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OFFICE OF TECHNICAL SERVICES

U. S. Government RESEARCH REPORTS

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BIBLIOGRAPHY

Bibliography of ice and frost control, by Thomas H. McConica, III. Arctic Research, Inc. Contract AF 33(616)-3156. Project 7312, Task 73121. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Jan 1958. 132p. $2.75. PB 131712

This report reviews all unclassified publications relating to the control of ice and frost which could be obtained by this laboratory during the period July 1955 to June 1956. Where abstracts or original reports could be reviewed a brief summary of the report is given. AD 142317. AF WADC TR 56-338, Part 1.

Part II: Jan 1958. 80p. $2.00. PB 131699

This report constitutes an annotated bibliography of patents relating to the control of ice and frost on aircraft. All patents of interest in the U.S. Patent Office under classification list No. 244, subclass 134, up until July 1956, are included. Additional patents have been located through searching Chemical Abstracts, other bibliographies, etc. All patents have been classified according to subject matter and coded. AD 142318. AF WADC TR 56-338 Part 2.

Cold weather operation of diesel engines, a bibliography. Part II, by Maurice W. Ayton, James E. Shea and Clement R. Brown. U.S. Library of Congress. Technical Information Division. Jan 1958. 150p. Order from OTS. $3.75. PB 131492

The bibliography consists of references, with abstracts, to all pertinent unclassified reports on the subject issued from 1939 to 1950, which have been found in a systematic search of sources listed. A few reports issued from 1952 to 1954 have also been included which were obtained from volumes I and II of the Polar Bibliography. Material relating to the starting and operation of diesel engines, and the use of antifreeze, batteries, starters, fuels and lubricants, at temperatures below -20°F, has been included. Information based on non-diesel experience with the above items has also been included, provided it was deemed applicable to the cold weather operation of diesel engines.

Literature survey of silane, its homologs, and their derivatives: Preparation of transistor grade silicon from silane or analogous compounds, by Henry C. Kelly. Metal Hydrides, Inc., Beverly, Mass. Sep 1956. 38p tables (1 fold). Order from LC. Mi $3.00, ph $6.30. PB 126406

In order to more effectively execute a program for the purpose of obtaining extremely high purity silicon by the decomposition of a silane or silane derivative, an extensive literature survey has been carried out on the published work in many phases of silicon chemistry. The purpose of this report is not an exhaustive résumé of the literature at hand, but rather a condensation of information which will be valuable in illuminating the experimental work which is to follow. Covers period 1 Jul - 31 Aug 1956. Contract AF 19(604)-1928, Scientific report no. 1. AF CRC TN 56-996.

Night vision and dark adaptation, 1946-1951, a selected reading list, by W.H. Plant. U.S. Research and Development Board. Reprinted, Jan 1952. 11p. Order from LC. Mi $2.40, ph $3.30. PB 130418

1. Night vision - Bibliography 2. Vision - Dark adaptation - Bibliography

Organic compounds of gallium; a summary of the literature, by Andrew J. Frank, Richard W. Sullivan and Virgil W. Lichtenberg. Denver. University. Denver Research Institute. Metallurgy Division, Denver, Colo. Nov 1957. 27p. Order from OTS. 75 cents. PB 131625

The literature concerning organic compounds containing gallium has been surveyed, and the properties of all organo-metallic and organic coordination compounds of gallium are summarized. An annotated bibliography of all references is provided. AD 142158. Project 7331, Task 73313. Covers work from Nov 1956-Jun 1957 under Contract AF 33(616)-2939. AF WADC TR 57-606.

Shaft sinking by the freezing method, compiled by R. Ruedy. National Research Council of Canada. Technical Information Service, Ottawa, Canada. Aug 1955. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125947

A summary of published literature on the method of sinking vertical shafts in loose ground by means of freezing the ground before drilling the shaft. NRCC TIS 43.

Survey of continuous fermentation processes, an annotated bibliography, by Muriel E. Whalley. National Research Council of Canada. Technical Information Service, Ottawa, Canada. Oct 1955. 34p. Order from LC. Mi $3.00, ph $6.30. PB 125945

1. Fermentation - Bibliography - Canada
2. NRCC TIS 45

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Action of chemotherapeutic agents and substrate analogues. Progress report for the period 15 Jun-15 Dec 1955 under Contract N6 ori-071(57), NR 135-137, by S. Spiegelman. Illinois. University. Jan 1956. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 125176

A study of the effect of substrate analogues on induced synthesis of enzymes, synchronization of nucleic acid metabolism, the isolation and properties of nuclei from B. megaterium, and the properties of the β-galactosidase of B. megaterium and the specificity of its induction. Contract N6 ori-071(57), NR 135-136. Continuation of research under Contract Nonr-781(00). For final report under this Contract see PB 126136.

Organic Chemicals

Fluorophenothiazine project. Final report under Contract Nonr-255(00), NR 356-259, by Arthur Roe. North Carolina. University. Venable Chemical Laboratory, Chapel Hill, N.C. Jul 1955. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 124486

For accompanying reports see PB 124484 and 124485. 1. Diphenylamine - Derivatives - Preparation 2. Phenothiazine - Derivatives - Synthesis 3. Fluorophenothiazine - Derivatives - Synthesis

Isochroman chemistry, by R. D. Sprenger. College of Puget Sound, Tacoma, Wash. Jun 1955. 8p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 124496

1. Isochroman - Derivatives - Preparation
2. Isochroman - Chemical reactions
3. Contract Nonr-0600, NR 122-013, Final report

Isotope exchange studies of acetylene reactions, by Fred H. Coats and Robbin C. Anderson. Texas University. Dept. of Chemistry, Austin, Tex. Oct 1956. 31p diagr, tables. Order from LC. Mi $3.00, ph $6.30. PB 124971

The study of the decomposition reactions of acetylene by mass-spectrographic techniques has been extended to an investigation of the early stages of reaction in mixtures of acetylene with deuterium and deuteroacetylene with hydrogen. The results

give evidence of both molecular and free-radical processes in the polymerization and decomposition reactions. A product of particular interest was methane. The problems inherent in the question of how it is formed are discussed and suggestions made of possible mechanisms of its formation. AD 110305. AF OSR Chem 50-1. Technical note 31. Contract AF 18(600)-430. AF OSR TN 56-491.

New synthesis of bibenzyls and polynuclear hydrocarbons, by Louis A. Carpino. Massachusetts. University. Dept. of Chemistry, Amherst, Mass. Apr 1957. 3p. Order from LC. Mi $1.80, ph $1.80. PB 126037

AD 115027. 1. Dibenzyl - Synthesis 2. Hydrocarbons - Synthesis 3. Contract AF 18(600)-114 4. AF OSR TN 56-601

Preparation of fluorine containing compounds. Quarterly technical report covering the period 1 Feb 1956 to 30 Apr 1956, by H.C. Brown, R.D. Dresdner, J.A. Wethington, Jr. and J.A. Young. Florida. University, Gainesville, Fla. 1956. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 126422

Includes "The melting point of Neo-C_5F_{12}", by R.D. Dresdner, reprinted from Journal of the American Chemical Society, vol. 78, p. 876, 1956, and "The pyrolysis of trifluoromethyl sulfur pentafluoride and its reaction with perfluoropropylene", by Richard Dresdner, reprinted from Journal of the American Chemical Society, vol. 77, p. 6633 (1955). For other reports under this contract see PB 121818 and 123174. 1. Fluorine compounds - Organic - Preparation 2. Fluorine compounds - Organic - Reactions 3. Fluorocarbons - Synthesis 4. Fluorocarbons - Derivatives - Preparation 5. Contract Nonr-580(03), NR 356-333

Preparation of some fluoro- and trifluoromethylphenothiazines, and some observations regarding determination of their structure by infrared spectroscopy, by Arthur Roe and William F. Little. North Carolina. University. Venable Chemical Laboratory, Chapel Hill, N.C. Jul 1955. 28p tables. Order from LC. Mi $2.70, ph $4.80. PB 124484

The preparation of fluorine-containing phenothiazines was of interest from several points of view, including evaluation of their use as antioxidants in lubricating oils of the type used in turbo-jet engines. This paper describes the preparation of several new fluorophenothiazines. Six were prepared by the action of sulfur on substituted diphenylamines, another by a Smiles rearrangement, and the attempted preparation of several other fluorophenothiazines by both methods is reported. The infrared spectra of these and other fluorophenothiazines prepared in this Laboratory were obtained, and some conclusions were reached regarding the use of infrared spectra in assigning structure to fluorophenothiazines. For other reports on this Contract see PB 124485 and 124486. Contract Nonr-255(00), NR 356-259.

Preparation of some fluorophenothiazines, by Arthur Roe, John A. Montgomery, Willis A. Yarnall and V.A. Hoyle, Jr. North Carolina. University. Venable Chemical Laboratory, Chapel Hill, N.C. Jul 1955. 12p table. Order from LC. Mi $2.40, ph $3.30. PB 124485

For other reports on this Contract see PB 124484 and 124486. 1. Fluorophenothiazine - Derivatives - Synthesis 2. Fluorophenothiazine - Derivatives - Spectrographic analysis 3. Contract Nonr-255(00), NR 356-259

Reactions in electrodeless discharges between volatile halides and organic compounds, by Gosta C. Akerlof. AeroChem Research Laboratories, Inc., Princeton, N.J. Sep 1957. 76p diagrs, graphs, tables. Order from OTS. $2.00. PB 131479

The purpose of this program was to study the formation of new types of thermally stable fluids and solids by means of high voltage electrodeless discharges through mixtures of volatile halides, particularly of silicon, and organic compounds. The effect of temperature, pressure, flow rate, current, and voltage, on the product yield and discharge behavior was investigated for typical reactant combinations. The product properties were studied for forty different reactant systems. AD 131095. Project 7340, Task 73404. Final report covering work from Nov 1955-Mar 1957 under Contract AF33(616)-3225. AF WADC TR 57-189.

Sorption of phenylmercuric acetate by aspergillus niger, by Dorothea E. Klemme and John M. Leonard. U.S. Naval Research Laboratory. Feb 1958. 15p graph, tables. Order from OTS. 50 cents. PB 131490

The sorption of phenylmercuric acetate (PMA) by spores of Aspergillus niger has been studied; the effects of the following variables on the sorption process have been included: pH, spore age, spore concentration, time of contract, and concentration of PMA. NRL R 5085.

Thermodynamics of hydrogen chloride in ethyl alcohol from electromotive force measurements, by Harry Taniguchi and George J. Janz. Rensselaer Polytechnic Institute. Dept. of Chemistry, Troy, N.Y. Nov 1956. 121p drawings, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 126550

AD 115059. Proj. Chem 40-3. Technical note no. 7. Appendices listed but not included. Appendix I. The silver, silver halide electrodes (In Chemical reviews, 53: 397 (1953). - Appendix II. Prepara-

tion and reproducibility of the thermal-electrolytic type silver, silver chloride electrode (Accepted for publication in J. Electrochem. Soc.). - Appendix III. Anhydrous hydrogen chloride generator (In Analytical chemistry 28: 287 (1956). 1. Hydrochloric acid - Thermodynamic properties 2. Ethyl alcohol - Use as solvent 3. Electromotive force - Measurements 4. Contract AF 18(600)-333 5. AF OSR TN 57-25

Plastics and Plasticizers

Boron polymers. Final report covering the period 1 May 1951 - 30 Apr 1952, under Contract DA 36-039 sc-5492, by Edwin S. Gould, S. Venkataramaraj Urs and others. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. 1952. 71p diagr, tables. Order from LC. Mi $4.50, ph $12.30. PB 127921

Objective was to prepare a class of boron resins most suitable for developing high temperature stable, low loss tangent, dielectric materials which can easily be fabricated into geometrical shapes used in electronic components and equipment. Dept. of the Army project no. 3-93-00-500. Signal Corps project no. 32-2005-34(C 03642.02)

Coordination polymers, by W. Conrad Fernelius, Maurice Shamma, Norman R. Garofano, David E. Goldberg, Dean F. Martin and Forrest D. Thomas, III. Pennsylvania State University. Dept. of Chemistry, State College. Pa. Dec 1957. 71p tables. Order from OTS. $2.00. PB 131649

Attempts to prepare a silicon monomer by the reaction of dimethyldichlorosilane with the sodium salt of acetylacetone were unsuccessful, the product formed being unstable. On the other hand, a series of monomeric bis (acetylacetoneate) dialkoxy titanium compounds were synthesized. A series of salts of dithiophosphates has been prepared, and efforts have been made to prepare an analogous bifunctional ligand. Polymeric materials have been produced from what probably is a mixed ester of a dialcohol and monoalcohol. These dithio compounds have low thermal stability. Investigations of similar compounds with other donor atoms led to the conclusion that compounds with various combinations of oxygen, sulfur, amido nitrogen, and substituted amido nitrogen do not coordinate well, except for the dithio compounds already mentioned. Efforts towards the formation of coordination polymers from bis(o-hydroxyazo) compounds did not yield promising results because of the insolubility of the products formed. A series of o-hydroxyketones was prepared by means of the Fries Rearrangement preliminary to the synthesis of bis(o-hydroxyketones). AD 142191. Project 7340, Task 73404. Covers work from Mar 1, 1956-Feb 28, 1957 under Contract AF 33(616)-2742. AF WADC TR 56-203, Part 2.

Development of thermally stable silicon containing resins, by L.W. Breed, Fred Baiocchi and Calvin C. Bolze. Midwest Research Institute, Kansas City, Mo. Feb 1958. 76p graphs, tables. Order from OTS. $2.00. PB 131715

Additional work aimed at preparing thermally stable silicon containing resins is described and some information on the incorporation of these resins into glass fabric laminates is included. Other methods for synthesizing monomers were investigated, particularly the use of tetrahydrofuran as a solvent in the Grignard synthesis. The results of a statistically designed experiment to study the variables effective in the formation of laminates from silicone resins and glass fabric are given, and the results of a similar experiment to study the effect of treating finished silicone resins with catalyst solutions are also described. Use of phenyldichlorosilyl-trichlorosilyl-benzene in resin compositions is reported in considerable detail and the properties of laminates prepared from these resins are described. Laminates are also obtained from resins prepared from 1, 4-bis(methyldiethoxysilyl)benzene, 4, 4'-bis(methyldiethoxysilyl)phenylether, m-bis(trichlorosilyl)benzene, p-bis(trichlorosilyl)benzene and a mixture of the last two isomers. AD 151002. . Project 7340, Task 73404. Covers work from 1 Feb - 15 Nov 1957 under Contract AF 33(616)-3675. For Part I see PB 131190. AF WADC TR 57-143, Part 2.

Polymerization through coordination, by John C. Bailar, Jr., William C. Drinkard, Jr. and Malcolm L. Judd. Illinois. University. Dept. of Chemistry and Chemical Engineering, Urbana, Ill. Sep 1957. 53p drawings, tables. Order from OTS. $1.50. PB 131517

The purpose of this work is to study the preparation and properties of meta-containing polymers in which the metal ion is held in the polymer through coordinate bonds. It is expected that such polymers will have exceptional stability toward heat and chemical reagents. The background for the formation of such polymers is presented and the principles involved in the preparation of plastic materials are discussed. Pertinent literature references are cited. AD 131100. Project 7340, Task 73404. Covers work conducted 1 Oct 1955 to 30 Sep 1956 under Contract AF 33(616)-3209. AF WADC TR 57-391.

Preparation of simple and polymeric products from fluorinated olefins. Quarterly technical report for period 1 Feb-31 Jul 1955 under Contract Nonr-1614(00), by Francis E. Lawlor, John T. Barr and Murray Hauptschein. Pennsylvania Salt Manufacturing Co., Philadelphia, Pa. Sep 1955. 5 tables. Order from LC. Mi $1.80, ph $1.80. PB 124651

The objective is the preparation of new compositions of matter, which, because of their structure and composition, should possess value as intermediates and as units for making plastics with superior re-

sistance to heat, low temperatures and chemicals, especially fuels, lubricants and hydraulic fuels. Pennsalt project: 9-00023-60. For later report see PB 125926.

Paints, Varnishes and Lacquers

Development of improved heater wire coating methods and materials. Third quarterly report on Contract AF 19(604)-1744 for the period 1 Sep 1956 to 30 Nov 1956, by Charlotte Curtis and David Bergeron. Columbia Broadcasting System, Inc., CBS-HYTRON Division, Danvers, Mass. 1956. 25p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126421

The work of this final quarter was concentrated on surface conditioning of the coating and on hydrogen flame annealing as a continuous part of drag-coating operation. Efforts to plate the tungsten wire with aluminum for subsequent oxidation were unsuccessful. For 1st report see PB 126151. Contract AF 19(604)-1744. AF CRC TN 57-154.

Optics of paints: Emissivity of Navy aluminum paints type A and type B and of inside granular pigment paints, by J. A. Sanderson and W. R. Holm. U.S. Naval Research Laboratory. Mar 1943. 18p drawings. Order from LC. Mi $2.40, ph $3.30. PB 130313

1. Paints, Aluminum - Emissivity 2. Paints, Pigment - Emissivity 3. NRL H 2024

Polymorphic modifications of silica in ceramic coatings, by J.H. Lauchner. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Feb 1957. 23p drawings, tables. Order from LC. Mi $2.70, ph $4.80. PB 126367

The polymorphic modifications of silica present in ceramic coatings due to devitrification or as a result of direct additions were identified by thermal strain, X-ray diffraction and differential thermal analyses. Comparison of the analytical results indicate thermal strain analysis to be the most sensitive method in identification of all silica modifications studied. Analysis of the tessellated stresses developed in the systems was applied in determination of effective linear thermal expansion characteristics and interpretation of residual stress development. AD 96791. Contract AF 18(603)-28, T.O. 77520. AF OSR TN 56-446.

Summary of development and evaluation of insulating type refractory coatings, by S. Sklarew, C.A. Hauck and A.V. Levy. Marquardt Aircraft Co., Van Nuys, Calif. Oct 1956. 147p photos, graphs, (fold) tables. Order from OTS. $3.75. PB 121759

Initial development of metal reinforced refractory coatings to provide thermal insulation to aircraft structural members operating in the temperature range 2000° to 3000°F is reported. Reinforced refractories 0.080 to 0.15-inch thick, providing thermal drops of 5° to 10°F per 0.001 inch of thickness have been successfully tested in small scale. These reinforced coatings averaged half the density of steel. AD 110410. Project 7350, Task 73500. Covers period of work 15 May 1955-15 May 1956 under Contract AF 33(616)-2957. AF WADC TR 56-250.

Theoretical and experimental investigations on thin film resistance elements, by Dorothy M. Hoffman and Jacob Riseman. International Resistance Co., Philadelphia, Pa. Jul 1957. 47p photos, diagrs, graphs, tables (fold). Order from OTS. $1.25. PB 131441

Vacuum deposited chromium films have been prepared and studied. The resistance - temperature - thickness characteristics have been determined. Substrate temperature and substrate material has been found to have a pronounced effect on temperature coefficient, but not on the resistivity - thickness relationship. The properties of thin chromium films appear to be a function of the history of the film rather than any intrinsic property of the film. Project 4155, Task 41643. AD 130996. Contract AF 33(616)-3443. AF WADC TR 57-215.

Inorganic Chemicals

Characterization of the aluminum oxides and of diatomic aluminum. Annual summary report under Contract Nonr-982(03) for period 1 Dec 1954-30 Nov 1955, by K. Keith Innes. Oklahoma. University. Research Institute, Norman, Okla. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 124662

1. Aluminum oxide - Spectrographic analysis
2. Aluminum oxide - Thermal properties
3. Electrodes, Aluminum - Tests

Design and construction of a special test fixture for the static evaluation of the corrosive effects of boron oxide at high temperatures, by Charles R. Andrews. Dayton. University. Research Center, Dayton, O. Dec 1957. 51p photos, drawings, diagrs, graphs, tables. Order from OTS. $1.50. PB 131667

The design and construction of a specialized high-temperature corrosion test fixture is described herein. The fixture is arranged to provide for the long-time exposure of test materials to static environments consisting of cyclic immersion in molten boron oxide (B_2O_3) at temperatures up to 3000°F under closely controlled conditions. Features of the test fixture included an extensive electrical heating control system and an automatic specimen cycling mechanism. The fixture can be operated on a

continuous basis with a minimum of attention. A description of the operating characteristics of the fixture and details of operating procedures are included in this report. A list of engineering drawings pertaining to the test fixture, as well as an outline of maintenance procedures to be followed, are contained in appendices. AD 142263. Project 3048, Task 73301. Contract AF 33(616) 3737. AF WADC TR 57-540.

Final report on Contract number N6 ori-07147. Part I: Preparation of heteropolynuclear inorganic complexes. Part II: Study of heteropolynuclear inorganic complexes, by John C. Bailar, Jr. and Robert L. Rau. Illinois. University, Urbana, Ill. n.d. 131p graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 126449

Part I studies the preparation of $Cu(Lysine \cdot HCl)_2$ + Salicylaldehyde. -Preparation of $Ni(Salicylaldehyde)_2$. -$Cu(Lysine \cdot HCl)_2$ + Ni $(Salicylaldehyde)_2$. - Preparation of Pd $(Salicylaldehyde)_2$. -$Cu(Lysine \cdot HCl)_2$ + Pd $(Sylicylaldehyde)_2$. -Preparation of Ni $(Lysine \cdot HCl)_2$. - Preparation of $Cu(Salicylaldehyde)_2$. -$Ni(Lysine \cdot HCl)_2$ + $Cu(Salicylaldehyde)_2$. - Continuous variation studies were performed on 13 compounds. Date is 1955 or later.

Heat of vaporization of diborane, by L. J. Paridon, G. E. MacWood and Jeh-Heng Hu. Ohio State University Research Foundation, Columbus, O. Aug 1956. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 129683

The heats of vaporization of diborane have been measured from the normal boiling point to within four degrees of the critical point. Entropy and heat of vaporization are tabulated. Contract NOa (s)-52-1023. MCC-1023-TR-229.

Literature survey of silane. See entry under Bibliography on page 249. PB 126406

Observations on the rare earths: Electrochemical studies of rare earth metal salts in various nonaqueous solvents, by Therald Moeller and Glenn Wherry Cullen. Illinois. University, Urbana, Ill. Oct 1956. 125p photos, drawings, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 124970

It is the purpose of the present investigation to extend the studies of Zimmerman and Aftandilian and to examine the variables influencing the electrodepositions. Since only small quantities of materials are obtained as cathode deposits, x-ray diffraction analysis is essentially the only analytical tool available to identify the products conclusively. Due to the importance of the method, this investigation includes a thorough analysis of results obtained by this procedure. Anhydrous lanthanum bromide, synthesized by a tube furnace reaction between lanthanum oxide and hydrogen bromide, is also included as a solute. Lanthanum is chosen as a representative rare earth cation due to the availability of pure oxide and also because of the relative wealth of x-ray diffraction data on the element and its compounds. Because of the favorable physical properties of dimethylformamide, study of this material as an electrodeposition medium is also included. As an aid to electrodeposition studies, an evaluation is included of the electrochemical characteristics of the two salts, lanthanum nitrate and lanthanum bromide, in dimethylformamide. A redetermination is also included of the electrochemical properties of the same two salts in ethylenediamine. AD 96520. AF OSR Chem 40-30. Contract AF 18(600)-1535. AF OSR TN 56-437.

Organic compounds of gallium. See entry under Bibliography on page 249. PB 131625

Quarterly periodic status report of the Hydrogen Peroxide Laboratories, by R. L. Wentworth. Massachusetts Institute of Technology. Hydrogen Peroxide Laboratories, Cambridge, Mass. Sep 1955. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 124887

Discusses the stability of high quality concentrated H_2O_2 solutions, optimum conditions for stabilization, behavior of stannite stabilizer in aluminum drums, cyclical barium peroxide processes, and flame velocities in hydrogen peroxide vapor. DIC 6552. Contract N5 ori-07819, NR 092-008.

Studies on the rare-earth hydrides. Technical report VI: Solutions of europium and ytterbium metals in liquid ammonia, by James C. Warf and William Korst. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Jun 1956. 9p. Order from LC. Mi $1.80, ph $1.80. PB 127170

For reports 1, 3-4, 7-10 see PB 128973, 127241-127242, 127239, 126953-126954. 1. Europium - Solubility 2. Ytterbium - Solubility 3. Ammonia, Liquid - Solvent properties 4. Contract Nonr-228(03), NR 356-290, Technical report 6

Thermal oxidation of hydrazine monohydrate in the vapor phase, by J. M. Nelson and D. E. Holcomb. Purdue University. Purdue Research Foundation, Lafayette, Ind. Jun 1949. 35p graphs, tables Order from LC. Mi $3.00, ph $6.30. PB 126288

The vapor pressure of hydrazine monhydrate has been determined over the temperature range from 27.6°C to 120°C. The vapor pressure can be determined from a given equation with an accuracy of about plus or minus 2 per cent. The experimental data obtained in this investigation indicate that hydrazine monohydrate completely dissociates in the vapor phase into hydrazine, N_2H_4, and water vapor over the temperature range from 71.2°C. to

151.2°C. The thermal oxidation of hydrazine monohydrate by oxygen was studied in a constant volume reactor constructed of pyrex glass. The experiments were carried out under isothermal conditions and with various concentrations of hydrazine, oxygen, water vapor, and nitrogen. A series of runs was made with each one of these components present in a large excess in the reacting mixture. Project Squid. Contract N6 ori-104, T.O. 1, NR 220-042. PUR 7 M.

