U. S. Government

RESEARCH REPORTS

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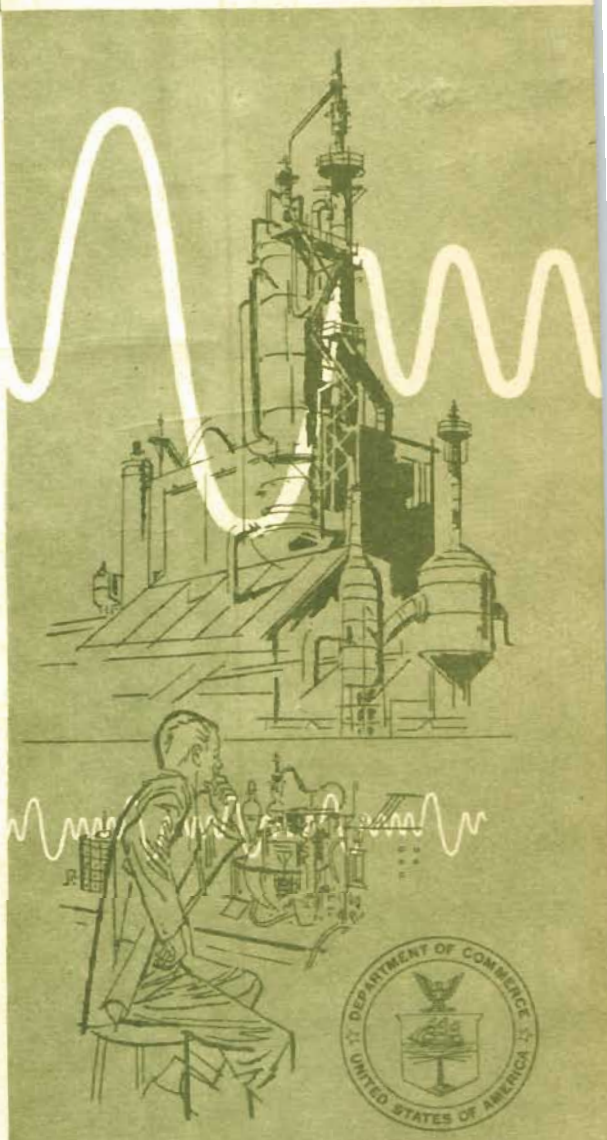
In this issue:



U. S. DEPARTMENT OF COMMERCE

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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 30, No. 1, Pp. 1-52 July 11, 1958

Contents

Printed Reports Available from OTS Announced in This Issue

APPAREL

Clothing and tolerance to heat, by James H. Veghte and Paul Webb. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1957. 14p graphs, tables. Order from OTS. 50 cents. PB 131705

A series of experiments has been conducted to determine the effect of clothing on human tolerance to hot environments (90° to 160°F). Exposures were made in five different clothing assemblies which were representative of permeable and impermeable lightweight and heavily insulated AF clothing The effect of the exposures was measured in terms of physiological strain. These experiments show to what extent impermeable clothing, as compared with permeable clothing, reduces human tolerance to heat, regardless of insulation value. AD 142248. Project 7155, Task 71804. AF WADC TR 57-759.

Height-weight sizing and fit-test of a cutaway g-suit, type CSU-3/P, by Irvin Emanuel and Milton Alexander. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory. Wright-Patterson Air Force Base, Dayton, O. and Antioch College, Yellow Springs, O. Jul 1957. 27p photos, drawings, tables. Order from OTS. 75 cents. PB 131451

Body size data from the 1950 Air Force Anthropometric Survey have been reanalyzed to yield a statistical sizing program based on height and weight. This six-size program was incorporated into the Type CSU-3/P Cutaway Anti-g Garment, which was tested from the standpoint of fit and comfort. Suit selection was accomplished simply by asking each subject his height and weight. Of seventy-three subjects fitted, seventy-two were comfortably accommodated by the size indicated by height and weight values. It is concluded that this sizing procedure will result in the saving of time and money because of the ease of fitting, reduction of individualized tailoring and simplification of procurement. AD 130912. Project 7214, Task 71739. Contract AF (18(600)-30. AF WADC TR 57-432.

BIBLIOGRAPHY

Causes of flavor and off-flavor in fresh and preserved foods, by Gustav Weingend, Charles H. Hearst and Gladys M. Burris. U.S. Quartermaster Food and Container Institute. Library Branch, Chicago, Ill. 2d edition. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Fresh and preserved foods (in general). May 1953. 117p. Mi $6.00, ph $18.30. PB 132844

1. Food - Flavor - Bibliography
2. QMC FCI BS no. 1, Part 1

Part II: Fresh and preserved vegetables. May 1953. 195p. Mi $8.70, ph $30.30. PB 132845

1. Food - Flavor - Bibliography
2. Vegetables - Preservation - Bibliography
3. QMC FCI BS no. 1, Part 2

Part III: Dairy products. May 1953. 160p. Mi $7.50, ph $24.30. PB 132846

1. Food - Flavor - Bibliography
2. QMC FCI BS no. 1, Part 3

Part IV: Fresh and preserved meats and fish. May 1953. 82p. Mi $4.80, ph $13.80. PB 132847

1. Food - Flavor - Bibliography
2. Meat - Preservation - Bibliography
3. Fish - Preservation - Bibliography
4. QMC FCI BS no. 1, Part 4

Part V: Fresh and preserved fruits. Jul 1953. 79p. Mi $4.50, ph $12.30. PB 132848

1. Food - Flavor - Bibliography
2. Fruit - Preservation - Bibliography
3. QMC FCI BS no. 1, Part 5

Part VI: Baking and bakery products. Oct 1953. 91p. Mi $5.40, ph $15.30. PB 132849

1. Food - Flavor - Bibliography
2. Bakery products - Preservation - Bibliography 3. QMC FCI BS no. 1, Part 6

Color and color changes in food, especially in fruits, by Gustav Weingend, Charles H. Hearst and Gladys M. Burris. U.S. Quartermaster Food and Container Institute, Chicago, Ill. Jul 1953. 177p. Order from LC. Mi $8.10, ph $27.30. PB 132850

1. Food - Color - Bibliography 2. Fruit - Color - Bibliography 3. QMC FCI BS no. 2

Human engineering bibliography, 1955-1956, prepared by the Project Staff, Human Engineering and Analysis Service. Tufts University. Institute for Applied Experimental Psychology, Medford, Mass. Oct 1957. 450p. Order from OTS. $4.75. PB 131507

Ezra V. Saul, Principal investigator. AD 149950. 1. Equipment design - Psychological aspects - Bibliography 2. Contract Nonr 494(13) 3. ONR ACR-24

Literature survey on the diffusion of metals into oxides. Illinois Institute of Technology. Dept. of Metallurgical Engineering, Chicago, Ill. IIT project 6078. Contract Nord-13883. Order separate parts described below from LC, giving PB number of each part ordered.

A. 1946-1952, by James Lommel. Dec 1953. 21p. Mi $2.70, ph $4.80. PB 132824

Progress report no. 1.
1. Metals - Oxidation - Bibliography
2. Metals - Diffusion - Bibliography

Part 2: Selected papers from 1946 to 1952, by J.J. Harwood, T.P. Hoar and others. Aug 1954. 18p graphs, tables. Mi $2.40, ph $3.30. PB 132825

Abstracts the following papers: 1. J.J. Harwood, "Powder Metallurgy Parts in High Temperature Applications", Materials and Methods, 36, no. 2, 87-91 (1952). - 2. T.P. Hoar and J.M. Butler, "Influence of Oxide on the Pressing and Sintering of Copper Compacts", J. Inst. Metals, 78, 351-92 (1950-1). - 3. J.M. Lepp and J.A. Slyh, U.S. Patent 2,568,157 (2-12-49). - 4. M.J. Stumback and R. Bayes, U.S. Patent 2,545,438 (1-12-49). 5. J.P. Lyle, Jr., "Excellent Products of Aluminum Powder Metallurgy" Metals Progress, 62, no. 6, 109-12 (1952). - 6. R. Irmann, Metallurgia 46, 125-33 (1952) or Rev. Aluminum 28, 267-75, 311-16 (1951) or Engineers' Digest 13, no. 1, 9 (1952). - 7. E. Gregory and N.J. Grant, Metallurgy Reports (MIT), 4, no. 5 (1953). - 8. G.E. Comstock, U.S. Patent 2,618,567 (10-19-50). - 9. A. von Zeerleder, "Aluminum in Powder Metallurgy", Modern Metals, 8, no. 12, 40-4 (1952). - 10. J.B. Campbell, "Metals and Refractories Combined in High Temperature Structural Parts", Materials and Methods

31, No. 5, 59-63 (1950). - 11. C.A. Hoffman, NACA Report, RM E53 G07 (11-16-53).

Part I: Literature survey on the diffusion of metals into oxides (continued). Part II: Literature survey on new structural materials made by powder metallurgy process for elevated temperature service. Aug 1954. 24p. Mi $2.70, ph $4.80. PB 132827

Literature survey report no. 3.
1. Metals - Oxidation, High temperature - Bibliography 2. Metallurgy, Powder - Bibliography

Review of selected papers relating to new structural materials developed by powder metallurgy. Illinois Institute of Technology. Dept. of Metallurgical Engineering, Chicago, Ill. Feb 1955. 31p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132828

Reviews the following papers: Part I. Theoretical consideration of development of high temperature materials by powder metallurgy: 1. Metal-ceramic interactions: A. Factors affecting fabrication and properties of cermet bodies, by W.D. Kingery. - B. Metal-oxide interfacial ractions at elevated temperatures, by G. Economos and W.D. Kingery. - C. Surface tension and wettability of metal-ceramic systems, by M. Humenik, Jr., and W.D. Kingery. - D. Absolute measurement of metal-ceramic interfacial energy and the interfacial absorption of silicon from iron-silicon alloys, by W.D. Kingery. -2. Slip shrinkage (during sintering) of metal-oxide mixtures and in boron carbide, by W. Dawihl. -3. Sintering mechanism as applied to refractory oxides and metals, by D. R. Wilder. -4. Hardening of metals, by J. L. Meijering. - Part II: General survey of high temperature materials developed by powder metallurgy: 5. Applicability of powder metallurgy to problems of high temperature materials, by G. M. Ault and G. C. Deutsch. -6. High performance jet engine design dependent upon metallurgical ingenuity, by I. Perlmutter. -7. Materials for high temperature service, by H. R. Clauser. -8. Cermets, by M. Kantzer. - 9. Tests of ceramic materials, and conditions for producing composite materials designed for the manufacture of aero-engine components, by Yves Le Sech and J. Tonachella. - 10. Modern refractory materials: (sintered) alumina-chromium mixtures, or "Chromal", by S. Tacvorian. - Part III. Treatments of powder products for property improvement: 11. Investigation of a chromium-plus aluminum oxide metal-ceramic body, by C.A. Hoffman. - 12. Sintered iron-copper compacts, by L. Northcott and C.J. Leadbeater. - 13. Electrical contact of an internally oxidized composition, by A.S. Doty and W.E. Lynch. - 14. Effect of cycle-sintering in the powder metallurgy process of iron, by H.H. Hausner. - 15. Steam treatment of porous iron, by F.V. Lenel. IIT project 6078. Literature survey report no. 4.

Review of the literature on two-phase (gas liquid) fluid flow in pipes. Part I, by William A. Gresham, Jr., Perry A. Foster, Jr. and Robert J. Kyle. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Jun 1955. 240p graphs, tables. Order from OTS. $3.50. PB 131728

All available literature on this subject was studied and the significant literature is summarized in this report. Abstracts of 180 references are included. Project no. 3084. Contract AF 33(616)-2660. AF WADC TR 55-422, Part 1.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Atropinization of dogs by intracardiac, intravenous, intrapulmonary, intramuscular and intraperitoneal injection routes, by Philip Andrews and Archer S. Gordon. Illinois. University. College of Medicine, Chicago, Ill. Dec 1956. 19p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 126206

This study was undertaken to compare the effectiveness of atropinization by various parenteral routes, including intracardiac, intravenous, intrapulmonary, intramuscular and intraperitoneal. Contract DA-18-108-CML-5365. CC CWL TM 27-5.

Organic Chemicals

Infrared spectra of fluorinated compounds (U), by Ernest Halpern and Jerome Goldenson. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Oct 1956. 43p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127196

Infrared spectral studies of 35 fluorinated organic compounds in the 2 μ to 15 μ region are reported. Included are the spectra of a number of fluorinated ethers, heterocyclic compounds, and derivatives of sulfur hexafluoride. Characteristic details of the spectra are discussed. A linear relation reported in the literature between the carbonyl absorption wave length and the sum of the effective electronegativities of the substituents on the carbon was extended for application to the types of fluorinated carbonyl compounds included in this report. Covers work from 14 Jan 1954 - 9 Jun 1955. Projects 4-08-03-001; 4-08-03-016-01. CC CRL R 642.

Rotational magnetic moment diamagnetic susceptibility of methane, by William Weltner, Jr. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 4p. Order from LC. Mi $1.80, ph $1.80. PB 127178

Date is 1953 or later. 1. Methane - Molecular structure 2. Methane - Spectrographic analysis 3. Contract N5 ori-76, T.O. 5

Plastics and Plasticizers

Plastic coated glass fiber insect screen, by James M. Osborn. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Jan 1956. 45p photos, tables. Order from OTS. $1.25. PB 131357s

This is the second report describing the evaluation of plastic-coated glass fiber insect screens. In this paper, natural weathering and the service testing of materials are considered primarily. ERDL Report No. 1327 (PB 129018) described the origin and reasons for this investigation, laboratory evaluation, and preparations for natural weathering tests. Repairs and utilities no. 52-21. Supplement to PB 129018. ERDL R 1327, Supplement.

Polymerization studies on monomers and evaluation of derivative polymers, by Faber B. Jones, R, A. Markle, Palmer B. Stickney and Randall G. Heiligmann. Battelle Memorial Institute, Columbus, O. Mar 1958. 128p graphs, tables (part fold). Order from OTS. $2.75. PB 131788

This report describes research to determine the polymerization characteristics of a group of experimental monomeric compounds and a preliminary evaluation of the potential of the resulting polymeric products as thermally stable and solvent-resistant rubbers and plastics. AD 151011. Project 7340, Task 73404. Covers work from Mar 1, 1956 - Sep 9, 1957 under Contract AF 33(616)-3313. For Part 1 see PB 131594. AF WADC TR 57-110, Part 2.

Spectral and total transmissivity characteristics of plexiglas in the wavelength range between 0.4 and 15 microns, by R.V. Dunkle, J.T. Gier, A.J. Test, L. Possner and J.T. Bevans. California. University. Dept. of Engineering, Berkeley, Calif. Mar 1949. 26p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 130776

ATI 89655. Thermal radiation project. 1. Plexiglass - Thermal conductivity 2. Plexiglas - Spectrographic analysis 3. Contract N7onr-295, T.O. 1, NR 015-202.

Paints, Varnishes and Lacquers

Development of improved heater wire coating methods and materials. Second quarterly report for the period 1 Jun 1956 to 31 Aug 1956 under Contract AF 19(604)-1744, by Charlotte Curtis and David Bergeron. Columbia Broadcasting System, Inc., CBS-HYTRON Division, Danvers, Mass. Sep 1956. 17p tables. Order from LC. Mi $2.40, ph $3.30. PB 127038

In the study of new coating formulations, various aluminum salts were added to the standard coating in an effort to improve the brittleness characteristic of the coating. Tests were made of several percentages of aluminum silicate, aluminum isopropylate and aluminum formate. The use of small amounts of aluminum formate shows particular promise. For 1st and 3rd reports see PB 126151 and 126421. Contract AF 19(604)-1744. AF CRC TN 56-392.

Effect of weathering upon the structural properties of organic finishes, by A.E. Austin, C.M. Schwartz and H.R. Nelson. Battelle Memorial Institute, Columbus, O. Apr 1949. 29p photos, graphs, table.. Order from LC. Mi $2.70, ph $4.80. PB 127043

The structural properties of thin films of clear organic finishes have been studied by means of electron diffraction and electron microscopy. The effect of weathering by exposure to ultraviolet radiation under controlled temperature and humidity was investigated. Electron micrographs show evidence, in the case of the varnishes, of crystalline degradation products, which appear as fine particles from 50 to 400 Å. in size, dispersed through the film. Micrographs of the lacquers, however, fail to reveal any structure which might be attributed to crystallinity. AD 80455. G-1152-1. Contract N5 ori-111, T.O. 4.

Effects of nuclear radiation on military specification paints, by Lloyd A. Horrocks. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Nov 1957. 31p photos, tables. Order from OTS. $1.00. PB 131599

This report is an evaluation of the gamma radiation and heat on several available types of specification and non-specification paints. Reflectance, adhesion abrasion, humidity, and film condition data are presented on the effects of gamma radiation and heat on silicone-alkyd, fluorocarbon, alkyd, nitrocellulose, phenolic, and epoxy resin-based paints. Silicone-alkyd, alkyd, and phenolic resin-based appear to be satisfactory for use after exposure to 1×10^9 roentgens. AD 142143. Project 7312, Task 73121. Covers work from Sep 1955-Aug 1956. AF WADC TR 57-186.

Final summary report on Contract NObs-62161 for for the period 18 Mar 1953 to 30 Nov 1955, by Martin H. Leipold, Wilfrid R. Foster and Thomas S. Shevlin. Ohio State University Research Foundation. Cermet Coating Dept., Columbus, O. Feb 1956. 147f photos, diagrs, graphs,

tables. Order from LC. Mi $7.20, enl pr $24.30. PB 132834

Results obtained in the course of this investigation have provided sound fundamental knowledge in the residual fuel-oil corrosion problem. Specific corrodents have been determined and were found to be two complex vanadyl-vanadates, a mixture of sulfur-bearing gases, and in some manner, sodium sulfate. Tentative explanations for the mechanisms of corrosion are offered in the light of the results determined. Zirconia, chromium, alumina-chromium and chromium-silicon have been indicated as having superior corrosion resistance. Chromium silicides high in chromium are applicable as a somewhat rough coating. AD 121940. Index no. NS 072-424. Covers work from 18 Mar 1953-30 Nov 1955 under Contract NObs-62161. OSURF Proj 565, Report no. 30.

Fundamental properties of organic finishes, by B. G. Brand, E. R. Mueller, E. E. McSweeney, A. E. Austin, C. M. Schwartz and H. R. Nelson. Battelle Memorial Institute, Columbus, O. Apr 1949. 13p. Order from LC. Mi $1.80, ph $1.80. PB 132031

The report summarizes a study of fundamental properties of organic finishes. The interfacial properties of finishes on metals and internal structural properties of various finishes have been investigated by means of electron diffraction and electron microscopy. Changes in structural properties of the finish and of the finish-to-metal interface with weathering have been studied. Detailed results have been reported in several topical reports which are summarized in this final report. ATI 173938. Contract N5 ori-111, T.O. 4, Final report.

Guide to electrodeposited coatings and other surface treatments for metals, by D. E. Couch and J. W. Hensley. U.S. Naval Ordnance Test Station, China Lake, Calif. Sep 1954. 30p tables. Order from OTS. 75 cents. PB 131496

The information in this paper was collected and tabulated to give the engineer a quick, reliable guide to the properties and uses of electrodeposited metals and to other chemical and electrochemical treatments used in metal finishing. NOTS TM 1939.

Surface reactions at organic coating-to-metal interfaces, by A. E. Austin, C. M. Schwartz and H. R. Nelson. Battelle Memorial Institute. Columbus, O. Mar 1949. 40p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127232

Effects of accelerated weathering of organic finishes on the structure at the coating-to-metal interface have been investigated by means of electron-diffraction examination of the interface surfaces. Various clear finishes on steel, aluminum, and magnesium alloys were studied. AD 80456. G-1152-1. Contract N5 ori-111, T.O. 4.

Inorganic Chemicals

Direct $\mathcal{J}$ - type doubling transitions in ClCn, by Leonard Yarmus. New York University. College of Engineering. Research Division, University Heights, N.Y. Oct 1956. 6p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 126482

AD 110320. N.Y.U. Report no. 289.8.
1. Cyanogen chloride - Spectrographic analysis
2. Cyanogen chloride - Phase transitions
3. Contract AF 18(600)-968 4. AF OSR TN 56-505

Heat of formation of titanium tribromide from the mercury reduction of titanium tetrabromide, by Elton H. Hall, John M. Blocher, Jr. and Ivor E. Campbell. Battelle Memorial Institute, Columbus, O. Jun 1956. 19p drawing, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127209

Equilibrium data on the mercury reduction of titanium tetrabromide were combined with the heats of formation of $TiBr_4$ and Hg_2Br_2 to obtain the heat of formation of $TiBr_3$. For Technical report no. 1 see PB 121542. Contract Nonr-1120(00), Technical report no. 2.

