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Office of Technical Services

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U. S. GOVERNMENT RESEARCH REPORTS

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OFFICE OF TECHNICAL SERVICES

U. S. Government RESEARCH REPORTS

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APPAREL

Shipboard evaluation of flight deck clothing - Operation "SNOWBALL", by J. Naimer and F. S. Andruk. U.S. Bureau of Supplies & Accounts. Navy Clothing & Textile Office. Jan 1958. 15p photos. Order from LC. Mi $2.40, ph $3.30.

PB 133501

Project NT001-052.04. 1. Clothing, Cold weather - Materials 2. Clothing, Protective - Restrictive effects 3. Clothing, Aircraft carriers - Identification 4. NAVSANDA RDD 18

BIBLIOGRAPHY

Bibliography of Soviet research on radiowave propagation and antennas, compiled by N. A. Logan and R. Flynn. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antennas Laboratory, Bedford, Mass. Jul 1957. 24p. Order from LC. Mi $2.70, ph $4.80.

PB 132339

AD 133638. 1. Radio waves - Propagation - Bibliography - Russia 2. Antennas - Bibliography - Russia 3. AF CRC TN 57-113

Bibliography on surface hardening of titanium and titanium alloys. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Mar 1957. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134566

1. Titanium - Hardening, Surface -Bibliography 2. Titanium alloys - Hardening, Surface - Bibliography

Chemical fragments as ultra-energy propellants. Aerojet-General Corp., Azusa, Calif. Contract AF 18(603)-110. Order separate parts described below from LC, giving PB number of each part ordered.

Abstracts bulletin no. 2, by W.H. Andersen, J.H. Abraham, and others. Oct 1957. 57p. Mi $3.60, ph $9.30. PB 133346

The Aerojet-General Corporation is investigating certain ultra-energy substances as potential propellants for rocket propulsion. These investigations have necessitated an extensive review of the literature concerned with chemical fragments, embracing the related subjects of production, identification, stabilization, and determination of properties. The ultra-energy substances include charged (ions) and uncharged (free radicals) molecular fragments. AD 136692. Aerojet TN-22. AF OSR TN 57-609.

Abstracts bulletin no. 3, by W.H. Andersen, L.H. Baum, and G. Moe. Mar 1958. 24p. Mi $2.70, ph $4.80. PB 133987

The ultra-energy substances include charged (ions) and uncharged (free radicals) molecular fragments. It was felt that the information accumulated in the Aerojet-General file of reference abstracts would be beneficial to other workers in the field. It is the purpose of this bulletin to help make the information generally available. AD 154125. Project 37507. Aerojet TN 25. AF OSR TN 58-233.

Contributions published or accepted for publication in periodicals. Final report on Contract N7 onr-295/XIII, NR 042-036, for the period 1 Feb 1948-31 Dec 1955, by J. Neyman. California. University. Dept. of Statistics, Berkeley, Calif. Feb 1956. 10p. Order from LC. Mi $1.80, ph $1.80. PB 126926

1. Statistical theory

Final report under Contract N5 ori-07660: Total publications under Contract. Harvard University, Cambridge, Mass. n.d. 3p. Order from LC. Mi $1.80, ph $1.80. PB 127453

Date is 1956 or later. 1. Dehydrogenase - Bibliography 2. Flame - Spectrographic analysis - Bibliography 3. Contract N5 ori-07660, Final report

Literature of space science and exploration, compiled by Mildred Benton. U.S. Naval Research Laboratory. Sep 1958. 277p. Order from OTS. $4.00. PB 131755

Bibliography of literature from 1903 through June 1958, both theoretical and applied. References are listed chronologically, with short summaries. NRL B 13.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Comparison of strains of acid-fast bacilli with special reference to drug sensitivity, by J. Carroll Bell, H.D. Olson, and Dick K. Riemensnider. Colorado. University, Denver, Colo. Mar 1956. 28p tables. Order from LC. Mi $2.70, ph $4.80. PB 125627

Objectives were: A. Comparisons between acid-fast bacilli which are sensitive and those which are resistant to isonicotinic acid hydrazide. B. A comprehensive study of "Wild Saprophytic" atypical acid-fast bacilli including bacteriological studies, clinical studies, histopathological studies in experimental animals, and hypersensitivity reactions in animals and in human beings. Final report covering period 1 Oct 1954-31 Jan 1956 under Contract Nonr-1063(00), NR 132-175.

Neutral metabolism in relation to function. Final report covering period Sep 1954-Aug 1956, under Contract N6 ori-071, by L.G. Abood. Illinois. University. Neuropsychiatric Institute, Chicago, Ill. Mar 1957. 9p. Order from LC. Mi $1.80, ph $1.80. PB 132639

A number of neurotropic drugs have been tested for their effect on oxidative phosphorylation of brain mitochondria, and an effect has been made to correlate physical properties and chemical constitution of such substances with their biochemical effects. Among such agents are the tranquilizing drugs, particularly those having a pnenothiazine or indole-like (Reserpine) structure. The problem of their inhibitory effect on oxidative phosphorylation has been explored both in vitro and in vivo, with the view in mind of determining precisely where in the central nervous system the agents are having an effect biochemically.

Acidolysis reactions for the system bis(2-ethylhexyl) sebacate, sebacic acid, and 2-ethylhexyl hydrogen sebacate, by Floyd L. James, C.M. Murphy, and J.G. O'Rear. U.S. Naval Research Laboratory. Aug 1958. 13p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134251

Pure 2-ethylhexyl hydrogen sebacate, reported to be the corrosive component in MIL-L-7808 oils, has been synthesized and characterized. Acidolysis of diester and sebacic acid to form the half ester is not the mechanism responsible for the formation of this compound in stored MIL-L-7808 oils. However, at engine operating temperatures, acidolysis reactions are significant. At diester pyrolysis temperatures, acidolysis reactions may play a major role in determining the relative concentrations of the products formed. NRL R 5181.

Dehydration of lead styphnate monohydrate, by Ted B. Flanagan. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. May 1958. 14p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 134621

The dehydration of lead styphnate has been studied in vacuo from 100°-130°C; it is found to dehydrate at a constant rate over a large range. The influence of water vapor has been examined at 120°C over a range of pressures. Material dehydrated at the maximum is found to differ quite markedly from material dehydrated in vacuo. The rate of rehydration is much slower, and the subsequent decomposition is different. Ord project TB 3-0115. DA project 503-05-021. PA TR-2514.

Evaluation of inductive and resonance effects in reactivity. II: Thermodynamic properties of hydrogenation of non-conjugated olefins, aldehydes and ketones. III: Extra resonance energies of conjugation, by Maurice M. Kreevoy and Robert W. Taft, Jr. Feb 1957. Pennsylvania State University. College of Chemistry and Physics, University Park, Pa. Feb 1957. 45p tables. Order from LC. Mi $3.30, ph $7.80. PB 132484

An equation is derived for the effect of unconjugated substituents on the enthalpies of hydrogenation of mono- and trans-disubstituted ethylenes and on the free energies of hydrogenation of carbonyl compounds. This empirical relationship is suggested by and is correlated with the hypothesis that polar and hyperconjugative effects of the substituents contribute approximately additively to give the observed effect on the thermodynamic property. This hypothesis unifies diverse observed effects of substituents with theory. Evidence is obtained that hyperconjugation stabilization is much less susceptible to electron demand at the reaction center than is stabilization by inductive electron-release. For Part I see PB 119929. Contract Nonr-656(05), NR 055-328.

Evaluation of polar and steric effects on reactivity. Acid- and base-catalyzed rates of methanolysis of (-)-menthyl esters in methanol, by William A. Pavelich and Robert W. Taft, Jr. Pennsylvania State University, College of Chemistry and Physics, University Park, Pa. Jun 1955. 40p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127264

The benzenesulfonic acid-catalyzed and the sodium methoxide-catalyzed rates of methanolysis of a series of (-)-menthyl esters of the general formula, $RCO_2C_{10}H_{19}$, have been determined polarimetrically in methanol at 30°. The kinetics of both reactions are first order in the ester and in the catalyst, and fission occurs at the acyl carbon-oxygen bond. Contract Nonr 656(05), NR 055-328.

Final technical report under Contract AF 18(600)-430, by R.C. Anderson, Lewis F. Hatch, and F.A. Matsen. Texas. University. Chemistry Division, Austin, Tex. Dec 1956. 21p. Order from LC. Mi $2.70, ph $4.80. PB 134592

Results of the investigations of kinetics of elemental processes in flames - particularly the self-combustion or decomposition flames of acetylene - carried out under this contract are summarized briefly. A bibliography of the technical notes, theses and dissertations, and outside publications which give the details of the work is given. The nature of the reaction mechanisms involved in flame propagation is discussed. AD 115028. Contract AF 18(600)-430. AF OSR TR 65-63.

Fluorescence and conductivity phenomena, by Hartmut Kallmann. New York University, Washington Square College of Arts and Sciences. Physics Dept., New York, N.Y. Contract DA 36-039-sc-35. Order separate parts described below from LC, giving PB number of each part ordered.

1st quarterly progress report for Jan 1950. Apr 1950. 75p photos, diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 132359

1. Fluorescent materials, Radioactive
2. Liquids - Gamma reactions
3. Liquids - Conductivity
4. Crystals - Structure - Radiation effects

Progress report no. 2, covering the period Apr-Jun 1950. Jul 1950. 87p photos, diagrs, graphs, tables. Mi $4.80, ph $13.80. PB 132357

Contents: Part I. Fluorescence of organic solutions and crystal powders. - Part II. Time constant measurements with different fluorescent materials. - Part III. Induced conductivity in insulating crystals.

Progress report no. 3, covering the period Jul-Sep 1950. Oct 1950. 39p photos, graphs, tables. Mi $3.00, ph $6.30. PB 132358

A theory was developed to explain the light emission of dilute organic solutions excited by high energy radiation. Sections B and C report on further experiments bearing out the theory. Section D describes experiments with mixed solutions where practically no absorption occurs, but where the maximum intensity of the emitted light and the concentration for maximum intensity are changed by the addition of fairly small amounts of additional solute.

Progress report no. 4, covering the period 1 Jan 1950-31 Jan 1951. May 1951. 72p diagrs (1 fold), graphs, tables. Mi $4.50, ph $12.30. PB 132356

Summarizes work done under this contract and includes table of contents for the four reports, divided into: Apparatus and methods, experimental results, and theoretical results. Continued under Contract DA 36-039-sc-5487.

Fluorescence and conductivity phenomena, by Hartmut Kallmann. New York University. Washington Square College of Arts and Sciences. Physics Dept., New York, N.Y. Contract DA 36-039-sc-5487. Order separate parts described below from LC, giving PB number of each part ordered.

Progress report no. 1, for the period Feb-Apr 1951. May 1951. 71p diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 127383

The following main subjects were investigated I. Fluorescence of solutions under gamma and alpha irradiation and their dependence on concentration of solutes; II. Fluorescence, stimulation of stored energy and phosphorescence, stimulation of stored energy and phosphorescence in different activated alkali-halide crystals when excited by high energy radiation; III. Light emission and energy storage of substances of the type of zinc sulfide under high energy irradiation; and, IV. The conductivity induced by light, alpha particles, and fast electrons in similar types of materials. Continues work under Contract DA 36-039-sc-35.

Progress report no. 2, for the period May-Jul 1951. Oct 1951. 56p photos, diagrs, tables. Mi $3.60, ph $9.30. PB 127382

The work done during the period covered the following subjects: The determination of the physical light efficiency of solutions and their theoretical interpretation; the investigation of the energy storage induced by high energy radiation and the release of this energy by light in different inorganic crystals in particular alkali halide crystals, ZnCd, and earth alkali sulfide phosphors; the determination of induced electric conductivity in different inorganic phosphors and the investigation of very high energy particles (cosmic ray particles) in a triple coincidence scintillation arrangement.

Progress report no. 3, for the period Aug-Oct 1951. Dec 1951. 53p diagr, graphs, tables. Mi $3.60, ph $9.30. PB 127381

This report deals mainly with the experimental and theoretical investigation of the physical efficiency of fluorescence of solutions and the light output of different crystals under gamma ray and alpha particle excitation. Besides these investigations, the work on other fields such as described in previous reports has been continued. In the field of storage of energy and its stimulation by light in inorganic crystals, especially the mechanism of the stimulating and quenching processes, have been explored more in detail. In the experiments on the effects of cosmic rays in liquid scintillation counters, several thousand tracks have been observed and analyzed. In the field of induced conductivity, the previously described A.C. method has been further developed, and interesting results have been obtained.

Progress report no. 4, for the period Nov 1951-Jan 1952. May 1952. 89p diagr, graphs, tables. Mi $4.80, ph $13.80. PB 128287

Part I is a review of the fluorescence of organic molecules. Part II is investigations of different storage phosphors, including a survey of evidence found for the existence of different kinds of traps. Part III is an investigation of the conductivity of fluorescent powders, by impedance measurements with A.C. fields. Part IV reports on preliminary results obtained with the coincidence method for investigating very high energy radiations using scintillations in liquids.

Progress report no. 5, for the period Feb-Apr 1952. Jul 1952. 95p photo, diagr, graphs, tables. Mi $5.40, ph $15.30. PB 128286

Contents: Part I. Status of high energy radiation measurements with the aid of luminescent material. - Part II. Supplement to Part I. - Part III. High energy induced fluorescence, phosphorescence, energy storage and energy release by light in activated alkali-halide crystals. - Part IV. Decay of stimulability as a function of the time between excitation and stimulation.

Progress report no. 6, for the period May-Jul 1952. Oct 1952. 73p diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 128285

Contents: Part I. Fluorescence of organic molecules. - Part II. Investigation of light emission as a function of time. - Part III. Investigation of storage phosphors.

Progress report no. 7, for the period Aug-Oct 1952. Mar 1953. 72p diagr, graphs, tables. Mi $4.50, ph $12.30. PB 128284

The fluorescent light efficiencies under gamma ray excitation of about 150 substances in solution compared to that of an equal mass of a crystal of anthracene are presented in Part I. Part II investigates the influence of heat on storage decay, and gives a new method of calibrating circuit and resistance. Part III reports on A.C. conductivity investigation with different fluorescent powders.

Progresss report no. 8. Aug 1953. 39p diagr, graph, tables. Mi $3.00, ph $6.30. PB 128283

Contents: Part I. Theoretical considerations on the fluorescent of organic molecules. - Part II: Fluroescent light yields under alpha, beta and gamma irradiation. - Part III: Phosphoresecence and photostimulation of NaCl (AgCl) with high energy excitation.

Free radical chemistry. I. Effect of azomethane on the photolysis of acetaldehyde, by F.G. Crider and O.K. Rice. II: Photolysis of azoethane, by M.T. Jaquiss and O.K. Rice. Final report for the period 1 Mar 1949-30 Jun 1955, under Contract N8 onr-779(00), NR 056-188. North Carolina. University. Dept. of Chemistry, Chapel Hill, N.C. Jul 1955. 37p diagr, tables. Order from LC. Mi $3.00, ph $6.30. PB 126919

1. Free radicals - Chemical reactions
2. Acetaldehyde - Decomposition
3. Azo compounds - Reactions

Hydrocarbon oxidation initiated by atomic hydrogen, by Elmer J. Badin. Princeton University. Dept. of Chemistry, Princeton, N.J. Jun 1949. 8p tables. Order from OTS. 50 cents. PB 131877

This paper summarizes work on the initiation of hydrocarbon oxidation (methane, propane, propylene, n-butane, iso-butane, 1-butene and 2-butene) by atomic hydrogen using the discharge tube method. Definite information regarding the course of the oxidation in regard to primary oxidation products and relative rates of oxidation is presented. Particular attention has been paid to iso-butane. A discussion of the results obtained is given. Technical memorandum PR-13. Project Squid. Project Bumblebee. Contract N6 ori-105, T.O., Phase 2, NR 220-038.

Internal barrier and structure of methyl silane, by R.W. Kilb and Louis Pierce. Harvard University. Dept. of Chemistry, Cambridge, Mass. Jun 1956. 1p. Order from LC. Mi $1.80, ph $1.80. PB 126922

Abstract for the Columbus Symposium on Spectroscopy, June 1956. 1. Silane, Methyl - Molecular structure 2. Contract N5 ori-76, T.O. V

Internal barrier height of methyl mercaptan, by Ralph W. Kilb, Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 127097

Splitting of rotational lines in the ground vibrational state is investigated. Contract N5 ori-76, T.O.V.

Internal barrier in CH_3CH_2F and CH_3CHF_2 from torsonial satellites, by Dudley R. Herschbach. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 4p table. Order from LC. Mi $1.80, ph $1.80. PB 127393

Date is 1955 or later. 1 Ethyledene fluoride - Molecular structure 2. Ethyl fluoride - Molecular structure 3. Contract N5 ori-1866, T.O. XIV

Intermolecular forces and pressure shifts of the spectra of aromatic hydrocarbons, by W.W. Robertson, S.E. Babb, Jr., and O.E. Weigang, Jr. Texas. University, Austin, Tex. n.d. 37p photo, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 132292

The absorption spectra of liquid benzene and of benzene, several monosubstituted benzenes, and a number of condensed ring aromatics in solution in n-pentane have been recorded at hydrostatic pressures up to 6000 bars. The vapor spectrum of benzene in various diluent gases has been taken over a wide density range and in carbon dioxide at temperatures above and below the critical temperature. Various theoretical interpretations are considered. Date is 1957 or later. Contract AF 49(638)-35. AF OSR TN 57-601.

Liquid phase photolysis of diethyl ketone and methyl ethyl ketone, by P. Ausloos. Rochester. University, Rochester, N.Y. Jun 1957. 24p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 132306

AD 132391. 1. Ketones, Diethyl - Photochemical reactions 2. 2-Butanone - Photochemical reactions 3. Contract AF 18(600)-1528 4. AF OSR TN 57-320

Metal ion complexes of 2-(2-aminoethylamino) ethanol: Reaction of copper (II) complexes with sodium hydroxide. Technical report no. 1 cover-

ing period 1 Jun - 1 Oct 1957, under Contract no. DA 36-061-ORD-579, by James L. Hall and Warren E. Dean. West Virgina. University. Dept. of Chemistry, Morgantown, W. Va. Nov 1957. 27p graphs. Order from LC. Mi $2.70, ph $4.80. PB 133154

In solution 2-(2-aminoethylamino) ethanol (hydroxyethylenediamine, abbreviated HEN) forms complexes with copper (II) ion in the ratio Cu(II): HEN of 1:1 and 1:2. The reaction of these complexes with further amine and with sodium hydroxide in solution has been studied by spectrophotometric, conductometric and potentiometric methods. AD 137030. Dept. of the Army. project no. 5B99-01-004. ORD project no. BR-CI (TB 2-001). Contract DA 36-061-ORD-579, Technical report no. 1.

Microwave spectrum and barrier to internal rotation in CH_3BF_2, by Robert E. Naylor, Jr. and E. Bright Wilson, Jr. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 127396

The microwave spectrum of CH_3BF_2 has been observed in the frequency range 12-33 kmc. The identifiable lines are explained in terms of a model consisting of a symmetric top (CH_3) rotating with respect to an asymmetric framework (BF_2) with the top axis coinciding with the (least) principal inertial axis of the molecule. The value of the barrier to internal rotation was determined to be 13.77 $\pm$ .03 calories. Three moments of inertia were also obtained from the analysis: A = 10586.73 (BF_2 group only), B = 8329.01, C = 4650.52 Mc. These are insufficient to determine the molecular structure, but are consistent with the structure reported from electron diffraction. Stark effect measurements yield a dipole moment of 1.67 + .02 D. Date is 1955 or later. Contract N5 ori-76, T.O.V.

Microwave spectrum of methyl difluorosilane, by Jerome D. Swalen. Harvard University. Dept. of Chemistry, Cambridge, Mass. Jun 1956. 1p. Order from LC. Mi $1.80, ph $1.80. PB 126923

Abstract for Columbus Symposium on Spectroscopy, Jun 1956. 1. Silane, Difluoro methyl - Spectrographic analysis 2. Contract N5 ori-76, T.O. V

Partial oxidation of propane, by C.N. Satterfield and R.E. Wilson. Massachusetts Institute of Technology. Division of Industrial Cooperation, Cambridge, Mass. Apr 1953. 42p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134588

The oxidation of propane was studied extensively in a flow system at inlet temperatures of 475°C, the temperature region considered most suitable for hydrogen peroxide formation and for which only limited information was previously available. Studies were conducted also at 375°C. AD 8946. DIC 6552. Contract N5 ori-07819, NR 092-008. MIT DIC R 37.

Photochemistry of 2-hexanone vapor, by V. Brunet and W. Albert Noyes, Jr. Rochester. University, Rochester, N.Y. Oct 1957. 11p table. Order from LC. Mi $2.40, ph $3.30. PB 133179

AD 136727. Chem 20-10. 1. 2-Hexanone - Photochemical reactions 2. Contract AF 18(600)-1528 3. AF OSR TN 57-741

Plantarity of the formic acid monomer, by Ralph Trambarulo, Arthur Clark, and Charles Hearns. Delaware. University. Dept of Physics, Newark, Del. Sep 1957. 9p diagr, tables. Order from LC. Mi $1.80, ph $1.80. PB 132293

Lines in the microwave spectrum of formic acid which were found between 8.7 and 58.8 kMc have been identified. From these assignments the three principal moments of inertia were calculated, and the molecule was found to be planar. AD 136608. Project no. R-357-10-4. Contract AF 18(600)-449. AF OSR TN 57-619.

Radiation synthesis of fluorinated aromatic compounds, by Paul Y. Feng and Ljerka Mamula. Armour Research Foundation. Physics Research Dept., Chicago, Ill. n.d. 6p graphs. Order from LC. Mi $1.80, ph $1.80. PB 133315

AD 136523. Date is 1955 or later. 1. Halogen compounds - Reactions 2. Radiochemical research 3. Chemical compounds, Organic - Radiation effects 4. Contract AF 18(603)-121 5. AF OSR TN 57-537

Some thermodynamic and flow properties of aqueous solutions of two aminosulfonic acids, by Wilbert E. Keder, T.H. Dunkelberger, Maak-Sang Tsao, and Henry S. Frank. Pittsburgh, University. Dept. of Chemistry, Pittsburgh, Pa. 1956. 71p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132327

Taurine and 2-aminobutane-1-sulfonic acid were chosen to calculate the ΔE values in solution. Viscosities of their aqueous solutions were measured over a range of composition and at several temperatures. Vapor pressures of aqueous solutions were measured at 25°C by the isopiestic method. Osmotic coefficients and activity coefficients of the solutes were calculated. Preliminary heat of dilution measurements made. Entropies of dilution are compared graphically with those calculated by Robinson for some amino carboxylic acids. AD 106722. Technical report no. 2. OOR project 525. Jointly supported by grants from the National Science Foundation and the Office of Ordnance Research. Thesis, University of Pittsburgh. Contract DA 39-061-ord-472. Contract DA 36-061-ord-295.

Stability of metal-tetraethylenepentamine complexes, by Charles N. Reilley and J. H. Holloway. North Carolina. University. Dept. of Chemistry, Chapel Hill, N.C. Dec 1957. 12p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 133312

UNC-Chem no. 18. AF OSR Chem 40-17. 1. Tetraethylenepentamine - Metallic complexes - Solubility 2. Amines - Reactions 3. Metal complex - Chemical stability 4. Contract AF 18(600)-1160 5. AF OSR TN 57-789

Structure and potential barrier to hindered rotation in methyl alcohol, by Jerome D. Swalen. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 10p tables. Order from LC. Mi $1.80, ph $1.80. PB 127096

Date is 1955 or later. 1. Molecules - Rotation 2. Molecular structures 3. Methane - Spectra 4. Molecules - Spectrographic analysis 5. Contract N5 ori-76, T.O. V

Studies of cellulose: Effect of acid on reducing sugars, by F.A.H. Rice and Lawrence Fishbein. U.S. Naval Powder Factory. Research and Development Dept., Indian Head, Md. Apr 1956. 32p graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 127424

It has been found that the rate at which an aldo sugar decomposes in acidic media to yield compounds with ultraviolet absorption characteristics depends on the concentration of acid, concentration of sugar, temperature and the configuration of the aldo sugar. The compounds which are responsible for the ultraviolet absorption spectrum of an aldo pentose can be extracted from aqueous acid solution by means of ether. These compounds have been separated by chromatographic means and identified as furfural, crotonaldehyde, acetaldehyde and formaldehyde. NPF MR 118.

Studies of thermal motion in crystals. First annual report covering period Dec 15, 1956-Dec 15, 1957, by J. L. Amorós, M. L. Canut and A. Bujosa. Madrid. University. Dept. of Crystallography, Madrid, Spain. Jan 1958. 89p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 133330

The study of thermal motion of atoms in crystals has been carried out. Dicarboxylic acids series has been chosen because it could allow the study of motion of a chain like type, the simplest scheme in this case. Direct determination of molecular movement was done. Methods employing electron density of a crystal were found to be of interest. Diffuse scattering of a chain like crystal has been studied in α-succinic, adipic, sebacic, glutaric and pimelic acids. In an effort to evaluate the influence of atom motion in crystal motion, in crystal expansion and polymorphism a comparison between diffuse scattering and both phenomena was done. AD 152180. Contract AF 61(514)-1146. AF OSR TN 58-154.

Studies on organic azides and substituted amino triazoles. Final report under Contract Nonr-1100(01), by Eugene Lieber, T.S. Chao, and C.N. Ramachandra Rao. Purdue University. Dept. of Chemistry, Lafayette, Ind. n.d. 75p tables. Order from LC. Mi $4.50, ph $12.30. PB 127277

Contents: Syntheses of anyl azides. - A new method of synthesis of alkyl azides. - Syntheses of 1-substituted 5-amino-1, 2, 3-triazoles. - Irreversible isomerization of 1-substituted-4-phenyl-5 amino 1-2, 3-triazoles into 4-phenyl-5-substituted amino-1, 2, 3-triazoles. - Equilibrium measurements in homogeneous melts of substituted amino triazoles. - Kinetics and energetics of the isomerization of substituted amino triazoles. - Spectrophotometric determination of acidities of 4-phenyl-5-(substituted phenyl) amino-1, 2, 3-triazoles. - Ultraviolet spectra of substituted amino triazoles. - Molar refractions of organic azides. - Ultra violet spectra of organic azides. - Appendix: (a) Acidity of 1-Methyl-5-anilino-1, 2, 3-triazole. - (b) Color development in alkaline solutions of 4-Phenyl-5-(substituted phenyl) amino-1, 2, 3-triazoles. - (c) Infrared absorption spectra of substituted amino triazoles. - (d) Application of non-aqueous methods of estimation for 5-(substituted phenyl) amino-4-phenyl-1, 2, 3-triazoles. Date is 1955 or later.

Studies on organometallic compounds: Reaction between diborane and cyclopropane; some remarks concerning the mode of attack of borine an unsaturated compounds, by W.A.G. Graham, F.G.A. Stone, H.D. Kaesz, and Eugene G. Rochow. Harvard University. Dept. of Chemistry, Cambridge, Mass. Jun 1955. 16p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 127263

For later report see PB 124899. 1. Chemical compounds, Organo - Metallic - Synthesis 2. Diborane - Reactions 3. Cyclopropane - Reactions 4. Chlorination - Research 5. Contract N5 ori-07661

Study of laminar flow phenomena utilizing a doubly refracting liquid. Progress report 1 Under Contract Nonr-811(04) for the period 1 Nov 1953-30 Jun 1954, by Fred N. Peebles, John W. Prados, and Edward H. Honeycutt, Jr. Tennessee. Engineering Experiment Station and Tennessee University. Dept. of Chemical Engineering, Knoxville, Tenn. Jul 1954. 86p photos, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 130471

Aqueous solutions of a commercial dye known as milling yellow exhibit flow double refraction and, as a result, visual observation of liquid flow phenomena can be made using plane polarized light. This report describes the activities on a research project con-

cerned with the quantitative interpretation of such optical patterns. The long range objectives of the study include the development of an experimental method for the determination of liquid velocity distribution and flow direction based upon the optical behavior of milling yellow solutions. AD 40000. Appendix A is Literature survey on flow double refraction. For reports 2 and 3 see PB 120028 and 122941.

Synthesis of organic carbamates: Their chemical, physical and electrochemical properties, by R. R. Schreib, Jr. and C.S. Grove, Jr. Syracuse University. Research Institute, Syracuse, N.Y. Feb 1955. 42p photos, table. Order from LC. Mi $3.30, ph $7.80. PB 134651

The initial work of a basic study of the chemical and electrochemical nature of carbamates has been completed. A completed background of the subject is given in the form of a literature review. Carbamates of the alkyl ammonium alkyl carbamate type are readily synthesized but are relatively unstable. Electrolysis of benzyl ammonium benzyl carbamate in various solvents has produced no hydrazo compounds. AD 85069. Project 3055, Task 70333. Contract AF 33(616)-2357. AF WADC TR 55-63.

Vapor phase catalytic synthesis of heterocycles. Final report under Contract N8 onr-676(00), by Corwin Hansch. Pomona College, Claremont, Calif. Jan 1957. 9p. Order from LC. Mi $1.80, ph $1.80. PB 132534

The object of the work undertaken on this project was to attempt to extend to the preparation of aromatic heterocycles the dehydrocyclization reaction, which had been studied extensively for the synthesis of aromatic hydrocarbons. Methods were developed for the synthesis of seven different heterocycles: indole (4, 5), carbazole (6), quinoline (4), acridine (6), benzofuran (7, 14), thianaphthene (8, 9), and 5-azathianaphtene.

Zeeman quadrupole spectra of p-chloroaniline and p-chlorobenzylchloride, by Harlan C. Meal. Harvard University. Mallinckrodt Chemical Laboratory, Cambridge, Mass. n.d. 24p diagr, tables. Order from LC. Mi $2.40, ph $4.80. PB 127092

1. Aniline, p-Chloro - Spectrographic analysis 2. Benzyl chloride, p-Chloro - Spectrographic analysis 3. Zeeman effect 4. Contract N5 ori-76, T.O. V

Agricultural Chemicals

Investigations of factors influencing plant virus infections. Final report for the period 1 Feb 1953-31 Jul 1956, under Contract Nonr-1064(00), by H.H. Thornberry. Illinois. University. Urbana, Ill. Jul 1956. 12p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 127399

1. Plants - Virus infections 2. Viruses - Chemotherapy

Plastics and Plasticizers

Design and development of a filament wound glass reinforced 2" pipe tee of composite structure, and apparatus for its fabrication, by Robert L. Noland, William H. Barner, and Frank Glockner. Reinhold Engineering and Plastics Co., Norwalk, Calif. 1957. 31f fold drawings, tables. Order from LC. Mi $3.00, enl pr $7.80. PB 135487

The purpose of the work was to develop a process for mass production of glass reinforced plastic fittings which are adaptable to manufacture by a winding type production technique. Emphasis was directed towards the development of a working model apparatus capable of producing 2-inch tees. Contract Nobs-72171.

Evaluation of an oil resistant fluorosilicone elastomer flexible at -80 F, by Ronald R. Freeman. U.S. Arsenal, Rock Island, Ill. Jul 1957. 18p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 132122

The physical properties of a vulcanized fluorinated silicone rubber were determined and compared with the physical properties of vulcanizates based on conventional silicone, SBR and nitrile vulcanizates. The fluorosilicone vulcanizate had excellent thermal stability, excellent properties at low temperatures (down to -90 F) and excellent resistance to hot petroleum and diester oils, JP4 and gasoline type fuels, but was disintegrated by unsymmetrical dimethyl hydrazine, red fuming nitric acid and triotyl phosphate. Dept. of the Army project no.: 593-15-008. OCO, R and D Branch project no.: TB 4-002D. RIAL R 57-1881.

Final technical report under Contract Nonr-343(00), NR 356-262 for the period 1 Jun 1951-30 Jun 1955, by C.G. Overberger. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Jun 1955. 9p. Order from LC. Mi $1.80, ph $1.80. PB 127099

Summaries of seven published papers covering research supported by the contract. These were on ionic polymerization and ionic copolymerization.

Lithium initiated "copolymerization" of styrene and methylmethacrylate, by K. F. O'Driscoll and A.V. Tobolsky. Princeton University. Frick Chemical Laboratory, Princeton, N.J. Jan 1957. 5p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 132500

These studies are connected with the polymerization

of isoprene using metallic lithium as a catalyst to give a cis 1-4 polyisoprene almost identical with natural rubber. Dept. of the Army project no. 599-01-004. OOR project no. 1073. ORD project no. TB 2-001. Contract DA 36-034-ord-2190RD. PU TR 12.

Low temperature dielectric absorption in polymethyl methacrylate, by D. J. Scheiber and D. J. Mead. University of Notre Dame. Dept. of Physics, Notre Dame, Ind. Jan 1958. 7p graph. Order from LC. Mi $1.80, ph $1.80. PB 132642

1. Plastics, Methacrylic - Dielectric properties
2. Plastics, Methacrylic - Thermal properties
3. Contract Nonr-1623(02), NR 356-382

Preparation of fluorochemicals by radiation induced cross-fluorination. Technical report covering the period 16 Sep 1956-15 Sep 1957, under Contract AF 18(603)-121. Armour Research Foundation, Chicago, Ill. Dec 1957. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132858

The radiation behavior of a number of fluorine compounds, including CF_4, CHF_3, CF_2Cl_2, $CFCl_3$, $C_2F_4Cl_2$, C_6H_5F and $C_6H_5CF_3$ in the presence of benzene and other organic compounds was studied. Diphenyl picryl hydrazyl disappearance and polymer degradation experiments showed that the fluorine compounds studied have considerably lower radiation sensitivities than the corresponding chlorine or bromine compounds. Irradiation of solutions of the fluorocarbons in benzene produced aromatic fluorine compounds with a total G value up to approximately 3 in the more favorable cases in spite of the known stability of fluorocarbons toward attack by radicals. AD 148059. ARF Proj. A-093. AF OSR TN 58-20.

Tensile and tensile fatigue properties of transparent enclosure attachments for aircraft, by Edward Holm, William Yamaguchi, M. Elber Lathram, and J. G. Stansbury. Swedlow Plastics Company, Los Angeles, Calif. Jul 1954. 78p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134614

Sixteen types of edge attachments, ten of laminated material and six of monolithic material were designed under Phase II of Air Force Contract AF 33(038)-22456. These sixteen types were of one geometric configuration for each monolithic and laminated material. They represent a cross sectional picture of the combinations of currently available transparent materials and edge attaching materials. All sixteen types were fabricated and tested for tensile strength at room temperature and at -65°F, and for tensile-fatigue at room temperature. AD 98357. Project 1368, Task 13434. Contract AF 33(038)-22456. AF WADC TR 54-396.

Corrosion in mixed fortifying acid storage tanks: Use of paraffin oil to reduce acid fume attack. Improvement of acid mixing and concentration. Part (C): Investigation of acid storage tank corrosion. Final report for Project 55-46-BX42, by William A. Abel. Liberty Powder Defense Corporation. Badger Ordnance Works, Baraboo, Wis. Aug 1956. 11p photo, tables. Order from LC. Mi $2.40, ph $3.30. PB 132331

Project 55-46-BX42. Technical report no. 152. Parts of this report may not reproduce well.
1. Tanks, Storage - Corrosion - Prevention
2. Paraffin oils - Use

Corrosion preventive treatments for aluminum, by M. Reed. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Oct 1957. 11p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 133348

None of the tested chemical conversion treatments for 2024 aluminum resisted 20 per cent salt spray (fog) corrosion for the 240 hours specified for anodized aluminum. Some treatments gave relatively high corrosion resistance, although this was under 240 hours. The dichromate-sealed anodized aluminum not only resisted the salt fog for the 240 hours as required by Specification MIL-A-8625A, but effectively provided corrosion resistance far beyond this requirement, as determined in this and another investigation. OCO project no. TB 4-302B. D/A project no. 5B9314006. FALR Memo 661.

Development of improved heater wire coating methods and materials. Final report for the period 1 Mar 1956-31 Dec 1956, under Contract AF 19 (604)-1744, by Charlotte Curtis and David Bergeron. Columbia Broadcasting System. CBS-HYTRON Division, Danvers, Mass. Jan 1957. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 126931

In an investigation of surface treatment of coated wires, various organic lacquers were applied to the surface of the wire. Surface treatment with hydrolyzed ethyl-silicate and subsequent firing produced wire with less bare loops exposed by spade-winding. The addition of small amounts of aluminum formate to the coating improved the coating when shrinkage from IHK and other heater defects were used as criteria. Tests were run with coatings made with aluminum-nitrate binder which had been purified by the addition of small amounts of aluminum powder. AF CRC TN 57-152.

Development of protective coatings resistant to synthetic lubricating and hydraulic fluids, by Robert W. Damm, George F. Salathe and William A McIntyre. Sherwin-Williams Company.

Lacquer Laboratories, Chicago, Ill. Oct 1957. 187p photos, tables. Order from OTS. $3.00. PB 131428s

This report is a presentation of the work performed in developing both aircraft skin and engine coatings that are resistant to the detrimental effects of synthetic fluids and the accompanying environmental conditions encountered by modern high speed aircraft. As a result of this work the contractor evaluated a skin coating system and an engine coating and developed two engine coatings. All these systems are capable of closely approaching complete resistance to the severe conditions involved. AD 142030. Project 7312, Task 73121. Covers work from Apr 1956-Apr 1957. Appendix I - Tables, pp. 75-175. For WADC TR 56-80 see PB 131428. Contract AF 33(616)-2919. AF WADC TR 56-80, Supplement 1.

Effect of grit-blasting and immersion time on coating weights in the phosphating process, by J. Knanishu. U.S. Arsenal, Rock Island, Ill. Dec 1957. 25p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133953

The effects of pretreatments of steel on phosphate coating formation in room temperature and hot phosphatizing solutions, after periods of immersion from 3 to 40 minutes, were studied. Coating weights were determined for all panels and coating weight versus immersion time curves were prepared from these data. Photomicrographs (100X) were made from samples of the 10 and 30 minute immersion periods. It is advantageous to grit-blast steel prior to room temperature phosphatizing. The crystallization is finer than that which occurs on an unblasted surface. The hot phosphatizing system produces heavier coating weights on vapor degreased, unblasted surfaces. DA project 593-32-006. Ord project TB 4-006B. RIAL R 57-2812.

Effect of pre-stressing on the strength of ceramic coatings, by J. H. Lauchner, D. G. Bennett, and others. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Sep 1957. 35p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133342

Ceramic coatings were applied to sheet iron strips and the residual strains developed as a result of thermal treatment were calculated. The coated-metal strips were statically loaded to induce axial tension, buckling or torsion. Coating strain was measured by means of SR-4 strain gages. Coatings were observed to fracture when strained approximately $1,000 \times 10^{-6}$ inches per inch in tension. Compression failure occurred when strains of $10,000^{-6}$ inches per inch were exceeded. AD 136758. Contract AF 18(603)-28. ILU DCE R 79. AF OSR TN 57-768.

Heat resisting paints for multiple rocket launchers, by T. Rice. U.S. Arsenal, Rock Island, Ill. Jan 1954. 18p photo, tables. Order from LC. Mi $2.40, ph $3.30. PB 130648

Silicone paints and ceramic coatings have been tested. Silicone varnish vehicles are now available which can be used to make better silicone paints than were available five years ago. By the use of the proper pigments and silicone vehicles, olive drab enamels can be made which will withstand temperatures up to 1000 F without appreciable deterioration of color. Ceramic coatings have also been tested for heat resistance, but are not considered practical for use on rocket launchers. Project TU 2-3002F, Report 1. Dept. of the Army project 5-17-05-002. RIAL R 54-319.

Investigation of the nature of the forces of adhesion, by L. Reed Brantley and Hajime Uyehara. Occidental College. Dept. of Chemistry, Los Angeles, Calif. Jul 1956. 47p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133415

A study of the interphase between organic coatings and the metallic substrate has been continued. The use of infrared analysis of lacquer solutions is described as adaptable to multicomponent systems. Covers period Jul 1, 1956-Jun 30, 1957. 6th annual report. Contract N9 onr-86701, NR 051-376.

Navy project for investigation of hot coined cermet coatings refractory and resistant to oil ash corrosion. Final report covering the period 1 Aug 1954-30 Sep 1955, under Contract NObs 66061, by Frank W. Heck, Donald P. Ferriss and Gregory J. Comstock. Stevens Institute of Technology. Powder Metallurgy Laboratory, Hoboken, N.J. Oct 1955. 36p photos, drawing, diagr, tables. Order from LC. Mi $3.00, ph $6.30. PB 132324

Preforms of alloy X-40 powder metal are pressed, sintered, coated with cermet materials, and hot coined to densify the metal and impregnate the surface to render the part resistant to oil ash corrosion at 1600°F. Wrought metals are also coated by hot coining or firing the cermet materials. A description of the cermet materials and their preparation is included, and a special hot coining die for washer shaped specimens is described. The corrosion test procedure and the NTBL cleaning process is described.

Oxidation resistant coating for molybdenum. Bimonthly progress report no. 2, covering period 1 Jun-31 Jul 1956, by E.S. Candidus. National Research Corp., Cambridge, Mass. Aug 1956. 16p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 134561

A rotary drum powder coater has been completed and tested. Coarse powders have been coated with nickel in the device but work with fine powders is still exploratory. Experiments with chromium, nickel, and aluminum vapor sources have been performed. Nickel and aluminum can be evaporated from carbon containers, and chromium from zircon-

ia. Several methods for sintering powder compacts include radiant heating in high vacuum. Contract NOas 56-481-c.

Oxidation-resistant coatings for molybdenum, by J. R. Blanchard. Climax Molybdenum Co., Detroit, Mich. Dec 1954. 65p photos, drawings, graphs, tables. Order from OTS. $1.75. PB 131629

Sprayed-metal coatings, applied with commercial metallizing equipment, for the protection of molybdenum against oxidation at 1700° and 1800°F. 12 of the oxidation-resistant alloys investigated had the capacity to protect molybdenum against oxidation for at least 500 hours at 1700° and 1800°F. Two aluminum-chromium-silicon alloy coatings and a Colmonoy No. 5 coating were investigated more thoroughly than other compositions. AD 73929. Issued in lieu of the 2nd quarterly progress report under Contract AF 33(616)-2488, Task 70646. For other reports on this contract see PB 111965, 131368, 123584. Project 7351. AF WADC TR 54-492.

Performance of iron phosphate coatings on steel and the effect of operating variables, by F. Schneiders. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Jul 1956. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132909

Previous work indicated the desirability of a systematic investigation of the effect of operating variables on the performance of iron phosphate coatings. Several proprietary iron phosphating pretreatments were selected, which previous work had proven to be from the extremes in performance characteristics. Treatment time, treatment temperature, pH and the composition of the final rise were varied with respect to a standard set of panels which were processed to the manufacturers instructions. The effect of these variations was evaluated by salt spray testing. Dept. of the Army project no. 593-14-007. Ord project no. TB 4-771B. APG CCL R 2.

Resistance to continued heating of powdered cover coats applied to enameling iron and ferritic alloy, by Robert M. King, Robert J. Brinkman, and William E. Watkins. Ohio State University Research Foundation, Columbus, O. Mar 1953. 18p photo, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134765

Powdered refractories, applied to one side which gave excellent protection to enameling iron during 72 hours of continued heating and intermittent testing for thermal shock, are listed. When powdered dead-burned magnesite and nickel-magnesia cermet were applied to the entire specimen of a boron-titanium alloy, failure at 1600°F was not observed until the end of the currently specified continued heating test during the 80-hour soaking period. When dead-burned magnesite was applied similarly to Alloy 4130 and enameling iron, failure occurred at 54 hours and 48 hours respectively. AD 14064. Contract AF 33(616)-3. AF WADC TR 53-170.

Study of the water of hydration contained in phosphate coatings by radiometric techniques, by Jodie Doss and W. Dennis McHenry. U.S. Arsenal, Rock Island, Ill. Research and Material Branch. Mar 1954. 24p photo, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 133431

Objective was to determine the amount of hydrated water lost by iron, zinc and manganese phosphates at elevated temperatures such as those encountered in the baking of paints on treated metal surfaces. Dept. of the Army project: 593-14-006. Project: TB 4-302D. RIAL R 54-900.

Study of thin vacuum deposited copper films by X-ray total reflection, by Nancy J. Scott. Cornell University. Dept. of Physics, Ithaca, N.Y. Dec 1957. 195p photos, diagrs, graphs, tables. Order from LC. Mi $8.70, ph $30.30. PB 133490

Copper films of nominal thickness 35, 75, 120, 150 and 200A were first studied as fresh films and then were subjected to successive heat treatments in laboratory air at temperatures up to 400°C. Reflection curves were recorded and the shapes of the curves were noted as a function of heat treatment. The density distribution with depth for either a fresh or a heat treated film was inferred from a comparison of the experimental curve with a theoretical reflection curve calculated for a model of parallel homogeneous laminae. AD 148010. Contract AF 18(600)-300, Technical report II. AF OSR TN 57-779.

Synthetic resins: 2nd report on survey to determine the effect of toxic wood sealers on finishing systems, by John P. Hill. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Sep 1956. 21p tables. Order from LC. Mi $2.40, ph $3.30. PB 132908

This report includes the results of 18 months exposure of a preliminary study of primers and of 13 months exposure of a series of panels to evaluate complete coating systems. 515 panels were used in these exposure series and they include 75 different systems. Sixty-four systems are on red oak, ponderosa pine, and tupelo gum, eleven on ponderosa pine. DA project no. 593-14-007. ORD project no. TB 4-771 G. APG CCL R 6.

Inorganic Chemicals

Activity of metal hydroxides as catalysts for the decomposition of H_2O_2. Progress report no. 7 under Contract no. NOrd-9107, by D. B. Broughton, D. M. Mauke, M. E. Laing, and R. L. Went-

worth. Massachusetts Institute of Technology. Division of Industrial Cooperation, Cambridge, Mass. Feb 1946. 38p diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30.
PB 130628

An investigation has been made of the relative activity of various freshly precipitated metal hydroxides as catalysts for the decomposition of hydrogen peroxide. ATI 37763. DIC 6351.

Anisotropy of edge luminescence in cadmium sulfide, by David Dutton. Rochester. University. Institute of Optics, Rochester, N.Y. Jan 1958. 6p graphs. Order from LC. Mi $1.80, ph $1.80.
PB 133484

The characteristic green luminescence observed in CdS crystals at low temperatures, often called "edge" emission, has been of particular interest because of the possibility that it is due to radiative decay of excitons, as suggested by Krooger and Meyer and others. The purpose of this note is to report some brief observations of the luminescence made with polarized light, which furnish additional evidence for an indirect excitation mechanism and provide some information as to the anisotropy of the luminescence centers and their distribution within the crystal. AD 148097. R 355-10-1. Report no. 193-12. Contract AF 18(600)-193. AF OSR TN 58-56.

Calculation of the energy of activation of some simple reactions: The ortho-para hydrogen reaction, by Ellis R. Lippincott and Asa Leifer. Maryland. University. Dept. of Chemistry, College Park, Md. Dec 1957. 23p graphs. Order from LC. Mi $2.70, ph $4.80. PB 132861

A model is proposed from which energies of activation and potential energy surfaces of three atom reactions may be calculated. The method makes use of internuclear attractive and repulsive potential functions which have been derived from a quantum mechanical delta-functional model. The energy of activation of the ortho-para hydrogen reaction was calculated and found to have a value of 8.5 k calories in agreement with the experimental value. AD 137024. Contract DA 36-034-ord-2175. UM C TR 5.

Ceramic-metal seal outgassing study. Raytheon Manufacturing Co. Microwave and Power Tube Operations, Waltham, Mass. Contract AF 19 (604)-1826. Project QK-608. Order separate parts described below from LC, giving PB number of each part ordered.

Quarterly scientific report no. 1, for the period 1 Apr-30 Jun 1956, by R.J. Dyer and M.L. Weiss. Jul 1956. 8p drawings, table. Mi $1.80, ph $1.80. PB 127380

This project concerns a study of the gases evolved from Raytheon ceramic-to-metal seal assemblies at temperatures up to 700°C, and the rate at which such gases are produced. These assemblies are like those used in high power UHF tubes made by Raytheon. AF CRC TN 56-757.

Quarterly scientific report no. 2, for the period 1 Jul 1956-1 Oct 1956, by R.J. Dyer and R.M. Adams. Nov 1956. 8p drawing, graph, table. Mi $1.80, ph $1.80. PB 126992

During the second three months (July 1 - October 1, 1956) of this project, eight ceramic-metal seal test assemblies were brazed. Bake-out oven construction was completed. Using the mass spectrometer, four test assemblies were baked out and the evolved gas was analyzed. AF CRC TN 56-965.

Quarterly scientific report no. 3, for the period Oct 1, 1956-Dec 31, 1956. n.d. 3p. Mi $1.80, ph $1.80. PB 127410

Summarizes main activities from beginning of the project, and discusses assemblies brazed and tested during the third quarter. AD 110287. AF CRC TN 57-153.

Chemistry of boron hydrides and related hydrides, by R.W. Parry, R.C. Taylor and others. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jan 1957. 38p graphs, tables. Order from LC. Mi $3.00, ph $6.30.
PB 133981

Previously reported work on the ammonia addition compounds of diborane, B_2H_6, has been extended. The Raman spectrum of H_3BCO has been investigated in some detail. The system ammonia-tetraborane (NH_3-B_4H_{10}) has been studied in some detail. The new compound, $B_4H_{10} \cdot 2NH_3$, has been isolated as a white microcrystalline solid. The new compound $H_3NB_3H_7$, has been isolated and characterized. The new compound Cl_3AlPF_3, has been prepared. AD 118032. Project 3055, Task 70321. Contract AF 33(616)-3343. AF WADC TR 57-11.

Crystal structure of titanium trichloride, by John W. Reed and George E. MacWood. Ohio State University Research Foundation. Dept. of Chemistry, Columbus, O. Apr 1957. 69p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80.
PB 133546

The crystal structure of titanium trichloride has been investigated by means of x-ray diffraction. The reciprocal lattice consists of Laue-Bragg spots and diffuse streaks. The structural and atomic positions are given. Contract Nonr 495(06), NR 037-024, Technical report no. 5. OSURF Proj. 553, Technical report no. 5.

Effect of composition on heat of formation for fuming nitric acid, by John S. Gordon. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1956. 14p graphs, tables. Order from LC. Mi $2.40, ph $3.30.
PB 134426

Data are tabulated for composition in weight per cent, mole per cent, gram atoms per 100 grams of solution and the atom ratios N/H and O/H, and heat of formation in calories/gram, for fuming nitric acids in the composition range 0-5 wt. % H_2O and 0-24 wt. % NO_2. AD 97196. Project 3055, Task 30196. AF WADC TR 56-21.

Effect of traces of xoygen on the reaction of aluminum borohydrine with ethylene, by Richard S. Brokaw. Princeton University. Dept. of Chemistry, Princeton, N.J. Jun 1950. 11p graph, tables. Order from OTS. 50 cents.
PB 131878

Technical memorandum 15. Technical paper 48. Under joint sponsorship of Project Bumblebee and Project Squid. 1. Borohydrides, Aluminum - Reactions with ethylene 2. Ethylene - Combustion 3. Contract N6 ori-105, T.O. 3, Phase 2, NR 220-038

Electrochemical mechanism of noble-metal hydrogen systems. Part III: Electronic configuration and catalytic activity, by S. Schuldiner and J.P. Hoare. U.S. Naval Research Laboratory. Jul 1958. 12p graphs. Order from LC. Mi $2.40, ph $3.30.
PB 133127

Relations between electronic configuration, the heat of adsorption of hydrogen atoms, catalytic activity, and the rate-determining step were experimentally demonstrated. It was shown that when the rate-determining step is an atomic desorption, the lower the atomic heat of adsorption, the higher the catalytic activity. When the slow discharge step is rate determining, the higher the atomic heat of adsorption, the higher the catalytic activity. A linear relation between the number of positive holes in the d-band of Ni-Pd-H alloys and their catalytic activity was shown. The systems studied are α and β palladium-hydrogen, nickel-palladium-hydrogen, and gold-palladium-hydrogen alloys. NRL R 5171. For Parts 1-2 see PB 131526 and 131683.

Electrode processes: Aqueous chromium (III) sulfate solutions. I. Chemical properties of aged solutions, by L.O. Morgan, Jean M. Mutchler and Jeffery Gipson. Texas. University. Dept. of Chemistry, Austin, Tex. Jun 1955. 15p table. Order from LC. Mi $2.40, ph $3.30.
PB 127109

An attempt was made to elucidate the structure of species in aged aqueous solutions of chromium (III) sulfate. It was determined that prolonged aging at 40°C. caused the formation of species which prevented free precipitation of approximately one-third of the total sulfate present. AD 70818. For Parts 2, 4-5 see PB 123225, 123467, 123735. Contract Nonr-375(04), NR 051-312, Technical report no. 2.

Fundamental optical absorption in magnesium oxide, by Gilbert H. Reiling. Missouri. University. Dept. of Physics, Columbia, Mo. Jun 1957. 28p photo, diagr, graphs. Order from LC. Mi $2.70, ph $4.80.
PB 133984

A sharp increase in absorption was observed at 7.4 ev and continued to at least 13 ev. Reflectivity measurements at room temperature on cleaved crystals showed a sharp peak at 7.55 ev and two broad peaks at 11 ev and 13.2 ev. Contract N7 onr-292, T.O. 5. ONR TR 21.

Hydrogen peroxide and the peroxide compounds (Perekis vodoroda i perekisnie soedineniya), by M.E. Pozina. Translated by G.E. Halpern. Massachusetts Institute of Technology. Dept. of Chemical Engineering, Cambridge, Mass. Apr 1957. 73p. Order from LC. Mi $4.50, ph $12.30.
PB 133233

This book consists primarily of a translation into Russian of the first edition (1937) of "Wasserstoff-superoxyd und die perverbindungen" by W. Machu. To the Russian translation, there has been added supplementary material, either as additions to the text or as footnotes. The present report contains a translation into English of all such new material added by the Russian editors. The Russian additions do not include any novel material of primary importance. The Machu text has been taken as a framework and expanded here and there, but the new material added is not deeply interpretative. The Russian literature quoted is largely confined to scientific, polemic, and review publications. The date of the publication is 1951. Translation of Russian material added to the translation of "Wasserstoffsuperoxyd und die Perverbindungen", by W. Machu. Report no. 52. Contract Nonr-1841(11), NR 09-008.

Industrial preparedness study on synthetic battery grade manganese dioxide, by Jerome T. Muench. American Potash & Chemical Corporation, Henderson, Nev. Oct 1957. 15p tables. Order from LC. Mi $2.40, ph $3.30.
PB 133275

The object of this study is to furnish the services and materials necessary for perfecting the techniques, processes, and equipment required for the mass production of synthetic battery grade manganese dioxide by the reaction between sodium chlorate and manganous sulfate, to establish the performance of a pilot run production of one ton per day, and to make the process continuous and proven capable of utilizing typical low grade domestic manganese ores. Covers period 29 Jun 1957-29 Sep 1957 under Contract DA 36-039-sc-72715.

Informal progress report no. 21, Apr 16-May 15 1950. (Short report no. 6), by Thomas R.P. Gibb, Jr. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. May 1950. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 133496

ATI 170326. 1. Uranium hydrides - Preparation 2. Lithium borohydrides - Preparation 3. NEPA 1419

Intrinsic-tenor permeabilities of ferrite rods, spheres and disks, by E.G. Spencer, L.A. Ault, and R.C. LeCraw. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Apr 1956. 26p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 126787

A discussion is given of the transformation relations between the measured permeability components and the values intrinsic to the material which then do not involve the sample shape. General theoretical curves are given showing the measured permeabilities through resonance for rods and spheres deduced from intrinsic permeability curves which is taken to have a Landau-Lifshitz shape. Complete data are given on the four measured- and intrinsic-tenor permeability components through magnetic resonance for small rods, spheres, and disks of a polycrystalline magnesium-manganese ferrite. The general shape of the intrinsic curves is explained by considering the distribution of the crystalline orientation directions and the solid angles associated with these directions. The line width is of the order of magnitude to be expected by published data on other ferrite single crystals. DOFL project 4403-41044. DOFL TR 343.