Vapor-liquid equilibrium for the diborane-ethyl ether system, by Leo J. Paridon and George E MacWood. Ohio State University Research Foundation, Columbus, O. Mar 1956. 16p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 129691

The two-phase, vapor-liquid equilibrium in the diborane-ethyl ether system has been studied under three different total pressures: 25, 50, and 100 p.s.i. It is shown how the equilibrium diagram can be calculated from the properties of the pure components. Contract NOa(s)-52-1023, Task report. MCC-1023-TR-199

Analytical Chemistry

Infrared spectra of HDO in water and ionic solutions, by R.D. Waldron. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1956. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126704

The infrared spectra of HDO in water and saturated metal halide solutions were investigated to study the interactions between ions and solvent molecules and the nature of hydrogen bonding in aqueous systems. Contract N5 ori-07801, NR 017-421. MIT LIR TR 108.

Microwave spectrum and dipole moment of cyclopentadine, by Victor W. Laurie. Harvard University. Dept. of Chemistry, Cambridge, Mass n.d. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 126292

Probably issued after 1956. 1. Dipole moments - Calculation 2. Cyclopentadiene - Spectrographic analysis 3. Contract N5 ori-76, T.O. V

Quantitative analysis of phosgene-carbon dioxide and isopropyl chloride system by infrared absorption spectroscopy, by Ivan L. DeWitt. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center. Sep 1956. 33p drawings, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126200

A procedure has been developed for quantitative analysis of gaseous mixtures of phosgene, carbon dioxide, and isopropyl chloride using absorption infrared radiation at 5.94μ, 4.27μ, and 3.64μ respectively. The system does not obey Beer's law. A procedure for obtaining correction factors is given. Project 4-92-03-013-02 (4-92-03-012). CC CRL R 527.

Research on a method for determining boron in low-boron steels, by C.T. Litsey, D.L. Chase and E.J. Center. Battelle Memorial Institute, Columbus, O. Jun 1957. 17p drawing, graph, tables. Order from OTS. 50 cents. PB 131374

A simple, rapid and reliable method has been developed for the determination of boron in low-boron steel with an accuracy of 5 to 10 per cent of the amount present at mid range, the range being 0.003 to 0.03 per cent boron. The method involves solution of the sample, adjustment of the acidity, passing the sample through an ion-exchange column of amberlite IR-120(H) resin, collecting the boron solution which passes through the column, development of the color of boron with carminic acid on an aliquot of the eluate, and measurement of the color intensity at 585 millimicrons in a spectrophotometer. The method is suitable for both umpire and control assays. AD 130896. Project 7360, Task 7032. First and final technical report under Contract AF 33(616)-3382. AF WADC TR 56-517.

Miscellaneous Chemicals

Corrosion preventive additives, by E.J. Schwoegler and L.U. Berman. Armour Research Foundation, Chicago, Ill. Feb 1953. 120p diagr, graphs, tables. Order from OTS. $3.00. PB 131459

This project was undertaken with the object of developing new corrosion inhibitors to supplement or replace petroleum sulfonates. A study of petroleum sulfonates was made to determine the nature of the compounds showing corrosion inhibition. Separation of a commercial sodium petroleum sulfonate into certain components was effected. From these studies, it appears that sodium petroleum sulfonates are alkyl benzene derivatives with the alkyl group in the para position to the sulfonic acid group. A large number of commercially available organic compounds were evaluated. Several good inhibitors were found. Certain general information concerning the type of organic compounds which will inhibit galvanic corrosion has been obtained. A large number of organic compounds were synthesized having corrosion inhibiting properties. These included glyoxalidines, alkyl aryl sodium sulfonates, amine salts of 2-ethylhexoic, oleic, nicotinic, pelargonic, linoleic, and dodecylbenzene-sulfonic acids. AD 8961. Covers work from 1 Mar 1951-31 Mar 1952 under Contract AF 33(038)-9202. ARF Proj 90-806 C, Final report. For Parts 2-3 see PB 121108 and 121113. AF WADC TR 53-16, Part 1.

ELECTRICAL MACHINERY

Communication Equipment

Instruction book for radio telegraph and telephone transmitting equipment TCK series. TCK to TCK-7 inclusive. General Electric Company, Bridgeport, Conn. Oct 1945. 312p photos, drawings (1 fold), diagrs (part fold), tables (1 fold). Order from LC. Mi $11.10, ph $48.60. PB 126839

1. TCK (Transmitting equipment) 2. Radio telegraph - Transmitters 3. Radio telephone - Transmitters 4. NAVSHIPS 900, 210

Investigation of emissive materials for electron tubes. Third scientific report for the period 1 Oct to 31 Dec 1956 under Contract AF 19(604)-1822, by Frederick T. Hill. Raytheon Manufacturing Company. Receiving and Cathode Ray Tube Operations, Newton, Mass. 1957. 32p graphs. Order from LC. Mi $3.00, ph $6.30. PB 126364

Standard diodes, exhausted at a partial pressure of 2.5 mm during the exhaust cycle, show slumping or lower emission levels during the life burning cycle of the tube. The completed standard triode tests show that the emission levels of the tube are affected by variations in vacuum pressure at exhaust. Physical analysis of standard diodes exhausted at 5 mm pressure Hg show definite signs of nonadherence of cathode coating. Diodes exhausted at 15 mm pressure of mercury show signs of a chemical reaction between the cathode coating and the nickel sleeve. A test structure for evaluation of cathode sleeve sublimate by use of spectrographic means is presented at this time. The evolution and description of the sublimation structure is described in detail. The first analytical results are also presented. AD 110193. See PB 125153 and 126100 for 1st and 2nd scientific reports. AF CRC TN 56-993.

Optimum filtering of sampled polynomial message plus random noise, by Arthur R. Bergen. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories, New York, N.Y. May 1956. 24p graphs. Order from LC. Mi $2.70, ph $4.80. PB 126359

This report considers the optimum linear filtering of polynomial message plus stationary random noise. The derivation is similar to that of Lees but is formulated differently. This formulation is more conventional and facilitates a consideration of desired operations on the message other than smoothing and prediction. AD 110179. CU 4-56-AF-1572-EE. Contract AF 19(604)-1572, Technical report T-1/133. AF CRC TN 56-981.

Electronics

Amplitude and phase difference fluctuations of 8.6 millimeter and 3.2 centimeter radio waves on line-of-sight paths, by C.W. Tolbert, B.M. Fannin and A.W. Straiton. Texas. University. Electrical Engineering Research Laboratory, Austin, Texas. Mar 1956. 17p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125571

This report presents data on 8.6 millimeter wavelength of phase difference fluctuations on a ten-mile path in Colorado between Pikes Peak and the Garden of the Gods and of amplitude fluctuations on this path and on a sixty-mile path between Pikes Peak and Mount Evans. The millimeter data are compared with similar data taken using a wavelength of 3.2 centimeters. Contract Nonr 375(01), NR 071-032. TU EERL 78.

Coupled helices for use in traveling-wave tubes, by G. Wade and N. Rynn. Stanford University. Electronics Research Laboratory, Stanford, Calif. Dec 1955. 11p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126331

Based in part on a thesis by G. Wade, Stanford University, 1955. Reprinted from the IRE Transactions, Jul 1955, p. 15-24. 1. Helix - Coupling - Theory 2. Waves, Electromagnetic - Propagation - Theory 3. Contract N6 onr - 251(07) 4. SU ERL TR 99

Darkflex, a fibrous microwave absorber, by H.A. Tanner, A.G. Sands and M.V. McDowell. U.S. Naval Research Laboratory. Apr 1953. 11p photos, drawing, table. Order from LC. Mi $2.40, ph $3.30. PB 130312

Microwave absorbers made in the form of mats using fibrous materials impregnated with pigmented rubber solutions have been found to give efficient broadband absorption from 2,500 to 30,000 Mc with less than 5% of the reflection obtained from a smooth metal plate. Modifications of these absorbers can be made to fill such requirements as fire resistance, mechanical strength, and indifference to water and weathering. These absorbers are adaptable to mass production techniques and have been used successfully in radar dark rooms for antenna research. NRL R 4137.

Design manual of natural methods of cooling electronic equipment, by James P. Welsh. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Nov 1956. 200p photos, diagrs, graphs, tables. Order from LC. Mi $8.70, ph $30.30. PB 132435

This manual was prepared to assist electronic engineers in the thermal design of equipment cooled by natural means It includes a bibliography of 60

items. Contract NObsr-63043. CAL HF 845-D-8. NAVSHIPS 900, 192.

Electrode process in metal deposition from aqueous solutions, by Einar Mattsson. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1955. 58p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 124926

When a metal electrode is immersed in an electrolyte an electric potential difference arises between metal and solution. Though it cannot be determined, a quantity rather significant for it—the electrode potential—can be measured. On electro-deposition the cathode potential decreases below its equilibrium value. The change is called (electrolytic) polariztion and three types of it can be distinguished; concentration, ohmic polarization and activation polarization. The polarization is dependent on current density, temperature, time, the nature of the metal and the composition of the solution. Chemistry including Metallurgy series, vol. 6 no. 12. Sweden. Kungl. Tekniska Högskolans Handlingar nr 96. Acta polytechnica 184.

Electronic energy bands in semiconductors with cubic crystal structure, by Gene Frederick Dresselhaus. California. University, Berkeley, Calif. Sep 1955. 93p diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 124893

Thesis - University of California. Technical report 66. 1. Brillouin function 2. Germanium - Resonance levels 3. Silicon - Resonance levels 4. Contract Nonr-220(01), NR 017-705

Heater-cathode leakage investigation. Third quarterly report for the period 1 Aug to 1 Nov 1956 under Contract AF 19(604)-1734, by Julius Cohen, Paul Cutler, J.V. Florio, A.L. Wilson and R. Rechtschaffner. Sylvania Electric Products, Inc., Product Development Laboratories, Kew Gardens, N.Y. Dec 1956. 36p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126374

Report YF 56(B7-3028-3). See PB 125151 and 124715 for 1st and 2nd quarterly reports. 1. Vacuum tubes, Cathode ray - Materials 2. Vacuum tubes, Cathode ray - Leakage 3. Contract AF 19 (604)-1734 4. AF CRC TN 57-164

Industrial preparedness study on diffused semiconductor devices. Final feasibility report under Contract no. DA-36-039-sc-72705 for period 25 Jun 1956 to 24 Mar 1957, by J.D. McCotter and C.G. Thornton. Philco Corporation, Philadelphia, Pa. Apr 1957. 51p photos, drawings, diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 126259

Laboratory models of the special test equipment needed to test the high-frequency parameters of the device have been constructed. An analysis of the equation used to obtain the most optimum diffusion cycle for the particular graded base layer is presented in this report. A summary of the parameters controlling the design of the 200mc power oscillator is given. Distribution charts of the electrical characteristics for 50 "State of the Art" feasibility samples of the device are included in the appendix. The target specifications for the L-5402, the 200 mc power oscillator, are included as Appendix A. Philco no. H-2761.

Measurement of ferrite parameters at microwave frequencies, by V.V. Nikol'skii. Translated by Morris D. Friedman under Contract AF 19(122)-458 with Lincoln Laboratory, Massachusetts Institute of Technology. Order separate parts described below from LC, giving PB number of each part ordered.

Part I. Dec 1956. 38p diagrs, graphs. Mi $3.00, ph $6.30. PB 127203

The question is considered of measuring the magnetic permeability μ and the dielectric permeability ε tensors of ferrites by using an electromagnetic cavity resonator. The principle of perturbing the resonator is generalized to gyrotropic media and the problems of ferrite bodies of various shapes, placed in the resonant cavity, are solved by using a quasi-stationary approximation. Different vibrations are proposed of measuring $\bar{\mu}$ and ε of ferrites by using a cylindrical resonator and certain experimental results are cited. AD 110168. Translated from Radiotekhnika i Elektronika, AN USSR, 1, 447-468, 1956.

Part II. Oct 1956. 18p diagrs, graph. Mi $2.40, ph $3.30. PB 127202

The use of a rectangular resonator to measure the μ and ε ferrite parameters in samples of various shapes is considered. The perturbation theory developed by the author in Part I underlies the computations. Cited are experimental results of comparable measurements of ferrite parameters using a cylindrical and a rectangular resonator. AD 110286. Translated from Radiotekhnika i Elektronika, AN USSR, 1, 638-646, 1956.

NEL reliability design handbook. Supplement. U.S. Navy Electronics Laboratory, San Diego, Calif. Apr 1958. 25p graphs, tables. Order from OTS. 75 cents per single issue, or on annual subscription rate of $2.25 a year in U.S.A., foreign rate $3.00 a year. PB 121839s3

These supplements are issued quarterly and may replace pages in the original loose-leaf edition of Nov 1955 or contain additional pages to be inserted

in it. This supplement contains Sec. 13.3, p. 1-4; Sec. 206.1, p. 1-3; Sec. 2.1, p. 1-7; Sec. 1.6, p. 1-11.

Researches on the electrochemical behaviour of metallic crystals, by Roberto Piontelli, Ugo Bertocci, L. Bicelli, G. Poli, B. Rivolta, G. Sternheim and C. Tamplenizza. Politecnico di Milano. Laboratorio di Elettrochimica, Chimica Fisica e Metallurgia, Milano, Italy. Feb 1957. 11p diagr. Order from LC. Mi $2.40, ph $3.30. PB 127914

A complete technique for investigating the electrochemical behaviour of metallic single crystals has been developed, including: a) preparation (by a modified Bridgman method) of single crystals; b) orientation; cutting (by chemical and electrochemical method avoiding stresses); electropolishing; surface finishing; c) overvoltage measurements in suitable cells. Technical note no. 10. For further reports under this Contract see PB 122405, 122406 and 125980. Contract AF 61(514)-733C.

Scanning arrays using the flat spiral antenna, by J. A. Kaiser. U.S. Naval Research Laboratory. Mar 1958. 23p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 130193

A pair of equally excited but oppositely sensed Archimedean two-wire spirals situated close to one another in the same plane is used to generate a linearly polarized field in which the direction of polarization and phase is controlled or varied by rotation of the spiral radiators. The possibility of using a parasitic spiral in conjunction with a driven spiral for application to a broadside scanning array is indicated. A brief simplified analysis of the two-wire Archimedean spiral is presented. NRL R 5103.

Solid state research, by Paul B. Pickar. Loyola University, New Orleans, La. Contract Nobsr-64028. Order separate reports described below from LC, giving PB number of each part ordered.

1st quarterly report covering activity between 15 Sep-15 Dec 1953. Jan 1954. 17p photo, diagrs, graph. Mi $2.40, ph $3.30. PB 128204

A single crystal of lead telluride was grown in this quarter. Apparatus and electronic equipment are described. Method of growth of the crystal and the circuit for measuring Hall coefficients are discussed.

3rd quarterly report for the period Mar 15, 1954-Jun 15, 1954. Jun 1954. 16p diagrs, table. Mi $2.40, ph $3.30. PB 125613

During the 3d quarter, work was begun on studying the Hall and magneto-resistive coefficients and resistivity of single crystals of Pb Te at liquid nitrogen temperatures (-196°C). An electronic device was added to the phase changer for the A.C. circuit used in measuring the Hall coefficient.

Final report covering the period 14 Aug 1953 to 15 Aug 1954. Aug 1954. 27p photos, diagrs, graphs, tables. Mi $2.70, ph $4.80. PB 128202

The purpose of this research was to study the electrical properties of the semiconductors PbTe, PbSe, and CdSe over temperatures of -78°C and -196°C, and at room temperature. Hall coefficients, resistivity and conductivity measurements have been made at these temperatures. Apparatus for growing single crystals, the crystal holder, electromagnet used, and Hall apparatus, are described and illustrated.

Stabilization of a high-voltage discharge by a vortex, by B. Vonnegut, C.B. Moore, Jr. and C.K. Harris. Arthur D. Little, Inc., Cambridge, Mass. May 1956. 9p photos, drawings. Order from LC. Mi $1.80, ph $1.80. PB 126391

Simple experiments show that an air vortex exercises a stabilizing influence on a high-voltage electrical discharge in its axis and alters its character considerably. These effects are probably caused by a centrifugally produced pressure gradient that confines the hot ionized gas of the discharge to the vortex axis. Contract Nonr-1684(00).

Synthesis of active RC transfer functions, by Isaac M. Horowitz. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Nov 1956. 93p diagrs, graphs. Order from LC. Mi $5.40, ph $15.30. PB 126381

This report presents new methods of synthesis of stable active RC transfer functions in the form of unbalanced two terminal-pair networks. AD120417. Contract AF 18(600)-1505. PIB 437. PIB R-507-56. AF OSR TN 57-74.

Torsion induced recrystallization of highly refractory filaments, by F. Gifford and E.A. Coomes. University of Notre Dame. Physical Electronics Group, Notre Dame, Ind. Jun 1956. 16p photos, diagrs, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 126355

With regard to recrystallization, the most remarkable effect observed is the strong influence of torsion. Not a single specimen of W or Mo wire containing twist failed to recrystallize by the gradient method; this occurred for polished or unpolished wires, and for twists as low as 1/2 TPI. Explana-

tions for the screw structure are still within the bounds of conjecture. The suggestion has been advanced that a long screw dislocation exists along the length of the wire; however, theory would suggest that screw dislocations resulting from the type of torsion imposed should occur at right angles to the wire. The most plausible explanation has been given by Kuczynski; he suggests that since W and Mo are made by the powdered metallurgy process impurity grains are occluded in the swaging process, which are extended into long fibers on drawing. On twisting and recrystallization this impurity will appear as a screw plane in the single crystal. Two observations substantiate this suggestion; (a) Laue X-ray patterns taken at intervals along the 110-plane of a specimen reveal a single crystal with imperfections; and (b) impurities along this screw on the wire surface would explain the unusually high electron emission from the spiral as observed in all the projection patterns. Table 1 in Appendix 1 is a tabulation of experiments over the past 20 years on recrystallization of highly refractory metals. To be presented at the 1956 Field Emission Symposium, Notre Dame, 11 - 13 Jun 1956 and A.P.S. Meeting, Chicago, 23 -24 Nov 1956, Chicago, Ill. Contract Nonr-1623(00). Contract AT (11-1)-274. Contract NObsr-64065.

Transmit-receive passive antenna multicoupler. Scientific report no. 3 on Contract AF 19(604)-1828, Oct-Dec 1956. Harvey-Wells Electronics, Inc., Southbridge, Mass. Dec 1956. 20p drawings (part fold), graphs. Order from LC. Mi $2.40, ph $3.30. PB 126372

The problem was to design a 12-channel transmit-receive antenna multicoupler to operate over the range 225-400 mc; the isolation between adjacent channels spaced 4 mcps. to be 60 db. minimum, with an insertion loss between the antenna and any equipment of 1 db. maximum; the power level to be 200 watts average power to a load of 52 ohms nominal resistance. AD 110183. Contract AF 19(604)-1828, Scientific report no. 3. AF CRC TN 56-985.

Generators, Motors, Transmission

Iterative methods in amplifier interstage synthesis, by George A. Caryotakis. Stanford University. Electronics Research Laboratory, Stanford, Calif. May 1955. 101p photos, diagrs, graphs, tables Order from LC. Mi $5.70, ph $16.80. PB 126469

This paper deals with the design of low-pass video amplifiers for specified amplitude or phase response. This is accomplished by what is essentially stagger-tuning similar to that used for narrow-band amplifiers, except that in this case the problem is complicated by the presence of finite zeroes in the amplifier gain function. The method used is an iterative process by means of which the elements in the predetermined amplifier configuration can be adjusted so that the gain function may approximate the desired response. The performance of the resulting designs is shown to approach the theoretical limits of gain-bandwidth product in cascaded amplifiers. Contract N6 onr-251(07), NR 373-360. SU ERL TR 86.

Radio frequency tuners and i-f amplifiers for transistors, by Edward A. Abbot. Emerson Radio and Phonograph Corporation. Government Engineering Division, Jersey City, N.J. Oct 1957. 53p photos, drawings, diagrs, graphs, tables. Order from OTS. $1.50. PB 131602

Each amplifier uses six double-tuned stages and is constructed with newly developed, miniature, i-f coils, which have unloaded Q's as high as 250. A novel permeability type r-f tuner using a combined rotary and axial motion of two ferrite cups has been developed. It has been proven that this "rotary-axial" tuner can cover a 15 to 1 tuning range when used as a semi-continuous tuner. AD 142105. Project 4155, Task 41621. Covers work from 1 Dec 1955-31 Jan 1957 under Contract AF 33(600)-31464. AF WADC TR 57-256.

Sweep reference voltage generator, by W. D. Dahl. U.S. Naval Research Laboratory. Jan 1958. 31p diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 129802

One method of generating sweep deflection voltage for fixed-coil PPI radar displays is to generate two reference voltages proportional, respectively, to the sine and cosine of the bearing angle of the radar antenna. These reference voltages may be used in conjunction with sweep generators for generating the required X and Y sweep deflection waveforms. This report describes the design factors and performance of such a sweep reference voltage generator, exclusive of the sweep generators. Tests on the unit indicated that the reference voltages, when used by appropriate sweep generators, resulted in PPI displays with a bearing accuracy greater than 0.1 degree. NRL R 5074.

FOOD AND KINDRED PRODUCTS

Acceptability of imitation of black pepper. U.S. Quartermaster Food and Container Institute for the Armed Forces. Food Laboratories. Food Acceptance Branch, Chicago, Ill. May 1956. 27p tables. Order from LC. Mi $2.70, ph $4.80. PB 126394

The acceptability of an apparently superior imitation black pepper was investigated in a field test. Since the actual percentage of consumers who believed the imitation pepper inferior to the kind normally used was small (21 percent) and since general food preferences were not shown to be affected, it may be concluded that the adequacy of the imitation pepper

under the conditions of the present test has been demonstrated. However, because of the significant frequency of correct identification and the tendency to consider the imitation inferior, the possibility of greater adverse effects if imitation pepper were made an item of regular issue has not been entirely eliminated. Project: 7-84-15-007, Subtask 07-10. Termination report.

Research study on improvements in dehydrated milk for beverage use. Final report for the period 1 May 1954 - 31 Dec 1955, under Contract DA 44-109-qm-1766, by S.T. Coulter. Minnesota. University. Dept. of Dairy Husbandry, St. Paul, Minn. 1956. 6p tables. Order from LC. Mi $1.80, ph $1.80. PB 126632

The objectives of this project are (1) to study the mechanism by which heat treatment of fluid milk delays the oxidation of fat in dry whole milk, (2) to determine the effect of oxygen content of the drying atmosphere on the initial quality and keeping quality of dry whole milk, and (3) to determine whether the heat exposure during the drying process accelerates the oxidative deterioration of dry whole milk. These steps are summarized. Project no: 7-84-06-029. D-305, Report no. 6. AD 96176.

Standard operating procedures for conducting nutrition surveys for the assessment of nutritional status in the field, by C. Frank Consolazio. U.S. Army. Medical Nutrition Laboratory, Fitzsimons Army Hospital, Denver, Colo. Oct 1955. 244p drawings, graphs (part fold), tables. Order from LC. Mi $11.10, ph $37.80. PB 126493

The procedures presented in this manual have been used and tested in the field for the past ten years at the Medical Nutrition Laboratory, and have proven to be very practical and useful for conducting nutritional surveys.

Vacuum requirements for canned tomatoes, a symposium sponsored by the Quartermaster Food and Container Institute for the Quartermaster Research and Development Command, U.S. Army, Chicago, Ill., Feb 18, 1955, edited by Frank J. Rubinate and Norbert J. Leinen. Jan 1956. 63p photos, drawing, diagrs, graphs, tables. Order from U.S. Quartermaster Food and Container Institute, 1819 Pershing Rd., Chicago 9, Ill. PB 125951

Contents: I. Introduction. - Purpose of the symposium, by Col. J.D. Peterman. - Importance of vacuum in canned foods, by A.V. Grundy. - II. Procurement and storage aspects of the problem. - Results of survey of current commercial practice, by G.E. Tripp. - Procurement of canned tomatoes, by G.E. Green. - Problem of vacuum as it affects depot operations, by P. Ikari. - III. Further considerations in attaining prolonged shelf life. - Relationship of vacuum to shelf life, by B.S. Clark. - Extending shelf life by means of low temperature storage, by G.H. Mitchell - general discussion. - IV. Minimum vacuum requirements - Recommendations and decisions, general discussion, J.R. Braden and F.J. Rubinate, moderators.