Photolysis of water vapor, by H. Austin Taylor and Mei Chio Chen. New York University. Dept. of Chemistry, New York, N.Y. n.d. 29p tables. Order from LC. Mi $2.70, ph $4.80. PB 126431

The photolysis of water vapor has been studied in a flow system at flow rates up to 5 mol hr^{-1} and at temperatures up to 540°K. under the influence of a hydrogen discharge radiation around 1650 A. The effect of helium as a filuent and of hydrogen initially added as a reactant for hydroxyl has been studied. A mechanism for the process is discussed which centers around the reactions of H and OH produced in the primary process. AD 110254. Date is 1956 or later. Contract AF 19(122)-426. AF CRC TR 56-467.

Radiological method for studying the permeability of H through films or fabrics (U), by George P. Smith. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. May 1956. 27p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127362

The radiological method for determining the penetration of H through films and fabrics is extremely sensitive. This method gives instantaneous, continuous readings. However, it requires expensive

instrumentation and highly trained personnel. This method seems to be the only one now available which gives instantaneous readings. Project 4-80-01-002. CC CRL R536.

Sodium silicates for the CO_2 process, by E. A. Lange and R. E. Morey. U.S. Naval Research Laboratory. Apr 1958. 19p diagrs, graphs, tables. Order from OTS. 50 cents. PB 131642

The chemistry of the CO_2-sodium silicate process for bonding foundry sand was investigated with particular attention given to the composition of the sodium silicate, CO_2 utilization, and drying procedures. NRL R 5121.

Studies on boron hydrides. 10th annual technical report of investigations on water-reactive chemical compounds, by Anton B. Burg, James L. Boone, W. A. G. Graham and Louis R. Grant. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Nov 1956. 48p tables. Order from LC. Mi $3.30, ph $7.80. PB 129886

Chapter I, shows the plasticizing effect of a tertiary amine upon boron-hydride polymers and opens a new field of B-B stabilized amino-polyboranes. Chapters II-V deal with reactions of the methyldiboranes and show some effects of B-methylation on the nature of bonding in B-O, B-S, and B-P compounds. Chapter VI presents a new field of inorganic chemistry: the character and consequences of the partially methylated stibenes. Lists articles resulting from this project which were published in periodicals during the year. For 7th-9th reports see PB 114674, 118544, and 125424. Contract N6onr-238, T.O. I, NR 052 050.

Analytical Chemistry

Determination of the isotopic ratios of carbon and hydrogen in volcanic gases; chemical analysis of volcanic gases, by John J. Naughton and Kazuji Terada. Hawaii. University. Dept. of Chemistry, Honolulu, Hawaii. Jan 1956. 28p diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 127254

1. Gases, Volcanic - Analysis 2. Carbon - Determination 3. Hydrogen - Determination 4. Contract Nonr-981(00), NR 081-185.

Determination of total sulfate in ball propellent, by Wilmer White and Joseph Cohen. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Dec 1956. 7p tables. Order from LC. Mi $1.80, ph $1.80. PB 130874

1. Propellants - Chemical properties 2. Propellants, Ball - Chemical analysis 3. Sulfates - Determination 4. FALR S 5425

Determination of volatile matter in ball propellants, by Albert Mitchell and Joseph Cohen. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Jan 1957. 14p tables. Order from LC. Mi $2.40, ph $3.30. PB 130891

1. Volatile substances - Determination 2. Propellants, Ball - Chemical analysis 3. FALR S 5441

Evaluation of wet methods for the determination of diphenylamine in ball propellent, by Julius B. Apatoff and Joseph Cohen. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Jan 1957. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 130892

1. Diphenylamine - Determination 2. Propellants, Ball - Chemical analysis 3. FALR S 5440

Herzberg oxygen bands in "air" afterglows and the night airglow, by Charles A. Barth and Joseph Kaplan. California. University. Institute of Geophysics, Los Angeles, Calif. May 1956. 31p photos, drawing, table. Order from LC. Mi $3.00, ph $6.30. PB 126557

Mixtures of oxygen and nitrogen gases were excited in an electrodeless discharge. The glowing gases were pumped past two light traps into an afterglow tube where they were exposed to the spectrograph from 24 to 165 hours. The Herzberg bands were found to decrease in intensity with further increase in oxygen composition, disappearing for mixtures containing more than about 5% of oxygen. These bands were produced in 2-5% oxygen, 95-98% nitrogen afterglows and in 99.9% oxygen afterglows but not in afterglows of intermediate composition. Contract AF 19(122)-453, Scientific report no. 5. AF CRC TN 56-485.

Microwave spectrum and internal barrier of acetaldehyde, by Chun Chia Lin and Ralph W. Kilb. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 4p tables. Order from LC. Mi $1.80, ph $1.80. PB 127177

Date is 1955 or later. 1. Acetaldehyde - Molecular structure 2. Acetaldehyde - Spectrographic analysis 3. Contract N5 ori-76, T.O. 5

Power spectrum analysis of atmospheric ozone, by Arthur Adel and Edward S. Epstein. Arizona State College, Flagstaff, Ariz. Sep 1956. 72p graphs. Order from LC. Mi $4.50, ph $12.30. PB 126511

Scientific report HA-8. 1. Ozone - Spectrographic analysis 2. Atmosphere - Ozone - Determination 3. Solar radiation 4. Contract AF 19(122)-198 5. AF CRC TN 56-861

Spectrographic determination of oxygen in titanium, by R. E. Heffelfinger and W. M. Henry. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Apr 1958. 24p photo, drawing, diagrs, graphs, tables. Order from OTS. 75 cents. PB 121641

This report describes feasibility studies on the spectrographic determination of oxygen in titanium. Included are a description of a special arc chamber for a controlled-atmosphere direct-current arc, experimental results, details on method of operation, and precision and accuracy of the technique. Contract AF 18(600)-1375. BMI TML R 98.

Miscellaneous Chemicals

Study of vapor-cycle refrigerants for high performance aircraft, by J. L. Mason, G. R. Whitnah and E. M. Larson. AiResearch Manufacturing Company, Los Angeles, Calif. Feb 1958. 178p photos, diagrs, graphs, tables. Order from OTS. $3.00. PB 131761

This report presents the results of a study concerning the use of vapor-cycle refrigerants in cooling systems for high performance aircraft. The use of ram air as a heat sink in this application will require refrigerants which are suitable for higher condensing temperatures than those used presently. A search of general chemicals has been carried out, covering inorganic, organic and fluorine-containing compounds. Several compounds were studied in detail with regard to performance in a vapor-cycle system, and three compounds were selected as being the more suitable refrigerants. Conclusions are presented with respect to the operating temperature ranges which appear to be suitable for the refrigerant compounds which have been studied. AD 151008. Task 61184. Contract AF 33(616)-2927. AF WADC TR 56-93.

ELECTRICAL MACHINERY

Electronics

Analysis of external circuit traveling-wave tubes, by Chih Tang Sah. Stanford University. Electronics Laboratories, Stanford, Calif. Jun 1956. 147p diagrs, graphs. Order from LC. Mi $7.20, ph $22.80. PB 126782

This report presents a theoretical investigation of traveling-wave tubes, using external slow wave circuits of either the lumped elements or a combination of the lumped and the distributed elements. The analysis is undertaken using two methods: the normal mode expansion method using Fourier series expansion of the electric field which interacts with the electron beam, and the method of equivalent current generator for a planar one-dimensional model. Contract Nonr-225(24), NR 373-360, Technical report no. 1. Contract N6 onr-251(07).

Beam analyzer for backward-wave interaction study, by Amnon Yariv. California. University. Div. of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Aug 1957. 44p photos, diagrs, graphs, table. Order from OTS. $1.25. PB 131445

The operation and design of an Electron Beam Velocity Analyzer are described and some of the theoretical aspects of the deflection system are investigated. The buildup of current and velocity modulation were observed for backward wave operation. The modulation buildup was found to similar to that observed by other investigators on the forward traveling-wave tube. AD 131061. Project 4156, Task 41570. Appendix I: - Dynamic analysis of the deflection system. - Appendix II: - Electrostatic lens as a space-charge-wave transducer. Contract AF 33 (616)-3278. AF WADC TR 57-250.

Causality and frequency-response functions, by T. T. Wu. Harvard University. Cruft Laboratory, Cambridge, Mass. Apr 1955. 47p. Order from LC. Mi $3.30, ph $7.80. PB 126790

A general system is studied under the assumptions of linearity, passivity, reproducibility, and causality. Under essentially no further assumption, frequency-response functions are defined for such systems and identified with positive functions, suitably defined. Through the Lebesgue decomposition theorem, any frequency-response function may be decomposed to be the sum of a minimum-reactive part and two reactive parts, one of which is of unfamiliar nature. This procedure is carried through for a system with one input-output and again for a system with multiple input-outputs. As an illustration, the result is applied to the study of the Kronig-Kramers relations. One of the relations is proved to be true under very general conditions, but not the other. Contract N5 ori-76, T.O. 1, NR 372-012. HU CL TR 223.

Clutter cancelation indication: A method for eliminating radar ground return, by John Reed. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Special Systems Laboratory, Bedford, Mass. Aug 1956. 22p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127036

Clutter cancelation indication is a simple method for eliminating radar ground return. In most applications, it is a reasonable substitute for MTI, without the system restrictions inherent in MTI. An antenna beam established slightly lower in elevation than the main radar beam delivers information to an auxiliary receiver. Fed into a difference amplifier, this information is compared with that from the main

receiver to cancel the clutter. AD 98811. AF CRC TR 56-116.

Counterpoise-mounted VOR monitor detector units, by William L. Wright and John Turk. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Apr 1958. 10p photos, diagrs, graphs. Order from OTS. 50 cents. PB 131760

This report describes the most satisfactory detector unit of several models developed specifically for mounting on the edge of the counterpoise. Further improvements necessary in production models of the detector unit are included. CAA TDR 337.

Development of millimeter backward wave oscillator, by Donald J. Blattner and Fred Sterzer. Radio Corporation of America. RCA Laboratories. Microwave Advanced Development, Princeton, N.J. Feb 1958. 72p photos, diagrs, graphs, tables. Order from OTS. $2.00. PB 131765

Two backward-wave oscillators have been developed which tune over the frequency ranges 35-50 kmc and 48-74 kmc, delivering power of the order of milliwatts. Ceramic guns, stems, and output windows have been developed for use with these tubes. The tubes operate at collector currents of 3 to 5 ma, and require a focusing magnetic field of 1200 gauss. The helix voltage is varied from 800 to 3500 volts to cover the complete frequency range of oscillation. Design features are calculated and observed performance curves for these tubes are shown. In addition to the development of the tape helix tubes, theoretical and experimental investigations were made of the properties of a coiled ridged waveguide and an interdigitally loaded waveguide as slow wave circuits for use in millimeter backward-wave oscillators. Design data and calculated performance for these circuits are given. Project 4156, Task 41533 (Formerly Task 41575). Covers work from 7 Feb 1955 - 7 Feb 1957 under Contract AF 33(600)-29244. AF WADC TR 57-399.

Elements of reliability prediction, by J.C. Bear. Aeronautical Radio, Inc. Reliability Research Dept., Washington, D.C. Oct 1956. 61p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132764

The purpose of this paper is to summarize the concepts and goals of the new field of reliability engineering. The paper does not attempt to cover the field in detail or to present new information not covered by other publications. Monograph no. 4. Contract NObsr-52372. Contract NObsr-64508.

Glass for electronic components. Final development report for the period 1 Jul 1952 to 30 Jun 1956 under Contract Nobsr-57432. Corning Glass Works, Corning, N.Y. Jul 1956. 244f photos, drawings (part fold), diagrs, graphs, tables (part fold). Order from LC. Mi $11.10, enl pr $39.30. PB 132833

Covers the use of glass in fabrication of radio insulators, potentiometers, printed circuits, enclosures, ferromagnetics, fused metal coils, thin-walled coil forms, disc-type resistors, glass-to-metal seals, glass sockets, small-sized insulators, plugs and jacks, inserts, air-core coil forms. AD 116934.

Investigation of a traveling-wave tube with interchangable external slow-wave structures, by Allen R. Matthews. Stanford University. Electronics Research Laboratory, Stanford, Calif. Feb 1956. 172p photo, drawings, diagrs, graphs. Order from LC. Mi $8.10, ph $27.30. PB 126329

This report describes an investigation of a traveling-wave tube using an external slow-wave structure consisting of lumped circuit elements connected as conventional filters. Contract N6 onr-251(07), NR 073-360. SU ERL TR 102.

Iterative synthesis of a linear-phase network, by C. Y. Chang. Stanford University. Electronics Laboratories, Stanford, Calif. Jun 1956. 48p diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 126784

This report is intended to illustrate the application of the iterative method of synthesis to linear-phase networks. Equal-ripple approximation is adopted in the design. The potential analogy is used to help clarify some important facts. The iterative method itself, rather than the results of design, is considered most important. Contract N6 onr-251(07), NR 373-360. Contract Nonr-225(24), NR 373-360, Technical report no. 3.

Low frequency propagation studies. Part I: Whistlers and related phenomena, by R.A. Helliwell Stanford University. Radio Propagation Laboratory, Stanford, Calif. Oct 1956. 154p photos, diagrs, graphs, table. Order from LC. Mi $7.50, ph $24.30. PB 126783

This report is divided into two parts. Part I is concerned mainly with whistlers and related low-frequency signals which pass through the ionosphere. Part II covers certain studies of low-frequency propagation in which the signals are reflected from the ionosphere. AD 110184. Contract AF 19(604)-795. AF CRC TR 56-189.

Multicolor storage tube, by Lorin L. Vant-Hull and Chester D. Beintema. Hughes Aircraft Company. Research Laboratories, Culver City, Calif. Mar 1958. 64p photos, diagrs, graphs. Order from OTS. $1.75. PB 131766

Multicolor storage tubes for applications involving low frame rates have been built by modification of direct-viewing storage tubes. A perforated shadow-mask is placed between the three writing guns and the storage surface. This mask allows electrons from each writing gun to strike discrete storage areas, each containing a single aperture in register with a color dot on the view plate. In this way it is possible to write and store electrical signals independently in adjacent color areas. The design and operation of the tube are discussed in detail. Several sources of color impurity are described, together with the steps taken to minimize their effects. AD 151113. Project 4156, Task 41653 (Formerly 41748). Covers work from 15 Jun 1953 - 1 Jun 1957 under Contract AF 33(616)-2177. AF WADC TR 57-400.

Normal mode theory in perturbed transmission systems, by Gordon S. Kino. Stanford University. Electronics Research Laboratory, Stanford, Calif. May 1955. 243p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $37.80. PB 126471

The reciprocity theorem is used to derive the orthogonality properties of the modes of transmission systems that are either uniform or periodic in the z direction. Certain of the conditions are valid for modes that are not pure TE or TM, even when there is loss present, and there are several conductors passing through the cross section. It is also shown that, in a lossless system, the propagation constants of the modes (or fundamental space harmonics) are pure real or pure imaginary and the corresponding power flows are pure imaginary or pure real. Contract N6 onr-251(07), NR 373-360. SU ERL TR 84.

Notorious unreliability of complex equipment, a condensed presentation for management use, by Robert Lusser. U.S. Redstone Arsenal. Research and Development Division, Huntsville, Ala. Sep 1956. 10p diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 126717

1. Electronic equipment - Reliability 2. Armaments, Aircraft - Reliability

On the observation of the Fischer gyromagnetic effect in bodies in waveguides, by K.M. Polivanov. Translated by Morris D. Friedman. Dec 1956. 4p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 127204

AD 110166. Translated from Doklady, AN USSR, Vol. 95, no. 5, 1954, pp. 969-970, under Contract AF 19(122)-458 with Lincoln Laboratory, Massachusetts Institute of Technology. 1. Magnetic fields - Russia 2. Ferromagnetism - Research - Russia 3. Generators, Pulse - Russia 4. Contract AF 19(122)-458

Performing research on new approaches to printed circuitry. Scientific report no. 4, Dec 1, 1956-Feb 28, 1957 under Contract AF 19(604)-1736, by John H. Dessauer, Frederick A. Schwertz and others. Haloid Company, Rochester, N.Y. Mar 1957. 31p diagrs, graphs. Order from OTS. $1.00. PB 131366

Experimental work continued with four methods of forming electronic circuit elements vacuum evaporation, chemical deposition, screen stencil printing, and electrostatic printing. In vacuum deposition the maximum evaporation chamber pressure for uniform deposition was found to be 2×10^{-4} mm of Hg. A dual-etch circuit board of electroplated copper on a Nesa resistive film showed good high temperature serviceability. In bimetallic screen printing, hot-dip filled stainless steel screen was found to be superior to either electroplated or cold rolled material. Zinc has been found most practical for the filler material. Performance of a new type electrostatic printing master was examined for use in printing metallic powders. AD 117093. Contract AF 19(604)-1736, Scientific report no. 4. AF CRC TN 57-387.

Position and weather telling methods, by Henry M. Moser. Ohio State University Research Foundation, Columbus, O. Jul 1955. 11p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 126513

Position and weather telling methods are compared for radio channel time and listener acceptance. Contract AF 18(600)-316. OSURF Proj 519, Tech. rept. no. 27. AF CRC TN 55-62.

Prebreakdown current studies in compressed nitrogen, by N.L. Allen. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Apr 1956. 25p drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126726

A description is given of a vessel containing an electrode system for measurement of prebreakdown currents in compressed gases. Auxiliary equipment includes a pressure intensifier and a manganin-wire pressure gauge. A highly stabilized high-voltage supply allows measurements to be made very close to breakdown. Values of the ionization coefficient η and regeneration coefficient γ are given for pressures between one and four atmospheres and the variation of γ in this region is discussed in detail. Contract N5 ori-07801, NR 017-421. MIT LIR TR 107.

Quarterly progress report under Contract DA 36-039-sc-100. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Dept. of the Army project no. 3-99-10-022. Signal Corps project no. 8-102-B.O. Order separate parts described below from LC, giving PB number of each part ordered.

26th, for period ending 1 Jun 1952, by J. B. Wiesner. Jul 1952. 108p photos, diagrs, graphs, table. Mi $5.70, ph $16.80. PB 126844

1. Electronics - Research 2. Electrons - Emission 3. Low temperature research 4. Vacuum tubes, Magnetron - Research 5. Communications - Theory 6. Computers, Analog 7. Spectroscopy, Molecular

27th, for period ending 1 Sep 1952, by J. B. Wiesner. Oct 1952. 82p photos, diagrs, graphs. Mi $4.80, ph $13.80. PB 126847

1. Electronics - Research 2. Electrons - Emission 3. Spectroscopy, Molecular 4. Computers, Analog 5. Communications - Theory 6. Vacuum tubes, Magnetron - Research

28th, for period ending 30 Nov 1952, by J. B. Wiesner, G. G. Harvey and H. J. Zimmermann. Jan 1953. 68p photos, diagrs, graphs, table. Mi $3.90, ph $10.80. PB 126848

1. Electronics - Research 2. Low temperature research 3. Spectroscopy, Molecular 4. Communications - Theory 5. Computers, Analog.

29th, for period ending 28 Feb 1953, by J. B. Wiesner, G. G. Harvey and H. J. Zimmermann. Apr 1953. 104p photos, drawings, diagrs, graphs, tables. Mi $4.70, ph $16.80. PB 126849

1. Electronics - Research 2. Electrons - Emission 3. Low temperature research 4. Spectroscopy, Molecular 5. Communications - Theory 6. Computers, Analog

33rd, for period ending 28 Feb 1954, by J. B. Wiesner, G. G. Harvey and H. J. Zimmermann. Apr 1954. 111p photos, drawings, diagrs, graphs, tables. Mi $6.00, ph $18.30. PB 126853

1. Electronics - Research 2. Spectroscopy, Molecular 3. Communications - Theory 4. Electrons - Emission 5. Computers, Analog

34th, for period ending 31 May 1954, by J. B. Wiesner, G. G. Harvey and H. J. Zimmermann. Jul 1954. 124p photo, diagrs, graphs, tables. Mi $6.30, ph $19.80. PB 126850

These quarterly reports cover progress for the period on physical electronics, microwave gaseous discharges, solid state physics, low temperature physics, microwave spectroscopy, microwave tube research, information theory, speech analysis, analog computer research, network synthesis, and related subjects.