Investigation of the structure of silver (I) complex ions in solution, by Calvin C. Rolland. Investigation of the stability of the iron (II) and manganese (II) tetra-ethylene-pentamine complexes and their reactivity toward oxygen, hydroxyl groups and hydroperoxides, by A. Schaafsma. Tulane University. Dept. of Chemistry, New Orleans, La. Apr 1956. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 126865

Continues work performed under Contract N8 onr-696(00), NR 052-155. 1. Silver ions - Structure 2. Silver (I) ions - Complex 3. Iron (II), tetraethylene pentamine - Complex 4. Manganese (II) tetraethylene pentamine - Complex 5. Contract NOonr-685(00), NR 052-155, Final report.

Isotopic techniques in the study of the sonochemical formation of hydrogen peroxide, by Michael Del Duca, Ernest Yeager, M.O. Davies, and Frank Hovorka. Western Reserve University. Dept. of Chemistry, Ultrasonic and Electrochemistry Research Laboratory, Cleveland, O. Dec 1956. 38p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132345

1. Ultrasonics - Chemical effects 2. Hydrogen peroxide - Reactions 3. Contract N7 onr-470(02), NR 384-305, Technical report no. 17

Kinetic study of the reaction of diborane with phosphine. Technical report no. 2 under Contract Nonr-839(09), NR 051-339, by H. Brumberger and R.A. Marcus. Polytechnic Institute of Brooklyn. Dept. of Chemistry, Brooklyn, N.Y. Jun 1955. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127110

From a thesis by H. Brumberger, Polytechnic Institute of Brooklyn, 1955. 1. Kinetic reactions, Chemical 2. Diborane - Reactions with phosphine 3. Phosphine - Reactions with diborane

Mechanism of catalytic decomposition of H_2O_2 solutions by manganese dioxide, by D.B. Broughton, R.L. Wentworth, M.E. Laing, and D.M. Mauke. Massachusetts Institute of Technology. Division of Industrial Cooperation, Cambridge, Mass. Feb 1946. 44p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133531

Experiments were made to measure the electrode potential of MnO_2-coated manganese rods in distilled H_2O_2 solutions, as a function of the concentrations of H_2O_2, H^+, and Mn^{++}, and of the speed of rotation of the rod. A second series of tests was made to measure the change in manganese concentration in distilled H_2O_2 solutions, decomposition in contact with MnO_2 surfaces. Attempts to measure the rate of decomposition of distilled H_2O_2 on stationary and rotating MnO_2 surfaces gave non-reproducible results. DIC 6351. Contract Nord 9107 Task C, Progress report no. 6.

Mechanisms of decomposition of hydrogen peroxide with cobalt compounds, by D.B. Broughton, R.L. Wentworth and M.L. Farnsworth. Massachusetts Institute of Technology. Division of Industrial Cooperation, Cambridge, Mass. May 1947. 35p diagr, graphs, tables. Order from LC. Mi $3.00 $3.00, ph $6.30. PB 130627

ATI 37785. DIC 6351. Report no. 16. 1. Hydrogen peroxide - Decomposition 2. Hydrogen peroxide - Reactions with cobalt 3. Contract NOrd 9107-C

Preparation and magnetic properties of pyrochlore-type titanates of neodymium and praseodymium, by Ardys Klann and R.C. Vickery. Horizons, Incorporated. Chemistry Dept., Cleveland, O. Mar 1957. 5p table. Order from LC. Mi $1.80, ph $1.80. PB 126935

AD 120479. 1. Neodymium titanates - Magnetic properties 2. Neodymium titanates - Preparation 3. Praseodymium titanates - Magnetic properties 4. Praseodymium titanates - Preparation 5. Contract AF 18(603)-96, Technical note no. 3 6. AF OSR TN 57-124

Preparation of cadmium niobate by an anodic spark reaction, by W. McNeill. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Aug 1957. 16p photos, table. Order from LC. Mi $2.40, ph $3.30.
PB 132397

A new method of preparing cadmium niobate was demonstrated. This method involved the anodic spark reaction of cadmium in a niobate solution, and crystallization of the anode product by heating at 650°C. The crystallized anode product was made into a solid wafer by pressing it a 350,000 psi, and electric measurements were made. Even though there was some evidence of impurity or porosity in the sample, a dielectric constant of about 600 was found at room temperature. Project: TB 1-0004. Dept. of the Army project: 5B72-01-004. FALR 1402.

Preparation of Diels-Alder adducts containing nitrogen and oxygen. Final and technical report under Contract AF 18(600)-648, by John S. Meek, Perry A. Argabright, Mary W. Fisher, and Richard D. Stacy. Colorado. University. Dept. of Chemistry, Boulder, Colo. Feb 1957. 134p diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 127155

The purpose of the research on this project was to investigate the feasibility of preparing polymers by means of the Diels-Alder reaction. The reaction was of interest since this type of polymerization was not previously reported in the literature save for a few cases such as the reversible polymerization of cyclopentadiene. This type of addition polymerization differs from other known types in having no catalyst necessary or known for the reaction. The polymers would be different in having numerous rings as part of the chain rather than as side chain substitutents as in polystyrene. The polymers were to be made from double dienes and double dienophiles. AD 120473. AF OSR TR 57-21.

Preparation of dry alkali chlorides for solutes and solvents in conductance studies, by Henry J. Gardner, Charles T. Brown, and George J. Janz. Rensselaer Polytechnic Institute. Dept. of Chemistry, Troy, N.Y. Mar 1956. 12p graph, tables. Order from LC. Mi $2.40, ph $3.30.
PB 126989

The weight losses of the alkali chlorides as a function of temperature and time, using modern high vacuum techniques and dry inert gases to remove water vapor have been investigated at increasing temperatures up to the melting points of each salt. Following the procedures recommended, LiCl, NaCl, and KCl can be achieved in a dry state at 450°C, 420°C, and 300°C respectively. Vacuum drying of each salt prior to the preparation of mixtures is recommended for the preparation of melts to minimize hydrolysis and contamination by hydroxide. Contract Nonr-591(06), Technical report no. 1.

Quarterly periodic status report under Contract N5 ori-07819, by R.L. Wentworth. Massachusetts Institute of Technology. Hydrogen Peroxide Laboratories, Cambridge, Mass. Order separate parts described below from LC, giving PB number of each part ordered.

Dec 1955. 7p tables. Mi $1.80, ph $1.80.
PB 127087

DIC 6552. 1. Hydrogen peroxide - Research
2. Barium peroxide - Decomposition
3. Hydrogen peroxide - Stability
4. Contract N5 ori-07819, NR 092-008

Jun 1956. 11p graphs, tables. Mi $2.40, ph $3.30. PB 127167

DIC 5-7476. 1. Hydrogen peroxide - Research
2. Hydrogen peroxide - Stability
3. Barium peroxide 4. Hydrogen peroxide - Vaporization 5. Contract Nonr-1841(11)

Research on the electrochemical behavior of polycristalline zinc, by Ugo Bertocci. Politecnico di Milano. Laboratorio de Electtrochimica, Chimica Fisica e Metallurgia, Milan, Italy. Nov 1956. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132918

Anodic and cathodic overvoltages for zinc have been measured in chloride, sulphate and perchlorate solutions. The influence of free acid content, of temperature and of current density has been investigated. The results of these experiments confirm that the overvoltages are greater in sulphate and especially in perchlorate solutions than in chloride. It has been proven also that the voltage current curves are nearly symmetrical in respect to the equilibrium value of the zinc electrode. AD 115023. Technical note no. 8. CA TN 8-56. Contract AF 61(514)-733C. AF OSR TN 56-596.

Scattering of high velocity neutral particles. X: He-N_2, A-N_2. The N_2-N_2 interaction, by I. Amdur, E.A. Mason, and J.E. Jordan. Massachusetts Institute of Technology. Dept. of Chemistry, Cambridge, Mass. May 1957. 17p diagr, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 133995

1. Atomic power - Research 2. Particles - Scattering - Theory 3. Molecular interactions
4. Nitrogen - Reactions with helium 5. Nitrogen - Reactions with argon 6. Argon - Reactions with nitrogen 7. Helium - Reactions with nitrogen
8. Contract Nonr-1841(23), NR 019-618, Technical report no. 1

Standard free energy of oxidation of magnetite to hematite at temperatures above 1000°C, by J. Smiltens. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge,

Mass. Jan 1957. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133814

A correction term is derived for the van't Hoff equation used for calculating the standard free energy from the dissociation pressure data. This term also allows such calculations in cases in which solid solutions are formed. The standard free energy for the reaction $4Fe_3O_4 + O_2 = 6Fe_2O_3$ has been calculated. Based on a thesis, Massachusetts Institute of Technology. Contract AF 30(635)-2872. Contract Nonr 1841(10), NR 017-421. MIT LIR TR 116.

Study of the chemistry of columbium, tantalum and some associated transition elements. Final report covering period 1 Jan 1948-31 Oct 1949 under Contract N6 onr-263, T.O. VI, by Russell Atkinson, Morris Berenbaum, Jovan Moacanin, Stephen Moros, Robert Woke and Michael Yamin. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Oct 1949. 23p tables. Order from LC. Mi $2.70, ph $4.80. PB 132030

ATI 86812. 1. Columbium - Chemical properties 2. Tantalum - Chemical properties

Study of the mechanics and kinetics of the reaction of titanium tetrachloride and magnesium in the vapor state. Final report for the period 15 Mar 1953-14 Apr 1956 under Contract Nonr-1121(00), by Emil Perout. Clevite Corporation. Clevite Research Center, Cleveland, O. May 1956. 52p photos, diagrs, fold table. Order from LC. Mi $3.60, ph $9.30. PB 127284

The purpose of this contract was to study the mechanics and kinetics of the vapor phase reaction of titanium tetrachloride and magnesium necessary to produce large, dense (approximately 1/8 inch) crystals or globules of titanium metal, and the determination of the factors controlling progressive growth of reduced titanium particles or grains. Two forms of operational reactors were built in prosecution of this contract. Project no. 50117-G.

Study of the oxides of silver. Second technical report under Contract Nonr 1682(01), NR 359-364 for the period 1 Jan-30 Jun 1956, by T.P. Dirkse. Calvin College. Dept. of Chemistry, Grand Rapids, Mich. Jul 1956. 12p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 127320

The electrode potentials of the following systems have been measured in potassium hydroxide solutions : silver; silver-silver (i) oxide; silver-silver (II) oxide; silver (I) oxide-silver(II) oxide; silver (II) oxide. For the silver (II) oxide system the potentials have been measured at temperatures of 0°, 25°, and $45^{\circ}C$.

Study of the systems TiC-SiC-B_4C and TiC-VC-ZrC, by Oliver E. Accountius, Robert F. Stoops, and others. Ohio State University Research Foundation, Columbus, O. Mar 1955. 201p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 133061

A study involving 66 binary and ternary compositions in the system TiC-SiC-B_4C with special emphasis on density and oxidation resistance. Also studied were the chemical reactions over a wide sintering range, the possibility of solid solution, new phases, and the identification of the components of the oxide layer. Oxidation resistance of hot-pressed compacts is investigated. A hypothesis is presented to explain, and a parameter is derived to measure, the relative oxidation resistance of mixed carbides and mixed-carbide base cermets. The cermet composition III RB cobalt (55.4 TiC + 17.9 TiB_2 + 10.0 Si + 16.7 Co), was found to be promising. A study of the significant binary and ternary compositions in the triaxial system TiC-VC-ZrC with physical properties of the cermet bodies resulting from metal bonding are studied. AD 75506. Project 7350, Task 73500. Contract AF 33(038)-16911. AF WADC TR 53-287.

Study of ultra high temperatures: Hexacarbon dinitride, C_6N_2, or dicyanodiacetylene, by Andrew J. Saggiomo. Temple University. Research Institute, Philadelphia, Pa. Dec 1956. 21p graphs, tables. Order from LC. Mi $2.40, ph $4.80. PB 127279

The synthesis of dicyanodiacetylene, or hexacarbon dinitride C_6N_2, is described. The pure compound is stable, at room temperature, in the absence of 0_2. Vapor pressure, infrared spectral data and other physical properties, are reported. AD 115068. Project no. 7-7968, For Technical notes 1, 2 and 4 see PB 121074, 121928 and 131732. Contract AF 18(600)-1475. AF OSR TN 57-33.

Thermal gradient in channels of helium II, by John D. Reppy and Charles A. Reynolds. Connecticut. University, Storrs, Conn. Jul 1956. 18p diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127446

For reports 2-3 see PB 122940 and 126044.
1. Helium, Liquid - Heat transfer 2. Contract Nonr 1277(00), NR 016-418, Technical report no. 4

Thermal oxidation of ammonia with oxygen, by E.R. Stephens. Princeton University. Dept. of Chemistry, Princeton, N.J. Dec 1948. 13p diagrs, graphs, tables. Order from OTS. 50 cents. PB 131876

The thermal non-catalytic reaction of ammonia with oxygen has been studied by the flow method. It was concluded that the principal products of the reaction are nitrogen and water. Measurement of the extent of the reaction as a function of composition showed that the reaction rate decreases with increasing

ammonia concentration. Technical paper no. 43. Technical memorandum no. PR-10. Project Squid. Project Bumblebee. Contract N6 ori-105, T.O. 3, Phase 2, NR 220-038.

Thermodynamic properties of titanium halides in molten salt systems. Final report covering period 1 Jul 1953-31 Dec 1956, under Contract Nonr 285(13), by K. Komarek and P. Herasymenko. New York University. College of Engineering. Research Division, New York, N.Y. Feb 1957. 10p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 132622

1. Titanium halides - Thermodynamic properties 2. Contract Nonr-285(13), NR 037-066, Final report

Thermodynamic properties of titanium-oxygen solutions and compounds, by Alla D. Mah, K.K. Kelley and others. U.S. Bureau of Mines. Mar 1957. 3p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132787

Heats of formation of 11 titanium-oxygen solutions, in the range of 0 to 10 wt.-percent oxygen, were determined at 298.15°K. Low-temperature heat-capacity data and entropies at 298.15°K, were determined for 2 representative titanium-oxygen interstitial solutions. High-temperature heat-content data were obtained for 2 titanium-oxygen interstitial solutions to about 1,600°K. Comparison with free-energy data applying to possible metallic reductants for titanium-oxygen solutions showed calcium to be the only one capable of reducing the oxygen concentration below 0.1 wt.-percent under technically feasible conditions. The other alkaline-earth metals and all of the alkali metals are much poorer reductants. BM RI 5316.

Thermodynamic stabilities of some metal sulfides, by Milton Farber. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Jun 1948. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 132455

This memorandum presents the relative thermodynamic stabilities of the metals copper, silver, molybdenum, iron, lead, tungsten, zinc, tin, and platinum at temperatures from 500 to 1000°K. Rates of reaction have not been considered and only the thermodynamic equilibrium constants are given at the temperatures shown. The higher the value for the equilibrium constant, the more stable is the metal thermodynamically. ATI 34321. ORD CIT project. Contract W-04-200-ord-455. CIT JPL M 4-33.

Analytical Chemistry

Conductometric determination of small amounts of oxygen in titanium, by M. Codell and G. Norwitz. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Feb 1957. 11p diagr. Order from LC. Mi $2.40, ph $3.30. PB 132815

A method is proposed for the conductometric determination of small amounts of oxygen in titanium. The sample is reacted with bromine and carbon, using an improved bromination apparatus, and the carbon monoxide produced is oxidized to carbon dioxide with hot copper oxide. The carbon dioxide is absorbed into barium hydroxide solution and the change in conductance measured. The method is recommended for titanium samples containing up to 0.05% oxygen. FALR S 5462.

Determination of microgram quantities of ethylene glycol, by Raymond Porter. Rochester. University, Rochester, N.Y. Oct 1957. 8p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 133270

AD 136620. Chem 20-10. 1. Ethylene glycol - Determination 2. Formaldehyde - Determination 3. Contract AF 18(600)-1528 4. AF OSR TN 57-634

Differential thermal analysis and thermogravimetry applied to analytical procedures for potassium perchlorate-aluminum-barium nitrate mixtures, by Virginia D. Hogan, Saul Gordon and Clement Campbell. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Feb 1957. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127169

A thermogravimetric study indicated that barium nitrate catalyzes the decomposition of potassium perchlorate to potassium chloride. Differential thermal analysis of the system yielded curves characteristic of the individual compounds and their relative quantities. These complementary techniques have been used to develop a simple but rapid method for analyzing the pyrotechnic composition potassium perchlorate-aluminum-barium nitrate. Dept. of the Army project: 504-01-031. Ord project: TA 2-9201. PA TR 2373.

Indirect chelometric analysis with the aid of liquid amalgams, by William G. Scribner and Charles N. Reilley. North Carolina. University. Dept. of Chemistry, Chapel Hill, N.C. Jan 1958. 46p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133483

The application of liquid amalgams lends a new perspective to the field of chelometric titrations. The principle involves reduction of one or more components of the sample by a metal amalgam with liberation of an equivalent quantity of metal ion from the amalgam. Certain multicomponent mixtures as well as reducible organic compounds can be analyzed by these techniques. Contract AF 18(600)-1160. AF OSR TN 58-60.

Infrared analysis of mixtures of nitroglycerine and ethylene glycol dinitrate, by Woodruff Huff, Michael Halik, and Frank Pristera. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Dec 1957. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 134624

A simple and rapid method using infrared spectrophotometry has been developed for the determination of nitroglycerine (NG) and ethylene glycol dinitrate (EGDN) in admixture. DA project 5A04-10-006. Ord project TA 3-5000B, Item A. PA TR 2472.

Infrared spectra of vanadia-silica gel catalyst, by Donald D. Woolley and George Richard Hill. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jan 1957. 29p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 133443

In the attempt to study the behavior of catalysts systematically, one approach has been to follow chemical changes in the catalytically active compound during its use. Recent development of the potassium iodide pressed crystal technique for obtaining the infrared spectra of solids provides another method of study of catalytic surfaces by means of which changes in their nature can be observed in various stages of activity. This paper discusses such an investigation applied to both promoted and unpromoted vanadia-silica gel catalysts. Contract N7 onr-45103, NR 051-192. UU ISRP TR 22.

Mass spectrometric analysis of low concentration HD in mixtures with hydrogen, by Edward R. Washwell, William J. McMahon, and Arthur Kant. U.S. Arsenal, Watertown, Mass. Nov 1957. 8p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 133444

The investigation of the solubility of gases in metals and in particular the solubility and exchange of H_2 and HD with Ti, requires development of mass spectrometric techniques for the precise analysis of low concentration deuterium in mixtures with hydrogen. This task involves the preparation of mixtures of hydrogen and hydrogen deuteride (HD) of accurately determined compositions as well as the determination of various parameters of the mass spectrometer used. As a result of the determinations and preparations mentioned above, a precision of 2% or less is attained in the analysis of low concentration deuterium in mixtures with hydrogen. OO project TB 2-0001. D/A project 5B 99-01-004. WAL R 833/7.

Methods of indirect spectrophotometry: Determination of calcium or magnesium, by Charles N. Reilley and Gary P. Hildebrand. North Carolina. University. Dept. of Chemistry, Chapel Hill, N.C. Aug 1957. 19p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133314

This paper is an inquiry into the modes of photometric measurement in cases where the introduction of sample causes a decrease in absorbance of the chromogenic reagent solution. Four methods are distinguished, of which two are new. These new methods yield a linear absorption scale versus concentration plot analogous to the usual "Beer's Law" and "Transmittance-Ratio" relationships. Magnesium is determined using calcon as the chromogenic reagent and calcium in a similar way by introduction of magnesium-EDTA to the calcium solution. The sensitivity of the method is 0.003 (Mg) and 0.005 (Ca) micrograms per cm^2 per 0.001 absorption units. UNC-Chem no. 16 CNR. AF OSR Chem 40-17. Contract AF 18(600)-1160. AF OSR TN 57-523.

Microwave spectrum of methyl monofluorosilane, Louis Pierce. Harvard University. Dept. of Chemistry, Cambridge, Mass. Jun 1956. 1p. Order from LC. Mi $1.80, ph $1.80. PB 126924

Abstract prepared for the Columbus Symposium on Spectroscopy, Jun 1956. 1. Silane, Monofluoro methyl - Spectrographic analysis 2. Contract N5 ori-76, T.O. V

Molecular weight determination of amines by spectrophotometry, by Victor I. Siele and Jean P. Picard. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Nov 1957. 13p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132859

The molecular weights of a large variety of amines, such as primary, secondary, tertiary, alkyl, aryl, and heterocyclic amines, have been determined by a study of the absorption spectra of their picrate and styphnate derivatives. The effect of concentration upon the accuracy of the method is discussed. Dept. of the Army project: 5A04-21-007. ORD project: TAI-3603(K). PA TR 2465.

Spectrochemical analysis of titanium and titanium alloys by a porous cup-spark method, by M.J. Peterson. U.S. Bureau of Mines, Washington, D.C. Sep 1956. 18p photo, diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133021

A spectrochemical procedure applicable to the determination of iron, manganese, and magnesium in titanium metal and to the determination of alloying constituents in three types of titanium alloys is presented. Acid solutions of samples and standards are excited with a spark-type discharge and porous-cup electrode arrangement. The method is particularly applicable for analyzing samples for which a self-electrode method cannot be used. BM RI 5256.

Ultramicro chelometric titrations with potentiometric end point detection, by Fawzy S. Sadek and Charles N. Reilley. North Carolina. University. Dept. of Chemistry, Chapel Hill, N.C. Dec 1957. 25p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133313

UNC-Chem no. 17. AF OSR Chem 40-17. 1. Metal ions - Reaction kinetics 2. Microchemical analysis 3. Potentiometers 4. Contract AF 18(600)-1160 5. AF OSR TN 57-788

X-ray microscopy project. Final report under Contract Nonr-1461(00), by Albert V. Baez. Redlands. University. Dept. of Physics, Redlands, Calif. n.d. 2p. Order from LC. Mi $1.80, ph $1.80. PB 127259

Date is 1955 or earlier. 1. X-ray research 2. Microscopy, X-ray

Miscellaneous Chemicals

Chemistry of taste. Report 5 (final) covering the period 1 Jul 1955-30 Jun 1956, under Contract DA 19-129-qm-484, by Lloyd N. Berguson. Howard University, Washington, D.C. Jul 1956. 7p tables. Order from LC. Mi $1.80, ph $1.80. PB 132152

The objective was to procure in pure form, from commercially available sources or by synthesis, a number of compounds possessing a more or less sweet taste, to study certain physical properties of these compounds and to seek correlations between their tastes and properties. Project no.: 7-84-01-002.

Effects of radiation on the Hill reaction, by Donald R. Anderson. U.S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Jul 1957. 33p drawing, diagrs, graphs, tables. Order from OTS. $1.00. PB 131674

Ultraviolet and gamma radiations were utilized as inhibitors in the Hill reaction under conditions permitting kinetic analysis of the results. Both the photochemical and enzymatic portions of the Hill reaction were inhibited with ultraviolet radiations, the former being the most sensitive. Comparisons with gamma radiations showed the converse to be true. The Hill reaction was resistant to gamma irradiation and the resistance appeared to vary with the age of the plants, the youngest being more sensitive. AF SAM R 57-83.

DETERIORATION STUDIES

Dry temperate phase of climatic exposure tests, processing and packing methods and materials, by T.R. Eiler, Jr. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. May 1957. 51p fold graph, tables. Order from LC. Mi $3.60, ph $9.30. PB 133944

This report evaluates the dry temperate phase of climatic exposure tests. When completed this project will include open storage tests of Corps of Engineers equipment at sites in arctic, damp temperate, dry temperate, average temperate, desert, and tropical climates to determine the effects of climatic conditions on preservatives and methods of preservation. Project: 8-91-12-104. Covers period 5 Dec 1949-2 Jan 1951. ERDL R 1481-TR.

Effect of moisture and mold on the dc resistance characteristics of low voltage hook-up wires, by R.H. Luce and K. N. Mathes. Rensselaer Polytechnic Institute, Troy, N.Y. Jul 1948. 86p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 133593

ATI 90108. 1. Insulation, Electrical - Materials - Fungus resistance 2. Insulation, Electrical - Material - Materials - Moisture resistance 3. Wire - Fungus proofing 4. Wire - Moisture proofing 5. Contract W-28-099-ac-69, Final report

Feasibility of combined-environment testing, by W.J. Carey and G. Kollin. American Power Jet Company, Ridgefield, N.J. Sep 1956. 107p fold map, diagr, tables. Order from LC. Mi $5.70, ph $16.80. PB 134418

The analysis, criteria, and testing programs presented herein are designed to establish the feasibility of combined environments in the environmental testing of USAF material. Such combination of environments is found to be feasible in general, and especially so for those environments which are at once most critical and most often encountered in USAF operations. AD 110499. Project 1111, Task 11115. Covers period 15 Dec 1955-30 Sep 1956 under Contract AF 33(616)-3322. AF WADC TR 56-546.

Fungitoxic activities of volatile compounds, by A. Kravitz. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Mar 1957. 38p photo, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132801

21 organic compounds, including 14 esters, 3 n-alkanes, 2 chlorinated hydrocarbons, and ethylene oxide, were tested for fungistatic and fungicidal ef-

fectiveness in the vapor phase, using Myrothecium verrucaria and Rhizopus nigricans as test organisms. The compounds were evaluated using a fan inside a closed vessel to circulate the vapors. ID_{50} (median inhibiting dose) and LD_{50} (median lethal dose) values for all of these compounds were computed. A survey of methods that have been used by investigators for testing volatile fungicides is presented. Project no. TB 4-321 F. FALR R 1379.

ELECTRICAL MACHINERY

Communication Equipment

Airborne tests of meteor-burst communications, by I. Roth. Stanford Research Institute, Menlo Park, Calif. Feb 1958. 19p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 133301

To conduct airborne studies of the meteor-burst communications system, a privately owned PBY-6A type aircraft was chartered and modified. This is a preliminary report on the project, containing descriptions of the equipment installed in the aircraft and of the airborne tests conducted to date. Results thus far confirm that ground-air meteor-burst communications are feasible. AD 146828. Contract AF 19(604)-1517, Scientific report 7. AF CRC TN 58-121. SRI Proj 1422.

Expectation in message reception, by Henry M. Moser, John J. Dreher. Ohio State University. Research Foundation, Columbus, O. Oct 1957. 25p graphs. Order from LC. Mi $2.70, ph $4.80. PB 134557

Listening panels of foreign and American airmen were given printed lists of monosyllabic words, polysyllabic words, and air traffic instructions. Their task was to decide whether these printed messages agreed or disagreed from correspondingly numbered aural messages which were presented in noise. Results indicated that under good listening conditions, both foreign and American listeners were influenced by suggestion regarding the probable amount of message agreement and disagreement. AD 110072. Technical report 44. Contract AF 19(604)-1577. OSURF Proj 664. AF CRC TN 57-55.

New horizon in communication theory, the polyphase concept, by A. A. Kunze, R. L. Marks, and J. G. Schermerhorn. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Jan 1958. 42p photos, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133469

This report attempts to explain the significance of the polyphase concept and its application to communications engineering which, to date, had been treated from a single-phase concept only. The polyphase concept is shown to be of sufficient scope and power to penetrate into every domain constituting communications theory and to provide new applications to old problems such as information theory, modulation, antennas, detection, and circuitry. The Fortescue symmetrical component theory is borrowed from the power engineer and its extension is shown to be a powerful tool in communications analysis. Further outlined are the possibilities of the application of the polyphase concept to such areas as multiplexing, high-power generation, and interference suppression. AD 148538. Project 4518. AF RADC TN 58-6.

Sequential decoding for reliable communication, by John M. Wozencraft. Massachusetts Institute of Technology, Research Laboratory of Electronics, Cambridge, Mass. Aug 1957. 159p diagrs, graphs, table. Order from LC. Mi $7.50, ph $24.30. PB 133464

Shannon's coding theorem for noisy channels states that it is possible to communicate information, with arbitrarily small error, at any rate of transmission less than the channel capacity. The attainable probability of error has previously been bounded as a function of capacity, transmission rate, and delay. This investigation considers the behavior of a new parameter, the average number of decoding computations. A convolutional encoding and sequential decoding procedure is proposed for the particular case of the binary symmetric channel. With this procedure, the average number of decoding computations per information digit can be constrained to grow less rapidly than the square of the delay. Thesis, Massachusetts Institute of Technology. Dept. of the Army task: 3-99-06-108. Dept. of the Army project: 3-99-00-100. Contract DA 36-039-sc-64637. MIT RLE TR 325.

Visual message presentation. Scientific report no. 5 for Contract no. AF 19(604)-1039, Item 1, for the period 1 Mar through 31 Aug 1956, by Martin W. Essigmann. Northeastern University. Electronics Research Laboratory, Boston, Mass. Sep 1956. 35p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127068

A method is proposed, for use in extracting speech parameters, which will vary the averaging time of a circuit inversely with the zero-crossing rate of the input signal. The waveform of the vocal-cord excitation function is investigated with the aid of a format-suppressor circuit. The difference between the average frequencies of an original signal and its differentiated version is proposed as a convenient measure of the dispersion of a singly-peaked spectrum, for use with turbulent speech sounds. Copper-oxide modulators have been tested for possible use in the speech synthesizer. Preliminary results are given for articulation tests designed to evaluate the analysis-synthesis scheme using continuous parameters. Procedures are described for calibra-

tion of the acoustical equipment in the laboratory. AD 98785. Contract AF 19(604)-1039. AF CRC TN 56-582.

Electronics

Aircraft antenna system ANDB type 7. 2NAI (DC-6 and Constellation - type aircraft). Final report under Contract NOa(s)-55-810-d, by W. Spanos and J. M. Ashbrook. Federal Telecommunication Laboratories, Nutley, N.J. Jun 1957. 80p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $4.50, ph $12.30.
PB 132250

A method is given for determining the performance in regions where patterns interference exists due to overlapping coverage from widely spaced antennas. The motion of the aircraft during yaw is taken into consideration to permit quantitative determination of signal losses and the consequent effect on electronic navigation equipment performance. The predicted performance for an experimental nose tail antenna system on a DC-3 is in substantial agreement with the results of flight tests which were conducted for both the Distance Measuring Equipment and the Radar Safety Beacon.

Analysis of problems related to scheduled maintenance of electronic equipment aboard Naval ships, by Glenn L. Bryan, Nicholas A. Bond, Jr., and Harold R. LaPorte, Jr. University of Southern California. Dept. of Psychology, Los Angeles, Calif. Jun 1957. 46p. Order from LC. Mi $3.30, ph $7.80. PB 134570

The suggested system utilizes computer facilities external to the ship for scheduling preventive maintenance aboard the ship. The computer approach is adopted because scheduling of maintenance work is viewed as an allocation-of-resources problems which is amenable to computer solution. Possible advantages and disadvantages of the system are discussed, and comments on practical implementation and evaluation are offered. Contract Nonr 228(02), NR 153-093, Technical report 22. USC PL 22.

Analysis of redundancy networks, by Fred Moskowitz. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Feb 1958. 27p diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 133468

Various properties and characteristics of probabilistic redundancy networks which can be used to represent reliability relationships in complex equipment containing redundant elements, large scale systems containing a multiplicity of alternative subsystems, or telecommunication nets containing possibilities of alternative routing, have been investigated and studied. It has been shown that such networks are amenable to systematic analysis; several methods and techniques have been suggested for dealing with such problems. AD 148588. AF RADC TN 58-42.

Analysis of the time and space scale problems in radio meteorology, by Arthur Engelman and Lawrence Colin. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Dec 1957. 29p maps, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80.
PB 133470

Rawinsonde data from three experimental range stations and five regularly reporting stations were collected during the summer of 1956. Flat earth approximations of the elevation angle and range errors were derived from more precise spherical earth equations. It is concluded from the space scale analysis that the magnitude of the surface index variations makes the application of the total elevation angle error of one station to that of another prohibitive. AD 131392. AF RADC TN 57-394.

Backlash and hysteresis effects in automation systems, by L. M. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Aug 1957. 14p diagrs, graph. Order from LC. Mi $2.40, ph $3.30.
PB 132198

Nonlinearities of backlash and of hysteresis type provide generally different types of stability limits in feedback control systems. These limits and the corresponding frequencies of oscillation may be expressed in terms of characteristic adimensional system parameters. Examples of application to second and third order systems are shown, using a procedure of analysis which is an extension of that of Kryloff-Bogoliuboff for application to systems of order higher than two. AD 136568. Submitted, March 1957 for the Convention "Electronics in Automation" of the British Institution of Radio Engineers in Cambridge, Eng., Jun 26-Jul 1 1957. Will appear in the Journal of the Institution. Contract AF 18 (600)-1505. PIB R 602-57. PIB 530. AF OSR TN 57-580.

Basic and applied research on semiconductors, by E.K. Weise. Illinois, University. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana. Ill. Feb 1958. 88p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 134716

In Section A, investigations of electric and magnetic properties of reduced (IIa) group titanates are reported which were made at the University of Illinois from 1950 to 1957. Sintered samples of Mg_2TiO_4, $MgTiO_3$, $MgTi_2O_5$, $CaTiO_3$, $SrTiO_3$, and $BaTiO_3$ were measured at temperatures between -190°C and +1, 500°C in inert atmospheres. The electric conductivity was measured between -900°C and

+1,500°C. Between +20°C and -190°C the Hall effect was measured. The behavior of magnetic susceptibility was investigated over a wide range of temperature and composition. In Section B, "Applied Research Work," investigations of the resistance-temperature characteristics, the voltage-current characteristics, and the equivalent circuit of thermistors are discussed. AD 154200. OSR project 52-670A-85. Contract AF 33(038)-12644, Final report. AF OSR TN 58-50.

Basic microwave research. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Contract AF 19(604)-1930. Order separate parts described below from LC, giving PB number of each part ordered.

Scientific report no. 1 covering the period 1 Apr-30 Jun 1957. Aug 1957. 15p diagrs. Mi $2.40, ph $3.30. PB 132578

Summarizes work under five projects: Electron-velocity spectrograph, large-signal klystron theory, connected-ring structures, studies in the theory of coupled cavities, and electron-gun studies. AD 117110. SU ML R 31. AF CRC TN 57-393.

Scientific report no. 2 for the period 1 Jul-31 Sep 1957. Oct 1957. 14p diagrs, graph. Mi $2.40, ph $3.30. PB 132940

In the electron velocity spectrograph project, the first phase of the work has now been completed, and a technical report is being prepared which will summarize this. Consideration is now being given to possible improvements in the spectrograph, and to the areas of investigation in which the spectrograph will be used in the future. In the large-signal klystron theory project, a large-signal, one-dimensional, non-relativistic analysis of the klystron drift-tube problem is now in progress. Attention is also being given to a three-dimensional formulation, and to the relativistic theory of a beam in a conducting drift tube in the presence of an axial magnetic field. AD 133666. SU ML R 449. AF CRC TN 57-758.

Bibliography of Soviet research on radiowave propagation and antennas. See entry under Bibliography on page 331. PB 132339

Broadband ferrite rotators using quadruply ridged circular waveguide, by H.N. Chait and N.G. Sakiotis. U.S. Naval Research Laboratory. Aug 1958. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133128

Various methods of lowering the cutoff of circular waveguide are compared. Data on the broadbanding of the rotation by dielectric loading and also by the use of quadruply ridged circular waveguide are shown. An experimental study showing the effect of the ridge width and height on the cutoff of the circular waveguide and the frequency dependence of the rotation is discussed. NRL R 5172.

Coiled waveguide delay line, by R.R. Palmisano and A. Sherman. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Sep 1957. 11p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132394

Dept. of the Army project: 506-01-001. DOFL project: 41047. ORD project: TA 3-9101.
1. Wave guides - Design 2. Lines, Delay - Design 3. DOFL TR 511

Comparison of antenna range characteristics (40' vs 156' range), by Gust E. Johnson. U.S. Army. White Sands Signal Agency, White Sands Proving Ground, N.M. May 1957. 17p tables. Order from LC. Mi $2.40, ph $3.30. PB 134267

AFC report ARA-29-5-57. 1. Antennas, Range - Tables

Concept of the absolute electrode potential, by R. Mendelsohn and G.J. Janz. Rensselaer Polytechnic Institute. Dept. of Chemistry, Troy, N.Y. Jun 1956. 48p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125195

The first section is a theoretical discussion showing how experimentation cannot determine the absolute emf. of an electrode with the accuracy that is required for such a measurement. The second covers experimental attempts to prepare a null electrode and to measure absolute potential of an electrode. The third covers the similarities, differences, and interrelations between the various approaches. It is stated that it is physically impossible to measure precisely thermodynamic quantities such as single ion activity. AD 88973. Project Chem 40-3. Contract AF 18(600)-333, Technical note 4. AF OSR TN 56-253.

Coordination of experimental results on the plasticity of single crystals. Final technical report under Contract AF 18(600)-488, by F. Zwicky. California Institute of Technology. Dept. of Mechanical Engineering, Pasadena, Calif. Jul 1955. 58p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 132298

A morphological survey has been given of some of the difficulties which confront the theory of the geometrically ideal atomic lattices when attempting to explain the low yield strength of many crystals in particular and structure sensitive properties in general. These results prove that mosaic structures, containing dislocations and other thermodynami-

cally pseudostable deviations from the geometrically ideal lattices, are not sufficient to account for the easy inset of slipping in many crystals. These crystals must rather contain secondary structures, characterized by secondary lattice constants which are many times greater than the primary lattice constants. AD 136461. Contract AF 18(600)-488, Supplemental agreement 2(54-815), Final technical report. AF OSR TN 57-53.

Current distributions on a cone surface-solution of the synthesis problem, by H. Unz. California. University. Division of Electrical Engineering. Electronic Research Laboratory, Antenna Group, Berkeley, Calif. Dec 1956. 32p diagr. Order from LC. Mi $3.00, ph $6.30. PB 130644

The synthesis problem of patterns produced by current distributions over the surface of a cone is formulated. F-pattern and G- pattern are defined. Solution of the synthesis problem in case of currents polarized in the direction of the generating lines of the cone is given for prescribed F-pattern or G-pattern. Contract N7 onr-295(29), Report no. 58. UC IER Series 60, Issue 173.

Curvilinear space-charge flow with applications to electron guns, by Peter T. Kirstein. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Jan 1958. 165p diagrs, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 133993

AD 133784. 1. Equations, Electromagnetic 2. Guns, Electron - Theory 3. Flow, Electron - Theory 4. Fields, Electromagnetic - Theory 5. Electron beams - Electromagnetic effects 6. Contract AF 19(604)-1930, Scientific report no. 4 7. AF CRC TN 57-964 8. SU ML R 440

Data for predicting dependable air-to-air radar range, by Chester A. Hines. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aerial Reconnaissance Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1956. 131p diagrs, graphs (1 fold), tables. Order from LC. Mi $6.90, ph $21.30. PB 134409

This report contains tabulated and graphically-presented data which, if used properly, can quickly provide vital information on the dependable maximum radar range when both the radar and targets are above super-standard layer in the atmosphere under stated conditions. Data were determined through the application of the radio line-of-sight equation. This application of the equation and the accompanying tables are believed to be new. AD 101277. Project 4063, Task 40520. AF WADC TR 56-232.

Design and development of L band prototype carcinotron tube with magnets. Final technical report under Contract AF 61(514)-918, by J. Nalot and W. Sobotka. Compagnie Générale de Télégraphie Sans Fil, Paris, France. Apr 1957. 110p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 132512

Discusses design, circuits, optics, technology, and performance of the tubes. Theoretical formulas give the properties of the delay line, the sole-line distance and the starting current which is an approach for the determination of efficiency. AD 131349. AF RADC TR 57-177.

Design of mirror-lenses for scanning, by A.E. Marston and R.M. Brown, Jr. U.S. Naval Research Laboratory. Aug 1958. 33p photo, drawing, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133236

A study has been made of the scanning properties at microwave frequencies of the mirro-lens, which is a lens in direct contact with a reflecting surface. Rays from a point source are incident on the lens curve C_1 and are there refracted, then reflected by the reflector curve C_2, and finally refracted a second time at C_1 to form a collimated beam (if properly designed). The best known mirror-lens treated in classical optics is the Mangin mirror, for which both C_1 and C_2 are circles. For off-axis feed positions they suffered from coma and could not be used for scanning. Two other types of mirror-lenses were designed. It was found experimentally that the Abbé sine mirror-lens was virtually coma-free and could scan a 1.5-degree beam over an angle of ±12 degrees with sidelobes more than 19 db down. By allowing both C_1 and C_2 to be ellipses and using a similar three-ray technique, bifocal mirror-lenses were designed. These bifocal mirror-lenses were slightly better than the Abbé sine models, being able to scan a 1.1-degree beam over about ±12 degrees with sidelobes more than 19 db down. The models that were built were three-dimensional rotationally symmetric lenses for which the aberration of astigmatism further limited the scan to about ±8 degrees. NRL R 5173.

Design technique for broadband strip line filters, by Martin Rabinowitz and Eugene N. Torgow. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Mar 1956. 89p drawing, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 132286

The basic characteristics of strip transmission line are presented and several components required in the line construction and testing of strip line filters are described. A discussion of techniques for fabricating strip line section and components is presented. Other problems in the design of filters for special applications are considered. These include the complementary pairing of filters and frequency partitioning arrangements. AD 97730. Contract AF 30 (602)-980. PIB R-475-56. PIB 405. AF RADC TN 56-291.

Development of an airborne radar method of avoiding severe turbulence and heavy precipitation areas of thunderstorms and line squalls, by R.W. Ayer, F.C. White, and L.W. Armstrong. American Airlines System. Flight Engineering Operational Development Branch, New York, N.Y. Sep 1949. 69f photos (part fold), diagrs (part fold), graphs, maps. Order from LC. Mi $3.90, ph $12.30. PB 135168

Airborne radar, in more or less standard form with PPI and controls in the cockpit for pilot use, has been shown to be capable of displaying areas of moderate and heavy precipitation of all kinds, thus permitting avoidance of same, if airways conditions will permit. This report, however, deals with a special form of 3.2 centimeter airborne radar revised to permit flying through such areas of moderate or heavy precipitation, avoiding the areas of heavy turbulence within the moderate and heavy precipitation, and probably avoiding most, if not all of the damaging hail. For technical note 12 see PB 119510. Contract NOa(s) 9006, T.O. 1, Final report.

Development of antenna control group OA 714/TLR, per specification MIL-A-13441. Final report covering period 6 Dec 1954-10 Mar 1956, by Ralph G. Arnold and Daniel A. Billet. J. and H. Smith. Manufacturing Company, Newburgh, N.Y. Apr 1956. 24p photos, diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 132754

AD 105060. 1. OA-714/TLR (Antenna) 2. Antennas - Design

Development of electron tube, plasmatron, 10-amper inverter. Final report on work at Lancaster covering the period 15 Sep 1953-30 Sep 1955, under Contract no. DA 36-039-sc-52664, by C.E. Curtis and H.H. Wittenberg. Radio Corporation of America. Tube Division, Harrison, N.J. Jan 1956. 202p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 132123

The object was to develop a low arc-drop gas tube for use in an inverter circuit. This tube is to operate from a power supply that will vary from 22 to 30 volts. This tube is to be 60% efficient in converting direct current to alternating current at 420cps with a supply voltage of 26 volts. AD 96020.

Development of high-power, traveling-wave and hybrid tubes. Scientific report no. 4 covering the period 15 Apr-15 Jul 1957, under Contract AF 19(604)-1924. Stanford University. W.W. Hansen Laboratories of Physics, Microwave Laboratory, Stanford, Calif. Sep 1957. 22p photo, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 132580

Summarizes work on the clover-leaf traveling-wave tube project, high-power broadband tube structures, and development of a grid-controlled converging beam electron gun for use in multi-megawatt klystron and traveling-wave tubes. AD 133665. SU ML R 434. AF CRC TN 57-757.

Development of sealed multi-contact power connectors, by D.L. Pfendler. Bendix Aviation Corp. Scintilla Magneto Division, Sidney, N.Y. Aug 1956. 181p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $8.40, ph $28.80. PB 134565

The principal purpose was outfitting of Signal Corps and other electronic equipment with "Q" connectors to determine their performance and reliability on a variety of applications in actual field service. DA project 3-26-00-600. SC project 2006A. Contract DA 36-039-sc-63197, Final report.

Diffraction by a convex cylinder, by Joseph B. Keller. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Jul 1956. 8p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 127215

AD 98789. From Electromagnetic wave theory symposium, p. 312-321. 1. Waves, Electromagnetic - Diffraction - Theory 2. Cylinders, Convex - Reflective effects 3. Contract AF 19(122)-42 4. AF CRC TN 56-590 5. NYU RR EM 94

Diffraction of a dipole field by a unidirectionally conducting screen, by James Radlow. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. May 1957. 27p. Order from LC. Mi $2.70, ph $4.80. PB 133182

An exact solution is obtained for the diffraction of a dipole field by a unidirectionally conducting semi-infinite plane screen. Double Laplace transforms are applied to Maxwell's equations, and the defining conditions of the unidirectionality lead to an equation between two complex functions of two complex variables. This equation is solved by an extension of the usual function-theoretical method, the electromagnetic field can be expressed in terms of certain complex triple integrals. These are transformed into real integrals, so that it is possible to discuss the field behavior in the neighborhood of the diffracting edge. The variation of singularity along the edge of the screen is given. AD 117079. Contract AF 19(604)-1717. NYU RR EM 105. AF CRC TN 57-377.

Domain structure effects in an anomalous ferrimagnetic resonance of ferrites, by R.C. LeCraw and E.G. Spencer. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Dec 1956. 23p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132519

Measurements of intrisic tensor permeability of unsaturated Ni-ferrite at 9300 mc, using cavity perturbation techniques, have revealed an anomalous resonance for negative (anti-Larmor) circularly polarized fields. A theory is presented which explains these effects based on a model involving a physically probable domain structure. TA 3-9109. DOFL project: 4403-41044. DOFL TR 419.

Effect of crystalline electric fields on ferromagnetic anisotropy, by W.P. Wolf. Harvard University. Gordon McKay Laboratory of Applied Physics, Cambridge, Mass. Aug 1957. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132052

The effect of the electrostatic crystalline field has been considered for a magnetic crystal in which the ions are strongly coupled by ferromagnetic exchange. AD 133645. Scientific report no. 12. Contract AF 19(604)-1084. AF CRC TN 57-594.

Effect of space charge formation upon electrical breakdown in gases, by A.L. Ward. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Aug 1957. 26p graphs. Order from LC. Mi $2.70, ph $4.80. PB 132360

1. Gases - Electrical properties 2. Tubes, Electron 3. Vacuum tubes - Gas discharges - Oscillations 4. DOFL TR 500

Effect of wall contact on permeability measurements in microwave resonant cavities, by J.E. Tompkins. U.S. Ordnance Corp. Diamond Ordnance Fuze Laboratories, Washington, D.C. Jan 1957. 11p. Order from LC. Mi $2.40, ph $3.30. PB 132520

An investigation is made of the effect of cavity wall current redistribution (due to the insertion of a sample) on the measurement of μ'', the imaginary part of the permeability of a nonconducting magnetic material. Attention is given specifically to thin cylindrical samples. For a given geometry, expressions are derived with which it is possible to obtain the lower limit of μ'' that can be measured with a prescribed accuracy. DOFL project: 4403-41044. DOFL TR 428.

Effects of atmospheric attenuation on reconnaissance antenna design, by Charles H. Wilcox. Hughes Aircraft Company. Research Laboratories, Culver City, Calif. Feb 1957. 54p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 132192

The principal results of attenuation by atmospheric and meteorological phenomena are presented in a form suitable for application to the design of advanced airborne reconnaissance antenna systems. AD 117098. Contract AF 19(604)-1708, Scientific report no. 1. AF CRC TN 57-197.

Effects of imperfect ground conditions on the vertical electrical field strength produced by leakage radiators, by Kurt Ikrath. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Oct 1956. 137p diagrs, graphs (part fold), table. Mi $6.90, ph $21.30. PB 132804

Interference due to leakage radiation is a major cause of malfunctioning of the complex electronic and electrical systems for communication, detection guidance and control. In order to safeguard their operation against interference, control and suppression of leakage radiations is imperative. One phase in the control of leakage radiation is its measurement. At low RF frequencies, where the dimension of the leakage radiator is small compared to the wavelength it is possible to express the strength of leakage radiators in terms of its equivalent noise-dipole moment or moments. The evaluation of these equivalent dipole moments is based essentially on a field strength measurement at a distance away from the source under the assumption of ideal ground conditions. Dept. of the Army task no. 3-54-03-041. Signal Corps task no. 2224B. AD 128324. SCEL TM M 1848.

Electroforming process used in the fabrication of a broadband single ridged antenna horn, by Joseph Schramp. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force, Base, N.Y. Oct 1957. 12p photos. Order from LC. Mi $2.40, ph $3.30. PB 132432

In fabricating a broadband single ridged antenna horn which will operate in the 10 to 40 kmc frequency range, several techniques were investigated at RADC. This report describes the particular electroforming process which proved the most suitable in meeting the design requirements of the horn. AD 131262. Project 4155, Task no. 45383. AF RADC TR 57-155.

Electromagnetic propagation effects in ferromagnetic resonance, by M.H. Seavey and P.E. Tannenwald. Massachusetts Institute of Technology. Lincoln Laboratory, Lexington, Mass. Jan 1957. 56p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 132993

It has been shown that an examination of electromagnetic wave propagation is necessary in the interpretation of ferromagnetic resonance experiments under almost all circumstances of conductivity, geometry and frequency. The electromagnetic effects observed under resonance conditions are examined in detail for insulators, moderate conductors and metals. Modifications of the μ'' resonance line which occur when the sample size is of the same magnitude as the skin depth and/or wavelength are derived. This also applies to good conductors where, because of the small skin depth, the effective sample volume is always a thin sheet of material. Further, criteria for observing body resonance are given. Detailed calculations and figures are presented which

give the power absorbed in semi-infinite and finite thickness slabs of various conductivities. Contract AF 19(122)-458. MIT LL TR 143.

Electromagnetic waves on corrugated lines: Propagation constant measurements, by George G. Weill and Hans Kuehl. California Institute of Technology. Antenna Laboratory, Pasadena, Calif. Dec 1957. 11p photo, diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133337

This report checks experimentally the accuracy of an approximate formula derived from an exact integral equation in PB 126690. AD 148017. Contract AF 18(600)-1113. CIT AL TR 13. AF OSR TN 57-786.

Electronic parts (Industrial electronics): Four articles on the standardization of electronic components, by P. Andrieux, A. Danzin, M. A. Dauphin, J. deLighy, and A. H. Schaafsma. Translated and edited by F. A. Raven. Sep 1956. 83p photos, diagrs (part fold), graphs, tables (part fold). Order from LC. Mi $4.80, ph $13.80. PB 127071

Translated from L'Onde Electrique, Vol. XXXVI, no. 348 Mar 1956, pp. 165-193. Contents: Individual electronic parts (Electronic components) (Piéces détachées d'electronique), by P. Andrieux. - Organization of French efforts respecting the specifications of individual electronic component parts (L'organization de l'effort francais en matiére de spécifications piéces detachées), by A. Danzin. - Check of individual electronic parts and of electronic tubes in the Central Laboratory of theElectrical Industries. (Le controle des pieces détachées et des tubes electroniques au Laboratoire Central des Industries Electriques), by M. A. Dauphin. - Check of variable factors during fabrication. (Le controle des facteurs variables pendant la fabrication), by J. de Ligny and A. H. Schaafsma. STS 244. NAVSHIPS T 617.

Electronic phase shifter employing high frequency gas discharge techniques, by R. H. Geiger and P. E. Dorney. Roger White, Electron Devices, Inc., Haskell, N.J. n.d. 61p photo, drawings, diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 133975

The general problem of shifting the phase of high level UHF and microwave signals is considered primarily for use in switching applications. Slow-wave interaction with d-c discharge and r-f resonance forms of plasma is studied both experimentally and theoretically. Several techniques of obtaining phase shift in the UHF range by the use of slow-wave structures and vacuum devices are reported. AD 133732. Contract AF 19(604)-1592, Final report. AF CRC TR 57-354.

Employment and suitability test of TACAN circular (arc) approach procedures as outlined in United States manual of criteria for standard instrument approach procedures, by Joseph A. Hauser. U.S. Air Force. Air Proving Ground Center, Eglin Air Force Base, Fla. Apr 1958. 41p diagrs. Order from OTS. $1.25. PB 151038

Formerly project APG/CSC/1480-A. 1. TACAN (Tactical air navigation system) 2. Instrument approach system 3. Landing approach 4. Radio navigation 5. Airports - Air traffic control 6. APGC TR 58-43

Encapsulation of electronic circuits, by Richard Calicchia. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Jan 1958. 22p photos, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 133475

Quantitative effects of the encapsulating dielectric upon the electrical characteristics of the embedment are discussed. Of major interest is the work initiated on the electrical performance of resistors, capacitors, inductors, and simple circuits, at frequencies up to 240 megacycles. The investigation of the electrical and mechanical properties of various resins was necessary in order that most suitable encapsulent be selected for the specific application. AD 148557. AF RADC TR 58-8.

Error analysis of carbon reference resistors for radiosonde AN/AMT-4 ( ), by Dudley E. Cline. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Feb 1955. 52p photos, diagrs (part fold), tables (1 fold). Order from LC. Mi $3.60, ph $9.30. PB 130902

Theoretical considerations show that a Radiosonde AN/AMT-4 ( ) using a boron-carbon reference resistor (temperature coefficient of 200 parts per million per ^{o}C) will permit the accuracy requirements. Flight tests have verified the theoretical results. On the basis of the theoretical and flight test data collected, it is concluded that the boron-carbon reference resistor may be used to replace the wirewound reference resistor may be Radiosonde Transmitter T-304 ( )/AMT-4' A or subsequent similar models. Dept. of the Army project no.: 3-36-06-000. Signal Corps project no.: NR 732M. SCEL ER 1152.

Evaluation of STL-114 traveling-wave tube, by Philip Order. U.S. Air Force. Air Research and Development Center, Griffiss Air Force Base, Rome, N.Y. Nov 1957. 48p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132765

The test procedures for evaluating the STL-114 Traveling-Wave Tube (TWT) are described. Performance curves indicating the operating parameters of the tube are plotted and evaluated. A discussion

is presented of the application of the tube as a driver for a high-power L-band transmitter. AD 131291. Project no. 4506, Task no. 45152. AF RADC TR 57-157.

Excitation of a dielectric rod by a cylindrical waveguide, by Carlos M. Angulo and William S. C. Chang. Brown University. Division of Engineering, Providence, R.I. Jul 1957. 49p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 132191

One possible way of exciting the lowest symmetrical surface wave in dielectric rods has been theoretically investigated and the results are presented in this report. AD 117061. Covers period Dec 1956-Jul 1957. Contract AF 19(604)-1391, Scientific report no. 7. AF CRC TN 57-367.

Experimental optical investigation of radar backscattering, by F. Sheppard Holt and Roy C. Spencer. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Bedford, Mass. Apr 1957. 19p photos. Order from LC. Mi $2.40, ph $3.30. PB 132354

If the dimensions of a scatterer are large compared with wavelength and if resonant effects are neglected, then the backscattering cross section of the scatterer is determined principally by the regions of specular reflection. The nature and location of the areas of specular reflection of polished aircraft model for various model orientations are clearly indicated in photographs taken with a single small-area light source located near the camera. AD 117070. AF CRC TR 57-106.