FUELS AND LUBRICANTS

Final report on studies of turbulent premixed flames and methods of suppressing combustion oscillations, by Abbott A. Putnam, Gail M. Clough and Milton J. Kenworthy. Battelle Memorial Institute, Columbus, O. Dec 1956. 132p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.50. PB 131430

This final technical report summarizes the results obtained in the program "Research Combustion of Liquid and Gaseous Fuels". The program consisted of two distinct phases, Phase I, covering "A Study of Methods of Acoustical Dampening in Rockets", and Phase II, covering " A Study of the Effect of Turbulence in the Flame Speed of Homogeneous Gas Mixtures". In the first phase, two methods of generating transverse oscillations in an axially symmetric combustor were investigated, (1) that of using a transducer and (2) that of using a small hydrogenair burner. The study of turbulent flames was conducted in a combustion bomb through which a grid would be passed prior to ignition. Several different mixtures of ethane and air were studied using two different grids, which had uniformly spaced 1/2 and 1-inch holes, respectively, and about 60 per cent blockage. The grid speed and the time of ignition after the passage of the grid were both varied. AD 130972. Project 6-(3012), Task 70334. Contract AF 33(616)-3315, Final report. AF WADC TR 56-583.

Flame holding requirements for stable combustion of gaseous mixtures flowing at high velocities, by H.J. Buttner and R.C. Teasel. Purdue University. Purdue Research Foundation, Lafayette, Ind. Aug 1949. 64p photos, drawings, graphs. Order from LC. Mi $3.90, ph $10.80. PB 126291

The major purpose of this report was to determine the relationship between the stability limit of high velocity gaseous mixtures and the heat release required from the flameholder. An attempt was also made to correlate the experimentation done on the annular type of flameholder used with the circular burner port and the rectangular flameholders used with the variable rectangular nozzle. Project Squid. Contract N6 ori-104, T.O. 1, NR 220-042. PUR TM 12.

High temperature hydraulic fluid development status and engineering data, by George Baum and Robert J. Benzing. U.S. Air Force. Air Research and

Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1957. 44p graphs, tables. Order from OTS. $1.25. PB 131512

A review of the status of extreme high temperature hydraulic fluid development is presented. Progress in research and development for fluids with a high temperature capability of 550°F to 700°F and a low temperature capability of 0°F to -65°F is described in detail. The fluids within this temperature range and described in this report fall into the following classes of compounds; Organosilicates, disiloxanes, silicones, mineral oils and silanes. The available data on properties of these research fluids, important to hydraulic system design, are reported. These data include the following; viscosity-temperature, density-temperature, thermal stability, data for heat transfer calculations, compressibility, vapor pressure, and flammability measurements. The large amount of design data on -65°F to 400°F type fluids obtained by industry and the military services is compiled and reported. This includes both previously published and unpublished data. AD 131009. Project no. 7331. Covers period from Jan 1956 to Jan 1957. AF WADC TR 57-167.

High-temperature kinetics of the hydrogen-bromine reaction, by Arthur Levy. Battelle Memorial Institute. Division of Physical Chemistry and Fuels, Columbus, O. Oct 1957. 26p diagr, graph, tables. Order from OTS. 75 cents. PB 131618

The steady-state reaction of H_2 and Br_2 has been studied in a flow system between 600 and 1470 K to determine whether the low-temperature steady-state mechanism, established from Bodenstein and Lind's original studies, is still valid at temperatures approaching flame temperature. The agreement of these rate equations with equations derived from the original, low-temperature studies establishes the validity of the steady-state mechanism. AD 142055. Project 5-(3-3012), Task 70334. First half reported in Section 8 of WADC TN 56-206. Contract AF 33(038)-12656. Contract AF 33(616)-3359. AF WADC TR 57-486.

Influence of the type of glass used in studies of distillate fuel stability, by J.G. Christian, J.E. Johnson and H.W. Carhart. U.S. Naval Research Laboratory. Feb 1958. 12p graphs, tables. Order from OTS. 50 cents. PB 131529

Glass containers are often used for storing fuels during stability studies. The nature of the glass used was found to have a pronounced effect on the rate of degradation of some distillate fuels. Of eleven fuels studied, eight degraded less rapidly in soft glass than in Pyrex glass while three fuels showed no difference. Treating the bottles with strong acid or alkali before use caused only minor changes in the degradation rates. It has been shown that the "glass effect," when operative, is due to inhibition by soft glass and not to acceleration by Pyrex glass. From this it is concluded that Pyrex vessels more closely approach field storage conditions than soft glass containers. NRL R 5095.

Metal-cyclopentadienyl high temperature lubricants and related materials. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Project 7340, Task 73404. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Synthesis and properties of alkyl, alkaryl, and metalated derivatives of ferrocene, by Marvin Rausch, Martin Vogel and Harold Rosenberg. Jan 1958. 49p tables. $1.25. PB 131701

The purpose of this program was to uncover new types of cyclopentadienyl metals, or "ferrocene-like," compounds with properties suitable for extreme temperature lubricant and hydraulic fluid applications. A series of long-chain alkylferrocenes and arylalkylferrocenes were prepared by the Friedel-Craft acylation of ferrocene and subsequent reduction. Furthermore, the metalation of ferrocene by n-butyl-lithium and by mercuric acetate was studied in detail, and some reactions of the metalated derivatives were investigated. AD 142326. Covers work from Jan 1956 - Jan 1957. AF WADC TR 57-62, Part I.

Part II: A. Synthesis and properties of aryl, benzyl, and silyl derivatives of ferrocene. B. Preliminary studies on the effect of tetrahydrofuran on the lithiation of ferrocene, by Marvin Rausch, Martin Vogel, Harold Rosenberg, Dana Mave and Paul Shaw. Feb 1958. 23p graph, tables. 75 cents. PB 131714

The purpose of this program was to uncove. new types of ferrocene-containing materials with properties suitable for extreme-temperature lubricant and hydraulic fluid applications. A number of new aryl- and benzylferrocenes have been prepared. A valuable modification of the lithiation of ferrocene by n-butyllithium has been devised using ethyl ether-tetrahydrofuran as the solvent system. This procedure has been employed for the preparation of both carboxy- and 1,1-dicarboxyferrocene in good yield, and for the synthesis of long-chain alkylsilylferrocenes. AD 150979. Project 7331, Task 73313. Covers work from Jan-Aug 1957. AF WADC TR 57-62, Part II.

Micro lubricant test methods. Part VI: Cloud point, pour point and cloud intensity, by John B.

Christian. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1957. 14p tables. Order from OTS. 50 cents. PB 131648

Miniaturized methods have been developed for the determination of cloud point, pour point, and cloud intensity. The methods described herein require a 5-milliliter sample for the three determinations. AD 142210. Project 3044, Task 73314. Covers work from Dec 1956-Aug 1957. For Parts 1 thru 5 see PB 121335, 121386, 121443, 121849 and 121995. AF WADC TR 55-449, Pt. 6.

Organosilanes and related compounds as high-temperature lubricants. Part III: Mixed symmetrical tetraalkylsilanes, by Harold Rosenberg, Christ Tamborski and James D. Groves. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1957. 19p graphs, tables. Order from OTS. 50 cents. PB 131424

One class of mixed symmetrical tetraalkylsilanes was investigated to determine their applicability as base materials for Air Force high-temperature hydraulic fluids and lubricants. A series of di-n-dodecyldialkylsilanes was prepared and various physical properties of the fluids obtained were correlated with molecular structure. These materials were found to be thermally stable at elevated temperatures and liquid over a wide temperature range. In addition to the tetraalkyl compounds, one aralkyl derivative, di-n-dodecyldiphenylsilane, was also synthesized. On the basis of preliminary property data, this fluid and at least several mixed symmetrical tetraalkylsilanes offer considerable promise as base stocks for 700°F lubricant and hydraulic fluid applications in new advanced air weapon systems. AD 131066. Project 7340, Task 73404. Covers work from Apr 1955-Apr 1956. For Parts 1-2 see PB 121003 and 131389. AF WADC TR 54-613, Part III.

Propane gas for metal cutting, notes compiled by G.G.M. Carr-Harris. National Research Council of Canada. Technical Information Service, Ottawa, Canada. Dec 1955. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 125946

1. Butane-propane mixtures - Uses - Canada
2. Propane, Liquid - Uses - Canada
3. NRCC TIS 46

Thermodynamic properties of constant pressure propane-air flames in relation to flame structure, by H.J. Buttner and W.G. Agnew. Purdue University. Purdue Research Foundation, Lafayette, Ind. Aug 1949. 94p drawings, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 126289

The space required for the three components--the inner cone, the reaction zone, and the outer envelope--is normally considered the "space required for combustion", and it is the intent of this report to determine the thermodynamic properties of the gas mixture at various points within this space under various conditions of operation. Thus, the purpose is to describe thermodynamically the "space required for combustion" in an attempt to gain some insight into the factors affecting this required space, with the ultimate objective of decreasing the space to a minimum. Project Squid. Contract N6 ori-104, T.O. 1, NR 220-042. PUR 9 P.

Volumetric rates of energy release characteristic of different mechanisms of turbulent combustion in premixed gases, by Richard R. John. Arde Associates, Newark, N.J. Dec 1956. 28p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 125960

Estimates have been made of the volumetric rates of energy release (SHR) characteristic of different mechanisms of turbulent combustion in premixed gases, including the wrinkled laminar flame, the zone of extended reaction, and the zone of instantaneous mixing. The emphasis is on the presentation of a discussion of the SHR characteristic of the zone of extended reaction. On the basis of the absolute value and the pressure dependence of the SHR, it is suggested that the zone of extended reaction is the turbulent combustion process occurring in contemporary continuous flow combustion systems. AD 115036. Technical note 4555-4. For Technical notes 4555-1 and 4555-2 see PB 122203 and 125075. Contract AF 18(600)-1560. AF OSR TN 57-5.

HIGHWAYS AND BRIDGES

Laboratory compaction tests of coarse-graded paving and embankment materials, by R.C. Mainfort and Warren L. Lawton. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 26p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132242

1. Soils - Compaction 2. Airports - Construction 3. Pavements - Materials - Tests 4. CAA TDR 177

Load transmission test for flexible paving and base courses. Part II: Triaxial test data on structural properties of granular base materials, by William M. Aldous, Raymond C. Herner and M.H. Price. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1951. 37p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132239

This report summarizes the results of triaxial tests on approximately 250 specimens of gravel, crushed stone, crushed slag and sand. Analysis of data both by use of the Mohr diagram and by use of Housel's equations is discussed. For Parts 1, 3-5 see PB 127853, 123577, 111828 and 121146. CAA TDR 144.

INSTRUMENTS

Analog electronic correlator, by Kenneth W. Goff. Bolt, Beranek and Newman Inc., Cambridge, Mass. Dec 1956. 109p photos, diagrs, graphs. Order from LC. Mi $5.70, ph $16.80. PB 129339

An analog electronic correlator for computing the crosscorrelation function between two electrical signals has been developed. The input signals are stored on a tape loop for repetition into the remainder of the correlator; a magnetic-drum variable-time-delay unit is used to delay one signal with respect to the other; an electronic multiplier forms the product of the two signals; the multiplier output is smoothed by either a low pass or band pass filter and plotted on a chart recorder having both linear and logarithmic channels. Detailed descriptions of the individual units of the system, operating and maintenance instructions, as well as bibliography of correlation theory and techniques are given in the report. A device for spraying the coating of magnetic oxide on the drum has been developed and instructions for its operation are included as an appendix to the report. AD 97197. Project no. 7210. Contract AF 33(616)-3335. AF WADC TR 56-446.

Balloon borne air sampling apparatus, by Charles W. Chagnon. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Bedford, Mass. Apr 1957. 27p photo, drawing, diagrs, table. Order from OTS. 75 cents. PB 131646

A balloon-borne air sampling apparatus for the analysis of gases in the upper atmosphere is described. By the use of selective chemical absorbents to perform the initial stages of the air analysis "in situ," the problems of sample collection and transportation are minimized. Various atmospheric constituents may be determined either singly or simultaneously by the selection of the proper absorbents. Although designed for balloon-borne air sampling, the components of the apparatus are described in detail, since they may be adapted readily to other types of high altitude equipment. Several successful flights have been made for the determination of the carbon dioxide content of the stratosphere. AD 117270. AF GRD IGR 6. AF CRC TR 57-215.

Circuit diagrams and operational data for the transform computer, by F.E. Brooks, Jr., H.W. Smith and George Hopkins, Jr. Texas. University. Electrical Engineering Research Laboratory, Austin, Tex. Mar 1956. 21p photos, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 125573

This report is intended to explain the theory, construction, and operation of the transform computer designed and built by the Electrical Engineering Research Laboratory of The University of Texas. Complete circuit diagrams and operational instructions are included, as well as instructions for adjusting and normalizing the resultant power spectra. Contract Nonr 375(01) NR 071-032 TU EERL R 79.

Computing machines and automatic decisions, by C.B. Tompkins. California. University. Dept. of Mathematics. Jun 1956. 44p diagrs, table. Order from LC. Mi $3.30, ph $7.80. PB 126382

A system of strictly accurate numerical description of some elementary decision processes and some computing techniques which are immediately susceptible to application in mechanical and particularly electronic equipment is described.

High velocity air filters, by Theron E. Wright, Richard J. Stasny and C.E. Lapple. Donaldson Company, Inc., St. Paul, Minn. Oct 1957. 278p photos, drawings, graphs, tables. Order from OTS. $6.00. PB 131570

A study was made of the performance of fibrous filters with specific objective of obtaining design information for high velocity air filters. Experimental data on pressure drop, collection efficiency and life for fibrous filters have been obtained with two supercooled liquid aerosols (0.3-and 1.4-microns diameter) and one solid aerosol (1.2-micron diameter). The data on the collection of liquid aerosols agreed well with theoretical predictions. Data are also presented on pressure drop and collection efficiency for pad-supporting screens, on the mechanical compressibility characteristics of fibers, and on two novel arrangements for particle size analysis. AD 142075. Task 61194. Contract AF (616)-2745. AF WADC TR 55-457.

Introduction to the use of the shock tube for the determination of physico-chemical parameters, by S.S. Penner, F. Harshbarger and V. Vali. California Institute of Technology. Daniel and Florence Guggenheim Jet Propulsion Center, Pasadena, Calif. Jun 1956. 79p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 126635

The use of the shock tube for the determination of physico-chemical parameters at elevated temperatures is considered. First a qualitative survey of shock tube development is presented, in which the

principles and performance of various shock-tube designs are described. Next the use of optical techniques suitable for shock-tube studies is surveyed. This section is followed by a summary of representative determinations of physico-chemical parameters behind incident and reflected shock waves. Some critical remarks, relating to the use of the shock tube as a research tool for studies of processes which are important for understanding combustion reactions, are included in the discussion. Contract Nonr-220(03), NR 015-401, Technical report no. 19. Contract AF 18(603)-2, Technical report no. 1.

Nondestructive readout of multilevel magnetic memory, by R.L. Van Allen and C.B. House. U.S. Naval Research Laboratory. Feb 1958. 26p photo, diagrs, graphs. Order from OTS. 75 cents. PB 131475

An infinite-resolution method of reading the flux level in a magnetic core without destroying this flux level has been developed. The method employs solid-state devices and requires less than ten milliwatts supply during nondestructive interrogation, while standby power drain is in the microwatt range. The output information is in the form of an alternating waveform whose frequency is a function of the flux level of the storage core. Frequency ratios of 30:1 have been obtained. The flux level in turn is a function of either the current or the integrated voltage previously applied to the core. The transfer characteristics make the device suitable for application as a peak-current memory or as an events counter. A circuit for clearing and resetting a core in preparation for further information storage has been developed. NRL R 5071.

Non-mean-square error criterion for the synthesis of optimum sampled-data filters, by Arthur R. Bergen. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories, New York, N.Y. Nov 1956. 32p graphs. Order from LC. Mi $3.00, ph $6.30. PB 126360

This report presents a non-mean square error criterion for designing optimum linear finite memory filters for the continuous prediction and smoothing of sampled-data. It is suggested by and approximates a generalized tolerance criterion whose use, while desirable in many applications, is excessively complicated. The new criterion simplifies the design considerably for inputs which are the sampled sum of Gaussian noise and a non-stationary message consists of sections of finite duration having a polynomial variation with time alternating with arbitrary transitions. AD 110180. CU 5-56-AF-1572-EE. Contract AF 19(604)-1572. CUN ERL TR T-2/133. AF CRC TN 56-982.

NOTS-modified Askania cinetheodolite. U.S. Naval Ordnance Test Station, Inyokern, Calif. Oct 1953. 47p photos, drawings, table. Order from LC. Mi $3.30, ph $7.80. PB 126506

The Askania cinetheodolites Kth 41 brought to this country from Germany immediately after World War II were the most practical instruments available at NOTS for tracking and recording guided-missile flights. In order to adapt the instruments for this use and to improve over-all operating efficiency and accuracy, the Askanias have been under a continuous modification program at NOTS. The modifications of the instruments themselves constitute the main subject of this report. Also covered are the associated improvements, such as film processing changes and refinements of operational technique, which have increased the value of the instruments. NOTS 772. NAVORD 2066.

Tests on mercury-in-glass thermostats in circuit employed in model LD-2 equipment, by W.E. Bower. U.S. Naval Research Laboratory. Jan 1935. 11p table. Order from LC. Mi $2.40, ph $3.30. PB 132392

1. Thermostats — Tests 2. NRL R 1112

Simple analog computer for determination of the LaPlacian of a mapped quantity, by Seymour L. Hess. Florida State University. Dept. of Meteorology, Tallahassee, Fla. May 1956. 20p photo. Order from LC. Mi $2.40, ph $3.30. PB 126392

The determination of the LaPlacian of a mapped quantity, such as the geostrophic vorticity, is an important but a time consuming process. The common procedure involves a number of interpolations and an algebraic computation for each point at which the evaluation is made. A device is presented in which the slow process of interpolation is replaced by the faster and more reliable process of measurement of distance between isopleths of the mapped quantity, and the algebraic calculation is replaced by the rapid, automatic operation of a DC analog computer. The numerical result is presented as the deflection of a millivoltmeter. Contract Nonr-1600(00), NR 082-071, Technical report no. 7.

MACHINERY

Cold weather operation of diesel engines. See entry under Bibliography on page 248. PB 131492

MATHEMATICS AND STATISTICAL ANALYSIS

Application of Hilbert space methods to Lie groups on a differentiable manifold, by Jacqueline Lelong-Ferrand. Princeton University. Institute for Advanced Study, Princeton, N.J. Dec 1956.

6p. Order from LC. Mi $1.80, ph $1.80.
PB 126437

AD 115046. Project no. 47500. 1. Hilbert space (Mathematics) 2. Contract AF 18(600)-1109 3. AF OSR TN 57-14

Coordinates which uncouple the equations of motion of damped linear dynamic systems, by Kenneth A. Foss. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory. Mar 1956. 18p. Order from LC. Mi $2.40, ph $3.30. PB 124950

Orthogonality relations between the eigenvectors of damped linear dynamic systems with lumped parameters are derived; and from these relations coordinates are found in terms of which uncoupled equations of motion can be written. Methods are developed for determining transient stresses in terms of these coordinates. The present treatment is extended to systems involving transient damping and to continuous systems. Contract N5 ori-07833, NR 064-259. MIT ASRL TR 25-20.

Cycling, by I. Richard Savage. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Mar 1956. 27p graphs. Order from LC. Mi $2.70, ph $4.80. PB 126322

Whenever a large quantity of property is under the management of a single organization, a well devised plan for maintaining the quality and keeping accurate account of the property can lead to substantial savings. The purpose of this paper is to present several applications of mathematics to the solution of these "cycling" problems. The formulations given here are of the simplest possible kind. The treatment presented does seem worthwhile, however, for it suggests the outlines of solutions to real problems and the feasibility of approaching more complicated problems of this type. Contract N6 onr-25126, NR 042-002. SU AMSL TR 27.

Dynamic properties of linear decision rules in production planning, by John F. Muth. Carnegie Institute of Technology. Graduate School of Industrial Administration, Pittsburgh, Pa. May 1956. 23p. Order from LC. Mi $2.70, ph $4.80. PB 126553

This paper is concerned with derivation of an optimal decision rule from an integral representing the costs associated with adjustments in production to changing sales forecasts. The simple case examined allows some of the dynamic performance characteristics of the scheduling rules and the effects of errors in estimates and expectations to be examined in a relatively convenient manner. Contract Nonr-76001, NR 047-001. ONR RM 44.

Elastic solids of limited compressibility, by William Prager. Brown University. Division of Applied Mathematics, Providence, R.I. Aug 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 128123

The paper is concerned with the mechanics of an isotropic elastic solid the density of which cannot exceed a given critical value regardless of the pressure. As long as the density remains below this critical value, the stress-strain law contains two elastic constants, the shear modulus and the bulk modulus. At the pressure that corresponds to the critical density by this two-constant law the solid becomes incompressible; for higher pressures the stress-strain law contains only one elastic constant, the shear modulus. The general boundary value problem for this type of solid is formulated, the uniqueness of the solution is discussed, and associated extremum principles are established. Contract Nonr-562(10), NR 064-406. GDAM C 11-16. BU AM TR 16.

Final report under Contract N6 onr-248, NR 010-201, Task order VI. Syracuse University. Institute of Industrial Research. Dept. of Physics, Jun 1956. 12p. Order from LC. Mi $2.40, ph $3.30. PB 126401

This report summarizes work from 1949-1956 under this contract on research in the field of general relativity, with the principal emphasis on possible quantization of the theory. The program was analytical rather than speculative. A list of technical reports, journal publications, and personnel, is appended.

Fourier transforms, conformal mapping, entire functions, and asymptotic solutions of ordinary differential equations. Wisconsin. University. Dept. of Mathematics, Madison, Wis. Jun 1957. 3p. Order from LC. Mi $1.80, ph $1.80.
PB 126358

1. Equations, Differential 2. Mathematical functions 3. Fourier analysis 4. Transformations (Mathematics) 5. Contract N7 onr-285-07, T.O. 7

Functional integration and S-matrix theory, by James L. Anderson. Maryland. University. Physics Dept., College Park, Md. Jul 1955. 10p. Order from LC. Mi $1.80, ph $1.80.
PB 124498

Report covers work during the period 15 Apr-Jul 1955 under Contract Nonr-594(00), NR 017-610. 1. Quantum theory 2. Matrix theory 3. Mathematical functions 4. Equations, Integral 5. UM TR 15

Generalized equations and procedures for the calculation of detonation parameters. Case 1: Ideal gaseous mixtures, by Robert G. Dunn and Bernard T. Wolfson. U.S. Air Force. Air Re-

search and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1956. 111p graphs (part fold), tables (1 fold). Order from OTS. $3.00.
PB 121233

The calculation method developed is readily adaptable to computations by automatic computing machines as well as by manually-operated machines. Graphs of basic data are presented for use in the sample calculations, and it is believed that these data will find practical use in other applications as well. Project no. 3012, Task no. 70164. Appendix I. Calculation procedures. - Appendix II: Graphs of basic data: Equilibrium constants and molal heat capacities. - Appendix III. Sample calculation. - Appendix IV. Graphs. AF WADC TN 54-13.

Least eigenvalue of Hill's equation, by Richard A. Moore. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. Jan 1957. 19p. Order from LC. Mi $2.40, ph $3.30.
PB 126387

This paper exploits the close connection between the nonoscillation and periodicity of solutions of Hill's equation. For convenience this equation is written in the form: $y'' + (-a + b\ q(x))y = 0$, where a and b are real parameters, and q(x) is a real-valued, continuous, periodic function. AD 115087 For reports 8 and 10 - 12 under this Contract see PB 122419, 122424, 122425 and 123079. Contract AF 18(600)-1138, Technical report no. 14. AF OSR TN 57-48.

Mechanics of non-linear materials with memory, by A.E. Green and R.S. Rivlin. Brown University. Division of Applied Mathematics, Providence, R.I. Aug 1956. 70p. Order from LC. Mi $3.90, ph $10.80.
PB 128624

In this paper a general theory for the deformation of visco-elastic materials is developed which is an extension to the non-linear case of the Boltzmann-Volterra "memory" theory. A method for the formulation of rheological equations of state has been given by Oldroyd (1950) who suggested that the right invariance properties can most readily be recognized if the frame of reference is a coordinate system convected with the material. This report with modifications, makes use of some of Oldroyd's methods but adopts a somewhat different starting point which is more in line with the basic assumptions made by Rivlin and Ericksen (1955) in their work on stress deformation relations for isotropic materials. Contract Nonr-562(10), NR 064-406. GDAM C 11-17. BU AM TR 17.