Some properties of oblique radio reflections from meteor ionization trails, by O. G. Villard, Jr., A. M. Peterson, L. A. Manning and V. R. Eshleman. Stanford University. Radio Propagation Laboratory, Stanford, Calif. May 1955. 39p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126470

Certain characteristics of radio signals propagated by reflection from meteor ionization trails from a low-power continuous-wave transmitter 960-km distant are studied at radio frequencies of 23.2, 46.4, and 92.8 megacycles. In particular, the percent of the total time that meteor reflections were detectable at each frequency is presented, and shown to be in qualitative agreement with theoretical expectations. Contract N6 onr-251(07), NR 373-360. SU RPL TR 85

Study of the effects of damping on normal modes of electrical and mechanical systems, by Stephen F. Crumb. California Institute of Technology, Pasadena, Calif. Jan 1955. 161p photos, diagrs, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 126882

This second report presents a general investigation of the properties of free and forced vibrations in linear, non-conservative systems. Particular emphasis is placed upon the problems which arise in normal mode studies made on the electric analog computer at the California Institute of Technology. Project R-354-30-1. Contract AF 18(600)-669, Technical report no. 2. AF OSR TN 55-121.

Synoptic-physical implications of 1.25 cm vertical beam radar echoes, by Roland J. Boucher. Harvard University. Blue Hill Meteorological Observatory, Milton, Mass. May 1957. 27p photos, maps, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126258

More than 1000 hours of radar records taken with the APS-34 1.25 cm vertical beam radar during a four-year period have been readily classified into four clearly recognizable types. A limited number of precipitation growth mechanisms are thereby suggested and the echo types representing them are shown to be well correlated to three basically different classes of synoptic situtations. A generalized echo cyclone model is derived. Maximum attainable hourly rates of precipitation are empirically related to the depth of detectable echo. AD 117220. Contract AF 19(604)-950. HU BHMO MRS 5. AF CRC TN 57-466.

Theoretical study of electromagnetic waves from shaped metal surfaces. Quarterly report no. 1, by William W. Hansen. Stanford University. W. W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Nov 1947. 10p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 127175

AD 133922. 1. Waves, Electromagnetic - Scattering 2. Waves, Electromagnetic - Radiation 3. Contract W 28-099-ac-333

Theory and application of uniform electrostatic focusing of hollow electron beams, by C. B. Crumly. Stanford University. Applied Electronics Laboratory, Stanford, Calif. Nov 1955. 86p photos, drawing, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 127636

An experimental traveling-wave amplifier tube, operating in the UHF region, was designed and constructed. The results confirm the practicability of this focusing method. Some problems encountered in this application are discussed. It is concluded that Harris flow can be applied to practical beam-type tubes, and, although more complex to design and build, these tubes will enjoy the unique advantage of focusing without the usual heavy magnet structure. Contract N6 onr-251(07), NR 373-360 and Contract DA 36-039-sc-63189. SU AEL TR 457-1.

Generators, Motors, Transmission

Development of a stable, high gain AC servo amplifier and an AC-DC mixing amplifier, by Charles T. Kleiner. Magnetic Research Corporation, El Segundo, Calif. Mar 1957. 35p photos, drawings, diagrs, graphs, tables. Order from OTS. $1.00. PB 131413

At the outset of this development there was a question whether solid state or vacuum tube elements should be used. It was decided that the servo amplifier load would be either a two terminal AC servo motor or a three terminal AC servo motor or a three terminal hydraulic valve. Further, this load was to be supplied by a high gain, fast response, magnetic power amplifier. Investigation of the elements for the pre-amplifier was to include the construction of three preamplifiers for evaluation. One of these would be a tube type using ruggedized subminiature tubes, another to be a magnetic amplifier type, and a third to be composed of silicon transistors. As the development program progressed it became apparent that the silicon transistor offered the most promising approach. As work progressed all three amplifiers were tested and the results indicated that a transformer-coupled silicon transistor pre-amplifier operated best with the chosen output power magnetic amplifier. The development of the combined AC-DC pre-amplifier followed the results outlined above. The object of this phase of the contract was to determine the feasibility of algebraically summing three signal channels such that whether they were AC, or DC, or combinations, the output could be amplified and used with the developed high gain AC servo amplifier. Project 1385, Task 50353. Research began Sep 1955; completed Aug 27, 1956. Contract AF 33(600)-29464. AF WADC TR 56-506.

On the equivalent circuits of linear amplifiers, by L. M. Vallese. Polytechnic Institute of Brooklyn. Microwave Institute, Brooklyn, N. Y. May 1955. 20p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 127233

The usefulness of the equivalent circuits of linear amplifiers for the circuit designer may be enhanced if the reciprocal forward- and reverse- equivalent circuits are derived. Applications to the grounded cathode vacuum tube amplifier and to the grounded emitter transistor amplifier are shown. Contract Nonr-839(05), NR 375-216. PIB 354. PIB R 422-55.

Miscellaneous

Improvement of hook-up wire insulations. Ninth quarterly report for the period 9 Dec 1950 to 8 Mar 1951 and final report for the period 9 Dec 1948 to 8 Mar 1951. Rensselaer Polytechnic Institute, Troy, N. H. Contract W-36-039-sc-38206. Army project 3-92-00-503. Signal Corps project 32-2005-33. Order separate parts described below from LC, giving PB number of each part ordered.

Section I: Bioelectrical, by R. H. Luce and K. N. Mathes. Apr 1951. 82p diagrs, graphs (part col., part fold), tables. Mi $4.80, ph $13.80. PB 127243

1. Wire - Insulation 2. Wire - Fungus resistance 3. Insulation, Electrical - Materials - Moisture resistance. Color will not reproduce.

Section II: Organic chemistry, by W. H. Rauscher, H. F. Hammer and D. L. MacPeek. Apr 1951. 57p tables. Mi $3.60, ph $9.30. PB 127244

Endeavors have been made to improve hook-up wire insulations by the development of superior insulating material of the fluorinated polyamide type. The synthesis of several of the necessary reactants, fluorinated dibasic acids and fluorinated diamines, has been accomplished. From these reactants several fluorinated polyamides of high softening range have been prepared in small amounts and studied to some extent. They show definite promise for the purpose for which they are intended.

FOOD AND KINDRED PRODUCTS

Causes of flavor and off-flavor in fresh and preserved foods. See entry under Bibliography on page 5.

Color and color changes in food. See entry under Bibliography on page 5. PB 132850

Effect of wheat age, viability and protein content on the storage life of wheat flour. Final report no. 4 for the period 15 Apr 1955 to 31 Sep 1956, under Contract DA 19-129-qm-345, by J. A. Shellenberger. Kansas. Agricultural Experiment Station. Dept. of Flour and Feed Milling Industries, Manhattan, Kan. Oct 1956. 19p photos, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 130826

A study was undertaken of the extent to which the post-harvest age of wheat might influence the rate of deterioration of flour milled from such grain. Protein level and flour grade were variable in the flour storage experiment. Project 7-84-06-031B. C-311, Report 4. Contract DA 19-129-QM-345.

Physiological basis for various constituents in survival rations. Part III: Efficiency of young men under conditions of moist heat, by Frederick Sargent, II, Virginia W. Sargent and Robert E. Johnson. Illinois. University. Dept. of Physiology and McKinley Hospital. Health Service Research Unit, Urbana, Ill. Dec 1957. 733p photos, diagrs, graphs, tables. Order from OTS. $10.00. PB 131525

From June 22, 1955, through July 27, 1955, 100 volunteer airmen served as subjects in a study of survival rations in moist heat at Camp Atterbury, Indiana. To establish physiological, biochemical, nutritional, and clinical judgements on the relative effects of work, water, calories, and protein/carbohydrate/fat ratio in all-purpose survival rations, numerous observations were made in two-week periods of adequate, restricted, and recovery diets, with luxus amounts of vitamins at all times. Twenty one nutrient combinations could be rank-ordered, by 27 different tests, with respect to effects on organ function and body efficiency. Clinical findings could also be rated. Limitation of water, decrease of calories, or marked deviations in protein/ carbohydrate/fat ratios resulted in measurable clinical or functional deterioration. Appendices to be issued as Vol. II. AD 142232. Project 7156, Task 71805. Investigations carried out summer, 1955. For Parts 1 and 4 see PB 128056 and 131709. Contract AF 18(600)-80. AF WADC TR 53-484, Part 3, Vol. 1.

FUELS AND LUBRICANTS

Effect of metals on lubricants. U.S. Air Force. Air Research and Development Command. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Project 7331, Task 73314. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Design, development and instrumentation of a high temperature bath, by Vernon A. Lauer. Feb 1955. 15p photo, drawing, diagrs. 50 cents. PB 131505

This report describes the design, development and instrumentation of a high temperature bath capable of attaining and controlling temperatures up to 700° ± 1.0°F. AD 63268. AF WADC TR 54-576 Part 1.

Part II: Corrosion and oxidation stability at 400° Fahrenheit, by John B. Christian. Feb 1958. 36p tables. $1.00. PB 131710

This report presents data which deals with the general effects which silicates and siloxanes have on various metals; and the effects which these metals have on the fluids under severe conditions. The corrosion and oxidation stability of a diester blend, a siloxane, and a silicate in the presence of various metal specimens is discussed. AD 150977. Covers work from Apr 1956 - Jul 1957. AF WADC TR 54-576, Part 2.

Gamma radiation stability of OS-45 and OS-45-1 hydraulic fluids, by William L. R. Rice. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1957. 47p graphs, tables. Order from OTS. $1.25. PB 131661

The hydraulic fluids OS-45 and OS-45-1 were exposed to gamma radiation over the range 4.36×10^8 ergs/gm C to 8.71×10^{10} ergs/gm C. Changes in the physical and chemical characteristics of the fluids were determined following the static irradiations. It was observed that major changes took place in most of the properties at the higher exposure levels. Relationships were derived between the change in certain properties and the gamma dosage. It was concluded that although the effects of gamma radiation on the fluids indicated possible difficulty in their use in a radiation field, dynamic in-source testing in a mock-up hydraulic system would be necessary to establish their use limitations. AD 142262. Project 2133, Task 73071. Covers work from Jul 1956-Jul 1957. AF WADC TR 57-573.

Viscosity-temperature charts modified from A.S.T.M. (D 341-39). U.S. Naval Research Laboratory. n.d. 1 sheet diagr. Order from OTS. $1.00. PB 131677

NRL charts cover the viscosity range of 0.4 to 20,000,000 centistokes and a temperature range of -100°F to + 700°F.

INSTRUMENTS

Cryoscopic assembly for precise measurements under controlled atmospheres at temperatures up to 500°C, by C. Solomons and George J. Janz. Rensselaer Polytechnic Institute. Dept. of Chemistry, Troy, N.Y. Aug 1957. 15p diagrs, tables. Order from OTS. 50 cents. PB 131499

A cryoscope is described which was designed for the accurate measurement of freezing points of molten salts under controlled atmospheres. It possesses several advantages over apparatus in the published literature, especially when used with solutions which attack or embrittle the glass container. The ancillary apparatus used with the cryoscope is also described, and the features of the apparatus are discussed. Examples are given to show how several problems of molten salt cryoscopy under controlled atmospheres have been satisfactorily overcome. AD 136510. Project Chem 40-45. Technical note 4. Contract AF 49(638)-50. AF OSR TN 57-526.

Data reduction facilities at the Electrical Engineering Research Laboratory, by F.E. Brooks, Jr. and H.W. Smith. Texas. University. Electrical Engineering Research Laboratory, Austin, Tex. Apr 1956. 33p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 126903

The computers and data reduction facilities developed at the Electrical Engineering Research Laboratory are described briefly. They include a correlation computer, a transform computer, a standard deviation computer, a power spectrum analyzer, an amplitude distribution analyzer, and special filter components. All of the computers are of the analog type and most utilize an input signal taken from magnetic tape. In general, graphic or film data is first transcribed onto the magnetic tape before playback in one of the computers. Issued jointly under Contract Nonr-375(01) with the Office of Naval Research and Contract Nord-16498 with the Bureau of Ordnance. Contract Nonr -375(01), NR371-032. TU EERL 81.

Development of a radioactive-dust collector. Final report for the period 15 Jun 1953 to 15 Sep 1954, under Contract no. DA 18-108-CML-5095, by W.A. Spraker, R.D. Ellsworth and R.B. Engdahl. Battelle Memorial Institute, Columbus, O. Sep 1954. 59p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 127197

This is a final comprehensive report covering the development of a sampler to be used in the field for obtaining samples of radioactive dust. Detailed drawings of the various components are included in the Appendix. Specific details as to the various methods used to arrive at some of the final designs were included in six bimonthly progress reports submitted earlier and are not repeated in this report.

Development of a sensitive rotational viscometer, by E.H. Dudgeon and W.C. Michie. National Research Council of Canada. Division of Mechanical Engineering. Jan 1957. 27p drawings (1 fold), graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127184

A sensitive co-axial rotational viscometer has been designed incorporating certain features to make it especially suitable for use with low viscosity non-Newtonian suspensions. The outer cylinder can be rotated over a considerable range of speeds and the inner cylinder is mounted in hydrostatic air bearings for increased sensitivity. A lower guard plate is incorporated to eliminate end effect with Newtonian fluids. Different combinations of outer and inner cylinders may be mounted to permit accurate measurement at shear rates up to 3000 sec.$^{-1}$ Viscosities as low as 1 centipoise can be measured conveniently. NRCC ME MT 34.

Development of decontaminating apparatus, portable, 3-gal., E5R2 and antiset, decontaminating slurry, E4 (U), by M.F. Gilchrist. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Aug 1957. 54p photos, drawings, tables. Order from LC. Mi $3.60, ph $9.30. PB 130824

Project 4-08-06-031-01 (Formerly 4-08-06-004). Covers work from 1 Apr 1954-11 Oct 1956. 1. Decontamination - Equipment 2. Slurries, Bleach 3. Spraying apparatus - Design 4. CC CWL R 1251

Development testing of prototype decontaminating apparatus, power driven, truck mounted, E9 (U), by M.F. Gilchrist, M.B. Minkin and J. Buddemeyer. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Sep 1957. 32p photos, tables. Order from LC. Mi $3.00, ph $6.30. PB 130969

The prototype decontaminating apparatus was tested for mechanical strength and durability when spraying bleach slurry. A number of minor deficiencies were noted and were partially corrected during the tests. Recommendations were made for further

modification by the contractor. Project 4-08-06-031-04. Covers work from Nov 1954-Apr 1955. CC CWL R 2171.

Evaluation on E2R1 facepiece flexibility indicator for measurement of low-temperature performance of faceblank for M9A1 field protective mask (U), by Richard H. Brown. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Aug 1957. 21p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 130853

The E2R1 facepiece flexibility indicator evaluates the low-temperature performance of the faceblank component of the M9A1 field protective mask facepiece, provided the indicator is first calibrated against physical donning trials of the rubber compound under consideration. Project 4-80-02-024. Covers period from Dec 1951-Dec 1952. CC CWL R 2164.

Flow reactor for high temperature reaction kinetics, by L. Crocco, I. Glassman and I. E. Smith. Princeton University. Dept. of Aeronautical Engineering, Princeton, N.J. Jun 1957. 9p drawing, graphs. Order from OTS. 50 cents. PB 131506

The purpose of this note is to describe a new type of flow reactor designed for the study of the reaction kinetics of propellants at high temperatures. AD 132445. Contract AF 18(600)-1527. PU AEL R 398. AF OSR TN 57-373.

High temperature vacuum and controlled environment fatigue tester, by G.J. Danek, Jr., and M. R. Achter. U.S. Naval Research Laboratory. May 1958. 13p photos, drawing, diagrs, graphs, table. Order from OTS. 50 cents. PB 131737

Equipment has been developed for reverse-bending fatigue tests at elevated temperatures in vacuum. Large strain amplitudes at low frequencies are used with this equipment to produce failures in approximately 10^5 cycles. A major problem in the design of such equipment, the transmission of motion through a vacuum seal, was circumvented by the use of a magnetic coupling driven at the resonant frequency of the specimen. Two methods of vibrating the specimen were developed. Fatigue data were gathered for type 316 stainless steel in a vacuum of 3×10^{-5} mm of mercury through a range of stresses at 1500°F. NRL R 5138.

Instruction book for Navy model OAX-1 portable underwater sound testing equipment (sound gear monitor). U.S. Bureau of Ships. Aug 1944. 86p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 129968

1. OAX-1 (Sound testing equipment)
2. Sound, Underwater - Measuring equipment
3. NAVSHIPS IB 900, 308

Logic and mechanics of storage and retrieval systems. Documentation, Inc., Washington, D.C. Feb 1956. 37p photos, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 128578

In the most general terms, a storage and retrieval device must be able to store information and to respond to queries by delivering or outputting some specific part of the information stored. This requirement can be made more specific by analyzing the type of questions to which the device must respond, and the type of output appropriate to any type of question. In such an analysis, we distinguish three types of input questions which we call: (1) the index question; (2) the content or abstract question; and (3) the association or coincidence question. Contract Nonr-1305(00), Technical report no. 14.

Procedure for determining vapor pressures of materials of low volatility, by O. M. Ballentine. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1955. 22p photos, diagrs, graph, table. Order from OTS. 75 cents. PB 131469

An apparatus has been developed for determining absolute vapor pressures of both liquids and solids that exhibit low volatility characteristics. The method has the following advantages: obtaining vapor pressures up to 1000°F., requiring a minimum of operator's time, relative simplicity and high degree of accuracy in final results. The method employs Knudsen's equation, based on the kinetic theory of gases, in which the weight loss of material per unit time is proportional to the vapor pressure of the material. AD 66390. Project 7331, Task 73310. AF WADC TR 54-418.

Saturated salt humidity test equipment for printed circuit material evaluations - Gases 27675-2 and 27655-2, by A. Paul Broyer. Bell Telephone Laboratories, Inc., New York, N.Y. Jun 1956. 21p photos, diagrs, table. Order from OTS. 75 cents. PB 131504

This memorandum describes three types of saturated salt humidity and temperature control cabinets used primarily for insulation resistance tests on printed circuits. AD 113667. MM-56-6234-8. Contract DA 30-069-ORD-1082.

Standardized X-ray field range, by H.M. Childers, A. Brodsky and A.E. Nash. U.S. Naval Research Laboratory. Apr 1958. 17p photos, diagrs, graphs, table. Order from OTS. 50 cents. PB 131643

A 300-kilovolt x-ray machine has been adapted for use as a source of standard fields of radiation to cover the photon energy interval from 20 to 300 kev. A field range has been constructed which incorporates a free-air ionization chamber for determining the absolute value of the dose rate of the x-ray beam in roentgens per unit time. The field range has been calibrated and appropriate dose-rate curves for determining the effective x-ray energy, have been constructed. Procedures for use of the entire apparatus have been worked out and are described herein. NRL R 5122.

Technical report no. 25 under Contract N6 onr-275, Task order IV, NR 022-053. California. University. Dept. of Physics, Los Angeles, Calif. n.d. 16p photo, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126303

A simple mechanical calculator has been developed for solving the transmission line equations when the characteristic impedance is a variable. The speed of computation is some two orders of magnitude faster than analytical methods. The theoretical basis is described and also the way in which it can be used. Some representative problems, which have benefited by use of the calculator, are discussed.

Testing of prototype AD-5 windshield wiper. U.S. Naval Air Test Center. Service Test Division, Patuxent River, Md. Apr 1956. 8p photos. Order from LC. Mi $1.80, ph $1.80. PB 126487

1. Windshields - Wipers - Tests 2. NATC Proj PTR AE-6314

MATHEMATICS AND STATISTICAL ANALYSIS

Down-hill method of solving a polynomial equation, by James A. Ward. U.S. Air Force. Air Research and Development Command. Holloman Air Development Center. Aero Medical Field Laboratory, Holloman Air Force Base, N. Mex. n.d. 6p. Order from LC. Mi $1.80, ph $1.80. PB 126580

The author shows that the down-hill method is a procedure to solve $f(z) = 0$ for any desired accuracy, a method which works equally well for real or imaginary roots and will always converge. It is a numerical method of determining the real and imaginary roots of a polynomial equation with real coefficients, and a technique for using this method on a digital computer. AD 113032. Date is probably 1957. AF HADC TN 57-2.

Elasto-dynamic problem concerning the spherical cavity, by A. Cemal Eringen. Purdue University. Division of Engineering Sciences, Lafayette, Ind. May 1956. 24p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126425

With the use of the Fourier transform technique the solution is given for the elasto-dynamic problem resulting from the application of arbitrary dynamical tractions to the surface of a spherical cavity in an infinite, isotropic, elastic solid. Various special cases are studied. Computations are carried out and plotted in the case of blast loading. Contract Nonr-1100(02). PUR TR 9.

Electronic measurements used to obtain a least squares position solution and its variance, by Frank C. Reed. U.S. Naval Ordnance Test Station, China Lake, Calif. Mar 1956. 37p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 130831

A method is presented whereby electronic data may be reduced by the least squares principle of conditioned observations. Two of the more common electronic systems, Radar and Dovap, are considered. The least squares solution with the determination of variance in the solution is fairly general, and should be of value to those contemplating the use of other types of electronic data. NOTS 1276. NAVORD 4954.