Experimental traveling-wave tube radiometer, by Joseph Casey, Jr. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Propagation Laboratory, Bedford, Mass. Mar 1957. 72p photos, drawings (part fold), diagrs (fold), graphs (part fold), tables. Order from LC. Mi $4.50, ph $12.30. PB 132744

A C-band traveling-wave tube radiometer has been assembled and bench-tested. The peak-to-peak noise power fluctuation of the equipment corresponds to temperature changes of about 1°K for a response time of 4 sec, as compared with about 5°K for a superheterodyne radiometer having the same noise figure and response time. When the gain stabilization features (signal chopper and synchronous detector) are deactivated, the long-term drift becomes severe but the device maintains its short-term sensitivity. Under these circumstances it is capable of detecting temperature changes of 40°K in 2.5 msec. AD 117005. Appendix A: "C-Band video receiver", is a reproduction of final report furnished by Federal Telecommunication Laboratories, under Contract AF 19(604)-1282. AF CRC TN 57-100.

Fabrication of data transmission systems, data receiving systems, power supplies, spare parts and instruction manuals. Final engineering report under Contract AF 08(606)-925, by A. Morrison and C. A. Atherton. Electronic Engineering Company of California, Los Angeles, Calif. Jan 1957. 51p photos, drawings, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 132287

This report outlines the use of the data transmission and receiving equipment and a description of the equipment. In addition, certain problems encountered during fabrication or testing are discussed and solutions described. AD 116706. AF MTC TR 57-6.

Flash-triggered electronic timing and multiple shutter system, by Everett O. Richey. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Texas. Jul 1957. 15p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132269

1. Electronic equipment - Design 2. AF SAM 57-118

Formulas for the radiation pattern of a cylindrically symmetric reflector-type antenna, by N. Grier Parke. Parke Mathematical Laboratories Inc., Carlisle, Mass. Aug 1957. 31p diagrs, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 132789

This report derives the integrals representing the far field of a reflector with parametric equations. This report does not give the analytic or computational details. AD 110155. Contract AF 19(604)-1720, Technical report no. 1. AF CRC TN 56-959.

Frequency indicator for the range 10 to 90 cps, by S. R. Curley, F. H. Utley, and N. W. Guinard. U.S. Naval Research Laboratory. Sep 1958. 20p photos, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134205

A new system has been designed and constructed which gives a simultaneous visual display of all frequencies in an arbitrary periodic signal, in the range from 10 to 90 cps. This low-frequency indicating system uses ten banks of vibrating reeds to accomplish the visual display. NRL R 5187.

Fundamentals of junction transistor physics, by W. J. Poppelbaum. Illinois. University. Digital Computer Laboratory, Urbana, Ill. Aug 1955. 40p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 127055

Internal report no. 64. 1. Transistors, Junction - Theory 2. Contract N6-ori-71, T.O. XXIV, NR 048-094

General theory of klystrons with arbitrary, extended inter action fields, by Tore Wessel-Berg. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Mar 1957. 312p diagrs, graphs. Order from LC. Mi $11.10, ph $48.60. PB 133551

A general theory of the bunching of an electron beam in arbitrary longitudinal r-f fields is given. Contract N6 onr-25123, NR 373-361. SU ML R 376.

Ground plane survey, by William B. Wrigley. Georgia Institute of Technology. Engineering Experiment Station, Atlanta, Ga. Jun 1956. 11p photos, drawing. Order from LC. Mi $2.40, ph $3.30. PB 127924

The objectives of this survey were to investigate the state of the art of antenna ground-plane construction and utilization, to prepare specifications for suitable facilities for antenna research at Georgia Tech, and to supervise construction of such facilities. Project A-241-3, Final technical report. Contract Nonr-991(02), Subtask no. 3, Final technical report.

Growing waves in electron streams in crossed electric and magnetic fields. Technical report no. 14 under Contract no. Nonr 225(24), by H. Heffner and T. Unotoro. Stanford University. Electronics Laboratories, Stanford, Calif. Feb 1957. 23p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132628

Project 206-1. 1. Waves, Electromagnetic - Velocity 2. Electron beams - Mixing 3. Electron beams - Electromagnetic effects 4. Contract Nonr 225(24), NR 373-360, Technical report no. 14

Heater-cathode leakage investigation, by Julius Cohen and J.V. Florio. Sylvania Electric Products, Inc. Physics Laboratories, Bayside, N.Y. Contract AF 19(604)-1734. Order separate parts described below from LC, giving PB number of each part ordered.

5th quarterly report covering the period 1 Feb-1 May 1957. Jun 1957. 32p diagrs, graphs, tables. Mi $3.00, ph $6.30. PB 132206

The purpose of this phase of the investigation is to measure the leakage characteristics under different life conditions and also to see what correlations, if any, exist between the leakage measurements and the tube characteristics. AD 117111. Report no. YF57(B7-3028 3028-5P). AF CRC TN 57-394.

7th quarterly report. Nov 1957. 16p diagr, graphs, table. Mi $2.40, ph $3.30. PB 134585

The purpose of this phase of the investigation is to measure the leakage characteristics under different life test conditions and also to determine whether correlations exist between the leakage measurements and the tube characteristics. AD 146793. Report YD 57-5-7. Progress no. 1111-1792. For reports 1-3 and 6, see PB 124715, 125151, 126374 and 132146. AF CRC TN 58-103.

High frequency silicon transistor. Hughes Aircraft Co. Semiconductor Laboratory, Los Angeles, Calif. Contract DA 36-039-sc-72702. Order separate parts described below from LC, giving PB number of each part ordered.

Industrial preparedness study for the period 28 Jun 1956 through 28 Jun 1957, by M.J. Barrett, S.T. Eng, T.W. Griswold, and others. n.d. 91p photos, drawings, diagrs, graphs, tables. Mi $5.40, ph $15.30. PB 130611

Techniques were developed for controlled diffusion of arsenic into P-type silicon using continuous flow. Then controlled aluminum and aluminum-boron alloy evaporation were developed for making the emitter junction. An alternate method of double diffusion of boron into the N-type diffused base was also perfected to eliminate difficulties found in aluminum-boron evaporations. This was followed by an aluminum evaporation for making contact to the emitter. Masking techniques using Kodak Photo Resist and etching techniques were developed to clear off the excess emitter material and properly expose the base. A jig was designed and built for fusion of gold wires to the emitter and base surfaces. Fifty device 20 transistors were made for delivery to the Signal Corps by these processes. Instrumentation for high frequency measurement of alpha-cutoff frequency, maximum frequency of oscillation, power gain, output capacity, $r_b'C_c$ product was developed and all measurements were made. A new technique of oxide masked double diffusion was developed. Date is 1957 or later.

Supplementary feasibility report covering period 29 Jun-31 Aug 1957, by T.W. Griswold and D.L. English. Sep 1957. 19p diagrs, graph, tables. Mi $2.40, ph $3.30. PB 133238

Development of techniques beyond those reported in the Final Feasibility Report has made feasible the 12.5 Mc silicon transistor. The pressure bonding operation is described and electrical properties are given.

High power microwave filters, by Joseph H. Vogelman. U.S. Air Force. Air Research and Development Command. Rome Air Development Cen-

ter, Griffiss Air Force Base, Rome, N.Y. Oct 1957. 71p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132507

In order to obtain filters capable of handling very high power, the use of radial lines and uniform line discontinuities was investigated as the most promising approach. In this connection, it was necessary to consider the equivalent circuit and interaction effects for H mode radial lines mated at each end to unifrom TE_{10} waveguide for taper angles of 45°. AD 131248. Project no. 4540. Thesis, Polytechnic Institute of Brooklyn. AF RADC TR 57-148.

High temperature VHF crystal units. Final report covering period 1 Dec 1955-15 Apr 1957, by Otis F. Ivie. James Knights Company, Sandwich, Ill. May 1957. 78p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 134568

Close tolerance, quality performance crystal units can be fabricated to operate at temperatures up through 125°C. Investigation of CR-32/U type crystal units to 135°C., investigation of angles of cut, fabrication of 40 crystal units on 40 mc, 55 mc, 70 mc and 80 mc, were carried out. Crystal units passed vibration and shock tests performed after extended aging periods, thus establishing durability of bonding materials and methods. D/A project 3-24-02-021. Signal Corps project 862A. Contract DA 36-039-sc-70176.

Human engineering review of requirements for the radio set AN/GCR-53 () antenna and mast. Part II: The mast assembly, by John D. Coakley, William C. Abbott, and Edward W. Bishop. Dunlap and Associates, Inc., Stamford, Conn. Sep 1957. 23p tables (1 fold). Order from LC. Mi $2.70, ph $4.80. PB 134604

Part II considers antenna masts and their use in conjunction with antenna assemblies. The appendix to Part II contains the procedures for assembling and erecting the mast and antenna as well as estimates of the time required. D/A project 3-99-01-022. Signal Corps project 2004A. Contract DA 36-039-sc-64647.

Industrial preparedness study for direct viewing storage tubes, by M.P. Wilder. Allen B. Du Mont Laboratories, Inc. Tube Operations Engineering, Clifton, N.J. Oct 1957. 22p drawings, tables. Order from LC. Mi $2.70, ph $4.80. PB 132758

An evaluation of the fifteen inch direct viewing storage tubes thus far made, was completed and photographs of stored pictures were included in the July report. Additional panels, funnels and guns were made for the fabrication of fifteen inch direct viewing storage tubes. A new method of doming storage tubes employing spinning was investigated. A means of employing a defraction microscope for measuring the thickness of evaporated films was explored. Three types of high vacuum pumps were evaluated and the most suitable type developed. A more extensive test set was designed and fabricated. Covers period 31 Jul-30 Sep 1957 under Contract DA 36-039-sc-72717.

Industrial preparedness study on device 1. Quarterly report No. 1 covering period Aug 1-Oct 31, 1957, under Contract no. DA 36-039-sc-72709, by Archer E. Mohr. Radio Corporation of America. Semiconductor Division, Somerville, N.J. Dec 1957. 24p photo, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133334

Improvements on both NPN and PNP versions of germanium Device #1 is discussed. The mechanical redesign of both the PNP and NPN discussed in the feasibility report was completed. The PNP version of Device #1 is being made in the pilot line.

Industrial preparedness study on diffused semiconductor devices. Final feasibility report covering period 25 Jun 1956-14 Apr 1957, under Contract DA 36-039-SC-72705, by R. Williams. Philco Corp., Philadelphia, Pa. May 1957. 44p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133335

A feasibility study with regard to the 4.3 mc silicon amplifier device indicates that the requirements of large scale production can be met by further engineering and development of the techniques of vapor-phase diffusion and shallow-alloying. A flow chart illustrating the fabrication process in block diagram form is included. Philco no. H-2761.

Industrial preparedness study on 5000.000kc/s 5th overtone crystal units. 5th narrative report for the period 1 Sep 1956-25 Mar 1957, under Contract DA 36-039-sc-54697. Bliley Electric Co., Erie, Pa. Apr 1957. 14p. Order from LC. Mi $2.40, ph $3.30. PB 127425

1. Crystal units - Tests

Industrial preparedness study on surface-alloy silicon transistors. 4th quarterly progress report covering the period 1 Mar-31 May 1957, under Contract DA 36-039-sc-72686, by J. Roschen and C G. Thornton. Philco Corporation, Philadelphia, Pa. Jun 1957. 110p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 132504

Philco no. H-2754. For 2d-3d reports see PB 127580 and 128768. 1. Transistors, Silicon - Fabrication 2. Transistors, Silicon - Design

Industrial preparedness study, transistor manufacturing feasibility report, device 13 of diffused transistor contract, covering period 1 Jul 1956-31 Aug

1957, under Contract DA 36-039-SC-72719, by C. Orman. Sylvania Electric Products, Inc., Semiconductor Division, Woburn, Mass. Aug 1957. 75p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30.
PB 133333

1. Transistors, Silicon - Design 2. Transistors, Silicon - Fabrication 3. Transistors, Silicon - Specifications

Impedance matching limitations with application to the broadband antenna problem, by Arthur Vassiliadis. Stanford Research Institute, Menlo Park, Calif. Jan 1957. 111p diagrs, graphs. Order from LC. Mi $6.00, ph $18.30.
PB 132188

The general problem of matching a load impedance to a constant resistance generator by means of a non-dissipative matching network is considered in this report. When matching broadband antennas, the antenna input impedance must first be approximated by a lumped-element network. The load impedances considered are restricted to those whose Darlington realization results in a simple ladder network. AD 110296. SRI Proj 1197. Contract AF 19(604)-1296. SRI TR 60. AF CRC TN 57-162.

Interference rejection in FM receivers, by Elie J. Baghdady. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Sep 1956. 107p diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80.
PB 133455

A new role is suggested for the amplitude limiter in FM receivers. By spreading out the spectrum which is necessary for the reproduction of the FM disturbance that is caused by the interference, the limiter makes it possible for a filter to reject an important portion of this spectrum without substantially affecting the spectrum that carries the message modulation. The conditions for the success of this operation are analyzed in terms of an ideal limiter followed by an idealized filter. The variation of the required minimum extent of linearity in the discriminator characteristic with the limiter bandwidth is determined. This is followed by a study of the effect upon the interference of a repeated cycle of amplitude limiting and spectrum filtering. The cascading of several narrow-band limiters is found to be an invaluable scheme for enhancing the capture capabilities of an FM receiver. Based on a thesis, Massachusetts Institute of Technology. Dept. of the Army task 3-99-06-108. Dept. of the Army project 3-99-00-100. Contract DA 36-039-sc-64637. MIT RLE TR 252.

Investigation of emissive materials for electron tubes. Raytheon Manufacturing Co. Receiving and Cathode Ray Tube Operations, Newton, Mass. Contract AF 19(604)-1822. Order separate parts described below from LC, giving PB number of each part ordered.

Fifth scientific report covering the period 1 Apr-31 Jun 1957, by Charles Bardsley and Frederick T. Hill. Jul 1957. 45p graphs, tables. Mi $3.30, ph $7.80. PB 132202

An experimental program of investigation of the effect of changing the vacuum pressure, the amount of heating, and the time of heating, at the exhaust step of tube fabrication, upon the electrical characteristics of the tube and upon the condition of the oxide-coated cathode, is being conducted. AD 117121. For reports nos. 1 and 2 see PB 125153 and 126100. AF CRC TN 57-553.

Sixth scientific report for the period 1 Jul-30 Sep 1957, by Charles Bardsley. Oct 1957. 66p graphs, tables. Mi $3.90, ph $10.80.
PB 132941

Report of an experimental investigation of the effect of changing the vacuum, the amount of vacuum heating and the length of the time of heating, during the exhaust process in electronic tube fabrication; upon the subsequent emission characteristics of the tube during life andupon the condition of the cathode coating. A method for determining the comparative amounts of sublimation from different cathode nickel alloys and melts is evaluated. AD 133737. AF CRC TN 57-784.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. Final report under Contract AF 19(604)-1419 for period 1 Jul 1955 to 30 Jun 1957, by John Koenig. Clevite Research Center, Cleveland, O. Aug 1957. 56p photos, drawings (part fold). Order from OTS. $1.50. PB 131631

Hydrothermal experiments were conducted at about 450°C and about 20,000 psi. For the magnetite growing runs, the systems consisted of magnetite crystal chips for seeds, loose or compacted Fe_2O_3 or Fe_3O_4 powder for supply, and solutions of NH_4Cl, NH_4Br, their mixtures and combinations with NH_4I for transferring agents. Nickelous ferrite was grown repeatedly on seed crystals by the "diffusion method" under isothermal conditions or nearly so. Growth occurred by diffusion of the components from the silver tube ends toward the seeds and reacting there to form the ferrite. AD 133643. For 1st - 4th quarterly reports see PB 122360, 122191, 123450, 124140. AF CRC TR 57-190.

Investigation of precision frequency-control techniques. Final report covering the period 1 Apr-31 Oct 1956, under Contract DA 36-039-sc-64597, by Robert E. Meek and Samuel N. Witt, Jr. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Nov 1956. 133p photos, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 132505

Data derived over an eight-month period from long-term frequency-stability measurements on invar cavity oscillators under temperature and voltage regulated conditions are discussed. Methods of constructing temperature insensitive cavities which are to be subjected to wide temperature variations are also discussed. Dept. of the Army project no. 3-99-11-022, Project no. A-216.

Investigation of techniques for production of high ambient silicon-germanium point contact switching transistors. Final report under Contract AF 19(604)-1586, covering period 1 Dec 1955-30 Apr 1957, by H. M. Meyer and D. E. Humez. Clevite Corporation. Transistor Products Division, Waltham, Mass. May 1957. 82p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 133327

The purpose of this contract was to develop point-contact switching transistors which operate without failure at the high temperatures encountered in military equipment. A study was made of techniques of crystal growing and a process was developed which had yielded silicon-germanium alloy single crystals of up to nine atomic percent. A study was also made of material processing and transistor forming techniques and the special encapsulation problems peculiar to high temperature devices. A pilot line was set up to produce point contact transistors using silicon-germanium alloy dice. The feasibility of fabricating high temperature switching transistors has been demonstrated by the production of over two hundred transistors which met the target specification. AD 133789. Project no. 4156. AF CRC TR 57-369.

Investigation of wide-band antennas above 2000 Mc, by R. C. Honey, E. M. T. Jones and others. Stanford Research Institute, Menlo Park, Calif. Oct 1956. 164p photos, diagrs, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 133597

A novel multi-terminal multi-mode antenna has been constructed and tested for possible use in an instantaneous, omnidirectional, video direction-finding system over the 8.2 to 12.4 kMc range. An evaluation of the pattern data shows that the antenna would contribute a maximum of 3 to 7 degrees to the over-all bearing error of the system. The same antenna has been tested as a wide-band omnidirectional three terminal-pair multiplexer over the same frequency band, with isolations on the order of 30 to 40 db between certain of the terminal-pairs, and on the order of 20 db between the others. This system can also be used as a direction-finder using superheterodyne detectors with their attendant greater sensitivities. AD 126812. DIA project: 3-99-05-022. Signal Corps project: 122-B. Contract DA 36-039-sc-63236, Final report. SRI Proj. 1115, Final report.

Launching and surface waves by a parallel plane waveguide, by Carlos M. Angulo and William S. C. Chang. Brown University. Division of Engineering, Providence, R.I. Apr 1957. 58p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 132189

Radiation loss, power transmitted to the surface wave, and power reflected back into the partially filled parallel plate waveguide, per unit power carried by the incident wave, are derived and computed numerically for various normalized heights of the parallel plate waveguide and various normalized thicknesses of the slab (Kd) for ϵ - 2.49. AD 117059. Covers period Sep 1956-Apr 1957. Contract AF 19(604)-1391, Scientific report no. 5. AF CRC TN 57-365.

Line-of-sight wave propagation in a randomly inhomogeneous medium, by B. M. Fannin. Texas. University. Electrical Engineering Research Laboratory, Austin, Tex. Dec 1955. 32p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132894

Theoretical calculations have been made, using the single-scattering approximation, for propagation in a randomly inhomogeneous medium in which the deviations of refractive index from the mean is small. The statistical quantities considered were the variance, correlation function, and power spectrum for the phase and relative amplitude of the field at a point and their difference at two points. The emphasis in this report is in indicating the transition from the ray treatment results to the scattering cross-section results. The correlation function for the refractive index was taken to be time as well as space dependent so that the power spectrum could be computed from the original formulation. Dept. of the Army project: 516-01-0042. ORD project: TUI-9004. Contract DA 23-072-ORD-763. TU EERL 7-08.

Long ranges of vhf, uhf, and shf, by H. Poeverlein. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Propagation Laboratory, Bedford, Mass. Sep 1957. 32p diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 132142

AD 133712. Translated from Zeitschrift für angewandte physik 8(no. 5): 244-254, 1956.
1. Radio waves - Reflection - Troposphere - Germany 2. Radio waves - Refraction - Troposphere - Germany 3. Radio waves - Meteorological effects - Germany 4. AF CRC TR 57-117

Low-frequency problem in the design of microwave gyrators and associated elements, by C. L. Hogan gan. Harvard University. Gordon McKay Laboratory of Applied Physics, Cambridge, Mass. Mar 1957. 8p diagr, graphs. Order from LC. Mi $1.80, ph $1.80. PB 132163

AD 117051. For Scientific reports 2-3 and 7 see PB 125041, 126117 and 132164. Reprinted from Electromagnetic wave theory symposium, p. 495-501. 1. Ferrites - Magnetic properties - Theory 2. Gryrators, Microwave - Design 3. Contract AF 19(604)-1084, Scientific report 6 4. AF CRC TN 57-357

Low frequency propagation studies. Part II: Low and medium frequency propagation studies. Final report covering 15 Jun 1953-30 Sep 1956 under Contract AF 19(604)-795, by R. A. Helliwell. Stanford University. Radio Propagation Laboratory, Stanford, Calif. Oct 1956. 157p photos, diagrs, graphs. tables. Order from LC. Mi $7.50, ph $24.30. PB 132944

During December and January, 1954-5, E-layer drift measurements were made over Stanford. Using the method of closely spaced receivers at a frequency of 310 kc, ten nights of data spaced evenly throughout one month were obtained. Analysis yielded average and rms drift velocities of 90 to 102 meters per second, respectively, with an average vector velocity of 53 meters per second directed 29 degrees west of south. The average height of reflection was 104 kilometers, and a drift gradient of 4.9 m/sec/km was found in the height range from 90 to 108 km. A well-defined diurnal variation in velocity was observed. Evidence indicates that the drift originated from only one height, and also that the diffraction pattern producing receiver correlation was moderately elliptical. The average speed is found to agree well with the speeds measured by the Doppler shift of meteor echoes. AD 110185. For part I see PB 126783. For other reports under this Contract see PB 119189 and 122359. AF CRC TR 56-190.

Low level d-c amplifiers, by James C. Taylor and William T. White. U.S. Army Ballistic Missile Agency. Development Operations Division. Guidance and Control Laboratory, Huntsville, Ala. Feb 1957. 31p photo, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 132807

This report describes practical design considerations for low level d-c amplifiers of the second harmonic type which employ a combination of the magnetic modulator and transistors. Circuit paramaters are given for a typical amplifier along with a discussion of expected performance. Report Dg-R-1.

Masking of cathode ray tube displays by ambient illumination, by Helmut E. Adler, Margaret P. Kuhns, and John L. Brown. Columbia University. New York, N.Y. Nov 1953. 24p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133972

Masking thresholds of ambient illumination were obtained for a signal presented as a horizontal trace on a cathode ray tube. Seven trace luminances and two trace widths were used. Ambient illumination was measured in terms of the luminance superimposed on the surface of the tube. The results show that in radar operation ambient light can be present considerably in excess of the signal strength without masking the signal display, except when the signal luminance is below 0.1 ml. AD 30677. Contract AF 33(038)-22616. AF WADC TR 53-266.

Measurement of second-order probability distributions of pictures by digital means, by James C. Stoddard. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jul 1955. 22p photo, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133456

The transmission of a picture was approached from the point of view of statistics and information theory. A picture was approximated by the processes of sampling and quantizing the video waveform that represents the intensity of the picture as it is scanned. Transmission of each sample of the picture is reduced to the problem of sending a number that indicates which of the 32 possible intensity levels occurred in that sample. Equipment that measures the second-order probability distribution of a video waveform from a facsimile transmitter by digital means was designed and built. System tests were made to permit evaluation of the potential accuracy of measurement. Based on a thesis, Massachusetts Institute of Technology. Signal Corps project: 102B. Dept. of the Army project 3-99-10-022. Contract DA 36-039-sc-64637. MIT RLE TR 302.

Measurement of turbulent heat transfer rates on the aft portion and blunt base of a hemisphere-cylinder in the shock tube, by Josef Rabinowicz. California Institute of Technology. Guggenheim Aeronautical Laboratory, Pasadena, Calif. Nov 1957. 29p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132963

Turbulent heat transfer rates on the aft portion and on the blunt base of a hemisphere cylinder were measured in the 2-7/8" x 2-7/8" GALCIT shock tube over a range of shock Mach numbers between 3.25 and 5.1 and initial pressures between 3 and 17 cm. Hg. Hypersonic research project. Dept. of the Army project no. 5B0306004. ORD project no. TB 3-0118. OOR project no. 1600-PE. Contract DA 04-495-ord-19. CIT GAL M 41.

Megawatt space-harmonic traveling-wave tube, by S.P. Otsuka and R.H. Pantell. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. May 1957. 54p photos, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 134679

Field configurations for the lowest and next higher passbands are drawn, based upon a field analysis

and cold-test measurements. The impedance determined by perturbation measurements is compared to the impedance for the forced sinusoid inside a closed region, and it is found that the tube has about four times the minimum energy necessary to obtain the same bandwidth. Contract N6onr 25123, NR 373-361. SU ML R 329.

Method of electronically steering and feeding a coherent radar array, by George J. Vogel. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Jan 1958. 16p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 133323

The beam direction of a coherent radar array depends on the relative phase of the transmitted signal at each antenna element in the array. A theoretical method of controlling the phase difference between adjacent elements in the array is presented. The relationship between this phase difference, the frequency of transmission and the radar beam direction is also derived. AD 148531. Project 5539, Task 45974. AF RADC TR 58-1.

Microwave detection by a dc gaseous discharge, by Lawrence Gould. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Oct 1956. 15p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 132805

The limitations of existing gas discharge diodes which are utilized for the detection of microwave power are discussed. A qualitative theory for the detection mechanism is developed for the positive column and the negative glow. The results appear to be in agreement with the observed phenomena. A novel technique for evaluating the characteristics of the detection mechanisms, in which a slow-wave helical structure is used as a microwave probe, is presented with a discussion of the problem which should be investigated. Dept. of the Army task no. 3-19-03-032. Signal Corps task no. 323B. SCEL TM M 1836.

Microwave frequency doubling from 9 to 18 kmc in ferrites, by J.L. Melchor, W.P. Ayres, and P.H. Vartanian. Electronic Defense Laboratory, Mountain View, Calif. Sep 1956. 13p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 134596

At high peak powers, frequency doubling in ferrites can be made more efficient than low power doubling in crystals. Frequency doubling in ferrites can be a practical means of generating high frequency microwave power. Contract DA 36-039-sc-71053. EDL M-79.

Microwave network theory and applications, by N. Marcuvitz and A.A. Oliner. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Sep 1957. 18p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 133803

Reflection and transmission by a single dielectric interface is considered first. Application is then made to the important special case of plane wave modes in free space. The relevance of this discussion to the Fresnel reflection relations and Brewster's angle in optics is brought out. The dielectric slab of finite thickness is treated next and its properties examined as a function of thickness and frequency. Contract AF 19(604)-2031. PIB R 618-57. PIB 546. AF CRC TN 57-977.

Multi-object phase tracking and ranging system (MOPTARS), by Marlyn Hicks. Cubic Corp., San Diego, Calif. Feb 1957. 25p diagrs (part fold). Order from LC. Mi $3.00, ph $6.30. PB 132928

This is an electronic system capable of making trajectory measurements of up to three different objects simultaneously and adaptable to track at least five objects simultaneously. Block diagrams of all elements are in Appendix A. AD 128006. Contract AF 08(616)-61. AF OSR TN 57-30.

Mutual coupling of shunt slots in the broad face of rectangular waveguide, by A.F. Kay. Technical Research Group, New York, N.Y. May 1956. 61p diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 127067

A formula for the impedance of a dielectric filled shunt slot in the broad face of rectangular waveguide is determined using a method based on Stevenson's method. The critical dependence of resonance on slot thickness observed in a dielectric filled slot but not in an air filled slot is verified. The problem of mutual coupling of two such slots is also solved in principal. Method of approximately calculating the coupling coefficients are given in Appendix I and II. Some sample calculations are given in Appendix IV. AD 98799. Contract AF 19(604)-1307, Scientific report no. 3. AF CRC TN 56-583.

Network calculations on periodic structures, by S. Barone, W. Kahn and others. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Oct 1957. 76p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 133804

Several internally circulated memoranda on periodic structures are collected and issued in this report. An introductory section sketches the relation between field-and network-theoretic calculations on periodic structures. Network techniques for band structure calculations on infinite crystals are then elaborated upon both analytically and graphically. Special consideration is given to resonances in finite periodic structures. AD 146806. Contract AF 19 (604)-2031. PIB R 628-57. PIB 556. AF CRC TN 58-108.

New class of broadband microwave 90-degree phase shifters, by B. M. Schiffman. Stanford Research Institute, Menlo Park, Calif. Jul 1957. 27p photo, drawings, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 132203

A new class of 90-degree differential phase shifters for use at microwave frequencies is described. Results of tests on an experimental strip-line model of a 90-degree differential phase shifter support the theory developed. AD 117287. Contract AF 19(604)-1571, Scientific report no. 2. SRI Proj 1592. AF CRC TN 57-566.

Noise analysis of a finite electron gun in an infinite magnetic field, by Harrison E. Rowe. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Oct 1952. 51p graphs, tables. Order from LC. Mi $3.90, ph $9.30. PB 133454

A theoretical study of the noise behavior of a finite electron beam in an infinite magnetic field was made to determine the effects of the finite diameter of the beam and the transverse variations in the velocity and current density modulation on the noise behavior of an electron beam, using the method presented by Parzen for the analysis of the gun region. Based on a thesis, Massachusetts Institute of Technology. Signal Corps project: 102B. Dept. of the Army project: 3-99-10-022. Contract DA 36-039-sc-42607. MIT RLE TR 239.

Nuclear magnetic resonance as applied to the stabilization of magnetic fields, by I. Weissman, S. Goldblatt, and F. Reder. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Oct 1956. 16p photos, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 132442

The purpose of this project was twofold. First, a one stage frequency multiplier from low R. F. to the microwave range was to be investigated where a klystron would be stabilized by paramagnetic resonance using a magnetic field which would, in turn, be stabilized by nuclear resonance using a stable quartz crystal oscillator. Second, work in the field of nuclear resonance instrumentation should serve as a relatively simple means to train personnel in R. F. and microwave spectroscopy. Dept. of the Army project no. 3-99-11-000. Signal Corps project no. 142 A. SCEL ER E 1191.

On the application of variational principle to antenna theory, by Charles H. Papas. California Institute of Technology. Antenna Laboratory, Pasadena, Calif. Nov 1957. 16p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132597

AD 136611. Presented before the Congrés International des Circuits et Antennes Hyperfréquences at the Conservatoire National des arts et Mëtiers, Paris, France, Oct 25, 1957. 1. Antennas - Theory 2. Contract AF 18(600)-1113 3. CIT AL TR 12 4. AF OSR TN 57-635

On the diffraction of a finite beam of electromagnetic waves by a cylinderical obstacle, by E. L. Burshtein and L. S. Solov'ev. Oct 1956. 7p graphs. Order from LC. Mi $1.80, ph $1.80. PB 127205

AD 110285. Translated from Doklady, AN USSR, Vol. 109, pp. 473-476, 1956, by Lincoln Laboratory, Massachusetts Institute of Technology under Contract AF 19(122)-458. 1. Waves, Electromagnetic - Diffraction - Theory - Russia 2. Equations, Electromagnetic - Russia

On the Green's function for a cylinder, by Ralph D. Kodis. Brown University. Division of Engineering, Providence, R.I. Oct 1957. 21p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132943

A method is presented for finding directly from the scalar wave equation the radial eigenfunction expansion for the field of a harmonic electric line source in the presence of a conducting cylinder. When the representation is specialized to the case of a remote source and used in the integral formulation of the far zone scattered amplitude, it is found to lead to Wu's formulas for the high frequency correction to geometrical optics. The method can be applied to problems with more complicated boundary conditions. AD 133772. Scientific report 1391/8. Contract AF 19(604)-1391, Scientific report no. 8. AF CRC TN 57-957.

Optimal sequential testing, by S. M. Johnson. Rand Corporation, Santa Monica, Calif. Mar 1956. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 132332

A problem of importance to the Air Force is that of trouble-shooting to find a malfunctioning part of a complex piece of electronic equipment. The process of identifying and replacing a faulty part is becoming more costly and time consuming as the equipment becomes more complex. At the same time, skilled mechanics with extensive training are becoming more difficult to find and retain. This points out the value of being able to prescribe to the mechanic a series of checks for him to make, preferably in terms of a training manual. To aid in this purpose, some mathematical versions of the general problem and their solutions are presented in this paper. RM 1652. Project Rand. Working paper.

Optimum use of limited microwave apertures, by Roger D. Wetherington. Georgia. Engineering Experiment Station, Atlanta, Ga. Jun 1956. 23p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127142

The purpose of this study was to investigate the pos-

sibility of improving the angular resolution of tracking or search radars by operating on the incoming signals in a manner different from that ordinarily used. Contract Nonr-991(02), Subtask no. 4, Final report.

Oscillatory phenomena in direct current glow discharges. Technical report no. 1 under Contract N6 onr-243, by T. Donahue and G.H. Dieke. Johns Hopkins University. Dept. of Physics, Baltimore, Md. n.d. 111p diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 132788

Oscillations have been studied which appear to be a practically universal phenomenon in glow discharge containing a positive column. These oscillations, present even if the discharge is operated with a constant source of potential, manifest themselves as variations in the voltage with a frequency roughly between one and one hundred kilocycles per second and an amplitude of a few per cent of the total operating voltage. The discharge current shows fluctuations of the same type, but the light intensity in the positive column usually has a modulation of 100%. These intensity oscillations are, moreover, different in shape, amplitude, and phase at different positions in the discharge. They have been studied with the help of photo-multiplier tubes and the oscillograph, and data are presented here for glow discharges in the rare gases, particularly argon, in mercury, and also in H_2 and air. AD 134792. Parts of report will not reproduce well.

Performing research on new approaches to printed circuitry. Haloid Company, Rochester, N.Y. Contract AF 19(604)-1736. Order separate parts described below from LC, giving PB number of each part ordered.

Scientific report no. 3 for the period 1 Sep 1956 thru 30 Nov 1956. Dec 1956. 34p photos, diagrs, graphs, tables. Mi $3.00, ph $6.30. PB 127212

Research studies have been continued in four special fields related to the printing of electronic circuits. Basic research into the formation of circuit elements by vacuum evaporation has led to new results in soldering to vacuum deposited films and in the formation of resistors. The basic processes required for a new circuit forming technique have been proposed and tested. The circuit "blank" consists of a resistive Nesa film and a plated copper layer from which resistors and connective lines can be cut by independent etching processes. A new material from which stencil screens can be cut has been developed and tested. Additional information has been obtained, experimentally, on electric printing with conductive materials. AD 110174. For reports 1, 2 and 4 see PB 126122, 126412 and 131366. AF CRC TN 56-979.

Scientific report no. 5, Mar 1, 1957-May 31, 1957. Jun 1957. 39p photos, diagrs, graphs. Mi $3.00, ph $6.30. PB 133281

Experimental study of vacuum deposited, chromium resistors was continued. It is shown that these resistors must be formed on a heated substrate to obtain stable characteristics when operated at elevated temperatures. A process for making printed circuits, based on the experience to date, is described in detail and an evaluation is presented. A detailed study of techniques used in forming stannic oxide resistor films was begun and initial results are presented. A comparison of several means for mechanized electrostatic printing was made. AD 117291. AF CRC TN 57-570.

PFN design method, by Roy W. Roberts, Jr. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Components and Techniques Laboratory, Bedford, Mass. Jun 1957. 22p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132338

A simplified method of designing pulse-forming networks for use with line-type pulse generators is presented. The method will result in correct values of mutual inductance, as well as self-inductance per section. AD 133626. AF CRC TR 57-112.

Piecewise-linear network theory, by Thomas E. Stern. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jun 1956. 78p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 133461

A systematic approach to the problems of analysis and synthesis of piecewise-linear systems that do not contain memory is presented. These systems provide a link between the general studies of nonlinear systems, exemplified by the work of Wiener, Zadeh, and others, and the needs of the practical circuit designer. In the area of analysis, straightforward procedures are developed for handling resistive piecewise-linear networks. The methods are based upon an algebra of inequalities. Examples of applications to analysis are given. Based on a thesis, Massachusetts Institute of Technology. Signal Corps project: 102B. Dept. of the Army project 3-99-10-022 and 3-99-10-000. Contract DA 36-039-sc-64637. MIT RLE TR 315.

Proceedings of the 11th annual symposium on frequency control, 7, 8, 9 May 1957 at Asbury Park, N.J. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Jun 1957. 645p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $98.40. PB 134925

Contents: Mathematical theory of vibrations of elastic plates, by R.D. Mindlin. - Strain patterns in thickness-shear quartz resonators, by K.S. Van

Dyke. - The anelasticity of natural and synthetic crystalline quartz, by J.C. King. - A study of VHF crystals, by Erich Hafner. - Some properties of doped and undoped synthetic quartz, by Joseph M. Stanley and A.R. Chi. - Defects in quartz crystals, by George W. Arnold, Jr. - Improving the quality of synthetic quartz, by Frank Augustine. - Factors covering the hydrothermal formation of cristobalite and quartz, by Richard G. Yalman. - Aging study of quartz resonators, by Richard B. Belser and Walter H. Hicklin. - High temperature AT-cut crystal units, by Charles W. Mann. - High temperature, low frequency crystal units, by J.M. Wolfskill. - High percision crystal units, by L. Dick. - Stability of quartz resonators at very low temperatures, by F.P. Phelps. - Fundamental studies on an improved crystal-controlled frequency standard, by M.D. Fagen and W.L. Smith. - Rubidium oscillator experiments, by T.R. Carver. - Optical pumping, buffer gases, and walls, by W.B. Hawkins. - Hot sources for MASER, by M.W.P. Strandberg. - MASER progress and phase lock techniques, by F.O. Vonbun and G.M.R. Winkler. - MASER engineering at Jet Propulsion Laboratory, by W. Higa. - Precision atomic beam techniques, by P. Kusch. - Performance of cesium beam standards and future R&D plans, by F.H. Reder and S.H. Roth. - Frequency control standardization trends within the international electrotechnical commission, by W.J. Young. - Crystal oven developments, by Maynard D. McFarlane. - Equipment for detecting unwanted modes in oscillator crystals, by Joseph Loos. - Low frequency C.I. meter AN/TSM-15, by D. Pochmerski. - Crystal measuring techniques above 200 mc/sec, by Samuel N. Witt, Jr. - Design criteria for vacuum tube crystal oscillators, by H.E. Gruen. - Studies on transistor crystal oscillators, by Everett Eberhard and William R. McSpadden. - Latest developments in mechanical filters, by J.C. Hathaway. - High-frequency crystal filters, by Leo Storch. - Low frequency standard transmissions, by W.D. George. - A portable frequency standard, by Robert L. Craiglow. - Precision measurement of short-time intervals, by F.K. Priebe, D. Schwab and H.D. Tanzman. - Frequency translator for MASER, by S. Schneider. E.A. Gerber, Chairman.

Propagation of electromagnetic waves in gyromagnetic media, by Giorgio Barzilai. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. May 1957. 17p diagrs. Order from LC. Mi $2.40, ph $3.30.
PB 132207

The transmission line formalism is discussed for uniform waveguides filled with lossless ferrite, by assuming the magnetizing field parallel to the axis of the guide. It is shown how it is possible to have modes with complex propagation constants, in spite of the assumption of lossless medium. AD 117113. Contract AF 19(604)-2031. PIB R 578-57. PIB 506. AF CRC TN 57-395.

Quarterly progress report, for the period 1 Jan-31 Mar 1956, under Contract N7 onr-29529, by J.R. Whinnery. California. University. Division of Electrical Engineering Electronics Research Laboratory, Antenna Group, Berkeley, Calif. Apr 1956. 28p diagrs. Order from LC. Mi $2.70, ph $4.80.
PB 126904

Theoretical analysis for the azimuthal scattering by the prolate spheroid for two particular angles of illumination, nose-on and broadside, is being investigated. The physical-optics approximation is being used to make an order of magnitude calculation. UC IER Series 60, Issue no. 12.

Quarterly progress report no. 15, for the period 1 Aug 1956-1Nov 1956, under Contract AF 18 (600)-497, by Monroe Cowan, Walter Gordy, Gunnar Erlandsson and John Cox. Duke University. Dept. of Physics. Microwave Laboratory, Durham, N.C. Nov 1956. 23p diagrs, tables. Order from LC. Mi $2.70, ph $4.80.
PB 127027

Lists papers published during period of contract, and abstracts current projects. Reports include: "Further extension of microwave spectroscopy in the submillimeter wave region," by Monroe Cowan and Walter Gordy (AD 96785. AF OSR TN 56-442); and "Millimeter-wave lines of heavy water," by Gunnar Erlandsson and John Cox (AD 110334. AF OSR TN 56-519). Project no. R-357-10-6. Includes AD 96785 and AD 110334. For May 1949-Jan 1953 and 8th-14th reports see PB 115618, 116774-116776, 108012, 108313, 109891, 116802, 118093, 118465, 120152, 126461, 122956 and 123417.

Quarterly progress report no. 6 for the period 15 Oct 1955 - 14 Jan 1957 under Contract AF 18 (600)-1505, by Ernest Weber. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Feb 1957. 44p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 127144

Lists publications and reports made in 1956, and summarizes work on nonlinear electrodynamics; fundamental electromagnetics; information processes such as general least-square estimation of random functions, distributed parameter network theory, and time-varying active networks; field responsive materials: microwave properties and dielectric constant measurements of germanium; and ferrite materials. For quarterly progress reports no. 1-4 under this Contract see PB 119553, 123157, 124214 and 125846. Contract AF 18(600)-1505. PIB R 452-6-57.

Quarterly scientific report no. 17, covering period 1 Jul-1Oct 1957, under Contract AF 19(604)-786. Harvard University. Cruft Laboratory, Cambridge, Mass. Oct 1957. 6p diagr. Order from LC. Mi $1.80, ph $1.80. PB 132582

AD 133756. 1. Waves, Electromagnetic - Scattering - Theory 2. AF CRC TN 57-799

Radar beam coding techniques, by Herbert W. Headle. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Dec 1957. 14p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 133324

The technique of radar beam coding described in this report allows a radar to send digital information to one or more targets and does not interfere in any way with the primary objective of the radar system. In tracking radar systems, the technique uses a bit rate which is the same as the prf of the radar used. In other types of radars the transmitted bit rate depends on the numbers of hits per target area. AD 131391. Project no. 4506, Task no. 45163. AF RADC TN 57-393.

Radar propagation on Lake Ontario, by A.D. Hood and L.H. Doherty. National Research Council of Canada. Radio and Electrical Engineering Division, Ottawa, Can. Mar 1957. 30p photos, diagr, graphs. Order from National Research Council of Canada, Ottawa, Canada. 50 cents. PB 134323

1. Radar, PPI - Tests - Canada 2. Radio waves - Propagation - Canada 3. NRCC 4508 4. NRCC ERA 321

Radio interference investigation of the electrical system of a vehicle. Final report under Contract NOy-76654, by Richard P. Thurston and Vincent Messina. National Company, Inc. Malden, Mass. n.d. 38p fold graphs, tables (part fold). Order from LC. Mi $3.00, ph $6.30. PB 132118

Radio interference suppression apparatus is installed in the vehicle by the manufacturer in order to pass the acceptance test. Experience has shown conclusively that a vehicle may pass the original acceptance test but after a time in actual use it may no longer be capable of passing the radio interference test. It therefore becomes necessary to test these vehicles periodically to assure that the radio interference suppression apparatus is still effective. The purpose of the survey covered by this report is to investigate the possibility of using an alternate test method using a simple "GO or NO-GO" measuring device that can be operated rapidly by non-technical personnel. AD 108678.

Range measurement with two atomic beam oscillators, by W.J. Whelan. National Co., Inc., Malden, Mass. Jan 1957. 23p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132541

A range measuring system is described which is based upon measurement of the phase difference of two extremely accurate atomic beam oscillators located at the two points whose distance is required. The errors of the system are discussed briefly in general. The main body of the text is devoted to analysis of shot and electron multiplier noise in the atomic beam tube; this is the basic uneliminatable noise of the system. This noise is traced through the servo loops and formulas are derived for the resulting rms range error. An appendix is included which gives alternate formulas, derived in terms of design parameters instead of measurement parameters. Addendum to the final report, Atomic frequency standard, under Contract Nonr-1707(00), 15 Nov 1956.

Range safety capability of mod. II radar system, by M.J. Gould, K.W. Hoover, A.-E. Hoffman-Heyden and H.R. Corbett. U.S. Air Force. Missile Test Center, Patrick Air Force Base, Fla. Jun 1957. 130p photos, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 132915

The system was analyzed to determine its capabilities as a range safety information device for the real-time determination of the velocity vector for such missiles as the WS-315A and the WS-107A. From theoretical studies, analysis of available data on previous missiles, and the system characteristics including the human link, approximate estimates were made of angular errors due to (a) chance fluctuations of noise amplitude and (b) time lags, and also the relation of errors from these two sources was established. Quality analysis technical note no. 27. AD 124139. AF MTC TN 57-22.

Reflectionless transmission through dielectrics and scattering potentials, by Irvin Kay and H.E. Moses. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. May 1956. 18p. Order from LC. Mi $2.40, ph $3.30. PB 127066

1. Dielectric research 2. Refraction indexes - Variation 4. AF CRC TN 56-561 5. NYU RR EM-91

Research and development "alpha-greater - than - one" silicon devices. Scientific report no. 3 for the period Mar-Jul 1957, under Contract AF 19 (604)-1932. Columbia Broadcasting System, Inc. CBS-HYTRON Division, Danvers, Mass. Aug 1957. 27p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132350

Summarizes work done to develop a reproducible negative resistance silicon two terminal device. A new structure incorporating both alloying and diffusion techniques is designed. The method of fabrication is as follows: An n type wafer of 1.5 mil thickness has an n + layer of about 0.4 mils thickness formed on one surface. After the n + layer is produced, a large p-n junction is formed on the opposite face. Finally a small p type emitter isformed just through the n + layer. AD 133656. AF CRC TN 57-751.

Research and development leading to establishment of designs for electromechanical components for printed circuits. Final report covering period 1 Jun 1954-31 Mar 1956 under Contract DA 36-039-sc-63181, by Lowell G. Brodrick. P. A. Mallory & Co., Inc., Indianapolis, Ind. Apr 1956. 121f photos, diagrs, tables. Order from LC. Mi $6.30, enl pr $21.30. PB 134831

Seven electrochemical components were developed for printed circuit applications: octal socket; 7-contact subminiature socket; vertical transistor socket; right angle transistor socket: Subminiature Rotary Switch: low voltage plug; low voltage receptacle. DA project 3-26-00-600. Signal Corps project 2006-A.

Research in magnetic antennas. Final report under Contract no. DA 36-039-sc-73189, by J. L. Stewart. California Institute of Technology, Pasadena, Calif. Sep 1957. 70p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132459

A simplified theory for electrically small ferrite-loaded loop antennas is presented. The theory is based on the principle of reciprocity and known solutions for fields in and about an ellipsoidal core. Approximate methods are given which extend the theory to cores of almost arbitrary cross section. Example calculations for antenna Q and efficiency show good correlation with experiment.

Research investigation directed toward extending the useful range of the electromagnetic spectrum. 4th quarterly progress report, Sep 16-Dec 1956, under Contract DA 36-039-sc-64630, by P. Kusch. Columbia University. Columbia Radiation Laboratory, New York, N.Y. Dec 1956. 31p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133383

CU 6-56-sc-64630. DA project 3-99-10-022. SC project 102 B. 1. Vacuum tubes, Magnetron - Tunable 2. Vacuum tubes, Magnetron - Frequency control

Research on solid state diffusion in semiconductor materials. Final technical report covering the period 1 Aug 1956-31 Jul 1957, under Contract AF 18(603)-117, by T. J. LaChapelle. Pacific Semiconductors, Inc. Research and Development Dept., Culver City, Calif. Sep 1957. 71p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132300

Silicon surface preparation and properties have been investigated in their relation to diffusion. Flat, damage-free surfaces have been produced by the use of garnet abrasives and special etches. Surface damage of less than a micron appeared to give a 20% faster diffusion rate than an etched surface for a penetration depth of about ninety microns. The effects of diffusion and heat treatment were studied as they relate to the resistivity, minority carrier lifetime, and structural perfection of silicon. The structure of diffused silicon appears to be far more imperfect than either heat-treated silicon or virgin (as grown) silicon. Known impurity-dislocation interactions and preliminary experiments suggest that contaminants in raw silicon are still an unknown variable. AD 136553. Report no. 3000: 5-5-F. ARDC project no. 19751. AF OSR TR 57-63.

Research study in connection with an L-band duplexing system. Final report covering period 1 Aug 1952-31 Aug 1956, under Contract DA 36-039-sc-15561, by J. W. Blaine. General Electric Co. Defense Electronic Division, Syracuse, N.Y. Sep 1956. 387p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $59.10. PB 132752

This report describes a program to increase the power handling capacity and tube life of an L-band polarization twist duplexer. The first part presents the results of a G. E. -sponsored investigation of tube improvement. Revised manufucturing techniques, improved tube designs and materials, new production test equipment, and quality controls are described. The second part deals with analysis of duplexer impedances and electric fields from a purely mathematical approach. The third part covers testing and experimentation. AD 114113. Dept. of the Army project no. 3-19-03-032. Signal Corps project no 27-323-B.

Response to single energy circuits to a sinusoidal drive, by E. Weber. Polytechnic Institute of Brooklyn. Microwave Institute, Brooklyn, N.Y. Jan 1956. 36p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 127051

Covers material from lectures on: Currents in a nonlinear resistance under A-C voltage drive; - Linear resistance in series with a nonlinear resistance;- Linear resistance in parallel with a nonlinear resistance; - Nonlinear resistance in series with a capacitance-resistance parallel combination; - Nonlinear resistance in series with a linear inductance; - Nonlinear inductance in series with a linear resistance; - Nonlinear capacitance in serieswith a linear resistance. Contract Nonr-839(15), T.O. IV, NR 375-214. PIB 396. PIB R 466-56.

Scattering equivalent circuits based on symmetries of common waveguide junctions, by W. K. Kahn. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Apr 1956. 22p diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 127064

A novel form of equivalent circuit is presented for the symmetric two-port, the shunt-T junction, the series-T junction and certain directional couplers. Contract AF 19(604)-890. PIB 417. PIB R 487-56. AF CRC TN 56-580.

Scattering matrices and the foundations of linear passive network theory, by Dante C. Youla, Liborio J. Castriota and Herbert J. Carlin. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Sep 1957. 79p diagrs. Order from LC. Mi $4.50, ph $12.30. PB 132136

This report is concerned with the construction of a rigorous theory of linear passive networks from the point of view of energy conservation and causality. A theorem concerning the necessary and sufficient conditions for the existence of a Faltung-representation is proved and its implications discussed. The entire treatment is mathematical in nature and leans heavily on the theory of linear bounded operators. AD 136569. Project no.: 47501. Continues work initiated under Contract AF 18(600)-1505. Contract AF 18(603)-105. PIB R 594-57. PIB 522. AF OSR TN 57-581.

Scattering of a surface wave by a discontinuity in normal reactance with applications to antenna problems, by Alan F. Kay. Technical Research Group, New York, N.Y. Sep 1957. 59p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132929

AD 110110. 1. Wiener-Hopf equation 2. Radio waves - Scattering - Theory 3. Antennas - Theory 4. Contract AF 19(604)-1307, Scientific report no. 7 5. AF CRC TN 56-778

Scattering of plane waves by locally homogeneous dielectric noise, by Richard A. Silverman. New York, N.Y. Dec 1957. 17p diagrs. Order from from LC. Mi $2.40, ph $3.30. PB 134289

This report studies the scattering of plane waves by a confined region of dielectric noise, using two different approaches. One approach represents the scattering dielectric noise as a finite sample of a homogeneous random process. The other approach represents the dielectric noise as a locally homogeneous random process. Contract DA 49-170-sc-2253. NYU RR MME 9.

Selection of optimum antenna arrays, by Charles J. Drane, Jr. and George B. Parrent, Jr.. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Bedford, Mass. May 1957. 35p diagr, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 132945

So far as image-forming properties of the system are concerned, there are two useful quality criteria for selecting optimum antenna array: directivity and fidelity defect. The specific forms of these criteria are given for antenna systems used either passively or actively, with the radiation either completely coherent or completely incoherent. AD 117703. AF CRC TR 57-109.

Service, facilities and materials to conduct research and investigation into the origin of activity dips in the response of AT cut low frequency resonators, Final progress report covering period 15 Oct 1956-1 Apr 1957, under Contract no. DA 36-039-sc-63105, by J.M. Wolfskill and R.H. Tuznik. Bliley Electric Company, Erie, Pa. May 1957. 101p graphs (part fold). Order from LC. Mi $5.70, ph $16.80. PB 130617

In this final report a review is given of all the previous seven reports particularly in so far as the high lights of those reports are concerned. Because of the voluminous amount of data presented in all of the past seven reports, it would be impossible to review all of the detailed curves. However, discussion of the most important phases of each report is given. AD 134826. Dept. of the Army project No. 3-24-02-021. Signal Corps project no. 862A.

Some effects of non-uniform fields on dielectrics, by H.A. Pohl. Princeton University. Plastics Laboratory, Princeton, N.J. Dec 1957. 27p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 133239

The effect can be used to produce a fairly efficient pumping action of non-conducting liquids, to cause continuous and easily measurable separations in coarse suspensions, to cause selective precipitation, and to produce mixing. Liquids may be thrown several feet into the air with an electro-mechanical efficiency of about 25%. A separation factor of at least 2.5 in continuous separatory operation may be produced in a suspension of polyvinyl chloride in carbon tetrachloride-benzene mixture. Suspensions of polar materials in less polar liquids may be either dispersed or precipitated. In one interesting 'demonstration' type experiment, drops were 'hung' in mid air. ONR 356-375. Dept. of the Army project: 13-99-15-022. Signal Corps project 152B. Contract DA 36-039-sc-701(54), Report no. 9. PU PL TR 48b.

Sound engineering; the foundation of equipment reliability. Address presented at the working conference on reliability and maintenance of electronic equipment, Aberdeen Proving Ground, Md., 5 Oct 1955, by J.M. Bridges. Oct 1955. 10p. Order from LC. Mi $1.80, ph $1.80. PB 132907

1. Working Conference on Reliability and Maintenance of Electronic Equipment, 5 Oct 1955, Aberdeen Proving Ground, Md. 2. Electronic equipment - Maintenance and repair 3. Electronic equipment - Reliability

Steady state signal in the presence of "shimming" pulses, by B. Nelson. Technical Research Group, New York, N.Y. Feb 1957. 25p diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 127159

1. Pulse - Integration 2. Radar - Signals - Stability 3. Contract AF 18(600)-1313 4. AF OSR TN 57-72

Strain electrometry and corrosion, by Albert G. Funk, J. Calvin Giddings, Carl J. Christensen, and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Contract N7onr-451(03), NR 051-192. Order separate parts described below from LC, giving PB number of each part ordered.

I: General consideration on interfacial electrical transients. Jan 1957. 16p graphs. Mi $2.40, ph $3.30. PB 132479

The measurement of the resulting electrical transients, when the electrode is plastically deformed, strain electrometry, has been used to piece together a kinetic picture of the underlying corrosion process. Some general features of these corrosion transients are clear, and these are presented along with some of the pertinent experimental data. UU ISRP TR 23.

II: Chemical effects with copper electrodes. Jan 1957. 20p diagr, graphs. Mi $2.40, ph $3.30. PB 132480

Electrode strain transients have been measured with several metal electrodes (most extensively with copper), and in many different solutions. The data have been used to study the importance of the several chemical processes contributing to the voltage change. UU ISRP TR 24.

Strip line. Final report under Contract AF 30(602) 387, by Eugene Torgow and John W. E. Griemsmann. Polytechnic Institute of Brooklyn. Microwave Institute, Brooklyn, N.Y. Feb 1954. 47p drawing, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132325

The immediate objective of this task was to determine the practicality of using "strip" transmission line in applications where size, ease of construction simplicity of component design, and other advantages inherent in this type of transmission line, are important. Preliminary measurements at low frequencies demonstrated the validity of a derived equation for the characteristic impedance of the strip line as a function of strip line geo netry. AD 104557. Task B-8. PIB R 360-54. PIB 294.