Non locally connected spaces related to absolute neighborhood retracts and fixed point properties, by D.G. Bourgin. Illinois. University, Urbana, Ill. Jan 1957. 11p. Order from LC. Mi $2.40, ph $3.30.
PB 126670

AD 110400. 1. Statistical theory 2. Topology 3. Lefschetz number 4. Contract AF 18(603)-32 5. AF OSR TN 56-578

On the Harnack inequality for linear elliptic equations, by James Serrin. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jan 1956. 29p diagr. Order from LC. Mi $2.40, ph $4.80.
PB 126351

This study improves the results of Lichtenstein and Feller by materially hightening the smoothness properties required of the coefficients. Contract Nonr-225(11), NR-041086. SU AMSL TR 47.

On the relations governing the boundary values of analytic functions of two complex variables, by Hans Lewy. California. University. Dept. of Mathematics, Berkeley, Calif. Nov 1955. 5p. Order from LC. Mi $1.80, ph $1.80.
PB 124980

The report answers the question as to what further quantitative conditions the function μ must satisfy in order to serve as boundary value of the real part of a function z of class Z. Contract Nonr-222(25), NR 041-134, Technical report no. 4.

Preliminary report on methods for determining dynamic stability parameters from free-flight tests, by Robert S. Swanson and N. Mastrocola. U.S. Naval Air Missile Test Center, Point Mugu, Calif. Sep 1949. 120p diagrs, graph, table. Order from LC. Mi $6.00, ph $18.30.
PB 126651

A survey was made of the various test and analysis methods now used to determine aircraft stability parameters from dynamic free-flight tests. Further analysis by the authors resulted in the formulation of a general philosophy of analysis methods for dynamic free-flight tests which should materially assist in the unification and correlation of the various testing techniques. It should be emphasized, however, that the methods discussed are relatively new and untried, and therefore this report is to be considered a preliminary edition, subject to further study and later experimental verification. Project TED MTC DE 302. NAMTC TR 58.

Relation of fourth to second moments in stationary homogeneous hydromagnetic turbulence, by Robert H. Kraichnan. New York University. Institute of Mathematical Science. Division of Electromagnetic Research, New York, N.Y. Jan 1957. 19p. Order from LC. Mi $2.40, ph $3.30.
PB 126648

The hypothesis that the fourth moments of the field amplitude distribution are related to the second moments as in a normal distribution is examined to determine whether it is consistent with the equations of motion for stationary, homogeneous, and incom-

pressible hydromagnetic turbulence. The results obtained are discussed in relation to a recent theory of turbulence formulated by Chandrasekhar. AD 110277. Contract AF 19(604)-2138. NYU RR MH-6. AF CRC TN 57-261.

Remarks on a uniqueness theorem for closed surfaces, by Philip Hartman. Johns Hopkins University. Dept. of Mathematics, Baltimore, Md. Dec 1956. 8p. Order from LC. Mi $1.80, ph $1.80. PB 126436

AD 115016. 1. Surfaces (Mathematics) - Theory 2. Elliptic functions 3. Equations, Differential 4. Contract AF 18(603)-41, Technical report no. 3 5. AF OSR TN 56-589

Response of a linear decision rule to sinusoidal sales, and accuracy requirements for estimates of the cost parameters, by Clyde E. Roberson, Charles C. Holt and Franco Modigliani. Carnegie Institute of Technology. Graduate School of Industrial Administration, Pittsburgh, Pa. Jul 1955. 24p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124782

1. Prediction - Theory 2. Sales - Fluctuations - Theory 3. Cost of production - Estimates 4. Contract Nonr-76001, NR 047001 5. ONR RM 32

Solution of the steady-state heat conduction equation with chemical reaction for the hollow cylinder, by J.W. Enig. U.S. Naval Ordnance Laboratory, White Oak, Md. Apr 1956. 15p tables (1 fold). Order from LC. Mi $2.40, ph $3.30. PB 126764

The non-linear steady-state heat conduction equation which arises in the theory of thermal explosions, was solved by Frank-Kamenetsky for the case of the semi-infinite slab, and by Chambre for the solid cylinder and sphere geometries. Solutions for the case of the hollow cylinder are presented and it is shown that from these, the slab and solid cylinder solutions can be deduced as special cases. The design of large rocket grains, where self-heating may result in "spontaneous" ignition during manufacture or storage, is considered. NAVORD 4267.

Some modifications of the Lieberman-Soloman multilevel continuous sampling plan, MLP, by George J. Resnikoff. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Feb 1956. 18p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125577

1. Statistical theory 2. Sampling (Statistics) - Theory 3. Manufactures - Inspection - Methods 4. Contract N6onr-25126, NR 042-002 5. SU AMSL TR 26

Studies in eigenvalue problems: Characterization of positive reproducing kernels. Applications to Green's functions, by N. Aronszajn and K.T. Smith. Kansas. University. Dept. of Mathematics, Lawrence, Kan. 1956. 19p. Order from LC. Mi $2.40, ph $3.30. PB 126390

The object of this paper is to prove a theorem which characterizes the proper functional Hilbert spaces whose reproducing kernels are positive. Since certain Green's functions are among the most important examples of reproducing kernels, it is natural that the general theorem leads to results about the positiveness of Green's functions. For reports nos. 10 - 14 under this Contract see PB 119077 - 119079, 119088 and 119214. Contract Nonr-58304, Technical report no. 15.

Tables for the calculation of Coulomb wave functions, by Frank S. Ham. Harvard University. Cruft Laboratory, Cambridge, Mass. Sep 1955. 88p tables. Order from LC. Mi $4.80, ph $13.80. PB 126328

1. Tables, Mathematical 2. Coulomb functions
3. Contract N5 ori-76, T.O. 1, NR 372-012
4. HU CL TR 204

Theorem about systems of linear equations, by Pedro Braumann. Stanford University. Dept. of Statistics, Stanford, Calif. Oct 1955. 13p. Order from LC. Mi $2.40, ph $3.30. PB 126345

Technical report 36. Foreign Operations Administration Project: TA 01-101-3006 (OEEC-151).
1. Mathematical research 2. Equations, Linear
3. Contract N6 onr-251 (T.O. III), NR 042-993
4. SU DS TR 36

Tightened multi-level continuous sampling plans, by C. Derman, S. Littauer and H. Solomon. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jun 1956. 18p. Order from LC. Mi $2.40, ph $3.30. PB 126362

Industrial needs have provoked some recent studies on continuous sampling. This procedure is especially of interest when the formation of inspection lots for lot-by-lot acceptance may be impractical or artificial as in conveyor line production or there is an important need for rectifying quality of product as it is manufactured. Contract N6 onr-25126, NR 042-002. SU AMSL TR 28.

Topology of almost uniform convergence, by John W. Brace. Maryland. University. Dept. of Mathematics, College Park, Md. Dec 1956. 28p. Order from LC. Mi $2.70, ph $4.80. PB 126435

1. Topology 2. Mathematical functions 3. Convergence (Mathematics) 4. Contract AF 18(603)-78 5. AF OSR TN 56-595

Two-dimensional Hilbert transforms, by R.J. Duffin. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. May 1956. 13p. Order from LC. Mi $2.40, ph $3.30. PB 126354

Fourier transforms, Abel summability, Poisson's integral, Cauchy's integral, conjugate harmonic functions, and Hilbert transforms are topics which are known to have a natural relationship. In this paper each of these topics is considered in one higher dimension. For example, the notion of a pair of conjugate harmonic functions in three variables is introduced by a suitable generalization of the Cauchy-Riemann equations. It is found that the same relationships are maintained between the six topics after they are so generalized. Dept. of the Army project no. 599-01-004. ORD no. TB2-0001. OOR project no. 223. CIT-ORD-6D-TR 28. Contract DA - 36-061-ord-490. CAR M TR 28.

Visco-elastic stress analysis, by J.R.M. Radok. Brown University. Division of Applied Mathematics, Providence, R.I. Feb 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 126547

In his paper on stress analysis in visco-elastic bodies, E.H. Lee bases his reasoning on the concept of an associated elastic problem to which a visco-elastic problem reduces after removal of its time dependence by application of the Laplace transform. It is the purpose of this paper to extend the applicability of Lee's method to problems of the above type and to show that the apparent restriction is due to the process by which Lee deduced his method, in particular, due to the concept of the associated elastic problem. Contract Nonr-562(10), NR 064406. Technical report no. 8. GDAM C11-8. BU AM TR 8.

MEDICAL RESEARCH AND PRACTICE

Enzymatic regulation of iodine metabolism in the thyroid. Annual progress report for period 1 Jun - 20 Dec 1955 under Contract Nonr-441: FHQ:mrl, by Arthur W. Wase and Nancy Inforzato. Hahnemann Medical College, Philadelphia, Pa. Dec 1955. 2p. Order from LC. Mi $1.80, ph $1.80. PB 124622

1. Thyroid - Metabolism 2. Contract Nonr-441, NR 115-383

Handbook of first aid treatment for survivors of disasters at sea. U.S. Bureau of Medicine and Surgery. Apr 1943. 22p photos. Order from LC. Mi $2.70, ph $4.80. PB 127862

1. First aid - Manuals 2. NAVMED 153

METALS AND METAL PRODUCTS

Aluminum powder metallurgy, by F.V. Lenel, A.B. Baskensto, and M.V. Rose. Rensselaer Polytechnic Institute, Troy, N.Y. Jun 1955. 85p drawings, tables, graphs, Order from OTS. $2.25. PB 121136

The procedures used at Rensselaer Polytechnic Institute in producing aluminum powder extrusions from flake aluminum pigment powders and from atomized powders are described. From tests of powder properties and mechanical properties of the extrusions, it was found that the yield strength at room temperature and at 400°C increased directly with the square root of the reciprocal of the average flake thickness and that the weight per cent of oxide was not as important as the flake thickness in strengthening these extrusions. The properties of these extrusions have also been compared with the properties of extrusions which were produced by Aluminium Industrie Aktien-Gesellschaft and Aluminum Company of America and which were tested at Rensselaer. Project no. 7351, Task no. 70608. Contract AF 33(616)-351. AF WADC TR 55-110.

Bending of coated zinc crystals, by L.C. Weiner. Columbia University. School of Engineering. Mechanical Metallurgy Laboratories, New York, N.Y. Aug 1957. 5p. Order from LC. Mi $1.80, ph $1.80. PB 126293

AD 136551. 1. Crystals, Zinc - Bending 2. Contract AF 18(600)-898 3. AF OSR TN 57-560

Coiled stainless steel tubing. Martin Company, Baltimore, Md. Contract AF 33(616)-3464. Project 1371, Task 13497. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Test results, by Joseph J. Chmura, Jr., Ronald D. Stouffer and Albert N. Winter. Dec 1957. 135p photos, diagrs, graphs, tables. $2.75. PB 131719

Tests were conducted on specimens of coiled stainless steel tubing and torsional tubes to determine the validity of the theoretical analysis of stresses and deformations arising from pressure and mechanical flexure. A manual for the design of coiled stainless steel tubing for use in aircraft hydraulic and pneumatic systems was prepared and based on the test

data. (See PB 131720). AD 142251. Covers work from May 1956-Jul 1957 . AF WADC TR 57-507, Part I.

Part II: Design manual, by Ronald A. Stouffer, James T. Hudson and Louis F. Freitag. Dec 1957. 45p diagrs, graphs, tables. $1.25. PB 131720

This Design Manual is to assist and instruct designers in using plain metal tubing to solve problems requiring flexibility or relative motion in plumbing for aircraft hydraulic and pneumatic systems. Two series of standard configurations of tubing which provide great flexibility are presented along with instructions and limitations for their applications or installations. The manual also covers variations from the standards using simple elements to build up any configuration desired or necessitated by particular installation requirements. The manual presents analytical procedures for evaluating any configuration with respect to structural limitations. AD 142253. Covers work from May 1956-Jul 1957. AF WADC TR 57-507, Part II.

Delayed yielding in a substitutional solid solution alloy, by L. A. Shepard and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Feb 1956. 36p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 125561

This investigation was initiated in an attempt to uncover the effects of temperature and stress on the delayed yielding arising for substitutional locking of dislocations in the face-centered cubic system. Specimens of an aluminum alloy containing 2% magnesium were prestrained to 25,000 psi at 78°K and then aged for 15 minutes at 273°K in order to develop a pronounced yield point at 78°K. Delayed yielding tests were performed at 78°K and 114°K at a series of constant stresses below the upper yield point observed in a tensile test. The delay time for yielding was found to depend on the product of two separable functions of stress and temperature. This observation is in disagreement with the predictions based on thermal activation of interstitially locked dislocations according to the Cottrell and Bilby and the Fisher models. Contract N7 onr-295, T.O. II, NR 031-048. Technical report no. 45. UC IER Series 22, Issue 45.

Determination of the tensile, compressive and bearing properties of ferrous and nonferrous structural sheet materials at elevated temperatures, by Donald E. Miller. Armour Research Foundation, Chicago, Ill. Dec 1957. 103p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.50. PB 131595

To provide data for the establishment of design criteria, the compressive and bearing properties of six aluminum alloys, three magnesium alloys, two titanium alloys, two stainless steels, and one alloy steel have been determined at elevated temperatures. Tensile data were also obtained for all materials except the stainless steels. Each material was tested at several temperatures. Test specimens, equipment, and procedures are described in detail, and test results are presented in both tabular and graphical form. AD 142218. Project 7360, Task 73605. Covers work from Jun 1956-Jul 1956 under Contract AF 33(616)-3145. ARF Project K 091 (formerly M 075). AF TR 6517, Part 5.

Determination of tensile, compressive, bearing and shear properties of ferrous and non-ferrous structural sheet metals at elevated temperatures, by John V. Melonas and J. Robert Kattus. Southern Research Institute, Birmingham, Ala. Sep 1957. 308p photos, drawing, diagrs, graphs, tables. Order from OTS. $6.50. PB 131461

The tensile, compressive, bearing, and shear properties of the following sheet metals were determined at various temperatures after exposure times of from 1/2 to 1000 hours at the test temperature: 1. AISI-4130 alloy steel, 150,000 psi nominal strength level; 2. AISI-4130 alloy steel, 180,000 psi nominal strength level; 3. AISI-4130 alloy steel, 200,000 psi nominal strength level; 4. A110-AT titanium alloy; 5. HK 31-H24 magnesium alloy; 6. Type 301 stainless steel, full-hard. The magnesium alloy was tested over a temperature range from 75°F to 600°F, whereas the other test metals were tested at temperatures up to 1000°F. AD 131069. Project 7360, Task 73605. Covers work from Jan 1955-Mar 1956 under Contract AF 33(616)-3224. Contract AF 33(616)-2741. AF WADC TR 56-340.

Effects of temperature-time-stress histories on the mechanical properties of aircraft structural metallic materials. Part I: Temperature-time studies for 2024-T3 and 7075-T6 alclad sheet, by Robert E. Fortney and Charles H. Avery. Northrop Aircraft, Inc., Hawthorne, Calif. Sep 1957. 214p photos, diagrs, graphs, tables. Order from OTS. $5.50. PB 131520

In order to establish realistic design criteria applicable to aerodynamically heated materials and their complex combinations of temperature, time and stress exposure and inspection criteria for materials after exposure to complex service conditions, the tensile properties of 2024-T3 alclad and 7075-T6 alclad sheet were determined at room temperature, 200, 300, and 400°F after single and sequential multiple exposure in the range 250 through 600°F. In addition, the Rockwell hardness properties at room temperature after the above exposure conditions were determined to provide a basis for inspection of aircraft after service exposure to aerodynamic or engine heating. Five tensile properties were determined for each exposure and test condition. Three of these, the proportional limit, modulus of elasticity, and percent elongation were

tabulated and graphed in a non-dimensional form to generalize the data with respect to test material variability. Since the yield and ultimate strengths determine the load carrying ability, these tensile properties were analyzed carefully and generalizations with respect to exposure temperature and time testing temperature were accomplished. Statistical calculations were made to determine the accuracy of the various analyses. Material, equipment, specimens and procedures are described in detail. Test results are presented in the form of tables and curves to illustrate the effect of the exposure and test conditions on the materials under investigation and the effect of normalization analyses on the generalization of the data. AD 142007. Report NAI 57-679. Project 7360, Task 73605. Covers work from Jun 1955 - Dec 1956 under Contract AF 33(616)-3028. AF WADC TR 56-585, Part I.

Engineering application of the absolute rate theory to the creep of cast magnesium, by Mervin B. Hogan. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Apr 1955. 46p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126152

The results of the analysis of various experimental data pertaining to the creep of several cast magnesium alloys are reported here. These data were analyzed in terms of a four-element mechanical model as an analogue, in conjunction with the absolute rate theory. Contract N7onr-45101, NR 032-168. UU ISRP TR 47.

Hydrogen contamination of titanium and titanium alloys. Part IV: Effect of hydrogen on the mechanical properties and control of hydrogen in titanium alloys, by O.N. Williams, F.R. Schwartzberg, P.R. Wilson, W.M. Albrecht, M.W. Mallett and R.I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Sep 1957. 238p photos, graphs, tables. Order from OTS. $5.50. PB 131516

A comprehensive investigation of hydrogen in titanium alloys was carried out. Tests were conducted to gain an insight into the mechanism of the slow-strain embrittlement of titanium alloys by hydrogen, and a tentative theory is presented. Eighty titanium alloys were examined in the stabilized condition to determine the effect of composition on the tendency toward hydrogen embrittlement. The effect of microstructural variations on the tendency toward embrittlement was also studied. In addition to studying the effects of hydrogen on the properties of titanium, factors affecting hydrogen pickup by titanium, and methods of removing hydrogen from titanium were investigated. Included were investigations of low pressure solubility, degassing methods, and the pickup of hydrogen from various atmospheres. Project no. 7351. Covers work from Dec 1954 to Mar 1957 under Contract AF 33(616)-2813. For Parts 1-3 see PB 111620, 121761 and 121786. AF WADC TR 54-616, Part 4.

Investigation of the effects of incongruous elements and the interaction effects of these elements on high temperature strength of Fe-Co-Ni-Cr alloys, by J.H. Sye, T.L. Robertshaw and F.M. Richmond. Universal-Cyclops Steel Corporation. Research and Development Dept., Bridgeville, Pa. Dec 1957. 111p photos, diagrs, graphs, tables. Order from OTS. $2.50. PB 131614

An investigation was made of the effect of five combinations of incongruous elements on the high temperature properties of vacuum melted alloys with a base composition of 60 atomic % Nic, 20 atomic % Cr, 10 atomic % Fe, 10 atomic % Co. Balanced experimental designs were used for each group. The value and limitations of balanced experimental designs are discussed. A metallographic study of cast and wrought alloys is appended. AD 142237. Project 7351, Task 73512. Covers work from Feb 29, 1956-Jun 30, 1957 under Contract AF 33(616)-2777. AF WADC TR 57-426.

M emission bands of the transition metals in the solid state, by E. Michael Gyorgy. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. May 1953. 36p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126334

The vacuum spectrograph used by R.H. Kinston for the study of the emission bands of potassium and calcium has been used, with minor modification, for the study of some of the iron group transition elements. The spectrograph employs the grazing-incidence Rowland mounting with a movable photodetector which measures the intensity of radiation in the range from 50A to 800A. The metals considered are copper, nickel, iron, manganese, and chromium. The spectra discussed here are produced by transitions of valence electrons into the excited $3P_{3/2, 1/2}$ states of the atom. Based on a thesis, Massachusetts Institute of Technology, 1953. Signal Corps project no. 8-102B-0. Dept. of the Army project no. 3-99-10-022. MIT RLE TR 254.

Magnesium alloys with high melting point additions, by R.R. Nash, H.K. Adams, Jr., A.E. Bibb, Jr., M. C. Huffstutler and E.J. Tulloch. Rensselaer Polytechnic Institute, Troy, N.Y. Mar 1957. 197p photos, drawings, tables. Order from OTS. $5.00. PB 131198

An exploratory investigation was made to determine the alloying characteristics and the influence on microstructures, mechanical properties and resistance to corrosion of small additions of titanium, hafnium, tantalum, nickel, cobalt, vanadium, boron, chromium, yttrium, rhenium, niobium, tungsten and molybdenum to magnesium and molybdenum to magnesium and to selected magnesium-base alloys. A potentially attractive method for the pronounced grain refinement of as-cast structure of magnesium um-base alloys was found. AD 118122. Project 7351, Task 73514. Covers work from 1 Feb 1954-31 Jan 1955 under Contract AF 33(616)-2312. AF WADC TR 55-207.

On the effect of loading on the hazard of fracture due to stress corrosion (Über den einfluss der beanspruchung auf die bruchgefahr durch spannungs-korrosion), by Kurt Matthaes. Translated and edited by F.A. Raven. Dec 1956. 52p photos, drawings, graphs. Order from LC. Mi $3.60, ph $9.30. PB 126318

Discusses corrosion fractures as a source of material failures, structural materials sensitive to stress corrosion, effect of mechanical and chemical loading, stress and life span, limit stress, time strength, damage due to cracks, local stress increase and hazard of fracture, effect of alternating loading, danger of fracture in the case of normal and shear stress. Translated from Metallforschung, vol. 2, Jul-Aug 1947, p. 213-225. STS 253. NAVSHIPS T 625.

Problems encountered in a study of the beryllium-chromium system, by George H. Schippereit. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. May 1948. 5p photos. Order from LC. Mi $1.80, ph $1.80. PB 127951

1. Beryllium-chromium alloys - Production 2. Project Squid 3. PIB AL 120 4. Contract N6 ori-98, T.O. II, NR 220-039 5. PIB TM 1

Research and development of wrought and cast high temperature alloys, by R.R. MacFarlane, R.S. DeFries, E.E. Reynolds and W.W. Dyrkacz. Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. Oct 1954. 98p photos, drawings, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 129969

Study of wrought and cast Co-base and Fe-base alloys was conducted with the object of development of better high-temperature alloys having a minimum strategic alloy content. An alloy containing 10 Ni, 10 Cr, 10 W, 5 Mo, and 1 Cb+Ta was outstanding in rupture properties for the wrought Co-base alloys at 1500° to 1700°F. An 18 Mn, 12 Cr, 3 Mo, .8 V alloy had a good combination of properties for application at 1200°F for the wrought Fe-base alloys. Thermal shock properties were best for the cast alloys containing the highest Co. No correlation was apparent between thermal shock characteristics and other commonly measured properties. AD 58695. Project 7351, Task 73512 and 73515. Contract AF 18(600)-149, Supplemental agreement S2(53-823). AF WADC TR 54-276.

Research on the effects of gaseous impurities in metals and alloys. Final report, by James H. Moore and Noble E. Hamilton. National Research Corporation, Cambridge, Mass. Apr 1951. 136f photos, diagrs, graphs, tables. Order from LC. Mi $6.90, enl pr $22.80. PB 132436

Procedures were worked out for preparing high purity metals and for the introduction of varying amounts of gaseous impurities. Precision cast specimens were subjected to stress-rupture tests under various load and temperature conditions to establish stress to rupture curves. Increased oxygen content was found to have no clear effect on rupture life of cobalt, iron-13% chromium alloy or cobalt-20% chromium alloy. Oxygen appeared associated with shift to intercrystalline fracture. In iron, increased oxygen apparently caused first a decrease and then an increase in strength. Nickel-20% chromium showed a definite decrease in rupture life with increased oxygen content, at both high and low carbon contents. In iron increased nitrogen content has a detrimental effect on rupture life. Hydrogen appeared to have no effect in nickel, iron and Nichrome. O.O. project TB-101. Contract DA 19-020-ORD-3, Final report. WAL R 310/88-37.

Resistivity of interstitial atoms and vacancies in copper, by A.W. Overhauser and R.L. Gorman. Cornell University. Dept. of Physics, Ithaca, N.Y. Jan 1956. 22p. Order from LC. Mi $2.70, ph $4.80. PB 126169

1. Copper - Resistivity 2. Copper - Molecular structure 3. Contract N6 ori-91, Task 11 4. ONR TR 20

Separation of tantalum-columbium by solvent extraction, by K.B. Higbie and J.R. Wearing. U.S. Bureau of Mines. Jul 1956. 53p photo, graphs, tables. Order from U.S. Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. PB 126958

The quantitative separation of tantalum from columbium has been obtained through several liquid-liquid extraction processes. The valuable metals are separated by selective extraction from organic feed solution using a mineral acid or by selective extraction from aqueous feed solutions employing an organic solvent. The greatest degree of separation was obtained when organic ketones, particularly methyl isobutyl ketone, were used. Utilization of low-grade concentrates is indicated by the successful extraction and separation of the tantalum and columbium content in the Geomines tin slag. The ratio of the two metals in the source material does not appear to be a restricting factor in the separation. BM RI 5239.