Final report on Contract Nonr-492(02), by Armand Siegel. Boston University, Boston, Mass. Mar 1956. 5p. Order from LC. Mi $1.80, ph $1.80. PB 126501

This research derives mainly from a paper by N. Wiener and A. Siegel, published in 1953, which gave the basic theorem for a formulation of quantum theory in terms of the classical mathematical theory of probability. This paper was written before the inauguration of the contract. Published work on this subject done subsequently under the contract deals with: Application of the theorem to systems with spin; a complete statistical theory of quantum systems in terms of hidden variables; formulation of quantum dynamics in terms of the new theory; formulation of the quantum measurement process in the new theory. Contract Nonr-492(02), Final report.

Numerical integration of a set of equations from Magnus force theory, by L.D. Gates, Jr., R.J. Arms and G.H. Gleissner. U.S. Naval Proving Ground. Computation and Exterior Ballistics Laboratory, Dahlgren, Va. May 1956. 74p tables. Order from LC. Mi $4.50, ph $12.30. PB 126486

A set of differential equations arising from boundary layer theory for the magnus force on a spinning cylinder have been integrated numerically, and certain quadratures involving the solutions have been computed. The first of the equations is the well known Blasius equation. The others are linear equations or pairs of simultaneous linear equations whose coefficients are obtained from previous solutions when the equations are taken in proper order. The quadratures are given to five decimal places or five significant figures. NPG R 1457.

On the distribution of ranks and of certain rank order statistics, by Meyer Dwass. Stanford University. Dept. of Statistics, Stanford, Calif. May 1956. 17p. Order from LC. Mi $2.40, ph $3.30. PB 126380

In the first part of the paper, various moment generating functions connected with ranks of the first observations of combined samples from two possibly different populations are derived. The main purpose of the last half of this paper is to show that for certain combinations of sample sizes m, n, the limiting distribution may be nonnormal. Contract Nonr-225(21), NR 042-993. SU DS TR 2.

Quasi interior points of cones in a linear space, by R. E. Fullerton. Maryland. University. Dept. of Mathematics, College Park, Md., Feb 1957. 16p diagr. Order from LC. Mi $2.40, ph $3.30. PB 126377

This paper gives a topological definition of what we shall call a quasi interior point of a cone in a linear topological space. If the cone has a non void interior it is shown that all quasi interior points are interior points and that furthermore in L spaces and other commonly considered function and sequence spaces the notion of a quasi interior point coincides with the notion of what we would like to call a strictly-positive element of the space. AD 120406. Contract AF 18(603)-78. AF OSR TN 57-65.

Role of securities in the optimal allocation of risk-bearing, by Kenneth J. Arrow. Stanford University. Dept. of Economics, Stanford, Calif. Jul 1952. 11p. Order from LC. Mi $2.40, ph $3.30. PB 126384

The theory of the optimal allocation of resources under conditions of certainty is well-known. In the present note, an extension of the theory to conditions of subjective uncertainty is considered. Presented at the Colloque sur les Fondements et Applications de la Theorie du Risque en Econometrie of the Centre Nationale de la Rechercho Scientifique Paris, France, May 13, 1952. Contract N6 onr-25133, NR 047-004. SU DE TR 5.

Technological and organizational structure of production in activity analysis, by Stanley Reiter. Stanford University. Dept. of Economics and Dept. of Statistics, Stanford, Calif. Jul 1952. 21p. Order from LC. Mi $2.70, ph $4.80. PB 126558

This paper is concerned with the welfare analysis of technological and organizational structure of production, i.e., with optimal technological composition of producing units and optimal distribution of information and control among decision-making units. Contract N6 onr-25133, NR 047-004. SU DE TR 4.

METALS AND METAL PRODUCTS

Alloying and heat treatment ductile cast iron. Final report. Massachusetts Institute of Technology. Dept. of Metallurgy. Metal Processing Div., Cambridge, Mass. Aug 1955. 97p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.50. PB 131350

The basic variables involved in risering ductile iron castings were determined and measurements were made of their effects on shrinkage. The amount of gross feed metal required depended upon carbon content, silicon content, pouring temperature, and rigidity of mold. Large sprues and flow-offs are sufficient to act as risers and fed the casting. Sponge shrinkage was eliminated by observing the following relationship: % carbon + 1/7% silicon = 3.9%. Various conditions of cutting ductile iron were investigated and the machining forces were measured and analyzed. AD 113425. Division of Industrial Cooperation, project 7029. Contract DA-19-066-ORD-1910, Final report. WAL R 331.1/14-19.

Cast age-hardenable austenitic steels, by E. A. Lange, N. C. Howells and A. Bukowski. U.S. Naval Research Laboratory. May 1958. 16p photos, graphs, tables. Order from OTS. 50 cents. PB 131733

Cr-Ni-P, Cr-Mn, and Cr-Ni-Mn-V types of age-hardenable, austenitic steels which have high strength characteristics in wrought forms were investigated for use as high-strength, nonmagnetic steels for castings. A Cr-N-P austenitic steel with 0.3% C and 0.25% P developed yield strengths at the 100,000 psi level. Modifying the wrought Cr-Ni-Mn-V composition resulted in an alloy with good ductility and yield strengths at the 100,000 psi level. A fourth type of age-hardenable, austenitic steel, Mn-V, containing a minimum of alloying elements was developed. The hardness and tensile properties of four compositions which were cast and heat treated to yield strengths at the 100,000 psi level are reported. NRL R 5140.

Chromium-nickel alloys for high temperature applications, by Albert G. Bucklin and Nicholas J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. 1955? 19p photos, graphs, tables. Order from OTS. 50 cents. PB 131465

Chromium-nickel alloys containing 35 to 70 percent chromium with additions of iron, molybdenum, and columbium have been precision cast and tested in stress rupture at 1600-1800°F. Results surpassing many commercial alloys have been obtained especially in alloys containing 40 to 45% chromium, 2 to 10% iron, 2% molybdenum, and 2% columbium.

Higher chromium alloys exhibit high hardenability which may make possible high temperature bearing applications. Forging of the 40 to 50% chromium alloys is difficult, but possible, and should improve through vacuum melting. AD 102321. Contract NOa(s) 54-254.

Crack propagation tests of high-strength sheet steels using small specimens, by J. E. Srawley and C. Beachem. U.S. Naval Research Laboratory. Apr 1958. 31p photos, diagrs, graphs, tables. Order from OTS. $1.00. PB 131682

A test for high-strength sheet materials is described which may serve to provide a means of distinction between materials which could be expected to behave reliably in highly stressed structures and those which would be sensitive to minute stress raisers. The test requires only small specimens, about the size usually used for conventional tests of sheet materials, which are provided with a central transverse crack. The result is expressed as a net fracture stress, which can be compared directly with the conventional tensile strength of the material. The test is limited to those materials which are sensitive to hydrogen embrittlement, but this category includes most materials which have sufficient strength to be eligible for current high-stress applications, and which derive their high strengths from heat treatment rather than strain hardening. NRL R 5127.

Department of Defense titanium sheet-rolling program. Status report no. 3, by C. R. Simcoe. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. May 1958. 57p graphs, tables. Order from OTS. $1.50. PB 121642

Under Phase I, producers have demonstrated acceptable control over chemistry, ingot homogeneity, sponge hardness level, and sheet-rolling procedures. Under Phase II, uniform testing procedures and preliminary design data are being collected and recommendations have been made by a subpanel on Design Data Collection of the MAB Titanium Sheet-Rolling Panel, for uniform testing procedures on tensile, bearing, shear, compression, and crippling tests. Under Phase III, several firms are evaluating fabricability and applications of the new alloys. An appendix gives references to information in Reports 46A and 46B. Covers work from the middle of 1957 to Jan 1, 1958. For reports 46 and 46A see PB 121617 and 121624. BMI TML R 46C.

Descaling and cleaning of titanium and titanium alloys, by D. W. Stough, H. S. George, E. B. Friedl, W. K. Boyd and F. W. Fink. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Mar 1958. 68p photos, diagrs, graphs, tables. Order from OTS. $1.75. PB 121640

This report presents a survey of the present commercial practices for descaling titanium and titanium alloys. Scales formed on titanium and titanium alloys that have been heated in air at temperatures up to about 1100F are generally removed by acid pickle baths. More drastic treatment is usually required when the metal is heated in air to temperatures in excess of 1100 F. Proprietary descaling methods are discussed to the extent that such information is available. Descaling practices at the major producers of mill products, such as titanium billet, bars, plate, and especially sheet, have been discussed in detail. BMI TML 96.

Development of titanium alloys for elevated temperature service by powder metallurgical techniques, by Robert W. Jech and Edward P. Weber. Clevite Corporation. Clevite Research Center, Cleveland, O. Contract NOas 55-953-C. Project 50121G. Order separate parts described below from LC, giving PB number of each part ordered.

Bi-monthly report for the period 16 Jan 1956 to 15 Mar 1956. Apr 1956. 17p photo, graphs, tables. Mi $2.40, ph $3.30. PB 127207

Investigation of the homogeneous solid solution alloys has progressed to the point that some room temperature tensile information is available on extruded titanium-magnesium titanium-antimony, and titanium-cadmium alloys. An increase in strength was observed over the base material in all cases and ductility was reduced in most cases. The antimony alloys maintained a rather high reduction in area but the elongation was reduced at the 3% and 6% compositions. It would appear that alpha alloy complexing additions of approximately 1% cadmium and antimony could be useful. Germanium, indium and arsenic additions have been made to titanium in an effort to find alpha stabilizers. AD 100382.

Final report. Aug 1957. 84p photo, diagr, graphs, tables. Mi $4.80, ph $13.80. PB 130686

Composite structures of molybdenum fiber in a Ti-6Al-4V matrix were found to have a higher strength to weight ratio than A286 alloy at 1200 F. The modulus of elasticity of a 20 percent molybdenum fiber composite at 1200 F was found to be equivalent to the unreinforced alloy at room temperature. Dispersion strengthening was investigated using ThO_2, Al_2O_3, TiC, Ti_5Si_3, TiB_2 and TiAl as the dispersed phases.

Development of ZM41 magnesium sheet alloy, by H. A. Johnson and R. D. Masteller. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1957. 30p photos, graphs, tables. Order from OTS. 75 cents. PB 131417

A very promising magnesium alloy system was developed which appears superior to AZ31 sheet alloy. This alloy has been designated as ZM41 and has a nominal composition of 4 zinc - 1.0 manganese - 0.7 Mishmetal balance magnesium. Some of the features of ZM41 alloy compared to AZ31 are higher strength, more uniform longitudinal and transverse tensile properties, and a much greater tolerance for iron without the corrosion resistance of the alloy being adversely affected. AD 131042. Project 7351, Task 73514. Covers work from 29 Jul 1953-1 Sep 1955. AF WADC TR 56-415.

Effect of cold-work on the creep-rupture properties of a series of simple 18-8 type stainless steels, by Frank B. Cuff, Jr. and Nicholas J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. Feb 1956. 37p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127194

The effect of cold-work on the creep-rupture properties of a series of six simple 18-8 type stainless steels at 1100° and 1200° F has been investigated. The compositional variation (15.7 to 21.8 percent chromium, 8.7 to 13.9 percent nickel, and .042 to .075 percent carbon plus nitrogen) resulted in a M_s temperature variation from +100°F to absolute zero. A relationship was found among the composition, M_s temperature, recrystallization temperature, and rupture-life. Contract N5ori-07881, NR 039-007.

Effect of prior creep on mechanical properties of aircraft structural metals (2024-T86 aluminum and 17-7 PH stainless), by Jeremy V. Gluck, Howard R. Voorhees and James W. Freeman. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Feb 1958. 116p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.50. PB 131716

Specimens of 2024-T86 aluminum alloy and 17-7 PH (TH 1050) precipitation hardening stainless steel were exposed for times of 10, 50, and 100 hours at stresses giving up to 3% total deformation, using temperatures of from 350° to 500°F for the 2024-T86 and 600° to 900°F for the 17-7 PH. Following the exposures, short-time tensile, compression, or tension-impact tests were run at either room temperature, the temperature of exposure, or both. AD 150956. Project 7360, Task 73605. Covers work from Feb 10, 1956-Jan 9, 1957 under Contract AF 33 (616)-3368. AF WADC TR 57-150, Part 1.

Investigation of alloys of magnesium and their properties. Dow Chemical Co. Magnesium Laboratories, Midland, Mich. Contract AF 33(616)-2337, Suppl. agreement no. 2 (56-1212) Project 7351, Task 73514. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I is not approved for release through OTS.

Part II: Thermal and electrical properties of magnesium base alloys, by H. Baker. Sep 1957. 29p graph, tables. 75 cents. PB 131436

The electrical resistivities for cast Az31A & B, AZ63A, AZ81A, AZ91C, AZ92A, AM100A, EK30A, EK41A, EZ33A, HK31A, rolled HK31A and HM21XA, and cast HZ32A were determined at room temperature and some cases up to 500F. The temperature coefficients of electrical resistivity were fairly constant ranging from 0.8 to 1.0 microhm/cm^3-°F. The temperature coefficients of thermal conductivity were all positive and decreased with increasing temperature. AD 131043. Covers work from Mar 1956-Jan 1957. AF WADC TR 57-194, Part 2.

Part III: Development of preferred orientation in wrought magnesium alloys, by S. L. Couling. Sep 1957. 33p photos, diagr. $1.00. PB 131437

A polarized-light metallographic technique capable of supplying information on the orientation of individual grains in a polycrystalline magnesium aggregate has been developed and used as a tool in several orientation studies. The distribution of preferentially oriented grains in various extruded alloys has been examined and it was found that elongated clusters of grains of one orientation alternate with clusters of another orientation throughout much of the extrusion thickness. AD 131035. Covers work from Mar 1956-Jan 1957. AF WADC TR 57-194, Part 3.

Investigation of germanium-silicon alloys. Final technical report, by C. C. Wang. Sylvania Electric Products, Inc., Electronics Div., Woburn, Mass. Feb 1955. 50p photos, graphs, tables. Order from OTS. $1.25. PB 131422

Experimental methods have been developed for preparing homogeneous germanium-silicon alloys in polycrystalline form for all the compositions and in single crystal form for the low silicon alloys. The isothermal solidification technique used in preparing these alloys is described in detail. From the standpoint of devices and ease of preparation, the most useful alloys are in the range between 0 to 15 atomic percent silicon. Covers period 1 Feb 1953-31 Jan 1954; 1 Jul 1954-31 Oct 1954 under Contract NObrs 63180. Figures will not reproduce well.

Investigation of intergranular oxidation in stainless steels and high-nickel alloys, by Clarence A. Siebert, Maurice J. Sinnott, Lynn H. DeSmyter and Robert E. Keith. Michigan. University, Ann Arbor, Michigan. Jun 1955. 110p photos, diagrs, graphs, tables. Order from OTS. $2.75. PB 131471

Chromel alloys ASM, ARM, and D, and type 310 stainless steels were oxidized for 100-hour periods in the stressed condition. Intergranular oxidation measurements were obtained microscopically. Influence of stress, increasing time and temperature, water-vapor content of the air, and preferred orientation, were determined. Visual and magnetic examinations were made on the oxidized specimens and their oxides. AD 84494. Project no. 7351. Covers work from Mar 1954 to Feb 1955 under Contract AF 33(616)353. For Part 2 see PB 121795. AF WADC TR 55-470, Part 1.

Investigation of nodular cast iron manufactured in the Springfield Armory Casting Laboratory, by Olgierd Lubinkowski. U.S. Armory, Springfield, Mass. May 1957. 45p photos, tables. Order from OTS. $1.25. PB 131399

In addition to using magnesium silicon successfully as an inoculant in the preparation of thin-wall, hypereutectic iron, other addition agents, such as ferromanganese, tellurium, Lanceramp, and ferrosilicon, were evaluated as to their use and importance in producing an iron with fully pearlitic structure and restricted carbide presence. Prepared for publication by Associated Engineers, Inc. under Contract DA 19-059-504-ORD-2548. SA TR 18-1049.

Iron-chromium-aluminum alloys, by J. E. Srawley. U.S. Naval Research Laboratory. Apr 1958. 20p photos, graphs, tables. Order from OTS. 50 cents. PB 131676

Alloys containing up to 25-percent chromium and 11-percent aluminum were produced by vacuum melting and hot worked by forging. Tensile properties at room and elevated temperatures were determined, and their resistance to oxidation, in air and attack by the combustion products of residual fuel oils was studied. NRL R 5124.

Literature survey on the diffusion of metals into oxides. See entry under Bibliography on page 5.

Materials evaluation in relation to component behavior. Proceedings of the third Sagamore Ordnance Materials Research Conference, Dec 5-7, 1956. n.d. 322p photos, diagrs, graphs, tables. Order from OTS. $8.00. PB 131783

Session I: General problems of material evaluation: The evaluation of steels, by A.O. Schaefer. - Evaluation of non-ferrous materials, by N.E. Promisel. - Design parameters for cermets, by J.C. Redmond. - Session II: Analysis of failures: Plasticity and fracture, by R. Beeuwkes, Jr. - A survey of the low-temperature brittle fracture problem, by J.D. Lubahn. - Toughness of titanium alloy sheet, by S.V. Arnold. - Notch-tension testing, by E.J. Ripling. - Session III: Performance and testing of complex structures: Bucket failure mechanisms and problems in correlation of laboratory data with gas-turbine bucket performance, by J.W. Weeton, G.M. Ault and F.B. Garrett. - Material properties and their use in design, by M.J. Manjoine. - Prediction of creep and creep buckling of thin symmetrical shells from tensile creep data, by C.C. Bigelow. - Application of laboratory test data to design of aircraft gas-turbine blade fastening models, by W.F. Brown, Jr., A.J. Meyer and M.H. Jones. - Session IV: Performance and testing of complex structures (Part II): Application of laboratory fatigue data to gear design, by D.W. Dudley and W.F. Diffin. - Design aspects of high-speed rotating parts, by R. G. Anderson. - Development and testing of magnesium alloy wheels, by R.L. Atkin and J.G. Mezoff. - High-temperature properties in relation to design, by J.R. Weir, R.V. Meghreblian and D.A. Douglas, Jr. - Session V: Stress corrosion and hydrogen embrittlement: Evaluation of stress-corrosion effects, by H.P. George. - Studies of hydrogen embrittlement produced by electrolysis (Progress Report on Research Sponsored by the National Advisory Committee for Aeronautics and Springfield Armory), by A. Brenner and G.B. Wood. - Test methods for evaluation of hydrogen embrittlement, by G. Sachs. - Session VI: Evaluation of weldments: Tests for the evaluation of weldments, by L.R. Jackson. - V-notch Charpy impact testing welded joints, by C.E. Hartbower. - Stress-rupture behavior of weldments and brazed joints, by J.G. Sessler. - Materials for guided missiles, by C.W. Clark. Co-sponsored by the Ordnance Materials Research Office and the Office of Ordnance Research, U.S. Army. MET 365-574.

Materials-property-design criteria for metals. Part VI: Conventional short-time elevated-temperature properties of selected alloys, by W.P. Achbach, R.J. Favor and W.S. Hyler. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Oct 1957. 258p graphs, tables. Order from OTS. $6.00. PB 131515

This report is a compilation of data on the conventional short-time elevated-temperature properties of selected light alloys applicable to airframe and missile fabrication. The resulting recommended design data obtained in this study has been presented in such form as to be directly applicable to Bulletin ANC-5 (issued by the Air Force-Navy-Civil Panel) on "Strength of Metal Aircraft Elements". AD 142043. Project no. 7360. Covers work from Jan 1-Jun 30, 1957 under Contract AF 33(616)-3965. Parts 1-2, 5, 7 not released. For Parts 3-4 see PB 121579 and 121857. AF WADC TR 55-150, Part 6.

Measurement of the absolute energy of low angle dislocation boundaries in zinc, by R.B. Shaw, T.L. Johnston, R.J. Stokes, J. Washburn and E.R. Parker. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. May 1956. 32p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126531

A theoretical study on dislocation boundaries, combined with microscopic examination of a low angle boundary in a small tapered zinc crystal which was heated to within a few degrees of the melting point. Contract N7 onr-29516, NR 031-255. UC IER Series 27, Issue no. 14.

Phenomenological relation between stress, strain rate, and temperature for metals at elevated temperatures, by Elbridge Z. Stowell. U.S. National Advisory Committee for Aeronautics. May 1957. 19p graphs, tables. Order as TN 4000 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125659

A phenomenological relation between stress, strain rate, and temperature is suggested to account for the behavior of polycrystalline metals above the equicohesive temperature. The properties of the metal included in the relation are elasticity, linear thermal expansion, and viscosity. The relation may be integrated under various conditions to provide information on creep rates, creep rupture, stress-strain curves, and rapid-heating curves. NACA TN 4000.