Strip-line 3-db directional coupler, by James K. Shimizu. Stanford Research Institute, Menlo Park, Calif. Jun 1957. 17p photo, drawing, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132194

In this report a 3-db coupled-strip-line directional coupler is described which can be designed to operate satisfactorily over two-to-one frequency bands anywhere in the range of approximately 100 to 3000 Mc. AD 117286. Contract AF 19(604)-1571, Scientific report no. 1. SRI Proj 1592. AF CRC TN 57-565.

Study of electron beam attenuation in air, by B. V. Markevitch and F. C. Hurlbut. California. University. Institute of Engineering Research, Berkeley, Calif. Feb 1957. 54p diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 134594

An investigation of the attenuation of an electron beam in air was undertaken to examine the possible utility of such measurements for density determinations in rarefied gas streams. An apparatus is described which was designed to direct an electron beam of several kilovolts energy through a test region into a detector. Attenuation in air of electron beams of 4 to 16 kilovolts energy was measured at gas pressures of 20 to 300 microns of mercury. The results are well described by the classical logarithmic relation of Lambert. Report HE 150-142. Thesis by B. V. Markevitch. Contract Nonr 222(45). UC IER Series 20, Issue 112.

Study of refraction errors in radar propagation, by Henry M. Dixon. U.S. Army. White Sands Signal Corps Agency, White Sands Proving Ground, N. Mex. Apr 1956. 31p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 133997

The refraction of radar propagations by a spherically stratified variation of atmospheric refractive index was studied by the use of Fermat's principle, assuming only those variations of index of refraction that would be produced by varying temperature pressure and water vapor pressure. WSSA TR 18A.

Study of the effects of processing techniques and materials on aging of quartz crystal units. Quarterly report no. 3, covering period 15 Nov 1955-15 Feb 1956, under Contract DA 36-039-sc-64613, by Richard B. Belser and Walter H. Hicklin. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Mar 1956. 156p photos, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 130619

Fifty-one resonators have been fabricated, mounted in HC-6/U metal containers and in glass containers of the general size and configuration of miniature 7-pin electron tubes. A simple system for sealing the resonators in glass containers has been accomplished. Tests have continued on rhodium-plated, gold plated, aluminum, rhodium-plus-gold, platinum-plus-gold and platinum units. AD 97546. Dept. of the Army project no. 3-24-02-021. Signal Corps project no. 862-A. Project no. A-226.

Study of the generation and detection of electromagnetic waves in the millimeter wave region. Final report under Contract AF 19(604)-1115, covering period 1 Jun 1954-31 Aug 1957, by J.H. Rohrbaugh. New York University. Dept. of Physics, New York, N.Y. Aug 1957. 252p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $ 39.60. PB 133465

A more precise method for determining the complex index of refraction of low-loss liquids at millimeter wavelengths is described and data are given for toluene, cyclohexane and dioxane at wavelengths ranging from λ 4.2 mm to λ1.8 mm. Improvements in bolometer detectors and instrumentation and a spectrometer which is to operate from millimeter wavelengths to the far infrared, are described. AD 133731. Millimeter wave project. For 1st-4th, 6th and 8th scientific reports see PB 116645, 116990, 117767, 125997, 126373, 132116. For report no. 4 see PB 119237. AF OSR TR 58-10.

Study of the hash in fluorescent tubes by means of an auto-synchronized plasmograph, by Max Hoyaux and Paul Gans. Ateliers de Constructions Electriques de Charleroi, Société Anonyme, Brussels, Belgium. n.d. 83p graphs (1 fold). Order from LC. Mi $4.80, ph $13.80. PB 127129

A series of experiments have been carried out with the auto-synchronized plasmograph in which probe characteristics were determined in the vicinity of the anode in a direct current discharge in a tube of cylindrical geometry of a type similar to those used for fluorescent lighting. The results show that each peak in the anode potential is followed by a peak in the electron temperature, which is itself followed by a broader peak in the electron concentration. Beyond this maximum, the electron density falls off exponentially towards a limiting value. AD 95433. Date is 1953.or later. Contract AF 61(514)-630-C. EO ARDC TN 55-9. AF OSR TN 56-347.

Summary of high speed vacuum tube circuit work for Oct and Nov 1955, by Gene H. Leichner. Illinois. University. Digital Computer Laboratory, Urbana, Ill. Dec 1955. 18p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 127090

The Digital Computer Laboratory of the University of Illinois has recently been examining direct-coupled asynchronous computer circuits of the highest possible speeds. Switching elements consisting of both vacuum tube and transistor types have been considered. This report presents a comparison of calculated circuit operating times with observed times for some representative circuits in the direct coupled asynchronous class. The study includes the electron multiplier type of vacuum tube. Contract N6 ori-71, T.O. XXIV, NR 048-094.

Synthesis of voltage transfer functions, by Philip M. Lewis, II. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jun 1956. 107p diagrs, table. Order from LC. Mi $5.70, ph $16.80. PB 133460

The synthesis of voltage transfer functions in the form of linear, lumped, finite, passive, bilateral networks containing no ideal transformers or mutual coupling, is considered. The basic realizability conditions are derived and realization procedures are developed based on these conditions, showing them to be both necessary and sufficient. This particular class of networks places constraints on the allowable values of the constant multiplier in the voltage transfer function and on the positions of the transmission zeros in the case of grounded networks. In order to study these constraints, a new concept - the concept of the one - is introduced. This concept gives a certain physical significance to the constant multiplier, which allows the basic realizability conditions to be derived in a simple fashion. Based on a thesis, Massachusetts Institute of Technology. Dept. of the Army task: 3-99-06-108. Dept. of the Army project: 3-99-00-100. Contract DA 36-039-sc-64637. MIT RLE TR 314.

Tables of dielectric materials. Volume V, by W.B. Westphal. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Apr 1957. 279p graphs, tables. Order from LC. Mi $11.10, ph $42.60. PB 133231

A tabulation of dielectric data at room temperature for inorganic and organic solids (crystals, ceramics, glasses, plastics, waxes, etc), liquids and gases; and gives data at fixed frequencies as a function of temperature for inorganic solids, plastics, elastomers and liquids. Section IV on ferromagnetic dielectrics gives low field strength data at fixed temperatures as a function of frequency, and hysteresis loops and saturation magnetization. Section V gives attenuator characteristics for ferrites, conducting ceramics and plastics, carbon-plastics and magnetic plastic mixtures. For Volumes 1-4 see PB 4658, 4661, 98537 and 109095. Contract Nonr-1841(00). MIT LIR TR 119.

Theoretical and experimental study of high phase velocity antennas. Final technical report covering period 1 Jan 1955-15 Jul 1956, under Contract no. DA 36-039-sc-64582, by Albert E. Ward. Pickard and Burns, Inc., Needham, Mass. Sep 1956. 146p photos, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 132756

An investigation has been conducted into the effects of varying the phase velocity of currents in transmission lines and antenna elements. It has been shown that, when the phase velocity is made greater than the velocity of light, radiation and impedance characteristics are radically altered. Dept. of the Army project no. 3-00-05-022. Signal Corps proj-

ect no. 122B. P and B Pub. no 374. Contract DA 36-039-sc-64582, Final report.

Theoretical study of electromagnetic waves scattered from shaped metal surfaces. Quarterly report no. 3 under Contract W 28-099-ac-333, by William W. Hansen and Leonard I. Schiff. Stanford University. W.W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford Calif. May 1948. 9p. Order from LC. Mi $1.80, ph $1.80. PB 127174

1. Waves, Electromagnetic - Scattering - Theory
2. Waves, Electromagnetic - Radiation
3. Electric conductivity - Theory 4. Cones - Reflective effects 5. Surfaces - Electrical properties

Theory and application of gyrator networks, by Herbert J. Carlin. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Mar 1954. 79p diagrs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132456

This report presents a theoretical investigation of the circuit properties of linear passive but nonreciprocal networks. Networks containing gyrators (the basic non-reciprocal element) are first briefly analyzed. This is followed by a complete presentation of the synthesis of an assymetric impedance matrix with complex elements. The class of networks having no impedance or admittance matrices is then treated by an extension of the synthesis technique in terms of scattering parameters. Structures having directional properties (biconjugate networks) are investigated as an application of the general synthesis techniques. The operation of ferrite devices employing directional elements such as circulators, duplexers, one way lines, frequency separators, and wide band filters is treated from a networks point of view. Equivalent circuit representations are given. AD 43721. Task II, B-5. Contract AF 30(602)-387, Final report. PIB R 355-53. PIB 289.

Theory of diffraction from a paraboloid of revolution, by V.A. Fok. Translated from Sbornik (collection of papers), Diffraktsia, "Soverskoe radio", Moscow, 1957, pp. 5-56, by Morris D. Friedman, Lincoln Laboratory, Massachusetts Institute of Technology, under Contract AF 19 (122)-458. Aug 1957. 42p. Order from LC. Mi $3.30, ph $7.80. PB 132083

AD 133663. 1. Diffraction - Theory - Russia 2. Maxwell's field equations - Russia 3. Bodies of revolution - Reflective properties - Russia

Theory of nonlinear systems, by Amar G. Bose. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. May 1956. 59p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 133458

The Wiener theory of nonlinear system characterization is described and some of its important concepts are discussed. Following these lines, a theory is developed for the experimental determination of optimum time-invariant nonlinear systems. The systems are optimum in a weighted mean-square sense in which the weighting function is at our disposal. Based on a thesis, Massachusetts Institute of Technology. Dept. of the Army task no. 3-99-06-108. Dept. of the Army project no. 3-99-00-100. Contract DA 36-039-64637. MIT RLE TR 309.

Thermal considerations in the use and evaluation of power transistors, by Bernard Reich. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Sep 1956. 11p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132568

The purpose of this report is to outline the problems associated with heat removal from junction transistors. Necessary design information for circuit users is also presented. Signal Corps project no. 4602D. SCEL TMM 1832.

Thermodynamic protential functions for anisotropic materials. Part V: Electromechanical potential function and the strain-energy function for a material possessing transverse isotropy, by G. F. Smith and R.S. Rivlin. Brown University. Division of Applied Mathematics, Providence, R.I. Jun 1956. 16p. Order from LC. Mi $2.40, ph $3.30. PB 132329

The electromechanical potential function is seen to be a polynomial in the components of a symmetric tensor and a vector. A polynomial basis is found for a polynomial which is form-invariant under the group of transformations associated with a material possessing transverse isotropy, and the electromechanical potential function is expressible as a polynomial in the elements of the polynomial basis. The form of the strain-energy function is also determined. Dept. of the Army project no. 599-01-004. ORD project no. TB 2-0001. OOR project no. 1271. Covers period Jan-Jun 1956. For Parts II and III see PB 125529 and 125532. Contract DA 19-020-3487. BU AM TR 9. GDAM DA 3487/9.

3.2-cm antenna with variable polarization, by E.V. Jull. National Research Council of Canada. Radio and Electrical Engineering Division, Ottawa, Can. Jun 1957. 15p photos, diagrs, graphs. Order from National Research Council of Canada, Ottawa, Canada. 25 cents. PB 134325

An X-band antenna capable of forming waves of any desired ellipticity from linear polarization through to 90% elliptic polarization is described. In addition, the device is capable of orienting the inclination of the linearly or elliptically polarized waves to any desired position. Polarization patterns showing the

performance of thepolarizer alone are presented as well as radiation patterns of the complete antenna. NRCC 4507. NRCC ERB 441.

Time-domain synthesis by means of trigonometric polynomial approximations, by Michael Strieby. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jan 1956. 36p graphs. Order from LC. Mi $3.00, ph $6.30. PB 133457

The area of time-domain synthesis considered here is the process of finding the system function of a lumped-element, linear, passive, bilateral network whose impulse response approximates a prescribed function of time. The first method of synthesis bases the choice of a rational delay-line approximant upon the particular impulse response that is being synthesized. The second of the many possible procedures based on the same underlying philosophy uses a rational delay-line approximant which is independent of the function that is being synthesized. One example seems to show that this approach also produces satisfactory results. Based on a thesis, Massachusetts Institute of Technology. Dept. of the Army project: 3-99-10-022. Signal Corps project: 102B. Contract DA 36-039-sc-64637. MIT RLE TR 308.

Topics in the microwave applications of ferrites, by J. Cacheris, G. Jones, and R. Van Wolfe. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Jul 1955. 19p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132809

Two ferrite waveguide components were developed that have many applications. A magnetically tuned klystron is described for applications requiring very wideband frequency modulation. The microwave permeability of a ferrite in the direction of the applied field was determined from frequency shift measurements of a transmission-type cavity. This paper also describes an extremely simple duplexer-detector for microwave systems using a common antenna for transmission and reception. The leakage signal, which is 31 db down from the transmitted signal, can be used as the local oscillator signal for superheterodyne systems. DOFL TR 188.

Transient correction by means of all-pass networks, by John C. Pinson. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. May 1957. 117p diagrs, graphs. Order from LC. Mi $6.00, ph $18.30. PB 133463

Phase correction, realized in the form of an all-pass network, is frequently used in order to improve the transient response of a system. An investigation is made here to determine the phase correction that should be used to achieve the optimum corrected response for a given system. In general, the ideally desired response cannot be obtained by means of phase correction. Then an error criterion must be used to define the corrected response that best approximates the desired response. The phase correction which gives the corrected response that approximates the desired response with minimum integral square error is determined. For the particular class of systems in which reproduction of the system input is desired, it is found that the correction should linearize the phase of the system in order to produce a corrected response with minimum integral square error. Thesis, Massachusetts Institute of Technology. DA task: 3-99-06-108. DA project: 3-99-00-100. Contract DA 36-039-sc-64637. MIT RLE TR 324.

Transistor magnetic amplifier circuits, by Niels Jasper, James C. Taylor, and William T. White. U.S. Army Ballistic Missile Agency. Development Operations Division. Guidance and Control Laboratory, Huntsville, Ala. Mar 1957. 21p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132806

This report discusses some advantages and disadvantages of transistor and magnetic amplifiers. A combination of the two is discussed and schematic diagrams are given for various example circuits and applications which utilize the better points of each. Report Dg-R-2.

Transistor regulators for 5-ampere currents, by J.K. Pulfer and D.W.R. McKinley. National Research Council of Canada. Radio and Electrical Engineering Division, Ottawa, Can. May 1957. 12p diagrs, graphs. Order from National Research Council of Canada, Ottawa, Canada. 25 cents. PB 134324

1. Transistors - Circuits - Design - Canada
2. Voltage regulators - Design - Canada
3. NRCC 4763 4. NRCC ERA 336

Transistorized coordinate data set. Final report covering period 1 Jul 1955-30 Sep 1956, under Contract DA 36-039-sc-64736, by F. Hoffman. D. Randise, and J. Stingelin. Sperry Gyroscope Company, Inc., Great Neck, N.Y. Oct 1956. 132p photos, diagrs (part fold), tables. Order from LC. Mi $6.90, ph $21.30. PB 133598

The overall data transmission system philosophy is discussed and the theoretical and practical aspects of the transistorized design are presented. The electrical and mechanical problems encountered, and the solutions adopted for the experimental system are described. Test data relative to the complete data transmission system and various subcomponents are presented and discussed along with modifications deemed advisable in future systems. Sperry report 5283-7278. DA project 3-14-02-043. Signal Corps project 414-C. Contract DA 36-039-sc-64736, Final report.

Twenty-channel electronic multiplexer, by Kenneth L. Berns and Bruce E. Bishop. U.S. Naval Ordnance Laboratory, Corona, Calif. Apr 1958. 24p diagrs, graphs, Order from LC. Mi $2.70, ph $4.80. PB 134627

This report describes the circuit design and performance of an electronic multiplexer for sequential sampling of from 2 to 20 voltage sources. The multiplexer accommodates signal inputs within the range -45 to +45 volts and operates at sampling rates up to 50,000 per second. NOLC 403. NAVORD 4648.

Two-dimensional feedback control system, by P. Sarachik and J.R. Ragazzini. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories, New York, N.Y. Aug 1956. 27p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127072

This paper discusses a class of feedback control systems whose distinctive feature is its ability to maintain accurately a given functional relationship between its two output variables, with no prior programming and without regard to time. AD 97369. CU 25-56-AF-677-EE. Project R 357-50-3. Contract AF 18(600)-677. CUN ERL TR T-16/B. AF OSR TN 56-485.

Variational expression for the terminal admittance of a semi-infinite dielectric rod, by Carlos M. Angulo and William S.C. Chang. Brown University. Division of Engineering, Providence, R.I. Jun 1957. 24p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132190

Contents: The complete mode spectrum of the partially filled cylindrical waveguide. - The complete mode spectrum of the homogenous air waveguide. - The variational expression for the thermal admittance. AD 117060. Covers period Nov 1956-Jun 1957. Contract AF 19(604)-1391, Scientific report no. 6. AF CRC TN 57-366.

Vehicular and pack equipment antenna study. Final technical report covering period Jan 1955-May 1956, under Contract DA 36-039-sc-64544, by James J. Glynn. Pickard and Burns, Inc., Needham, Mass. Dec 1956. 93p diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 132755

The study and investigation of Vehicular and Pack Antenna operating characteristics is herein described. The antennas are vertically polarized and operate over the frequency range of 20 to 70 mc. The radiation pattern is essentially omnidirectional in the horizontal plane and possesses some directivity in the elevation plane. Impedance measurements using artifical ground planes show that definite conclusions may be reached as to predicting operating characteristics of antennas in such a system. Heretofore, ambiguities existed as to knowing the actual impedance conditions of an antenna operating on a pack or vehicular installation. As a result of this contractor's investigation, improved ground radiation may be obtained using ground systems described. Dept. of the Army project no. 3-24-01-071. Signal Corps project no. 807A.

VHF ferrite antenna radiation properties (U), by O.R. Cruzan. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Aug 1957. 32p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 132361

Certain radiation properties of a spherical ferrite antenna are derived theoretically. The antenna, consisting of a sphere of ferrite with a thin wire loop embedded just below the surface in an equatorial plane, is driven by a slice generator. For the ferrite, the permeability and the dielectric constant are scalars and, in general, complex. The radiation resistance and antenna efficiency are evaluated for antennas that are electrically small in the VHF band with respect to the radiation wavelength in free space but have general sizes with respect to the wavelengths inside the ferrite. Compared to simialr unloaded antennas, the loaded one has a greater radiation resistance, and below certain radius-to-wavelength ratios the efficiency is also greater. DOFL TR 516.

Wavemeter FR-97(XW-1)/U, final engineering report. Aircraft Armaments, Inc., Cockeysville, Md. Aug 1956. 31p photo, diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133506

This final engineering report describes the work performed in the development of a precision wavemeter which is used to determine the frequency of beacons operating in the frequency range of 16,250 to 16,300 megacycles (Ku-band). The design of a temperature-compensated direct-reading cavity is discussed in appropriate sections, and the development of a metering circuit which utilizes transistors for indicating cavity resonance is also presented. The process by which the absolute frequency and "Q" of the transmission-type cavity was calibrated is described. AD 97847. Report ER 916. Contract AF 30(635)-2871. AF RADC TR 56-129.

Generators, Motors, Transmission

About the equivalent circuit of thermistors, by E.K. Weise and B.P. Lathi. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Nov 1957. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133309

An equivalent circuit for thermistors was developed and the elements were determined for a commercial bead, type, both for alternating current and for direct current transients. The circuit contains an in-

ductance for which values of several thousand henries were found. The dependence of the circuit elements upon the position of the operating point on the characteristic, upon frequency, and upon outside parameters, as voltage and series resistance, was determined. AD 148029. OSR project no. 52-670A-85. Thesis, with chapter added, University of Ill. Contract AF 33-038-12644. AF OSR TN 57-797. ILU EES TN 9.

Cooling and materials investigation for aircraft generators, by A. Kusko, P.N. Hjertberg, and others. Massachusetts Institute of Technology. Servomechanisms Laboratory, Cambridge, Mass. Jun 1956. 314p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $41.70. PB 134589

In Part I, methods are developed for finding the optimum cooling systems for use with present and proposed aircraft generators, when an optimum system is defined as one which imposes minimum aircraft performance penalty. In Part II, the effect of temperature on the process of mechanical-to-electrical energy conversion is investigated. AD 118086. Project 7352, Task 60286. Contract AF 33(616)-2921. AF WADC TR 56-305.

Correlation of the thermodynamic and electrical characteristics of blast-cooled aircraft generators. Part IV: Procedure for the experimental evaluation of constant-speed blast-cooled ac generators, by D. Friedman. U.S. Naval Research Laboratory. Aug 1958. 20p photo, diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 133126

This report contains detailed instruction on how to: 1. Determine, from limited amount of experimental data, the thermal rating of blast-cooled ac generators for a wide range of altitudes, inlet air temperatures, pressure drops, and load conditions. 2. Present the resulting information in the form of a rating chart, and 3. Obtain the required experimental data. NRL R 5169.

CV-157/URR single sideband converter. Final technical report covering period 17 Aug 1951-20 Nov 1953, under Contract DA 36-039-sc-15422, by L. Schultz. Hoffman Laboratories, Inc., Los Angeles, Calif. Dec 1953. 164p photos, diagrs (1 fold), graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 133253

Dept. of the Army project: 3-24-01-051. Signal Corps project: 15-805C. 1. Converters, Sideband - Design 2. CV-157/URR (Converter)

Development of a two repetition rate magnetic pulse modulator, by J.E. Sunderlin. Westinghouse Electric Corp., Air Arm Division, Friendship International Airport, Baltimore, Md. Sep 1955. 138p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 134559

The purpose of this report is to reveal investigations made and conclusions reached in the development of a two repetition rate magnetic pulse modulator. Since the magnetic pulse modulator requires only capacitors and iron-core reactors, it has several advantages. It is rugged and withstands shock and vibration well. Due to the relative simplicity of the components, reliability is high and the unit has long life. AD 89173. Project 4155, Task 41639. Contract AF 33(616)-2020. AF WADC TR 55-380.

Digital computer rating of blast-cooled generators, by R.M. Moroney. Massachusetts Institute of Technology. Servomechanisms Laboratory, Cambridge, Mass. Aug 1957. 78p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134639

The electrical rating of a blast-cooled aircraft generator depends on the flow rate and the temperature of the cooling air supplied. At the present time the rating data are presented in a series of charts obtained by correlating experimental measurements made on the particular machine in question. A new approach is presented in this report. AD 142250. Project 7352, Task 60286. Contract AF 33(616)-2921. AF WADC TR 57-522.

Dynamic operation of magnetic amplifiers for feeding back control systems, by H.C. Bourne, Jr., T.T. Kadota, R.J. Jameson, and D. Nitzan. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Aug 1957. 92p photos, diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 132948

The operation of magnetic amplifiers at higher frequencies improves the gain-bandwidth product and the dynamic power gain or figure of merit. Predictions of performance at these frequencies requires knowledge of the magnetic core characteristics under high frequency excitation. A practical gate supply for the study of high frequency operation is the transistor-saturable-core square-wave oscillator. Preliminary tests of various core materials and core configurations give data applicable to magnetic amplifier performance up to 1000 cps. Extension of this frequency range is the subject of current research. AD 133717. For other reports under this Contract, see PB 123415, 125984, and 126762. Contract AF 19(604)-1813, Technical report 2. UC IER Series no. 60, Issue no. 196. AF CRC TR 57-351.

Graphical extrapolation of voltage current characteristics of thermistors, by E.K. Weise and J. Reynolds. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Dec 1957. 9p graphs. Order from LC. Mi $1.80, ph $1.80. PB 133310

It was found that at each point of the voltage current characteristic of a thermistor the rise of tempera-

ture is directly proportional to the wattage. Using this relation, a simple graphical extrapolation method was derived. By it, any number of characteristics at arbitrary environmental temperatures can be found if two characteristics and the respective environmental temperatures have been measured. The limits of the method are discussed. AD 148028. OSR project no. 52-670A-85. Contract AF 33038-13644. ILU EES TN 10. AF OSR TN 57-796.

Industrial preparedness study, diffused semiconductor devices: Feasibility report for device no. 7, by J.M. Early, C.H. Knowles, and others. Western Electric Company, Inc., Laureldale, Pa. Jun 1957. 59p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 133393

Device 7 objective specifications call for 70 Mcps IF amplifier gain greater than 15 db at I_e = 1.0 milliampere, V_C = -5.0 volt. This gain requirement has been interpreted as a neutralized or unilateralized gain in either grounded base or grounded emitter circuits. Economical manufacturing techniques were a second major goal in the development. The specific electrical, mechanical, and reliability objectives are given in the target specification. Contract DA 36-039-sc-72729.

Industrial preparedness study for low-noise traveling-wave amplifier. Quarterly progress report no. 5, covering period 1 Jul-30 Sep 1957, under Contract DA 36-039-sc-72733, by E. Goldman. Radio Corporation of America. Electron Tube Division, Harrison, N.J. Oct 1957. 31p diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132759

1. Amplifiers, Traveling-wave - Design
2. Amplifiers, Traveling-wave - Testing equipment

Low-frequency random noise generator, by S.R. Parris and T.R. Williams. Princeton University. Dept. of Electrical Engineering, Princeton, N.J. Jan 1957. 37p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134000

The random noise generator described in this paper has been designed especially for low frequency operation. The source of random events is gamma radiation from a radium sample which is detected by a sodium iodide scintillation crystal. A photomultiplier, operating with a gain of about 10^5 is used to amplify the resulting light pulses, and appropriate circuits are used to shape and filter the output as well as to provide usable output characteristics for operation as a test instrument. This generator has a 3 volts rms a-c output level, a frequency spectrum having an upper half power frequency of 30 cycles, and an amplitude distribution very nearly Gaussian. The lowest usable frequency is from about 0.01 to 0.1 cps, depending on the application; factors limiting this are discussed and suggestions for improving the low-frequency performance are made. The apparatus required is quite simple and for the most part consists of standard laboratory equipment. Contract N6 onr-270, T.O. V, Technical report no. 11.

Power gain in feedback amplifiers, by S.J. Mason. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Aug 1953. 15p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126991

The study of passive filter theory has led to classical design procedures by which the power loss through a given filter can be minimized. Unfortunately, these methods are not generally applicable to the problem of power gain maximization in an active filter, since the question of stability arises. Single-loop feedback theory lends design methods in which the stability is conveniently controlled, but the active device treated is unilateral, the feedback is external to the device and separately adjustable, and voltage gain rather then power gain is the quantity related to stability. This paper offers a possible viewpoint from which the classical filter theory and the single-loop feedback theory can join forces in a more useful manner. Dept. of the Army project: 3-99-10-022, Signal Corps project: 8-102B-0. For earlier report of same title see PB 112632. Contract DA 36-039-sc-100. MIT RLE TR 257.

Preliminary investigation toward the development of solid aluminum electrolytic capacitors, by Frederick Hochberg. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Aug 1956. 27p photo, tables. Order from LC. Mi $2.40, ph $4.80. PB 132569

The feasibility of preparing an all-solid aluminum electrolytic capacitor has been demonstrated. This report contains a discussion of the application of solids as electrolytes in aluminum electrolytic capacitors with special emphasis on the use of manganese dioxide as the electrolyte. During the course of the experimentation various related problems were investigated, including anodization electrolytes and techniques, and methods of assembly of complete units. Dept. of the Army project no. 3-93-01-000. Signal Corps project no. 2005A. SCEL TM M 1820.

Principles of thermistor application, by Erwin K. Weise. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Dec 1957. 28p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 133308

After a general treatment of the behavior of thermistors, the concepts of the isothermal and the non-isothermal temperature coefficients of resistance are introduced. The first determines the change of

resistance with temperature when the current is too small to produce a heating effect; it is constant for each individual thermistor. The second is variable with the parameters of a series circuit and can be made very large. Stability conditions on the voltage-current characteristic are derived for series circuits. Thermistors in balanced and unbalanced bridge circuits are considered by graphical methods. AD 148030. OSR project no. 52-670A-85. Contract AF 33(038)-sc-12644, Technical note no. 7. ILU EES TN 7. AF OSR TN 57-798.

Progress report of Contract N7 onr-41906 covering the period 15 Feb 1956-15 Feb 1957, by Nelson T. Grisamore. George Washington University, Washington, D.C. Feb 1957. 50p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 132536

A study was made of a beam deflection device designed to produce short pulses (< one musec). Rough calculations have been made on the dimensions of the device and the characteristics of the output pulses. Theoretical and experimental work is reported here on a tube using a grid to control the output of secondary electrons. The use of this tube as a modulator having unusual characteristics is described in detail. The frequency stability of the recycling pulse generator reported previously has been measured and the results are discussed. For earlier reports see PB 119688 and 125869.

Pulse system theory, by Kurt Ikrath. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Oct 1957. 131p diagrs, graphs. Order from LC. Mi $6.90, ph $21.30. PB 133439

This treatise is devoted to a theoretical discussion of pulse excited networks and pulse-circuits as they are used in many electrical, electronic, and mechanical systems. Ordinary Fourier and Laplace transform calculus, primarily suitable for a description of the behavior of networks employing continuous function type signals, become impractical for a description of the behavior of networks and systems under pulse type operational conditions. In this treatise the jump-function calculus is applied to all problems involving pulse type signal processing and transmission. By a refinement of the original Laplace transform method, a universal scheme is derived for the analytical treatment of all systems employing pulse type signals. DA project 3-99-00-100, Task 3-99-12-103. SCEL TM M 1922.

Remark on the analysis of the external feedback magnetic amplifier, by Tadashi Kikuchi. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Feb 1957. 26p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 133427

The series-connected saturable reactor circuit with external feedback is analysed under usual operating conditions, using the difference equation approach; the complete solution for transient and steady state operation is given. Special emphasis is laid on the existence of the circuit mode in which the rectifier bridge (for the feedback circuit) completely blocks the gate current, and the gate circuit together with feedback circuit are thus effectively opened. Contract Nonr 839(05), NR 375-216. PIB R 555-57. PIB 483.

Research concerning a solid state amplifier. Final report under Contract AF 19(604)-2269, by Perry H. Vartanian. Microwave Engineering Laboratories, Palo Alto, Calif. Oct 1957. 66p photo, diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 132949

Experimental and theoretical studies have been conducted to determine the feasibility of constructing a solid state amplifier having a noise figure near zero at liquid helium temperature, based on the behavior of unequally spaced energy levels in a paramagnetic salt. A survey of data reported in the literature indicated that salts of the ions Ni^{2+}, Cr^{3+} and Gd^{3+} offer the best possibilities for application in a 3 level maser. Detailed theoretical calculations were made for Gd^{3+} in $Mg_3Bi_2(NO_3)_{12} \cdot 24\ H_2O$ to determine the energy levels and transition frequencies as a function of magnetic field intensity. Associated microwave and low temperature equipment was provided to study amplifier operating characteristics, but attempts to get a maser into operation during the sixth and final month of the contract were unsuccessful. AD133766. AF CRC TR 57-361.

Synthesis of "optimum" transient response - criteria and standard forms, by Frank D. Graham and Richard C. Lathrop. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Directorate of Flight and All-weather Testing, Wright-Patterson Air Force Base, Dayton, O. Aug 1953. 72p diagrs, graphs. tables. Order from LC. Mi $3.60, ph $9.30. PB 133466

Various methods for synthesizing servomechanisms are reviewed, and it is pointed out that, in general, criteria for determining an optimum solution to the synthesis problem are vague. Stability criteria, frequency, and root locus methods reduce to conditions on the transfer function constants which may be made mathematically specific following Whiteley's suggestion of "standard forms". Eight mathematical criteria for optimum transient responses are critically examined. Tables of "standard forms" for optimum zero-displacement error systems are presented through the eighth order, and standard forms for zero-velocity and zero-acceleration-error systems are presented through the sixth order. An Appendix contains a discussion of computer techniques including the absolute value unit and the generation of error responses by an extension of Beck's method. AD21966. AF WADC TR 53-66.

Temperature stabilization of transistor amplifiers, by L. M. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Feb 1956. 22p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127095

A novel method of analysis of the thermal behavior of transistor amplifiers is developed by introducing the temperature incremental equations of the transistor and of its associated d-c network. Design formulas for prescribed thermal stability, and in particular for the case of thermistor compensation, are derived. Experimental verifications of the theory are included. Contract Nonr-839(05), NR 375-216. PIB 400. PIB R 470-56.

Theory and design of dc converters (U), by J. Scales. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Oct 1957. 21p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132362

Dept. of the Army project: 506-01-001. ORD project: TA 3-9101. DOFL project: 51050. 1. Frequency changers - Design 2. Frequency changers - Theory 3. DOFL TR 517

Upper limits of output power in vacuum tube and transistor a-c amplifiers, by L.M. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Dec 1956. 27p graphs. Order from LC. Mi $2.70, ph $4.80. PB 132208

A simplified analytical procedure of design of amplifiers for maximum power output is given, taking into account the current, voltage and power limitations of the unit. Contract Nonr 839(05), NR 375-216. PIB R 540-56. PIB 468.

Miscellaneous

Galvanic fuel cells, by Friedrich Kornfeil. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Jan 1956. 25p. Order from LC. Mi $2.70, ph $4.80. PB 132441

A review of investigations on galvanic fuel cells reported in the literature is given with the emphasis on general possibilities of such cells, their characteristics, and the materials and components used by various experiments. Different types of fuel cells are outlined in respect to the electrochemical reactions occurring in the cells and the type of fuel used. A description of the more important and more thoroughly investigated approaches leading to an eventual construction of a satisfactory fuel cell is given. SCEL ER E-1163.

Industrial preparedness study on magnesium can (for magnesium dry cell battery, type BA-270/U-XM). 8th quarterly report for the period 1 Nov 1956-31 Jan 1957 under Contract DA 36-039-sc-66083, by Chris Jaffe. White Metal Rolling and Stamping Corp., New York, N.Y. Feb 1957. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 127390

The optimum operating temperature for both the extrusion die and the slug was found to be 500 degrees Fahrenheit. The best results achieved to date on the experimental lubrication study have been combinations of transformer oil and Poly-Alkylene Glycol 5100, with palm oil as an additive. 13 pages of tables.

Industrial preparedness study on paper lined batteries, type BA-270/U-XPL. 16th quarterly progress report under Contract DA 36-039-sc-30256, by M. Lang. United States Electric Manufacturing Corporation. Jul 1957. 6p. Order from LC. Mi $1.80, ph $1.80. PB 132499

1. BA-270/U-XPL (Battery) 2. Batteries - Manufacture 3. Electrolytic cells - Manufacture

FOOD AND KINDRED PRODUCTS

Cereal rust. V: Development of a technique for evaluation of infectivity, by C.G. Schmitt, E.L. Sharp and others. U.S. Chemical Corps, Fort Detrick, Md. Oct 1956. 54p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134698

Techniques developed for assessment of infectivity of cereal rust spores are described. Relatively uniform spore distribution was attained by using a galvanized sheeting settling tower 4 feet high and 3 feet in diameter mounted over a plywood box with a rotating floor to facilitate loading and unloading and with a baffle to allow spore clumps to settle prior to exposing leaves to the shower. A CO_2 pistol provided somewhat better spore distribution than did air pressure between 15 and 50 psi instantaneously released by a solenoid-actuated mechanism. Temperature and humidity were regulated from 55° to more than 95°F. Aniline blue and acid fuchsin alone or in mixture with either lacto-phenol or chloral hydrate were effective in rapid staining methods to demonstrate rust organisms.

Effect of temperature on the relation of food to survival potential of isocalorically restricted animals, by Raymond F. Kline and Harry C. Dyme. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1955. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134392

The effect of temperature on the relation of food to survival potential was studied in rats. Food was borne out to be an important facet in the survival stress-strain complex. In the absence of food, length of survival also varied with temperature; cold stress decreased the survival potential markedly. The relative water intake of calorically restricted animals further demonstrated that carbohydrates would be advantageous while protein would be disadvantageous for survival feeding in severely limited water situations. AD 63617. AF WADC TR 55-66.

Radiation sensitivity of meat spoilage microorganisms. Final report covering period 14 Jan 1956-14 Apr 1957 under Contract DA 19-129-qm-574, by C. F. Niven, Jr. American Meat Institute Foundation. Division of Bacteriology, Chicago, Ill. May 1957. 20p tables. Order from LC. Mi $2.40, ph $3.30. PB 134749

These studies deal with the actual kinds of microorganisms encountered as spoilage agents, their respective resistances toward ionizing radiation, and factors affecting their resistance. Ultimately it is hoped that these studies may yield information applicable to the goal of complete sterilization of meat products by high energy radiations, or by a combination of methods, including irradiation. S-509, Report no. 5. Project no. 7-84-01-002. AD 130177.

FUELS AND LUBRICANTS

Air specific impulse and flame temperature of kerosene-air mixtures, by W. T. Renich. Johns Hopkins University. Applied Physics Laboratory, Silver Spring, Md. Aug 1956. 41p fold graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134522

Air specific impulse and flame temperature of various kerosene-air mixtures at a number of pressures and inlet temperatures have been computed and presented in graphic and tabular form. Included with the tables and graphs is the method of calculation. Contract NOrd-7386. JHU APL CM 884.

Chemical steady state in HBr flames, by Mitchell Gilbert and David Altman. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Contract DA 04-495-ord-18. Order separate parts described below from LC, giving PB number of each part ordered.

I: Diffusion neglected. Jun 1955. 21p graphs, tables. Mi $2.70, ph $4.80. PB 133973

The validity of the steady-state rate expression for the H_2-Br_2 reaction was studied theoretically under conditions approximating the flame. Separate analyses were made of the effects of high temperature and high time rates of temperature change on the deviations from chemical steady state. The flame speeds for several typical mixtures neglecting diffusion were calculated with the steady-state rate expression and it was shown that the appreciable dissociation of bromine near stoichiometric incurs a significant correction which cannot be neglected. CIT JPL 20-276.

II: Effect of diffusion on the HBr flame. Jun 1955. 15p tables. Mi $2.40, ph $3.30. PB 133998

Calculations of the flame speed of the H_2-Br_2 reaction have been made including the effect of diffusion. A system of equations is employed for the species which is similar in form to a binary system and the diffusion coefficients so defined are evaluated from the exact diffusion relations. It is shown that for a chain reaction invovling free radicals, the diffusion of minor species, if neglected, introduces a small error. In this connection, the case of Br atom is discussed for near-stoichiometric mixtures in a region near final flame temperature where this species is no longer minor. CIT JPL 20-277.

Continued studies to develop a high speed type test for the purpose of qualifying military gear lubricants, by John A. Vitkovits. Southwest Research Institute, San Antonio, Tex. Feb 1958. 117p photos, diagrs, tables. Order from LC. Mi $6.00, ph $18.30. PB 134315

Continuing the program to develop a rear axle gear lubricant test of greater severity, tests were run to check the severity level and study the correlation between results at various laboratories. The CRC-L-42 technique appears to meet military requirements for severity; repeatability and evaluation of lubricant anti-scoring properties is satisfactory; but possible refinements should be investigated. ORD project no. TB 5-3010. D/A project no. 593-21-052. Contract DA 23-072-ord-1144.

Contribution to the knowledge of reaction kinetics in premixed laminar flames, by A. Van Tiggelen. Louvain. University. Laboratory for Inorganic and Analytical Chemistry, Brussels, Belgium. Feb 1957. 98p photos, diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 132050

A general but very simple theory for flame propagation is derived on the basis of the kinetics of chain reactions. The theory has the advantage of giving a good correlation between different flame properties and even between flames propagating in mixtures of different fuels and oxidants. Messurements of flame temperature, burning velocity and flame

front thickness have been made in mixtures of certain fuels and oxidants. The intensities of the different bands emitted in the spectra have been measured for certain flames. An attempt has been made to give kinetic interpretation of those intensities, assuming chemiluminescent excitation of the emitting radicals. AD 126445. Contract AF 61(514)-814. AF OSR TN 57-27.

Current theoretical concepts of steady-state flame propagation, by Marjorie W. Evans. Princeton University, Princeton, N.J. Jun 1951. 87p graphs, tables. Order from OTS. $2.25. PB 131881

The basic laws and equations which govern the behavior of flames together with the numerous modifications, assumptions, and approximations which are necessary to transform the basic equations into a form capable of being treated are presented. In addition the current models and methods of attack are also considered. Project Squid. Contract N6ori-105, T.O. 3, NR 220-038. PU TR 27.

Development of test methods for antiseize compounds, by John W. Cunningham. Southwest Research Institute, San Antonio, Tex. Feb 1954. 187p photos, diagrs, graphs, tables. Order from LC. Mi $8.40, ph $28.80. PB 134774

The tapered pin seizure tester was modified to provide a progressively increasing contact pressure. Tests were conducted to determine the relationship to the effectiveness of antiseize compounds of varied time and temperature exposure, different specimen materials, various specimen surface finishes, specimen assembly design modifications, and vibration at varying frequencies and amplitudes. AD 27766. Contract AF 33(038)-22805. AF WADC TR 53-197.

Effect of fuel injection on turbojet engine operation. Part I: J35 and J47 engines, by Jack H. Cohen. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. May 1958. 50p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 131907

Investigations of aircraft turbojet engine explosions have indicated that a possible cause might be the leakage of flammable fluids into the engine primary air. In view of the explosion record and recent trends in design, it was decided that the degree of hazard associated with turbine-engine fuel ingestion should be investigated. CAA TDR 319.

Effect of temperature on rollingcontact fatigue life with liquid and dry powder lubricants, by Thomas L. Carter. U.S. National Advisory Committe for Aeronautics. Jan 1958. 40p photos, diagrs, graphs, tables. Order as TN 4163 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington, D.C. PB 126352

An experimental study with liquid nitrogen in a closed container showed that surface temperature controlled the tank pressure and verified the existence of temperature gradients that accounted for the increase in pressure above the calculated from the average liquid temperature. Stirring the liquid to equalize liquid temperatures caused a pressure reduction to the calculated value. Mixing the vapor increased the direct heat flow to the stable liquid layer at the surface, which resulted in an increase in pressure. NACA TN 4163.

Experimental tests with the liquid fluorine-liquid oxygen-liquid hydrogen cyanide system for aerodynamic heating in excess of 5000°K., by William L. Doyle. Temple University. Research Institute, Philadelphia, Pa. Aug 1956. 41p photos, drawings (part fold), fold diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134574

The liquid fluorine-liquid oxygen-liquid cyanogen system was tested in a thrust chamber having a 2" circular exit at pressures close to designed chamber pressures of 300 psia. The purpose of this jet flame was to test samples in an aerodynamic stream, in excess of 4000°K. The calculated flame temperature at 300 psia at the stoichiometric point is approximately 4400°K. for the pure substances. A minimum value of 15.8 BTU/in^2-sec was produced by the flame on a sample. This value could be low by a factor of 4. The test facilities are described, and drawings and photographs are presented. Contract DAI 01-021-506-ord(P)-195.

Exploratory experiments on surface deposits on metals from pyrolysis of hydrocarbons, by Jas. H. Dent and Robbin C. Anderson. Texas. University. Combustion Dynamics Division, Austin, Tex. Dec 1957. 7p. Order from LC. Mi $1.80, ph $1.80. PB 133482

Exploratory experiments have been made on surface reactions of acetylene and hexane with various metals over ranges of 250-900°. These results show that specific interactions occur between the gases and certain metals, under conditions where physical condensation is highly unlikely. Tests with octatriyne indicate that such compounds may be chemisorbed, and that they can activate a surface for further reaction and deposit formation. AD 148090. AF OSR Chem 50-18. Technical note 2. Contract AF 18(603)-142. AF OSR TN 58-50.

Exploratory study relating viscosity and propellant stability, by Charles Lenchitz and Marvin Goldstein. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratory, Dover, N.J. Feb 1958. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134626

A viscosity study of nineteen single-base IMR propellants is described. It is shown that the viscosity characteristics of stable and unstable propellants

differ. Viscosity measurements were made of acetone solutions containing 0.2 g and 3.0 g of propellant per deciliter. The rate of viscosity reduction at 134.5°C is the same for both an unstable and a stable propellant. Ordnance project 57-55. PA TR 2458.

High temperature project. First progress report for the period 13 Jun-15 Oct 1949, under Contract N9-onr-87300, by A.V. Grosse. Temple University. Research Institute, Philadelphia, Pa. Dec 1949. 33p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132012

The first section summarizes work done on the high temperature project preceeding the ONR contract. The purpose of the project is to devise and develop new methods for the production and maintenance of extremely high temperatures in special furnaces. Equipment used is described and illustrated. Using metallic aluminum and oxygen at atmospheric pressure, temperatures just above 5000°F, or 3000°K, have been measured by means of a pyro-optical pyrometer. ATI 209099.

Hydrocarbon flame extinguishing efficiencies of sodium and potassium bicarbonate powders, by R.R. Neill. U.S. Naval Research Laboratory. 21p photos, graphs, tables. Order from OTS. 75 cents. PB 131857

Both laboratory and field-scale comparative fire tests have demonstrated that the extinguishing efficiency of potassium bicarbonate exceeds that of the presently used related sodium compound. A regulated environment, uniformity of application technique, and the use of two powder types having an equivalent particle size distribution were controlling factors for this study. NRL R 5183.

Investigation of factors influencing low temperature engine cranking. 6th quarterly report under Contract DA 44-009-Eng-765, by J.J. DeCarolis and W.E. Meyer. Pennsylvania State University. Dept. of Engineering Research. Automotive Research Section, University Park, Pa. May 1956. 77p graphs. Order from LC. Mi $4.50, ph $12.30. PB 132785

In this report results are presented for the base oil, Indopol L-10, and a high viscosity oil designated as Indopol L-100. The base oil will provide a basis for comparing the influence of various parameters on cranking torque. The high viscosity oil shows the effect of oil viscosity and temperature on cranking. Also included are lube oil pressure and engine temperature data. AD 117757. Project 8-50-02-001. 4 pages of text, remainder consists of graphs.

New formulas for rapid calculation of linear burning rates of solid propellants, by William F. Wallace. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Apr 1958. 42p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134623

The derivation of a new simplified set of linear burning rate equations for solid, monoperforated, and 7-perforated cylindrical solid propellant grains is explained. PA TR 2488.

New methods for the measurement of relative ignitability and ignition efficiency, by Cecilio R. Grande. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Feb 1958. 27p photos, diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 134625

A new laboratory method for determining the relative ignitability of artillery and rocket propellants was developed. DA project 5A04-01-040. Ord project TA-1-5025. PA TR 2469.

Percutaneous toxicity of JP-3 and JP-4 (U), by Milton H. Joffe and Herbert Khalouf. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Oct 1957. 8p table. Order from LC. Mi $1.80, ph $1.80. PB 133947

Percutaneous damage resulting from daily applications of fuels JP-3 and JP-4, and an inhibitor ranged from erythema to desquamation. No residual or systemic toxic effects were seen after applications ceased and rapid recovery occurred. The hazard involved in handling this material is slightly more than that of gasoline. Project no.: 4-61-14-002. CC CWL R 2188.

Phase studies of greases, by Robert D. Vold. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Sep 1950. 78p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134605

The object was to ascertain the phase behavior of certain soaps in hydrocarbon solvents and the extent to which the properties of grease systems made from these soaps depend on the phases present or, instead, upon colloidal structure of the systems. The results obtained have been described in eighteen papers, and three comprehensive technical reports. The present fourth and final report contains, in addition to recent new data, a unified summary of previous results and a discussion of some of the problems now apparent in continuing investigations of grease structure. ATI 94883. Covers period 1 Feb-31 Aug 1950 under Contract N6 onr 238, T.O. 2, NR 057-057, Final technical report.

Phenomena in electrically and acoustically disturbed Bunsen burner flames, by M.L. Polanyi and G.W. Markstein. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Sep 1957. 49p photos,

diagrs, graphs, tables. Order from OTS. $1.50. PB 131856

The study of flame propagation under turbulent flow conditions by means of an indirect method is proposed, which comprises stroboscopic observation of Bunsen flames subjected to periodical disturbances of electrical or acoustical nature. It is found that the disturbances set on the flame only in the region immediately above the burner port, creating wave-shaped distortions of the flame front which travel upwards along the flame cone with a velocity equal to the velocity of gas flow within the experimental accuracy. While the distortions travel up, their amplitude increases gradually for moderate intensities of the distrubances; for large intensities an initial increase is followed abruptly by a decrease. The surface area of the distorted flame cones is found to be constant during the whole cycle and independent of the intensity of the disturbance. The significance of these observations for the theory of flame propagation in a turbulent medium is discussed. Project Squid. Contract N6 ori-119. CAL DD-420-A-3. CAL TM 3.

Propagation of a free flame in a turbulent gas stream, by William R. Mickelsen and Norman E. Ernstein. U.S. National Advisory Committee for Aeronautics. 1956. 28p photos, diagrs, graphs, tables. Order as NACA Report 1286 from U.S. Government Printing Office, Washington 25, D.C. 30 cents. PB 127441

Effective turbulent free-flame speeds measured in turbulent, flowing propane-air mixtures were found to have statistical distributions about mean values. The statistical spread was greater for rich and lean fuel-air ratios and at high turbulence intensities. The measured flame speeds, together with hot-wire-anemometer measurements, formed a basis for comparison with three theories and other types of flames. Supersedes NACA TN 3456 (PB 118023). NACA 1286.

Recent studies on flame stabilization of premixed turbulent gases, by S.S. Penner and F. Williams California Institute of Technology. Daniel and Florence Guggenheim Jet Propulsion Center, Pasadena, Calif. Mar 1957. 41p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 132516

Flame stabilization has been studied extensively in recent years, particularly with reference to bluff-body flame-holders. The present survey describes the investigations relating to flame holding by bluff bodies as well as new techniques (e.g., flame holding by the use of reverse jets) which may prove to be of practical importance in new engine configurations. Section II considers the flow field downsteam of a fluff-body flame-holder which includes the recirculation zone behind the body and a region of flame spreading farther downstream. Contract DA 04-495-ord-446, Technical report no. 18. CIT JPL TR 18.

Research on the flammability characteristics of aircraft fuels, by G.W. Jones, M.G. Zabetakis, G.S. Scott and A.L. Furno. U.S. Bureau of Mines. Jan 1954. 67p photo, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 127339s

The results of limit of flammability, limit of ignitibility, and ignition temperature tests conducted on aircraft fuel vapor-air mixtures, with various quantities of added nitrogen and carbon dioxide, by the U.S. Bureau of Mines Gas Explosion Branch between 1 February 1952 and 1 February 1953 are presented. Two aviation gasolines grades 100/130 and 115/145, and three jet fuels grades JP-1, JP-3 and JP-4 were used in the investigations. AD 27722. Supplement 1 to PB 127339. Contract AF 18(600)-151. AF WADC TR 52-35, Suppl. 1.

Research on vinylic filler lubricants and greases, by U.F. Nager, M.T. Johnston, and B. Hunt. Burke Research Co., Van Dyke, Mich. Jul 1957. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 134304

The aim of this study is to develop new lubricating greases which will stand up under shear at temperatures up to 300°C. (preferably above 500°C) to which they may be subjected under operating conditions. Cross-linked styrene/divinylbenzene-type vinylic fillers were prepared and investigated as thickners for high temperature greases. Technical report no. 13T covering period 1 Apr-30 Jun 1957. Contract Nonr-2146(00).

Sandwich burner model for the composite solid propellant, by William Nachbar and J.M. Parks. Lockheed Aircraft Corporation. Missile Systems Division, Palo Alto, Calif. Sep 1957. 41p diagr, graph. Order from LC. Mi $3.30, ph $7.80. PB 132308

An idealized solid propellant sandwich burner, composed of alternating flat slabs of fuel and oxidizer which are ignited edgewise, is proposed for theoretical study of the functional relationship of the regression rate, pressure, and surface temperature in the combustion of composite solid propellants, and the dependence of this relationship on geometry and on physical and chemical material properties. The work of Powell on the gaseous sandwich burner is reviewed in detail. AD 132497. LMSD 2191. Contract AF 18(600)-146. AF OSR TN 57-418.

Second part of one dimensionalized aero-thermodynamic theory of turbulent flame propagation in flame tubes, by J.K. L. MacDonald and J.L. Neuringer. New York University, New York, N.Y. Jul 1948. 9p. Order from OTS. 50 cents. PB 131863

A set of formulas is obtained for the flame motions in a flame tube. These results refer to new initial conditions suggested by recent experimental work.

Project Squid. Contract N6 ori-11, Task 2. Technical memorandum 4.

Spectroscopic investigation of butane-NO_2 flames, by W. W. Wharton, T. D. Violett, and E. Miller. U. S. Redstone Arsenal. Ordnance Missile Laboratories, Huntsville, Ala. Nov 1956. 22p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132183

Project no.: TB 2-0001. Contribution no. 38. 1. Flame - Spectrographic analysis 2. Burners, Gas - Design 3. Butane-nitrogen dioxide mixtures - Combustion 4. RSA OML R 2R21F

Survey and analysis of engine cold-starting aids for Ordnance engines (from -25° to -65°), by I. Palmer. Southwest Research Institute. Division of Engines, Fuels and Lubricants Research, San Antonio, Tex. Apr 1956. 74f diagr, graph. Order from LC. Mi $4.50, enl pr $13.80. PB 134828

This report concludes a literature survey having as its objective an analysis and comparison of the effectiveness of past, present and contemplated engine cold-starting aids for use on Ordnance gasoline engines in the temperature range of -25° to -65°F. The remarks, conclusions, and recommendations made in this report are based upon a critical analysis and review of information obtained from government and civilian reports, papers, engineering journals, trade catalogs, and upon actual discussions with members of civilian and military organizations. SRI 29A. Contract DA 23-072-ord-836, T.O. 7, Suppl. agreement 4.

Teflon lubricant for aluminum cased cartridges, by H.N. Marsh, Jr. U.S. Frankford Arsenal. Ammunition Group, Philadelphia, Pa. Mar 1956. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134580

Aluminum cartridge cases were subjected to various Teflon coating, solution heat treating and age hardening cycles. The finished cases were examined for hardness and the appearance and adherence of the Teflon coating was observed. AD 102947. Project TS 1-47, Report 9. FAL MR 1723.

Thermodynamic calculations of the performance of the hydrogen-fluorine system, by Rudolph Edse and William L. Doyle. Ohio State University Research Foundation, Columbus, O. Mar 1956. 55p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 133204

Values of the specific impulse of the hydrogen-fluorine system were calculated for various chamber pressures and mixture ratios. Both pure fluorine and technical fluorine containing 4% nitrogen by weight were considered. It is concluded that accurate values of the specific impulse of rocket propellants can be derived only from enthalpy-entropy diagrams of the chamber and the exhaust gases. AD 92491. Project 3058, Task 70158. Contract AF 33(616)-2078. AF WADC TR 53-427.

Thermodynamics of high-temperature mixtures and application to combustion problems, by John S. Gordon. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jan 1957. 179p tables. Order from LC. Mi $8.10, ph $27.30. PB 133980

Approximate statistical-mechanical relations are used to compute the ideal-gas thermodynamic functions of a variety of combustion products containing the elements H, Li, Be, B, C, N, O, F, P, S, Cl and Br. Heat-of-formation and dissociation-energy data are critically reviewed and equilibrium constants for a variety of gaseous reactions are computed from the most reliable heat-of-reaction values and the free-energy data already computed. Methods of analysis of rocket engine performance, gaseous detonations and constant-volume combustion are described. AD 110735. Project 3055-30198. Thesis - Ohio State University. AF WADC TR 57-33.

HIGHWAYS AND BRIDGES

Application of mechanical stabilization to an Arctic beach, by R.L. Handy, D.T. Davidson, Ira J. Ward, and C.J. Roy. Iowa. Engineering Experiment Station, Ames, Iowa. Jan 1956. 27p photos, map, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127052

Covers period 1 Jun 1954-1 Jun 1955. Prepared for presentation at the Highway Research Board Meeting, Washington, D.C., Jan 17-20, 1956. 1. Soil stabilization - Artic regions 2. Beaches - Trafficability - Arctic regions 3. Contract Nonr 530(04)

Review of frozen ground excavation methods, by C. R. McCullough. U.S. Army, Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Feb 1958. 13p Order from LC. Mi $2.40, ph $3.30. PB 134734

Present methods, reviewed and evaluated on the basis of a literature survey, include thawing prior to excavation by solar heat, steam jets, water and electric needles, valveless pulsejet engines, and hydraulic methods as well as fracturing by hand, with saws, drop and pneumatic hammers, and cutter and scraper blades. DA proj 8-66-02-004. SIPRE proj 22.4-9. SIPRE TR 51.