Statistical rate theory of metals. II: Application to tensile properties, by Jay W. Fredrickson, H.K. Zimmerman and Henry Eyring. Utah. University. College of Mines and Mineral Industries, Salt Lake City, Utah. Mar 1949. 27p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 130254

Plastic flow is assumed to proceed by the movement of domains of material barriers from one equilibrium position to another. Certain equations involving the free energy of activation are developed on the basis of the Reaction Rate Theory to account for the deformation of metals in tension. These equations are used to analyze published tensile data. A quali-

tative comparison is made between the mechanism of metals stressed in tension and metals stressed at constant load, or creep. AD 210135. Part I issued as A.I.M.E. Technical paper 2423 (1948). Contract N7 onr-451 (T.O.I.), NR 032-168, Technical report no. 7.

Stress corrosion of heat resistant alloys at elevated temperatures, by I. Perlmutter. U.S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, O. Nov 1947. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126465

Data obtained on various high temperature alloys with the stress corrosion furnace built by the Ethyl Corporation are evaluated. Some 40 materials (16 forged steels, 17 forged alloys, and 7 cast alloys) were tested at 1200°F maximum and 1500°F maximum, under oxidizing and reducing conditions. The steels were much stronger under reducing than under oxidizing conditions, both at 1200°F and 1500°F maximum. At 1500°F maximum all the forged alloys exhibited higher stress-rupture properties in a reducing atmosphere, with the low chromium alloys generally showing the greatest susceptibility to oxidizing corrosion. At 1200°F maximum the higher chromium (20% chromium) alloys were generally slightly stronger under an oxidizing atmosphere. Whereas the lower chromium (13-15%) materials were much stronger in reducing atmosphere. AD 31332. AF TSEAM M 5355. AF TR 5649.

Study of the metallurgical properties that are necessary for satisfactory bearing performance and the development of improved bearing alloys for service up to 1000 F., by Gopal K. Bhat and Alvin E. Nehrenberg. Crucible Steel Company of America, Pittsburgh, Pa. Nov 1957. 74p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.00. PB 131609

The use of bearings made from hot work steels and other tool steels in experimental engines has resulted in a few premature engine failures. Unfortunately, very little has been known about the elevated temperature properties such as hot hardness, compressive yield strength, resistance to softening and structural and dimensional stability of these hot work and other tool steels. This report describes the work done to obtain these material properties for 29 steels ranging in type from SAE 52100, its modifications, to hot work and other tool steels. AD 142117. Project 7351, Task 73512. Covers work from 1 Jan 1956-31 Mar 1957 under Contract AF 33(616)-3318, Phase 2. AF WADC TR 57-343.

Survey of refractory compounds and metallic binders, by Robert H. Witt and Otto H. Henry. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. May 1948. 78p photos, tables. Order from LC. Mi $4.50, ph $12.30. PB 127958

This study is limited to (1) a review of the literature, (2) experimentation on the wettability of various refractory metals on tungsten carbide, titanium carbide and tantalum carbide, and (3) development of a method to survey quickly the possible combinations of carbide-metal. In addition, a supplementary bibliography is appended covering papers published after the completion of this survey. Project Squid. Contract N6 ori-98, T.O. II, NR 220-040. PIB AL 157. PIB TM-13.

Tensile properties of aircraft-structural metals at various rates of loading after rapid heating, by William P. Roe and J. Robert Kattus. Southern Research Institute, Birmingham, Ala. Sep 1957. 96p photos, diagrs, graphs, tables. Order from OTS. $2.50. PB 131511

The purpose of the present phase of this program was to determine the effects of variations in strain rate and holding time at temperature on the tensile properties of several aircraft-structural metals after they had been heated within 10 sec to test temperatures approaching the melting points of the alloys involved. Major emphasis was placed on an accurate determination of these effects on the ultimate tensile strength and 0, 2%-offset yield strength. The modulus of elasticity, percent elongation, and proportional limit were determined with less accuracy as by-products of the data for the purpose of establishing trends. This investigation covered strain rates from 0.00005 in./in./ sec to 1.0 in./in./sec, holding times at test temperature from 10 sec to 1800 sec, and the following sheet materials over the range of test temperatures indicated: annealed Stellite-25, 1600°F -2250°F; heat-treated Inconel-X, 1600°F - 2250°F; full-hard 301 stainless steel, 1600°F – 2250°F; annealed Al 10-AT titanium alloy 1200°F - 2700°F; Alclad 2024-T3 aluminum alloy, 800°F - 900°F. AD 142003. Project 7360, Task 73605. Covers work from Oct 1956- Apr 1957 under Contract AF 33(616)-424. For Parts 1-2 see PB 121137 and 121812. AF WADC TR 55-199, Part 3.

Tensile properties of Inconel and RS-120 titanium-alloy sheet under rapid-heating and constant-temperature conditions. by George J. Heimerl, Ivo M. Kurg and John E. Inge. U.S. National Advisory Committee for Aeronautics. Jul 1956. 29p photo, drawing, graphs, tables. Order as TN 3731 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 123687

Results are presented of rapid-heating tests to determine the tensile strength of Inconel and RS-120 titanium-alloy sheet heated to failure at uniform temperature rates from 0.2°F to 100° F per second under constant load conditions. Yield and rupture stresses, obtained by rapid heating, are compared with yield and ultimate stresses from elevated-temperature tensile stress-strain tests for 1/2-hour exposure. The applicability of master curves and temperature-rate parameters to the predication

of yield and rupture stresses and temperatures under rapid-heating conditions was investigated. NACA TN 3731.

Torsional properties of steel at high rates of strain, by Paul G. Jones and Thomas Dolan. Illinois. University. Engineering Experiment Station, Urbana, Ill. Feb 1957. 25p photos, drawings, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126222

An experimental study was made to determine the effects of strain rate, temperature, type of notch, and size of specimen on four steels tested in torsion. Torque, angle of twist, and time were continuously recorded and torsional properties were determined. A study was also made of the energy conditions governing the onset of unstable fracturing. ILU EES B 438.

METEOROLOGY AND CLIMATOLOGY

Bibliography of ice and frost control. See entry under Bibliography on page 248.

Calculation of the radiation fields of whistling atmospherics, by R.M. Golden, R.S. Macmillan, R. Nathan and W.V.T. Rusch. California Institute of Technology. Electrical Engineering Dept., Pasadena, Calif. Jul 1956. 43p diagr, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 126595

It is the purpose of this paper to calculate the amount of input power to the antenna needed to produce a detectable echo. In order to accomplish this, it was necessary to consider the initial lightning discharge radiation fields and the mechanism by which these fields were drawn out into the dispersed whistler fields. Analysis of the VLF antenna had previously been carried out by one of the authors. The results of this earlier analysis have been employed in this paper when it was necessary to consider the efficiency and radiation characteristics of the antenna. AD 115042. Contract AF 18 (600)-1522, Technical report no. 1. AF OSR TN 57-10.

Comparison of relative vorticities computed from geostrophic and observed winds, by Roy E. Peterson. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography, New York, N.Y. Mar 1956. 50p maps, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126349

In the first study an assumption was made of linear wind variation, such that observed vorticity on a 600 km scale was assumed to be representative of the 300 km scale on which the geostrophic vorticity was computed. Poor agreement indicated this assumption to be erroneous. The second study based upon 600 km observed vorticity of 300 km and 600 km scale geostrophic vorticity. This indicated importance of grid size in computations, with small though significant differences. Project Scud. Contract N onr-285(09), Technical paper no. 5.

Cosmic ray intensity at high altitudes on 23 Feb 1956, by J.A. Van Allen and C.E. McIlwain. Iowa State University. Physics Dept., Iowa City, Ia. Mar 1956. 8p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 126320

A balloon flight of a single Geiger tube was made on February 23, 1956. The apparatus consisted of a single Victoreen 1B85 Geiger tube of calibrated effective length and a radio transmitter, all housed in a pressure-tight aluminum shell of wall thickness 0.032". Jointly supported by the National Science Foundation, the Office of Naval Research and the Atomic Energy Commission. SUI 56-5.

Heat balance of the earth's surface (Teplovoi valans zemnoi poverkhnosti), by M.I. Budyko. Translated by Nina A. Stephanova, Office of Climatology, U.S. Weather Bureau. 1958. 264p maps. Order from OTS. $4.00. PB 131692

Russian text published in Leningrad by Gidrometeorologicheskoe Izdatel'stvo, 1956. The monograph summarizes the results of investigations in heat balance climatology of the earth's surface. Various methods for determining the components of the heat balance are analyzed and systematized. Data on geographical distribution of all components of the heat balance and of their annual and diurnal variations are presented. Applications of the heat balance climatology to various problems of physical geography, agrometeorology, and hydrology are interpreted. The utilization of heat balance data for the analysis of meteorological effectiveness of ameliorative measures is investigated. This monograph can be used by scientists, aspirants and students, who are working in fields of climatology, meteorology, land geography, and oceanography, and also, by scientists and practitioners in other professions who might be interested in problems of the transformation of solar energy on the earth's surface.

Measurements of radiation from Venus at 3.15-cm wavelength, by C.H. Mayer, T.P. McCullough and R.M. Sloanaker. U.S. Naval Research Laboratory. Sep 1957. 12p graphs. Order from LC. Mi $2.40, ph $3.30. PB 128721

The observations of radiation from Venus at 3.15-cm wavelength on 34 days in May and June 1956 are described. The apparent blackbody temperature for Venus derived from the measurements changed from about 620 $\pm$110°K (mean error) in early May

to about 560 $\pm$73°K (mean error) near inferior conjunction. Two single observations at 9.4-cm wavelength are described which suggest that the radiation follows a thermal spectrum. NRL R 4998.

Mobile meteorological recording van, by Boyd L. Blanthorn. U.S. Dugway Proving Ground. Technical Services Division, Utah. Dec 1955. 35p photos, drawings, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 127981

The three main parameters to be measured are: wind speed, wind direction, and temperature; they are measured on a wind velocity head, wind direction head, and a thermocouple, respectively. The mobile van, which is wired for a plug-in cable, eleminates costly duplication of equipment at the various grids. Developmental report no. 13.

On principal shortcomings of the geostrophic approximation and the introduction of ageostrophic wind components, by G. Hollmann. Germany. Wetterdienst, Frankfurt/Main, Ger. n.d. 17p. Order from LC. Mi $2.40, ph $3.30. PB 126714

It is shown that only a strongly simplified form of the vorticity equation is consistent with the geostrophic approximation, whereby a quantitatively sufficient prediction of baroclinic developments is guaranteed only for field distributions of small amplitudes. It is concluded that in order not to achieve a statement contrary to the energy principle the horizontal variation of hydrostatic stability has to be omitted when applying the geostrophic approximation. Some critical remarks are included on attempts to establish non-geostrophic theories on encountering ageostrophic wind components only partially. AD 110245. Numerical weather prediction project. Contract AF 61(514)-735C, Technical note no. 4. AF CRC TN 56-882.

Rainfall drop size-distribution and radar reflectivity, by Douglas M.A. Jones. Illinois. State Water Survey. Meteorologic Laboratory, Urbana, Ill. Apr 1956. 39p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126668

This report contains the results of a two-year study on the size and number of raindrops as observed in central Illinois. The raindrop samples have been classified as to the rainfall type which produced the raindrops. Dept. of the Army project 3-99-07-002. Signal Corps project 172B. Contract DA 36-039-sc-64723, Research report no. 6.

Statistical study of aircraft icing probabilities at the 700 - and 500 - millibar levels over ocean areas in the Northern hemisphere, by Porter J. Perkins, William Lewis and Donald R. Mulholland. U.S. National Advisory Committee for Aeronautics. May 1957. 31p graphs, tables. Order as TN 3984 from The National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 126098

A statistical study is made of icing observations reported from weather reconnaissance aircraft flown by Air Weather Service (USAF). Wide areas of the Pacific, Atlantic, and Arctic Oceans were surveyed at fixed flight levels of 500 mb (18,000 ft) and 700 mb (10,000 ft). Icing statistics presented include the relative frequencies of the occurrence of icing, the estimated probability of flight in icing, and the relation of these probabilities to the frequencies of flight in clouds and cloud temperatures. NACA TN 3984.

Study of the near infrared solar and terrestrial radiation as a function of altitude above the earth's surface. Final report under Contract AF 19(604)-1005, by David G. Murcray. Denver. University. Dept. of Physics, Denver, Colo. Feb 1957. 8p. Order from LC. Mi $1.80, ph $1.80. PB 126366

This report summarizes the results obtained in an experimental study of the absorption of infrared solar radiation by the atmosphere and its variation with atmospheric conditions and altitude. In this study the emphasis is on altitude variation investigated by use of a balloon-borne spectrometer. AD 117170. Contract AF 19(604)-1005, Final report. AF CRC TR 57-266.

Thermal radiation of the moon at 0.86-cm wavelength, by J.E. Gibson. U.S. Naval Research Laboratory. Aug 1957. 24p photo, drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127884

Measurements of microwave radiation of the moon as a function of lunar phase were conducted to investigate further the variation in apparent temperature first reported by Piddington and Minnett at 1.25-cm wavelength. Observations of two total lunar eclipses showed that little if any change in lunar radio brightness occurs during the short period of an eclipse. Comparison of these experimental results with calculations by Jaeger suggests that the lunar surface is composed mainly of a fine dust layer of at least two or three centimeters average depth and which has very low thermal conductivity. The effect of variation in lunar brightness on the pointing accuracy of a radio sextant is considered, and estimates are given of the required correction under certain conditions. NRL R 4984.

Acoustic relaxation effect in Mn_3O_4, by M.E. Fine and Charles Chiou. Northwestern Technological Institute. Dept. of Metallurgy, Evanston, Ill. Aug 1956. 12p graphs. Order from LC. Mi $2.40, ph $3.30. PB 123473

AD 94847. 1. Young's modulus 2. Hausmannite - Damping capacity 3. Contract AF 18(600)-1468 4. AF OSR TN 56-312

Ceramic reinforced alloys and plated cermets, by M.T. Curran, R.P. Riegert, R.K. Francis, R.S. Truesdale and J.R. Tinklepaugh. New York State College of Ceramics, Alfred, N.Y. May 1957. 50p photos, graphs, tables. Order from OTS. $1.25. PB 131188

A precision casting technique was developed for the reinforcement of super alloys with ceramic rods. Procedures were found for the electroplating of cermets with nickel and chromium to improve their impact resistance and for the chemical plating of nickel on titanium carbide grains. The effect of molybdenum as an alloying agent in the cermet binder was observed. AD 130754. Project 3066, Task 30253. Covers work from Jan 30 - Oct 31, 1956 under Contract AF 33(616)-2414. AF WADC TR 57-39.

Durability of concrete. Highway Research Board. Jan 1955. 56p photos, graphs, tables. Order as HRB Bul 128 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 90 cents. PB 124739

Presented at the 34th annual meeting, Jan 11-14, 1955. Contents: Effect of entrained air on strength and durability of concrete with various sizes of aggregates, by Paul Klieger. - Resistance of concrete surfaces to scaling action of ice-removal agents, by Albert C. Timms. NRC 416. HRB Bul 128..

Factors controlling resistance to deformation and mechanical failure in polycrystalline (glass-free) ceramics, by John B. Wachtman, Jr. and Laurel H. Maxwell. U.S. National Bureau of Standards. Dec 1957. 76p photos, diagrs, graphs, tables. Order from OTS. $2.00. PB 131623

The temperature dependence of creep behavior, modulus of rupture, Young's modulus and internal friction were studied to determine the factors controlling resistance to deformation and failure in polycrystalline alumina and magnesia. The temperature dependence of Young's modulus was measured for various refractory materials to determine the temperatures at which grain-boundary slip caused relaxation to begin. AD 142245. Project 7021, Task 70627. Covers work from 15 Nov 1954-1 Jul 1957 under Contract AF 33(616)-56-4. AF WADC TR 57-526.

Investigation of glass fibers as reinforcement for prestressing concrete. Final report under Contract NOy-27488. Princeton University. Dept. of Civil Engineering, Princeton, N.J. n.d. 30p photos, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 126543

Various samples of commercially obtainable fiber glass products that could be used for prestressing concrete were investigated and tested. These samples included fiber glass cordage, tape and rods. Fiber glass rods proved to be most promising and further investigations were confined to testing fiber glass rods. AD 94804. Date is 1955 or later.

Preliminary microscopic studies of cermets at high temperatures, by Earle T. Montgomery, Thomas S. Shevlin, Harold M. Greenhouse and Herbert W. Newkirk. Ohio State University Research Foundation, Columbus, O. Apr 1955. 42p photos, drawings, tables. Order from OTS. $1.25. PB 131470

This report covers the determination of some of the physical properties of cermet IIIB not previously reported. It also covers the design, construction, and testing of special equipment required for the study of the microstructure of TiC base cermets. In preparation for this study the following special equipment was built: a high-temperature x-ray camera, a vacuum quench furnace, and apparatus for the determination of coefficients of thermal conductivity at temperatures to 1700°F. A preliminary evaluation of the potentialities of TiB_2 and $MoSi_2$ as components of a cermet is discussed. Project no. 7350. Covers work performed from Sep 1952 to Sep 1953 under Contract AF 33(038)-16911. Continues work reported in WADC TR 53-287. AF WADC TR 54-33.

Refractory oxide bodies and coatings for aircraft power plants, by L.E. Marchi, J.S. Griffith and J.M. Neff. Armour Research Foundation. Ceramics and Minerals Dept., Chicago, Ill. Jul 1950. 21p. Order from LC. Mi $2.70, ph $4.80. PB 128794

Discusses experimental procedures for testing hypotheses for achieving solid solutions in which the major constituent of the solution, CaO, would be stabilized against hydration. La_2O_3, Ce_2O_3, and CeO_2, in conjunction with Na_2O, are the most effective stabilizers. Specimens have been prepared that show the first traces of hydration after 3 to 5 days immersion in water and only minor deterioration after 18 to 21 days immersion. Evidence supporting the accomplishment of solid solution is presented. Unclassified 15 Jul 1952. Contract AF 33(038)-2289. AF TR 6065.

ORDNANCE AND ACCESSORIES

Biscopic method of determining the altitude of a large missile, by David M. Carstens. U.S. Naval Ordnance Test Station, China Lake, Calif. Oct 1955. 13p drawings. Order from LC. Mi $2.40, ph $3.30. PB 126541

A method has been developed for determining the attitude of the longitudinal axis of a large missile. This method uses (1) data which are obtained from two widely spaced, long focal-length, ground cameras of known location (preferably with one camera under and the other to one side of the missile path) and (2) data which give the location of the missile at known times along its path. The cameras track the missile, and from their pictures the angles that the missile axis makes with film coordinate systems are measured at known times and correlated with the missile and camera-location data to obtain the desired attitude. NOTS 1253. NAVORD 4943.

Compilation of data on Army, Navy, and commercial standard electric squibs, by Robert E. Betts. U.S. Redstone Arsenal. Ordnance Missile Laboratories, Huntsville, Ala. Jan 1956. 89p drawings, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 126157

This is a revision of its report S-1-a, compiled to aid the engineer in the choice of a squib suitable for specific applications. Information is reported on such properties as physical and electrical characteristics and functioning times with respect to moisture, ammonia atmosphere, storage life, temperature, and altitude. Project TU2-25, Phase II. RSA OML R3J-14N1.

Dynamic system studies. Part 10: Performance requirements for flight tables, by H. Elmore Blanton. Massachusetts Institute of Technology. Dynamic Analysis and Control Laboratory, Cambridge, Mass. Jun 1957. 167p photos, diagrs, graphs, tables. Order from OTS. $4.25. PB 131418

A comprehensive program of analysis and investigation has been conducted for the purpose of determining the dynamic performance requirements necessary for flight tables adapted to use in a wide variety of simulation problems. This program, supported by an extensive analog-computer study, has shown the relative advantages of various methods of interconnecting a flight table and the associated computer. AD 130893. For Parts 1-2, 4-7, 13-14 and 16 see PB 121596-7, 121658, 121578, 121792, 121598, 121577, 121706 and 121651. Other parts not available through OTS. Contract AF 33(616)-2263, Task statement no. 2. AF WADC TR 54-250, Part 10.

Shock-testing facilities, by W.F. Johnson. U.S. Naval Ordnance Laboratory. 2nd revision. Mar 1956. 111p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 126542

This report describes the shock-testing facilities available at the Naval Ordnance Laboratory for simulating the shocks experienced by various types of ordnance (mines, torpedoes, and guided missiles, for example) under service conditions. The capabilities and limitations of the equipment are set forth as a guide for designers in planning tests of experimental mechanisms. Supersedes NOL R 1056 (first revision) 10 Dec 1948. NOL R 1056 Revised.

Testing to specified limits versus testing to failure, by Robert Lusser. U.S. Redstone Arsenal, Huntsville, Ala. Oct 1956. 6p graph. Available on request from Redstone Arsenal, Huntsville, Ala. PB 128350

Paper presented at the Fifth Joint Military-Industry Reliability Symposium, held at Redstone Arsenal, 15-17 October 1956. 1.Testing and standardization

PACKING AND PACKAGING

Disposable plastic paraffin embedding box for histological work, by Philip R. Joram. U.S. National Institutes of Health. Division of Research Services. Scientific Reports Branch. Medical Arts Section. Plastic Unit. n.d. 15p photos, drawing, diagr. Order from OTS. 50 cents. PB 131397

The technique of making a disposable transparent plastic paraffin embedding box for histological work by means of the vacuum forming method is described. Date is 1956 or later.

Water-resistance test for barrier materials, by Milton Roth and John H. Mazzei. U.S. Picatinny Arsenal. Samuel Feltman Amunnition Laboratories, Dover, N.J. Jan 1957. 18p photo, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126092

A new method for testing the water resistance of barrier materials called the PA conductive method, is based on the development of an instrument which takes advantage of the electrical conductivity of the water reagent used in the tests prescribed in the above specifications. Ordnance project TB 4-672. Dept. of the Army project: 591-07-001. PA TR 2385.

PHYSICS

General

Charts for flow parameters of helium at hypersonic speeds, Mach number 10 to 20. Princeton. University. James Forrestal Research Center. Nov 1957. 68p graphs. Order from OTS. $1.75. PB 131706

Flow parameters have been calculated for helium gas at hypersonic speeds assuming perfect gas relationships with gamma equal to 5/3. Charts are presented for isentropic and normal shock parameters in the range of Mach number from 10 to 20 and for oblique shock parameters in the range of Mach number from 5 to 25. In general, only results for weak shock waves are presented, however, some solutions for strong shocks are included. The gas relations were determined by two-dimensional analysis. AD 142310. Task 70114. Contract AF 33(038)-250. Continued under Contract AF 33(616)-2547. AF WADC TN 57-377.

Experimental and theoretical study of mean boundary conditions at perforated and longitudinally slotted wind tunnel walls, by C.F. Chen and J. W. Mears. Brown University. Division of Engineering, Providence, R.I. Dec 1957. 43p photos, drawings, graphs. Order from LC. Mi $3.30, ph $7.80. PB 126272

A mean boundary condition has been derived for the flow of an incompressible inviscid fluid along a longitudinally slotted wall taking into consideration the finite thickness of the slats. The flow was investigated near a wall along its longitudinal axis, and the results showed that the mean boundary condition was satisfied in the middle portion of this region. AD 144320. Brown U. TR WT-23. Contract AF 40(600)-600)-677. AF AEDC TR 57-20.

Investigation of separated flows in supersonic and subsonic streams with emphasis on the effect of transition, by Dean R. Chapman, Donald M. Kuehn, and Howard K. Larson. U.S. National Advisory Committee for Aeronautics. Mar 1957. 111p photos, drawings, diagrs, graphs, tables. Order as TN 3869 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125687

Experimental and theoretical research has been conducted on flow-separation phenomena associated with steps, bases, compression corners, curved surfaces, shock-wave boundary-layer reflections, and configurations involving leading-edge separation. Results were obtained from pressure-distribution measurements, shadowgraph observations, high-speed motion pictures, and oil-film studies. The maximum scope of measurement encompassed Mach numbers between 0.4 and 3.6 and length Reynolds numbers between 4,000 and 5,000,000. NACA TN 3869.