Recovery of embrittled cadmium plated steel, by H.H. Johnson, E.J. Schneider and A.R. Troiano. Case Institute of Technology, Cleveland, O. Dec 1957. 23p drawing, graphs, tables. Order from OTS. 75 cents. PB 131654

The cadmium electroplate thickness influences the recovery rate of hydrogen embrittled steel; the recovery rate decreases with increasing plate thickness. A new and efficient technique for minimizing hydrogen embrittlement is described. AD 142244. Project 7021, Task 70645. Contract AF 33(616)-3431. AF WADC TR 57-340.

Review of selected papers relating to new structural materials developed by powder metallurgy. See entry under Bibliography on page 6. PB 132828

Some useful applications of zirconium, by J.H. McClain and R.W. Nelson. U.S. Bureau of Mines. Jun 1954. 32p photos. Order from LC. Mi $3.00, ph $6.30. PB 127199

1. Zirconium - Chemical properties 2. Zirconium - Corrosion 3. Zirconium - Nuclear properties 4. Zirconium - Uses 5. BM IC 7686

Status report for the period 1 Jan 1956-31 Mar 1956 under Contract Nonr-404-09, by Doris L. Evans. Rutgers University. College of Engineering. Bureau of Engineering Research, New Brunswick, N.J. May 1956. 5p. Order from LC. Mi $1.80, ph $1.80. PB 126536

An investigation of the age-hardening of the Cu-Be alloy system has been conducted on single crystals.

Stress corrosion cracking of austenitic stainless steels, by H.H. Uhlig, John Lincoln, Jr. and Richard A. White. Massachusetts Institute of Technology. Corrosion Laboratory, Cambridge, Mass. Apr 1957. 56p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 128219

Transgranular stress corrosion cracking of 18-8 type 304 specimens in 42% $MgCl_2$ does not depei on rate of stressing, whether specimens are bent within times of 10 minutes or a fraction of a second. Addition of hydrochloric acid to $MgCl_2$ decreases cracking time, whereas addition to sodium hydroxide increases cracking time. AD 120498. Contract AF 18(600)-1221. AF OSR TR 57-24.

Study of the factors influencing the properties of heat treatable titanium sheet alloys, by R.S. Richards, D.L. Day and H.D. Kessler. Titanium Metals Corporation of America, Henderson, Nev. Mar 1958. 279p photos, drawings, diagrs, graphs, tables. Order from OTS. $4.00. PB 131769

A number of factors were investigated which influence the properties of two titanium sheet alloys, Ti-4Al-3Mo-1V and Ti-2Al-6Mo-2V, in the annealed, solution treated, and aged conditions. AD 151061. Project 7351, Task 73510. Covers work from Jun 1956 - Jun 1957 under Contract AF 33(616)-3727. AF WADC TR 57-639.

Study of the possibility of reinforcing high-temperature alloys by addition of refractory powders, by John D. Burney. Mallory, P.R. & Co., Inc. Metallurgical Research Laboratory, Indianapolis, Ind. Feb 1958. 49p photos, graphs, tables. Order from OTS. $1.25. PB 131768

This investigation was concerned with attempting to reinforce 80 Ni-20 Cr alloy by the addition of such refractory oxides as TiO_2 and Al_2O_3. Several powder metallurgical fabrication techniques were investigated such as (1) pressing and sintering, (2) pressing and sintering followed by various working procedures, (3) internal oxidation and (4) liquid phase sintering. AD 150971. Project 7350, Task 73500. Covers work from Apr 1956 - Jul 1957 under Contract AF 33(616)2959. For earlier report see PB 121474. AF WADC TR 57-535.

Tables of interplanar spacings computed for the characteristic radiations of copper, molybdenum, iron, chromium and cobalt, by H.J. Garrett and R.E. Brocklehurst. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory. Wright-Patterson Air Force Base, Dayton, O. Feb 1958. 730p tables. Order from OTS. $10.00. PB 131764

Computations of interplanar spacings, "d" values, obtained from solutions of the Bragg equation are listed for the radiations normally used in X-ray diffraction analysis. All angular measurements are expressed as (2θ) values. Interplanar spacings are calculated for the Ka, Ka_1, Ka_2 and K_β radiations of the elements copper, molybdenum, iron, chromium, and cobalt. AD 142344. Project 7360. Task 73601. Covers work from Nov 1953 - Dec 1956. AF WADC TR 57-381.

Theory of creep of dispersion-hardened alloys, by J. Weertman. U.S. Naval Research Laboratory. Apr 1958. 11p diagrs, graphs. Order from OTS. 50 cents. PB 131675

Creep equations have been derived for dispersion-hardened alloys. Following Schoeck, it is assumed that the rate-controlling process is the climb of dislocations over second-phase particles. At low stresses a first-power stress dependence is found; at intermediate stresses a fourth-power dependence; and at high stresses an exponential stress dependence. NRL R 5123.

Thermodynamics of the liquid solutions in the triad Cu-Ag-Au: II. Cu-Au systems, by Russell K. Edwards and Merwyn B. Brodsky. Illinois Institute of Technology. Dept. of Chemistry, Chicago, Ill. Jan 1956. 17p table. Order from LC. Mi $2.40, ph $3.30. PB 127037

Thesis by M. B. Brodsky - Illinois Institute of Technology. Technical report no. 17.
1. Gold-copper alloys - Thermodynamic properties
2. Vapor pressure - Measuring equipment
3. Contract Nonr-1406, T.O. 2, NR 358-070, Technical report no. 17 4. Contract N7 onr-329, T.O. 2

Weldability of the chromium, nickel, molybdenum stainless steels. Final report on Contract NObs-62314, by R.D. Wylie and E.W. Coleman. Babcock and Wilcox Company, New York, N.Y. Mar 1956. 101f photos, diagrs, graphs, tables. Order from LC. Mi $5.70, enl pr $18.30. PB 132832

Experience in this program indicates that for temperatures up to 1350 F the molybdenum-bearing materials are satisfactory for service for extended periods of time. An electrode has been developed which is satisfactory for welding Type 316 material for elevated temperature service at temperatures below 1350 F. AD 120144. Index no. NS-021-300. Report no. 395. Contract NObs 62314, Final report.

METEOROLOGY AND CLIMATOLOGY

Activities of the Stormy Weather group. Final report covering the period Apr 1950-Mar 1957, under Contract AF 19(122)-217. McGill University. McDonald Physics Laboratory. "Stormy Weather" Research Group, Montreal, Canada. Apr 1957. 120p photos, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 128281

AD 117194. 1. Precipitation - Radar analysis - Canada 2. Radar - Meteorological use - Canada 3. Weather reconnaissance, Radar - Canada 4. AF CRC TR 57-274

Collection and analysis of upper-air samples. Final report for the period 15 Oct 1954-31 Dec 1955, by L.M. Jones. Michigan. University. Engineering Research Institute. Dept. of Aeronautical Engineering, Ann Arbor, Mich. Feb 1956. 16p photo, diagrs, graphs, Order from LC. Mi $2.40, ph $3.30. PB 126563

A new selective adsorption micro gas analyzer capable of measuring the helium and neon in 0.01 cc NPT of air was completed and successfully operated. Improvements in the construction and preparation of upper-air sampling bottles were made. The instrumentation for sampling at the peak of an Aerobee rocket trajectory was redesigned. An analysis of the possibility of "separation" results being caused by a flow phenomenon was continued. Dept. of the Army project no. 3-99-07-022. Sig. Corps project no. 172-B. Report no. 5. Contract DA 36-039-sc-56737, Final report. MU ERI Proj 2232-18-F.

Deposition of airborne particles on a large heated surface (U), by Martin Harwit. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Aug 1956. 27p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126534

The effect of a large heated surface on the deposition pattern from a polluted atmosphere is studied. It is concluded that the use of heat to avert the deposition of particulate matter 20 μ to 300 μ is not practical. Project: 4-12-10-007-64. CC CWL R 2046.

Extreme ultraviolet research. Final report for period 1 Mar 1953-1 Dec 1956, under Contract AF 19(604)-631, by William A. Rense. Colorado. University. Dept. of Physics, Boulder, Col. Jan 1957. 10p. Order from LC. Mi $1.80, ph $1.80. PB 126780

Spectrograms and photographs obtained from five rocket flights were analyzed for intensity of Lyman-

alpha radiation and its fluctuation with solar activity; molecular oxygen dissociation and its variation with height. Laboratory research included development of techniques for testing and calibrating rocket spectrographs at 1216Å, the measurement of the absorption coefficients of molecular atmospheric gases in the far ultraviolet, and the study of phosphor efficiencies under excitation by ultraviolet radiation. Theoretical research centered on the design of new types of ultraviolet spectrographs and monochromators, and on the calculation of Lyman-alpha line broadening. This report summarizes research and lists articles published. AD 117147. AF CRC TR 57-257.

Investigation of solar frequency at USAF Upper Air Research Observatory, Sunspot, New Mexico, by E. R. Schiffmacher. Cornell University. School of Electrical Engineering, Ithaca, N.Y. Jul 1956. 27p photo. Order from LC. Mi $2.40, ph $4.80. PB 126458

Summarizes work under this contract from 1 Dec 1951 until termination of observations at the Sunspot Observatory at the end of April 1955, including three joint technical reports in conjunction with the ONR radio astronomy project at Cornell. Short abstracts of publications are given. Research report EE 299. Contract AF 19(604)-73, Final report.

The 1954 eclipse measurement of the 8.6-mm solar brightness distribution, by R.J. Coates, J.E. Gibson and J.P. Hagen. U.S. Naval Research Laboratory. Apr 1958. 12p photo, graphs. Order from LC. Mi $2.40, ph $3.30. PB 130310

The solar eclipse of June 30, 1954 was observed at 8.6-mm wavelength from a site in Sweden near the eclipse center line, and the brightness distribution across the solar disk was determined. NRL R 5114.

Radiation budget of the stratosphere, by George Ohring. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography, New York, N.Y. Jun 1957. 47p graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 126257

The radiation budget of the northern hemisphere stratosphere is determined for the months of January, April, July and October. Emission of infrared radiation by carbon dioxide, water vapor and ozone is calculated by means of a simple numerical method derived from the radiative transfer equations. Absorption of solar radiation by ozone is taken from published results; absorption of solar energy by water vapor is computed with the aid of an empirical formula. It is shown that carbon dioxide is most important in cooling the stratosphere and that infrared transfer in the 9.6 μ ozone band normally results in a radiative convergence in the stratosphere. Some features of the stratospheric temperature distribution and circulation pattern are inferred from the computed radiation budget and its seasonal variations. AD 117229. Project no. 429. Contract AF 19(604)-1738, Scientific report no. 1. AF CRC TN 57-470.

Radiosonde ascent through the Sierra wave, by Edward L. Corton, Jr. U.S. Naval Ordnance Test Station, China Lake, Calif. Aug 1951. 19p tables. Order from LC. Mi $2.40, ph $3.30. PB 130840

A radiosonde ascent on January 18, 1951, at the Naval Ordnance Test Station showed three levels of updraft and two of downdraft. Wind observations were taken to the base of the main wave cloud; the balloon did not go through the lower roll clouds. Temperature and wind profiles indicate a discontinuity surface at about 6000 feet above the ground. Presented at the 111th national meeting of the American Meteorological Society, 19-21 Jun 1951, Los Angeles, Calif. NOTS TM 225.

Rates of temperature change in the atmosphere due to radiation in the 9.6 micron band of ozone, by Edward S. Epstein and Arthur Adel. Arizona State College, Flagstaff, Ariz. Sep 1956. 27p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126549

Scientific report HA-10. 1. Atmosphere - Temperature - Effects of radiation 2. Atmosphere - Ozone - Radiation 3. Contract AF 19(122)-198 4. AF CRC TN 56-863

Research on objective weather forecasting: On the influence of static stability on the development of disturbances, by H. Reiser. Germany. Wetterdienst, Frankfurt am Main, Ger. n.d. 25p graphs. Order from LC. Mi $2.70, ph $4.80. PB 125616

From a most simple initial field capable of development (baroclinic basic current with superimposed barotropic disturbance), time derivatives of the geopotential field are determined with the aid of quasigeostrophic equations. From the latter, conclusions can be deduced concerning the initial state of development (cyclo- and/or anticyclogenesis). The modification of results due to the variation of static stability and the dependency upon wavelength of the intensity of development are discussed. AD 98721. Date is 1953 or later. Contract AF 61(514)-735-C. EO ARDC TN 3A. AF CRC TN 56-665.

Some kinematics of frontal zones, by Clarence E. Palmer. Florida State University. Dept. of Meteorology, Tallahassee, Fla. Apr 1957. 21p diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 126522

It is possible that the technique of wind analysis, developed long ago by Sandstrom and V. Bjerknes,

may supplement the standard isobaric and frontal analysis of surface weather maps. A first approximation to a theory concerning the relation between asymptotes in the wind field and frontal zones suggests that the technique might reveal, by simple inspection of the separate frontal and wind analyses, the speed of movement of frontal zones, changes in their intensity and the sign of the vertical motion in their neighborhood. AD 117131. For Scientific report no. 2 under this Contract see PB 124822. Contract AF 19(604)-753, Scientific report no. 4. AF CRC TN 57-276.

Subsidence of a column of airborne particles (U), by Martin O. Harwit. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Jun 1956. 14p diagr, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 126306

A theoretical investigation of the mechanism of the subsidence of dense suspensions is reported. It is concluded that the suspension may be replaced by a fluid of density equal to that of the suspension. A method is also presented for estimating the magnitude of entrainment effect. Project 4-12-10-007-02. CC CWL R 2039.

Terminal forecasting. Part I: Extrapolation techniques for short-period terminal forecasting, by Richard E. Bell. U.S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D.C. Jan 1957. 42p maps, diagrs, graph. Order from LC. Mi $3.30, ph $7.80. PB 126735

Part I is limited to very short-period terminal forecasting methods based largely on extrapolation. Various techniques for forecasting visual elements are suggested as well as a systematic means of charting the surface and upper-level conditions in the local region of interest. AF AWS M 105-51/1.

Use of basic general circulation patterns in extended and long-range forecasting, by Arnold H. Glaser. Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, College Station, Tex. Dec 1956. 33p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126596

The hemispheric wave number is defined as the number of waves in the jet stream (or streams) of the westerlies as it circles the hemisphere. An investigation of persistence of the middle latitude wave number shows that the effect of persistence falls off rapidly with time, reaching negligible levels after seven days. Since lack of persistence suggests that the wave number is controlled by factors other than the meridional temperature gradient, the relation between wave number and the horizontal width of the westerly belt was investigated. There is a slight indication that wave number may tend to increase as the westerlies extend to lower latitudes. AD 110253. Appendix by William H. Hildreth, Jr. A&M Project: 107 - Reference 56-37F. For other report under this Contract see PB 123449. Contract AF 19(604)-1301, Final report. AF CRC TN 56-466.

Vertical motion and cyclogenesis, by Edwin L. Fisher. New York University. College of Engineering. Research Division, New York, N.Y. Mar 1956. 34p maps graphs. Order from LC. Mi $3.00, ph $6.30. PB 127230

The field of vertical motion in two east coast cyclones are examined and compared with the fields of vertical motion computed by other investigators. It is found that there is a definite pattern of rising and sinking motion associated with each of the cyclones. Certain other auxiliary effects of the vertical motions are also explored. It is suggested that the development of a double tropopause is caused by the sinking motion, and it is also thought that the vertical motions tend to increase the potential energy in the cyclone. Project SCUD. Contract Nonr-285(09), Technical paper 6.

MINERALS AND MINERAL PRODUCTS

Elastic, piezoelectric and dielectric constants of polarized barium titanate ceramics and some applications of the piezoelectric equations, by Rudolf Bechmann. Clevite Corporation. Clevite Research Center, Cleveland, O. Jan 1956. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 127137

1. Ceramics, Barium titanate - Piezoelectric properties 2. Ceramics, Barium titanate - Dielectric properties 3. Piezoelectric constants - Calculation 4. Contract Nonr-1055(00), Technical report no. 9

PACKING AND PACKAGING

Development of a non-adhering chemically foamed-in-place polyurethane cushioning material for packaging purposes, by Sidney Childers and Sidney Allinikov. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jan 1958. 23p photos, graphs. Order from OTS. 75 cents. PB 131665

Polyurethane cushioning materials exhibit excellent dynamic energy absorbing properties. Recently machines for producing the foams have been developed which are inexpensive and simple to operate. These machines make it feasible to foam-in-place the cushioning materials in the packaging line; in

other words, to manufacture the cushioning rather than procure it from a fabricator. Very significant reductions in packaging costs as well as increased flexibility in operations appear to be possible with foaming in place processes. A complete investigation into all aspects of foaming-in-place processes has been initiated. One important problem is concerned with eliminating the adhesion of polyurethane to surfaces of many materials when it is foamed-in-place. AD 142282. Project 7312, Task 73127. Covers work from Aug 1957-Oct 1957. AF WADC TR 57-682.

Evaluation of container-grade paper-overlaid veneer panel boxes for overseas use, by Edward H. Clarke. U.S. Forest Products Laboratory, Madison, Wis. Sep 1957. 31p photos, tables. Order from OTS. $1.00. PB 131553

Laboratory tests were conducted in an effort to investigate the suitability of some commercially available paper-overlaid veneers for use in overseas-type, cleated panel boxes. Rough handling tests and diagonal-compression tests involving some 220 overseas-type boxes provided information regarding the relative performance of various paper-overlaid veneers and two currently acceptable panel materials, V3s fiberboard and container-grade plywood. AD 142004. Project 7312. Covers work conducted from Dec 1954 - Jun 1957 under Contract AF 33(600)-53-4023. AF WADC TN 55-328.

Free-fall container, 5-gallon. Final report under Contract no. DA 19-129-QM-217. Firestone Tire and Rubber Company, Akron, O. May 1956. 17p photos, drawings, diagr. Order from LC. Mi $2.40, ph $3.30. PB 132740

The scope outlined in the contract called for the designing of a container that would withstand a free fall from a plane traveling up to 180 knots at altitudes of from 150 to 2,000 feet. Project 7-87-03-004. O.I. no. 1219.

PERSONNEL APTITUDE TESTING

Development of an efficient set of dimensions for description of Air Force ground-crew jobs. Part I: Rating dimensions, by Raymond C. Norris. 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. 60p diagr, tables. Order from LC. Mi $3.60, ph $9.30. PB 126801

In order to identify the significant independent dimensions of Air Force enlisted jobs, 150 jobs were rated by four professional psychologists with respect to 170 attributes. A set of 130 attributes were chosen as meeting minimum standards for importance and reliability of rating. Correlations were computed among the 130 attributes. The intercorrelations matrix was factor analyzed by Thurstone's "diagonal" method to identify the common dimensions. Traits which were quite reliable but indendent of the common dimensions were identified by multiple correlation techniques. Project no. 7700, Task no. 17000. Contract AF 33(038)-13474. AF PTRC TN 56-63.

Empirical study of the job components list, by Robert L. Gunn. 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. Oct 1956. 57p tables. Order from LC. Mi $3.60, ph $9.30. PB 126804

The frequency of performance check lists completed by the mechanics were analyzed in order to determine the job-defining function of the technique. Because of the large number of tasks involved (101), the Wherry-Gaylord and the Wherry-Winer adaptation of the multiple group factor method with relation to simplest orthogonal structure was used. AD 098897. Project no. 7950, Task no. 79500. Contract AF 18(600)-82. AF PTRC TN 56-123.

Learning measures as predictors of success in pipefitter and metalsmith schools, by Roger B. Allison, Jr. Educational Testing Service, Inc. Princeton, N.J. Mar 1956. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 126500

The results indicate that learning scores derived from this test were significantly related to the average grades earned by students on performance tests within either school. The predictive efficiency of the mechanical test from the Navy Basic Test Battery was also significantly improved with the addition of scores from the Breech Block Performance Test. These results lend additional support to the conclusions reached in a study at the Torpedoman's Mates School--namely, that the learning scores measure some aspect of mechanical ability and aid in the prediction of performance grades. Contract Nonr-694(00), NR 151-113.

Review and summary of research on personnel classification problems, by D. F. Votaw, Jr. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Laboratory, Personnel Research Laboratory, Lackland Air Force Base, Tex. Aug 1956. 16p table. Order from LC. Mi $2.40, ph $3.30. PB 126457

The report is divided into three sections; definition of the problem, methods of solution, and problem areas. In the first section two main problems are de-

fined: (1) Given a number of job categories with preassigned quotas, and given a group of persons for each of whom an amount of production in each job is known, the problem is to allocate persons to jobs so that production per person is a maximum. (2) Given a number of job categories with quotas and a group of persons, where each person is regarded simply as qualified or not in each job category, the problem is to find, if one exists, some allocation that will place each person in a job for which he is qualified. Ten methods of solution are listed, referenced, and discussed briefly in nonmathematical terms in Section 2. Section 3 summarizes present knowledge and suggests further research. AD 098881. Project no. 7702, Task 77057. Contract AF 18(600)-369. AF PTRC TN 56-106.