INSTRUMENTS

Airborne Lyman-α-humidiometer, by J.M. Bologna, O.K. Larison, D.L. Randall, and D.L. Ringwalt. U.S. Naval Research Laboratory. Aug 1958. 13p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 134001

A simple, lightweight instrument with rapid response has been developed for the direct measurement of atmospheric water vapor density. The operation of the instrument is based upon the high (387/cm) absorption coefficient of water vapor for the Lyman -α (1215.6A) line of hydrogen. NRL R 5180.

Algorithms and the machine decision problem, by B.A. Trachtenbrot. Feb 1957. 52p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 132489

This is a report on the development of electronic digital computers and on their use for solving mathematical and logical problems. The sphere of use of these computers grows continually. They solve complicated mathematical problems requiring study and solution of very cumbersome systems of algebraic or differential equations; they translate text from one language to another, play chess, etc. There exists the prospect of using them as production devices to guide automation processes. Translated from Matematika b Shkole, vol. 3, no. 4, p. 3-10, no. 5, 5-14, by R.M. Baer and L. Kruhe, Purdue University. School of Industrial Engineering and Management, Management Sciences Reseach Group. Contract Nonr-1100(05), NR 047-016. ONR RM 11.

Aliphatic hydrocarbon detector, by John E. Devries Stanford University, Stanford, Calif. Jul 1957. 56p photo, tables. Order from LC. Mi $3.60, ph $9.30, PB 134978

A simple device is required for detecting and measuring aliphatic hydrocarbons in the air around aircraft, hangars, and other military equipment. Complex instrumentation is routinely used for precise analysis of such air samples. An investigation of possible hydrocarbon reactions has been completed, with the result that a simple, inexpensive, easily operated squeeze-bulb detector has been developed which is capable of measuring aliphatic hydrocarbons in air in concentrations of 0 to 5000 parts per million within a few minutes. Higher ranges of concentration can be measured. The reagent is iodine pentoxide and fuming sulfuric acid on silica gel. This report furnishes all the information necessary to make and use the hydrocarbon detector. The detector is accurate within $\pm$20 percent. Appendix in bibliography of 171 references. Contract AF 33(600)-31904. AF WADC TR 57-88.

Apparatus for the study of high speed air flow over a freely suspended rotating cylinder, by Winston Nelson, Alfred Trachtenberg, and Albert Grundy, Jr. Columbia University. Electronics Research Laboratories, New York, N.Y. Dec 1957. 88p photos, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 133977

This report describes an apparatus constructed for the study of air flow over high speed smooth surfaces. A steel and aluminum rotor, eight inches in diameter, is magnetically supported in a test chamber, and is accelerated to speeds up to 21,000 rpm. Specific attention is given to the theory and design of the magnetic support and drive systems. AD 142127. Project 1370, Task 13463. For Technical note 56-263 see PB 121894. Contract AF 33(616)-2331. AF WADC TR 57-338.

Automatic adiabatic control, adaptable for heat capacity and heat of fusion measurements, by Leslie J. Todd, Robert H. Dettre, and Donald H. Andrews. Johns Hopkins University. Dept. of Chemistry, Baltimore, Md. Nov 1957. 18p diagr, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 132984

An automatic adiabatic shield control has been constructed for a calorimeter designed to measure heat capacities and heats of fusion, using a combination of partial on-off control coupled with an integrating device which keeps the on-cycle equal in length to the off-cycle. A difference thermocouple is the primary source of the control impulse. By calibrating the control with zero heat input, corrosion can be made for variations from absolute adiabatic states. Measurements on test compounds indicate a reduction of error due to heat leak to less than 0.1% of the heat to the sample. AD 148002. Chem 40-12. Based on theses, Johns Hopkins University. Contract AF 18(600)-765, Technical note no. 2. AF OSR TN 57-772.

Automatic contouring instrumentation, by Edward R. DeMeter. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Jul 1957. 75p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132522

This interim report covers the research and development of automatic contouring instrumentation accomplished by the Corps of Engineers from January 1950 to June 1955. Investigations and studies are presented that were conducted in the course of designing automatic contouring equipment. Details of design and performance information on the equipment developed are included. It is concluded that the development of a practical automatic contouring instrument is feasible although considerable research and development of the equipment and techniques involved remains to be done. Subproject: 8-35-03-121. Work also conducted under project: 8-35-07-001 and project: 8-99-04-001. Covers period Jan 1950-Jun 1955. ERDL R 1488-TR.

Automatic indicating and recording data systems for wind tunnels, by John B. D'Andrea. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory. Wright-Patterson Air Force Base, Dayton, O. Sep 1956. 45p photos, diagrs. Order from LC. Mi $3.30, ph $7.80.
PB 134435

The purpose of this project is to improve the data recording system for digital machine input at the Wright Air Development Center 10-ft transonic wind tunnel. The report was prepared for presentation to the Advisory Group for Aeronautical Research and Development (AGARD) Wind Tunnel and Model Testing Panel held in Rome, Italy during the week of 20 February 1956. AD 110482, Project 1363, Task 13651. AF WADC TR 56-479.

Calculations on the average power spectrum of the Cambridge electron accelerator, by D.H. Tamboulian and D.E. Bedo, Harvard University. Harvard College Observatory, Cambridge, Mass. Contract AF 19(122)-482. Order separate parts described below from LC, giving PB number of each part ordered.

Scientific report no. 1. Jul 1957. 32p graphs, tables. Mi $2.70, ph $4.80. PB 132573

The calculations presented in this report are concerned with spectral characteristics of the electromagnetic radiation from centripetally accelerated high energy electrons. The study was undertaken to explore the feasibility of using the by-product radiation from the future operation of the Cambridge Electron Accelerator (CEA) in various experimental projects in the soft x-ray region of the spectrum. AD 113678. AF CRC TN 57-211.

Scientific report no. 2: Part cycle distributions. Sep 1957. 15p graph, tables. Mi $2.40, ph $3.30. PB 132574

AD 133825. 1. Accelerators, Electronic - Power spectra 2. Electrons - Radiation - Theory 3. Electrons - Energy - Theory 4. AF CRC TN 57-246

Complex plane scanner, by C.M. Alaia and P.H. Oden. Columbia University. Dept. of Electrical Engineering, New York, N.Y. Jan 1958. 82p photo, diagrs (part fold). Order from LC. Mi $4.80, ph $13.80. PB 134578

This report contains a description of the circuits and the general theory of operation of a specialized type of analogue computer, the Complex Plane Scanner. Essentially, this computer will automatically map contours in the complex frequency plane into an arbitrary function plane. A brief resume of pertinent theory and applications of the computer is presented. AD 152220. Project 47501. CU 41-58-AF-677-EE. Contract AF 18(600)-677, Final report. CUN ERL TR-T-26B. AF OSR TN 58-29.

Computer for solving integral formulations of engineering problems by method of successive approximations, by J.M. Ham. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. May 1953. 57p photos, diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 126993

It is concluded that small and relatively simple special-purpose computers designed for use by the research worker can contribute significantly to the effective application of methods of successive approximations. The design and application of such a computer is described. The machine is effective for evaluating integral transformations such as Fourier, correlation, and convolution integrals. Dept. of the Army project: 3-99-10-022. Signal Corps project: 8-102B-0. Contract DA 36-039-sc-100. MIT RLE TR 241.

Correlation analyzer, by Albert Haberstich and Francis R. Hama. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Mar 1958. 58p pho photo, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 133994

In order to enable a double harmonic analysis with higher accuracy, a correlation analyzer, which measures directly the spectral equivalent of a time-correlation of any two signals, has been developed. This instrument is primarily designed for the direct measurement of the energy-transfer function in the spectrum of turbulence. It is believed capable of measuring input-output transfer functions in such problems as buffeting, stability of airplanes, and aeroelasticity as well as electronic instruments, servomechanisms or any "black box". Operation principle, circuit description and calibration results are given in this report. Maintenance and operation instructions are also included. AD 154242. Project R-353-20-17. Contract AF 18(600)-1014. UM BN 125. AF OSR TN 58-338.

Development of a fatigue damage indicator. Part 1: Preliminary investigation, by Darnley M. Howard. U.S. National Bureau of Standards. Dec 1953. 45p photos, diagrs, graph, tables. Order from LC. Mi $3.30, ph $7.80. PB 134586

This report describes an investigation that was conducted in an attempt to develop a fatigue damage indicator which can be used in aircraft to warn of impending fatigue failure. Five different methods of indicating fatigue damage were investigated, four were subsequently abandoned as all tests on these four methods were unsuccessful. The fifth method investigated is based on Miner's theory of cumulative damage and measures fatigue damage by means of a fine aluminum alloy wire bonded to

an aluminum alloy fatigue specimen. AD 27588. Contract AF 33(038)-51-4061. AF WADC TR 53-393, Part 1.

Development of a method for the calibration of secondary standard lamps, by Carleton I. Davidson. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Jun 1956. 16p diagrs, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 127377

A simple method was devised to calibrate secondary standard lamps. This method consists of a bridge circuit, two barrier layer cells with narrow band pass filters as opposing bridge elements, and precision resistors. A sensitive galvanometer is used as the detecting device of the measured color ratio. The instrument is sensitive enough to measure a one-degree Kelvin change in color temperature. Dept. of the Army project: 504-01-027. ORD project: TA 2-9201. PA TR 2283.

Dynamic systems synthesizer, by E.C. Hutter, J. Lehmann and others. Radio Corporation of America. RCA Laboratories. David Sarnoff Research Center, Princeton, N.J. Nov 1956. 231p photos, drawing, diagrs, graphs, tables. Order from OTS. $3.50. PB 151137

A study was made of the requirements for a new modern analog computer facility that would be sufficient to simulate modern guided missile systems. A number of new components were developed to enable the proposed computer to operate on a 1:1 time scale. These new components and the proposed new programming system have been tested on a model computer that contains one or more of all the components. These tests indicate that the methods and components suggested are sound, and that their use would result in a guided missile simulator that could operate in real time. AD 110687. Project 7060. Contract AF 33(616)-349. AF WADC TR 56-22.

Dynamic tester for shipboard antisubmarine fire control equipment. Final report under Contract Nord 11879. Librascope, Inc., Glendale, Calif. Jul 1955. 27p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134293

It is possible with a system of this type to measure qualitatively the output of different instruments at different times to compare the dynamic accuracy of the respective machine solutions of the same problem. It is also possible to measure one set of quantities on one run and measure other quantities from the same instrument on succeeding runs with the assurance that output data may be correlated as representing the same moment of problem time. Contract Nonr-11879, Final report. NAVORD 4694.

Electrical analogue for studying heat transfer in dynamic situations, by A.H. Woodcock, H.L. Thwaites, and J.R. Breckenridge. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Research Division. Quartermaster Research and Engineering Center, Natick, Mass. Apr 1958. 22p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134617

An electrical analogue has been constructed to represent the heat transfer system between a clothed man and his environment. The primary purpose of this analogue was to provide a visual indication of the manner in which skin temperature and heat loss through clothing are affected by varying wind, air temperature, activity, and clothing systems. The value of the electrical analogue approach in forcing the research worker to synthesize his concepts of heat transfer is discussed. An outline of methods, using electrical analogues, for investigating the significance of various environmental, activity, and clothing factors is presented. Examples are given of the types of problems which can be solved rapidly with the instrument. The possibility of using analogues for planning experiments involving human subjects is discussed. Project reference: 7-83-01-005B. QMC EP TR 86.

Electronic radar target simulator for air traffic control studies, by W. Carroll Hixson, George A. Harter, C.E. Warren, and John D. Cowan, Jr. Ohio State University. Aviation Psychology Laboratory, Columbus, O. Dec 1954. 91p photos, diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 133526

The radar simulator described in this report has been designed for research on air traffic problems arising from the need to control large numbers of aircraft in the vicinity of a landing field. The simulator provides independent control of speed and heading for thirty radar aircraft targets. The targets are displayed on a PPI-type radar display with simulated ranges of either ten or fifty miles. The simulator display system is flexible, providing for several types of target identification including target shape coding and a light-pencil target identifier. The techniques of simulation and the specific device described in the report, although developed specifically for air traffic control research, may be of interest to other agencies concerned with training, maintenance, or research not only on return-to-base problems, but also in the general air defense problem. AD 95405. Project 7192, Task 71596. This report is based in part on a thesis by W. Carroll Hixson. Contract AF 33 (616)-43. AF WADC TR 54-569.

Engineering tests of the cartographic grid ruler, by William H. Carr. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Jun 1957. 39p photos, diagrs, table. Order from LC. Mi $3.00, ph $6.30. PB 132521

This report covers the development, engineering

tests, and evaluation of the Cartographic Grid Ruler, a portable grid-ruling instrument, suitable for use in mobile field operations and capable of producing high-accuracy rectangular grids. The grid ruler was developed as a result of research, studies, and investigations conducted under contract by leading engineering and instrument fabricating firms. Project: 8-35-02-104. ERDL R 1486-TR.

50 - kMc dielectrometer, by N.E. Dye. Massachusetts Institute of Technology. Laboratory for insulation Research, Cambridge, Mass. Jan 1957. 22p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134002

A dielectrometer, using the standing-wave method with circular wave guide, has been developed which permits measurements of the complex permittivity and permeability of materials at 50 kMc. The instrument is capable of measuring relative dielectric constants from 1 to 100 and loss tangents as low as 0.0001. Only small samples are required and measurements can be made over a wide temperature range up to 1200°C. Special developmental problems concerning the crystal detector, slotted section, and probe are discussed in detail. Typical dielectric measurements on various samples are appended. Contract Nonr- 1841(10). MIT LIR TR 114.

Final engineering report on engineering, design and development of a prototype data recording system and furnishing two additional systems, by Carl Spaulding, William Kling, and others. G.M. Giannini and Co., Inc., Pasadena, Calif. May 1955. 71p 1 fold drawing, diagrs (part fold), tables. Order from LC. Mi $4.50, ph $12.30. PB 133384

A summary of the system specifications is given, followed by a description of the logical system functional and mechanical designs. Original breadboard circuit descriptions and component tests are enumerated to clarify the system performance. Functional and mechanical descriptions of the system, as well as the associated commutators and chassis, are presented to illustrate the transition from the logical design to the manufactured recording system. Installation and adjustment procedures are presented, together with maintenance recommendations for obtaining long, reliable field service. AD 122473. Covers period Jul 1953-Apr 1955. Report 1431-22. Contract AF 08(606)-617.

Final report on Contract DA 36-034-ord-1646, for the period 1 Jul 1954-31 Dec 1956. Part I: Engineering, by Hans J. Maehly. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N.J. Dec 1956. 118p photos, drawing, diagrs (part fold), tables. Order from LC. Mic$6.00, ph $18.30. PB 132501

This report describes the operation of and engineering improvements on the electronic computer at the Institute for Advanced Study during the period Previous technical descriptions of the machine are in PB 117640. Project no. TB 3-0538, For earlier reports see PB 118659, 118660, 119072, 120319, 120321, 123155, 123156, 123170, 124105, 124165, 124166, 126164 and 126356.

Fluctuations and hot-wire anemometry in compressible flows, by Mark V. Morkovin. Advisory Group for Aeronautical Research and Development. Nov 1956. 115p diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 127222

The problem of extracting information from a heated thin wire cooled by an unsteady compressible flow is treated. Empirical evidence on heat transfer from thin wires at high speeds is analyzed. Procedure for the different speed ranges are outlined and probable accuracy discussed. Parallel procedures for mean-flow measurements are also given. AGARDograph 24.

General-purpose audiometer, by Wolf W. von Wittern, Henning E. von Gierke, Ernst K. Franke, and Johann E. Frank. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1953. 25p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134389

A general purpose audiometer has been developed for the solution of research problems in psychoacoustics. In addition to its usefulness for routine tests, this instrument is suitable for measuring auditory thresholds and masking effects, loudness balancing, determining differential sensitivity, and the solving of many other related problems. The electrical frequency response of the audiometer makes it useful from 20 cps to 20,000 cps. For a combination of binaural tests, a two-channel amplifier is provided. Special emphasis is laid on freedom from objectional transients at the beginning and end of a signal. For this requirement, a novel switching circuit was developed. A wide choice of input and output connections is provided to facilitate the adaptation of the audiometer to a great variety of tests. AD 27600. AF WADC TR 53-30.

Infrared radiosonde. Scientific report no. 1 under Contract no. AF 19(604)-949, by John B. Newman. Johns Hopkins University. Laboratory of Astrophysics and Physical Meteorology, Baltimore, Md. Aug 1956. 46p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 132791

The design and performance of an infrared radiosonde for the fifteen micron carbon dioxide band is described. Two units have been built and flown. No data were obtained from the first owing to dam-

age in launching. Qualitative data were obtained from the second over a limited path, which indicate that the equipment can be made to perform reliably. AD 117260. Contract AF 19(604)-949, Scientific report no. 1. AF CRC TN 57-492.

Instrumentation for the measurement of air blast and ground shock intensities generated by the detonation of high explosives, by A.C. Davidson. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jul 1956. 196p photos, diagrs, graphs, tables. Order from LC. Mi $8.70, ph $30.30. PB 134595

A brief general background of the nature of air blast and ground shock is presented together with the psychological problems which often arise. The background presented here is intended to help the reader who is not fully acquainted with these problems to understand quickly the reasons for the specific instrumentation requirements. Actual methods and instrumentation for making absolute measurements and for analysis thereof are described as successfully used in the Explosive Research Group to record thousands of demolition shots throughout the United States. Contract DA 04-495-ORD-674. UU ISRP TR 1.

Investigation of regenerative heat exchangers for gas turbines, by J.C. Miles, N.A. Parker, and R.L. Smoot. Illinois. Engineering Experiment Station. Dept. of Mechanical Engineering, Urbana, Ill. Jun 1955. 117p photos, diagrs (part fold), graphs (part fold), tables (part fold). Order from LC. Mi $6.00, ph $18.30. PB 132635

The objects of this investigation were: To make an engineering study and an experimental appraisal of regenerative heat exchangers as to their practicability for use with gas turbine power packages; to develop through analysis, design, construction, and testing, the heat exchanger most suitable for this application; to evaluate findings and results and submit recommendations in a final report. Contract DA 20-089-ord-36564, Final report. ILU EES TR 564-1.

Investigation of the methods of utilizing a liquid oxygen pump in a low pressure oxygen gas generator, Arthur D. Little, Inc., Cambridge, Mass. n.d. 56p diagrs (1 fold), graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 133376

Date is 1953 or later. 1. Pumps, Liquid oxygen 2. Oxygen generators - Parts 3. Contract DA 44-009-eng-1667

Iterative predictor selection for a single criterion, IBM type 650 computational program, by Clifford E. Lunneborg. Washington. University. Division of Counseling and Testing Services, Seattle, Wash. Mar 1957. 14p tables. Order from LC. Mi $2.40, ph $3.30. PB 132647

The computer program as described here will process matrices of predictor intercorrelations and vectors of validity coefficients of order as high as 45. The computations carried out by the program are those described by Horst with one exception. The Wherry shrinkage formula for multiple correlation coefficients has been replaced in this program by a shrinkage formula suggested by Snedecor. Contract Nonr 477(08).

Level and quadrant calibrator. Final summary report under Contract DA 11-022-ORD-1997. Engis Equipment Company, Chicago, Ill. Feb 1957. 58p photos, fold drawings, fold diagr. Order from LC. Mi $3.60, ph $9.30. PB 133434

The calibrator, although based on well accepted principles of metrology, is claimed to possess novel details in microptic precision clinometer refinement. Ord Project TX-3. Dept. of the Army project 5X9003001.

Lightweight synchros: The static resolver tester, by William Biltzstein and Sidney W. Gill. U.S. Frankford Arsenal, Philadelphia, Pa. Aug 1956. 32p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133946

ORD project: TR 5-5058B. D/A project: 5R18-05-003. Fire control project FC 559-1. 1. Synchronous machines - Testing equipment 2. FAL R 1298

Manometers in pulsating systems, by Robert J. Kraushaar. New York University, New York, N.Y. Aug 1951. 24p photos, diagrs, graphs. Order from OTS. 75 cents. PB 131867

These experiments were performed to check the practicability of connecting the sensory element to the point of measurement with a tube of unspecified length. Manometer measurements were taken on a small gas pulsator, which is described, and FM pressure gauge measurements were taken on this pulsator and on a Dynajet engine producing average pressures of 4-5 inches Hg. Project Squid. Contract N6 ori-11, T.O. 2, NR 220-040. NYU TM 14.

Neutron dosimetry at U.S. Army Signal Engineering Laboratories, by Harry M. Murphy, Jr. U.S. Army Signal Engineering Laboratories, Fort Monmouth, N.J. Nov 1957. 31p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133440

The measurement of biologically significant fast-neutron doses, especially when combined with an associated gamma dose, has never been satisfactorily performed with field-type dosimeters. To meet

this need, the U.S. Army Signal Engineering Laboratories (USASEL) has been doing research designed to lead to the development of a tactical fast-neutron dosimeter. The purpose of this report is to discuss briefly the history, theory, and current state of the neutron dosimetry work being done in the Nucleonics Section of Evans Signal Laboratory, USASEL. SCEL TM M 1917.

New spectroscopic instrumentation for the vacuum ultraviolet. Final report under Contract AF 19 (604)-506, by George R. Harrison. Massachusetts Institute of Technology. Spectroscopy Laboratory, Cambridge, Mass. Feb 1957. 11p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126933

AD 117141. 1. Spectrographs, Ultraviolet - Design 2. AF CRC TR 57-261

Non-linear aspects of angular rate gyroscope systems, by Howard H. Brown and Donald L. Birx. Franklin Institute. Laboratories for Research and Development, Philadelphia, Pa. Dec 1953. 169p photo, diagrs, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 134859

The major sources of nonlinearity in rate gyroscope systems are examined. The equations of motion for a single-degree-freedom gyroscope are expressed in terms of a moving coordinate system attached to the gyro support case. The equation of motion of the gimbal around the gyro output axis is presented in its general form. AD 42154. Project 52-670A-87. Final report F-2308. Contract AF 33(616)-121, Final report. AF WADC TR 53-492.

On the New York University pressure gauge. Final report under Contract N6 ori-11, by Robert W. King, Jr. New York University, N.Y. Dec 1951. 35p photos, diagrs, graphs, table. Order from OTS. $1.00. PB 131865

Various experiments with the N.Y.U. type condenser gauge are described. The thermal perturbation of the sensing diaphragm as a function of diaphragm shape, concave or convex, is investigated. Diaphragms laminated with copper and thermosetting plastics showed much improvement. A new circuit was devised which uses the connecting cable as a low impedance coupling between a resonant circuit at the guage and a resonant circuit at the receiver. Phase changes in the receiver are measured with 6 B N-6 tubes. The system operates well in gas turbines but additional cooling is desirable in rockets. Project Squid. Contract N6 ori-11, T.O. 2, NR 220-040. NYU TM 11.

Performance of finned-circular-tube heat exchanger surfaces, by D.W. Johnson. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Jan 1951. 38p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133433

This report contains the results of basic heat transfer and flow friction tests of three finned-circular tube heat exchanger surfaces in which the only geometrical variable is the fin spacing. The discrepancy with respect to heat transfer behavior between the results reported here and data reported previously raises serious questions as to the validity of the older data. However, as extrapolation of heat transfer characteristics to other geometries without preservation of strict geometrical similarity is quite speculative, these questions can only be resolved completely by obtaining additional accurate test results for a variety of finned-circular-tube bank geometries. ATI 134049. Contract N6 onr-251, T.O. 6, NR 035-104. SU ME TR 12.

Polarization elements for various photometric polarimetric applications. Final report for the period 15 Oct 1951-15 Apr 1955, under Contract Nonr-618(00), by Lincoln Baxter, II. Polaroid Corporation. Research Division, Cambridge, Mass. May 1955. 37p tables. Order from LC. Mi $3.00, ph $6.30. PB 127021

Project RC-35. 1. Polarization, Electrolytic - Theory 2. Spectropolarimeters - Operation 3. Polarimetry

Portable adiabatic calorimeter, by B.L. Hansen and H.H.G. Jellinek. U.S. Army Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Jul 1957. 8p photo, diagr, graph. Order from OTS. 50 cents. PB 131636

An adiabatic calorimeter was constructed and tested on glacier ice. The heat of fusion thus determined was found to be within a small fraction of a percent of published values for ice. The calorimeter is considered suitable for determination of water in snow. SIPRE project 22.1-18. DA project 8-66-02-004. Contract DA 21-018-Eng-500. SIPRE TR 49.

Pressure drop and heat transfer for coolers and heat exchangers, by A. Burgdorfer. Escher Wyss Engineering Works, Ltd., Zurich, Switzerland. Jul 1956. 22p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127101

AD 97090. EW report no. Sp-AK-56-030. Issued as vol. IV of complete report on this contract. Contents: Technical note no. 2: Pressure loss coefficients of different arrangements of tube rows. Technical note no. 3: General relation for pressure-drop and heat transfer for coolers and heat exchangers. 1. Heat exchangers - Cooling systems - Switzerland 2. Heat - Transference - Theory - Switzerland 3. Heat exchangers - Theory - Switzerland 4. Contract AF 61(514)-854 4. AF OSR TR 56-48

Relative rates of some very rapid gaseous bimolecular reactions, by Jerome Daen and R.A. Marcus. Polytechnic Institute of Brooklyn. Dept. of Chemistry, Brooklyn, N.Y. Apr 1956. 25p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 126940

This paper describes a steady state flow apparatus which permits the measurement of relative rates of rapid gas phase bimolecular association reactions at very low pressures. Abstract of a thesis by Jerome Daen, Polytechnic Institute of Brooklyn, Jun 1955. Contract Nonr 839(09), NR 051-339, Technical report no. 3.

Report on the application of cine theodolite calibration procedures on cine theodolite #53-630, by D.J. Leffler. Pan American World Airways. Guided Missiles Range Division and Radio Corporation of America. R.C.A. Missile Test Project, Patrick Air Force Base, Fla. Apr 1957. 24p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 133022

AD 116726. Unclassified 24 Jan 1958. 1. Theodolites - Tests 2. AF MTC TN 57-16

Sinden aerosol sampler, a proposed particle sampling device, by Frank W. Sinden. U.S. Dugway Proving Ground, Utah. Jul 1957. 47p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134633

The objective of this study was to design, on the basis of theoretical considerations, an aerosol sampling device capable of assessing BW aerosols as a function of their particulate nature. AD 137968. Project no. 4-98-05-026. DPG TR 192.

"Standard" sample holder for X-ray diffraction exposure and its absorption corrections, by Howard L. Ritter. Miami University, Oxford, O. Sep 1955. 12p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 126934

This report describes the choice of a "standard" sample-holder for liquids for x-ray diffraction exposures, a procedure for the computation of absorption corrections for encased diffracters, and the computed numerical values of these corrections for the standard holder. AF OSR Chem 30-12. Contract AF 18(600)-485, Report no. 1. AF OSR TN 55-297.

Studies relating to the development of an isoelastic interferometer suitable for large field dynamic stress studies, by D. Post, D. Dommasch, and A. Schuman. Polarizing Instrument Co., Inc., Irvington-on-Hudson, N.Y. Jun 1956. 41p photos, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 134378

Experimental techniques suitable for complete experimental stress analysis in the static and dynamic realm have been developed. The method of absolute retardation measurements is employed in conjunction with an optical interferometer of the series design. Interference fringe density in the no-load pattern is controlled by application of special model material which is cast between glass surfaces of high optical flatness. Techniques for separating superimposed fringe patterns of the absolute retardation method are simplified to a nearly mechanical procedure. A detailed demonstration of the development is provided by analysis of individual principal stresses in a complete member subjected to dynamic loading conditions. AD 110631. Project 1363, Task 70824. Contract AF 33(616)-3124. AF WADC TR 56-438.

Study of Air Force Missile Employment Facility instrumentation requirements. Final report under Contract AF 08(603)-3189. Electronic Engineering Co. of California, Santa Ana, Calif. May 1957. 382p photo, fold maps, fold drawings, diagrs (par fold), tables. Order from LC. Mi $11.10, ph $59.10. PB 134303

An engineering study was conducted to determine the technical design of a range instrumentation system for drone control and missile surveillance along the Florida coast. The study includes an outline specification for the complete system and its components, which is in sufficient detail to be used as the basis for procurement and installation of the system. AD 136292.

Synthetic mica high temperature strain gage research, by Given A. Brewer. Brewer Engineering Laboratories, Marion, Mass. Dec 1957. 245p photos, diagrs, graphs, tables. Order from OTS. $3.50. PB 151045

A successful procedure has been developed for sintering synthetic mica strain gages utilizing a sectioned graphic die and a 15 KW, 10 KC, induction generator. The gages were sintered at 2050°F under 1000 psi pressure. The gages fabricated under the techniques described are capable of being produced successfully with few losses suffered during fabrication. Extensive investigations of low temperature setting cements were undertaken. AD 155560. Project 1347, Task 13700. Research started 3 Nov 1955. Contract AF 33(616)-3302. AF WADC TR 57-306.

Theory of oscillation type viscometer. IV: Thick disk, by A.G. Azpeitia and G.F. Newell. Brown University. Division of Engineering, Providence, R.I. Sep 1957. 34p graphs. Order from LC. Mi $3.00, ph $6.30. PB 132134

The viscous drag exerted by a fluid on an oscillating disk is determined by methods similar to those used in part III. The present paper differs from part III in that the boundary layer thickness is assumed here to be small compared with both the thickness and the radius of the disk. An extrapolation of the formulae

derived here agree sufficiently well, however, with those derived for the thin disk (boundary layer thickness large compared with the thickness but small compared with the radius) that it is possible to make an interpolation between the present formulae and those of part III that will permit the evaluation of the drag for arbitrary shape disks provided the boundary layer thickness is small compared with the radius. AD 136580. Contract AF 18(600)-1548, Technical report 9. AF OSR TN 57-594.

Theory of response and phase shift in a spectrophone, by W.D. Jones and J.C. Decius. Oregon State College. Dept. of Chemistry, Corvallis, Ore. Jul 1957. 18p. Order from LC. Mi $2.40, ph $3.30. PB 134704

A spectrophone cell is an enclosed container for a gas which absorbs electromagnetic radiation. When the radiation is modulated at an audio frequency, the periodic fluctuations in the gas temperature give rise to pressure fluctuations of the same frequency which are detected with a microphone mounted on the cell wall. A preliminary object of this research is to make use of the phase shift in such a periodic pressure signal to yield information on the relaxation time for vibrationally excited molecules, i.e., the average time required for the conversion of internal molecular energy, in this case vibrational, into translational energy, by the mechanism of inelastic collisions. Contract Nonr 974(00), NR 015-405, Technical report 2.

Transistorized capacitor-diode memory system, by H.R. Irons. U.S. Naval Ordnance Laboratory, White Oak, Md. May 1957. 31p photo, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 133950

A capacitor-diode random access memory system having a capacity of 64 words of 20 bits each is described. The access time is 1μs and the time required for a complete memory cycle is 7μs (12μs when successive memory accesses are to the same work position). The physical size of the unit is comparable to a ferrite core-transistor memory and the power consumption is much less than the latter unit. NAVORD 4456.

Vibration tests of thermocouples, by Clarence M. Bailey, Jr. and Andrew I. Dahl. U.S. National Bureau of Standards. Jun 1953. 19p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134797

This report presents the description of a vibration test facility developed for use in comparing mechanical stability of thermoelements under vibrational stresses as great as 430 g. AD 24744. Contract AF 33(616)-53-1. AF WADC TR 53-340.

Wedge thermocouples, by John H. Hett. New York University, New York, N.Y. Aug 1948. 9p photo, diagrs. Order from OTS. 50 cents. PB 131862

This paper describes the actual construction of a quartz wedge thermocouple. Pure platinum and platinum-rhodium with thirteen percent rhodium, were chosen as the metals. Technical memorandum 3. Contract N6 ori-11, T.O. 2. NYU TM 3.

Wind tunnel calibrations of three instruments designed for measurement of the liquid-water content of clouds, by George V. Owens. Chicago. University. Dept. of Meteorology, Chicago, Ill. Dec 1957. 27p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134558

The report describes the calibration of three liquid-water sensing devices -- a paper-tape conductometric instrument, a hot-wire instrument and a chemical reagent conductometric instrument. A method for the determination of actual liquid-water content in the tunnel, using one of the instruments being tested, is demonstrated. Technical note 10.

MACHINERY

Carbide wafer reamer insert, by M. Douglas. U.S. Arsenal, Watervliet, N.Y. Operations Engineering Branch. Mar 1958. 12p photos, diagr. Order from LC. Mi $2.40, ph $3.30. PB 133982

1. Reamers - Maintenance and repair.

High temperature furnace for use in neutron reactors, by W.E. Browning, L. Martel Bratcher, and H.T. King. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Mar 1951. 9p photo. Order from LC. Mi $1.80, ph $1.80. PB 133499

A furnace suitable for application at temperatures up to 1600°C, was constructed for use in a nuclear reactor. Special characteristics such as compactness, long life, ease of changing specimens, low neutron poisoning effect and relatively low induced radioactivity were incorporated in its design, Design, construction, and performance details are given. ATI 173412. Copy will not reproduce well. NEPA 1864.

Investigation of the performance of automatic storage-type gas and electric domestic water heaters, by Eugene F. Hebrank. Illinois. Engineering Experiment Station, Urbana, Ill. Oct 1956. 40p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. Limited supply available from University of Illinois. 60 cents. PB 127270

University of Illinois bulletin, vol. 54, no. 15.

1. Water heaters, Gas - Performance 2. Water heaters, Gas - Design 3. Water heaters, Electric - Performance 4. Water heaters, Electric - Design 5. ILU EES B 436

6-inch and 8-inch steel flood pump stations, by W. L. Nelson. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Jun 1957. 21p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 133945

This report summarizes the investigation, development, and testing of both 6-inch and 8-inch, steel, flood pump stations for use as standard sets of equipment in coupled-type military petroleum pipeline systems. The flood pump stations consist essentially of check and gate valve sections, elbows, straight and reducting tees, pipe nipples, pipe couplings, pumps, and fire extinguishers. The two stations are identical except for the header, which is 8-inch for the 8-inch station and 6-inch for the 6-inch station. Project: 8-53-03-101. Period covered 5 Sep 1952-1 May 1957. ERDL R 1482-TR.

Wear studies on nonmetallic bearing materials, by R.O. Bolt and J.G. Carroll. California Research Corporation, Richmond, Calif. Jan 1951. 22p photo, fold graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133498

The test work described herein was conducted to determine the suitability of various combinations of nonmetallic bearing materials and metallic shafts for use under water at temperatures ultimately of the order of 500°F. With these conditions conventional bearings and lubrication methods are not usable and new bearing materials must therefore be investigated. ATI 202481. Topical technical report no. 4. Copy will not reproduce well.

MATHEMATICS AND STATISTICAL ANALYSIS

Absolute low speed anemometer, by R.E. Walker and A.A. Westenberg. Johns Hopkins University. Applied Physics Laboratory, Silver Spring, Md. Jun 1956. 25p photos, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 133983

An absolute anemometer has been developed that is suitable for measurements of very low gas velocities under a wide variety of conditions. The instrument, based on an idea first used by Kovasznay, utilizes the temperature fluctuations in the wake of a sinusoidally heated fine wire as tracer. A second hot-wire detects the fluctuations, and the phase change between two successive positions of this wire can be used to determine the free stream velocity. Contract NOrd 7386. JHU APL CM 874.

Analysis for diffusion during plastic deformation, by J. Simmons and J.E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Jan 1958. 22p. Order from LC. Mi $2.70, ph $4.80. PB 133967

This paper presents the general equation for self-diffusion in deforming media. Methods of analysis for determining the self-diffusivity as a function or time for prescribed strain histories are given for special cases ot linear diffusion. AD 154187. Contract AF 49(638)-58. UC IER Series 114, Issue no. 1. AF OSR TN 58-283.

Analysis of carry transmission in computer addition, by Sullivan G. Campbell and Gordon H. Rosser, Jr. Duke University, Durham, N.C. Sep 1957. 26p diagrs (part fold), tables. Order from LC. Mi $2.70, ph $4.80. PB 132604

Such results as are developed in this paper make it possible to transform immediately any information about ordinary binary carry into equivalent information about any transformed circuit. For this reason, the analysis of carry transformations is quite valuable in approaching the general problem of carry transmission in computer addition. Some characteristics of some of the carry transforming circuits which are mentioned in this paper are tabulated. AD 136701. Contract AF 18(600)-1539. AF OSR TN 57-707.

Analysis of dynamic tests of visco-elastic materials, by E.H. Lee and D.R. Bland. Brown University. Division of Applied Mathematics, Providence, R.I. Jun 1954. 21p diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 133416

In this report methods of analysis of dynamic tests of visco-electric materials are examined. It is shown that it is important to develop the analysis on the basis of a general stress-strain relation, since the particular form of the relation for the material under test is not known in advance, and any arbitrary assumption about it may lead to contradictions. Such a general method of analysis is discussed for a simple longitudinal stress test, and for the vibrating reed test. Contract Nord-11496, Technical report no. 7.

Analysis of linear sampled-data systems with finite pulse width (open-loop), by G. Farmanfarma. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Sampled Data Control Systems Group, Berkeley, Calif. Apr 1956. 59p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 127136

An exact method for analysis of sampled-data systems with finite pulse width is presented. The results make it possible to obtain the output of such systems in a closed form, as a continuous function

of time, and without recourse to any approximations. AD 87058, Contract AF 18(600)-1521. UC IER Ser. 60, Issue 157. AF OSR TN 56-186.

Analysis of 2^n factorial experiments, by Allan Birnabaum. Columbia University. Dept. of Mathematical Statistics, New York, N.Y. Jan 1956. 18p table. Order from LC. Mi $2.40, ph $3.30. PB 125172

The standard methods of analysis of factorial experiments, especially 2^n experiments without replication, based on t and F statistics, are reviewed. Three categories of factorial experiments are distinguished "measurement experiments," "weighing experiments," and "exploratory multifactor experiments." The usefulness and limitations of the standard methods are discussed for each category of experiment. An alternative method of analysis related to a special assumption of "hidden replication" is described. An approximate graphical form of this method is described. Draft of talk to be given 28 Dec 1955 at the Annual Meeting of the American Statistical Association, Section on Physical and Engineering Sciences. Contract Nonr 266 (33), NR 042-034.

Application of Fourier analysis methods to Eddy current impedance techniques for nondestructive testing, by Thomas A. Moore. U.S. Arsenal, Watertown, Mass. Apr 1957. 14p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132816

A correlation of Fourier coefficients with eddy current impedance components is noted and analyzed Three electronic methods for measuring the Fourier coefficients are derived and applied to eddy current impedance techniques. It is believed that the Fourier analysis of eddy current impedance signals will further the art of nondestructive testing. Dept. of the Army project no. 5B93-08-022. OO project no. TB 4-21. WAL R 140/21.

Application of matrix methods to coordinate transformations occurring in systems studies involving large motions of aircraft, by Brian F. Doolin. U.S. National Advisory Committee for Aeronautics. May 1957. 36p diagrs. Order as TN 3968 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 127219

The paper shows the method and advantages of matrix algebra in setting up geometric aspects of problems of airplane motion. Such aspects arise particularly in studies of systems which include aircraft. The paper first discusses the matrix properties needed. Then it applies them in several examples. NACA TN 3968.

Application of the variational method, and Galerkin technique, and normal coordinates in a transient temperature distribution problem, by L.A. Schmit. Massachusetts Institute of Technology. Aeroeleastic and Structures Research Laboratory, Cambridge, Mass. Aug 1956. 44p diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134417

The purpose of this paper is to illustrate the usefulness of the variational method and Galerkin's techniques in formulating a linear transient temperature distribution problem as a characteristics value problem. Normal coordinates are introduced to facilitate the solution. The method is applied to a linear one-dimensional heat conduction problem with time varying boundary conditions. Two numerical examples are given and the results obtained compare satisfactorily with independent calculations by other methods. AD 97326. Project 1350. Contract AF 33(616)-3259. AF WADC TR 56-287.

Augmenting a differential prediction battery: Arbitrary pre-selection procedure versus arbitrary post-selection procedure, by Charlotte MacEwan. Washington. University, Seattle, Wash. May 1956. 23p tables. Order from LC. Mi $2.70, ph $4.80. PB 127001

A technique was developed for selecting from a large battery of potential predictors that subset of specified size which yields the highest index of differential prediction efficiency, $\emptyset$, for a given set of criterion variables. In this technique, the first predictor selected is that for which the value $\emptyset$ is the highest. An iterative procedure is employed to select in each cycle that predictor which contributes the greatest increment to the $\emptyset$ value obtained for the subset of predictors already selected. Contract Nonr-477(08).

Class of inequalities, by H.D. Block. Cornell University. Dept. of Mathematics, Ithaca, N.Y. n.d. 12p. Order from LC. Mi $2.40, ph $3.30. PB 134266

Under contract with the Office of Naval Research. 1. Mathematical equations and solutions.

Convergence of certain functions of sample spacings, by Lionel Weiss. Cornell University. Dept. of Mathematics, Ithaca, N.Y. n.d. 11p. Order from LC. Mi $2.40, ph $3.30. PB 134269

Date is 1955 or later. Under contract with the Office of Naval Research. 1. Stochastic methods 2. Mathematical equations and solutions.

Classification problem, by Herman Chernoff. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jan 1956. 20p. Order from LC. Mi $2.40, ph $3.30. PB 126990

A classification problem wherein use is made of

Kulback-Leibler information numbers. Contract N6 onr-251-(40), NR 342-022. SU AMSL TR 33.

Confidence region for the solution of a set of simultaneous equations with an application to experimental design, by G.E.P. Box and J.S. Hunter. North Carolina State College. Institute of Statistics, Raleigh, N.C. n.d. 21p graphs. Order from LC. Mi $2.70, ph $4.80. PB 133408

This problem is discussed and a method is described which yields the exact confidence region about the solution. In addition, the manner in which both the conditioning of the equations and the errors in the coefficients affect the shape, orientation and size of the confidence region is discussed. Date is 1952 or later. Technical report 3. Contract DA 36-034-ORD-1177 (RD).

Convergence of series of characteristic functions. I: Airy and Laguerre series, by W.J. Klimczak. Trinity College. Hartford, Conn. Oct 1956. 5p. Order from LC. Mi $1.80, ph $1.80. PB 125611

AD 110350. 1. Mathematical functions 2. Contract AF 18(600)-1397 3. AF OSR TN 56-531.

Crystal structure refinement by least squares with the IBM 650, by L.R. Lavine and J.R. Steinberg. Massachusetts Institute of Technology. Laboratory for Insulation Research and Office of Statistical Services, Cambridge, Mass. Feb 1957. 16p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 132531

A description of a program for performing least-squares refinements of crystal structures is given. Details of subroutines of possible interest to others are included. Contract Nonr-1841(10), NR 017-421. MIT LIR TR 117.

Cyclic error-correcting codes in two symbols, by E. Prange. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Communications Laboratory, Bedford, Mass. Sep 1957. 28p tables. Order from LC. Mi $2.70, ph $4.80. PB 132930

A code set containing elements of length n in two symbols is called cylcic if it contains the elements $(x_n, x_1, \ldots x_{n-1})$ whenever it contains $(x_1, x_2, \ldots, x_n)$. Optimal error-correcting group codes for several n have been found that are cyclic. Methods of constructing cyclic subspaces of the n-dimensional vector space over the field of two elements are given. The case n = 23 is taken as an example, and here relevant combinational problems are worked through. The final section is a study of the problem of finding code sets such that no value of the correlation function for any two members x and y of the set has a large positive value unless x = y. AD133740. AF CRC TN 57-103.

Discrete analogues of certain integral inequalities, by H.D. Block. Cornell University. Dept. of Mathematics, Ithaca, N.Y. n.d. 13p. Order from LC. Mi $2.40, ph $3.30. PB 134268

Date is 1955 or later. 1. Analogies, Mathematical solutions 2. Mathematical equations and solutions.

Discrete isoperimentric-type inequalities, by H.D. Block. Cornell University. Dept. of Mathematics, Ithaca, N.Y. n.d. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134314

Contract number not given. 1. Mathematical research.

Discontinuous Markoff processes, by J.E. Moyal. Columbia University, New York, N.Y. Apr 1957. 57p. Order from LC. Mi $3.60, ph $9.30. PB 133271

This paper is devoted to the theory of discontinuous Markoff processes, that is , processes where the transitions between states take place either by "jumps" of some specified kind, or by other means. AD 136521. Contract AF 18(600)-442. AF OSR TN 57-535.

Dual Markoff processes, by G.A. Hunt, Jr. Princeton University, Princeton, N.J. n.d. 25p. Order from LC. Mi $2.70, ph $4.80. PB 134300

Date is 1957 or later. AD 129939. 1. Markoff process 2. Contract DA 034-ord-2001.

Dynamic equations of Donnell's type for cylindrical shells with application to vibration problems, by Yi-Yuan Yu. Syracuse University Research Institute. Mechanical Engineering Dept., Syracuse, N.Y. Oct 1956. 27p diagr. Order from LC. Mi $2.70, ph $4.80. PB 132967

In a previous paper by the author a set of dynamic equations was derived which corresponds to the original Donnell static equations used in bending and buckling problems of cylindrical shells. In this note two more sets of Donnell-type dynamic equations for cylindrical shells are presented. The first of these two sets is derived from the well-known Flügge equations, which, like the previous set, do not include transverse shear and rotational inertia effects. The second set, on the other hand, is derived from equations which do include these effects. AD 110345. Report ME 390-5610 TN 1. Contract AF 18(603)-5. AF OSR TN 56-526.

Estimates of error for two modifications of the Robbins-Monro stochastic approximation process, by H. D. Block. Cornell University. Dept. of Mathematics, Ithaca, N.Y. n.d. 14p. Order from LC. Mi $2.40, ph $3.30. PB 134313

Date is 1956 or later. Contract number not given. 1. Approximate computations 2. Stochastic methods 3. Errors - Theory.

Estimating a linear functional relation, by H. F. Smith. North Carolina State College. Institute of Statistics, Raleigh, N.C. Jan 1956. 21p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 133412

The purpose of this paper is to show why Kummell's solution is unique; thence to prove that it is efficient and unbiased, with respect to the angle of the line with either coordinate axis; and to obtain its sampling distribution. Dept. of the Army project no. 5B 99-01-004. ORD project no. T B2-0001. OOR project no. 832. Contract DA 36-034-ord-1517(RD), Technical report no. 10.

Evaluation of two-center exchange integrals, by G.E. Tauber. Western Reserve University. Dept. of Physics, Cleveland, O. Dec 1957. 34p tables. Order from LC. Mi $3.00. ph $6.30. PB 133491

The evaluation of two-center exchange integrals for any homo-nuclear molecules using Slater type wave functions is reduced to the solution of Poisson's equation. An expression is obtained for the exchange integrals in terms of integrals which can be evaluated analytically. In particular, all cases which arise from 2s and 2p wave functions are discussed in detail and the auxiliary integrals evaluated. The pertinent results are collected in tables, and the final result for a particular exchange integral is given explicitly. AD 148031. Contract AF 18(603)-61. AF OSR TN 57-799.

Experimental designs for multi-factor experiments by G.E.P. Box, R.J. Hader, and J.S. Hunter, North Carolina State College. Institute of Statistics, Raleigh, N.C. n.d. 42p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 133414

This report contains preliminary results of research on experimental design and statistical analysis of experiments whose purpose is to investigate functional relationships between a dependent and several independent variables. Background, largely contained in a paper by Box and Wilson (Journal of Royal Statistical Society Series B, 1951), is reviewed. An application in the field of chemistry is presented. Some useful matrix identities are developed and the solution of the design problem for first order surfaces is presented. Contract DA 34-ord-1177, (RD), Technical report no. 1.

Foundations of fiber bundles, Lectures, by Samuel Eilenberg. Chicago. University. Dept. of Mathematics, Chicago, Ill. 1957. 71p. Order from LC. Mi $4.50, ph $12.30. PB 133350

The material presented in these lectures was obtained jointly by H. Cartan and S. Eilenberg. It is hitherto unpublished except for a brief summary that appeared in the proceedings of the Colloquium in Algebraic Topology held in Mexico City in August 1956. AD 136720. Contract AF 18(603)-67. Contract AF 18(600)-1383. AF OSR TN 57-733.

Gaussian integration for the digital computer, by Sullivan G. Campbell. Duke University, Durham, N.C. Sep 1957. 33p. Order from LC. Mi $3.00, ph $6.30. PB 132606

AD 136702. 1. Gaussian law (Mathematics) 2. Mathematical functions - Symmetrization - Theory 3. Contract AF 18(600)-1539 4. AF OSR TN 57-708.

Integral operators and Markov processes, by Shu-Teh Chen Moy. Syracuse. University, Syracuse, N.Y. Aug 1956. 13p. Order from LC. Mi $2.40, ph $3.30. PB 132916

Any integral K(x, X) can define an operator on M' to M' and an operator on M to M. The mystery tie between spaces M and M' by an integral operator is solved in II. If we enlarge the domain of integral operator to the space M* of bounded additive set functions, an integral operator on M* is simply the adjoint of any linear operator on M. AD 110338. Parts of this report will not reproduce well. Contract AF 18(600)-760. AF OSR TN 56-520.

Intervals for the characteristic roots of an Hermitian matrix, by Alfred Brauer and A.C. Mewborn. North Carolina. University, Chapel Hill, N.C. Oct 1957. 14p. Order from LC. Mi $2.40, ph $3.30. PB 133274

AD 132416. Project no. 47500. UNC Technical report no. 5. 1. Matrix theory 2. Mathematical research 3. Contract AF 18(600)-38 4. AF OSR TN 57-343.

Least squares filtering and prediction of nonstationary sampled data, by Bernard Friedland. Columbia University. Dept. of Electrical Engineering, New York, N.Y. Dec 1957. 27p diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 133487

The design of a linear, least squares filter or predictor H for nonstatinnary sampled-data is shown to entail inversion of an n x n matrix for the n^{th} row of the "transmission matrix, " $\underline{H}$ which characterizes the device. By the use of an "ensemble-shaping" technique the computation required is reduced to tractable proportions. AD 148063. Project 47501. CU 39-57-AF-677-EE. Contract AF 18(600)-677. CUN ERL TR T 25/B. AF OSR TN 58-24.

Localization of spheres, by Victor L. Shapiro. Rutgers University, New Brunswick, N.J. Jul

1956. 16p. Order from LC. Mi $2.40, ph $3.30. PB 126929

AD 94846. 1. Mathematical equations and solutions 2. Riemann surfaces - Theory 3. Zygmund surfaces - Theory 4. Harmonic functions 4. Contract AF 18(600)-1595 5. AF OSR TN 56-311.

Logical characterization of automata, by Sullivan G. Campbell and Gordon H. Rosser, Jr. Duke University, Durham, N.C. Sep 1957. 9p diagr, table. Order from LC. Mi $1.80, ph $1.80. PB 132605

This article offers brief illustration of some of the theories developed by A.W. Burks and H. Wang in The Logic of Automata, with respect to analysis of fixed, deterministic automata by state tables. It will depend largely on the logical algebra of the so-called propositional calculus, the classical two-valued logic. AD 136700. Contract AF 18(600)-1539. AF OSR TN 57-706.

Matrix solutions to steady state distributions of particles in bulk matter, by Wendell C. DeMarcus. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Jun 1950. 18p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 133497

ATI 200948. 1. Particles - Distribution - Mathematical analysis 2. Probability - Theory 3. Matrix theory 4. NEPA 1448.

Maximum likelihood estimates in a simple queue, by A. Bruce Clarke. Cornell University. Dept. of Mathematics, Ithaca, N.Y. n.d. 8p. Order from LC. Mi $1.80, ph $1.80. PB 134312

The problem of obtaining maximum likelihood estimates for the parameters involved in a stationary single-channel, Markovian queuing process is considered. Date is 1953 or later.

Mean value theorems in the theory of elasticity, by J.B. Diaz and L.E. Payne. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Jan 1958. 32p. Order from LC. Mi $3.00, ph $6.30. PB 133962

Gauss' mean value theorem of potential theory states that the value of a harmonic function (harmonic on a sphere plus its interior) at the center of a sphere equals the arithmetic mean of the values of the function on the surface of the sphere. In this paper several of the possible mean value theorems of the theory of elasticity are obtained. AD154165. To appear in the Proceedings of the Third U.S. National Congress of Applied Mechanics, held at Brown University, Providence, R.I. Jun 11-14, 1958. Contract AF 18(600)-573. UM BN 117. AF OSR TN 58-261.

Method for finding the general solution to an arbitrary non-singular system of linear equations involving $n^3/2$ multiplications, by J. Paul Roth. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N.J. Jan 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 127053

In numerical analysis it is clear that the order in which algebraic operations are performed affects the number of arithmetic operations that have to be made: for example, if in the expression $a(b_1 + \ldots + b)$ addition is performed inside the brackets before multiplication by a, n additions and 1 multiplications are performed whereas the opposite order requires n multiplications and n additions. This note shows that if the form in which the general solution to a system of non-singular linear equations is suitably modified, the number of arithmetic operations required is cut in half. Project TB 3-0538. Contract Nonr-1358(03). Contract DA 36-034-ord-1646. PU IAS TR 56-01.

Multivariate analysis of convariance, by H.F. Smith North Carolina State College. Institute of Statistics, Raleigh, N.C. Sep 1956. 24p. Order from LC. Mi $2.70, ph $4.80. PB 133413

The objective of the experiment was to determine whether the drugs delay atrophy of denervated muscles. Apparently it had been hoped that drugs would not affect intact muscles, so that they could be used as concomitant control. But inspection of the data revealed that drugs seriously affected both intact muscles (v) and final body weights (y). Dept. of the Army project no. 5B 99-01-044. Ordnance project no. TB 2-0001. OOR project no. 832. Contract DA 36-034-ord-1517(RD), Technical report no. 14.

New method of analyzing stresses and strains in work-hardening plastic solids, by W. Prager. Brown University. Division of Applied Mathematics, Providence, R.I. Jul 1955. 14p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132912

For work-hardening plastic solids, segmentwise linear yield conditions and the associated flow rules constitute a reasonable compromise between the mathematically convenient but physically unsound total stress-strain laws and the physically sound but mathematically inconvenient incremental laws They allow total stress-strain laws to be used in the small, but retain the characteristic features of incremental laws in the large. Contract Nonr 562 (10), NR 064-406. GDAM A11-123. BU AM TR123.

New method of evaluating the zeros of analytic functions, by Stephen Kulik. South Carolina. University, Columbia, S.C. Jul 1956. 20p. Order from LC. Mi $2.40, ph $3.30. PB 126723

Section 1 of the report represents an introduction to

the paper. Section 2 develops the idea of the general method for two particular cases, which, however, are important by themselves. The general method is developed in Section 3. An infinity of algorithms follow from this method. Properties of functions involded in the algorithm are discussed in Section 4. In Section 5 two particular cases of the general method are shown which will be used in further investigation. In Section 6 the rapidity of the convergence of the successive approximations to a zero of a function is considered. Dept. of the Army project no. 5B99-01-004. Ordnance R&D project no. TB 2-001. OOR project no. 1522. Covers period 1 Jan-30 Jun 1956. Contract DA 36-034-ORD-2200, Report no. 1.