Measurement of sound levels associated with aircraft, highway and railroad traffic, by R.L. Field, T.M. Edwards, Pell Kangas and G.L. Pigman. U.S. Civil Aeronautics Administration. Technical Development Service. Jul 1947. 65p photos, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132236

1. Sound - Propagation - Atmospheric effects 2. Sound - Intensity 3. Noise, Traffic - Measurement 4. CAA TDR 68

Study of stagnation temperature and pressure in a free-molecular flow regime, by means of the revolving arm method, by F. Marcel Devienne. Laboratoire Méditerranéen de Recherches Thermodynamiques, Nice, France. Mar 1957. 105p graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 126087

This report is divided into four parts. The first part gives the theory regarding stagnation pressure and also that concerning the rise in temperature of a plate moving perpendicular to its velocity. In the second part the results of stagnation pressure measurements taken up to speeds a little above 150 m/s are discussed. The third part, which is by far the most detailed, gives the results concerning rise in temperature and measurements of the ratio $\frac{a}{\ell}$ and $\frac{a}{\ell}$ for plates of different kinds in different gases up to speeds slightly above 300 m/s. Dry air, helium, argon, carbon dioxide, methyl chloride and freon 12 were used. These measurements were taken at different pressures and for speeds in general between 50 and 300 m/s. They were taken by using the revolving arm of the device. The last part of the report is devoted to new series of measurements taken up to speeds definitely above 300 m/s. AD 126495. Contract AF 61(514)-930. AF OSR TR 57-32.

Theoretical and experimental studies of liquid viscosity. II. Historical background, by F.C. Collins. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Jul 1957. 55p graph, table. Order from OTS. $1.50. PB 131407

Part I of this report presented an analysis of the cell theory of liquids from the viewpoint of kinetic theory for later use in the development of theories of liquid viscosity. This note reviews critically the more important approaches to the viscosity problem in the published literature. It appears that no fully satisfactory theory of viscosity has yet appeared in the literature. AD 130901. Project 3044. Contract AF 33(616)-373. For Part I see PB 121758. For final report see PB 131403. AF WADC TN 56-255, Part 2.

Comparison of high-energy electron and gamma irradiation effects on orgainic liquids, by Edwin L. Zebroski and Edwin M. Kinderman. Stanford Research Institute, Stanford, Calif. Jul 1957. 22p diagrs, graph, tables. Order from OTS. 75 cents. PB 131362

It has been proposed that high-energy electron irradiation be substituted for gamma irradiation in testing the radiation resistance of aircraft materials, components and systems. To determine the feasibility of the proposal, the effects of electron and gamma radiation on selected organic liquids were compared. Results of this study and the experimental work reported by others indicate that there is qualitative similarity between electron and gamma radiation effects on simple compounds. Some differences in quantitative yields are observed, but these may be a result of differences in time of irradiation rather than of differences in radiation type. AD 130857. Project no. 7360, Task no. 73607. Covers work from 1 May 1956 to 21 Feb 1957 under Contract AF 33(616)-3738. AF WADC TR 57-141.

Controlled development for nuclear emulsions, by Jacques M. Blum. Rochester. University. Dept. of Physics, Rochester, N.Y. May 1956. 7p graphs. Order from LC. Mi $1.80, ph $1.80. PB 124491

1. Emulsions, Nuclear - Development

Final report under Contract N6 onr-249-3, NR 022-019. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. n.d. 11p. Order from LC. Mi $2.40, ph $3.30. PB 124943

Research under this contract centers principally around the use of the betatron x-rays to investigate the interaction of high energy photons with nuclear matter. Research is summarized and results published in journal articles and technical reports are listed. Date is 1954 or later. For Technical report 8 see PB 118661.

Inelastic molecular collisions with a Maxwellian interaction energy, by B. Widom. Cornell University. Dept. of Chemistry, Ithaca, N.Y. Mar 1957. 46p graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 125961

1. Molecules - Collisions 2. Maxwell's field equations 3. Kinetic reactions, Molecular 4. Probability - Theory 5. Contract AF 18(600)-111 6. AF OSR TN 57-129

Interaction of an electron and positron in pair production (Vzaimodeĭstvie elektrona i pozitrona pri rozhdenii par), by A. D. Sakharov. Edited by David Kraus. Aug 1956. 12p. Order from LC. Mi $2.40, ph $3.30. PB 126101

Translated from Zhurnal eksperimental'noi i teoreticheskoĭ fiziki, 18(7): 631-635, 1948 for the Geophysics Research Directorate, AF Research Center, Cambridge, Mass. by the American Meteorological Society under Contract AF 19(604)-1364. 1. Atomic power - Research - Russia 2. Probability - Theory - Russia 3. Electrons - Pairs - Production - Russia 4. Positions - Pair production - Russia

Neutron detectors for the Harwell fast chopper, by K.P. Nicholson and J.W. Hall. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Mar 1956. 18p diagrs, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 55 cents. PB 123609

S.O. Code no. 91-3-2-47. 1. Atomic power - Research - Gt. Brit. 2. Harwell fast chopper - Gt. Brit. 3. Radiation counters - Uses - Gt. Brit. 4. AERE N/M 76

Nuclear and electronic paramagnetism and low temperature studies. Final report, Sep 1, 1946-Sep 1954, under Contract N6 ori-20301, by H.C. Torrey and C.A. Whitmer. Rutgers University. Physics Dept., New Brunswick, N.J. Jul 1955. 4p. Order from LC. Mi $1.80, ph $1.80. PB 124949

1. Atomic power - Research 2. Low temperature research 3. Resonance, Paramagnetic - Research

Pair-creation cross section of spin one-half particles possessing an anomalous magnetic moment, by George H. Rawitscher. Stanford University. Dept. of Physics, Stanford, Calif. Jan 1957. 11p graph. Order from LC. Mi $2.40, ph $3.30. PB 125109

The electromagnetic pair-production cross section of spin-1/2 particles possessing an anomalous magnetic moment λ (in units of en/2mc) is calculated. The result is compared with the experimental measurement of the pair production of mu mesons. Project: R-357-40-3. Stanford report 545-21. Contract AF 19(600)-545. SU DP TR 21. AF OSR TN 57-27.

Theoretical nuclear physics. Final report under Contracts N6 ori-97, T.O. 1 and N6 ori-44, T.O. 16. Wisconsin. University, Madison, Wis. and Yale University, New Haven, Conn. Jul 1955. 12p. Order from LC. Mi $2.40, ph $3.30. PB 124948

1. Atomic power - Research

PHYSIOLOGY

Comparative physiology of small mammals. Final report for the period 15 Jun 1950-14 Dec 1955 under Contract N7 onr-28506, by Peter R. Morrison. Wisconsin. University. Dept. of Zoology, Madison, Wis. Jan 1956. 20p tables. Order from LC. Mi $2.40, ph $3.30. PB 124664

Includes "Tissue respiration studies in small wild animals", by Marion P. Meyer. 1. Animals, Laboratory - Records 2. Animals - Physiology 3. Animals - Respiration - Measurement

Control of ACTH synthesis and secretion, by Sidney Roberts. California. University, Los Angeles, Calif. Feb 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 124951

The object of this program is to delineate some of the factors (neural, humoral, and metabolic) which participate in the regulation of ACTH elaboration by the pituitary. Period covered is 1 Oct 1955 - 31 Dec 1955. Contract N onr-233(33), NR 110-402.

Cutaneous toxicity evaluations of Air Force development materials. Part II, by Morris V. Shelanski and Karl L. Gabriel. Industrial Biology Research and Testing Laboratories, Philadelphia, Pa. Nov 1957. 21p tables. Order from OTS. 75 cents. PB 131668

Two hydraulic fluids, two experimental impregnated cloths, one control cloth for both experimental impregnated cloths, three engine oils, one plastic coated natural rubber sheeting and two synthetic base stocks for high temperature fluid were studied via the prophetic patch test method on laboratory animals and volunteer human subjects to determine the primary irritant effect and the sensitization index of these materials. AD 142220. Project 7159, Task 71802. AF WADC TR 57-742, Part II. For Part I see PB 131199.

Prevention of heat casualties at Marine Corps training centers, by Constantin P. Yaglou and David Minard. Harvard University. School of Public Health and U.S. Naval Medical Research Institute, Bethesda, Md. May 1956. 45p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126552

The object of this Contract was to study the conditions under which heat injury occurs in basic and advanced trainees, and to develop safe limits for physical exertion in the heat in order to reduce casualties in hot weather. Heat stress on trainees at Quantico was found to be due not so much to strenuous exercises, which generally were of short duration, as to exercise of moderate intensity but of too long duration for warm weather. A good physiological criterion of total heat stress (metabolic plus climatic) was the evaporative sweat loss which correlated well with ETR and with the "wet bulb-globe temperature" index. Contract N5 ori-07665, Final report.

Studies on the mineral fraction of the bone. Technical report (including QTSR no. 4), covering the period 1 Jun 1955 - 31 May 1956 under Contract no. AF 61(514)-853, by Marcel J. Dallemagne, Claudine Fabry, Camille Francois, Rika DeWitte and Paul Bodson. Liège. University. Institute of Experimental Therapeutics, Liège, Belgium. Jun 1956. 91p diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 126711

The general purpose of the work performed in the Bone Biochemistry Division of the Institute of Experimental Therapeutics of the University of Liége, is to study the chemical composition, the molecular structure and the crystallographic properties of bone salts, including the study of the possible bonds between the organic and the mineral part of bone. Special attempts have been made to study the properties of the carbonate fraction of bone mineral. AD 88987. Contract AF 61(514)-858. AF OSR TN 56-258.

WAF trainee body dimensions: A correlation matrix, by Edmund Churchill and Katherine Bernhardi. Antioch College, Yellow Springs, O. Apr 1957. 80p tables. Order from OTS. $2.00. PB 131438

Correlation coefficients expressing the degree of relationship between the 1830 pairings of 61 WAF basic trainee body dimensions are presented in this report. Regression equations for estimating all other dimensions from specified values of stature, of weight, and of stature and weight together are listed. Values computed from most of these equations are tabulated for the most frequently occuring values of stature, weight, and stature-weight combinations. This correlation material supplements the basic dimensional data given in Anthropometry of WAF Basic Trainees, WADC TR 53-12, (PB 111326) and, with these data, provides a basis for the planning and execution of design programs involving the body dimensions of these individuals. AD 118161. Contract AF 18(600)-30. Contract AF 33(616)-3841. AF WADC TR 57-197.

PSYCHOLOGY

Attitudinal correlates of role-selection processes in organized groups. Methodological supplement, by Donald W. Olmsted and Philip C. Sagi. Minnesota. University. Dept. of Sociology, Minneapolis, Minn. May 1955. 18p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122250s

Supplement to PB 122250. 1. Group behavior - Statistical analysis 2. Sociology - Research 3. Variance - Analysis 4. Attitude surveys 5. Contract N8 onr-66216, Technical report no. 2, Supplement

Contributions of psychology to the study of pattern vision, by Harold W. Hake. Johns Hopkins University, Baltimore, Md. Oct 1957. 123p. Order from OTS. $2.75. PB 131626

A survey is provided of major research topics in psychology having relevance to patterned vision, including the study of threshold measurements, visual distortion, form discrimination, constancy in form perception, memory for form, and training problems. An analysis of the perceptual task suggests that true fidelity in visual perception is not possible, but that the visual system does operate to produce coherent reconstructions of visual stimulation. AD 142035. Project 7192, Task 71598. Bibliography: pp. 99-118. Contract AF 33(616)-2918. AF WADC TR 57-621.

Electronics trouble shooting, a behavioral analysis by Glenn L. Bryan, Nicholas A. Bond, Jr., Harold R. LaPorte, Jr. and Lyle S. Hoffman. University of Southern California. Dept. of Psychology, Los Angeles, Calif. Mar 1956. 211p diagrs, graphs, tables. Order from LC. Mi $9.60, ph $33.30. PB 126448

Step-by-step protocols from four data sources are examined with the objective of developing a framework for behavioral analyses of trouble shooting. Separate treatment is given to special aspects such as redundancy, errors, time and action rate. Throughout the report, attention is directed to generalizability of the results to different kinds of electronics equipment and to different test formats. The main conclusions are presented in a series of summary statements. Contract N onr-228(02), NR 153-093, Technical report no. 13.

Experimental studies of trust and suspicion. I: Effect of motivational orientation, by Morton Deutsch. New York University. Research Center for Human Relations, New York, N.Y. Dec 1955. 9p diagr, graphs. Order from LC. Mi $1.80, ph $1.80. PB 124621

1. Psychological research 2. Orientation - Tests 3. Contract Nonr-285(10)

Human engineering research in the area of color perception: Relationship of the color and brightness of background to the perception of colored test objects. Rochester. University. Biology Dept., Rochester, N.Y. Mar 1955. 30p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126411

This investigation involved the determination of the just perceptible brightness of a test illumination of given spectral composition when viewed against a series of colored backgrounds. The background varied in brightness over the effective range of visual function. An instrument designed to perform these measurements is described. AD 76361. Will not reproduce well. Contract AF 30(602)-109, Final report. AF RADC TR 55-90.

Information flow in task-oriented groups, by R. Duncan Luce, Josiah Macy, Jr., Lee S. Christie and D. Harvie Hay. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Aug 1953. 98p diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 126335

A nonaction-quantized group experiment in which the subjects were conditioned in one communication network and tested in another is described. The difficulties of this general information flow problem are pointed out. The group results for time, number of messages, content of messages, and errors are presented. Individual decisions are characterized in terms of conditional probabilities for certain ambiguous and unambiguous conditions. It is shown that individual decision times and probabilities of decision are not directly interdependent; that both depend on the information state. Subject's knowledge of the network and their attitudes toward experiences in the groups are examined and explanations in terms of the problem situation and previous network experience are given. Dept. of the Army project no. 3-99-10-022. Signal Corps project no. 8-102B-0. For earlier report see RLE report no. 231 (PB 112028). MIT RLE TR 264.

Night vision and dark adaptation. See entry under Bibliography on page 249. PB 130418

Organization of the retention of verbal material, by H. Brand and P.J. Woods. Connecticut. University, Storrs, Conn. Jun 1955. 22p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124938

This report investigates the organization of the recall of a list of meaningful words, using separate groups for each retention test. Another analysis is the comparison of the kinds of errors found in each type of procedure. This error analysis bears on the process of organization itself. Contract Nonr-631(00), Technical report no. 16.

Parameters of a visual monitoring task, by Donald H. Bullock and Susan R. Meyer. Buffalo. University. Dept. of Psychology, Buffalo, N.Y. n.d. 13p table. Order from LC. Mi $2.40, ph $3.30. PB 126417

This report describes the results of two experiments dealing with parameters of a visual monitoring task. The task required the subjects to discriminate

whether the second of two film-presented spatial-temporal patterns produced by successive appearances of a single dot in a square grid was the first. Contract AF 30(602)-574, Scientific report no. 1.

Periodic status report XXVI, for the period 16 May-15 Nov 1955 under Contract N5 ori-76(T.O. II), NR 142-201. Harvard University. Psycho-Acoustic Laboratory, Cambridge, Mass. Nov 1955. 23p. Order from LC. Mi $2.70, ph $4.80. PB 125344

A periodic status report upon acoustics research measuring loudness, sensory magnitudes, impedance at the eardrum and auditory threshold changes. For reports 15, 21, 23-25 see PB 102811, 109618, 117201, 118550 and 124073. PNM 65.

Personality factors and their influence on group behavior, a questionnaire study, by Genevieve O. Rogge. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Aug 1953. 37p tables. Order from LC. Mi $3.00, ph $6.30. PB 126336

Dept. of the Army project no. 3-99-10-022. Signal Corps project no. 8-102B-0. 1. Group behavior - Tests 2. Personality - Research 3. MIT RLE TR 265

Relative effectiveness of several film variables in modifying attitudes: A study of the application of films for influencing the acceptability of foods, by Robert W. Scollon, Jr. Pennsylvania State University, University Park, Pa. Jun 1956. 54p photos, tables. Order from LC. Mi $3.60, ph $9.30. PB 126363

The study being reported here developed from an inquiry by the Army Quartermaster Corps, asking whether films might be employed successfully to alter individual attitudes toward certain food items, and thereby gain higher acceptance of them. In this study an effort was made to define and manipulate variables in motion pictures which were considered to be related to the effectiveness of films in restructuring trainees' attitudes. NAVTRADEVCEN Project 20-E-4. Contract N6 onr-269. SDC TR 269-7-60.

Strength of association and forgetting, by Benton J. Underwood. Northwestern University, Evanston, Ill. n.d. 26p graphs. Order from LC. Mi $2.70, ph $4.80. PB 126253

Date is 1956 or later. 1. Words - Memory 2. Words - Association 3. Contract N7 onr-45008, NR 154-057

Target designation with small joystick controls, by J. David Reed. Rutgers University. Dept. of Psychology, New Brunswick, N.J. n.d. 24p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126330

In a series of experiments relating accuracy of designation to the ratio of hand movement, measurements were taken of the time required to position a tiny beam of light over simulated targets of 1/8", 1/4", and 1/2" diameters under various ratios of hand-to-pointer movement: one to 5, 11, 23, and 35. A total of ten highly trained subjects was used. Each experiment consisted of a balanced sequence of four subjects on 24 trials under each condition. AD 85908. Contract AF 30(602)-573, Final report.

Task proficiency and feelings of fatigue, by Richard G. Pearson. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Apr 1957. 6p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 130059

One hundred subjects received 50 minutes of training on a complex, fatiguing, perceptual motor task. Following a 10-minute rest period, the subjects continued at the task for a period of 3 hours during which measures of task proficiency were continuously recorded. A 13-item checklist, previously developed and validated to measure feelings of fatigue, was administered before the learning period, during the rest period, and upon completion of the task. Correlations between task proficiency criteria and checklist data (subjective fatigue) were not significantly different from zero. It was concluded that the way a subject says he feels prior to a 3-hour psychomotor task and the way he performs the task are not necessarily related, nor do the subject's fellings necessarily parallel his performance. AF SAM R 57-77

RUBBER AND RUBBER PRODUCTS

Design data for O-ring and similar elastic seals, by George E. Trepus. Boeing Airplane Co., Seattle, Wash. Sep 1957. 114p photos, diagrs, graphs, tables. Order from OTS. $3.00. PB 131510

This study is to gain knowledge of the relationship between the physical properties of seal materials and sealing efficiency so that materials may be fully utilized in seal design. The literature survey on O-rings and seal design has been continued. Commercially available polymers have been compounded with various physical properties. Static annulus (with varying groove configuration), rotating shaft, and reciprocating shaft functional test jigs have been designed and manufactured. Seal tests, under various environmental and mechanical conditions, have been run in these jigs. No definite relationship between physical properties and seal efficiency was found. A general relationship, however, was evident between seal life, and compression modulus and compression relaxation. AD 131094. Project

7340, Task 73405. Covers work from May 1956-Mar 1957 under Contract AF 33(616)-2867. For Part I see PB 121898. AF WADC TR 56-272, Part II.

Development of fluoro-silicone elastomers, by George W. Dykes. Peninsular Chemresearch, Inc., Gainesville, Fla. Sep 1957. 63p table. Order from OTS. $1.75. PB 131425

Appreciable quantities of the monomers were synthesized for polymerization studies. Hydrolysis reactions were carried out on the monomers and the constant boiling products have been characterized. Polymerization of the cyclic hydrolysis products to elastic homopolymers has been realized using the active metals in Group IA of the periodic table as polymerization catalysts. Copolymers with octamethylcyclotetrasiloxane were also prepared using potassium hydroxide as a catalyst. A study was made of the reaction of hydrogen fluoride with the compound, $CF_2BrCH_2CH_2Br$ in attempt to improve the yield of the fluorinated product, $CF_3CH_2CH_2Br$. In the preparation of new fluoroalkyl silane monomers, preliminary experiments were carried out on the fluorination of the beta carbon atom on the compounds $CCl_2{=}CHSi(CH_3)_3$ and $CHCl{=}CHSi(CH_3)_3$. Analytical results indicate the fluorinated compounds were obtained. AD 131044. Project 7340, Task 73404. Covers work from Dec 15, 1955-Dec 15, 1956 under Contract AF 33(616)-3238. For Part 2 see PB 121394. AF WADC TR 55-220, Part 3.

Development of satisfactory Buna N compounds incorporating antiozonants, by Robert H. Haberstroh. United States Steel Corporation. American Steel and Wire Division. Electrical Cable Works, Worcester, Mass. Oct 1956. 32p tables. Order from LC. Mi $3.00, ph $6.30. PB 126438

Various antiozonants were added to a base Buna N compound and the resultant compounds were evaluated for ozone resistance. Physical, low temperature and fungus resistance tests were recorded. Promising compounds were subjected to tests after 70 hours aging at 250°F in an air oven. Several laboratory compounds were developed which met the original ozone resistance, low temperature, and fungus resistance requirements. Laboratory blends of Buna N and Hypalon met all requirements. Contract DA-33-019-ord-1741, Final report.

STRUCTURAL ENGINEERING

Aeroelasticity in stability and control. J.B. Rea Company, Inc., Santa Monica, Calif. Mar 1957. 506p diagrs, graphs, tables. Order from OTS. $8.00. PB 131027

The purpose of this volume is to present sufficient technical material to enable a practicing dynamics engineer to understand various aeroelastic phenomena and to give methods for incorporating aeroelastic effects in equations of motion as well as techniques for obtaining the solutions. Matrix methods are emphasized throughout because of their generality. The first five chapters present basic concepts and theories of elasticity and aerodynamics; chapters VI and VII contain applications to airplanes (which can be extended to missiles) and helicopters; chapters VIII and IX describe the solution techniques as well as methods for analyzing flight test data relative to aeroelastic analysis. Project 1365, Task 13542. Contract AF 33(616)-2424. AF WADC TR 55-173.

Bounds on minimum weight design, by D.C. Drucker and R.T. Shield. Brown University. Division of Applied Mathematics, Providence, R.I. Oct 1956. 29p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 129621

A somewhat limited design procedure for elastic-perfectly plastic structures is extended here to provide upper and lower bounds on the minimum weight of three dimensional structures and is specialized to safe one and two dimensional structures in which either direct stresses or bending stresses are negligible. The generalization also includes the influence of body forces. In principle, therefore, such troublesome factors as the weight of the structure itself or centrifugal "forces" may be designed for in a direct manner. Radially symmetric plane stress and plate bending examples are solved to demonstrate direct design procedures. Contract Nonr-562(10), NR 064-406. GDAM C 11-18. BU AM TR 18.

Buckling and post-buckling behavior of cylindrical shell subjected to external pressure, by H.L. Langhaar and A.P. Boresi. Illinois. University. Dept. of Theoretical and Applied Mechanics, Urbana, Ill. Apr 1956. 101p diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 126339

The buckling and post-buckling behavior of an ideal elastic cylindrical shell loaded by uniform external pressure on its lateral surface, and by an axial compressive force was studied. The shell is treated as a system with 21 degrees of freedom. By the imposition of constraints on the 21 generalized coordinates, various end conditons can be realized. Contract N6 ori-071(53), NR 064-413. For earlier report see PB 119921. ILU TAM 93.

TEXTILES AND TEXTILE PRODUCTS

Development of design data on the mechanics of air flow through parachute fabrics, by William G. Klein, Charles A. Lermond and Milton M. Platt.

Fabric Research Laboratories, Inc., Dedham, Mass. Sep 1957. 104p photos, diagr, graphs, tables. Order from OTS. $2.75. PB 131431

The purposes of this report are two: 1) A determination of the factors involved in parachute fabric permeability and the quantitative prediction of their influence with a view to rational engineering design of such materials; and 2) An assay of a representative selection of commercially produced parachute fabrics (Type I and Type II) to determine the degree to which they meet current permeability specifications and, where such requirements are not met, the reasons therefor AD 131055. Project 7320, Task 73201. Covers work from Apr 1955-Aug 1956 under Contract AF 33(616)-2977. AF WADC TR 56-576.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Design study of an aircraft cargo-handling system, by K.V. Broman, S.A. LaMar and L.G. Regan. Douglas Aircraft Company, Inc., Long Beach, Calif. May 1957. 109p photos, drawings (part fold), graphs, tables. Order from OTS. $2.50. PB 131596

This study covers the development of a cargo-handling system for five low floor rear-loading aircraft. An analysis of present loading conditions indicates that most of the present loading activity inside the aircraft can be shifted into the terminal, where cargo can be easily stacked on and secured to a pallet. The loaded pallets can then be moved into the aircraft. Included as part of the report are investigations into a optimum-sized pallet and pallet-conveyance methods. AD 14207. Project 6126, Task 61014. Covers work from 15 May 1956-28 Feb 1957 under Contract AF 33(616)-3482. AF WADC TR 57-145.

Measurement of forces affecting human bodies in aircraft accidents, by Robert R. Mackie, Laurence Morehouse, and Donald A. Clegg. Human Factors Research, Inc., Los Angeles, Calif. Contract Nonr-1527(00), NR 118-381. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report no. 2: A study of the crashes during landing of two instrumented F6F drone aircraft. Feb 1956. 44p photos, graphs. Mi $3.30, ph $7.80. PB 126874

A study has been conducted to develop a method for recording deceleration forces in airplane crashes. This report presents the findings of two airplane crashes which were similar in nature. Both airplanes crashed during landing, striking the runway nose down, at approximately the same angle. The severity of the two crashes differed somewhat, but in the main, they were the same kind of crash.