Validation of the Airman Classification Battery 1949-1953, by Iris H. Massey and John A. Creager. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Nov 1956. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126803

Validation of the battery is carried out by correlational techniques, including factor analysis, and by experimental methods designed to assess the effects of various testing conditions. Regression analyses are continuously carried out, using both training and proficiency criteria. The use of training criteria predominated during the period covered by this report, due to earlier maturation of such criteria and the large numbers of airmen flowing through technical training. Occasional validation against phase criteria is used to keep abreast of changing requirements and to study heterogeneity of function within a specialty area. AD 98903. Project 7700, Task no. 77006. AF PTRC TN 56-129.

PHYSICS

General

Conference on mechanics of elasticity and plasticity, sponsored by U.S. Army. Office of Ordnance Research, Durham, N.C. Proceedings. Order separate parts described below from LC, giving PB number of each part ordered.

First, 11-12 Feb 1954, Sheraton-Park Hotel, Washington, D.C. Feb 1954. 24p. Mi $2.70, ph $4.80. PB 128579

1. Elasticity - Congresses
2. Plasticity - Congresses

Second, Washington, D.C. Feb 1957. 440p photos, drawings, diagrs, graphs, tables. Mi $11.10, ph $66.60. PB 127290

Contents: Strength of very slender beams, by E. F. Masur. - Experimental determination of initial imperfections in cylindrical shells, by William A. Nash. - Plastic and elastic buckling stresses of clamped plates and clamped or simply supported flanges subjected to bending or eccentric compression in their plane, by P.P. Bijlaard. - Vibrations of straight and curved bars according to the "method of internal constraints," by E.G. Volterra. - Plastic behavior of aluminum alloy 17S-4 under triaxial stresses, by L.W. Hu. - The study of the propagation of stress waves by photoelasticity, by Josephine Feder. - Current research in the laboratory of experimental stress analysis of the mechanics department, by Max M. Frocht. - Tests on behavior of metal parts in the plastic range, by D.C. Drucker. - The stability of truncated cones, by Peter P. Radkowski. - High-speed tensile tests of thermoplastics, by Richard E. Ely. - Experiments on plastic wave propagation, by George Gerard. - On the plane plastic flow of an inset block, by E.W. Ross. - A theory of the non-linear influence of normal stress on fatigue under combined stresses, by W.N. Findley. - The mechanism of transient creep, by Egon Orowan. - The initiation of brittle fracture in mild steel, by D.S. Wood. - Thermal cycling commercially pure titanium and nickel, by Harry Majors, Jr. - A study of the crystal structure of iron-hydrogen alloys, by E.P. Klier. - Scabbing in materials, by Sudhir Kumar. - Velocities of radially-symmetric stress waves, by Norman Davids. - Dispersion of a longitudial strain pulse in an elastic cylindrical bar, by C.W. Curtis. - The statistical aspect of fatigue, by E.J. Gumbel.

Experimental study of heat transfer to small cylinders in a subsonic, high temperature gas stream, by George E. Glawe, Richard S. Brokaw and Robert C. Johnson. U.S. National Advisory Committee for Aeronautics. May 1957. 21p photos, diagrs, graphs. Order as TN 3934 from National Advisory Committee for Aeronautics, 1512 "H" St., N.W., Washington 25, D.C. PB 125658

A Nusselt-Reynolds number relation for cylindrical thermocouple wires in crossflow was obtained from the experimental determination of time constants. Tests were conducted in exhaust gas over a temperature range of 2000° to 3400°R, a Mach number range of 0.3 to 0.8, and a static-pressure range from 2/3 to 1-1/3 atmospheres, yielding a Reynolds number range of 450 to 3000. NACA TN 3934.

Mass transfer cooling of a laminar air boundary layer by injection of a light-weight gas, by E. R.

G. Eckert, P.J. Schneider and F. Koehler. Minnesota. University. Institute of Technology. Dept. of Mechanical Engineering, Minneapolis, Minn. Apr 1956. 27p graphs. Order from LC. Mi $2.70, ph $4.80. PB 126579

Calculations are presented for mass transfer cooling of a laminar air boundary layer by injection of hydrogen. All properties in the binary boundary layer are considered to vary with local mixture concentration and local mixture temperature. Results in the form of boundary-layer velocity, concentration, and temperature profiles are given for a particular free-stream air temperature of 392°F, a free-stream Mach number of 12, a surface-to-free-stream temperature ratio of 6, and surface concentrations of 0, 0.2, 0.4, 0.6, 0.8, and 0.9. The injection rate and skin friction are presented as a function of the surface concentration. AD 86014. Contract AF 18(600)-1226, Technical report no. 8. AF OSR TN 56-136.

On limiting states of deformation, by William Prager. Brown University. Division of Applied Mathematics, Providence, R.I. Feb 1956. 13p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126546

The paper is concerned with the mechanics of ideal locking materials. Such a material deforms freely under negligible stresses until a certain strain invariant reaches a limiting value when locking strain, certain kinds of stress increase will not cause any change in strain. A special boundary value problem is discussed. Theorems are established which furnish bounds for the surface displacements that cause locking. A simple example is discussed in some detail. Contract Nonr-532 (10), NR 064-406. GDAM C 11-9. BU AM TR 9.

On the unsteady motion of a viscous fluid past a semi-infinite flat plate, by G. F. Carrier and R.C. DiPrima. Harvard University, Cambridge, Mass. Mar 1956. 44p graphs. Order from LC. Mi $3.30, ph $7.80. PB 126507

1. Plates, Flat - Hydrodynamics 2. Flow, Viscous - Motion 3. Contract N5 ori-07666

Progress report on instantaneous temperature measurements: Summary report on the development of methods for measuring end-gas temperatures in internal combustion engines. Coordinating Research Council, Inc. Coordinating Fuel and Equipment Research Committee, New York, N.Y. Dec 1955. 314p photos, diagrs (part fold), tables. Order from LC. Mi $11.10, ph $48.60. PB 126946

AD 78600. Covers period 1 Jul 1954-30 Nov 1955 under Contract DA 30-069-ord-1324. Dept. of the Army project no. 599-01-04. ORD project: TB 2-0001(1320). Includes Appendix A. Development of a method for measuring gas temperatures of an internal combustion engine. Final report on CRC project CF 1-4 for the period 1 Aug 1954-15 Sep 1955, by the Sloan Laboratories for Automotive and Aircraft Engines, Massachusetts Institute of Technology, by J.C. Livengood, G.F. Harper, E.A. Oster, T.P. Rona, T.Y. Toong and P.C. Wu (171 pages). - Appendix B. Measurement of compression temperatures in spark-ignition engines. Technical report no. 2 under Contract with the University of Wisconsin, by T.J. Schweitzer, R. Kadesch and O.A. Uyehara (94 pages). Four techniques are reported upon: velocity of sound, iodine absorption spectra, infrared radiation, and thermocouple methods.

Quarterly report under Contract AF 19(604)-626. Massachusetts Institute of Technology. Acoustics Laboratory, Cambridge, Mass. Order separate parts described below from LC, giving PB number of each part ordered.

Jul - Sep 1956, edited by J. Doty. Oct 1956. 27p graphs. Mi $2.70, ph $4.80. PB 126712

A quarterly report indicating significant research progress in The Acoustic Laboratory i.e. Random noise thru stretched membrane; jet edge whistle; reflection of untrasound for irregular surface, flutter in magnetic tape recording. AD 110161.

Oct - Dec 1956. Jan 1957. 39p photos, diagrs, graphs, table. Mi $3.00, ph $6.30. PB 126379

Reports research on an analog speech synthesizer, a therminal analog of the vocal tract, studies of speech sound production, speech compression system, pitch of damped waves, difference limen for the fundamental frequency of vowel sounds, wireless microphones, etc., and lists publications, papers, and activities for the period covered. AD 117032. For other quarterly reports see PB 117331, 118198, 118413, 119806, 120226, 125150 and 124658.

Review of the literature on two-phase (gas-liquid) fluid flow in pipes. See entry under Bibliography. on page 6. PB 131728

Structure of spectral lines from plasmas, by Henry Margenau and George W. Landwehr. Yale University. Sloane Physics Laboratory, New Haven, Conn. Jan 1957. 99p graphs. Order from LC. Mi $5.40, ph $15.30. PB 126514

AD 115095. 1. Plasma - Spectral lines 2. Spectral lines - Structure - Theory 3. Contract AF 18(603)-15

Nuclear

Annual progress report, 41st, for the period 1 Jun

1955 to 31 May 1956, under Contract no. AT (30-1)-905 and Contract N5ori-07806. Massachusetts Institute of Technology. Laboratory for Nuclear Science, Cambridge, Mass. Jun 1956. 235p photo, drawings, diagrs, graphs, tables. Order from LC. Mi $10.20, ph $36.30. PB 127200

Progress during the period is reported under the following group headings: 1. Chemistry of the fission elements. - 2. Nuclear chemistry (inorganic). - 3. Nuclear chemistry (organic). - 4. Cosmic ray. - 5. Elementary particle scattering. - 6. Neutron physics. - 7. ONR generator. - 8. Radioactivity. - 9. Cyclotron. - 10. Synchrotron. - 11. Theoretical. - 12. Cambridge accelerator project.

Design and use of a 23,000 Curie cobalt-60 facility, by Marvin C. Atkins, Kurt Wolfsberg, William N. Lorentz and Donald R. Smith. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. and U.S. Air Force. Institute of Technology. Nov 1957. 103p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.50. PB 131619

A two-chambered hot cell has been designed, built and used. The hot cell is suitable for radioactive materials testing, hot chemistry, or handling of radiation sources. A 23,000 curie cobalt-60 source has been assembled and is being used for materials irradiations. The source in its normal form is 11.6 inch I.D. x 28 inches long. The activity of each of the 2450 slugs comprising the source was individually calibrated. Slugs of different activities were arranged to give the desired flux distribution inside the cylindrical source. Dose rates in and around the source have been measured with an ion chamber and glass dosimeters. An engineering approach to design of radiation sources has been formulated and tested with the 23,000 curie source. The report includes a complete description of the hot cell, design and assembly of the source, dosimetry methods, and mathematical design of cylindrical sources. AD 142157. Project 7360, Task 73607. Covers work from Jul 1953-Mar 1957. Chapter 2 is Thesis - Air Force Institute of Technology. AF WADC TR 57-498.

Investigation of nuclear-energy levels, by J.M. Cork. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Mar 1956, 6p. Order from LC. Mi $1.80, ph $1.80. PB 126497

Lists articles published in various periodicals dealing with new data on the structure of various nuclei. Covers period Jun 1946-1 Apr 1955 under Contract N5ori-116, T.O. III, NR 024-01. MU ERI Proj 1670-2-2-F.

Method for determining neutron flux spectra from activation measurements, by Sven R. Hartmann. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1957. 31p graphs. Order from OTS. $1.00. PB 131611

A method for the determination of neutron spectra which approximates the neutron flux by a linear combination of the response functions (cross sections) of the detectors used in the spectral measurement is discussed. This linear combination is shown to approximate the neutron flux in the mean and to provide a calculated activation, for each detector, identical with that found in the experiment. Some practical cases are considered herein. A set of seven cross sections are used to approximate a fission, constant, and monoenergetic spectrum. A discussion of uncertainty propagation is given with illustrative examples for the fission and constant spectras. The integral neutron flux is also calculated and shown to be more adequately representable than neutron flux. AD 142029. Project 6002, Task 73075. Covers work from Dec 1956-Jun 1957. AF WADC TR 57-375.

Standard instrumentation techniques for nuclear environmental testing, by Walter R. Burrus. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1957. 33p tables. Order from OTS. $1.00. PB 131590

The ANP Advisory Committee for Nuclear Measurements and Standards was established to standardize nuclear measurements for all Air Force programs supporting the development of nuclear weapon systems. The first phase of this Committee's effort is nearly complete and is concerned with the standardization of nuclear measurements for radiation damage studies. This technical note presents and discusses Committee recommendations for standardizing radiation damage measurements. AD 142179. Project 6002. Covers work from Jul 1956-May 1957. This report is an extension of TN 56-190. AF WADC TN 57-207.

Theory of inelastic electron scattering by C^{12}, by R.A. Ferrell and W.M. Visscher. Maryland. University. Dept. of Physics, College Park, Md. Jun 1956. 19p graphs. Order from LC. Mi $2.40, ph $3.30. PB 127238

The recently measured elastic and inelastic electron scattering cross-sections of C^{12} are utilized to test the shell model of light nuclei. Collective effects are important in the excitation of two of the excited states (7.68 and 4.42 Mev). and are acceptably accounted for by the independent particle approach to collective oscillations recently proposed by the a authors. The inelastic scattering data leading to the 9.61 Mev state is shown to identify it as probably 1^-. Some of the results of higher energy scattering

experiments on C^{12} and O^{16} are predicted. Covers work from Feb 15 - Jun 15, 1956. Research supported by the National Science Foundation Grant no. G 1608 and by the Office of Naval Research under Contract Nonr-594(00), NR 017-610. UM TR 45.

Transition amplitudes for photo-meson production from nucleons and photo-disintegration of the deuteron, by Abraham Klein and L. Donald Pearlstein. Pennsylvania. University, Philadelphia, Pa. Mar 1957. 26p tables. Order from LC. Mi $2.70, ph $4.80. PB 126589

An elementary technique of general applicability is applied to the explicit construction as operators in the spin space of the particle involved, of the transition matrices for photo-production of mesons from nucleons and photo-disintegration of the deuteron. AD 120414. Technical note no. 5. For earlier report under this Contract see PB 124773. Contract AF 18(603)-60. AF OSR TN 57-71.

PHYSIOLOGY

Climate and exercise, by Elsworth R. Buskirk and David E. Bass. U.S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Jul 1957. 38p map, diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132437

The effect of climate on man's ability to perform exercise is reviewed, with special emphasis on the effects of hot environments. The physiology of temperature regulation is discussed and the manner in which temperature regulatory mechanisms are altered during exercise is described. Also reviewed are the interactions between exercise and external heat load imposed by hot environments and the importance of cardiovascular adjustments as a common denominator. The importance of acclimatization to heat and the manner in which physical conditioning and prior exposure to heat enhance ability to perform severe work are described. Other sections deal with the role of clothing during work in the heat and recent attempts to characterize the environment in terms of its physiological strain, i.e., "heat stress index." QMC EP TR 61.

Estimation of the mass of body segments, by James T. Barter. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1957. 15p drawings, graphs, tables. Order from OTS. 50 cents. PB 131447

The present study is concerned with the reanalysis of the data concerning the mass of body segments published in WADC TR 55-159 (PB 121053), Space Requirements of the Seated Operator, and in The Center of Gravity of the Human Body as Related to the Equipment of the German Infantry, by Braune and Fischer, 1889. Regression equations for computing the mass of body segments for any known body weight are presented along with data on estimated weights of body segments of Air Force flying personnel. AD 118222. Project 7214, Task 71727. Reanalysis of the data in PB 121053 (WADC TR 55-159). AF WADC TR 57-260.

Influence of graded impedance to tracheal air flow on timed vital capacity measurements of normal human subjects, by F.G. Hall and L.C. Sappenfield, Jr. Duke University. School of Medicine. Dept. of Physiology and Pharmacology. Aero Physiology Laboratory, Durham, N.C. Oct 1957. 10p graphs, tables. Order from OTS. 50 cents. PB 131554

Timed vital capacities have been determined on nine healthy young men ranging in age from 21 to 28 years. Their normal vital capacities were determined and found to vary on the average only 1% from predicted values. Subsequently, four different resistances were interposed between mouthpiece and vitalometer and the volume of air which could be expelled into the vitalometer determined. The reduction in the timed capacities varied proportionally with resistances imposed. It is suggested that this test gives a value which can be used to determine the degree of breathing obstruction in pulmonary efficiency tests. AD 142041. Project 7160, Task 71811. Contract AF 33(616)-3821. AF WADC TN 57-353.

Metrical relations among dimensions of the head and face, by Edmund Churchill and Bruce Truett. Antioch College, Yellow Springs, O. Jun 1957. 132p drawings, tables (part fold). Order from OTS. $3.50. PB 131480

Correlation data for the head and face dimensions of two groups of USAF personnel are presented. These data extend the useful information about these dimensions into the areas in which two or more dimensions are considered simultaneously. Forty-one dimensions of flying personnel, based on a sample of over 4,000, and six dimensions of WAF trainees, based on a sample of 852, are reported. In addition to a presentation of the data, the report discusses the utility of correlational statistics in the design of personal equipment and describes the procedures used in obtaining these data. AD 110629. Project 7214, Task 71728. Contract AF 18(616)-3841. AF WADC TR 56-621

Physiological properties of plasma substitutes: Muscle, by George A. Feigen. Stanford University. Dept. of Physiology. School of Medicine, Stanford, Calif. Dec 1955. 95p. Order from LC. Mi $5.40, ph $15.30. PB 132315

Work is divided into three parts: I. Synthesis of the work-cycle; II. Structure and chemical composition; III. Biophysics of resting and active muscle. AD 79014. Contract N6 onr-25137.

Statistical evaluation of joint range data, by James T. Barter, Irvin Emanuel and Bruce Truett. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1957. 29p drawings, tables. Order from OTS. 75 cents. PB 131592

This study reanalyzes the data concerning the range of motion of human body joints published in WADC TR 55-159, Space Requirements of the Seated Operator, by W. T. Dempster, (PB 121053). The reanalysis is intended to present the information in a form more applicable to Air Force design problems. An analysis of variance of 43 joints movements for four subgroups originally selected on the basis of physique revealed that 12 body movements (28%) were combined to yield summary statistics for the total sample of 39 young men. Design ranges were derived from these total group values. Descriptions and illustrations of joint movements are included. AD 131028. Project 6333; Project 7214, Task 71727. Analysis of data in WADC TR 55-159 (PB 121053). Contract AF 18(600)-30. AF WADC TN 57-311.

PSYCHOLOGY

Effect of traffic configurations on the accuracy of radar air traffic controller judgements, by James C. McGuire. Ohio State University. Laboratory of Aviation Psychology and Ohio State University Research Foundation, Columbus, O. May 1957. 25p diagrs, graphs, tables. Order from OTS. 75 cents. PB 131463

In this experiment six skilled radar air traffic controllers adjusted a movable target to a position judged to be one which would result in simultaneous arrival of the adjustable and standard targets at a reference. The results were analyzed for both constant errors and variable errors. With both types of errors, there was an interaction between the two types of trails, and the three configurations. Over all, the mean variable error in making the judgements required in this study was found to be of the order of 4 per cent of the distance-to-go, over and above a small amount of variability. AD 118268. Project 7192, Task 71596. Contract AF 33(616)-43. Contract AF 33(616)-3612. AF WADC TR 56-73.

Effects of elevated temperatures on performance of a complex mental task, by W. Dean Chiles. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1957. 14p photos, diagrs, tables. Order from OTS. 50 cents. PB 131666

Eleven subjects were tested on a complex mental task at four different effective temperatures-76, 81, 86, and 91 degrees F. Differences among the temperature conditions were not significant. This result is in contrast to that obtained by Pepler, who reported significant differences under essentially the same conditions. AD 142192. Project 7193, Task 71615. AF WADC TR 57-726.

Evaluation of selected rifle sights under two levels of illumination, by H. F. Pohlmann and L. T. Katchmar. U.S. Aberdeen Proving Ground. Human Engineering Laboratory, Aberdeen Proving Ground, Md. Jul 1957. 11p drawings, tables. Order from LC. Mi $2.40, ph $3.30. PB 130842

This study investigated the accuracy permitted by a series of rifle sights under live firing conditions for high (50 foot-candles) and low, (1 foot-candle) levels of illumination. The sights were a standard M1 and two experimental sights which had been reported to permit a high degree of sighting accuracy for both high and low illumination under laboratory conditions. The results indicated that the smallest mean shot group for both conditions of illumination was obtained with the standard M1 sight. Ordnance project TB 1-1000. APG HEL TM 7-57.

Human engineering bibliography. See entry under Bibliography on page 5. PB 131507

Human factors checklists for test equipment, visual displays and ground support equipment, by Richard L. Krumm and Wayne K. Kirchner. American Institute for Research, Pittsburgh, Pa. Feb 1956. 19p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 130837

This report consists of a series of checklists intended as an aid in the human engineering analysis of general design features of certain types of equipment. The checklists can be used to identify human factors design deficiencies. Since deficiencies in design contribute in varying degrees to system degraduation, the checklists are scaled to indicate design characteristics that are minor, important, and serious. In their present stage of development, the checklists are a diagnostic tool; they point out equipment shortcomings which require improvement and they suggest the relative seriousness of these shortcomings. AD 96941. Project 7800. Contract AF 29(601)-175. AF SWC TN 56-12.