Note on the number of lattice points in a region bounded by hyper-planes, by S. Chowla and W.E. Mientka. Colorado. University, Boulder, Colo. Jan 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 129484

AD 100908. Project R 354-10-41. CU report no. C-8. 1. Mathematical equations and solutions 2. Contract AF 18(600)-758 3. AF OSR TN 55-30

On a semi-Markovian process with particular application to reliability theory, by George H. Weiss. U.S. Naval Ordnance Laboratory, White Oak, Md. Oct 1956. 26p graph. Order from LC. Mi $2.70, ph $4.80. PB 132820

This paper deals with a semi-Markovian process which has application in reliability theory. It is shown that the process may be described by a set of integral equations that generalize the integral equation associated with classical renewal theory. Appropriate existence and uniqueness theorems are stated for the set of integral equations, and the asymptotic properties of the process are studied by means of Tauberian theorems. Finally, an application of the theory is made to a situation wherein it is desired to have a fixed number of mechanisms ready for use at all times. The mechanisms may become unavailable due to surveillance, or to random failures and repairs. A method is given for relating the reliability functions of the mechanisms and other given parameters to the number available at a given time. NAVORD 4351.

On certain non-linear elliptic differential equations and univalent mappings, by Erhard Heinz. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. May 1957. 115p. Order from LC. Mi $6.00, ph $18.30. PB 133219

1. Equations, Differential - Non-linear
2. Elliptic functions 3. Mapping (Mathematics)
4. Contract Nonr-225(11), NR 041-086
5. SU AMSL TR 63

On exact solutions of one dimensional flow equations of magneto-gasdynamics, by S.I. Pai. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Sep 1956. 16p graph. Order from LC. Mi $2.40, ph $3.30. PB 132968

The magneto-gasdynamic equations describing the steady one dimensional flow of a viscous beat conducting, electrically conducting and compressible gas under planar magnetic field perpendicular to the velocity vector are treated. It corresponds to the problem of structure of shock wave in magneto-gasdynamics. AD 97370. Presented at the IX International Congress of Applied Mechanics at Brussels, Belgium, 5-13 Sep 1956. Contract AF 18(600)-993. AF OSR TN 56-486. UM BN 82.

On Hart's theory on the role of dislocation in bulk diffusion, by C.T. Tomizuka. Chicago. University. Institute for the Study of Metals, Chicago, Ill. Apr 1958. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 133964

It has been suggested by E.W. Hart that the apparent volume diffusion process can be enhanced by numerous small segments of short-circuiting dislocations without any change in the Gaussian nature of the experimental penetration profile. AD 154173. Contract AF 18(600)-1489. AF OSR TN 58-272.

On statistics independent of sufficient statistics, by A. Bruce Clarke. Cornell University. Dept. of Mathematics, Ithaca, N.Y. Mar 1957. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134311

For a broad class of populations whose distributions depend on a parameter which admits a sufficient statistic, it is shown that a statistic is independent of this sufficient statistic if and only if its distribution is independent of the corresponding parameter.

On the abstract approach to the local theory of continuous infinite pseudo groups, by Masatake Kuranishi. Chicago, University. Dept. of Mathematics, Chicago, Ill. Oct 1957. 96p. Order from LC. Mi $5.40, ph $15.30. PB 133351

The continuous pseudo group of transformations is a collection of local homomorphism of a domain in a euclidean space, which is closed under compositions and inverses, and which forms the general solutions of a system of partial differential equations, as the collection of conformal mappings of a domain in a Euclidean space forms the general solutions of Cauchy-Riemann equations. AD 136712. Covers period 1 Oct 1956-30 Sep 1957. Contract AF 18(600)-1383. AF OSR TN 57-728.

On the construction of a complete set of independent observables in the general theory of relativity, by Arthur Komar. Syracuse University. Dept. of Physics, Syracuse, N.Y. Apr 1958. 23p. Order from LC. Mi $2.70, ph $4.80. PB 133965

The construction of a complete set of quantities in general relativity, whose functional form is invarient under coordinate transformations, is indicated. The set obtained is highly redundant. The Cauchy problem for obtaining an independent complete set of such quantities ("observables") is therefore discussed. It is also pointed out, that the observables obtained may alternatively be viewed as the metric tensor in a special "gauge" (i.e. with a special coordinate condition). This latter viewpoint may readily facilitate the quantization of general relativity. AD 154178. Project no.: 3750-37506. Technical note P-13. Jointly supported by National Science Foundation and the Air Force Office of Scientific Research. Contract AF 18(600)-459. AF OSR TN 58-276.

On the generation and testing of random digits, by Herbert A. Meyer, Landis S. Gephart, and Norman L. Rasmussen. Florida. University. Statistical Laboratory, Gainesville, Fla. Jan 1954. 61p tables. Order from LC. Mi $3.90, ph $10.80. PB 134471

After a brief outline of the historical facts connected with the generation of generally available sets of random digits, the concepts of randomness and local randomness are defined and discussed. The four standard tests for local randomness proposed by Kendall and Smith are described, and a modification of one of these, the gap test, is proposed. A test for the local randomness of sets of random digits to be used in certain Monte Carlo calculations is also described. AD 27683. Contract AF 33(616)-285. AF WADC TR 54-55.

On the statistical theory of many electron systems. II: Discrete bases of representation: Quasi-classical approximation, by Sidney Golden. Brandeis University. Dept. of Chemistry, Waltham, Mass. May 1957. 27p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133591

The density matrix for a many-electron system has been examined. A formalism has been arrived at which facilitates its evaluation in terms of a basis correponding to a discrete spectrum of eigenvalues. This allows a representation to be employed associated with a suitably chosen approximation to the Hamiltonian. Thereby, reasonably accurate estimates of the properties of many-electron systems may be anticipated for low orders of approximation. Contract Nonr-1677(01), NR 051-362.

Optimal estimates of multiple criteria with restrictions on the covariance matrix of estimated criteria, by Paul Horst. Washington. University. Seattle, Wash. Mar 1957. 23p tables. Order from LC. Mi $2.70, ph $4.80. PB 132645

It is the purpose of this paper to consider an approach to the problem which purports to integrate the techniques of differential prediction and differential classification, and which is relatively independent of the number of cases involved. Contract Nonr-477(08).

Optimal test length for multiple prediction: General case, by Paul Horst and Charlotte MacEwan. Washington. University, Seattle, Wash. Mar 1957. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 132646

Techniques previously developed provide methods of solving for optimal test lengths, in terms of time allotments, by series of approximations. Since reciprocals of the altered time allotments are involved the methods do not hold in the event that any altered testing-time becomes zero. In this report a modification of procedure is presented which is applicable also in the case in which the new time allotment for any test approaches zero. Contract Nonr 477(08).

Outline of Lebesgue theory, a heuristic introduction, by Robert E. Wernikoff. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jan 1957. 77p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 133459

The report is an attempt to give a heuristic exposition of measure theory and of the theory of integration that derives from it. Its purpose is to acquaint communication engineers with a language that has been found most useful in probability theory, statistics, ergodic theory, the theory of linear operators in function spaces - in fact, the language in which much of the mathematical foundation of communication theory is most frequently and most naturally expressed. Dept. of the Army task: 3-99-06-108. Dept. of the Army project: 3-99-00-100. Contract DA 36-039-sc-64637. MIT RLE TR 310.

Perturbation theory of periodic surfaces, by Stephen P. Diliberto. California. University. Dept. of Mathematics, Berkeley, Calif. Contract Nonr 222(37), NR 041-157. Order separate parts described below from LC, giving PB number of each part ordered.

Part III. Jul 1957. 36p. Mi $3.00, ph $6.30. PB 134720

This paper contains two theorems relating to the author's notion of periodic surface (1952), The first result concerns Poincaré's Non-Existence Theorem for certain types of integrals in the restricted three body problem. The second result concerns the Kryloff-Bogoliuboff averaging procedure, and establishes a result about the "limit cycle case". Technical report no. 10.

Part IV: Preliminary report on center prob-

lems. Jun 1957. 31p. Mi $3.00, ph $6.30. PB 133958

1. Perturbation - Theory 2. Hamiltonian equations 3. Surfaces (Mathematics) - Theory 6. Technical report no. 12

Power of multiple range tests, by R. Lowell Wine. Virginia. Agricultural Experiment Station. Dept. of Statistics and Statistical Laboratory, Blacksburg, Va. Jun 1956. 61p diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132326

Four aspects of the power of a test might be considered. They are (i) the definition of power, (ii) the mathematical expression of power, (iii) the evaluation of these mathematical expressions, and (iv) the use of power in comparing two tests. This paper is mainly concerned with considerations of the mathematical formulation and evaluation of power for multiple range tests. Dept. of the Army project no. 599-01-004. ORD project no. TB 2-0001(1166). OOR project no. 1166. Contract DA 36-034-ord-1527 RD. Technical report no. 20.

Probability estimation based on two sources of data, by M.L. Eaton. U.S. Naval Air Missile Test Center, Point Mugu, Calif. Sep 1951. 18p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 130957

A method is presented for estimating the probability that an item drawn at random from one population will be larger than an item similarly drawn from another population. For example, the first population may be the maximum accelerations to which the yaw-displacement gyros are subjected during the flights of a given type of missile, and the second the acceleration resistance strength of these gyros. It is possible to prepare tables and/or graphs in sufficient detail to allow research workers to read probability estimates directly therefrom. Samples of such tables and graphs are given. NAMTC TM 53.

Properties and tables of the extended Airy-Hardy integrals, by M.V. Cerrillo and W.H. Kautz. Massachusetts Institute of Technology. Research Laboratory, of Electronics, Cambridge, Mass. Nov 1951. 64p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 133453

Airy-Hardy and other associated functions play an important role in the theory of approximate integration; specifically, in saddlepoint methods. They appear in the pure and mixed transitional cases corresponding to configurations that lead to saddlepoints of third order. Three basic Airy-Hardy functions are denoted by: $Ah_{1,3}$, $Ah_{2,3}$, $Ah_{3,3}$. The first index refers to the particular function; the second index expresses the order of the saddlepoint associated with the function. Definitions, series representations, and properties are given in this report. Signal Corps project: 102B. Dept. of the Army project : 3-99-10-022. Dept. of the Army project: 3-99-10-000. Contract DA 36-039-sc-64637. MIT RLE TR 144.

Quantum mechanical irreversible Gibbsian ensembles, by Charles Willis and Peter G. Bergmann. Syracuse University, Syracuse, N.Y. 38p. Order from LC. Mi $3.00, ph $6.30. PB 132294

A model of irreversible processes of Lebowitz and Bergmann is extended from the classical to the quantum mechanical domain. This model permits the construction of Gibbs-type ensemble for open systems not in equilibrium. The internal dynamics of the system that is engaged in a non-equilibrium process is assumed to be described fully by its Hamiltonian. Its interaction with its surroundings, i.e., the driving reservoirs, is described in terms of the weak, but sustained, interactions of perturbation theory. AD 136611. Project no. R 357-40-10. Technical note P-11. Contract AF 18(600)-459. AF OSR TN 57-623.

Radius effect in boron trifluoride counters, by Raymond M. Chang. New York University. College of Engineering. Dept. of Physics, University Heights, N.Y. Dec 1957. 46p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 133986

The radius effect in boron trifluoride counters is defined as the progressive diminution of the flatness of the plateau as the radius of the counter is increased. This report concerns itself with a set of systematic tests of this effect. AD 152166. Contract AF 18(600)-1466. AF OSR TN 58-139.

Research on the Hilbert transform and related topics. Technical reports no. 1: Note on the interpolation of sublinear operations. 2. Algebras of certain singular operators. 3. On singular integrals, by A.P. Calderon and Antoni Zygmund. Chicago. University. Dept. of Mathematics, Chicago, Ill. Jan 1956. 53p. Order from LC. Mi $3.60, ph $9.30. PB 127245

Project R-354-10-65. 1. Mathematical equations and solutions 2. Equations, Integral 3. Linear systems - Analysis 4. Contract AF 18(600)-1111

Simple proof and some extensions of the sampling theorem, by Emanuel Parzen. Stanford University. Dept. of Statistics, Stanford, Calif. Dec 1956. 13p table. Order from LC. Mi $2.40, p ph $3.30. PB 133359

1. Statistical theory 2. Sampling (Statistics) - Theory 3. Contract Nonr-225(21), NR 042-993 4. SU DS TR 7

Spectral resolution of complex structure. Technical report no. 5, under Contract DA 36-034-ORD-2164, by D.C. Spencer. Princeton, University. Dept. of Mathematics, Princeton, N.J. Oct 1956. 53p. Order from LC. Mi $2.70, ph $4.80. PB 132892

AD 109367. Technical report no. 5. 1. Mathematical equations and solutions 2. Contract AF 18(600)-231

Statistical basis of Onsager's minimum principle, by Armand Siegel. Boston University. Dept. of Physics, Boston, Mass. Aug 1955. 18p. Order from LC. Mi $2.40, ph $3.30. PB 132913

The phenomenological equations of motion of thermodynamic quantities, and Onsager's minimum principle, are correct only to the extent that fluctuations are neglected. This paper presents a statistical analysis of the situation and gives a criterion for the validity of the phenomenological approximation.

Study of the restricted random walk, by R. Sherman Lehman and George H. Weiss. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jul 1957. 37p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133503

This paper treats several aspects of the restricted random walk, both theoretically and numerically. It presents, for the first time, study of the phenomenom of "trapping" in such random walks. A proof is given that such trapping must occur with probability one in most lattices. An ORDVAC study of this phenomenon shows that the number of survivors is very nearly an exponentially decreasing function of the number of steps. A further ORDVAC study of the mean square end-to-end distance of the restricted random walk is made, but sampling difficulties prevent definitive conclusions from being drawn. DA project 5B0306002. ORD project TB 3-0007. APG BRL R 1017.

Theorems of Ledermann and Ostrowski on positive matrices, by Alfred T. Brauer. North Carolina University, Chapel Hill, N.C. Feb 1957. 15p Order from LC. Mi $2.40, ph $3.30. PB 126583

Let A be a positive matrix, R the greatest and r the smallest sum of the elements of a row. It was proven by Frobenius that the greatest positive characteristic root ω of A satisfies the inequalities $r \leq \omega \leq R$. This result was improved by Ledermann and by Ostrowski who obtained bounds for ω as function of R, r, and the smallest element m of A. In this paper the best possible bounds for ω as function of R, r, and m are obtained. These results are further improved by replacing m by the elements of the main diagonal and the minima of the off-diagonal elements of certain columns. AD 95214. Project no. 47500. Contract AF 18 (603)-38, Technical report no. 3. AF OSR TN 56-338.

Theory of square integrable differentials on open Riemann surfaces, by Lars V. Ahlfors. Harvard University, Cambridge, Mass. Jan 1958. 54p. Order from LC. Mi $3.60, ph $9.30. PB 133220

AD 148021. 1. Riemann surfaces - Theory 2. Equations, Differential 3. Contract AF 18 (600)-1461 4. AF OSR TN 57-790

Topological aspects of the theory of functions. Technical note no. 4: On convergence of mappings, by Gordon R. Whyburn. Virginia. University. Dept. of Mathematics, Charlottesville, Va. Oct 1957. 16p. Order from LC. Mi $2.40, ph $3.30. PB 133320

This paper is concerned with sequences of mappings from one locally compact separable metric space to another. Conditions for the almost uniform convergence of such sequences having some applicability in the case of function sequences are studied. The existence of a limit mapping toward which the sequence converges in a certain sense is assumed. Emphasis is centered on the case of mappings with non-compact domain and range spaces. AD136703. Project 47500. Contract AF 49(638)-71. AF OSR TN 57-709.

Use of generalized error criteria in the statistical evaluation of system performance, by William M. Kaufman. Carnegie Institute of Technology. Dept. of Electrical Engineering, Pittsburgh, Pa. n.d. 72p diagrs, graphs, table. Order from LC. Mi $4.50, ph $12.30. PB 130415

This dissertation presents a theory by which systems may be optimized on the basis of the statisti cal properties of the input signal and noise. Optimization is performed according to any predetermined criterion of performance provided that such a criterion can be represented as a power series of the instantaneous system error. A method is also provided by which the statistical data can be represented approximately as explicit integrable functions, thus permitting the evaluation of the integral expressions occurring in the theory. The theory is valid only for stationary inputs and linear systems; however, one type of non-linear system is also considered. AD 74115. Date is 1950 or later. Thesis, Carnegie Institute of Technology. Contract N7 onr-30306.

MEDICAL RESEARCH AND PRACTICE

Antigenic studies on the psittacosis - lymphogranuloma venereum group of viruses. C: Detection of ornithosis hypersensitivity in experimentally infected chickens, by Albert A. Benedict, Clarence McFarland, and Edith O'Brien. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. and Texas. University. Medical Branch, Dept. of Preventive Medicine and Public Health, Galveston, Tex. Jul 1956. 13p photo, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127294

For Section B of this report see PB 124606.
1. Antigens and anti-bodies 2. Psittacosis - Therapy 3. Viruses - Chemotherapy 4. AF SAM R 56-73

Dynamics of bacterial infections in mice under conditions known to alter survival time, by L. Joe Berry, Madeleine K. de Ropp, Marjory H. Fair, and Eva M. Schur. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. and Bryn Mawr College, Dept. of Biology, Bryn Mawr, Pa. Jun 1956. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 127300

The number of viable cells of Salmonella typhimurium in mice infected intraperitoneally at different dosage levels was determined in control animals, in groups previously immunized or exposed to a simulated altitude of 20,000 feet for 3 weeks, and in mice given mucin or large numbers of heat-killed bacteria at time of infection. AF SAM R 56-46.

Effects of motion-sickness preventives on orientation in space, by Richard G. Pearson. U.S. Air Force. Air University. School of Aviation Medicine, Randolph Air Force Base, Tex. Nov 1957. 8p photos, tables. Order from LC. Mi $1.80, ph $1.80. PB 133472

This investigation was designed to evaluate the effect fects of meclizine, cyclizine, and promethazine on a test of spatial orientation. Dextroamphetamine sulfate, a mixture of scopolamine with diphenhydramine hydrochloride, and lactose placebo were also included in the experimental design. AF SAM R 58-7.

Evaluation of the rapid hemoglobin reduction procedure to determine microbal susceptibility to antibiotics, by Nathan J. Schneider, R. Davis, F.L. Young, E.C. Yawn, and Roland B. Mitchell. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. and Florida. State Board of Health. Bureau of Laboratories, Jacksonville, Fla. May 1956. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 127298

A modified diffusion agar disc plate procedure for determining microbial susceptibility ot antibiotics is presented. The rapid test procedure can be used with clinical material as well as with pure bacterial cultures. Comparative studies on 761 gram-negative organisms by the new method and the overnight diffusion agar disc plate technic are reported. Better than 80 percent agreement was obtained with all antibiotics tested except neomycin and polymyxin B. Similar comparative studies on 324 gram-positive organisms are reported also. More than 80 percent agreement was obtained with all antibiotics tested except aureomycin, achromycin, and bacitracin. AF SAM R 56-49.

Factors influencing susceptibility of fibrin and fibrinogen to proteolysis by fibrinolysin, by D.R. Celander and M. Mason Guest. U.S. Air Force. School of Aviation Medicine. Randolph Air Force Base, Tex. and Texas. University Medical Branch. Carter Physiological Laboratory, Galveston, Tex. May 1956. 10p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 127299

Data are presented to substantiate the postulate that the formation of a clot in the presence of fibrinolysin results in the adsorption of all or part of the fibrinolysin and in the protection of it against the action of antifibrinolysin. The adsorbed fibrinolysin brings about the degradation of the clot regardless of the presence of antifibrinolysin. Profibrinolysin is not adsorbed during clot formation. AF SAM R 56-48

Lipide metabolism following thermal trauma. I: Depot for depletion, by Seymour W. Milstein, Robert E. Coalson, and Leonard H. Driscoll. U.S. Army Surgical Research Unit. Brooke Army Medical Center, Fort Sam Houston, Tex. Feb 1958. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133595

Moderate to lethal thermal injuries in the rat result in varying degrees of depot fat depletion in the presence of ad libitum food intake. Pair-fed controls show initially greater fat losses, which are subsequently restored. Project: 6-59-12-028. MEDEW RS-2-58.

METALS AND METAL PRODUCTS

Absolute areas of some metallic surfaces, by Thomas L. O'Connor and Herbert H. Uhlig. Massachusetts Institute of Technology. Dept. of Metallurgy Cambridge, Mass. Jun 1956. 18p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 134612

Knowledge of the absolute surface area is important to the interpretation of many measurements dealing with metal properties. Surface preparation of bulk metals may change the ratio of absolute to apparent

area (roughness factor) by either a small percentage or by several hundred percent. The method use used for presently reported values was the well known BET method of gas absorption which is concerned essentially with the volume of gas v_m necessary to form a monolayer on the surface. AD 108450. Contract N5 ori 78, T.O. 15, NR 036-007.

Activation energies for creep of single aluminum crystals favorably oriented for (111) [101] slip, by J.L. Lytton, L.A. Sheppard and J.E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Apr 1957. 33p photos, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 133534

Single aluminum crystals were subjected to creep in simple shear on the (111) planes in the slip direction. Creep of single aluminum crystals occurs by three unique processes characterized by three distinct and isolatable activation energies; the 35,500 calories per mole activation energy obtained at the highest temperatures was ascribed to a dislocation climb process; the 28,000 calorie per mole activation energy process occurring over the intermediate temperature range is believed to be due to control of the creep rate by a cross-slip mechanism; the 3,400 calorie per mole process was identified with easy glide. Contract Nonr 222(49). UC IER Series 103 Issue 1.

Anelasticity in alloys of Cd and Mg, by J. Enrietto and C. Wert. Illinois. University. Dept. of Mining and Metallurgical Engineering, Urbana, Ill. Aug 1957. 26p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132588

Conclusions are as follows: 1. There is an ordered phase based on the MgCd superlattice extending from above 50% to 39% magnesium. 2. There exists from 39% to 34% magnesium a two phase region composed of the ordered phase mentioned above and another disordered phase. 3. Between 34 and 29% magnesium, it is not clear as to what phases exist. It is assumed here that a second disordered phase exists between these compositions. 4. From 29% to 25% magnesium there exists another two phase region consisting of the ordered compound $MgCd_3$ and the disordered phase mentioned above. AD 136547. Contract AF 18(603)-22. AF OSR TN 57-562.

Annual report. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Contract AF 18(600)-1375. Order separate parts described below from LC, giving PB number of each part ordered.

First, covering period 1 Oct 1954-1 Jan 1956. Apr 1956. 122p graphs, tables. Mi $6.30, ph $19.80. PB 134326

Gives organization, operation and activities of the Laboratory. Appendix A summarizes all reports issued up to Jan 31, 1956, lists tasks in progress on that date, and technical assistance to various firms and to government agencies. BMI TML R 36.

Second, covering period 1 Feb 1956-31 Jan 1957. Jul 1957. 153p graphs (part col.) Mi $7.50, ph $24.30. PB 134327

Four major activities are: (1) Technical-information service on titanium and competitive materials. (2) Technical assistance to defense-related projects on the solution of titanium-fabrication or -application problems. (3) Direct work with the Department of Defense Steering Group on Titanium Research and Development and other Government agencies as requested, especially in studies of future research and development needs. (4) Laboratory investigations and surveys, of limited extent, to provide urgently needed data, or to define problem areas. Color in graphs will not reproduce. BMI TML R 74.

Arc welding titanium, by G.E. Faulkner. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Mar 1957. 34p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.00. PB 135062

The purpose of this report is to summarize information that is useful in setting up arc-welding procedures and selecting alloys. It considers the characteristics of titanium that have the greatest effects on welding operations, and then discusses surface preparation, welding procedures, and the mechanical properties of welded joints in detail. This memorandum presents the test of a paper delivered on March 28, 1957, by G.E. Faulkner, Assistant Chief, Metals Joining Research Division, Battelle Memorial Institute, at the American Society for Metals Titanium Conference, Los Angeles, California, March 25 through March 29, 1957. Paper delivered on Mar 28, 1957 at the American Society for Metals Titanium Conference, Los Angeles, Calif. NP 6259.

Beryllium for structural applications, a review of the the unclassified literature, by Webster Hodge. Battelle Memorial Institute. Defense Metals Information Center, Columbus, O. Aug 1958. 18 p diagrs, graphs, tables. Order from OTS. $3.00. PB 121648

This report is a summary of available information on beryllium and contains recent data which may aid in evaluating the usefulness of beryllium as a structural material in airframe and missile applications. Its literature references include data on sources of ore and the production, fabrication, properties, and applications of the metal. The problems in industrial hygiene encountered in working with beryllium and its compounds are reviewed briefly. AD 201103. Contract AF 18(600)-375. BMI DMIC 106

Bibliography on surface hardening of titanium and titanium alloys. See entry under Bibliography on page 332. PB 134566

Calculation of interdiffusion coefficients when volume changes occur, by Morris Cohen, Carl Wagner, and J. E. Reynolds. Massachusetts Institute of Technology, Dept. of Metallurgy, Cambridge, Mass. May 1954. 14p. Order from LC. Mi $2.40, ph $3.30. PB 134655

If the total volume of a diffusion couple changes during the diffusion, the measurement of distance becomes ambiguous. Use of distance parameters as suggested by Hartley and Crank is discussed. AD 54618. Project 7351, Task 70608. Contract AF 33(038)-23281. AF WADC TR 54-340.

Casting and forging turbine bucket alloys, by R. K. Pitler and W. W. Dyrkacz. Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. Dec 1953. 70p photos, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 134470

Wrought nickel-base alloys and chromium-manganese austenitic steels, as well as cast iron-nickel-cobalt-chromium alloys were investigated with an aim toward lowering the strategic alloy content of materials for gas turbine service at temperatures of 1200° to 1600°F. The best nickel-base alloys contained around 10% cobalt. AD 26352. Contract AF 18(600)-149. AF WADC TR 53-274.

Chemical milling of titanium, by Walter K. Boyd. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Jan 1958. 11p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 134610

The process of chemical milling, which has already been developed for application to magnesium, aluminum, and alloy steels, is of special interest for titanium because complex shapes are sometimes difficult to produce by other means. The process, its applications, and technological advantages are described.

Comparative pressure-loss study of 6-inch, portable military pipelines, by A. Bernard Eyler. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Apr 1957. 46p photos, drawings, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134295

The report presents data to be used in accurately predicting for design purposes pressure losses expected in lightweight, military pipelines under normal operation. Pressure losses vary greatly with the condition of the tubing wall; procedures for using the standard, brush-type pipeline cleaner to reduce pressure losses are suggested. Tables are included to show (1) the relationship of temperature versus viscosity and (2) the relationship of temperature versus gravity for the test fluids normally conveyed through military pipelines. Methods are outlined for calculating the pressure losses of the test fluids at various temperatures. D/A project no. 8-53-03-101. Period covered: Jun 1956-Aug 1956. ERDL R 1479-TR.

Comparison of thermal fatigue with mechanical fatigue cycling. Final report covering period 1 Sep 1954-1 Sep 1957, under Contract nos. DA 01-009-ORD-396 and DA 01-009-ORD-454, by Harry Majors, Jr. Alabama. University. Bureau of Engineering Research, University, Ala. Sep 1957. 85p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 133067

The purpose of the program was to compare load-cycling tests with thermal cycling tests of type "A" nickel and type Ti-75A titanium. It was necessary to design machines as described in chapter II so that the results could be comparable at the same mean temperature, constant amplitude of strain and type of specimen. Also, in order to compare with existing thermal cycling tests, temperatures were chosen in order to avoid any phase changes. Dept. of the Army project no. 599-01-004. ORD project no. TE 2-0001. OOR project no. 1230. WAL R 812/25-2.

Constitution of ordering alloys of the systems Cu-Au and Co-Pt, by F. N. Rhines, W. E. Bond, and R. A. Rummel. Carnegie Institute of Technology. Metals Research Laboratory, Pittsburgh, Pa. Jul 1953. 41p photo, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134525

The copper-gold phase diagram in the composition range 19.5 to 70 atomic percentage gold, has been determined with greater precision than previously. A eutectoid equilibrium, corresponding to the decomposition of the disordered phase simultaneously into the ordered Cu_3Au and CuAu phases, occurs near 36 atomic percentage gold and 284°C. Beneath the eutectoid, and separating the fields of Cu_3Au and CuAu, is a two-phase field of Cu_3Au + CuAu, extending from about 35 to 40 atomic percentage gold. An incomplete study of the ordering alloys of the system Co-Pt indicates the existence of conjugate ordus and disordus boundaries, as in the copper-gold system. AD 29398. Covers period Jul 1951-Jul 1953. Contract AF 33(616)-39. AF WADC TR 54-118.

Contribution of core polarization to the cohesive energies of the alkali metals, by Joseph Callaway. Miami. University. Dept. of Physics, Coral Gables, Fla. Feb 1957. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132488

An approximate potential is constructed to represent the effect of polarization of the atomic core on the energy of the valence electron in an atom with one

valence electron. The potential is treated in first order perturbation theory to determine its contribution to the cohesive energies of the alkali metals. Numerical calculations have been made for lithium, sodium, and potassium. Contract Nonr-840(06), NR 817-616.

Correlated review of information relating to the mechanism of allotropic tranformations in metals, by Joseph W. Spretnak. Ohio State University. Dept. of Metallurgical Engineering, Columbus, O. Mar 1955. 95p photo, diagrs, tables. Order from LC. Mi $5.40, ph $15.30. PB 134642

Two mechanisms of allotropic transformations in metals and alloys predominate: namely, nucleation and growth, and nucleation and shear. Both mechanisms are cited in the ferrous and nonferrous alloys. Suitable generalized criteria for distinguishing between the two mechanisms are discussed. AD84492. Project 7351, Task 70645. Contract AF 18(600)-94. AF WADC TR 55-105.

Corrosion of metals in tropical environments. Part 3: Underwater corrosion of ten structural steels, by B.W. Forgeson, C.R. Southwell and A.L. Alexander. U.S. Naval Research Laboratory. Aug 1958. 27p photos, map, graphs, tables. Order from OTS. 75 cents. PB 131780

Corrosion of ten structural steels exposed to tropical sea and fresh waters has been evaluated following an eight-year exposure period. The severity of corrosion is compared between the natural tropical environments of sea water mean tide, and sea water and fresh water continuous immersion, and correlated with similar corrosion tests that have been made on the east and west coasts of the United States. Corrosion resistance for mild carbon steel is compared when exposed with millscale, pickled, and machined surfaces. Underwater corrosion rates are compared for unalloyed carbon steel, copper-bearing steel, steels containing small percentages of nickel and chromium, and proprietary low-alloy steels. A comprehensive evaluation of the measured and observed effects of corrosion in given for the ten steels following exposure in each of the tropical environments. For Parts 1-2 see PB 121952 and PB 131175. NRL R 5153.

Corrosion resistance of anodized aluminum, by F. Pearlstein. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Oct 1957. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 132525

Panels anodized in sulfuric acid for 15 or 45 minutes and subsequently dichromate-sealed were unattacked after 240 hours' salt spray exposure. Water sealing also considerably increased corrosion resistance over unsealed panels, the latter showing signs of corrosion after 19 hours' salt spray exposure. Chromic acid-anodized panels, sealed, exhibited white corrosion products after 240 hours' salt exposure. Panels anodized five minutes in sulfuric acid followed by chromic acid anodizing for two minutes were unattacked up to 163 hours' exposure to salt spray. Panels anodized 15 minutes in sulfuric acid followed by a two-minute chromic acid anodizing, unsealed, were unattacked until the 240-hour exposure examination. Water and dichromate sealing improved the corrosion resistance. Of the unsealed panels, the sulfuric-chromic acid anodizing process was superior to the sulfuric acid or chromic acid anodizing in corrosion resistance afforded. ORD project no. TB 4-302A. Dept. of the Army project no. 5B93-14-006. FAL MR 660.

Creep behavior of magnesium-cerium alloys. Dow Chemical Company, Midland, Mich. Jun 1954. 41p photos, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134494

Four binary Mg-Ce alloys were creepstested at 300 to 600F. The outstanding creep resistance results primarily from a potent precipitation hardening locally at grain boundaries. Twinning was correlated with the primary stage and nonbasal slip with the tertiary stage of creep. AD 44593. Contract AF 33(038)-16655, Suppl. agreement S2. AF WADC TR 54-294.

Creep, fracture, and bending of lead and lead alloy cable sheathing, by Curtis W. Dollins and Cecil E. Betzer. Illinois. Engineering Experiment Station, Urbana, Ill. Nov 1956. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. Limited supply available from University of Illinois 65 cents. PB 127274

This bulletin is the eighth and last of the reports on the 27-year investigation of the properties of lead and lead-alloy sheathing for power cable. The tests have covered principally long-time creep under steady tensile stresses up to 300 psi at 110 F and 150 F, time to fracture and ductility under steady tensile stresses of 400 to 1800 psi at room temperature and 110 F, and life to fracture in slow bending to strains of 0.3 to 0.5%. University of Illinois bulletin vol. 54, no. 28. ILU EES B 440.

Creep of a dispersion-hardened aluminum alloy, by G.S. Ansell and J. Weertman. U.S. Naval Research Laboratory. Aug 1958. 19p photos, diagrs, graphs, tables. Order from OTS. 50 cents. PB 131887

The creep behavior of an aluminum alloy hardened with a finely dispersed phase of aluminum oxide was investigated. The as-extruded alloy shows an approximate steady-state creep in which the creep rate depends exponentially on the applied stress. The activation energy of creep is approximately 150,000 cal/mole. The recrystallized alloy shows no steady-state creep. NRL R 5176.

Deformation of single crystals of ferrite alloyed with 5% Mo or 18% Cr, by M. L. Wolpert and R. M. Brick. Pennsylvania. University. School of Metallurgical Engineering, Philadelphia, Pa. Jun 1955. 28p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134272

The slip behavior of the chromium ferrite single crystal was much like that of pure ferrite crystals except that perhaps [112] slip was somewhat more frequent. Like other ferrites, a reduction in the temperature of deformation resulted in an increased tendency for [110] slip in the chromium ferrites. AD 85068. Project 7351, Task 70627. Contract AF 33(038)-15889. AF WADC TR 55-260.

Delayed failure and hydrogen embrittlement in titanium, by R. D. Daniels, R. J. Quigg, and A. R. Troiano. Case Institute of Technology, Cleveland, O. Feb 1958. 63p photos, diagrs, graphs, tables. Order from OTS. $1.75. PB 151139

Hydrogen induced delayed failure in an alpha-beta titanium alloy was sensitive to microstructure. A quenched structure was less susceptible to delayed failure than aged or annealed structures. The tendency for delayed failure was magnified in all structures by an increase in hydrogen content or an increase in strength level. Hydrogen induced delayed failure occurred by a process of crack initiation and controlled crack growth. Delayed failures resulting from creep were also encountered. Plastic strain resulting from creep tended to retard crack initiation. Changes occurring in material under static load prior to formation of cracks were reversible, as long as no appreciable plastic strain occurred, indicating stress induced diffusion of hydrogen. Hydrogen induced delayed failure disappeared at both high and low temperatures. The time required for failure as well as the minimum stress at which failure could occur increased at elevated temperatures. AF WADC TR 58-39.

Development of cast iron-base alloys of austenitic type for high heat-resistance and scale-resistance, by F. Eberle, W. E. Leyda and others. Babcock & Wilcox Company. Research Center, Alliance, O. Oct 1955. 73p photos, diagr, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134476

The most-promising composition found was an alloy containing 0.52C, 1.11Mn, 0.7Si, 19.8Cr, 27.8Ni, 2.02Cb, 0.63Ta, 2.2W, 0.05CeLa. Its rupture strength at 1600° and 1800°F was equal to about 80-85% that of H.S.21. AD 90691. Project 7351, Task 73512. Covers period May 1954-May 1955 under Contract AF 33(616)-2413. For Part 2 see PB 121950. AF WADC TN 55-290.

Development of high-purity InSb and investigation of basic electrical transport phenomena, by A. C. Beer, R. T. Bate, and R. K. Willardson. Battelle Memorial Institute, Columbus, O. Dec 1957. 27p diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 133477

A new tool has been discovered which promises to yield interesting information in InSb and other high-mobility semiconductors. This involves analysis of thermomagnetic effects measured under experimental conditions so chosen that the transverse electric and temperature gradients are eliminated. AD 148078. Contract AF 18(600)-1547, Final report. AF OSR TR 58-10.

Development of substitute alloys for high temperature use. Bimonthly progress report under Contract NOa(s)-52-368-c. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Aug 1954. 10p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 130630

In evaluating the high-temperature properties of three selected compositions of titanium-boron bearing stainless steels, creep-rupture properties of three 300-lb. heats were determined. Addition of zirconium to a type 316 stainless steel containing titanium, titanium plus boron, or titanium plus boron plus tungsten, resulted in no consistent benefit to strength properties. Tungsten added to a type 316 stainless steel containing titanium or titanium and boron combined, tended to stabilize the strength properties. For earlier reports see PB 129684, 129685 and 121026. CAL KA 797-M-12.

Effect of boron on the relative interfacial tension of gamma iron, by A. M. Adair, R. Speiser and J. W. Spretnak. Ohio State University. Dept. of Metallurgy, Columbus, O. Apr 1954. 26p photo, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134515

The effect of boron on the relative interfacial tension of gamma iron in two commercial steels is studied by means of thermal etching techniques. Boron effects a measurable reduction in interfacial tension. In the range of 0.20 to 0.40 percent, carbon has essentially no effect on the degree of reduction of the interfacial tension by boron. AD 40743. Contract AF 18(600)-94. AF WADC TR 54-150.

Effect of prior creep on mechanical properties of aircraft structural metals. Part III: C 110M titanium alloy, by Jeremy V. Gluck, Howard R. Voorhees, and James W. Freeman. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. May 1958. 97p photos, diagrs, graphs, tables. Order from OTS. $2.25. PB 151145

A study was carried out of the effect of exposure to elevated temperature creep conditions on the subsequent mechanical properties of C110M, an 8 percent manganese binary titanium alloy. Exposures were conducted for times of 10, 50, and 100 hours either unstressed or at stresses causing up to 3 percent total deformation at temperatures between 650°

and 800°F. Specimens were taken parallel to the sheet rolling direction. Following the exposures, short-time tensile, compression or tension-impact tests were run at either room temperature or the temperature of exposure. AD 155578. Project no. 7360, Task no. 73605. Covers period 10 Jan-31 Dec 1957 under Contract AF 33(616)-3368, Supplement no. 1 (57-850. For Parts I and II see PB 131716 and 131826. AF WADC TR 57-150, Part 3.

Effect of rapid heating on the specific heat curve of low carbon steel at the phase transformation points, by Alan M. Nathan. New York University, New York, N.Y. Mar 1951. 20p photos, diagrs, graphs, table. Order from OTS. 75 cents. PB 131864

A dynamic method of measuring the specific heat curves of metals under conditions of rapidly increasing temperature (100°C per second) is described and some results obtained with it are given. The method is used for a preliminary study of the specific heat curves of low carbon steel at the phase transformation points. Results obtained indicate that the peak of specific heat which normally occurs at the A_1 allotropic phase transformation point under equilibrium conditions is greatly affected by rapid heating, while the specific heat anomaly at the Curie point is not affected by the rate of heating. Project Squid. Contract N6 ori-11, T.O. 2, NR 220-040. NYU TM 6.

Effect of strain rate on the mechanical properties of titanium base materials, by J.P. Catlin and W.W. Wentz. Rem-Cru Titanium, Inc., Midland, Pa. Feb 1955. 131p photos, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 134784

Constant strain rate tensile tests at room temperature in order of increasing rate sensitivity were conducted on: 1. Ti-4%Mn-4%Al (combined alpha-beta). 2. Ti-5%Al-2.5%Sn (alpha). 3. Ti-10%Mn-5%Cr-5%Mo (beta). Tensile results on high purity materials indicate that the C, O, and N additions (0.3, 0.2 and 0.1% respectively) cause an increase in rate sensitivity at room temperature. The hydrogen addition (0.01%) had little effect on rate sensitivity. Some evidence of increased amounts of twinning with decreasing strain rates was also obtained. AD 63458. Project 7360, Task 73605. Covers period Dec 1952-Dec 1954 under Contract AF 33(038)-21912. AF WADC TR 53-71, Part 2.

Electrochemical behavior of polycrystalline cadmium, by Ugo Bertocci and Claudio Tamplenizza. Politecnico di Milano. Laboratorio di Electtrochimica, Chimica Fisica e Metallurgia, Milan, Italy. May 1956. 32p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127070

Anodic and cathodic overvoltage measurements of polycrystalline cadmium have been carried out in perchlorate, sulfate and chlortde solutions, having different free acid contents. The influence of the c.d. and temperature on these overvoltages has been investigated. AD 90017. Technical note no. 5. Contract AF 61(514)-733-C. AF OSR TN 56-303.

Electrochemical behavior of polycrystalline thallium, by Ugo Bertocci and Sergio Ticozzi. Politecnico di Milano. Laboratorio di Electrochimica, Chimica Fisica e Metallurgia, Milan, Italy. Sep 1956. 19p graphs. Order from LC. Mi $2.40, ph $3.30. PB 132919

Anodic and cathodic overvoltages for thallium have been measured in nitrate, perchlorate and hydroxide solutions, at different pH-values. Measurements were carried out at 25°C and 40°C; the corresponding overvoltages are plotted vs. c.d. The results of these experiments confirm the "normal" electrochemical behavior of Tl also in hydroxide solutions, not investigated before. Technical note no. 6. AD 110364. CA TN 9-56. Contract AF 61(514)-733C. AF OSR TN 56-545.

Evaluation of chromium-manganese-nickel stainless steel, by W.F. Emmons. U.S. Naval Air Materials Center. Aeronautical Materials Laboratory, Naval Air Experimental Station, Philadelphia, Pa. Apr 1956. 26p photos, fold graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132817

A 17Cr-8Mn-4Ni-high nitrogen stainless steel was evaluated with respect to tensile, stress-rupture, and impact properties, for use in replacing 18-8 stainless steel, and found to be satisfactory. Tensile and stress-rupture strengths were found to be slightly higher than those published for "strength 18-8" stainless steels. Impact tests at room temperature and -65°F indicate this steel to be tough and notch-insensitive. BUAER project TED NAM AE 4167. NAM AML AE 1001.

Evaluation of current knowledge of the mechanics, of brittle fracture, by D.C. Drucker, including papers and discussions presented at Confreence on Brittle Fracture Mechanics held on Oct 15 and 16, 1953, at Massachusetts Institute of Technology. May 1954. 231p photos, diagrs, graphs, tables. Order from LC. Mi $10.20, ph $36.30. PB 135537

Contents: An evaluation of current knowlegge of the mechanics of brittle fracture, by D.C. Drucker. - Report on brittle fracture studies, by F.J. Feely, Jr., D. Hrtko, S.R. Kleppe, M.S. Northup. - University of California tube and flat plate tests, by E.R. Parker. - Mechanics of brittle fracture in notched plate specimens, by Wendell P. Roop. - Summary of David Taylor Model Basin and ALCOA notch-tensile tests and observations on engineering applications of fracture mechanics, by E.M. MacCutcheon, Jr. - The relation of notched tensile test data to performance in service, by E.M. Lape,

and J.D. Lubahn. - Some remarks on the relation of the geometry of welded details to their susceptibility to brittle fracture, by R.A. Hechtman. - Brittle fracture mechanics, as revealed by tests of large structures, by E. Paul DeGarmo. - Fracture dynamics and fracture strength of large welded structures, by G.R. Irwin. - Review of brittle fracture research at University of Illinois, by N. M. Newmark. - Energy criteria of fracture, by E. Orowan. - The condition of high-velocity ductile fracture, by E. Orowan. - Contribution to the discussion, by G.M. Boyd. SSC-69.

Fundamentals of the transition temperature phenomenon in steel. Quarterly progress report no. 15 for period from 1 Apr to 30 Jun 1955, under Contract Nonr-266(07), by M. Gensamer, F. Deronja, H. Hahn, and R.H. Dudley. Columbia. University, School of Mines, New York, N.Y. Sep 1955. 15p drawing, diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30.
PB 127111

The testing of 1020 commercial steel specimens with a grain size ASTM 6 has been initiated to extend and reproduce some of the previous data. The all-glass vacuum melting unit as well as procedure has been modified to accomodate larger melts. A lowering of the transition temperature of iron by 10 degrees has been accomplished by solid state outgassing. For 8th-14th reports see PB 114670, 116097, 116880, 117792, 119047, 119645, 127030.

Growth bends in iron whiskers, by George S. Baker. Illinois. University. Dept. of Mining and Metallurgical Engineering, Urbana, Ill. Oct 1956. 3p table. Order from LC. Mi $1.80, ph $1.80.
PB 126930

It has been proposed that the bent part of the whisker is the location of a twin boundary, or of some other type of boundary. The purpose of the present communication is to show that the case for iron whiskers grown from the vapor. AD 96222. MEDUI-18-AF. AF OSR TN 56-413.

Heterogeneity of surfaces: Immersional calorimetry and adsorption studies of the heterogeneous nature of the surfaces of metallic solids. Final report for the period 1 Jan 1949-31 Dec 1955, under Contract N8 onr-74300, NR 358-186, by A.C. Zettlemoyer, J.J. Chessick, F.H. Healey, and Y. Yu. Lehigh University. Surface Chemistry Laboratory, Bethlehem, Pa. Jan 1956. 54p graphs, tables. Order from LC. Mi $3.60, ph $9.30.
PB 127269

The rates of oxidation of cobalt and nickel powders were measured in the thin film region at -78°, -22°, 0° and 26°. The theory of Mott and Cabrera for the growth of very thin oxide films did not satisfactorily explain the results. The governing kinetic factor for both nickel and cobalt was found to be the increase in oxide thickness rather than the total oxide film thickness. A mechanism based on the formation of metal lattice vacancies and their elimination by heating is proposed. Nitrogen, ammonia and water vapor adsorption isotherms were measured on a Wyoming bentonite, a montmorillonite. Comparison of the heat immersion curves for samples activated at 25 verus 100°, and with the adsorption isotherms, revealed high energy sites for water adsorption. These are apparently exchange ion sites.

High temperature effects of boron in iron and iron alloys, by R.M. Goldhoff, J.W. Spretnak, and R. Speiser. Ohio State University Research Foundation, Columbus, O. Mar 1956. 62p photos, diagrs (1 fold), graphs, tables. Order from LC. Mi $3.90, ph $10.80.
PB 134641

Experimental technique involved the comparative measurement of properties and characteristics of high-purity iron and iron alloys with and without boron. Studies include austenite grain growth, characteristics, and metallography. AD 90913. Project 7351, Task 70645. Contract AF 18(600)-94. AF WADC TR 55-281.

Improved magnetic materials. Final report covering the period 16 Jul 1955-15 Jul 1956, under Contract DA 36-039-sc-64548, by George P. Conard, II. Lehigh University. Institute of Research, Bethlehem, Pa. Jul 1956. 29p photo, tables. Order from LC. Mi $2.70, ph $4.80.
PB 132167

The objective of this project is to conduct research toward the development of improved soft and permanent magnet materials. For the soft magnet materials, high saturation and residual induction values should be associated with low coercive force. For the permanent magnet materials, a high energy product is required. Preferably, this sould be achieved through high remanence. Dept. of the Army project no. 3-99-15-022. Signal Corps project no. 152B.

Influence of boron on strain aging of iron, by Morris E. Nicholson. Chicago. University. Institute for the Study of Metals, Chicago, Ill. May 1955. 11p graphs. Order from LC. Mi $2.40, ph $3.30.
PB 134652

From these experiments it appears that boron will produce strain aging in iron and occupies an interstitial position in the body-centered cubic lattice of alpha iron. AD 80867. Project 7351, Task 70645. Contract AF 18(600)-12. AF WADC TR 55-43.

Influence of boron on the rate of the A_3 transformation of pure iron, by Morris E. Nicholson. Chicago. University. Institute for the Study of Metals, Chicago, Ill. Feb 1955. 9p graph. Order from LC. Mi $1.80, ph $1.80.
PB 134654

A study was made of the transformation temperature of iron, an iron boron and an iron nickel alloy as a function of temperature. Boron exhibited a about one-half the multiplying factor derived by extrapolating steel hardenability data. AD 67337. Project 7351, Task 70645. Contract AF 18(600)-12. AF WADC TR 55-41.

Influence of certain microstructural configurations on the tensile properties of titanium alloys, by Sheldon A. Spachner, Arthur G. Metcalfe, and Rostoker. Armour Research Foundation, Chicago, Ill. Apr 1957. 68p photos, diagr, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 133999

A study was made of the relationship of tensile mechanical properties to forging practice and microstructure in two commercial titanium alloys. Ti-7Al-3Mo and Ti-3Mn-1Cr-1Fe-1Mo-IV (Ti-3Mn Complex). Forging practice was varied by holding the forging temperature range above or below the beta transus temperature. Material forged below the beta transus was forged to 20%, 50%, and 70% reductions in area at this temperature range. Microstructural variations were effected by varying the coarse alpha size and coarse alpha-to-beta ratios by appropriate heat treatment. Covers period 15 Jan 1955-15 Mar 1957 under Contract Nonr-1846(00). ARF Proj B-097.

Introduction to the silicon and germanium crystal lattice, by A.D. Johnson. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Components and Techniques Laboratory, Bedford, Mass. Apr 1957. 46p diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132337

An introduction to the geometrical relationship between atoms in silicon and in germanium, and to the terminology commonly used for describing these relationships is presented. (Ideal, or perfect crystal structure is assumed, and lattice vibrations are not considered.) Application is made of these relationships to the problem of preparing small-angle grain boundaries. AD 117123. AF CRC TN 57-110.

Investigation of "corrosion inhibitors for magnesium", by S.J. Ketcham. U.S. Naval Air Material Center. Aeronautical Materials Laboratory, Philadelphia, Pa. Mar 1957. 31p photo, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134479

Study of galvanic corrosion between magnesium alloy AZ31B and aluminum alloy 2024-T3 in saline solutions. The object was to determine the mechanism of protection afforded by the inhibitors, $Mg(VO_3)_2$, $BaK_2(CrO_4)_2$, and CaS, singly and in combination. The effect on the polarization characteristics of the metals was determined with the electrodes isolated in separate compartments, bridging being accomplished with agar-salt bridges. Results indicate that the $Mg(VO_3)_2$ and $BaK_2(CrO_4)_2$ polarize the aluminum strongly in the anodic direction, thereby reducing the galvanic current and the weight loss of magnesium. Project TED NAM AE 4161, Part II, Final report. NAM AML AE 1031.

Investigation of fundamental properties of elements and their compounds including the rare earths at very low temperatures with particular emphasis upon superconductivity, by W.T. Ziegler. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Jun 1957. 23p. Order from LC. Mi $2.70, ph $4.80. PB 133985

Project 116-18. 1. Earths, Rare - Superconductivity 2. Rare earth metals 3. Contract N6 ori-192, T.O. 1, NR 016-406, Final report

Investigation of surface properties of silicon and other semiconductors, by H.E. Farnsworth, J.A. Dillon, Jr., and R.E. Schlier. Brown University. Dept. of Physics, Providence, R.I. Sep 1957. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 132581

For the (111) face of a silicon crystal no diffraction beams were observed after heating in high vacuum to 700°C. Evidence was obtained that oxygen diffuses into silicon on heating at 1000°C. This diffused layer was removed only by ion-bombardment cleaning. Oxygen adsorption resulted in work-function increases and photoelectric yield decreases, the effects being larger when the silicon had been annealed at 500°C than after heating and quenching from 1000°C. Covers period 1 Jun-31 Aug 1957 under Contracts AF 19(604)-1952 and AF 19(122)-458, Subcontract 12. Scientific report no. 4. AF CRC TN 57-781.

Investigation of the composition of an iron-rich nickel-zinc ferrite, by C.F. Jefferson. Michigan. University. Engineering Research Institute. Electronic Research Group, Ann Arbor, Mich. Jun 1956. 20p diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132753

The purpose of this work is to determine the composition of the system $Ni_aZn_{1-a}Fe_2O_4$ - Fe_2O_3 as a function of temperature in air at one atmosphere The spinel phase in the one phase area consists of a solid solution of $Ni_aZn_{1-a}Fe_2O_4$, Fe_3O_4 and γFe_2O_3. AD 102760. Dept. of the Army project no. 3-99-04-042. Signal Corps project no. 194B. Contract DA 36-039-sc-63203. MU ERI TR 66. MU ERI Proj 2262-125-T.

Investigation of the effects of the valence band degeneracy on the conduction processes in germanium, by A.C. Beer, F.J. Reid, G.L. Kendall,

and R.K. Willardson. Battelle Memorial Institute, Columbus, O. Dec 1957. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133476

Hall effect and magnetoresistance were measured as functions of the magnetic field and of temperature in the extrinsic region for p-type germanium specimens with room-temperature resistivities in the range from 0.01 to 50 ohm-cm. A definite fine structure, including a maximum and a minimum was observed in the Hall coefficient of p-type germanium as a function of magnetic field. The theoretical explanation for these observations includes the effects of ionized impurity scattering, warped energy surfaces, and the magnetic field dependence of the effect of these warped energy surfaces. AD 148077. Contract AF 18(603)-39, Final report. AF OSR TR 58-9.

Investigation of the mechanism by which boron increases the hardenability of steel, by Charles R. Simcoe, Harold J. Hucek, and others. Battelle Memorial Institute, Columbus, O. Dec 1954. 69p photos, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 133819

Boron increases the hardenability of hypoeutectoid steels by decreasing the nucleation rate of ferrite and bainite. Boron, because of its atomic diameter, will concentrate at lattice imperfections where sites of suitable size are present and will decrease the energy of these local areas by occupying these sites. It was shown that the critical amount of boron for an SAE 8635 steel was 0.0004 per cent added to the fully deoxidized steel. The hardenability of boron steels was found to be reproducible when the boron was in the range of 0.00005 to 0.0017 per cent. AD 65275. Project 7351, Task 70645. Contract AF 18(600)-155. AF WADC TR 54-542.

Investigations on superconductivity and liquid helium, by Henry A. Boorse. Columbia University. Dept. of Physics, New York, N.Y. May 1957. 17p. Order from LC. Mi $2.40, ph $3.30. PB 133600

Summarizes results of the program from May 1947-Sep 1956, and lists publications resulting from this cryogenic research. Methods of measuring transport were devised and equipment designed. Niobium, niobium nitride, lead, vanadium, tantalum, lanthanum, and thallium were examined. Covers period May 1947-Sep 1956 under Contract N6 onr-271, T.O. 6, Final report.

Magnetic properties of rare earth metals at very low temperatures, by Hugo Leipfinger. Munich, Ger. Technische Hochschule, Physikalishes Institut, Munich, Ger. Jul 1957. 41p drawing, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132291

The magnetic susceptibilities of the rare earth metals Ce, Pr, Nd, Sm, Dy, Yb were measured from 293°K down to 1, 5°K. AD 136546. Covers period 1 May-31 Jul 1957 under Contract AF 61(514)-941. AF OSR TN 57-561.

Manufacturing criteria for titanium alloys. Final report: Forming of titanium alloys, by Roger V. Carter. Boeing Airplane Company, Seattle, Wash. Apr 1956. 100p photos, drawing, diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 127897

Presents discussions and results of tests conducted to develop techniques and limitations of conventional sheet forming processes as applicable to titanium-alloy airframe manufacture. The processes included are power brake bending, joggling of formed sections, drop hammer forming, spin-forming, hydro-press forming, and sheet stretch-forming. A correlation between sheet mechanical properties and minimum bend radii is also presented. AD 98562. Boeing Document D-14460-F-11-B. T.O. 9397; Unit 0796, Item no. 6111. B-52 Manufacturing processes analysis. Study no. 11. Contract AF 33(600)-23223.

Material property design criteria for large magnesium-alloy castings, by Keith F. Finlay. Northrup Aircraft, Inc., Hawthorne, Calif. Jul 1954. 145p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 133507

A study was made of the correlation between casting size, metallurgical quality as determined by radiographic classification, and mechanical properties of large magnesium alloy castings. Twelve 40-inch panels, one 16-foot wing section and standard separately cast test bars were produced and radiographed. Representative imperfect sections were machined into test coupons, radiographed and classified. Tensile tests, compression tests, shear tests, and strain measurements were carried out on the coupons, and statistical analysis was conducted on the resulting data, Photomicrographs representing typical radiographic classifications are included. AD 38626. Contract AF 33(600)-8496. AF WADC TR 53-300.