Technical report no. 3: A study of the crashes of four instrumented F6F drone aircraft. Apr 1956. 34p photos, graphs. Mi $3.00, ph $6.30. PB 126503

This report presents the findings on four crashes. In two cases, which were similar in nature, the airplanes ran out of fuel and were crash-landed under control on the desert, one with wheels up and the other with wheels down. In the other two cases, one crash occurred on take-off, and one occurred when control of the aircraft was lost and it crashed into a mountain ridge.

Test facilities, aircraft fire protection program, by H.L. Hansberry. U.S. Civil Aeronautics Administration. Technical Development Service. Jul 1947. 20p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132234

1. Fire prevention - Airplanes 2. CAA TDR 54

Instruments

CAA-RTCA instrument landing system. Part I: Development and installation, by Henry I. Metz. U.S. Civil Aeronautics Administration. Technical Development Division. Oct 1943. 86p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 123547

1. Landings, Instrument 2. Landing aids 3. CAA TDR 35

CAA type I course line computer, by Chester B. Watts, Jr. and Logan E. Setzer. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1952. 24p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132240

1. Computers, Flight 2. Flight paths - Computation 3. CAA TDR 152

CAA type III portable pictorial computer. Part I: Development and initial tests, by Logan Setzer. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1952. 27p photos, maps, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132241

1. Computers, Photographic 2. Photography, Aerial 3. CAA TDR 172

Development of a straight-line glide path, by J.M. Lee and H.I. Metz. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1947. 37p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132235

1. Glide path equipment 2. Landing aids 3. Landing, Instrument 4. Radar, Ground controlled approach 5. CAA TDR 55

Equipment cooling systems for aircraft. Part 3: Cooling systems evaluation, by R.H. Zimmerman, W. Robinson, K.G. Hornung and W.E. Krauss. Ohio State University. Dept. of Mechanical Engineering, Columbus, O. Sep 1954. 363p diagrs, graphs, tables. Order from OTS. $8.00. PB 121203

Part 3 of the report contains the development of the methods of analysis for the evaluation of seven types of cooling systems. Results of evaluation are presented describing the physical characteristics and the aircraft gross weight penalty of each system for aircraft operation up to 65,000 feet altitude and flight speeds up to Mach 1.8. System designs are optimized for minimum gross weight increase of the aircraft operating over the same range and with the same payload as before addition of the cooling system. Contract AF 33(616)-147. For Parts 1-2 see PB 121256 and PB 121234. AF WADC TR 54-359, Part 3.

Integrated instruments: A roll and turn indicator, by Harold E. Bamford, Jr. and Malcolm L. Ritchie. Illinois. University, Urbana, Ill. May 1957. 24p photos, drawings, tables. Order from OTS. 75 cents. PB 131439

Measurements of the performance of nine Air Force pilots in simulated flight demonstrated an improvement in direction control when an integrated roll and turn indicator was substituted for the standard turn indicator. The finding is discussed in relation to a simplified model of the experimental man-machine system. Three principles of display design are offered by the authors in conclusion: a. The command effectiveness of a feedback display is increased by the distinct indication therein of control-induced components of the system output; b. The command effectiveness of a feedback display is increased by anticipatory indication therein of the feedback signal; and c. The interpretability of an instrument display is increased by the distinct indication therein of each aspect of the condition displayed. AD 118170. Project no. 6190-71573. Contract AF 33(616)-3000. AF WADC TR 57-205.

Preliminary study of operational advantages of pictorial navigation displays, by Fred S. McKnight. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1954. 28p maps, diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 132233

Project no. 6.2.5. 1. Computers, Photographic 2. Photography, Aerial 3. Computers, Navigational 4. CAA TDR 241

Technical and operational evaluation of the type IV pictorial-display equipment, by E. Blount, C.E. Dowling, H. Kay, R.E. McCormick and E.R. Sellers. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1954. 34p photos, maps, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132243

Project no. 6.2.5. 1. Flight paths - Computation 2. Computers, Photographic 3. Computers, Navigational 4. Computers, Flight 5. CAA TDR 242

Tests of a wing duct mockup for a blowing, circulation-control model, by J.L. Stalter. Wichita. University. School of Engineering, Wichita, Kan. Apr 1955. 26p photo, drawing, diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126307

A full-scale mockup of a wing duct for a circulation control wind-tunnel model has been tested by the Department of Engineering Research of the University of Wichita. These tests were conducted to arrive at a suitable duct design on the basis of duct capacity, slot velocity distribution and duct efficiency. Two types of ducts were evaluated, a rectangular duct with approximately a linear drop of dynamic pressure along the span and a tapered duct with approximately a constant value of dynamic pressure. Contract Nonr-201(01). UW ER 180.

Engines and Propellers

Exhaust ejector cooling research. Final report for the period Jul 21, 1954-Jul 15, 1955 under Contract no. Nonr-1437(00), by W.G. Evans. Avco Manufacturing Corp. Lycoming-Spencer Division, Williamsport, Pa. Aug 1955. 117p photos, graphs (1fold). Order from LC. Mi $6.00, ph $18.30. PB 123136

This investigation disclosed the nature of the relatively high amplitude pressure waves in the exhaust pipe of an internal combustion engine and the influence these waves have on the power output of the engine and the thrust developed at the outlet of the exhaust pipe. It points out ways of utilizing these pressure waves to reduce the power loss normally associated with exhaust systems. It further disclosed some of the effects of pulsating flow on the pumping ability of an exhaust ejector pump. Report no. 1703. Contract Nonr-1437(00), Final report.

Fire-extinguishment 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. 14p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132238

1. Fire extinguishers - Airplanes - Tests 2. Methane, Bromochloro - Uses 3. Fire extinguishers, Bromochloromethane 4. CAA TDR 265

Study of explosion and fire suppression of aircraft engine sections, by Clarence Carlton, Walter Gunket and Calvin Yuill. Southwest Research Institute, San Antonio, Tex. Apr 1957. 81p diagrs, graphs, tables. Order from OTS. $2.25. PB 131449

The results of a study to determine the feasibility of an explosion and fire suppression system for turbo-prop and turbo-jet aircraft engine sections are presented in this report. Aircraft accidents involving explosions and fires in engine sections are reviewed and an estimate made of potential savings in aircraft if such a system were available. Principles involved in explosion and fire detection and suppression are examined and equipment available discussed. It is concluded that the feasibility of a fire and explosion suppression system is largely dependent upon the degree to which the detector component can withstand ambient temperatures in the engine section and to perform with a high degree of reliability, and upon a design of the agent distribution system that will provide the necessary rate of discharge. It is further concluded that combining the function of explosion and fire suppression in one system is not now feasible. AD 130957. Project 6075, Task 61342. Contract AF 33(616)-3489. AF WADC TR 57-300.

Airports and Airways

Point-light-source projection display for air traffic control, by R. J. Lampkin and M. F. Williams. U.S. Naval Research Laboratory. Feb 1958. 11p photos, diagrs. Order from OTS. 50 cents. PB 131524

An experimental display has been developed recently which shows promise of satisfying many of the requirements of modern multipurpose radar data systems. This system projects spots of light representing aircraft onto a 10-ft square back-lighted screen. Position, identity, category, heading, and altitude information on a given aircraft is contained within each 3/4-in. spot of light. NRL R 5092.

Study of the visibility and glare ranges of slope-line approach lights, by Marcus S. Gilbert and H. J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Nov 1951. 32p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132237

1. Lights, Approach 2. Runways - Lights 3. Signals, Light - Range 4. CAA TDR 150

Aerodynamics

Correlation of low-speed, airfoil-section stalling characteristics with Reynolds number and airfoil geometry, by Donald E. Gault. U.S. National Advisory Committee for Aeronautics. Mar 1957. 9p diagrs, graph, table. Order as TN 3963 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125686

1. Reynolds number - Effects 2. Wings - Stalling - Research 3. Airfoil theory 4. NACA TN 3963

Elements of a simplified wing theory, by H. B. Helmbold. Wichita. University. School of Engineering, Wichita, Kan. Jan 1953. 32p diagr, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 126325

The following note has been developed since 1940 for the purpose of avoiding the solution of integral equations in lifting surface theory. The intention was to save current computation work by storing prefabricated auxiliary functions. Materially, the method is still incomplete in as far as the needed downwash functions are tabulated for straight wings only. Contract N onr-201(01). UW ER 94

Experimental development and tests of a high-lift, circulation-control wing, by Kenneth Razak, Virgil Razak, Frederick Wagner and Richard E. Wallace. Wichita. University. School of Engineering, Wichita, Kan. May 1953. 119p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 126326

Experimental results are presented as three-component aerodynamic data, surface-flow tuft studies and wake studies. Deflections of the flaps and aileron were varied systematically in conjunction with control-quantity coefficients to explore the effectiveness of their combination. Unclassified May 25, 1955. Contract N onr 201(01). UW ER 97.

Experimental investigation of a swept-wing research model boundary layer, by Richard E. Wallace. Wichita. University. School of Engineering, Wichita, Kan. Jan 1953. 94p photos, drawings, graphs (part fold), tables. Order from LC. Mi $5.40, ph $15.30. PB 126324

This experiment produced basic information on the character of the wing boundary layer, its flow direction variations, and its thickness growth along chords parallel to the plane of symmetry and along spanwise constant local-chord percentage lines. Contract Nonr 201(01). UW ER 92.

Flutter velocity and amplitude predictions on isolated blades in stalled flow by single-degree-of-freedom analysis, by Robert J. Vaccaro. New York University. College of Engineering. Research Division, New York, N.Y. Jan 1957. 109p photos, drawings, diagr, graphs, tables. Order from LC. Mi $5.70, ph $16.30. PB 126434

A method is proposed whereby the equations of motion are employed to compute oscillatory airforces in the stall region from flutter tests on isolated blades restricted to oscillate in torsion. AD115019. Contract AF 18(600)-1372. AF OSR TN 56-592.

Measurements of lift fluctuations due to turbulence, by Philip Lamson. U.S. National Advisory Committee for Aeronautics. Mar 1957. 38p drawings, diagrs, graphs, tables. Order as TN 3880 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125689

1. Wings - Lift - Effect of aspect ratio 2. Gust loads - Mathematical analysis 3. NACA TN 3880

On the lift of a blowing wing in a parallel stream, by H.B. Helmbold. Wichita. University. School of Engineering, Wichita, Kan. Aug 1953. 7p diagr. Order from LC. Mi $1.80, ph $1.80. PB 126327

The physical problem of the lift of a blowing wing in a parallel stream is discussed and the integral equations for a two dimensional case are derived. Contract N onr 201(01). UW ER 110.

Pressure measurements and flow investigation on delta wings at supersonic speed, by G. Drougge and P.O. Larson. Flygtekniska Försöksanstalten (FFA), Stockholm. Nov 1956. 33p photos, drawings, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 126216

Pressure distribution measurements were carried out on two delta wings, one with a sharp and the other with a rounded leading edge. The sweep angle was 70^{0} and the investigation was made at about Mach number 1.5 at different angles of attack. From the measurements, the lift distributions were evaluated and were compared with the linearized conical-flow theory. The agreement was quite satisfactory at small angles of attack, but with increasing lift the influence from leading edge separation became apparent. To explore this phenomenon more closely, a detailed investigation of the flow above the surface and in the boundary layer was performed. FFA 57.

Princeton pilot variable density supersonic wind tunnel, by Seymour M. Bogdonoff. Princeton University. Aeronautical Engineering Laboratory, Princeton, N.J. May 1948. 24p photos, drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126279

The design and operation of the pilot variable density supersonic wind tunnel of Princeton University's Aeronautical Engineering Laboratory are discussed in some detail. The tunnel, with a 1 x 2-1/2 inch test section, is designed to operate with stagnation pressures up to 500 psi at Mach numbers from 1.5 to 5.0. It is of the blow-down type, but uses a pressure control system to keep the stagnation pressure constant during a test. Schematic drawings of the equipment and photographs are presented and a short discussion of the preliminary tests is included. Project Squid. Contract N6-ori-105, T.O. III, Phase 1, NR 220-038. PU AEL TM 8.

Systematic, two-dimensional tests of an NACA 23015 airfoil section with a plain flap and circulation control by suction through a cusped-slot entry, by J.L. Stalter and Richard E. Wallace. Wichita. University. School of Engineering, Wichita, Kan. Mar 1955. 48p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 126308

Systematic, two-dimensional, wind-tunnel tests were made with NACA 23015 airfoil section to determine the aerodynamic properties of a quarter-chord, plain flap with suction circulation control. Model geometric variables included flap deflection, slot width and position, and a complete range of attack angles through the stall. The suction mass flow was varied from zero to approximately $c_{M_S} = .025$. A detailed investigation was made of the cusped-slot entry to evaluate the importance of slot width and position over the upper surface of the flap bend. Contract Nonr-201(01). UW ER 174.

Theoretical and experimental investigation of random gust loads. Part I: Aerodynamics transfer function of a simple wing configuration in incompressible flow, by Raimo J. Hakkinen and A. S. Richardson. U.S. National Advisory Committee for Aeronautics. May 1957. 64p diagrs, graphs. Order as TN 3878 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 126083

1. Gust loads 2. Wings - Aerodynamics - Theory 3. Flow, Incompressible - Theory 4. NACA TN 3878

Wall interference in a perforated wind tunnel, (Studio dell 'interferenza della gallerie aerodynamiche con pareti a fessure), by Riccardo Brescia. U.S. National Advisory Committee for Aeronautics. May 1957. 28p graphs, table. Order as NACA TM 1429 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB126084

Translated from Atti della Academia delle Scienza di Torini, Vol. 87, 1952 - 1953. 1. Wind tunnels -

Walls - Effects - Italy 2. Cascades (Aerodynamics) - Theory - Italy 3. NACA TM 1429

Rockets and Jet Propulsion

Adaptation of jet pumps for combined suction and blowing on an airplane wing, by J. P. Chevallier and P. Jousserandot, translated by H. B. Helmbold. Wichita. University. School of Engineering, Wichita, Kan. Dec 1953. 12p drawing, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126314

The use of jet pumps for combined suction and blowing of the boundary layer permits solution of the difficult problem of uniform quantity distribution along the span of an airplane wing. The low efficiency of jet pumps is compensated by their ease of installation, their lightness and safety of operation when using a source of compressed gas aboard the airplane. Translated from "Adaptations des trompes à induction assurant l'aspiration et le soufflage combines sur une aile d'arron. La Recherche Aeronautique, 35, p. 25 (1953). Contract Nonr-201(01). UW ER 126.

Application of the electromagnetic flowmeter to the testing of liquid-propellant rocket motors, by Eric G. Laue. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Mar 1955. 18p photos, drawing, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126297

Investigation leading to the development of a simply constructed permanent-magnet flow-meter with associated electronic circuitry for detecting the flow signal and for minimizing polarization drift effects has resulted in a system capable of measuring fluid flow from steady state to 10 kc for a period of 5 minutes with an accuracy of ±3 per cent. The flow sensitivity of the system is independent of the fluid conductivity over a range of 1.4×10^4 to 1.3 micromhos/cm. Contract DA 04-495-ord-18. CIT JPL M 20-109.

Effect of length of observing time on earth satellite visibility, by W. D. Garvey, Jean B. Henson and Irene S. Gulledge. U.S. Naval Research Laboratory. Feb 1958. 11p diagr, graphs, table. Order from OTS. 50 cents. PB 131528

This report describes an investigation to determine the extent to which an observer's ability to detect a satellite through a telescope is reduced, after protracted periods of search ranging from 5 to 120 minutes. The results led to the following recommendations for maximum probability of detecting an earth satellite at Moonwatch stations: (a) observers be given training in observing a simulated satellite before making critical observations, (b) observers be rotated every 30 minutes if sufficient numbers are available, and (c) telescopes be arranged so that fields of view overlap in order to screen false reports. It is concluded that, while not leading to maximum probability of detecting very faint satellites, it is still worthwhile for an observer to watch for one or two hours, since the staellite will often be several times brighter than his visibility threshold. NRL R 5094.

Experimental comparison of constant-pressure and constant-diameter jet pumps, by H. B. Helmbold, G. Luessen and A. M. Heinrich. Wichita. University. School of Engineering, Wichita, Kan. Jul 1954. 57p photos, fold drawing, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 126309

Two jet pumps, one of conventional constant-diameter design and the other of constant-pressure design (design initial-velocity ratio = 0.069), having identical jet-nozzle to mixing-tube area ratios and overall dimensions were compared for initial velocity ratios from 0.01 to 0.13. Good agreement between theoretical and experimental values was obtained for free-mixing-zone lengths and static pressures at the end of the free mixing zone for the cylindrical jet pump. Contract Nonr-201(01). UW ER 147.

Performance test of a side-inlet, stream-to-air jet pump with an inboard nozzle, by A. M. Heinrich. Wichita. University. School of Engineering, Wichita, Kan. Feb 1954. 82p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 126313

An experimental investigation was conducted to determine the performance of a side-inlet, steam-to-air jet pump with an inboard nozzle. A jet pump with a cylindrical mixing tube was tested for mass ratio, pressure ratio, and efficiency. The transfer of the available energy in the primary flow to the secondary flow and the influence on performance of controlling the direction of secondary air flow into the mixing tube were also investigated together with curves showing mixing-tube, cross-sectional distributions of temperature and total pressure taken at several survey stations. This report is the first in a series on jet pumps with different taper ratio mixing tubes. Contract Nonr-201(01). UW ER 131.

Performance test of a side-inlet, steam-to-air jet pump with an inboard nozzle and a tapered mixing tube, by A. M. Heinrich. Wichita. University. School of Engineering, Wichita, Kan. May 1954. 76p photos, diagrs, graphs, table. Order from LC. Mi $4.50, ph $12.30. PB 126311

A series of tests were conducted to determine the performance, the pressure and temperature distributions, and the nature of the flow in a side-inlet jet-pump with an inboard nozzle. This series of tests were performed on a pump having a conical mixing tube, a cascaded side-entrance throat, a suction duct, and a suction slot of constant width. The effects of varying the primary jet pressure, the

pump pressure ratio, and the cascades were determined. Pump pressure ratio was varied both with and without control of the suction-slot flow distribution. Flow direction in the suction duct between the slot and the throat was studied with the aid of wool tufts. Contract Nonr-201(01). UW ER 138.

Pre-test report for multiple-nozzle jet pump, by Robert Foster. Wichita. University. School of Engineering, Wichita, Kan. Nov 1953. 25p drawings (1 fold), diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 126317

This is a pre-test report on a multiple-nozzle jet pump. The steps leading up to this design are discussed, the details of the model construction are shown, and the instrumentation, testing procedure, calculations and data presentation is completely explained. Contract Nonr-201(01). UW ER 116.

Pre-test report for a systematic investigation of constant-diameter and constant-pressure jet pumps, by H.B. Helmbold and Richard E. Wallace. Wichita. University. School of Engineering, Wichita, Kan. Nov 1953. 9p drawing, diagrs, tables. Order from LC. Mi $1.80, ph $1.80. PB 126316

Two types of jet-pump mixing tubes, constant diameter and constant pressure, are to be investigated for qualitative and quantitative comparison. They will be tested with the identical initial conditions of jet-nozzle to mixing-tube area ratio and net-power coefficient. In this manner, specific test points will be obtained to compare their ideal efficiencies at design conditions. Contract Nonr-201(01). UW ER 121.

Review of a systematic, theoretical investigation of jet pumps, by H.B. Helmbold. Wichita. University. School of Engineering, Wichita, Kan. Nov 1953. 14p graphs. Order from LC. Mi $2.40, ph $3.30. PB 126315

Summary of four studies on jet pump theory. For 1st-3rd see PB 127093, 124625-124626. 1. Pumps, Jet - Theory 2. Contract Nonr-201(01) 3. UW ER 122

Summary of performance tests of two side inlet, steam-to-air jet pumps, by A.M. Heinrich. Wichita. University. School of Engineering, Wichita, Kan. Jun 1954. 24p photos, drawing, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126310

Two types of side-inlet, jet-pump mixing tubes, cylindrical and tapered, have been tested to determine their operating characteristics. The pumps were tested under various conditions of pressure ratio, primary total pressure, secondary flow guidance at the side-inlet, and suction slot air-flow distribution. The results of these tests showed the relative importance of factors most influential in the performance of the side-inlet jet pump. In general, the tapered mixing tube was superior to the cylindrical mixing tube, since it produced better flow distribution, higher pressure ratios, and larger mass ratios. Contract Nonr-201(01). UW ER 146.

Land Transportation

Traffic forecast and calculation of receipts for motor road connecting Sweden and Denmark, by Torsten R. Åström. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1955. 91p map, graphs, tables (1 fold). Order from LC. Mi $5.40, ph $15.30. PB 124921

A forecast of the continual increase in traffic by numbers of cars and car traffic in conjunction with increase in national income has been made, and the instantaneous increase in traffic caused by the provision of land communication in place of ferries has been calculated. An estimate of receipts as a guide for judging the remunerativeness of imposing a charge for the projected road communication has been made, as also calculation of optimum bridge tolls. Civil engineering and building construction series, vol. 3, no. 3. Sweden. Kungl. Tekniska Högskolan, Stockholm. Handlingar nr. 92. Acta polytechnica 179.

Marine Transportation

Action of variable wind stresses on a stratified ocean, by G. Veronis and Henry Stommel. Princeton University. Institute for Advanced Study, Princeton, N.J. Oct 1956. 34p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126251

Reprint from Sears Foundation Journal of Marine Research, Vol. 15, No. 1, Oct 15, 1956, pp 43-75. Woods Hole Oceanographic Institution Contribution no. 859. 1. Winds - Effect on waves 2. Ocean surface - Effects of wind stress 3. Contract N6 ori-139, T.O. 1

Distribution of air in self-aerated flow in a smooth open channel, by Alvin G. Anderson. Minnesota. University. St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minn. Jul 1955. 60p photos, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124874

The high-velocity self-aerated flow in an open channel is characterized by the appearance of "white water" caused by the entrainment of atmospheric air. The phenomenon appears to be made up of two parts. In the lower portion of the flow the entrained air is in the form of bubbles distributed through the flow. Above this region, water particles projected outward from the flow by the intense normal velocity fluctuations give rise to the highly

agitated appearance of the flow. Contract N6 onr-246, T.O. VI, Report no. 48.

Equipment for mobile logistics support, by M.D. Sims, Jr. U.S. Naval Supply Research and Development Facility, Bayonne, N.J. Nov 1957. 90p photos, tables. Order from OTS. $2.25. PB 131679

This brochure is intended to provide the latest information on equipment which has been or is now being developed by this Facility for use on supply or combatant ships for the replenishment at sea operation. Engineering report no. 2.4001. NAVSANDA 347.

Problems in ship theory, by Georg Weinblum. California. University. Institute for Engineering Research, Berkeley, Calif. Nov 1955. 33p. Order from LC. Mi $3.00, ph $6.30. PB 126296

1. Hydrodynamics - Theory 2. Ships - Propulsion - Theory 3. Contract N onr-222-(30), Technical report no. 1 4. UC IER Series 82, Issue 1

Review of the oceanography of the Northern Pacific, by Richard H. Fleming. Washington. University. Dept. of Oceanography, Seattle, Wash. Dec 1955. 48p maps, diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 126287

Technical report no. 44. Contribution no. 187. Reprinted from Bulletin no. 2, International North Pacific Fisheries Commission, 1955. 1. Oceanography - Pacific Ocean 2. Contract Nonr -477(01), NR 083-072. WU OR 55-43

MISCELLANEOUS

Analysis of the distribution of plant individuals in plant communities, by Grant Cottam and J.T. Curtis. Wisconsin. University, Madison, Wis. Jul 1955. 3p. Order from LC. Mi $1.80, ph $1.80. PB 124495

General procedures were to use models of artifical populations and maps of natural populations and testing of suitable sampling methods and then to apply these methods to natural plant communities under a wide range of environmental conditions. Final report covering period 1 Jul 1952-30 Jun 1955 under Contract N8onr-3600, NR 164-056.

