illite and possibly kaolinite are also present. Project: 320-S. Contract Nonr-530(04), Final report.

Report of NRL progress. U.S. Naval Research Laboratory. Feb 1958. 58p. Order from OTS. $1.25. Also available on annual subscription rate of $10 a year in the U.S.A., foreign rate $13 a year. PB 131635

Contents: Articles: A short program for satellite orbit prediction, by I. Harris and R. Jastrow. - Use of printed-wiring techniques in the development of electronic circuits, by F.C. Hallberg, H.H. Levy and C.J. Creveling. - High temperature creep of metals, by J. Weertman. - Scientific program: Problem notes: Application research: Human decision-making in manned-machine systems... Compensatory gain shift of the human operator... Determination of human gain in quickened and unquickened tracking systems... On the relative importance of certain surveillance information categories in air defense. - Chemistry: Influence of the type of glass used in studies of distillate fuel stability... Improvements in the vibrating condenser method of measuring contact potential differences... Interferometric measurements of the infrared dispersion of liquids... A simple P/T aerometer. - Electricity: Mass destructive readout of multilevel magnetic memory... A solid-state commutating and pulse width encoding circuit. - Mechanics: Effect of carbon content on the yield delay-time in steel... Effect of manganese content on the yield delay-time in steel... Aircraft armoring theory... High velocity projectile photographing station... Improved valveless pressure gain combusters to power a gas turbine compressor. - Metallurgy and ceramics: Theory of modifying the microstructure of cast alloys... Effect of atmosphere on the creep-rupture properties of a Ni-Cr-Al alloy... Radiation effect in ferrites... High temperature studies of several nickel-base, heat resisting alloys tested in welded and unwelded states... Cold cured piezoelectric ceramics. - Nuclear and atomic physics: A 2-meter positive ion beam electrostatic analyzer... Elastic scattering of neutrons from indium and silver. - Radio: Visibility in an empty visual field ...Contributing factor in the generation of noise in crossed-field, microwave tubes... Scanning arrays using the flat spiral antenna. - Solid-state physics: Polarized luminescent emission from KCl:Tl at low temperatures... Electrical contact transients... The form effect in magnetostriction... Magnetostriction of copper. - Published reports. - Papers by NRL staff members. - Patents.

Soviet bloc International Geophysical Year information, no. 1, Feb 14, 1958. Order from OTS. $10.00 for series of 48 issues through Jan 2, 1959. PB 131632

Published weekly. Back issues will be furnished regardless of date of order. Presents unevaluated information selected and translated from foreign language publications. Covers Soviet plans and activities in such IGV subjects as rockets, artifical earth satellites, upper atmosphere, meteorology, oceanography, seismology, glaciology, and the Antarctic.

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Administrative

Corporate author entries used by the Technical Information Service in cataloging reports. Third revised edition. Edited by Frances E. Stratton. Technical Information Service Extension. Oak Ridge, Tenn. November 1957. 290p. Order from OTS. $4.00. TID-5059 (3rd. Rev.)

Biology and Medicine

Annual progress report. Utah. Univ., Salt Lake City. Radiobiology Lab. March 1957. Contract AT(11-1)-119. 177p. Order from LC. Mi $8.10, ph $27.30. AECU-3522

Methods of collection, preparation and spectrographic analysis of human tissues, by I. H. Tipton and others. Oak Ridge National Lab., Tenn. February 1957. Contract W-7405-Eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-57-2-2

Spectrographic analysis of normal human tissue from Dallas, Texas, by I. H. Tipton and others. Oak Ridge National Lab., Tenn. February 1957. Contract W-7405-Eng-26. 51p. Order from LC. Mi $3.60, ph $9.30. CF-57-2-3

Spectrographic analysis of normal human tissue from Miami, Florida, by I. H. Tipton and others. Oak Ridge National Lab., Tenn. February 1957. Contract W-7405-Eng-26. 61p. Order from LC. Mi $3.90, ph $10.80. CF-57-2-4

A current review of body fluid analysis, procedures, and method of reporting--January 1957, by P. E. Brown, D. M. Davis, and L. C. Henley. Oak Ridge National Lab., Tenn. August 1957. Contract W-7405-Eng-26. 38p. Order from LC. Mi $3.00, ph $6.30. CF-57-8-1

Recent changes affecting the specifications concerning activity levels in reclaimed uranium, by C. C. Gamertsfelder. Hanford Works, Richland, Wash. March 1951. Decl. Jan. 21, 1957. 2p. Order from LC. Mi $1.80, ph $1.80. HW-20628

Tertiary effects of blast-displacement, by R. V. Taborelli and I. G. Bowen. Project 33.3. Lovelace Foundation for Medical Education and Research. Albuquerque, N. Mex. December 1957. 34p. Order from OTS. $1.00. ITR-1469

A review of beryllium and uranium airborne contamination in KAPL shop and laboratory areas, by J. E. Loy. Knolls Atomic Power Lab., Schenectady, N. Y. January 1951. Decl. Jan. 28, 1957. Contract W-31-109-Eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JEL-1

Quarterly progress report for period ending June 30, 1953. California. Univ., Los Angeles. Atomic Energy Project. July 1, 1953. Decl. Mar. 6, 1957. Contract AT-04-1-GEN-12. 99p. Order from LC. Mi $5.40, ph $15.30. UCLA-260

Biology and medicine quarterly report. July, August, September 1957. University of California. Radiation Lab., Berkeley, Calif. October 1957. Contract W-7405-Eng-48. 21p. Order from OTS. 75 cents. UCRL-8031

Studies on small area sub-fabric flash burns, by K. M. Berkley. University of Rochester. Rochester, N. Y. October 1957. Contract W-7401-Eng-49. 38p. Order from OTS. $ 1.00. UR-493

Effect of ionizing irradiation on longevity, by John B. Hursh. Rochester, N. Y. Univ. August 1957. Contract W-7405-Eng-49. 29p. Order from LC. Mi $2.70, ph $4.80. UR-506

Kinetics of the reaction of sulfite and bromate, by Frank S. Williamson and Edward L. King. Wisconsin. Univ., Madison. (1957). Contract AT(11-1)-64, Project No. 3. 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3436

The partition of oxygen between sodium and tantalum, by Charles E. Holley, Jr. Los Alamos Scientific Lab., N. Mex. July 1957. Contract W-7405-Eng-36. 8p. Order from LC. Mi $1.80, ph $1.80. AECU-3519

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