Memorandum on the heat treatment of Ti-6Al-4V. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Feb 1957. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 135516

Ti-6Al-4V alloy is an alpha-beta alloy; its heat treatment is designed to adjust the relative proportions of the two phases and their distribution. The heat treatments and their resultant properties are presented followed by a discussion of the physical metallurgy of the alloy.

On the nucleation of pearlite, by Morris E. Nicholson. Chicago. University. Institute for the study of Metals, Chicago, Ill. Dec 1953. 9p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 133512

A study of the influence of carbon on rate of pearlite nucleation indicates that the change based on currently accepted model does not agree with the observed change. A two-mode model is proposed in which either ferrite or cementite may initiate the nucleation of pearlite. It is demonstrated that all of the observed changes in pearlite nucleation rates agree with changes based on this model. AD 30040. Contract AF 18(600)-12. AF WADC TR 53-316.

Preferred orientation and deformation in titanium and titanium alloys, by Carl J. McHargue, Cullie J. Sparks, Jr., and Joseph P. Hammond. Kentucky. University, Lexington, Ky. Dec 1954. 114p photos, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 134500

Preferred orientations in titanium and titanium alloys containing aluminum, columbium, titanium, molybdenum, and zirconium in solid solution were produced by cold rolling, annealing and hot rolling. The effect of cycling through the alpha-beta transformation on the texture of cold-rolled titanium was determined. Higher temperatures of hot rolling and annealing (above 1300°F) produced textures differing from the cold-rolled testures by 30° rotations about the C-axis. AD 68001. Project 7351, Task 70608. Covers period Feb 1951-Aug 1954 under Contract AF 33(038)-19574. AF WADC TR 54-343.

Preparation and tensile properties of cast aluminum panels for potential armor plate applications, by K.L. Herrick and R.C. Harris. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Oct 1957. 21p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132529

Test panels were cast from 220 aluminum alloy which were to be subjected to ballistic tests to determine the potential of cast aluminum for armor plate applications. Tensile properties at various locations within the plates were measured to determine the optimum combination of number of chills used and riser dimensions. Dept. of the Army project no. 5B03-04-004. ORD project no. TB 3-1224B. FALR 1412.

Recrystallization of titanium, by L.S. Castleman, F.D. Rossi, and L.L. Seigle. Sylvania Electric Products, Inc., Bayside, N.Y. Sep 1955. 45p photos, graphs, tables. Order from OTS. $1.25. PB 121188

An exploratory investigation was made of rates of nucleation and grain growth during the recrystallization of critically deformed sponge and iodide titanium. In arc-melted sponge titanium strained 2 to 3%, recrystallization occurred in bands, and because of non-uniform recrystallization it was impossible to determine nucleation rates. Rates of nucleation were measured approximately in arc-melted iodide titanium strained 2 to 3%, which recrystallized uniformly, and the activation energy for nucleation was determined to be 59,000 calories per mol. The energy of activation for grain growth in sponge titanium was about 52,000 calories per mol, and in iodide titanium 39,000 calories per mol, confirming the tendency of impurities to raise the activation energy for growth during recrystallization of a pure metal. Project 7351, Task 70627. Summarizes work from Mar 15, 1953 to Feb 28, 1954 and from Nov 1, 1954 to May 31, 1955. Contract AF 33(616)-422. AF WADC TR 55-321.

Relation between magnetic properties and crystal morphology of submicron iron particles, by Michael W. Freeman and John H.L. Watson. M.W. Freeman Co., and Edsel B. Ford Institute for Medical Research, Detroit, Mich. n.d. 12p photos, drawings, table. Order from LC. Mi $2.40, ph $3.30. PB 126725

The purpose of the paper is to emphasize the relationships which have been found to exist for these iron powders between the form and structure of the particles as observed by the electron microscope and their quality as magnetic materials. Date is 1956 or later.

Research on stresses in weldments. Massachusetts Institute of Technology. Dept. of Metallurgy. Welding Section, Cambridge, Mass. Jun 1957. 71p photos, drawings, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134317

The problem of stress buildup and cracking has been studied by experimental and theoretical techniques which permit the use of conventional resistance strain gages on samples being welded to measure and analyze welding stresses during and after welding. In the absence of preheat, the maximum level of stress which precedes cracking is found to be substantially independent of the detailed nature of applied restraint forces and welding conditions. Neither measurement nor analysis technique is sensitive to plastic behavior of the weld region, but they determine transverse stress independent of yield phenomena. Project no. 7141. Contract DA 19-020-505-ord-4222. WAL R 640/220-1, Part IV.

Resistance welding of tubes to tube sheets, by J. Mueller, C. Shaeffer, and J. Moore. Glenn L. Martin Company, Baltimore, Md. Jun 1956. 37p photos, diagr, tables. Order from LC. Mi $3.00, ph $6.30. PB 132406

A method for joining Type 430 stainless steel tubes to heavy tube sheets by resistance welding was developed. The method produced weld joints with a recrystallization-type bond, high strength and leak-

proofness, and uniform quality. ER 8476. Contract NObs-67001.

Resonance measurements on nickel-cobalt ferrites as a function of temperature and on nickel ferrite-aluminates, by J.E. Pippin and C.L. Hogan. Harvard University. Gordon McKay Laboratory of Applied Physics, Cambridge, Mass. Jul 1957. 29p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 132054

The variation of line width (ΔH) and effective g factor (g_{eff}) with cobalt content and with temperature is studied in a series of ferrites of composition $Ni_{1-\alpha}Co_{\alpha}Mn_{.02}Fe_{1.9}O_{4+}$. Here α lies between 0 and 0.09; temperatures range from 20°C to 340° C. A minimum in ΔH is observed at $\alpha = .027$; g_{eff} decreases with increasing α. Resonance data are presented on several nickel-cobalt ferrite-aluminates, of composition $Ni_{1-\alpha}Co_{\alpha}Mn_{.02}Fe_{2-t}Al_tO_{4+}$, with α varying from 0 to .025 for t = .3, .4, .5, and .6. AD 117297. Scientific report 10. Contract AF 19(604)-1084. AF CRC TN 57-573.

Selected photomicrographs of titanium and titanium alloys, by H.R. Ogden. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Mar 1957. 11p photos. Order from LC. Mi $2.40, ph $3.30. PN 135063

Three photographs show hydride markings, twins, and porosity that can occur in alpha titanium alloys. Five photographs show structures of Ti-8Mn alloys, including examples of carbides and porosity around carbides. Four photographs of Ti-6Al-4V illustrate structures found in this alloy. Two photographs of Ti-150A show cracks. NP 6284.

Selection of materials for aircraft auxiliary gas containers, by C.T. Olofson, G.E. Faulkner, and others. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Dec 1957. 62p drawings, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 134611

Evaluation was made of the suitability of titanium alloys and 17-7PH steel for constructing high-pressure auxiliary gas containers, for aircraft, to hold various gases under operating pressures of 3500 psi. The titanium alloys included commercially pure titanium, Ti-6Al-4V, Ti-5Al-2.5Sn, and Ti-4Al-4Mn. The gases under consideration are oxygen, nitrogen, air, carbon dioxide, hydrogen, and helium. The service temperatures under consideration are limited to the range of -65 F to +400 F. NP 6628.

Self-diffusion of zinc in aluminum-zinc alloys, by J.E. Hilliard, B.L. Averbach, and Morris Cohen. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. Sep 1957. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134280

The self-diffusion of radioactive Zn^{65} has been studied in coarse-grained aluminum, zinc, and f.c.c. aluminum-zinc alloys. The diffusivity increases while the activation energy and frequency factor decrease as the zinc content is increased. There are no anomalies associated with the miscibility gap in this system, and the mobility seems unaffected by the thermodynamic driving force for interdiffusion. AD 142111. Project 7021, Task 70663. Contract AF 33(616)-3264. AF WADC TR 57-524.

Single crystal anisotropy and magnetostriction constants of several ferromagnetic alloys, by R.C. Hall. Westinghouse Electric Corp., East Pittsburgh, Pa. Apr 1958. 45p photos, graphs, tables. Order from OTS. $1.25. PB 151036

As a preliminary step in the study of the effects of radiation on magnetic materials, the anisotropy and magnetostriction of single crystals of several soft ferromagnetic materials have been measured prior to irradiation. The materials include the metals iron and nickel, binary alloys of nickel iron, silicon iron, cobalt nickel, cobalt iron, and aluminum iron (previously reported), ternary alloys of molybdenum nickel iron, nickel cobalt iron, and molybdenum aluminum iron, and magnetitite. The effect of the order-disorder reaction on these properties was measured where possible. Comparison is made of the present data to that which is available in the literature. AD 155519. Project 7021, Task 70651. Contract AF 33(616)-5555. AF WADC TN 58-127.

Solubility of boron in cementite and variation of Curie temperature and lattice parameter of iron boro-cementite with composition, by M.E. Nicholson. Chicago. University. Institute for the Study of Metals, Chicago, Ill. Apr 1955. 22p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134653

The solid solubility of boron in cementite, Fe_3C, at 1000°C was determined with the aid of quantitative metallography, X-ray lattice parameter measurements, and Curie temperature measurements. The solubility observed is considerably greater than that determined by previous investigation. AD 75189. Project 7351, Task 70645. Contract AF 18 (600)-12. AF WADC TR 55-42.

Some aspects of government-sponsored research in metallurgy, by Julius J. Harwood. U.S. Office of Naval Research. May 1957. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134569

1. Contracts, Government - Scientific research
2. Metallurgy - Research 3. Ceramics - Research
4. ONR ACR 19

Static strength of rivets subjected to combined tension and shear, by William H. Munse and Hugh L. Cox. Illinois. Engineering Experiment Station, Urbana, Ill. Dec 1956. 26p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. Limited supply available from University of Illinois. 45 cents. PB 127271

University of Illinois bulletin, vol. 54, no. 29.
1. Rivets - Design 2. Rivets - Shear - Tests
3. Rivets - Strength 4. ILU EES B 437

Strain rate sensitivity of niobium as a function of grain size, by E. S. Tankins and R. Maddin. Pennsylvania. University. School of Metallurgical Engineering, Philadelphia, Pa. Jul 1956. 16p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 127403

The yield strength of niobium increases with increasing strain rates and with decreasing grain size in such a way that the yield strength is related to the grain size and strain rate by an equation of the form: $\sigma_{ys} = B\, d^{-c/2} (\dot{\epsilon})^{n}$. Contract Nonr-551 (19), Technical report no. 2.

Structural changes in single crystal copper-alpha brass diffusion couples, by V. Y. Doo and R. W. Balluffi. Illinois. University. Dept. of Mining and Metallurgical Engineering, Urbana, Ill. n.d. 39p photos, tables. Order from LC. Mi $3.00, ph $6.30. PB 133188

Structural changes associated with Kirkendall diffusion in single crystal copper-alpha brass couples have been studied. Vapor-solid couples in which zinc was diffused into copper from the vapor were investigated using metallographic and X-ray techniques. Recrystallization was found at low diffusion temperatures, and twin formation was always associated with recrystallization. An explanation of these phenomena is given in terms of the production ans subsequent redistribution of dislocations by climb and slip mechanisms during diffusion. AD 136734. Date is 1957 or later. Contract AF 18 (600)-106. AF OSR TN 57-747.

Study of cleavage surfaces in ferrite. Final report for the period 15 Oct 1948-15 Oct 1949, under Contract N6 onr-269/XII, NR 031-321, by E. P. Klier. Pennsylvania State College. Mineral Industries Experiment Station, Division of Metallurgy, State College, Pa. Oct 1949. 35p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 130949

The structures at cleavage surfaces in ferrite have been examined by x-ray, fractographic and metallographic prodedures. It has been found that plastically-strained metal exists at such surfaces in coarse-grained ferrite over a wide range of testing conditions. ATI 66495.

Summary report on the solubility of metals and alloys in pure bismuth at temperatures up to 2200°F, by John F. Collins. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Apr 1951. 23p photos, diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 132182

A survey of high-temperature metals and alloys was made to determine their suitability as containing materials for liquid bismuth at 900° to 2200°F. Type 446 stainless iron is the more satisfactory alloy from corrosion considerations. Of the pure metals tested, molybdenum showed the lowest solubility, closely followed by columbium, iron and titanium. Some special tests of ceramics in bismuth and a group of service tests are summarized. NEPA 1800.

Temperature dependence of the flow stress of an age hardened alloy, by A. Kelly and C. Chiou. Northwestern University. Technological Institute. Dept. of Metallurgy, Evanston, Ill. Feb 1958. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133485

Measurements have been made of the critical resolved shear stress of single crystals of an aluminum-copper alloy between 77°K and 373°K. The crystals were aged so that they contained only Guinier-Preston zones of the first kind. By changing the temperature during deformation of these crystals the reversible change of flow stress with temperature during deformation has also been measured. This reversible change of flow stress varies with temperature in a manner similar to that shown by pure aluminum crystals in that, after elimination of the variation of the elastic constants with temperature, it is approximately constant at temperatures above 160°K but increases at lower temperatures. AD 148013. Contract AF 18(600)-1468. AF OSR TN 58-36.

Tensile properties of porosity-graded 355 plaster mold aluminum alloy, by Irving J. Feinberg and John D. Grimsley. U.S. Naval Ordnance Laboratory, White Oak, Md. Aug 1957. 29p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134794

The nature of hydrogen gas porosity in plaster mold 355 aluminum alloy is reviewed. Reference radiographs providing bases for association with derived tensile properties were prepared. Quantitative determinations of the damage by elongated hydrogen gas porosity to ultimate tensile strength and to yield strength were obtained. Expected minimum properties for material containing four degrees of porosity are given. Project NOL 325-57. NAVORD 5690.

Test and evaluation of titanium for hydraulic piping, by E. Dickerson and W. J. Tocha. U.S. Naval

Gun Factory, Washington, D.C. Jul 1957. 20p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 134294

From a bursting strength viewpoint titanium tubing is better than copper tubing and compares favorably with steel tubing. The favorable characteristics of titanium tubing are outweighed by the difficulties of forming and keeping suitable hydraulic assemblies made up of titanium tubing. NGF T 26-57. NAVORD 5516.

Titanium alloys for thermal flight, by R.I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Apr 1957. 13p graphs. Order from LC. Mi $2.40, ph $3.30. PB 135061

Paper delivered on Mar 27, 1957 at the American Society for Metals Technical Program, Western Metals Congress, Los Angeles, Calif. 1. Titanium alloys - Strength 2. Titanium alloys - Tensile properties 3. Titanium alloys - High temperature tests

Titanium brazing. Final report covering period 19 Mar 1951-31 Oct 1952, under Contract NOa(s)-51-294-C, by L.A. Yerkovich. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Oct 1952. 44p photos, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134963

Oxyacetylene torch, furnace and salt bath brazing techniques as presently practiced can be applied providing a suitable flux is incorporated in the brazing processes. Studies using various aluminum and silver base brazing alloys revealed the existence of brittle compounds formed during brazing which are believed to be one of the main causes of the erratic strengths found in single lap joint evaluation. In double lap joints, these compounds seem to have less effect on the joint strength. A very rapid brazing technique results in fairly single lap joints which exhibit good fatigue and impact resistance. CAL KD 752-M-4.

Titanium-germanium system from 0 to 30 percent germanium, by V.C. Petersen and R.W. Huber. U.S. Bureau of Mines. Oct 1957. 23p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133347

The titanium-rich end of the titanium-germanium system was investigated by X-ray and metallographic methods and verified by resistivity and dilatometer measurements. A continuation diagram is proposed. Some data are presented on the electrical resistivity and temperature coefficients of resistance and expansion for titanium and a few titanium-germanium alloys. BM RI 5365.

METEOROLOGY AND CLIMATOLOGY

Absolute photoelectric yield of surfaces for radiation of the extreme ultraviolet. Final report covering period 16 Jun 1952-30 Sep 1956 under Contract DA 04-495-ord-323, by G.L. Weissler. University of Southern California. Dept. of Physics, Los Angeles, Calif. Oct 1956. 6p. Order from LC. Mi $1.80, ph $1.80. PB 132896

1. Spectrophotometry, Ultraviolet 2. Ultraviolet radiation - Research 3. Electrons - Energy - Theory

Aerosol travel through ventilation systems, by E. N. Hellberg, J.K. Thompson, and J.A. Young. U.S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Jun 1957. 88p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 132822

Polydisperse aerosols of dioctylphthalate with a particle-size range of approximately 1- to 20-μ diameter were passed into two typical ventilation air systems. The effect on particle-zize distribution and concentration was studied at various sampling stations throughout the system by means of a jet-impactor, light-scattering method. In general, aerosol particles larger than 3-μ diameter were removed to varying degrees by the system components while smaller particles were essentially unaffected. It was concluded that building ventilation systems could not be relied upon to provide adequate protection from a biological warfare aerosol attack. Project NY 300010. NCEREL M 127.

Classification of solar prominences, by Donald H. Menzel and F. Shirley Jones. Harvard University. Harvard College Observatory. Solar Dept. Cambridge, Mass. Contract AF 19(604)-1394. Order separate parts described below from LC, giving PB number of each part ordered.

III - 1952. 1952. 76p tables. Mi $4.50, ph $12.30. PB 132935

AD 133841. For Parts 1 and 2 see PB 125620 and 127971. 1. Tables, Meteorological 2. Solar phenomena 3. Sun - Prominences 4. AF CRC TN 57-607

IV - 1949. 1949. 41p tables. Mi $3.30, ph $7.80. PB 132936

AD 133848. 1. Tables, Meteorological 2. Sun - Prominences 3. Solar phenomena 4. AF CRC TN 57-610

Determination of atmospheric transmissivity by back-scatter from a pulsed-light system, by Norman B. Stevens, Melvin H. Horman, and Edward E. Dodd. Motorola, Inc. Riverside Research Laboratory, Riverside, Calif. Jul 1957. 139p photos, diagrs, graphs, table. Order from LC. Mi $6.90, ph $21.30. PB 132341

The feasibility of determining visual range along the slant path by observing the light scattered by the atmosphere from a pulsed beam of transmitted light was investigated experimentally and theoretically. Three configurations were considered, in which the receiver and transmitter were coaxial, separated laterally, and separated in range. The experimental equipment produced useful signals at night from ranges of 1000 to 2000 feet. AD 133602. Contract AF 19(604)-2213. AF CRC TR 57-201.

Development program of vidicon and image tube technique for spectroscopic observation of faint stars and galaxies. Fourteenth and final report covering the period 15 Jan 1952-30 Jun 1955, under Contract DA 11-022-ord-471, by W.A. Hiltner and John N. Hodgson. Chicago. University, Chicago, Ill. Jul 1955. 34p photos, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 132328

The present work is an attempt to increase the efficiency of image formation. The sensitive element in all cases has been a photocathode which has an efficiency of the order of ten percent. Two general methods have been considered. First, that of storing the accummulated information as a charge distribution on an insulator. The image orthicon and vidicon are examples. Secondly, that of employing an image converter by which a photographic emulsion is exposed by a greatly enhanced light intensity or by photoelectrons exposing the emulsion directly. Dept. of the Army project 5B99-01-004. ORD project TB 2-0001. OOR project 1533.

Direct method of utilizing flight data to determine space and spectrum gust velocity distributions and airplane gust performance function (low level turbulence study), by U.O. Lappi. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Aug 1955. 111p graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 132961

Considering atmospheric turbulence as a random process a method is developed for determining directly from recorded flight data the time (or space) histories of gust velocity components. These velocity components are basically the difference between airplane motions relative to the ground and airplane motions relative to the air. The problem of determining airplane transfer functions from turbulence inputs and airplane motions is also considered for the plane-of-symmetry motions of the airplane. AD 108204. Thesis, University of Buffalo. Project Buffalo Bill. Contract AF 18(600)-1550. CAL GM 776-T-45.

Dynamo theory of magnetic storms, by J.A. Jacobs and T. Obayashi. Toronto. University. Dept. of Physics, Toronto, Canada. Mar 1957. 26p diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 133276

The dynamo theory has been successfully applied to account for special geomagnetic variations. The magnetic variations at the time of a solar flare or solar eclipse have been interpreted by a dynamo theory on the assumption of an increase or decrease in the electrical conductivity of the ionosphere and the longitudinal inequality of the Sq field can be explained by taking into account the obliquity of the earth's magnetic axis. AD 117241. Contract AF 19(604)-761, Scientific report no. 4. AF CRC TN 57-480.

Easily applied method for the reduction of h'-f records to N-h profiles including the effects of the earth's magnetic field, by E.R. Schmerling. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Aug 1957. 27p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132186

A method is presented by means of which experimental h'-f records may be readily reduced to electron-density-height profiles without the use of computing aids during the final reduction process. No special assumptions are made concerning profile shapes, account is taken of the earth's magnetic field, and collisions are neglected. AD 133690. Contract AF 19(604)-1304. PSC IRL SR 96. AF CRC TN 57-219.

Examples of cyclogenesis in the Mediterranean region during winter, by P. Krishna Rao and Thomas A. Gleeson. Florida State University. Dept. of Meteorology, Tallahassee, Fla. Jun 1957. 19p maps. Order from LC. Mi $2.40, ph $3.30. PB 133290

AD 117189. 1. Cyclones - Development - Mediterranean 2. Contract AF 19(122)-466, Scientific report no. 10 3. AF CRC TN 57-296

General description of the earth's atmosphere, by M. Nicolet. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Oct 1957. 79p tables. Order from LC. Mi $4.50, ph $12.30. PB 132579

The basic problem of the composition of the homosphere is studied. The nature of the inter-relation between pressure, density and temperature is obtained for practical studies. It is shown that vertical transport by diffusion is of importance over the entire thermosphere. Finally, this report considers the influence of thermal conduction on the temperature distribution and the effects of this parameter are indicated. AD 133835. Contract AF 19(604)-1304. PSC IRL SR 97. AF CRC TN 57-601.

Handbook of the Quartermaster Research Engineering Center: Environment and climatic test facilities, by Fernand P. de Percin and Sigmund J. Falkowski. U.S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Sep 1957. 71p photos, maps (part col), diagr, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134468

Both indoor and outdoor climatic facilities for research and testing are available at the Center. These facilities include wind tunnels for simulating extreme climates and a solar furnace for testing materials designed to protect soldiers against thermal radiation. A comprehensive weather recording and observing program is conducted at the Center by personnel of the Army Signal Corps. Topoclimatic stations are located in representative areas, and microclimatological measurements are made to determine the vertical distribution of weather elements as well as the physical processes involved. Unclassified 17 Apr 1958. Color in map will not reproduce. Project reference: 7-83-01-005A. QMC EP TR 62.

Horizontal advection and the motion of pressure and flow patterns. Scientific report 5 under Contract AF 19(604)-1738, by B. Huarwitz. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography, New York, N.Y. Oct 1957. 38p diagr, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 132792

A relation is derived between pressure variations at different levels in the atmosphere under a number of simplifying assumptions. Essentially the atmospheric model considered allows for pressure changes only by means of density advection and by means of an upper pressure disturbance which is given a priori. It is shown that this advective model gives reasonable values for the speed of tropospheric pressure disturbances, despite its crudeness. Some examples are presented which show how a given upper wave should be transmitted downward. AD 133833. AF CRC TN 57-600.

Hydromagnetic waves in an inhomogeneous primary field, by Donald E. Skabelund. Utah. University. Dept. of Physics, Salt Lake City, Utah. Aug 1955. 24p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 126996

Technical report no. 17, under Contract Nonr-1288 (00): Earth's magnetism and magnetohydrodynamics. 1. Hydromagnetic theory 2. Waves, Magneto-hydrodynamic - Theory

Ice-nucleus concentration in various air masses (Die gefrierkerngehalte der verschiedenen luftmassen), by Walter Rau. Translated by James Gough, Jr. and Valda Dreimanis. Jun 1955. 29p diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 132020

Translated from Meteorologische Rundschau, 7(12): 205-211, 1954, by the American Meteorological Society under Contract AF 19(604)-1936.
1. Meteorological research - Germany
2. Ice - Nucleation - Germany 3. Fronts (Meteorology) - Germany 4. Contract AF 19(604)-1936

Investigation of nighttime thunderstorms in the central United States, by Wayne E. Sangster. Chicago. University. Dept. of Meteorology, Chicago, Ill. Jan 1958. 39p maps, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133307

The vertical motion at the 700-mb level for the area of high nighttime thunderstorm frequency in the central United States is computed for four times daily for a period of twelve consecutive days. A significant diurnal variation is found, with the maximun upward motion occurring, on the average, at 2100 CST, and the maximum downward motion at 0900 CST. The diurnal variation of vertical motion is shown to be primarily a consequence of the diurnal wind variation along the southern border of the area of study. Individual cases of nighttime thunderstorm activity are shown to be associated with a diurnal pulsation of the vertical motion of 700 mb. AD 146860. Contract AF 19(604)-2179, Technical report no. 5. AF CRC TN 58-211.

Measurement of air density by electron absorption. Final technical report under Contract AF 61 (514)-911, by A.E. Grun. Max-Planck-Institut für Physik der Stratosphäre, Gottingen, Germany. n.d. 9p graph. Order from LC. Mi $1.80, ph $1.80. PB 132299

AD 136515. Date is 1955 or later. 1. Air - Density - Measurements - Germany 2. AF OSR TR 57-58

Measurement of drop size distribution and liquid water content in clouds, Scientific report no 6: An electric probe drop counter, by D.P. Kelly. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Sep 1954. 29p photo, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132937

An instrument is described which detects, counts, and sizes natural cloud droplets in the size range of 4 to 60 microns diameter, at a rate of several thousand per second, by electrical means. AD 133850. For other reports see PB 113524, 116010, 118200. Contract AF 19(122)-245. AF CRC TN 57-614.

Meteorites and ballistics, by John S. Rinehart. Smithsonian Institution. Astrophysical Observatory, Cambridge, Mass. Apr 1958. 68p photos,

diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 134767

A meteorite enters the earth's atmosphere at high velocity (11 km/sec to 72 km/sec), is subjected to powerful aerodynamic forces, suffers rapid loss of material through aerodynamic heating and abrasion, but occasionally survives passage and finally may strike the ground, producing an impact crater. This paper discusses recent studies in the interrelated areas, meteoritics, ballistics, and astroballistics, with specific reference to ablation fundamentals, the shapes and surface features of various meteorites, and the nature of impact craters. AD 154259. Paper to be presented at AGARD Wind Tunnel and Model Testing Panel meeting to be held at Freiburg, Germany. Includes bibliography of 13 pages. Contract AF 18(600)-1596, Technical report no. 8. AF OSR TN 58-354.

Meteorology of the stratosphere (Die meteorologie der stratosphäre), by Hans-Karl Paetzold. Germany. Wetterdienst. Translated by Rudolf Loeser and James Gough, Jr. Jun 1957. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132019

Translated from its Berichte, 4(22): 43-54, 1956, by the American Meteorological Society under Contract AF 19(604)-1936.
1. Stratosphere - Temperature - Measurement - Germany 2. Stratosphere - Radiation - Absorption - Germany 3. Stratosphere - Meteorology - Germany

Note on primary cosmic ray proton and alpha flux near the geomagnetic equator, by Frank B. MacDonald. Iowa State University. Dept. of Physics, Iowa City, Iowa. n.d. 38p diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134683

Date is 1957 or later. 1. Cosmic radiation - Geomagnetic effects 2. Cosmic radiation - Measurements 3. Photons - Energy levels 4. SUI 57-9

On the prediction of three-day hurricane motion, by Chaepyo Cook. Chicago. University. Dept. of Meteorology, Chicago, Ill. Jul 1957. 25p maps, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134684

A quantitative method for the prediction of a three-day hurricane motion from vertically integrated mean flow charts is developed using the hurricanes of August and September 1955. Contract N6ori-02036, NR 082-120.

Particle size distribution in rain and snow inferred from Z-R relations, by Raymond Wexler. Harvard University. Blue Hill Meteorological Observatory, Milton, Mass. Dec 1957. 9p table. Order from LC. Mi $1.80, ph $1.80. PB 132938

AD 146765. 1. Particles - Size - Distribution - Theory 2. Contract AF 19(604)-950 3. AF CRC TN 57-621 4. HU BHMO MRS 7

Physical theory of meteors and meteoric matter in the solar system, Chapters I-III (Fizicheskaia teoriia meteorov i meteornoe veschestvo v solnechnai sisteme), by B. Iu Levin. Translated by John Miller and David Kraus. n.d. 252p. Order from LC. Mi $11.10, ph $39.60. PB 133240

Discusses motion of a meteoroid in the upper layers of the atmosphere, collisions with air molecules, sputter and deceleration, heating, vaporization of a meteoroid, luminosity, masses of a meteoroids. AD 110091. Date is 1956 or later. Original was published in Moscow, 1956. Translated by American Meteorological Society for Geophysics Research Directorate, under Contract AF 19(604)-1936.

Planetary representation of the terdiurnal variations of atmospheric pressure and temperature, by Manfred Siebert. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography, New York, N.Y. Jul 1957. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132187

Terdiurnal planetary waves of pressure and temperature are derived from the third harmonic coefficient of pressure and temperature for about 100 stations in both cases. The data for January and July only are used for a representation of the annual mean and the separated pure annual change. The resulting planetary waves are represented by series of spherical harmonics. The influence of land-water distribution has been considered for the temperature waves. The main terms of the pressure and the temperature waves belong to the annual change. No possibility could be found to explain these terdiurnal waves (and three added important semidiurnal wave types) by means of the resonance theory of atmospheric tides. AD 133697. Project 429. Contract AF 19(604)-1738, Scientific report no. 4. AF CRC TN 57-225.

Research on relations between ice-nuclei and atmospheric aerosols, by Hans-Walter Georgii. Goethe Universität. Institut für Meteorologie und Geophysik, Frankfurt am Main, Germany. May 1956. 36p photos, diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 126561

This report summarizes the research work on natural atmospheric ice-nuclei carried out from 15 March 1955 to 15 April 1956. It describes the first phase of investigations having the aim to detect relations between ice-nuclei and particles of atmospheric aerosols and to enlarge our knowledge on the mechanism of ice-crystal formation in the atmosphere. As far as the ice-nuclei research is concerned, the report deals mainly with the construc-

tion and calibration of the necessary equipment and first measurements. The results of measurements presented in this report have only preliminary character. AD 98742. English version. Covers work from 15 Mar 1955-15 Apr 1956 under Contract AF 61(514)-815. AF CRC TN 56-686.

Statistical application of atmospheric circulation and solar indices to extend and long-range forecasting, by Hurd C. Willett. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Oct 1957. 36p fold tables. Order from LC. Mi $3.00, ph $6.30. PB 132140

As initially planned, the work in this project was centered on three inter-related primary investigations. Subsequent developments dictated temporary postponement of work on two of these, in favor of a fourth investigation, essentially statistical in nature, which during the past two years has represented two thirds of the total project effort. These four investigations, and their principal results, may be summarized as follows: A. Operational monthly and seasonal forecasting of temperature and precipitation over the continental United States; B. The interpretation of the internal mechanics of the general circulation by the correlation of selected index parameters; C. The study of the solar influence in the control of the general circulation; D. The application of empirical orthogonal functions to thirty-day forecasting. AD 133832. Work initiated under Contract AF 19(604)-449. Contract AF 19(604)-1283, Final report. AF CRC TR 57-233.

Study of the diffusion of gases or aerosols in the lower atmosphere, by H.E. Cramer, F.A. Record, and H.C. Vaughan. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. May 1958. 184p photos, map, diagrs, graphs, tables. Order from LC. Mi $8.40, ph $28.80. PB 134673

The principal objectives have been to achieve improved understanding of the basic physical processes involved in the dispersal of airborne material in the lower atmosphere; and to establish empirical relationships between basic diffusion parameters and direct meterological indicators that permit satisfactory quantitative estimates of dispersal from continuous point sources, over travel distances of the order of 1 km. in a wide variety of general weather conditions. AD 152582. Contract AF 19 (604)-1058. AF CRC TR 58-239.

System for recording eight meteorological elements simultaneously on moving film (Weatherlog), by G.K. Thompson. Harvard University. Blue Hill Meteorological Observatory, Milton, Mass. Mar 1958. 65p photos, diagrs. Order from LC. Mi $3.90, ph $10.80. PB 134598

Weatherlog is a system which continuously and simultaneously records eight meteorological elements on 35 mm film. The recorded elements are temperature, dew point, wind speed, wind direction, barometric pressure, precipitation rate, precipitation aggregate and electric field intensity. The primary purpose of the system is to provide on a single photographic print a consolidated record of ground weather conditions. The two sets of data are recorded separately but on the same time base. AD 152461. Meteorological radar studies 8. Contract AF 19(604)-950. AF CRC TN 58-227.

Upper wind representation and flight planning, by Irving I. Gringorten. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Mar 1957. 88p photo, map, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 133992

This survey is divided into four parts: (a) a representation of winds in space and time, which includes a "geostrophic-gradient divider" tool for analysis and 2-prog and 4-prog charts (b) flight planning tools, the 4-D and the fixed-speed time-front plotters (c) flight planning methods, including fixed-track, single-drift and emphasizing minimal flight (MF) planning. Included are three appendices to: (a) derive the basic equation of MF planning, to show why time fronts (TF's) should be drawn omitting cross-winds, and to show why TF's prepared for one airspeed can be used on MF paths with another airspeed (b) show advantage of 4-prog charts or derived 2-prog charts in representing vertical wind shears that are changing with time and (c) report on tests of recommended procedures. AD 133675. Figures 6 and 11 are on transparent plastic. AF GRD SG 89. AF CRC TN 57-221.

Use of planetary atmospheres for propulsion, by Sterge T. Demetriades and Carl Kretschmer. Aerojet-General Corp., Azusa, Calif. Apr 1958. 21p tables. Order from LC. Mi $2.70, ph $4.80. PB 133988

It is possible that the ultraviolet emission of the sun produces useful quantities of free radicals and dissociated molecules in the atmospheres of the other planets. A provisional table of atmospheric compositions of the planets is presented. This paper presents the reaction kinetics of atomic oxygen in the earth's upper atmosphere and a preliminary analysis of an atomic-oxygen propulsion unit. AD 154132. OSR project 37507. Presented at the annual meeting of the American Astronautical Society 31 Jan 1958. Contract AF 49(638)-111. AF OSR TN 58-229.

Vertical structure of continuous streamer-form precipitation, by Raymond Wexler and David Atlas. Harvard University. Blue Hill Meteorological Observatory, Milton, Mass. Mar 1958. 43p photos, maps, graphs. Order from LC. Mi $3.30, ph $7.80. PB 134955

AD 152551. 1. Precipitation - Radar analysis 2. Precipitation - Measurements 3. Contract AF 19(604)-950 4. Contract AF 19(604)-3492 4. AF CRC TN 58-401 6. HU BHMO MRS 10

Windchill in the Northern Hemisphere, by Sigmund J. Falkowski, Andrew D. Hastings, Jr. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Feb 1958. 15p fold map, tables. Order from LC. Mi $2.40, ph $3.30. PB 134619

Windchill is defined as the cooling power of wind and temperature combinations on shaded, dry human skin. It is measured in kilogram calories of heat loss per square meter of exposed skin surface per hour for each centigrade degree of temperature difference between the skin and the ambient air. The report points out the usefulness of the windchill index in assessing relative human comfort as well as its limitations with respect to evaporation and radiation influences. Tables simplifying computation of the index are included. These tables list temperature and wind speed factors derived from the windchill formula, converted from metric to English units for temperatures from 90°F. to -105°F. and for wind speeds from 0 to 45 miles per hour. Any pair of these factors applicable to a given situation may be multiplied directly to yield the windchill index. Project reference: 7-83-01-005A. QMC EP TR 82.

MINERALS AND MINERAL PRODUCTS

Additions of Fe_2O_3 to $BaTiO_3$ - $SrTiO_3$ ferroelectrics, by J. Diamond and V. Chang. Michigan. University. Dept. of Electrical Engineering. Solid State Devices Laboratory, Ann Arbor, Mich. Dec 1957. 11p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 133273

If small percentages of Fe_2O_3 are added to polycrystalline $BaTiO_3$ and fired at 1400° as a ceramic, the Curie temperature of the ceramic remains constant while the peak permittivity is lowered. However, if the Fe_2O_3 is added to BaO and TiO_2, the iron goes into the lattice predominately in the titania sites and decreases the Curie temperature as well as the peak permittivity. Additions of Fe_2O_3 to mixed $BaTiO_3$ - $SrTiO_3$ compositions result both in a lowering of the Curie temperature and a depression of the peak permittivity of the single phase system. No changes in lattice dimensions with the additions were observed when the Ba to Sr ratio was held fixed. AD 132446. Contract AF 18(600)-8. MU ERITR 3. MU ERI Proj 2495-T. AF OSR TN 57-391.

Alumina-base cermets. Ohio State University Research Foundation, Columbus, O. Contract AF 33(616)-472. Project 7022, Task 70634. Order separate parts described below as directed, giving PB number of each part ordered.

Part I, by Thomas S. Shevlin and Charles A. Hauck. Mar 1954. 51p photos, diagr, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134856

Describes preparation, test procedure, and physical properties of a cermet composed of 34% Al_2O_3 - 66% (80Cr-20Mo), in addition to modified compositions. Properties include firing shrinkage, density, modulus of rupture, tensile strength, stress-rupture, modulus of elasticity, oxidation resistance, thermal shock resistance, and hardness. The cermet studied had a 1000-hour stress-rupture life at 1800°F of 19,000 psi, negligible oxidation to 2000°F and excellent thermal shock resistance at 1900°F. AD 49092. Covers period 1 Mar 1953-1Mar 1954. AF WADC TR 54-173, Part 1.

Part V, by James G. Stradley and Thomas S. Shevlin. Feb 1958. 21p diagr, graph, tables. Order from OTS. 75 cents. PB 151143

Solid solutions of Al_2O_3-Cr_2O_3 and Al_2O_3-NiO spinels were combined with iron metal, and their physical properties were studied. Modulus of elasticity, modulus of rupture, shrinkage, weight change during firing, absorption, tensile strength, and thermal expansion values were determined. Modulus of elasticity values were obtained which equaled or were above the accepted value for iron alone. AD 155611. Summarizes research from 1 Feb 1957 to 31 Jan 1958. For Parts 2-4 see PB 121253, 121461 and 131342. AF WADC TR 54-173, Part 5.

Effect of single oxide additions on the devitrification tendencies of a barium-boro-silicate ceramic coating glass, by Raymond R. Reschetz, William R. Bratschun, Richard M. Spriggs, and Dwight G. Bennett. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Sep 1957. 32p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133961

The effect of single oxide additions of calcia, titania, ceria, bismuth oxide and zinc oxide on the devitrification tendencies of a barium-boro-silicate glass was investigated. Coated specimens on type 347 stainless steel were examined by X-ray diffraction after exposures at 871°C for times up to 150 hours. All coatings of the ceria and zinc oxide series plus those compositions with smaller molar additions to TiO_2 and Bi_2O_3 appeared to retain their continuity and dimensional stability after 150 hours of heating at 871°C. Of these, the coating with 1.50 moles of ceria appeared to be the best. Contract AF 18(603)-

28, T.O. 77520. ILU DCE R 80. AF OSR TN 58-251.

Kalk- och kalkcemetbruk invändig puts pa betong (Comparison of lime and lime-cement mortar for concrete), by Gerhard Hinderson. Sweden. Staten Nämnd för Byggnadsforskning, Stockholm, Sweden. Jan 1958. 109p. Order from LC. Mi $5.70, ph $16.80. PB 134207

1. Concrete - Materials - Sweden 2. Mortar (Building material) - Cement-lime - Sweden 3. Mortar (Building material) - Lime - Sweden 4. SN B 46

Line broadening of impurity spectrum in silicon, by Douglas Sampson and Henry Margenau. Yale University. Sloane Physics Laboratory, New Haven, Conn. Jan 1956. 36p diagr, graphs. Order from LC. Mi $3.00, ph $6.30. PB 127017

Contains article on "Electromagnetic standing wave in an ionized gas". 1. Silicon - Spectrographic analysis 2. Gases - Ionization - Theory 3. Gases - Electrical properties 4. Contract Nonr-288, T.O. 2, NR 072-133

Plastic deformation of ceramic-oxide single crystals, by John B. Wachtman, Jr. and Laurel H. Maxwell. U.S. National Bureau of Standards. Jul 1953. 42p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133508

A study was made of the temperatures at which periclase, rutile, and sapphire deform plastically. Periclase can be plastically deformed above 1100°C, rutile above 600°C, and sapphire above 900°C. These temperatures are approximately one-half the melting temperatures on the absolute-scale. Studies of slip lines and orientation changes during deformation have indicated that the geometry of plastic deformation in ceramic oxide single crystals is the same as that of metals. It has been shown that deformation in sapphire takes place by slip on the (0001) plane in the [1120] direction. Creep curves for sapphire in tension consist of three stages: a stage of increasing creep rate, a stage of large but decreasing creep rate and a state of small and nearly constant creep rate. Measurements of the electrical resistivity of sapphire as a function of temperature have been made. AD 27292. Covers period 1 Oct 1950-30 Jun 1953. Contract AF 33(038)-51-4056. AF WADC TR 53-265.

Prestressed ceramic structures, by F.R. Shanley and W.G. Knapp. California. University. Dept. of Engineering, Los Angeles, Calif. Jan 1954. 72p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 130928

Use of prestressed ceramics as primary aircraft structures is discussed. Several semi-span wings were assembled and prestressed. Failure during prestressing in each case precluded static tests. Methods of cellulating ceramics to reduce the apparent density were developed and tested. The following tests and studies were conducted: I. Determination of Poisson's Ratio for various ceramics; 2. Fatigue tests of ceramics; 3. Ceramic body study in the (clay - Al_2O_3 - flux) field systems; 4. A study of gasketing materials. Task no.: 70634. Summarizes work covering period 1 Aug 1952 through 1 Nov 1953 under Contract AF 18(600)-120. For Part 2 see PB 111944. AF WADC TR 54-75.

Research investigations of magnetic materials, permanent ceramic type, by Frank Brockman, Paul W. Beck and others. Philips Laboratories, Inc., Irvington-on-Hudson, N.Y. Contract DA 36-039-sc-72319. Dept. of the Army project no. 3-99-01-500. Signal Corps project no. 2005A. Case 12-120. Order separate parts described below from LC, giving PB number of each part ordered.

First quarterly progress report covering period 1 May-31 Jul 1956. Oct 1956. 37p photo, diagrs, graphs, tables. Mi $3.00, ph $6.30. PB 130689

Study of the process by which the particles are oriented in the preparation of anisotropic magnets. The system BaO:CaO:Fe_2O_3 was studied in detail. Continues work under Contract DA 36-039-sc-56759.

Final technical report covering period 1 May 1956-30 Apr 1957. May 1957. 38p diagr, graphs, tables (part fold). Mi $3.00, ph $6.30. PB 130688

Microwave properties of materials of the type $M^{+2}O \cdot 6Fe_2O_3$ are studied. Permanent magnets of this general composition can be made in an isotropic form or in an anisotropic form. Both types have been studied. In the system BaO-CaO-Fe_2O_3, it was found that up to 60 mol per cent of the barium can be replaced by calcium without seriously affecting the permanent magnet properties. Anisotropic strontium-iron oxide permanent magnets were made with energy products in excess of 3×10^6 gauss-oersteds. A technique was devised to determine the anisotropy constant of the strontium-iron oxide material sample. An experimental study was made of Faraday rotation and insertion loss at X-band frequencies of permanently magnetized, oriented 1.1 $BaO \cdot 6Fe_2O_3$ and 1.1 $SrO \cdot 6Fe_2O_3$. A theoretical study was made to understand the experimental results. Technical report no. 115.

Study of adsorption techniques in the preparation of ultra high purity silicon compounds, by Bernard Manning. Technical Operations Incorporated, Burlington, Mass. Apr 1957. 12p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 132141

AD 117068. Report TOI 57-8. 1. Silica - Preparation 2. Silicon tetraiodide - Preparation 3. Crystals, Silicon - Preparation 4. Chromatographic analysis - Apparatus 5. AF CRC TN 57-170

ORDNANCE AND ACCESSORIES

Graphical presentation of ballistics for recoilless rifles, by D.J. Katsanis. U.S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. Oct 1957. 41p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134297

On the basis of the physical interactions and processes involved in conventional recoilless weapons, the following equations are taken as describing, with reasonable certainty, any such physical system: equation of motion of projectile, gas generation rate, gas flow through nozzle, equation of state of gas in weapon, and energy eauation. The limitations on these equations and the assumptions that were made in order to express them in a form which could be represented graphically are discussed in detail in the main part of the report and in the references. The subject of this report is the simultaneous solution of the fundamental equations by various approximations. A method of representing these equations by a minimum of graphs and nomograms is devised, and various treatments of the results of interior ballistic problems are discussed. OCO project no. TS 4-4020. D/A project no. 5S0209010. FAL R 1410.

Mathematical foundation of reliability theory, by Erich Pieruschka. U.S. Redstone Arsenal. Ordnance Missile Laboratories, Huntsville, Ala. Jan 1958. 32p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134700

This study is concerned with the theoretical aspects of reliability of complex equipment. It discusses frequency distribution of wear-out failures and chance failures; of mortality and force of morality; and of single and frequently occurring components. It culminates in a new realistic model failure frequency distribution encompassing the all-important aspect of maintenance. Part I of the study presents the theory in non-mathematical language, whereas Part II presents it in purely mathematical terms.

Problem of TNT exudation, by Samuel D. Stein. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Apr 1958. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 134622

The amount of exudation produced depends upon the quantity and type of impurity in the TNT. Non-exuding TNT can be manufactured, but the purification process it entails is prohibitively expensive. Recent work to inhibit or prevent the flow of exudation by the use of absorbents has produced promising results. Ord project WD-OAC-60304111-19-46123 PA 60-12a. PA TR 2493.

Shell mold casting of nodular iron artillery shell, by E.D. Levine and R.C. Harris. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Aug 1957. 15p photos, diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 132526

Nodular iron artillery shells were cast in molds made by the shell molding (Croning) process. The castings produced were used to obtain tensile properties (in the as-cast and heat-treated conditions) and to determine whether dimensional requirements could be met using this process. The results indicate that neither the tensile nor dimensional requirements were satisfied in these castings. Further studies with respect to composition and heat treatment, however, could probably lead to an improvement in these properties. In order to achieve better dimensional control, complete redesign of pattern equipment is necessary. Project M121. FAL MR 658.

PACKING AND PACKAGING

Preliminary results of revolving drum method of pallet testing, by David Lauck. U.S. Naval Supply Research and Development Facility, Bayonne, N.J. May 1956. 28p fold table. Order from LC. Mi $2.70, ph $4.80. PB 132818

A previous report by this activity, Project Report No. 2.4182 (Report No. 1), entitled, "A Reference Guide for the Construction and Inspection of Pallets", also published by the Office of Technical Services, Department of Commerce, under publication number PB 111998, provided certain information for the determination of adequacy of pallets for Armed Service usage. Recently, additional investigations have indicated that a standard package testing device called a "Fourteen Foot Revolving Drum Tester" can be used to indicate structural failure points of wood pallets and also give qualitative comparisons between pallets of different designs. This present report summarizes results obtained from a limited number of tests, and indicates the desirability of additional research work in this area. Project no. NT003-020(p). Engineering report no. 2.4182 (Report no. 2). For report no. 1 see PB 111998.

PERSONNEL APTITUDE TESTING

Activities of field radio repair personnel with implications for training, by Harry A. Shoemaker, George H. Brown, and Joan M. Whittemore.

George Washington University. Human Resources Research Office. Training Methods Division, Washington, D.C. May 1958. 124p diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 134628

Data were obtained from 1,085 field radio repairmen in the United States and Europe to determine (1) the nature and frequency of their job activities, (2) special difficulties in maintenance work and training needs, and (3) the nature and extent of on-the-job training. DA project 095-50-000. Contract DA 49-106-qm-1. GWU HRRO TR 48.

Application of sociometric technique to women recruits. I: Prediction of individual success or failure in recruit training, by Marilyn K. Rigby, Paul T. Sayers, and others. St. Louis University. Dept. of Psychology, St. Louis, Mo. Jun 1957. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 134463

This study investigated the relevance of peer relations within groups of women recruits to performance in recruit training. The sociometric questionnaire used in this study was designed specifically for women recruits, and contained items eliciting judgments of military performance and items dealing with social compatability. Contract N7 onr 40802, NR 151-092, Technical report no. 8.

Comparison between the empirical and rational approaches for keying a heterogeneous test, by Marvin H. Berkeley. U.S. Air Force. Air Research and Development Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, Tex. Jul 1953. 42p tables. Order from LC. Mi $3.30, ph $7.80. PB 134766

The purpose of this study is to compare two app proaches of keying a biographical inventory. One approach consists of the empirical derivation of keys on external criteria. The other approach consists of the development of homogeneous and relatively independent keys. Both keys are to be evaluated by means of cross-validation on a new sample. Project no. 503-001-0011. AF HRRC RB 53-24.

Content analysis of achievement motivation protocols: A working manual, by Robert Sadacca, Russell A. Clark, and Henry N. Ricciuti. Educational Testing Service, Princeton, N.J. Jul 1957. 88p tables. Order from LC. Mi $4.80, ph $18.30. PB 134564

This manual describes a scoring system for measuring the strength of an individual's achievement motivation, as revealed in imaginative stories suggested by a series of pictures. The revised system, D-2, has been set down in some detail in this manual to provide interested workers with a description of the scoring categories that were actually used in a series of projects, and to provide a provisional scoring system for use in future research. Imperfections in this scoring system are noted. Contract Nonr 694(00), NR 151-113.

Determination of job requirements for tank crew members, by Robert A. Baker. George Washington University, Human Resources Research Office, Washington, D.C. May 1958. 51p tables. Order from LC. Mi $3.60, ph $9.30. PB 134629

This study was conducted to determine what each member of a tank crew needs to know in order to do his job. Lists of job requirements covering the duties and skills for the four crew positions (tank commander, gunner, driver, loader) were established. D/A project no. 095-30-000. Contract DA 44-109-qm-650, Technical report no. 17. GWU HRRO TR 47.

Development and evaluation of an experimental program of instruction for fire control technicians, by Lloyd Hitchcock, Jr., Robert F. Mager, and James E. Whipple. George Washington University. Human Resources Research Office, Washington, D.C. May 1958. 32p graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 134630

This study is part of along-range research program in electronic maintenance and operator training. An experimental training program was developed and evaluated. Contract DA 44-109-qm-650, Technical report no. 16. GWU HRRO TR 46.

Gear assembly test: Description and preliminary results, by William G. Mollenkopf. Educational Testing Service, Inc., Princeton, N.J. Jan 1957. 28p photo, tables. Order from LC. Mi $2.70, ph $4.80. PB 132485

As part of a larger project on the interrelationships of learning measures, a new measure called the Gear Assembly Test was developed. The general approach utilized a miniature learning situation with periods of controlled instruction followed by performance checks. Contract Nonr-694(00), NR 151-113.

Prediction of success in engineer equipment maintenance and automotive maintenance courses, by William H. Helme and Richard K. White. U.S. Adjutant General's Office. Personnel Research Branch, Washington, D.C. Sep 1957. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 132914

B-6-131 School-Job success a-51. Dept. of the Army project no. 29560000. 1. Ability tests - Evaluation 2. Personnel, Military - Tests 3. WD AGO PRS TRN 82

Prediction of success in clerk jobs, by James A. Sprunger and Sidney J. Armore. U.S. Adjutant General's Office. Personnel Research Branch. Dec 1956. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 132891

The ten tests in the Army Classification Battery, the previously operational aptitude areas, and other potential composites of ACB tests were validated against on-the-job ratings of success in four job samples of enlisted men and WAC's previously trained in the MOS 4405 clerk course. Comparisons were made of the effectiveness of the best course composites on job sample criteria and of the best job sample composites on course grade criteria. PRB project D-15-201-32. Technical research note no. 68. Dept. of the Army project 29560000, Task 201. WD AGO PRS TRN 68.

Prediction of success in courses training EM for electronics and electrical maintenance jobs, by William H. Helme and Richard K. White. U.S. Adjutant General's Office. Personnel Research Branch, Washington, D.C. Apr 1958. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 134741

Electronics a-01. School-Job success a-30. DA project no. 29560000. 1. Personnel, Electronics - Training 2. Personnel, Electronics - Ability tests 3. WD AGO PRB TRN 91

Procurement of Counter Intelligence Corps trainees, by Roy J. Jones and Berton Winograd. George Washington University. Human Resources Research Office, Washington, D.C. Oct 1957. 27p tables. Order from LC. Mi $2.70, ph $4.80. PB 134601

This study investigated two basic problems of procurement of trainees for the Counter Intelligence Corps: the setting of quotas for the basic training centers, and the feasibility of extending the enlistment program to three years. D/A project 095-50-000. Contract DA 49-106-qm-1. GWU HRRO SR 10.

Standardization of tests of gross motor performance, by E. Ralph Dusek. U.S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Jan 1958. 48p photos, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134465

A series of performance tests have been given to a group of military-age men to obtain norms and to study the interrelationships among the tests. These tests were designed for use in evaluating the effects of clothing restriction. The results indicate that the tests will be useful in evaluating prototype clothing and equipment. Project reference: 7-83-01-005B. QMC EP TR 81.

Validation of experimental aptitude tests for air defense crewmen, by William H. Helme and Richard K. White. U.S. Adjutant General's Office. Personnel Research Branch, Washington, D.C. Feb 1958. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 134747

The validity of each of six experimental tests measuring motor coordination, perceptual speed, nonverbal reasoning, and mechanical knowledge was studied for samples of AAA gun crew and guided missile jobs through use of a validity generalization design. Army project no. 29560000. WD AGO PRB TRN 90.

PHOTOGRAPHIC AND OPTICAL GOODS

Connection between silver bromide grains and the sensitivity of the emulsion, under Contract AF 61(514)-942, by Wilhelm Waidelich. Munich, Ger. Technische Hochschule. Physikalisches Institut. Oct 1957. 34p diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132425

By precision-measurements of the half-breadth of the Debye fringes of photographic grains the sizes of the coherent lattice domains were determined. It is concluded from the results, that the internal image is formed mainly at "inner surfaces" i.e. the boundaries of the coherent domains. This shows that in the inner part of an undisturbed AgBr lattice there is no place for a growing centre. By separated development of the internal and the surface image it could be shown, that the number of internal development centers is higher the more internal surfaces are present. AD 136637. Technical report covering the period 1 May 1956-30 Sep 1957. Contract AF 61(514)-942. AF OSR TR 57-75.

Continuous-tone electrostatic electrophotography. Final progress report covering the period 1 Sep 1955-30 Sep 1956, under Contract DA 36-039-sc-70130, by P.G. Andrus, W.E. Bixby, and others. Battelle Memorial Institute, Columbus, O. Sep 1956. 38p photos, diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132856

The objective of this project is to evolve an electrostatic electrophotographic process capable of producing continuous-tone photographs of high quality. The research is being directed particularly towards the solution of problems associated with the design of specific end items of electrophotographic equipment. Dept. of the Army project no. 3-99-04-052. Signal Corps project no. 195B.

Illumination, contrast, spectrum, and color conditions in an "average" outdoor scene as functions of ground reflectance, object orientation, and viewing direction, by Max R. Nagel. U.S. Air

Force. Air Research and Development Command. Wright Air Development Center. Aerial Reconnaissance Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1956. 61p fold diagrs, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 134388

An attempt is made to define the concept of an "average" outdoor scene for application in the development of photographic equipment and material. It consists primarily of a white sphere on a neutral gray or white ground under a clear sky at a sun altitude of 40 degrees. The distribution of illumination, reflection spectra, and color on the surface of such an object is investigated. The contrast (on exposure range) and the spectral uniformity of the illumination on the object are determined as a function of both ground reflectance and the direction from which the object is photographed or viewed. AD 97137. Project 6272, Task 62174. AF WADC TR 56-14.