Fluorosis problem in livestock production, prepared by the Subcommittee on Fluorosis Problems. National Research Council. Division of Biology and Agriculture. Committee on Animal Nutrition. Sep 1955. 34p photos (part col.), tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.00. PB 122541

Color in photos will not reproduce. 1. Livestock-Feeding and nutrition 2. Livestock - Production 3. Fluorosis 4. NRC 381

Layout of technical reports, edited by A.H. Holloway. Advisory Group for Aeronautical Research and Development. Aug 1956. 27p. Order as AGARD Specification 1 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124305

Recommendations by Documentation Committee for size, markings on cover and title page, contents list, pagination, notation, abstract, list of references, tables, illustrations, appendices and index cards in technical reports. Notes are included on the application of the recommendations to bound books and to periodicals. Appendices give proposals to I.S.O. for minimum biographical references, examples of abbreviations of titles of periodicals and cataloguer's notes. Presented at the Seventh Meeting of the Documentation Committee held in August, 1956, in Brussels. AG Spec. 1.

Polar guide. U.S. Air Force. Dec 1947. 164p photos, drawings, fold. maps. Order from LC. Mi $7.80, ph $25.80. PB 125767

Folded maps in pocket on back cover. 1. Arctic regions 2. Survival, Arctic 3. AFTRC M50-0-23 4. NA 00-80T-32

Report of NRL progress. U.S. Naval Research Laboratory. Apr 1958. 54p. Order from OTS. $1.25. Also available at annual subscription rate of $10.00 a year in the U.S.A., foreign rate $13.00 a year. PB 131750

Contents: Articles: Correlation of atmospheric transmission with back scattering, by J.A. Curcio. - New and sensitive technique for measuring the hardness of crystals, by J.W. Davisson and W.H. Vaughan. - Effect of environment on creep-rupture properties of metals, by P. Shahinian and M.R. Achter. - Scientific program: Problem notes: Astronomy and astrophysics: The 1954 eclipse measurements of the 8.6-mm solar brightness distribution . . . Upper-air rocket-research program at NRL, 1946-1957. . . Density of the atmosphere from Minitrack observations of 1957 alpha 2. . . Firing time of satellite launching vehicle as related to solar illumination and satellite visibility. . . Receiving equipment for tracking the satellite. . . Receiving equipment for tracking the satellite. . . Effect of length of observing time on earth satellite visibility . . . Electronic computer program for satellite launching trajectory calculations. . . Spectrally selective middle-ultraviolet photodetectors. . . Rate of turbulent dissipation of kinetic energy of winds near

30,000 ft altitude. - Chemistry: Electrochemical mechanisms of noble-metal/hydrogen systems. Part II--palladium...Study of the characteristics of foam-water sprinkler systems in controlling full-scale fires. - Mechanics: Static and dynamic stress-strain data for an SAE 1010 steel...Crack-extension-force for a crack at a free surface boundary...New method for analyzing slow-bend fracture tests...Effect of prefracture plastic deformation on notch-bar impact energy...New model of the NRL light-gas gun...New photographic, velocity-measuring system. - Metallurgy and ceramics: Titanium ingot melts obtained at very low pressures ...Possible solutions to the corrosion problem in steam desuperheaters of ship propulsion plants... Crack propagation tests of high-strength sheet steels using small specimens...Simple method for detecting gases entrapped within metals. - Optics: Ground-based observations of the vertical atmospheric haze structure. - Radio: Electronic digital computer control of a radio telescope for tracking the sun, moon, and planets. - Solid state physics: Form effect in linear magnetization. - Sound: Influence of chromaticity and intensity on the visual resolution of fine detail in multicolor sonar displays...Amplitude variation (drop-outs) of output signal is basis of new device for evaluating magnetic tapes employed in recording sound research data. - Published reports. - Papers by NRL staff members.

Review of the Air Force materials research and development program, by Helen E. Hines. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1957. 188p. Order from OTS. $4.75. PB 111648s3

Two hundred and seventy (270) technical reports and technical notes written during the period 1 July 1956 - 30 June 1957 are abstracted. These reports cover the following areas of research: adhesives, metallurgy, analysis and measurement, biochemistry, textiles, petroleum products, plastics, packaging, protective treatments and rubber. A contractor index, investigator index, and a numerical index of all the technical reports issued during the period March 1923 - June 1957 are provided. AD 131001. Supplement 4 to WADC TR 53-373 (PB 111537). AF WADC TR 53-373, Suppl. 4.

Wandering quadrant method, by Anthony Catana, Grant Cottam and J.T. Curtis. Wisconsin. University, Madison, Wis. Jul 1955. 14p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 124494

This method has been applied to random distributions in nature, as observed in forest trees and herbs, giving close agreement to the expected results. Contract N8 onr-3600, NR 164-056.

ATOMIC ENERGY COMMISSION REPORTS

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

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Biology and Medicine

Part I. Transfer and migration of energy in biochemical processes, by A. N. Terenin. Translated from Uspekhi Fiz. Nauk 43, 347-79(1951). Part II. Intermolecular energy transfer in the sensitized fluorescence of organic systems, by A. N. Terenin and V. L. Ermolaev. Translated from Uspekhi Fiz. Nauk 58, 37-68(1956). Technical Information Serv. Extension, Oak Ridge, Tenn. Jan. 1958. 63p. Order from OTS. $1.75. AEC-tr-3031

Summary of the radiological findings in animals from the biological surveys of 1947, 1948, 1949, and 1950, by James L. Leitch. California. Univ., Los Angeles. Atomic Energy Project. Feb. 1951. Decl. Mar. 5, 1957. Contract AT-04-1-GEN-12. 29p. Order from LC. Mi $2.70, ph $4.80. UCLA-111

Quarterly progress report for period ending June 30, 1951. California. Univ., Los Angeles, Atomic Energy Project. July 1951. Decl. Mar. 6, 1957. Contract AT-04-1-GEN-12. 94p. Order from LC. Mi $5.40, ph $15.30. UCLA-143

Quarterly progress report for period ending March 31, 1952. California. Univ., Los Angeles, Atomic Energy Project. Apr. 1952. Decl. with deletions Mar. 7, 1957. Contract AT-04-1-GEN-12. 71p. Order from LC. Mi $4.50, ph $12.30. UCLA-195(Del.)

Quarterly progress report for period ending June 30, 1952. California. Univ., Los Angeles. Atomic Energy Project. July 1952. Decl. Mar. 19, 1957. Contract AT-04-1-GEN-12. 80p. Order from LC. Mi $4.50, ph $12.30. UCLA-206

Quarterly progress report for period ending September 30, 1953. Calif. Univ., Los Angeles. Atomic Energy Project. Oct. 1953. Decl. Mar. 6, 1957. Contract AT-04-1-GEN-12. 87p. Order from LC. Mi $4.80, ph $13.80. UCLA-267

Quarterly progress report for period ending December 31, 1955. California. Univ., Los Angeles. Atomic Energy Project. Jan. 1956. Decl. Mar. 19, 1957. Contract AT-04-1-GEN-12. 111p. Order from LC. Mi $6.00, ph $18.30. UCLA-357

Localization of cerium-144 in the skeletal tissues of fetal rats, by C. Willet Asling and others. Calif. Univ., Radiation Lab., Berkeley. Oct. 1957. Contract W-7405-Eng-48. 28p. Order from OTS. $1.00. UCRL-8024

Further studies on the relationship between exposure time and depth of damage of moderate and severe cutaneous burns, by F. W. Payne and J. R. Hinshaw. Rochester. Univ., New York. Jan. 1958. Contract W-7401-Eng-49. 23p. Order from OTS. 75 cents. UR-509

Histologic studies of the early healing process in moderate second degree burns, by F. W. Payne and J. R. Hinshaw. Rochester. Univ., New York. Feb. 1958. Contract W-7401-Eng-49. 21p. Order from OTS. 75 cents. UR-514

Effects of some locally applied medications on the healing of second degree burns, by J. R. Hinshaw and H. E. Pearse. Rochester. Univ., New York. Feb. 1958. Contract W-7401-Eng-49. 14p. Order from OTS. 50 cents. UR-518

Chemistry—General

Nuclear chemical research radiochemical separations and activation analysis. Progress report 6. November 1956 - October 1957. Univ. of Michigan. Ann Arbor, Mich. Nov. 1957. Contract AT(11-1)-70. 81p. Order from OTS. $2.25. AECU-3641

Chemical development status report for week ending April 13, 1956, by R. E. Blanco and D. E. Ferguson. Oak Ridge National Lab., Tenn. Apr. 1956. Decl. with deletions Mar. 14, 1957. Contract W-7405-Eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-56-4-164(Del.)

Heat capacity of composition No. 100, by W. D. Powers and G. C. Blalock. Oak Ridge National Lab., Tenn. May 1956. Decl. July 5, 1957. Contract W-7405-Eng-26. 2p. Order from LC. Mi $1.80, ph $1.80 CF-56-5-67

A study of dilute solutions in the system, UO_2SO_4-$CuSO_4$-$NiSO_4$-H_2SO_4-H_2O, by F. E. Clark and others. Oak Ridge National Lab., Tenn. May 1956. Decl. Mar. 13, 1957. Contract W-7405-Eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-56-5-114

Heat removal from zirconium hydrochlorination, by R. J. McNamee. Oak Ridge National Lab., Tenn. May 1956. Decl. with deletions Mar. 13, 1957. Contract W-7405-Eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-56-5-193 (Del.)

Status report for chemical development, Sections A and B: Week ending August 31, 1956, by R. E. Blanco and D. E. Ferguson. Oak Ridge National Lab., Tenn. Sept. 1956. Decl. with deletions Mar. 13, 1957. 10p. Order from LC. Mi $1.80, ph $1.80. CF-56-9-41 (Del.)

Status report for chemical development-Sections A and B: Week ending Sept. 14, 1956, by R. E. Blanco and D. E. Ferguson. Oak Ridge National Lab., Tenn. Sept. 1956. Decl. with deletions Mar. 13, 1957. Contract W-7405-Eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-56-9-113 (Del.)

Solubility of $BiPO_4$ in HNO_3. Final report on problem assignment No. 202-X59C--solubility and rate of solution of $BiPO_4$ in HNO_3, by G. R. Leader. Clinton Labs., Oak Ridge, Tenn. July 1944. Decl. Apr. 4, 1957. Contract W-7405-Eng-39. 40p. Order from LC. Mi $3.00, ph $6.30. CN-1863

Development report for electrolytic cell, by C. G. Williams and G. R. Peterson. General Electric Co. General Engineering and Consulting Lab., Schenectady, N. Y. May 1950. Decl. Feb. 18, 1957. 22p. Order from LC. Mi $2.70, ph $4.80. EAH-135

Zirconium phenylarsonate tracer scale method for the differentiation of Pu(III) and Pu(IV) in Redox solutions, by C. H. Ice. Hanford Works, Richland, Wash. June 1948. Decl. Feb. 18, 1957. Contract W-31-109-Eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. HW-10277

Use of minute amounts of sodium dichromate as a corrosion inhibitor in single pass aluminum systems, by D. R. DeHalas. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Nov. 1954. Decl. Jan. 7, 1958. Contract W-31-109-Eng-52. 36p. Order from LC. Mi $3.00, ph $6.30. HW-33736

An apparatus for the determination of total gas in fuel element samples, by R. I. Miller. Hanford Atomic Products Operation, Richland, Wash. July 1957. Contract W-31-109-Eng-52. 10p. Order from OTS. 50 cents. HW-51452

Standardization of plutonium solutions by ignition to the oxide, by W. W. Mills. Hanford Atomic Products Operation. Richland, Wash. Aug. 1957. Decl. December 2, 1957. Contract W-31-109-Eng-52. 9p. Order from OTS. 50 cents. HW-51822

Examination of boron content in ETR 1-4 fuel element by means of fuel scan and transmission measurements, by W. C. Francis. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. May 1956. Contract AT-10-1-205. 9p. Order from LC. Mi $1.80, ph $1.80. IDO-16354

Steric effects on the formation constant of metal chelates of beta-diketones, by G. A. Guter and G. S. Hammond. Ames Laboratory. Iowa State College, Ames, Iowa. Aug. 1955. Contract W-7405-Eng-82. 61p. Order from OTS. $1.75. ISC-673

Flow of an aqueous slurry through a vertical tube, by Harold E. Wolfe and Glenn Murphy. Ames Laboratory. Iowa State College. Ames, Iowa. Mar. 1957. Contract W-7405-Eng-82. 70p. Order from OTS. $2.00. ISC-874

Electronic specific heat of sodium tungsten bronze, by Robert W. Vest, M. Griffel and J. F. Smith. Ames Lab., Iowa State College. Ames, Iowa. Mar. 1957. Contract W-7405-Eng-82. 75p. Order from OTS. $2.00. ISC-899

Semi-annual summary research report in chemistry for January - June, 1957, by Ames Laboratory Staff. Ames Lab. Iowa State College. Ames, Iowa. Sept. 1957. Contract W-7405-Eng-82. 67p. Order from OTS. $1.75. ISC-902

Mass transfer in low velocity gas streams, by John E. Frandolig and R. W. Fahlen. Ames Laboratory. Iowa State College. Ames, Iowa. June 1957. Contract W-7405-Eng-82. 72p. Order from OTS. $2.00. ISC-908

Simultaneous single element air temperature and velocity measurements, by James E. Benjamin and R. W. Fahlen. Ames Laboratory, Iowa State College. Ames, Iowa. June 1957. Contract W-7405-Eng-82. 65p. Order from OTS. $1.75. ISC-909

Reactor fuels suspended in liquid metals - II Fuel preparation and capsule studies of liquid metal-UO_2 slurries, by F. K. Heumann, O. N. Salmon and E. A. Wilk. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 40p. Order from OTS. $1.25. KAPL-1672

Electrolytic recycle method for the treatment of radioactive nitric acid waste, by H. W. Alter and others. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 74p. Order from OTS. $2.00. KAPL-1721

Electrokinetic processes--nuclear aspects. Quarterly progress report for February 1, 1956-April 30, 1956, by H. F. Reichard and others. Vitro Laboratories. West Orange, New Jersey. May 1956. Decl. Mar. 15, 1957. Contract AT 30-1-850. Vitro Job 2018. 14p. Order from OTS. 50 cents. KLX-10029

Fluidization in tapered beds, by W. R. Rossmassler and R. L. Harris. Union Carbide Nuclear Co., a division of Union Carbide Corp. Paducah Plant. Paducah, Kentucky. Feb. 1958. Contract W-7405-Eng-26. 19p. Order from OTS. 50 cents. KY-240

A glass-metal vacuum system, by George L. Fox and Ernest Paige. Mound Laboratory. Monsanto Chemical Company. Miamisburg, Ohio. n. d. Contract AT 33-1-GEN-53. 9p. Order from OTS. 50 cents. MLM-1015

The density, viscosity, and surface tension of light and heavy water solutions of uranyl sulfate at temperatures to 250°C, by M. K. Barnett, and others. (Final report). Mound Laboratory. Monsanto Chemical Co. Miamisburg, Ohio. Dec. 1954. Decl. Apr. 2, 1956. Contract AT-33-1-GEN-53. 28p. Order from OTS. 75 cents. MLM-1021

Reactions of the glycosylamines, by Horace S. Isbell and Harriet L. Frush. National Bureau of Standards, Washington, D. C. Dec. 1957. 42p. Order from OTS. $1.25. NBS-5325

Recording thermogravimetric balance, by F. M. Teetzel and others. Technical Division of National Lead Company of Ohio. Cincinnati, Ohio. Jan. 1958. Contract AT(30-1)-1156. 15p. Order from OTS. 75 cents. NLCO-713

Chemistry division quarterly progress report for period ending March 31, 1951. Oak Ridge National Lab., Tenn. Oct. 1951. Decl. Mar. 19, 1957. Contract W-7405-Eng-26. 149p. Order from LC . Mi $7.20, ph $22.80. ORNL-1053

Explosion and detonation properties of mixtures of hydrogen, oxygen, and water vapor, by T. H. Pigford. Oak Ridge National Lab., Oak Ridge, Tenn. Aug. 1952. Decl. Feb. 24, 1958. Contract W-7405-Eng-26. 89p. Order from OTS. $2.25. ORNL-1322

Statistical evaluation of methods for the analysis of dibasic aluminum nitrate (Diban), by J. G. Surak and P. F. Thomason. Oak Ridge National Lab., Oak Ridge, Tenn. Sept. 1955. Decl. Mar. 22, 1957. Contract W-7405-Eng-26. 41p. Order from OTS. $1.25. ORNL-1931

Methods of analysis of anisole-BF_3 solutions, by H. P. House and others. Oak Ridge National Lab. Oak Ridge, Tenn. Jan. 1956. Decl. Mar. 26, 1957. Contract W-7405-Eng-26. 25p. Order from OTS. 75 cents. ORNL-2014

Analytical chemistry division semiannual progress report for period ending April 20, 1956, by H. P. Raaen, ed. Oak Ridge National Lab., Tenn. May 1956. Decl. with deletions Mar. 1, 1957. Contract W-7405-Eng-26. 59p. Order from LC. Mi $3.60, ph $9.30. ORNL-2070 (Del.)

Kinetics of the thermal decomposition of uranyl fluoride. I. Preliminary results, by L. M. Ferris and E. F. Gabbard. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 24p. Order from OTS. 75 cents. ORNL-2401

Solubility relations among some fission product fluorides in NaF-ZrF_4-UF_4 (50-46-4 mole %), by W. T. Ward and others. Oak Ridge National Lab., Tenn. n. d. Contract W-7405-Eng-26. 35p. Order from OTS. $1.25. ORNL-2421

Analytical chemistry division annual progress report for period ending December 31, 1957, by M. T. Kelley and C. D. Susano and others. Oak Ridge National Lab., Tenn. n. d. Contract W-7405-Eng-26. 103p. Order from OTS. $2.75. ORNL-2453

Master analytical manual. ORNL Analytical Chemistry Division. Oak Ridge, Tenn. Nov. 1957. 156p. Order from OTS. $3.50. TID-7015 (Sections 3 and 5)

Heats of sublimation of the elements, by Leo Brewer. Calif. University. Radiation Lab., Berkeley. Jan. 1958. Contract W-7405-Eng-48. 5p. Order from OTS. 50 cents. UCRL-2854 (2nd Rev.)

Decay studies of some neutron-deficient isotopes of antimony and tellurium (thesis), by Ann Rhodes. Calif. University. Radiation Lab., Berkeley. Aug. 1957. Contract W-7405-Eng-48. 23p. Order from LC. Mi $2.70, ph $4.80. UCRL-3879

Synthesis and storage of small quantities of tritiated water, by Irville M. Whittemore and Richard L. Lehman. Calif. University. Radiation Lab., Berkeley. Nov. 1957. Contract W-7405-Eng-48. 10p. Order from OTS. 50 cents. UCRL-8056

Chemistry division quarterly report - September, October, November 1957. Calif. University. Radiation Lab., Berkeley. Dec. 1957. Contract W-7405-Eng-48. 83p. Order from OTS. $2.25. UCRL-8141

Analytical laboratory process improvement report - November 1948. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Dec. 1948. Decl. Mar. 7, 1957. Contract W-7405-Eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. Y-301

Purification of calcium by distillation semiworks development, by W. M. Leaders, C. C. Haws, and G. B. Marrow. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Feb. 1949. Decl. with deletions Mar. 5, 1957. Contract W-7405-Eng-26. 32p. Order from LC. Mi $3.00, ph $6.30. Y-348 (Del.)

Manual of procedure for normal accountability laboratory, by R. C. McIlhenny, ed. Carbide and Carbon Chemicals Co., Y-12 Area, Oak Ridge, Tenn. Mar. 1952. Decl. Mar. 9, 1957. Contract W-7405-Eng-26. 153p. Order from LC. Mi $7.50, ph $24.30. Y-B41-484

Description of permanent zirconium plant. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. Sept. 1951. Decl. Mar. 9, 1957. 13p. Order from LC. Mi $2.40, ph $3.30. Y-B46-114

Chemistry—Radiation and Radiochemistry

Development of isotope production in the USSR, (Razvitiye proizvodstva izotopov v SSSR), by Yu. S. Frolov, V. V. Bochkarve, and E. E. Kulish. Tech. Information Service Ext., Oak Ridge, Tenn. (Booklet published by the All-Union Scientific-Technical Conference on the Utilization of Radioactive and Stable Isotopes and Radiations in the National Economy and in Science, and the USSR Academy of Sciences. Moscow, 1957). n. d. 14p. Order from OTS. 50 cents. AEC-tr-3093

Predictions on the chemical behavior of iodine in an LMFR fuel, by O. E. Dwyer. Brookhaven National Lab., Upton, N. Y. Apr. 1957. 13p. Order from OTS. 50 cents. BNL-454

Radiation damage problems in the ICPP barium-140 separation process, by R. L. Andelin. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Nov. 1955. Decl. Feb. 23, 1957. Contract AT(10-1)-205. 50p. Order from LC. Mi $3.30, ph $7.80. IDO-14348

Startup operation of a production facitity for separating barium-140 from MTR fuel, by B. M. Legler and others. Phillips Petroleum Co. Idaho Falls, Idaho. Sept. 1957. Contract AT (10-1)-205. 215p. Order from OTS. $5.50. IDO-14414

Radiochemical studies of mercury and its ions in dilute solutions, by Herbert C. Moser and Adolf Voigt. Ames Laboratory. Iowa State College, Ames, Iowa. Mar. 1957. Contract W-7405-Eng-82. 70p. Order from OTS. $2.00. ISC-892

Effects of alpha particles on chlorine trifluoride gas, by W. S. Wendolkowski and W. Davis, Jr. Carbide and Carbon Chemicals Co. Union Carbide and Carbon Corp. K-25 Plant. Oak Ridge, Tenn. July 1953. Decl. Dec. 12, 1957. Contract W-7405-Eng-26. 21p. Order from OTS. 75 cents. K-1027

Report for general research - April 1 - June 26, 1950. (Radium Volume). Mound Laboratory. Operated by Monsanto Chemical Co. Miamisburg, Ohio. July 1950. Decl. Mar. 11, 1957. Contract AT-33-1-GEN-53. 91p. Order from OTS. $2.25. MLM-475

Report for general research - June 26 to September 18, 1950. (Radium Volume). Mound Laboratory, operated by Monsanto Chemical Co., Miamisburg, Ohio. Oct. 1950. Decl. Apr. 18, 1957. Contract AT-33-1-GEN-53. 90p. Order from OTS. $2.25. MLM-498

Absorption cross section of actinium-227, by D. L. Timma and L. N. Russell. (Final report). Mound Laboratory, operated by Monsanto Chemical Co. Miamisburg, Ohio. Aug. 1952. Decl. Mar. 19, 1957. Contract AT-33-1-GEN--53. 8p. Order from OTS. 50 cents. MLM-744

Decomposition under pile radiation of concentrated sulfuric acid and solutions of hexavalent uranium in concentrated sulfuric acid, by J. W. Boyle and A. O. Allen. Oak Ridge National Lab., Oak Ridge, Tenn. Sept. 1948. Decl. Dec. 12, 1957. Contract AT-33-1-GEN-53. 10p. Order from OTS. 50 cents. ORNL-155

Laboratory development of the Versene process for the purification of radiobarium by ion exchange, by E. Blanco and A. H. Kibbey. Oak Ridge National Lab., Oak Ridge Tenn. July 1951. Decl. Mar. 8, 1957. Contract W-7405-Eng-26. 36p. Order from LC. Mi $3.00, ph $6.30. ORNL-625

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Properties and settling rates of 101-U sludge-supernate slurries, by R. B. Richards. Hanford Works, Richland, Wash. June 1950. Decl. Feb. 19, 1957. Contract W-31-109-Eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-18128

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KAPL-M-CVL-4 (Del.)

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LA-1958 (deleted)

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RME-3143

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Detection of air-borne beryllium dust, by R. Gold and C. A. Stone. Armour Research Foundation. Illinois Institute of Technology. Chicago, Ill. (Final report covering period from May 1955 to February 1957. Project No. A-057). Apr. 1957. Contract No. AT (11-1)-346. 83p. Order from OTS. $2.25. AECU-3505

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Suggested urinary tolerance levels for enriched uranium, by John B. Hursh. Rochester University. New York. Feb. 1958. Contract W-7401-Eng-49. 15p. Order from OTS. 50 cents. UR-515

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Land crabs and radioactive fallout at Eniwetok Atoll, by Edward E. Held. Applied Fisheries Lab., University of Washington, Seattle, Wash. May 1957. Contract AT(45-1)-540. 37p. Order from OTS. $1.25. UWFL-50

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Progress report I - Thermocouple research report for period - November 1, 1956 to October 31, 1957, by David L. McElroy. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26, subcontract 1072. 95p. Order from OTS. $2.75. ORNL-2467

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Conical scanner for circular array, by S. Stan Locus. Report edited and Appendix A by H. George Oltman, Jr. Sandia Corp. Albuquerque, N. Mex. Jan. 1954. Contract AT-(29-1)-789. 44p. Order from OTS. $1.25. SCTM222-53(54)

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National Laboratory. Lemont, Ill. Feb. 1958. Contract W-31-109-Eng-38. 295p. Order from OTS. $6.00. ANL-5628

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