Human factors considerations in the design proposals for a ballistic missile unit proficiency system, by Felix F. Kopstein and Ross L. Morgan. U.S. Air Force. Air Research and Development Com-

mand. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1957. 18p. Order from OTS. 50 cents. PB 131696

The purpose of this paper is to provide an outline of steps in the preliminary design of a unit proficiency system. It is meant to give an overview rather than serve as a detailed guide. This system is the means by which proficiency training and measurement are obtained in ballistic missile systems. AD 142040. Project 7197, Task 71640. AF WADC TN 57-352.

Investigations of formal systems of reasoning leading to machine processing. ACF Industries. Research Dept. Avion Division, Alexandria, Va. n.d. 17p. Order from LC. Mi $2.40, ph $3.30. PB 126517

Studies were made of four distinct phases of the problem; translation of language of discourse into formal logic, digitalization of the monadic predicate calculus, digitalization of the dyadic functional calculus, and mechanization of digitalized logic. AD 110103. Date is 1956 or later. Contract AF 19(604)-1582, Final report. AF CRC TR 56-166.

Mechanics of association. Documentation, Inc., Washington, D.C. Aug 1955. 31p photo, drawings, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 126909

Problems concerned with analyzing a system of information so that all associations among the ideas on the systems could be displayed to anyone consulting the system. Technical report no. 11. Contract Nonr-1305(00), Final report, Phase 2.

Parameters of an auditory monitoring task, by Donald H. Bullock and Loy S. Braley. Buffalo. University. Dept. of Psychology, Buffalo, N.Y. n.d. 7p tables. Order from LC. Mi $1.80, ph $1.80. PB 126484

This report describes an experimental study of the effect of two variables on auditory monitoring proficiency: (a) informational loading of a message; (b) rate of information presentation of a message. Date is 1954 or later. Scientific report no. 2. For Scientific report no. 3 (Final report under this contract) see PB 126646. Contract AF 30(602)-574. AF RADC TN 55-73.

Psychological stress as a theoretical concept, by W. Dean Chiles. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jul 1957. 21p diagr. Order from OTS. 75 cents. PB 131616

An examination of some typical treatments of psychological stress is carried out in this paper. The approach of construing stress in analogy to physical and physiological concepts is rejected since these approaches have not led to quantifiable insights into the action of stress with respect to human behavior. A systematic approach, based on the presentation of J.S. Brown and I.E. Farber, is suggested along with the framework for the quantification of psychological stress as a theoretical concept. Some of the implications of this approach with respect to performance variables are discussed. AD 130942. Project 7193. AF WADC TR 57-457.

Theoretical approach to authority, by David Easton. Stanford University. Dept. of Economics, Stanford, Calif. Apr 1955. 65p. Order from LC. Mi $3.90, ph $10.80. PB 126560

This is an attempt to reinterpret the role of authority in society and at the same time to take an initial step in the development of a general theory that might offer some fresh insights into the operation of the political system. Contract N6 onr-25133, NR 047-004. SU DE TR 17.

STRUCTURAL ENGINEERING

Determination of the mechanical properties of aircraft-structural materials at very high temperatures after rapid heating, by James B. Preston, William P. Roe and J. Robert Kattus. Southern Research Institute, Birmingham, Ala. Jan 1958. 207p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.00. PB 131664

A study was made of the mechanical properties--tensile, creep, fracture, compression, shear, and bending--of several structural materials under conditions of moderate to rapid rates of heating and of loading. The materials involved in this investigation included electrolytic-tough-pitch copper, oxygen-free high-conductivity copper, A-nickel, ingot iron, molybdenum, tantalum, type GBH graphite, and composite OFHC copper plus 316 stainless steel sheet. The testing temperatures ranged from room temperature to the melting points of the metals and to 5750°F for the graphite. The total heating, holding, and loading times to failure ranged from about three seconds to about 30 minutes. Many of the tests were carried out both in air and in inert atmospheres. AD 142284. Project 2998, Task 73320. Covers work from Mar 1956-Jun 1957 under Contract AF 33(616)-3494. Contract AF 33(616)-2837 complements this report. AF WADC TR 57-649, Part 1.

Effect of axial load on the shear strength of reinforced concrete beams, by M.J. Baron and C.P. Siess. Illinois. University. Dept. of Civil Engineering, Urbana, Ill. Jun 1956. 78p photos, tables, diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 127240

The investigation consisted of tests on 20 beams and the analysis and interpretation of the results. The variables included axial load, span, steel percentage, and unintentional differences in concrete strength. The beams were all simply supported and loaded at midspan through an integrally cast column stub. The ultimate application of the results of this investigation is to the design of members in reinforced concrete box culverts. Sponsored by the Ohio River Division Laboratories, Corps of Engineers, U.S. Army. Contract DA 017-CIVENG-56-6, Final report, Part 2. ILU CES SR 121.

Limit design of a reinforced square plate, by W. E. Boyce. Brown University. Division of Applied Mathematics, Providence, R.I. Feb 1956. 14p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126502.

While the limit design of simple structures (beams, frames, plates, and shells) is fairly well developed, that of composite structures (combinations of simple structures) has received little attention. This paper considers the limit design of a particular composite structure, a square plate reinforced by a square grid of beams. Contract Nonr-562(10), NR 064-406. BU AM TR 11. GDAM C 11-11.

TEXTILES AND TEXTILE PRODUCTS

Aerodynamic heating of parachutes, by A. L. Ruoff, S. W. Liu and F. Frank. Cornell University. Dept. of Engineering Mechanics and Materials Ithaca, N.Y. Dec 1957. 61p diagrs, graphs, tables. Order from OTS. $1.75. PB 131597

Heating rates for a parachute employed at varying Mach numbers (2-5) and altitudes (sea level to 100,000 feet) are obtained. Various methods of protecting the nylon parachute are discussed. Although requiring further engineering development the following methods are theoretically feasible: Coating with a silicone foam which reduces the heat transfer rate to the nylon is possible; use of a sublimating coating, e.g., hexachlorethane is feasible; and the use of water absorbed in a polyurethane foam coating on the nylon is possible. The method is described, whereby, using the data of this report, the amount of evaporating material required to keep the nylon at a safe temperature can be very readily calculated when a specific time-velocity profile is given. AD 142261. Project 7320, Task 73201. Covers work from Apr 1956-Mar 1957 under Contract AF 33(616)-3572. AF WADC TR 57-157.

Design data on biaxial forces developed in parachute fabrics, by Jan G. Krizik, Ebrahim Victory, Joseph F. Cheatham and Stanley Backer. Massachusetts Institute of Technology. Mechanical Engineering Dept. Textile Division, Cambridge, Mass. Dec 1957. 96p photos, diagrs, graphs, tables. Order from OTS. $2.25. PB 131658

A high pressure permeometer has been constructed for use with parachute cloths over a differential pressure range of 0.5 to 1000 inches of water. The unit consists of a compressor, test duct with special biaxial stress jaws, and a steam ejector in series. Operation with variable air densities is possible to simulate high altitude parachute operation. A range of standard and experimental parachute materials has been tested on the permeometer and extensive data are available relating air flow, biaxial stress and strain and area increase to pressure differentials across the fabric. Data showing the effect of sample prestressing, cyclic testing and average air density are included. AD 142208. Project 7320, Task 73201. Covers work from Jan 1956-Jun 1957 under Contract AF 33(616)-3253. AF WADC TR 57-443.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Helicopter handling qualities investigation. Phase II: Analysis of helicopter stability and control problems. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Contract NOa(s)-12151. Order separate parts described below from LC, giving PB number of each part ordered.

Part B: Physical discussion of helicopter handling qualities, by A. F. Donovan. Jun 1955. 135p drawings, diagrs, graphs. Mi $6.90, ph $21.30. PB 130463

Part B is devoted primarily to a physical description of the stability and control characteristics of the helicopter unmodified by stabilizing devices. The handling characteristics of the gear driven, single lifting rotor helicopter are compared with analogous qualities in airplanes and other vehicles. Based on this study, a set of desirable flying qualities is postulated for helicopters. CAL TB 707-S-2, Part B.

Part C: Characteristics and comparison of existing helicopter stabilizing devices, by H. Daughaday and F. A. DuWaldt. Jun 1955. 193p photos, drawings, diagrs, graphs, tables. Mi $8.70, ph $30.30. PB 130808

Part C includes a description of various exist-

ing stabilizing devices and a physical explanation of how each one affects helicopter flying qualities. Also an attempt is made to give a unified treatment of these devices by considerating them as special cases of a generalized autopilot. Quantitative data on the influence of the devices considered is obtained by determining how they would modify the handling qualities of a sample helicopter. Response time histories for the sample helicopter with various devices were obtained on an analogue computer and used in evaluating the devices. CAL TB 707-S-2, Part C.

Investigation of fires originating from an oxygen system, by Paul R. Dierdorf. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Mar 1958. 8p photos. Order from OTS. 50 cents. PB 131730

The occurrence of a spontaneous-combustion fire in an aircraft oxygen system indicated a need for investigating this hazard. Accordingly, tests were conducted in an attempt to reproduce this accident. These were followed by tests in which combustibles were ignited. CAA TDR 327.

Instruments

Development of a variable-parameter DME interrogator, by Richard C. Borden, Robert E. Carlson, John R. Hoffman and Harold G. McMurtrey. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1954. 14p photo, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132725

1. Distance measuring equipment - Components - Design 2. Interrogators - Design 3. CAA TDR 246

Development of a VHF directional localizer. Part I: Preliminary tests, by Chester B. Watts, Jr., Samuel E. Taggart and Kennard E. Voyles. Part II: Monitor, by Kennard E. Voyles. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1954. 45p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132707

Prepared for the Air Navigation Development Board under project 9.1. 1. Antennas, Directive - Radiation pattern 2. Radio direction finders (VHF) 3. CAA TDR 183

Developments in DME interrogators, by John R. Hoffman and Robert E. Carlson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1953. 31p photos, diagr, graphs, tables. Order from LC. Mi $3.00 ph $6.30. PB 132715

1. Distance measuring equipment 2. Interrogators - Design 3. CAA TDR 212

Evaluation of the Upson stall warning indicators, by James H. Harding. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1953. 11p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132716

1. Indicators, Stall 2. Pressure warning systems - Parts 3. CAA TDR 213

Identification of DME transponders, by Richard C. Borden and Carl C. Trout. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 19p photos, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 132706

1. Distance measuring equipment 2. Transponders - Identification 3. CAA TDR 174

Flight calibration of VHF omnirange system, by Thomas S. Wonnell. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1949. 8p photo, diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 132682

1. Radio range (VHF) - Calibration 2. CAA TDR 69

Improved model ball drop sextant, by A.M. Weber. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1949. 21p photos, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 132690

1. Navigational aids 2. Sextants, Ball drop 3. CAA TDR 90

Initial flight tests and theory of an experimental parallel course computer, by Francis J. Gross and Hugh A. Kay. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1948. 25p photos, maps, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132686

1. Computers, Position (Navigation) 2. CAA TDR 83

Position plotter, by A.M. Weber. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1948. 7p photos. Order from LC. Mi $1.80, ph $1.80. PB 132689

1. Plotting equipment 2. Navigational aids - Evaluation 5. CAA TDR 88

Type V pictorial computer with automatic chart selection. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Prepared for the Air Navigation Board. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Development and initial tests, by Logan E. Setzer and Paul H. Leake. Jun 1954. 32p photos, maps, diagrs, graphs, tables. Mi $3.00, ph $6.30. PB 132711

1. Instruments, Aeronautical - Pictorial
2. Computers, Navigational - Operation
3. CAA TDR 199

Part II: Technical and operational evaluation, by Raymond E. McCormick and Fred S. McKnight. Jun 1954. 18p photos, diagrs, tables. PB 132723

1. Instruments, Aeronautical - Pictorial
2. Computers, Navigational - Operation
3. CAA TDR 243

Type IV rotatable-panel pictorial computer. Part I: Development and initial tests, by Logan E. Setzer. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1954. 29p photos, diagrs (part fold), tables. Order from LC. Mi $2.70, ph $4.80. PB 132710

Prepared for the Air Navigation Development Board under project 13.1. 1. Instruments, Aeronautical - Pictorial 2. Computers, Navigational - Operation 3. CAA TDR 195

Engines and Propellers

Aircraft fire extinguishment. Part IV: Evaluation of a bromochloromethane fire-extinguishing system for the XB-45 airplane, by Charles A. Hughes and C.M. Middlesworth. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1954. 10p photos, diagrs, tables. Order from LC. Mi $1.80, ph $1.80. PB 132722

For Parts 1-3, 5 see PB 122835-122837 and 121010. 1. XB-45 (Airplane) 2. Fire extinguishers, Bromochloromethane 3. Fire Extinguishers - Airplanes - Evaluation 4. CAA TDR 240

Comparison of typical national gas turbine establishment and NACA axial-flow compressor blade sections in cascade at low speed, by A. Richard Felix and James C. Emery. U.S. National Advisory Committee for Aeronautics. Mar 1957. 46p photo, diagrs, graphs, tables. Order as TN 3937 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125690

Supersedes RML 53B26a. 1. Cascades (Aerodynamics) - Tests 2. Compressors, Axial - Blades - Tests 3. NACA TN 3937

Differential equations of motion for combined flapwise bending, chordwise bending, and torsion of twisted nonuniform rotor blades, by John C. Houbolt and George W. Brooks. U.S. National Advisory Committee for Aeronautics. Feb 1957. 47p diagrs. Order as TN 3905 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125706

1. Equations of motion 2. Rotor blades, Twisted - Flutter - Theory 3. NACA TN 3905

Fire-resistance studies of the Convair-340 power plant, by L.A. Asadourian. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1955. 8p photos, drawings. Order from LC. Mi $1.80, ph $1.80. PB 132731

1. CV-340 (Power plant) 2. Power plants - Fire prevention 3. CAA TDR 266

Structural and vibrational characteristics of scale model supersonic propeller blades, by Marshall O. Burquest and James E. Carpenter. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Aug 1956. 71p photos, diagrs, graphs, table. Order from OTS. $2.00. PB 131426

As part of a general program to determine experimentally the structural and vibrational characteristics of thin, scale model propeller blades and compare these results with results of theoretical analysis, special test equipment has been designed, fabricated and made operational. This report deals primarily with the design and operation of the experimental apparatus. AD 97175. Project 3346, Task 33048. Contract 33(616)-250. AF WADC TR 55-425.

Structural and vibrational characteristics of WADC X-1, X-2 and X-3 model propeller blades, by James E. Carpenter, Floyd W. Stutzman and Edward M. Sullivan. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Jan 1957. 182p diagr, graphs, tables. Order from OTS. $4.75. PB 131239

The propeller blades were instrumented with wire resistance strain gages and were tested at various positive and negative blade angle settings and rota-

tional speeds ranging up to 5800 rpm. All blade sets were vibrated in the fundamental bending mode, second bending mode and fundamental torsion mode at various blade angles and rotational speeds. Excitation of the third bending mode was achieved in a few isolated cases. The experimental data includes the steady strain distributions produced by centrifugal force, blade natural frequencies, change in blade tip pitch angle with rotation, vibratory strain distributions, and blade damping characteristics. The blade vibratory characteristics, in both bending and torsion, were analytically determined for several combinations of blade angle setting and rotational speed. Excellent correlation was obtained between the experimental and analytical results. AD 130788. Project 3346, Task 33048. Contract AF 33(616)-3190. AF WADC TR 57-8.

Airports and Airways

Development of a retractable slope-line approach-light unit, by Marcus S. Gilbert and H. J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1952. 9p photos, diagrs, tables. Order from LC. Mi $1.80, ph $1.80. PB 132701

1. Lights, Approach - Design 2. CAA TDR 156

Development of an airport taxi guidance system, by Bernard A. Hemelt and Marcus S. Gilbert. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 17p diagrs, Order from LC. Mi $2.40, ph $3.30. PB 132705

1. Taxiways - Markers 2. CAA TDR 171

Evaluation by simulation techniques of proposed traffic-control procedures for the Norfolk terminal area, by C. M. Anderson, F. S. McKnight, T. K. Vickers and M. H. Yost. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1955. 38p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132708

1. Simulators, Air traffic control 2. CAA TDR 185

Evaluation of a controllable-beam runway light, by Marcus S. Gilbert and H. J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1954. 11p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132721

1. Runways - Markers 2. Airports - Lights
3. CAA TDR 238

Lighting pattern for runway zone identification, by Arthur T. Tiedemann. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1954. 13p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 132713

USAF project R656-2115-10. 1. Runways - Markers 2. Runways - Lights 3. CAA TDR 208

Low cost boundary lighting system for small airports, by M. S. Gilbert. U.S. Civil Aeronautics Administration. Technical Development Service. Aug 1947. 14p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132677

1. Airports - Lights 2. CAA TDR 53

Preliminary evaluation of narrow-gauge runway lighting and runway surface illumination, by James H. Harding, Raymond C. Herner and Robert F. Gates. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Feb 1958. 14p photos, diagr, table. Order from OTS. 50 cents. PB 131729

A preliminary flight evaluation of the narrow-gauge lighting concept was accomplished through use of mock-up lighting units set in various patterns on a concrete runway 150 feet wide, which was served by conventional radio and visual aids. CAA TDR 338.

Aerodynamics

Aerodynamic interference of slender wing-tail combinations, by Alvin H. Sacks. U.S. National Advisory Committee for Aeronautics. Jan 1957. 82p photos, diagrs, graphs. Order as TN 3725 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125702

1. Wings - Wake - Photographic analysis
2. Interference, Aerodynamic - Theory
3. NACA TN 3725

Analysis of static aeroelastic behavior of low-aspect-ratio rectangular wings, by John M. Hedgepeth and Paul G. Waner, Jr. U.S. National Advisory Committee for Aeronautics. Apr 1957. 21p diagr, graphs. Order as TN 3958 from National Advisory Committee for Aeronautics, 1512 H Street, N.W. Washington 25, D.C. PB 125718

1. Wings, Rectangular - Aeroelasticity
2. NACA TN 3958

Application of numerical integration techniques to the low-aspect-ratio flutter problem in subsonic and supersonic flows, by Garabed Zartarian,

Poa-Tan Hsu and Herbert M. Voss. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory, Cambridge, Mass. Oct 1954. 205f diagrs, graphs, tables. Order from LC. Mi $9.30, enl pr $33.30. PB 132835

The integral equation which governs the flutter of a lifting surface with plate-like deformations is reformulated by the application of the reverse flow theorem. The resultant equation avoids the intermediate calculation of the normal modes of vibration and works directly with the structural influence coefficients. All integrals can be evaluated conveniently by numerical means in terms of the amplitudes of the flutter mode at a series of discrete points over the planform. A numerical procedure is derived for the solution of the integral equation that relates the pressure and vertical velocity on a planar wing of arbitrary shape which is oscillating in subsonic flow. AD 66413. Contract NOa(s) 53-564-c. MIT ASRL TR 52-3.

Charts for the analysis of flow in a whirling duct, by Robert A. Makofski. U.S. National Advisory Committee for Aeronautics. May 1957. 21p graphs. Order as TN 3950 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 127217

1. Rotors, Jet-driven 2. Flow, Subsonic - Heat transfer 3. Flow, Turbulent - Viscosity effects 4. Flow, One dimensional - Theory 5. NACA TN 3950

Experimental study of detail phenomena of transition in boundary layers, and on steady flow patterns appearing when a sink is combined with layer flow, by John R. Weske and J. M. Burgers. Maryland University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Feb 1957. 88p photos, drawings, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 126581

In presenting and correlating the results of visual and photographic studies of the process of transition from laminar to turbulent flow on a flat plate, evidence is furnished which tends to prove that, whatever the original cause initiating transition, whether point disturbance, two-dimensional periodic excitation or steady adverse pressure gradient, the observed motions are so closely alike that the sequence of individual processes composing the chain of events which constitute the breakdown of laminar flow and the origin and spread of turbulence may be regarded as a universal characteristic of boundary layer transition. Appendix I. On steady flow patterns appearing when a sink is combined with boundary layer flow, by J. M. Burgers. - Appendix II. Change of the laminar boundary layer profile through a pressure decrease, by Y. Y. Chen. - Appendix III. Upstream effect of a two-dimensional obstacle upon the laminar boundary layer along a flat plate, by G. Jungclaus. AD 120403. Contract AF 18(600)-893. AF OSR TN 57-62. UM BN 91.

Experimental investigation of the forces and moments due to sideslip of a series of triangular vertical- and horizontal-tail combinations at Mach numbers of 1.62, 1.93 and 2.41, by Donald E. Coletti. U.S. National Advisory Committee for Aeronautics. Mar 1957. 32p graphs. Order as TN 3846 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125688

Supersedes RML 54G01. 1. Airplanes - Sideslip - Effect of tail 2. Mach number - Effect 3. NACA TN 3846.

Heat transfer and skin friction of yawed infinate wings with large suction, by H. G. Lew and J. B. Fanucci. Pennsylvania State University, University, Pa. Nov 1956. 46p diagr, graphs. Order from LC. Mi $3.30, ph $7.80. PB 126523

The flow over yawed infinite bodies with large suction is considered. Both the compressible and incompressible cases are treated. Some simple relations are determined for the skin friction coefficient and heat transfer coefficient variations with the pressure gradient, suction, and sweep back parameters. In addition, a modified Reynolds analogy for the compressible case is obtained. AD 120404. For earlier report under this Contract see PB PB 125183. Project no. R-353-20-11. Contract AF 18(600)-575, Technical report no. 8. AF OSR TN 57-63.

Recovery temperatures and heat transfer near two-dimensional roughness elements at Mach 3.1, by Paul F. Brinich. U.S. National Advisory Committee for Aeronautics. Feb 1958. 20p drawings, graphs. Order as NACA TN 4213 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 127229

1. Mach number - Effect 2. Flow, Supersonic - Heat transference 3. Flow, Viscous - Heat transference 4. Boundary layer, Turbulent - Heat transference 5. NACA TN 4213

Rockets and Jet Propulsion

Collection of data for zero-lift damping in roll of wing-body combinations as determined with rocket-powered models equipped with roll-torque nozzles, by David G. Stone. U.S. National Advisory Committee for Aeronautics. Apr 1957. 23p diagrs, graphs, table. Order as TN 3955 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125719

Supersedes RML53E26. 1. Wings - Damping 2. Damping derivatives - Stability 3. NACA TN 3955

A limited correlation of atmospheric sounding data and turbulence experienced by rocket-powered models, by Homer P. Mason and William N. Gardner. U.S. National Advisory Committee for Aeronautics. Apr 1957. 51p diagrs, graphs, table. Order as TN 3953 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125716

1. Airplanes - Models, Rocket-powered - Effect of gust loads 2. Gust loads - Effects 3. NACA TN 3953

Review of techniques for measuring and analyzing missile vibration, by V.C. McIntosh. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Wright-Patterson Air Force Base, Dayton, O. Feb 1957. 14p photos, diagr, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 132842

In the selection of instrumentation to measure missile vibration, factors peculiar to missile operation must be carefully considered. These factors are utilized to suggest guides to the instrument technician in obtaining the desired vibration data. Methods of data analysis are discussed which will yield a complete description of the vibration environment. Reliable measurements and complete analyses of this type are essential to form a basis for realistic vibration testing procedures.

Rocket research report no. XVII: Propellant level sensors for Viking, by Allen W. Niles and Roger L. Easton. U.S. Naval Research Laboratory. Dec 1954. 33p photos (1 fold), diagrs, graphs (1 fold), tables. Order from LC. Mi $3.00, ph $6.30. PB 129026

One of the important performance factors in a large liquid-propellant rocket is the amount of unused propellant remaining at fuel burnout. With the design of a control to minimize the amount of unused propellant as the final objective, two types of mercury-manometer sensors have been developed, and were tested in Vikings 10 and 11. The use of the step sensor in a mixture-ratio control system has been simulated on an analog computer. NRL R 4454.

Studies of random vibration, by M.W. Oleson and R.E. Blake. U.S. Naval Research Laboratory. Feb 1957. 10p diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 132741

For the Vanguard satellite project, studies were made of problems dealing with random-vibration testing. Progress is reported on the following topics: (1) whether peak-notch filters are needed to correct for the limited output impedance of vibration table, (2) the calculation of amplifier power required to produce random-vibration with an electromagnetic shaker, (3) the advantages of a swept-band random-vibration test, and (4) a new "equivalent sinusoidal test" to simulate the effect of random vibration.

Survey of the acoustic near field of three nozzles at a pressure ratio of 30, by Harold R. Mull and John C. Erickson, Jr. U.S. National Advisory Committee for Aeronautics. Apr 1957. 32p photos, diagrs, graphs. Order as TN 3978 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 125710

1. Flow, Jet mixing - Noise 2. Nozzles, Jet - Noise - Effect of nozzle shape 3. Rocket motors - Noise - Measurements 4. NACA TN 3978

Vibration measurements on the Vanguard vehicle, by C.B. Cunningham. U.S. Naval Research Laboratory. n.d. 6p photos, graphs. Order from LC. Mi $1.80, ph $1.80. PB 132865

Describes possible source of shock and vibration of the satellite to be launched by the Vanguard vehicle. Data on the vibration and noise levels measured during captive firings of the second and third stages are presented, along with available power density spectra.

Marine Transportation

Causes and mechanisms of diurnal vertical scattering layers in the sea. Progress report, 1 May 31 Dec 1955, by Elizabeth M.K. and Brian P. Boden. California. University. Scripps Institution of Oceanography. Mar 1956. 6p. Order from LC. Mi $1.80, ph $1.80. PB 126452

An effort was made to obtain a comparison of the composition, the environment, and the behavior of sonic-scattering layers in the sea at four different stations which were as near as practical to the same degree of latitude in the northern hemisphere: Hawaii, California, Bermuda, and the Mediterranean. Contract Nonr-233(31), NR 163-305. UC SIO Ref 56-8.

Fouling project: Biology of marine fouling growths on and adjacent to the bottom. Annual progress report under Contract Nonr-396(06), NR 163-312, for 1 Mar 1955-31 Dec 1955, by Charles J. Fish. Rhode Island. University. Narragansett Marine Laboratory, Kinston, R.I. May 1956. 11p map, drawings. Order from LC. Mi $2.40, ph $3.30. PB 126562

The work can be grouped under five different headings: (1) Fouling of mines, (2) Fouling of 3-box apparatus, (3) Fouling of 1-box apparatus and

(4) Fouling of 5-box apparatus. Reference no. 56-11.

Productivity of Florida springs. Final report covering progress from 31 Dec 1955 to 31 May 1956, under Contract Nonr 580-02, NR 163-106, by J. L. Yount, H. T. Odum and Delle N. Swindale. Florida. University. Dept. of Biology, Gainesville, Fla. Jun 1956. 14p graphs. Order from LC. Mi $2.40, ph $3.30. PB 126424

A study of basic factors that control productivity and of the effects of productivity on community structure and density by an analysis of the unique conditions supplied by selected constant temperature springs.

Role of microorganisms in estuarine and sea waters. Final report under Contract Nonr-1781(01), NR 163-308 for the period 1 Jul 1955-30 Jun 1956, by Paul R. Burkholder. Georgia. University, Athens, Ga. Jul 1955. 3p. Order from LC. Mi $1.80, ph $1.80. PB 127353

1. Microorganisms 2. Vitamin B12 - Determination - Methods

Trailing platinum-clad anode dockside and underway tests, by Donald E. Lincoln. U.S. Portsmouth Naval Shipyard, Portsmouth, N.H. Nov 1955. 21p photos, drawings, tables, graphs. Order from LC. Mi $2.70, ph $4.80. PB 130770

Technical report no. T-548, Supplement no. 1. Research and development project: NSS-067-010, Sub-task III. 1. Anodes, Platinum - Tests 2. Hulls - Coatings, Electrolytic

MISCELLANEOUS

Age measurements and other isotopic studies on Arctic materials. Final report on Contract no. AF 19(604)-1063, by J. Laurence Kulp. Columbia University. Lamont Geological Observatory, Palidades, N.Y. Jan 1957. 110p maps, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 127372

AD 117196. 1. Geological time - Determination - Arctic 2. Earth - Age - Determination 3. AF CRC TR 57-276

Investigation of possible vertical reflections from deep crustal discontinuities, by Judson Mead. Indiana. University. Dept. of Geology, Bloomington, Ind. Apr 1956. 10p graphs (1 fold), table. Order from LC. Mi $1.80, ph $1.80. PB 126846

The purpose of this report is to summarize the work under Contract N7onr-18008, NR081-108 with the Office of Naval Research. This project was a continuation of work started under Contract N5Ori-07825, N-081-042 at the Massachusetts Institute of Technology. The purpose of the work under both contracts was to investigate the possibility of identifying vertical reflections from possible seismic discontinuities within and at the lower boundary of the earth's crust. The instrumentation and the results of the first observations were presented in detail in the Technical Report of August 15, 1949, and are summarized here. N-081-042. Continues work started under Contract N5 ori-07825. Contract N7 onr-18008, NR 081-108, Final report.

Meaning of social welfare, a comment on some recent proposals. by Kenneth J. Arrow. Stanford University. Dept. of Economics and Dept. of Statistics, Stanford, Calif. Dec 1951. 16p. Order from LC. Mi $2.40, ph $3.30. PB 126559

In an earlier work, the author considered the problem of decision-making by a group when each individual has his own preferences among the alternatives being considered. It was shown that there is no technique of aggregating individual preferences to get to a group preference which will satisfy all of a list of plausible conditions. Recently, C. Hildreth and L. Goodman and H. Markowitz have proposed certain resolutions of this paradoxical situation. In the present note, these proposals are examined in detail, and some critical defects are noted. Contract N6 onr-25133, NR 047-004. SU DE TR 2.

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

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

Non-visual orientation of fish. Progress report 1955, by Theodore J. Walker. California. University. Scripps Institution of Oceanography. Mar 1956. 7p. Order from LC. Mi $1.80, ph $1.80. PB 126453

Anatomical studies revealed three types of sensing structures, all supplied by the lateral-line nerve, which carried at least four kinds of fibers. Intensive experimentation was begun to eliminate some of the technical difficulties that had hindered the anatomical program. See PB 116485 and 119199 for Progress reports for 1953-1954. Contract Nonr-233(15), NR 165-196. UC SIO Ref 56-11.

Oceanographic Atlas of the Polar Seas. Part I: Antarctic. U.S. Hydrographic Office. 1957. 70p maps, graphs. Available from U.S. Hydrographic Office, Washington 25, D.C. $2.50.

H.O. Pub. 705, Part 1.

Report of NRL progress. U.S. Naval Research Laboratory. Jun 1958. 56p. Order from OTS. $1.25. Also available at annual subscription rate of $10.00 a year in the U.S.A., foreign rate of $13.00 a year. PB 131840

Contents: Articles: The 55E liquid helium temperature scale, by J. R. Clement. - Atmospheric electricity research at the earth's surface, by W. A. Tayler, Jr. - Estimate of the unperturbed dimension of poly-alpha-methylstyrene, by A. M. Ketlair and V. J. Linnenbom. - Scientific program: Problems accepted: Problem notes: Astronomy and astrophysics: Lunar radiation at a wavelength of 2.2 cm... Lyot heliograph for the IGY solar flare program at NRL. - Chemistry: Fungus-inhibitive properties of iodoacetates and iodoacetamides... New techniques for applying the mocroscope to problems of battery research and development... A new thermal conductivity leak detector. - Mathematics: Computer resolution of a definite integral involving parameters ... Automatic differential equations program for the NAREC. - Mechanics: A motorized reed gage to obtain spectrum of maximum response values induced by a check motion. - Metallurgy and ceramics: Effect of neutron irradiation on the Curie temperature of a variety of ferrites... Liquid metal densitometry ... Radiation damage of materials... Corrosion studies in dynamic aqueous systems at elevated temperature and pressure. - Nuclear and atomic physics: Elementary particles: K-interactions in a nuclear emulsion stack... Reactivity effects of air voids in the reflector and in the core of the NRL research reactor. - Radio: A method of controlling gain and of reducing coverload pulse distortion in a traveling-wave tube... A new microwave polariscope... Artificial signals found to enhance and sustain vigilance of human monitors of displays... Improved world-wide comparison of precision frequency standards at vlf... Electrical properties of Soviet 3-cm Si crystal diodes. - Solid-state physics: Indications that the master crystal (Cr^{+++}) can operate at temperatures well above those of liquid helium... Derived numerical values of the p-T relations in the He4 temperature scale (55E). - Published reports. - Papers by NRL staff members. - Patents.

Trafficability and navigability of delta-type coasts: Trafficability and navigability of Louisiana coastal marshes. Louisiana State University, Baton Rouge, La. Contract N7onr-35608, NR 388-002. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report no. 6: Sedimentology and ecology of southeast coastal Louisiana, by Robert Cuthrell Treadwell. Sep 1955. 171p photos, graphs, tables (1 pt. col.), maps (1 fold) Mi $8.10, ph $27.30. PB 128321

The following divisions are considered: (1) physiographic features of the marshland, (2) sedimentation, (3) ecology of foraminifera and mollusca, (4) geological history, (5) appendix, (6) bibliography. Color will not reproduce.

Technical report no. 7: Recent geology and geomorphic history of central coastal Louisiana, by Jack R. VanLopik. Sep 1955. 179p photos, drawings, diagr, graphs, table, maps (1 fold). Mi $8.10, ph $27.30. PB 128320

This report attempts to roughly outline the history of this area during the preceeding 150,000 years, primarily through the interpretation of the sedimentary record. Emphasis is placed on changes of the last 5,000 years. For Technical reports no. 2, 4-5 see PB 110723, 117206, 118777.

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Administrative

Subject headings used in the catalogs of the United States Atomic Energy Commission, Book I: Subject headings; Book II: Appendixes, by Charles W. Hargrave. United States Atomic Energy Commission, Technical Information Service Extension, Oak Ridge, Tenn. Apr 1958. (Second Revised Edition). 2 books. Order from OTS. $7.00. TID-5001(2nd Rev.)

Biology and Medicine

Radiation mutations in plant breeding, by H.J. Curtis. Brookhaven National Lab., Upton, N.Y. 1956. 16p. Order from LC. Mi $2.40, ph $3.30. BNL-2827

Genetic plant tumors in nicotiana, by Harold H. Smith. Brookhaven National Lab., Upton, N.Y. 1957. 2p. Order from LC. Mi $1.80, ph $1.80. BNL-3385

Decontamination of human skin after immersion in a plutonium solution, by R. H. Wilson. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Mar 1956. Decl. Jul 9, 1957. Contract W-31-109-eng-52. 31p. Order from LC. Mi $2.70, ph $4.80. HW-42030

Radioactivity levels of the Columbia River below Richland, Washington for the period October, November, December 1956, by H.V. Clukey. Hanford Atomic Products Operation, Richland, Wash. Apr 1957. Contract W-31-109-Eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. HW-49840

Problems in the establishment of a colony of specific-pathogen-free rats, by Edgar A. Cress and Granvil C. Kyker. Oak Ridge Institute of Nuclear Studies, Inc., Oak Ridge, Tenn. Dec 1957. Contract AT-40-1-gen-33. 19p. Order from OTS. 75 cents. ORINS-22

Human and cattle thyroid radioactivity associated with fallout: October 1955 to October 1956, by Margaret R. White. California. University, Berkeley. Radiation Lab. Mar 1957. Contract W-7405-eng-48. 15p. Order from LC. Mi $2.40, ph $3.30. UCRL-3703

The unreliability of the intra-peritoneal injection route and the validity of experimental observations, by R.C. Baxter and L.W. Tuttle. The University of Rochester, Atomic Energy Project, Rochester, N.Y. Mar 1958. Contract W-7401-eng-49. 7p. Order from OTS. 50 cents. UR-516

Chemistry—General

Manual of analytical methods. Volume II. Part I. Analysis of refined materials and by-products, by Lewis G. Bassett and others. Oak Ridge National Lab., Oak Ridge, Tenn. Jan 1946. Decl. Jan 2, 1957. 151p. Order from OTS. 85 cents. A-2912(Vol. II, Pt. 1)

Impregnation of graphite with uranium compounds for use as fuel rod materials, by M.A. Kanter. Argonne National Lab., Lemont, Ill. Feb 1948. Decl. Apr 2, 1957. Contract W-31-109-eng-38. 33p. Order from LC. Mi $3.00, ph $6.30. ANL-4118

Chemistry division, section C-1 summary report for January, February, and March 1949. Argonne National Lab., Lemont, Ill. May 1949. Decl. with deletions Feb 12, 1957. Contract W-31-109-eng-38. 45p. Order from LC. Mi $3.30, ph $7.80. ANL-4286(Del.)

Chemistry division, section C-II summary report for period April through September 1950, by J.R. Gilbreath and O.C. Simpson, comps. Argonne National Lab., Lemont, Ill. Jan 1951. Decl. with deletions Feb 13, 1957. Contract W-31-109-eng-38. 123p. Order from LC. Mi $6.30, ph $19.80. ANL-4526(Del.)

The sublimation of uranium tetrachloride. Paper No. 16, by Manfred E. Mueller. University of California. Radiation Lab., Berkeley, Calif. 1946?. Decl. Apr 8, 1957. 84p. Order from LC. Mi $5.70, ph $16.80. BC-28

Beta-counting methods applied to the determination of uranium in low-grade ores, by J.R. Doig, C. M. Schwartz, Iver Igelsrud, and H.R. Nelson. Battelle Memorial Inst., Columbus, O. Jul 1947. Decl. Feb 15, 1957. Contract W-38-094-eng-27. 76p. Order from LC. Mi $4.50, ph $12.30. BMI-98

Reactivity studies of uranium oxides, by Dale A. Vaughan, J. Robert Bridge, and Charles M. Schwartz. Battelle Memorial Inst., Columbus, O. Jul 1957. Contract W-7405-eng-92. 15p. Order from LC. Mi $2.40, ph $3.30. BMI-1205

Accident in continuous-dissolver pilot plant of fluoride volatility project on May 15, 1957, by Gerald Strickland, F.L. Horn, Richard Johnson, and O.E. Dwyer. Brookhaven National Lab., Upton, N.Y. Jul 1957. Revised Aug 1957. 44p. Order from LC. Mi $3.60, ph $9.30. BNL-470

Filter samplers for field use, by Maynard E. Smith, Frederick E. Bartlett, and George W. Potts. Brookhaven National Lab., Upton, N.Y. Mar 1956. 12p. Order from LC. Mi $2.40, ph $3.30. BNL-2737

The chemical consequences of the $N^{14}(n,p)C^{14}$ reaction in the acetamide system and the implications of nuclear recoil as a tool for synthesis, by Alfred P. Wolf, Carol S. Redvanly, and R. Christian Anderson. Brookhaven National Lab., Upton, N.Y. 1956. 34p. Order from LC. Mi $3.00, ph $6.30. BNL-3084

Re: accommodation of radioactive impurities in the reprocessing of the bromine trifluoride to bromine pentafluoride, by E.I. Goodman. Brookhaven National Lab., Upton, N.Y. Jun 1954. Decl. Nov 16, 1955. Order from LC. Mi $1.80, ph $1.80. BNL-3203

Use of recoiling carbon-14 as a new technique in labeling organic compounds, by Alfred P. Wolf. Brookhaven National Lab., Upton, N.Y. 1957. 22p. Order from LC. Mi $2.70, ph $4.80. BNL-3299

Dissolution of zirconium-type fuel elements in sulfuric acid catalysed with HF, by J.J. Reilly, W.H. Regan, R.H. Wiswall, and L. P. Hatch. Brookhaven National Lab., Upton, N.Y. 1957. Contract AT-30-2-gen-16. 19p. Order from LC. Mi $2.40, ph $3.30. BNL-3335

Graphite purity research program, by G.E. Boyd, R.E. Curtis, and W.H. Johnston. Chicago. Univ. Metallurgical Lab. Dec 1943. Decl. Apr 2, 1957. Contract W-7401-eng-37. (A-1652). 70p. Order from LC. Mi $3.90, ph $10.80. CC-976

Radiocarbon from pile graphite; chemical methods for its concentrations, by James R. Arnold and W.F. Libby. Argonne National Lab., Lemont, Ill. Oct 1946. Decl. Feb 16, 1957. Contract W-31-109-eng-38. 27p. Order from LC. Mi $2.70, ph $4.80. CC-3643

Statistical survey of pressure differential methods in the determination of liquid level and specific gravity, by E.G. Bianco, A. De la Garza, and A. M. Rom. Oak Ridge National Lab., Oak Ridge, Tenn. Sep 1951. Changed from Official use only Oct 3, 1956. Contract W-7405-eng-26. 25p. Order from LC. Mi $2.70, ph $4.80. CF-51-9-151

Development and operation of a semi-continuous system for the production of ferrous sulfamate, by W.B. Watkins. Oak Ridge National Lab., Oak Ridge, Tenn. Feb 1952. Decl. with deletions Feb 13, 1957. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-52-2-214(Del.)

Densities of certain salt mixtures at room temperature, by M.Tobias, S.I. Kaplan, and S.J. Claiborne. Oak Ridge National Lab., Oak Ridge, Tenn. Mar 1952. Decl. Feb 20, 1957. Contract W-7405-eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-52-3-230

Measurement of the thermal conductivity of Flinak, by L. Cooper and S.J. Claiborne. Oak Ridge National Lab., Oak Ridge, Tenn. Aug 1952. Decl. Feb 20, 1957. Contract W-7405-eng-25. 7p. Order from LC. Mi $1.80, ph $1.80. CF-52-8-163

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