Moving target optical projector for use in air traffic control research, by Merrill J. Allen, Paul M. Fitts, and Alec J. Slivinske. Ohio State University Research Foundation. Aviation Psychology Laboratory, Columbus, O. Jan 1954. 13p photo, diagrs, Order from LC. Mi $2.40, ph $3.30. PB 127063

The specifications and design of a moving target optical projector are described. This projector was specifically designed to meet the requirements of a versatile research apparatus in human engineering studies of air traffic control systems based upon ground displays of radar derived information. The most important features of the simulator unit herein described are (1) the linearity and precision of target movement which can be obtained without distortion of loss of focus of the image, (2) the flexibility of coding provided for the target image and the area immediately surrounding each image, and (3) flexibility in providing a simulated one-man display or a large projection screen which can be used by several controllers. The projector can be used singly or a large number can be used together. It can provide a static display, or when connected with a suitable course generator, it can produce a moving target display. The projector also has potential future use in an actual traffic-control center. AD 30062. Contract AF 33(616)-43. AF WADC TR 53-417.

Optical absorption by silver halide, by Simpei Tutihasi. Rochester. University. Institute of Optics, Rochester, N.Y. Oct 1956. 15p graphs. Order from LC. Mi $2.40, ph $3.30. PB 125136

The absorption spectra of silver chloride, silver bromide and silver iodide films evaporated on quartz plates have been measured at room temperature and liquid nitrogen temperature. It has been found that the "exciton peaks", which have been believed to depend very little upon temperature, become sharper and shift toward the shorter wavelength side as the films are cooled down to liquid nitrogen temperature. Attempts are made to combine the present data with some published data to give absorption curves for silver chloride and silver bromide over a large range of absorption spectrum at room and low temperatures. AD 110362. Contract AF 18(600)-193. Contract AF 18(600)-688. AF OSR TN 56-543.

Ultraviolet sensitivity of lead sulfide photocells, by Abbott Smith and David Dutton. Rochester. University. Institute of Optics, Rochester, N.Y. Dec 1957. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133486

Spectral response measurements have been made on Eastman Kodak lead sulfide photocells in the wavelength range 0.2 - 2.0μ. The quantum sensitivity is roughly constant for wavelengths greater than 0.6μ, and rises linearly with photon energy at shorter wavelengths. The increase in quantum yield is attributed to secondary internal photoemission. AD 148074. Contract AF 18(600)-193. AF OSR TN 58-35.

PHYSICS

General

Calculation of the cross-stream wave length of the three-dimensional transition pattern and correlation with the Gortler instability theory, by J. R. Weske and Y.Y. Chen. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Oct 1957. 35p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 132296

A theory is presented concerning the mechanism producing, at an early stage of transition in the boundary layer, a regular three-dimensional pattern. Relations for secondary vorticity, for the case of rotational yet nonviscous flow, are used to derive quantitative relationships for the cross-stream wave length of this pattern, for uniform and for retarded free flow. The results obtained are linked to the Taylor-Gortler theory of instability along curved walls. AD 136625. Task 17500. Contract AF 18(600)-893. UM BN 111. AF OSR TN 57-637.

Collapse of a transient cavity in a compressible liquid. Part I: Approximate solution, by Hugh G. Flynn. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Mar 1957. 163p graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 133527

Transient cavities are small bubbles which form ex-

plosively in liquids under reduced pressures and then collapse with great violence. An approximate solution describing the collapse of a transient cavity has been found for a model in which the cavity contents undergo an initially isothermal and finally adiabatic compression. The method of solution permits the use of numerical tables as equations of state for contents of the cavity and for the surrounding liquid. The solution is expressed in terms of either the exponential integral or the confluent hypergeometric function. An extensive tabulation of the latter function is presented in an appendix. Contract Nonr-1866(24), NR 014-903. HU ARL TM 38.

Creep behavior of circular plates, by B. Venkatraman and P.G. Hodge. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Apr 1957. 30p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134606

The creep behavior of circular plates is analysed on the assumption that steady state creep conditions prevail. The creep law used is based upon a flow rule associated with a condition of maximum shearing stress. The method is applied to plates with simply supported and clamped edges. Closed forms solutions for moments and creep deformations are presented. AD 120491. Task 17500. Contract AF 18(600)-1381. PIB AL 369. AF OSR TN 57-135.

Density variation in shock tube flow; a comparison of Trimpi-Cohen theory with data of Mack, by Donald B. Wheeler, Jr. Lehigh University. Institute of Research, Bethleham, Pa. Aug 1956. 32p diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134613

The accurate prediction by the Trimpi-Cohen theory of shock strength decrease with distance from the diaphragm is not accompanied by equally good prediction of the density in the flow behind the shock for pressure ratios P_{21} of the ideal shock tube theory. Nevertheless the order of magnitude of deviation from the ideally predicted density in the "hot gas" is correct for flows in this range of shock strength. AD 104444. Technical report 8. Contract N7 onr 39302, NR 061-063.

Determination of a constant-pressure surfact in two-dimensional hypersonic viscous flow, by R.A. Harris and T.Y. Li. Rensselaer Polytechnic Institute. Dept. of Aeronautical Engineering, Troy, N.Y. Aug 1956. 20p graphs. Order from LC. Mi $2.40, ph $3.30. PB 132966

In a previous report, a method was developed whereby the necessary body shape associated with an assumed pressure distribution in two dimensional hypersonic steady flow can be computed. The present report deals with the simple case of computing the body shape corresponding to a constant pressure field. The results are intended to be of interest to experimental people designing a constant pressure surface for testings at hypersonic speeds. AD 97368. TR AE 5604. Contract AF 18(600)-1591. AF OSR TN 56-484.

Effect of boundary layer profile, air speed, and system geometry on the stability of flow in suction systems, by C.E. Treanor and A.H. Flax. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Jul 1956. 58p photos, diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 134658

The stability of flow in air induction systems for boundary-layer suction has been studied as a continuation of the theoretical and experimental work reported in WADC TR 53-189. In these suction systems, the dynamic head of the boundary-layer air can increase the pressure in the suction system, causing dynamic and static instability. The theoretical work reported here extends the previous analysis to include the effects of wave motion in the exit section of the suction system. The experiments include tests with both a turbulent boundary layer and an artificially produced laminar-like boundary layer, obtained by air injection through the tunnel wall. AD 97115. Project 1366, Task 70103. Contract AF 33(616)-2373. AF WADC TR 55-318.

Elastic plates of variable thickness, by F. Essenburg and P.M. Naghdi. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Oct 1957. 14p graphs. Order from LC. Mi $2.40, ph $3.30. PB 133344

This paper contains a derivation of suitable stress-strain relations for elastic isotropic plates of variable thickness which include the effects of transverse shear deformation and normal stress, as well as the variation in thickness. The significance of the results is examined in the light of some simple examples, where in particular for torsion of plates whose thickness is such as to give rise to equilateral triangular and elliptic cross-sections, exact agreement is obtained for the stress distribution with the corresponding results of Saint-Venant's theory of torsion. AD 136607. Project 1750-175000-717. Contract AF 18(603)-47, Technical note no. 1. MU ERI 2500-T. AF OSR TN 57-618.

Establishing a relationship between dynamic and non-periodic viscoelastic behavior, by Stephen Strella. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Jul 1957. 19p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 132953

A simple relationship between a sinusoidal loading frequency and the duration time of a constant-rate loading function was determined. Experiments showed that the relationship is accurate. The stress-strain behavior of a material subjected to a

constant rate of tensile strain was accurately predicted solely from the dynamic modulus of the material. Dept. of the Army project: 559-01-004. ORD project: TB 2-001. PA TR 2427.

Further investigation of heat transfer in a laminar, compressible, boundary layer on a porous flat plate with fuel injection, by Shao Wen Yuan and Daniel E. Whitford. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Sep 1949. 27p diagr, graphs. Order from OTS. 75 cents.
PB 131872

A theoretical investigation of the flow of hot fluid over a porous flat plate under the condition of uniform fluid injection from the bottom of the plate was made. In this investigation it is assumed that the fluid density varies inversely as a certain quartic function of the distance inside the boundary layer, and that the viscosity of the fluid varies directly as one-half power of the same function. Project Squid. Technical report 14. Contract N6 ori-98, T.O. 2, NR 220-039.

Generalized theory regarding the conversion of energy by electrokinetic means, by E.V. Hardway, Jr. Beta Corp., Richmond, Va. Feb 1952. 21p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134609

In an attempt to generalize the relations affecting the conversion of energy in capillaries or porous plugs considerable difficulty was found in justifying the assumptions made in the published theory. Although the previous methods lead to correct conclusion in many practical examples which can be experimentally verified, they offer no physical or mathematical explanation of the surface conductance effect in very small capillaries. Another example of possible importance in its implications is that it leads to a different result in explaining the electroviscous effect. The existing theory for the electroviscous effect does not check the experimental data. It is believed that the new relationship may have significance in studies of electrophoresis and in several other related fields of physical chemistry and biochemistry. It offers a possible experimental means of determining the effective thickness of the double-layer and the surface charge density. ATI 205312. Contract Nonr 617(00), Technical report 1.

Heat transfer in turbulent pipe flow, by Raul R. Hunziker. Reed Research Inc., Washington, D.C. Apr 1957. 78p diagr, graphs, tables. Order from LC. Mi $4.50, ph $12.30.
PB 134593

Heat transfer to anf from fully developed turbulent flow in a circular pipe and between parallel plates is analyzed. The corresponding boundary value problems for temperature distribution in circular pipe parallel plates are solved by application of Laplace's transformation. AD 126517. Project RR-1167-B-TN-1. Contract AF 18(603)-104. AF OSR TN 57-219.

Heat transfer investigations in supersonic flow, by John L. Harkness. Texas. University. Defense Research Laboratory, Austin, Tex. Mar 1958. 73p photos, diagrs, graphs, table. Order from LC. Mi $4.50, ph $12.30. PB 133241

This paper is a final report of the work accomplished at the Defense Research Laboratory of The University of Texas, under Contract AF 18(600)-589, for the period 5 January 1953 to 5 February 1958. The major effort concerned the development of a small high stagnation temperature intermittent-flow supersonic wind tunnel, and a description of this work and the resulting facility is presented. The development of an electrically heated shield temperature probe for measurements in supersonic flow, is described and the results of an interference study concerning total pressure probes in the boundary layer are presented. Heat transfer measurements on a flat-plate model were accomplished and this investigation is described including a brief discussion of the test results. An analytical study concerning the temperature distribution through the turbulent boundary layer is also discussed. All of this work has been previously reported in considerable detail and specific references are given in each case. AD 152023. Task no. 17500. Final report for the period 5 Jan 1953-5 Feb 1958 under Contract AF 18(600)-589. TU DRL 429. AF OSR TR 58-21.

Interaction of a reflected shock wave with the boundary layer in a shock tube, by Herman Mark. Cornell University. Graduate School of Aeronautical Engineering, Ithaca, N.Y. Jun 1957. 156p photos, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 133358

Ideally, the reflection of a shock from the closed end of a shock tube, provides, for laboratory study, a quantity of stationary gas at extremely high temperature. Due to the action of viscosity, however, the flow in the real case is not one-dimensional, and a boundary layer grows in the fluid following the initial shock wave. In this paper simplifying assumptions are made to allow an analysis of the interaction of the shock reflected from the closed end with the boundary layer of the initial-shock afterflow. Experiment proves the theory. AD 132418. Contract AF 18(600)-1523. Contract Nonr-401(25). AF OSR TN 57-345.

Note on the significance of zero shear stress in the pure bending of a wide curved bar, by Bernard W. Shaffer and Raymond N. House, Jr. New York University. College of Engineering. Research Division, New York, N.Y. Dec 1956. 8p. Order from LC. Mi $1.80, ph $1.80.
PB 133447

A general solution is obtained for the displacements

and strains within a wide curved bar made of an incompressible, perfectly plastic material subjected to zero shear stress, The solution, which is equally applicable for the elastic and plastic regions of the bar, shows that plane sections remain plane throughout the loading program. For technical report 3 see PB 130163. Contract DA 30-069-ord-1398, Technical report 4.

On mass transfer near the stagnation point, by E. R. van Driest. North American Aviation, Inc. Missile Development Division, Downey, Calif. Jun 1957. 23p graphs. Order from LC. Mi $2.70, ph $4.80. PB 133969

Heat transfer with blowing near the stagnation point is computed by first analyzing the problem for the flat plate without pressure gradient and then converting the solution to that for the stagnation region of spheres and cylinders. AD 136449. AL 2553. Contract AF 49(638)-250. AF OSR TN 57-458.

On the possibility of representing one-dimensional gas notion by means of an electrical analogy, by Joseph G. Logan. Cornell Aeronautical Laboratory, Buffalo, N.Y. Jun 1947. 9p diagrs. Order from OTS. 50 cents. PB 131855

The possibility of representing the motion of a gas in a half-open pipe by means of a loss-free transmission line is considered. The one-dimensional wave equation is linearized by considering the wave velocity constant during a small time interval The wave equation is then related to the transmission line equation. Project Squid. Contract N6 ori-119, T.O. 1. CAL TR 2.

Plasma heating of hypersonic gas flow, by Raymond L. Chuan. University of Southern California. Engineering Center, Los Angeles, Calif. Dec 1957. 25p graphs. Order from LC. Mi $2.70, ph $4.80. PB 133340

For the production of condensation-free hypersonic flow in a wind tunnel it is proposed to add energy to the electrons in the air downstream of the throat by high frequency electrodeless discharge, and allow electron energy to go into random kinetic energy of the molecules in the decay process. AD 136751. Project 17500-509. Contract AF 18(603)-95. USC EC 56-202. AF OSR TN 57-762.

Quarterly report covering the period Apr-Jun 1957, under Contract AF 19(604)-2061, by J. Doty. Massachusetts Institute of Technology. Acoustics Laboratory, Cambridge, Mass. Jul 1957. 37p photos, diagr, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 132145

AD 133735. 1. Acoustic research 2. Speech - Analysis - Equipment - Design 3. Speech - Compression and expansion 4. AF CRC TN 57-783

Remarks on the interaction between shock waves and boundary layer in transonic and supersonic flow, by Lester Lees. Princeton University. Aeronautical Engineering Dept., Princeton, N.J. Nov 1957. 24p diagrs, graphs. Order from OTS. 75 cents. PB 131873

The purpose of this paper is to explore a possible explanation of the phenomena observed when a shock wave incident upon a surface interacts with the boundary layer at the surface. The basis of the suggested explanation is the marked difference in behavior between the laminar and turbulent boundary layers in response to the pressure rise in the flow direction that is communicated upstream through the subsonic portion of the boundary layer. By examining the flow within the laminar boundary layer, it is shown that the reflection conditions are satisfied only by a reflected Prandtl-Meyer expansion; for the turbulent boundary layer the reflection conditions require a reflected shock wave. Project Squid. Contract N6 ori-105, T.O. 3. PU AEL TM 1.

Research in properties of liquids and solids: Nuclear magnetic resonance and ultrasonic-wave investigations of relaxing liquids, liquid crystal compounds, and high polymers. Annual summary report for the period 1 Feb 1954-31 Jan 1955, under Contract Nonr-375(05), by A.W. Nolle. Texas. University. Dept. of Physics, Austin, Tex. Feb 1955. 17p photos, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127098

Objectives were: (1) To study the velocity and absorption of ultrasonic waves in "relaxing" liquids as functions of frequency, temperature and pressure; (2) To study the nuclear magnetic resonance behavior of "relaxing" liquids as functions of temperature and pressure; (3) To extend the studies under (1) and (2) to high-polymer solids; (4) To devise a special ultrasonic interferometer of improved precision, and to search with this instrument for dispersion of the ultrasonic-wave velocity in "relaxing" liquids; (5) To extend the studies under (1) and (2) to liquid-crystal substances.

Résumé of the theory of plane shock and adiabatic waves with applications to the theory of the shock tube, by C.W. Lampson. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Mar 1950. 62p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 134538

The theory of plane shock and adiabatic waves is presented in an easily derived manner together with background material. The application of the basic theory to the shock tube as a research instrument is given together with some experimental results to illustrate the calculations. Certain conceptions of energy and its relation to the impulse in a shock wave are presented in a new way. ORD project no.

TB 3-0112j. Reprint and extension of a technical memorandum written for the Princeton University Station, NDRC, 27 Apr 1945, by C.W. Lampson. APG BRL TN 139.

Reversible susceptibility in ferromagnets, by Dale M. Grimes. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Apr 1956. 142p diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 127373

The purpose of this study is to investigate theoretically the variation of the low-frequency reversible susceptibility exhibited by a ferromagnet as a function of the internal magnetization level for small alternating fields both parallel with and normal to a static magnetic biasing field, assuming firstly that the susceptibility has its origin in domainwall motion, and secondly that it has its origin in domain rotation. Dept. of the Army project no. 3-99-04-042. Signal Corps project no. 194B. Thesis, University of Michigan. Contract DA 36-039-sc-632 (03). MU ERI Proj 2262-113-T. MU ERI TR 64.

Solution of compressible boundary layer problems by a finite difference method. Stanford University. Division of Engineering Mechanics, Stanford, Calif. Contract AF 18(600)-1488. Order separate parts described below from LC, giving PB number of each part ordered.

Part 2: Further discussion of the method and computation of examples, by Donald C. Baxter and Irmgard Flügge-Lotz. Oct 1957. 231p diagrs, graphs, tables. Mi $10.20, ph $36.30. PB 133489

The present report duplicates some of the material of Part 1, but this is felt to be necessary to provide a more coherent picture for the reader. The main contribution of this second report is to present the results of some sixty examples which have been computed using the difference method and a digital computer, and to use these to gain some insight into compressible flows with variable pressure gradients and surface temperatures. They illustrate certain trends which can be expected and allow comparison with various approximate methods of solution which have been proposed in the past. AD 148040. For Part 1 see PB 125137. AF OSR TN 58-1. SU ME TR 110.

Part 3: Influence of suction or blowing at the wall, by Irmgard Flügge-Lotz and John T. Howe. Oct 1957. 51p diagrs, graphs, tables. Mi $3.60, ph $9.30. PB 133488

The influence of a transverse velocity at a porous wall on skin friction, heat transfer, and laminar separation is treated on a finite difference basis. The finite difference scheme employed in the solution of the boundary layer problem by references 2 and 3 is modified to include the transverse velocity effects in the computation at the wall point. Series expansions involving the shear stress and the enthalpy derivative are employed at each wall point. A number of examples are presented illustrating the effects of the transverse velocity in subsonic and supersonic flow over both hot and cold walls. Examples with and without pressure gradient are discussed. AD 148041. SU ME TR 111. AF OSR TN 58-2.

Stress distribution in the presence of creep, by N.J. Hoff. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Sep 1956. 21p graphs. Order from LC. Mi $2.70, ph $4.80. PB 132965

When the material of a structure creeps, the law governing the creep deformations, or a law combining elastic and creep deformations, takes the place of Hooke's law in the statement of the problem of stress distribution. The creep laws obtained from creep tensile tests, and their generalizations applicable when the state of stress is biaxial or triaxial and when the stress varies, are discussed. The existence of elastic and plastic analogues for steady and for transient creep is shown and the use of the analogues in stress analysis is explained. The theory of the buckling of columns whose material is subject to creep is presented. AD 97072. Task no. 17500. Presented before the 9th International Congress of Applied Mechanics in Bruxelles, Belgium, 6 Sep 1956. Contract AF 18(600)-1381. PIB AL 362. AF OSR TN 56-456.

Structure of a shock wave in a gas having a long relaxation time, by L. Talbot. California. University. Institute of Engineering Research, Berkeley, Calif. Mar 1957. 33p photo, diagr, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134555

The shock wave structure in a gas possessing a long relaxation time for one of its internal degrees of freedom was investigated. Both the Navier-Stokes equations and a subsidiary relation equation were assumed to apply throughout the entire transition. The behavior of the direction field of the differential equations was examined, and one particular shock profile was computed numerically. It is concluded that for shock waves in gases having long relaxation times, calculations based on the simple two-stage model give adequate approximations for the significant parameters. Technical report HE 150-145. Contract Nonr 222(45). UC IER Series 20, Issue 114.

Study of gas oscillations in half-open pipes of various shapes (Preliminary report), by G. Rudinger and J. Logan. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Jun 1947. 18p graphs. Order from LC. Mi $2.40, ph $3.30. PB 134253

The influence of shape of a half-open pipe on gas oscillations is investigated. The mathematical treatment used is a continuation of a method developed by H. Lewy. The effect of shape is evaluated by two parameters. One shows the influence on the acoustic resonance frequency and the other determines how the effect of the maximum amplitude of oscillations is modified by shape. Analytical relations have been derived for a number of configurations. Project Squid. Contract N6 ori-119. CAL DD 420-A-4. CAL TM 4.

Temperature distribution studies in the turbulent boundary layer for compressible flow without heat transfer, by Everett H. Alford. Texas. University. Defense Research Laboratory, Austin, Tex. Jan 1958. 55p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 133357

This study is an extension of Van Driest's compressible turbulent boundary layer work. Van Driest's boundary layer temperature equation is modified in an attempt to account for the Prandtl number not being unity. AD 148043. Contract AF 18(600)-589, T.O. 17500. TU DRL 421. AF OSR TN 58-4.

Theoretical study of the properties of insulating and conducting solids. Quarterly report covering the period of Jun 1, 1956 through Aug 31, 1956 through Nov 30, 1956, under Contract AF 18(600)-689, R-355-40-9, by R. Suzuki, R. Casella, and F.E. Dart. Illinois. University. Dept. of Physics, Urbana, Ill. Dec 1956. 9p graphs. Order from LC. Mi $1.80, ph $1.80. PB 125533

1. Crystals, F-centers - Effect on mechanical properties 2. Crystals, Alkali halide - Mechanical properties 3. Carbon - Crystal structure

Thermodynamic and transport properties of liquids. Problem I: Thermal conductivities of liquids. Final report under Contract N6ori-105, by Ernest F. Johnson, Jr. and William J. Sheffy. Princeton University, Princeton, N.J. Oct 1951. 6p. Order from OTS. 50 cents. PB 131880

The measurement of thermal conductivities and diffusivities in pure liquids and liquid mixtures over extensive pressure and temperature ranges is considered. On the basis of experimental work and a survey of the literature, a comparison is made between a thick-disk type apparatus and a heterogeneous apparatus of concentric metal cylinders for measuring thermal diffusivities in steady and unsteady-state operation. Project Squid. Contract N6ori-105, T.O. 3, Phase 6, NR 220-038. Technical memorandum 17.

Transport properties for binary gas mixtures, by W.O. Carlson and P.J. Schneider. Minnesota. University. Institute of Technology, Minneapolis, Minn. Jan 1956. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134591

The diffusion process associated with two-component flow over flat plates has been found from recent studies to have a marked effect on the boundary-layer development. This effect is particularly pronounced when the properties of the diffusing foreign gas are widely different from the properties of the free stream. Since the thermal and dynamical properties affect the flow, there is a definite need for accurate information on the variation of these transport properties with both temperature and diffusing gas concentration. A review has been made of the various methods available for calculating these properties, and methods have been developed and suggested which lend themselves to rapid calculation without an excessive loss in accuracy. AD 80557. Technical report 7. Contract AF 18 (600)-1226. AF OSR TN 56-45.

Unsteady laminar heat transfer from a flat plate, by Hideo Yoshihara. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1955. 19p graphs. Order from LC. Mi $2.40, ph $3.30. PB 134657

The laminar boundary layer flow over a flat plate with unsteady heating is investigated using the linear viscosity and heat conductivity laws and assuming that the flow is quasi-stationary. Results indicate that this approximation is valid over a range of heat pulses considered as rapid pulses. AD 90919. Project 1350, Task 13605. AF WADC TR 55-370.

Unsteady one-dimensional flows with heat addition or entropy gradients, by A. Kahane and Lester Lees. Princeton University. Aeronautical Engineering Laboratory, Princeton, N.J. Nov 1947. 30p graphs. Order from OTS. $1.00. PB 131874

One important aspect of the combustion problem which is considered herein is the unsteady gas-dynamical effects associated with the burning process. Non-linear differential equations of the Riemann type are derived for the solution of problems involving the propagation of one-dimensional waves in flows in tubes of slowly varying cross section with heat addition or entropy variation. These equations can be solved graphically or numerically with the method of characteristics; the method is described in an appendix. Project Squid. Contract N6 ori-105, T.O. 3. PU AEL 124. PU AEL TM-2.

Water analogue of the isentropic flow of compressible gases which have arbitrary ratios of specific heats, by Ronald F. Probstein and George E. Hudson. New York University, New York, N.Y. Aug 1948. 22p photos, diagrs, graphs, tables. Order from OTS. $1.00. PB 131869

1. Gas flow - Effect of heat 2. Flow, Isentropic - Theory 3. Project Squid 4. Contract N6 ori 11, T.O. 2, NR 220-040 5. NYU TR 15

Wave propagation in elastic tubes filled with streaming liquid. Part II, by G. W. Morgan and W. R. Ferrante. Brown University. Division of Applied Mathematics, Providence, R. I. Jan 1955. 33p. Order from LC. Mi $3.00, ph $6.30. PB 130895

The investigation of Morgan and Kiely into the propagation of pressure waves through liquid filled, elastic tubes, is extended to the case when the disturbance is set up in a system in which a steady stream is flowing. In part I the analysis was carried out subject to the assumption that the liquid is inviscid. In this report the corresponding analysis for a liquid possessing "small" viscosity is presented. AD 51343. Contract Nonr 562(07)-NR 062-179. BU AM TR-2.

Nuclear

Absorption of radiation by ion plasmas, by G. L. Weissler. University of Southern California. Dept. of Physics, Los Angeles, Calif. Oct 1956. 9p. Order from LC. Mi $1.80, ph $1.80. PB 125624

A method has been developed to measure absolute absorption coefficients of atomic nitrogen in the region of its ionization continuum below 800A. This was achieved by passing radiation from an appropriate light source through the plasma of a Philips Ionization Gauge (P.I.G.) type discharge into a normal incidence vacuum spectrograph. Light intensities at various wavelengths between 400A and 800A were recorded on film and measured photometrically for the cases of the absorbing plasma either on or off. By taking into account information on the concentration of ions in such discharges, and by considering the relative probabilities of formation of other plasma constituents from their appearance potentials by electron impact methods, it was possible to estimate the concentration of atomic nitrogen in the plasma and to show that, aside from neutral N_2, atomic nitrogen was the sole cause of the attenuation of light. The experimental absorption cross sections were found to agree well with the theoretical values of Bates and Seaton. Contract AF 19(604)-151, Final report.

Design for an inexpensive 3-curie cobalt-60 irradiator for use in radiation research, by Bernard Shapiro. U.S. Air Force. Air University. School of Aviation Medicine, Randolph Air Force Base, Tex. Oct 1957. 4p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 133471

Radiation - Sources - Design 2. Laboratories, liation - Equipment 3. Cobalt, Radioactive - 4. AF SAM R 58-22

and interpretation of electron collisections, by Edwin N. Lassettre. versity Research Foundation, Columbus, O. May 1957. 71p diagr, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132428

The theoretical basis for the interpretation of electronic collision cross sections is reviewed and developed to the degree needed for the investigation of atmospheric gases. The determination of optical oscillator strengths from measured electronic collision cross sections is discussed in some detail and the basis for comparison of electron impact and optical spectra for both atoms and molecules is described. The technique of measurement of collision cross sections, developed prior to initiation of this contract, is reviewed and the theory is reexamined in detail especially in connection with resolution errors in the study of unresolved or continuous spectra. Some results obtained prior to the present contract are very briefly reviewed. AD 133822. Contract AF 19(122)-642. OSURF Proj 464, Scientific report no. 1. AF CRC TN 57-244.

Effect of radioactive substances on sludge digestion, by R. H. Harmeson and J. C. Dietz. Illinois. Engineering Experiment Station, Urbana, Ill. Jan 1957. 36p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. Limited supply available from University of Illinois. PB 127275

University of Illinois Bulletin, vol. 54, no. 36. 1. Sludge storage tanks 2. Waste, Radioactive - Disposal - Methods 3. Waste, Radioactive - Filtration 4. Contract AEC AT-(11-1)-218 5. ILU EES B 441

Electron effects on barrier penetration, by Victor A. Erma. U.S. Naval Ordnance Laboratory, White Oak, Md. Mar 1957. 15p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 133952

An investigation has been made of the increase in the quantum-mechanical probability of penetrating a nuclear potential barrier because of the presence of atomic electrons. If the electrons are represented by the Fermi-Thomas model, it has been shown that the electrons have the effect of providing an apparent increase in the energy of the particle passing through the barrier. The probability of alpha decay of a heavy nucleus has been found to be amplified by factors ranging from about 1.2 for high energy decays to about 2.4 for low energy decays. Project FR-43. NAVORD R 5677.

Electron energy bands in cesium, by Joseph Callaway and Ernst L. Haase. Miami. University. Dept. of Physics, Coral Gables, Fla. May 1957. 21p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133590

Technical report no. 6. 1. Atomic power - Research 2. Cesium - Energy levels 3. Contract Nonr-840(06), NR 017-616

Fine structure of the ground states of N^{15} and O^{17}, by Cabell A. Pearse. Yale University, New Haven, Conn. Oct 1956. 37p. Order from LC. Mi $3.00, ph $6.30. PB 125135

AD 110354. Parts of this report may not reproduce well. 1. Gaussian law (Mathematics) 2. Nuclei - Nuclear spin 3. Nuclei - Energy levels 4. Contract AF 18(600)-771 5. AF OSR TN 56-535

Fuel element ceric sulfate dosimetry, by Arthur J. Scott. U.S. Dugway Proving Ground. RW Laboratories, Dugway, Utah. Jan 1956. 16p diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127171

A method is described for determining the high gamma flux intensities. A potentiometric titration procedure is employed to measure $Ce(SO_4)_2$ solutions which have been subjected to radiation. The method elimates some of the weaknesses of the spectrophotometric method. The accuracy and application of this method to gamma dosimetry of spent fuel elements are discussed in detail. RW Scientific report no. 3.

High energy gamma ray penetration in lead, by W. Earl White. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Mar 1950. 9p graphs. Order from LC. Mi $1.80, ph $1.80. PB 133495

ATI 181212. 1. Lead - Gamma absorption 2. NEPA 1324

High negative nuclear polarization in a liquid, by Lawrence H. Bennett and H.C. Torrey. Rutgers University, New Brunswick, N.J. Aug 1957. 6p graphs. Order from LC. Mi $1.80, ph $1.80. PB 132312

AD 136550. 1. Resonance, Nuclear - Theory 2. Electronegativity 3. Contract AF 18(603)-6 4. AF OSR TN 57-488

Improved sum rule for electron-deuteron scattering, by R. Blankenbecler. Stanford University. Dept. of Physics, Stanford, Calif. May 1958. 31p table. Order from LC. Mi $3.00, ph $6.30. PB 134762

A qualitative discussion of the approximations implicit in the present theoretical treatment of the deuteron is presented. An improved sum rule which relates the total elastic and inelastic scattering of electrons from the deuteron to the free electron-nucleon cross sections is derived. It is proved that the use of folded nucleon and nuclear form factors is correct. It is shown that the finite-nucleon size does not affect any real photon process. Project no. 3750-37504. Stanford report 545-29. Contract AF 18(600)-545. SU DP TR 29. AF OSR TN 58-410.

Influence of electromagnetic radiation of biological material, by Herman P. Schwan. Pennsylvania. University, Philadelphia, Pa. Jun 1957. 12p graphs. Order from LC. Mi $2.40, ph $3.30. PB 134599

Objective was to investigate the effects of ultrahigh frequency electromagnetic radiation on biological material and the possible health hazard of high powered radiation on mankind. Covers period 7-1-54 to 6-30-57. Contract Nonr-551(13), Final report.

Informal progress report no. 21, Apr 16-May 15 1950 (Short report no. 6), by Thomas R.P. Gibb, Jr. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. May 1950. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 133496

ATI 170326. 1. Uranium hydrides - Preparation 2. Lithium borohydrides - Preparation 3. NEPA 1419

Interaction energies and scattering cross sections of hydrogen ions in helium, by Edward A. Mason and Joseph T. Vanderslice. Maryland. University. Institute of Molecular Physics, College Park, Md. Apr 1957. 46p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127166

AD 126442. AF OSR Chem 40-31. IMP OSR 4. 1. Hydrogen - Reaction mechanisms 2. Hydrogen ions - Diffusion 3. Atomic power - Research 4. Contract AF 18(600)-1562 5. AF OSR TN 57-152

Interaction energy and mobility of Li^+ ions in helium, by E.A. Mason, H.W. Schamp, Jr., and J.T. Vanderslice. Maryland. University. Institute of Molecular Physics, College Park, Md. Apr 1958. 19p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 133963

The interaction energy of Li^+ and He has been calculated for a range of internuclear separations. The results are used to calculate the mobility of Li^+ ions in He gas as a function of temperature for comparison with experiment. It is concluded that the theoretical interaction energy is not inconsistent with the experimental mobility data, within the uncertainty caused by the second-order exchange energy. AD 154172. AF OSR Chem 40-31. IMP-OSR-9. Contract AF 18(600)-1562. AF OSR TN 58-271.

Investigations on utilization of radioactive energy as a source of battery power. Quarterly repo no. 3 (no. 11 in series) covering period 1 Fe 30 Apr 1955, by Alexander Thomas and [illegible] DiBello. Tracerlab, Inc., Boston, M 1955. 53p photo, diagrs, graphs, [illegible] from LC. Mi $3.60, ph $9.30.

Two models made with quartz and mica insulation and with different electrode surfaces showed considerably less drop in voltage during the low temperature tests. Experience directed towards substituting glazed Alsimag 243 for the quartz is described. Failures in models containing halogenated plastics are documented from cold tests, operation under load, and exposure to a high dose of gamma radiation. AD 69290. Dept. of the Army project no. 3-99-09-022. For report no. 1 see PB 130243. Sig. Corps project no. 162B. Includes an Address on "Nuclear batteries" presented by Alexander Thomas before the National Industrial Conference Board's Atomic Energy Course for Management, Apr 25-30 and Jun 20-25, 1955. Contract DA 36-039-sc-64519, Quarterly report no. 3.

Kinetic theory of multi-component systems of non-spherical of "loaded sphere" molecules, by John S. Dahler. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Dec 1956. 36p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 132247

The kinetic theory of loaded spheres was originally studied by Jeans to determine the rate of equilibration of translational and rotational energy by molecular encounters. In his work Jeans used the method of mean-free-paths. This report develops the kinetic theory of loaded spheres in a manner patterned upon the Chapman-Enskog approach and the more recent work of C.F. Curtiss. This problem provides a simple explanation of the enrichment by thermal diffusion of mixtures of molecular species which differ from one another only by their different internal mass distribution. Contract N7-onr 285 (11). WIS ONR 23.

Mobility of gaseous ions in weak electric fields, by Edward A. Mason and Homer W. Schamp, Jr. Maryland. University. Institute of Molecular Physics, College Park, Md. Feb 1958. 72p graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 133479

Kihara's extension of the Chapman-Enskog theory of transport phenomena is used to obtain the second order and third order approximations to the mobility of gaseous ions in a weak electric field as a function of temperature and field strength. In this method it is assumed that there is no charge exchange between ions and molecules, there is no clustering, and that quantum effects can be neglected. AF OSR Chem 40-31. AD 152013. IMP OSR 8. Contract AF 18(600)-1562. AF OSR TN 58-104.

Model of a nonequilibrium ensemble: The Knudsen gas, by Joel L. Lebowitz and Harry L. Frisch. Syracuse University. Dept. of Physics, Syracuse, N.Y. n.d. 27p. Order from LC. Mi $2.70, ph $4.80. PB 134590

An example of a nonequilibrium ensemble is constructed, a Knudsen gas in a container whose walls are maintained at different temperatures. The approach to a stationary state is investigated, and an iteration procedure for finding the stationary velocity distribution is derived. AD 134845. Date is 1955 or later. Contract AF 18(600)-459. AF OSR TN 58-266.

Motion of electrons between concentric cylinders (U), by William E. Waters. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Nov 1957. 29p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 132808

The problem of determining the motion of electrons moving in the logarithmic-varying potential distribution, such as would exist in the space between two concentric, conducting circular cyclinders, is discussed, for the special case that the inner cylinder is at the higher potential. It is shown that a non-linear differential equation, of deceptively simple appearance, governs the variations of radial position with azimuth angle. A first integral of this equation is possible and yields much useful information. An approximate solution, valid for nearly circular orbits, is also presented and its signficance discussed. Analog computer solutions of the orbit equation are also presented, and the nature of the orbits is described in detail. TA 3-9101. DA 506-01-001. DOFL project: 52050. DOFL TR 525.

Naval Research Laboratory research reactor: Part VII: Control and safety rod drives, by J.M. Frame and M.P. Young. U.S. Naval Research Laboratory. Sep 1958. 27p photos, fold drawing, diagrs. Order from OTS. 75 cents. PB 131929

A unitized rod-drive mechanism was designed which consists basically of a lead screw and a revolving nut. A drive motor, remotely operated from the control room, causes the lead screw to move vertically; the lead screw, coupled to either a safety rod or a control rod, moves its load vertically in or out of the reactor core. The control rod is coupled mechanically to its drive; the safety rods are coupled to their drives by electromagnets. Rod position is measured by a translatory potentiometer and is presented in the control room on a dc meter. For Parts 1-5 see PB 111859, 121050, 131303, 121879, 131734. NRL R 5189.

Note on relativistic corrections to p-p scattering, by G. Breit. Yale University, New Haven, Conn. Nov 1956. 22p. Order from LC. Mi $2.70, ph $4.80. PB 125608

Effects of wave function distortion by nuclear forces of non-electromagnetic origin are qualitatively considered. It is found that the relativistic corrections to the Coulomb wave contain effects of wave function distortion which may affect these corrections by reasonably large fractional amounts. The spin-orbit interactions arising from the action of the

electric field are found to be affected by wave function distortion. Since these interactions affect the polarization of proton beams in double and triple scattering the analysis of high energy data is affected. The theory of spin-orbit interactions is brought into relation with that of atomic spectra. The unreliability of contact terms contained in the relativistic corrections is brought out. A concise proof of the vanishing of first order tensor force effects on the polarization applying independently of the origin of the tensor force effects is supplied in an appendix. AD 110386. Contract AF 18(600)-771. AF OSR TN 56-565.

Note on the calculation of energy levels in molecules with internal torsion, by Jerome D. Swalen. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 7p. Order from LC. Mi $1.80, ph $1.80. PB 127091

Approximate formulas are given for calculating the matrix elements of the angular momentum operator of a symmetric top undergoing hindered rotation on an asymmetric molecule. These can then be used to calculate the effect of torsion on over-all rotation in microwave rotational spectra using the method of Wilson, Lin and Lide. Date is 1955 or later. Contract N5 ori-76, T.O. V.

On the dissociation rate of diatomic gas, by Gianni Jarre. Politecnico di Torino. Laboratorio di Meccanica Applicata, Torino, Italy. Jul 1957. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 132348

Discusses a formula of the reaction rate, to use in current studies on hypersonic flow of diatomic gases. AD 136513. Contract AF 61(514)-1124. AF OSR TN 57-528.

Quarterly progress report no. 22, under Contract N5 ori-07856. Massachusetts Institute of Technology. Solid-State and Molecular Theory Group. Oct 1956. 62p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 130024

1. Atomic power - Research 2. Molecular theory 3. Lithium hydride - Energy levels 4. Potassium chloride - Molecular structure 5. Lithium - Molecular structure 6. Manganese oxides - Molecular structure 7. Hydrogen - Molecular structure

Resonance self-shielding for hydrogenous reactor, by Raymond L. Murray. Alco Products, Inc., Schenectady, N.Y. Dec 1956. 10p diagr. Order from LC. Mi $1.80, ph $1.80. PB 134575

AP-Memo-70. 1. Resonance - Mathematical analysis 2. Reactors, Neutron - Shielding 3. Contract DA 44-009-eng-2868

simple model for barrier to internal rotation. II: Rotational isomers, by Maurice M. Kreevoy and Edward A. Mason. Maryland. University. Institute of Molecular Physics, College Park, Md. and Minnesota. University. School of Chemistry. Mar 1957. 16p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 132739

1. Atomic power - Research 2. Molecular rearrangement 3. Ethylene - Exchange reactions 4. Contract Nonr-595(02)

Sliding mechanism of dislocation impurity interactions, by Peter Gibbs. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jul 1957. 24p diagrs, graph, table. Order from LC. Mi $2.70, ph $4.80. PB 134717

It is shown that stress on a dislocation which is pinned down by a non-uniform distribution of impurity atoms causes a lateral force on the impurity atoms, tending to slide them along the dislocation like beads on a string. Contract Nonr 1288(03), NR 032-168. UU ISRP TR 111.

Studies in photonuclear reactions. Annual report under Contract AF 18(600)-472. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Oct 1957. 9p. Order from LC. Mi $1.80, ph $1.80. PB 132094

The photodisintegration of the deuteron is examined more closely, with several refinements in apparatus and technique. A proton detector and its use with a deuterated paraffin target are described.

Technical report no. 1 under Contract no. N6 ori-20, by Clyde A. Hutchison, Jr. Chicago. University. Institute of Nuclear Studies, Chicago, Ill. 1951. 153p photos, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 127164

Part I discusses magnetic susceptibilities of heavy metal compounds in regard to apparatus used, experimental procedures, preparation and analysis of U and N_p compounds. Part II deals with paramagnetic resonance absorption: Apparatus, theory, preparation of Tutton salt and other V salts as powders and as crystals, microwave measurements and interpretation of results. ATI 196097.

Use of ultrafractionated radiation in the study of radiation-induced reactions, by J.G. Kereiakes, R.H. Hodgson and A.T. Krebs. U.S. Army. Medical Research Laboratory, Fort Knox, Ky. Jun 1955. 14p diagr, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 132169

Ultrafractionated ultraviolet irradiation does not damage yeast cells to the same extent as does continuous irradiation. Definite minima in the per

cent of yeast cells damaged were found for single exposure times of 0.024 sec and 0.0025 sec corresponding to radiation pulses of 13.8 per sec and 133.3 per sec, respectively. Project no.: 6-59-08-014, Subtask AMRL S-1. AMRL R 195.

PHYSIOLOGY

Cutaneous toxicological studies of materials containing anti-mildew formulations, by Donald J. Birmingham, Cleveland R. Denton, and James J. Jambor. Cincinnati. Division of Occupational Health. Clinical Section. Dermatology Unit, Cincinnati, O. Dec 1953. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 134391

Thirteen materials treated with selected anti-mildew formulations and three control materials were tested for cutaneous primary irritation and sensitization reactions on animals and human volunteers by the prophetic patch test method. These materials included fabric treated with orthophenyl phenol aerosol, orthophenyl phenol impregnated leathers, copper-8-hydroxyquinoline impregnated fabrics, dehydroabietylamine pentachlorophenoxide impregnated fabric, dehydroabietylamine acetate impregnated fabric and two control fabrics and one control leather material. The materials varied widely in cutaneous reactivity. Recommendations were made for usage testing of the anti-mildew treated materials found suitable for direct skin contact prior to their release for general use. AD 28008. Contract PO 33(616)-53-7. AF WADC TR 58-359.

Effect of supplemental feeding on body temperature during sleep in the cold, by Marlin B. Kreider and Elsworth R. Buskirk. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Division, Quartermaster Research and Engineering Center, Natick, Mass. Oct 1957. 12p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 133500

Skin temperatures (T_s) and rectal temperature (T_r) were taken on 6 men sleeping 12 nights in Arctic sleeping bags at -34.5°C. Oxygen consumption (V_{O_2}) was measured for 2 of these men sleeping 6 nights. The men ate the usual 3 meals a day during the first 8 days, and half the men received a supplement of 600 kcal each night before retiring. During the last 4 days, half the men ate the usual 3 meals, while the other half received no evening meal but were given a 1200 kcal supplement before retiring. Project 7-83-01-004C. QMC EP TR 73.

Effect on complex manual performance of cooling the body while maintaining the hands at normal temperatures, by H.F. Gaydos. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Research Division. Quartermaster Research and Engineering Center, Natick, Mass. Apr 1958. 11p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 134618

Subjects were tested on complex manual performance tasks under two different conditions. In one the body and the hands were cooled simultaneously, and in the other the body was cooled to the same degree as in the earlier condition while the hands were kept warm. It was concluded that hand temperature is a vital factor in fine manipulation; the body can be cooled to a degree which is distinctly uncomfortable without affecting manual performance, provided the surface temperature of the hands is maintained at normal levels. Project reference: 7-83-01-005. QMC EP TR 84.

Effects of food, climate, and exercise on rectal temperature during the day, by P.F. Iampietro, Elsworth R. Buskirk and David E. Bass. U.S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Dec 1957. 9p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 134467

A series of experiments was performed to determine the effect of climate, food intake, and activity level on the diurnal pattern of rectal temperature (T_r) from 8 A.M. to 8 P.M. The results indicate that living in diverse-climates has little or no effect on the diurnal pattern of T_r. Activity level, when food intake was adequate, did not alter the pattern. Fasting, with no exercise, reduced the diurnal elevation of rectal temperature to one-half the "normal" elevation. During fasting with excercise the rectal temperature at 8 P.M. was the same at 8 A.M. (i.e., no diurnal increase was evident). Thus, the major portion of the diurnal change occurring between 8 A.M. and 8 P.M. was associated with the ingestion of food. Project reference: 7-83-01-005B. QMC EP TR 76.

Effects of localized cooling of the hands versus total body cooling on performance of a complex manual task, by Henry F. Gaydos and Edwin R. Dusek. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Aug 1957. 12p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 133493

Subjects were tested on complex manual performance tasks under two different environmental conditions after a period of training to control learning effects. Under one condition, only the subject's hands were cooled while the rest of his body was exposed to a comfortable ambient temperature (70° - 80° F). In the other experimental condition the subject worked in toto in a low ambient temperature (15° F). The tests were given, in both cases, when hand skin temperatures reached certain pre-

determined levels. Results indicate that performance was impaired when hand skin temperature dropped, but there was no significant effect attributable to the temperature of the air to which the clothed body was exposed. Hand temperature seems to have been the primary determinant of performance decrement. Project 7-83-01-005. QMC EP TR 65.

Evaluation of histamine itch technique for measuring skin irritation from clothing, by Frank E. Cormia, John W. Dougherty, and Shirley A. Unrau. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Research Division, Quartermaster Research and Engineering Center, Natick, Mass. Oct 1957. 19p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 133494

The literature on inflammation and itching has been reviewed and studies made of mechanisms underlying these processes. Cutaneous inflammation is concluded to result from accelerated proteolytic activity in human skin. The mechanisms involved in pruritus are apparently similar to those of inflammation. Responses to injections of various proteolytic agents are discussed from the standpoint of "normal" response and response in patients with various types of dermatitis, uticaria, and pemphigus. QMC EP TR 72.

Fate of energy-rich phosphates in red blood cells and brain in anoxic states, by Fritz Eichholtz, E. Gerlach and J. Döring. Heidelberg. Universität. Pharmacological Institute, Heidelberg, Germany. May 1956. 12p photos, graphs. Order from LC. Mi $2.40, ph $3.30. PB 125614

The result of these experiments is definite: Anoxemia does not lead to any charge in content of energy rich phosphates. AD 96212. Covers period 1 May 1955-30 Apr 1956 under Contract AF 61(514)-823. AF OSR TN 56-404.

Final progress report covering period 1 Oct 1955-31 Oct 1956, under Contract Nonr-1844(00), by Ralph I. Dorfman. Worcester Foundation for Experimental Biology, Shrewsbury, Mass. Nov 1956. 25p tables. Order from LC. Mi $2.70, ph $4.80. PB 133549

Exposure of the isolated, ACTH-stimulated calf adrenal to moderate doses (1802 to 2739r) of gamma radiation (Co^{60}) during perfusion resulted in a significantly decreased production of hydrocortisone, corticosterone, and related material. Using essentially the same experimental design it was found that the irradiated gland shows a significant reduction in the ability of the gland to carry out four important biosynthetic reactions, namely, 11β, 17α, and 21-hydroxylation as well as the oxidation of the Δ^5-3β-hydroxyl group to the Δ^4-3-ketone group. These studies indicate that the adrenal cortex is a radiosensitive tissue in contrast to certain morphological studies which indicated that this tissue is radioresistant. Aldosterone has been detected in calf adrenal perfusates. It has been demonstrated that neither ACTH nor growth hormone effectively modify aldosterone production and/or secretion but that decreased sodium and increased potassium concentrations in the perfusing medium caused significant increases in aldosterone secretion.

Intestinal absorption of unhydrolyzed tripalmitin, by Raymond Reiser and Julius W. Dieckert. Texas. Agricultural Experiment Station. Dept. of Biochemistry and Nutrition, College Station, Tex. Sep 1955. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 127350

Two 200 mg. samples of a mixture containing 10 per cent tripalmitin, (glycerol and fatty acid labeled) and 90 per cent triunsaturated gylceride were fed to a rat at two different periods. The amount of glycerol labeled saturated triglyceride in the lymph was a measure of the unhydrolyzed labeled tripalmitin present. The percentage of the latter in the total ingested fat in the lymph may be considered as the upper limit of the percentage of ingested tripalmitin absorbed unhydrolyzed. It was found to be 3.3 per cent and 3.2 per cent in the two periods, respectively.

Manual performance and finger temperature as a function of ambient temperature, by E. Ralph Dusek. U.S. Army. Quartermaster Research and Engineering Command. Environmental Protection Research Division. Quartermaster Research and Engineering Center, Natick, Mass. Oct 1957. 13p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133237

The results indicate that lowering ambient temperature: (1) reduces fine finger dexterity more than gross hand dexterity; (2) increases variability and decreases level of manual performance; (3) decreases finger skin temperatures. However, no significant correlations were found between finger skin temperature and manual performance. Project 7-83-01-005B. QMC EP TR 68.

Mechanism of emesis following X-irradiation, by S.C. Wang, A.A. Renzi, and Herman I. Chinn. U.S. Air Force. Air University. School of Aviation Medicine, Randolph Air Force Base, Tex. Dec 1957. 6p tables. Order from LC. Mi $1.80, ph $1.80. PB 133811

It has been shown that dogs exposed to 800 r total-body irradiation vomited within 2 hours after completion of exposure. After chronic destruction of the chemoceptive emetic trigger zone, no dogs vomited within 2 hours of radiation. It was observed that these operated animals would vomit later throughout their period of survival. Visceral deafferentation alone (abdominal vagotomy and sympathectomy) did not prevent dogs from vomiting soon after irradiation nor within several days. On the other hand, neither

acute nor delayed emesis due to irradiation was observed in dogs with chronic destruction of the chemoceptive trigger-zone and abdominal deafferentation. It appeared, therefore, that delayed vomiting following lethal total-body irradiation was mediated th through two mechanisms: the centrally located trigger zone, and the peripheral visceral afferent receptors of the vagus and sympathetic trunks. AF SAM R 58-34.

Mechanisms of tolerance to tissue transplants, by Ray D. Owen. California Institute of Technology. Division of Biology, Pasadena, Calif. Jun 1957. 13p. Order from LC. Mi $2.40, ph $3.30. PB 134600

Objective was to attempt to extend the ability to acquire graft tolerance into more mature states than the embryonic stages to which this ability has so far been restricted, to investigate the possibility that tolerance acquired naturally by embryos may affect the sensitivity of adults to antigens with which they come in contact, and to contribute toward the eventual understanding of the mechanisms of tolerance. Contract Nonr 220(20), NR 121-334, Final report.

Nomograph of the hand and its related dimensions, by Edmund Churchill, Alma Kuby, and G.S. Daniels. Antioch College, Yellow Springs, O., and U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1957. 54p drawing, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134455

The design of equipment which must fit closely a part of the user's body cells for a knowledge both of the actual dimensions and of the interrelationships among these dimensions. This report brings together both types of information for the hand. Dimensional data for the hands of both male and female are summarized in tabular and graphic form. Intensities of the interrelationships within each of the two groups of dimensions are given in the form of tables of correlation coefficients. A series of tables supply estimates of the other dimensions for the appropriate ranges of values of hand length, hand breadth at metacarpale, hand breadth at thumb and fist circumference. Nomographic charts are presented for estimating the related dimensions for all likely combinations of values of the hand lengths and breadths. AD 118162. Contract AF 33(616)-3841. Contract AF 18(600)-30. AF WADC TR 57-198.

Physiology of simple tumbling, by R. Edelberg, H. S. Weiss and others. U.S. Air Force. Air Research and Development Command. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Order separate parts described below from LC, giving PB number of each part ordered.

Part 1. Animal studies. Jan 1954. 43p photos, diagrs, graphs, tables. Mi $3.30, ph $7.80. PB 134853

The tumbling that follows emergency escape from an aircraft by seat ejection or that occurs during prolonged free-fall poses a threat to the escaping crewman. Tumbling was simulated in the laboratory on a horizontal spin table using anesthetized dogs as subjects preliminary to human experimentation. AF WADC TR 54-139, Part 1.

Part 2: Human studies. Jan 1954. 26p photos, graphs, tables. Mi $2.70, ph $4.80. PB 134852

In order to assess the tolerance limits to head-over-heels rotations or flat spins, as likely to be encountered in escape from aircraft, human subjects were spun on the horizontal spin-table. The experiments were guided by previous animal investigations but runs on human subjects were limited to 125 rpm because of the onset of pressure pain in the head or feet. During the spin, the physiological behavior of the humans closely resembled that of the dogs and, on the basis of this, curves for the responses of humans at speeds up to 110 rpm were extrapolated to the level of circulatory failure. By this procedure, it was estimated that the border line of unconsciousness would be reached after three to ten seconds of rotation at 140 rpm and complete unconsciousness after three to ten seconds at 160 rpm with the center of rotation at the heart. The data, together with performance tests and the observation of conjunctival petechiae, were used to determine the time-intensity areas of safe and dangerous rotations. AF WADC TR 53-139, Part 2.

Some ultraviolet microspectrophotometric measurements on isolated nerve axons, by Douglas Ambrose Eggen. Chicago. University, Chicago, Ill. Mar 1957. 34p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30, PB 132969

AD 126465. Thesis, University of Chicago.
1. Spectrophotometers, Micro - Uses
2. Spectroscopy, Ultraviolet 3. Nervous system - Physiology 4. Contract AF 18(600)-1482 5. AF OSR TN 57-171

PSYCHOLOGY

Comparison of a linear scale and three logarithmic scales on the time for check reading, by Jerome Cohen and Albert J. Dinnerstein. Antioch College, Yellow Springs, O. Mar 1958. 21p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134640

The results indicate that a linearly graduated scale is read faster than a highly asymetrical logarithmic scale. The inferiority of the highly asymetrical logarithmic scale is believed to be caused principally by the progressive changes in meaning of the graduation marks. It is concluded that although linear scales are generally preferred to logarithmic scales, logarithmic scales are satisfactory providing the scale graduation marks retain their identity over the entire scale. AD 118017. Project 7186, Task 71545. Contract AF 33(616)-3404. AF WADC TR 57-63.

Effect of intense stimulation on the perception of time, by M. Loeb and R. George Richmond. U.S. Army Medical Research Laboratory. Psychology Dept., Fort Knox, Ky. Jun 1957. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132910

An exploratory experiment was conducted on the ability of subjects to make successive estimations, with feed-back, of 10-minute and 3-minute periods by the method of production. Successive judgments without feed-back were then performed in one hour sessions in the presence of 110 db noise and normal illumination, 80 db noise and intense illumination, and 80 db noise and normal illumination. The difference in illumination was not correlated with a difference in time judgments. The difference in noise levels was accompanied by a difference in time judgments but these differences did not reach the 0.05 level of significance. Project no. 6-95-20-001, Subtask - S-3. AMRL R 269.

Evaluation of unusual attitude recovery procedures, by William E. Wharton. U.S. Air Force. Air Research and Development Command. Training Research and Development Section, Moody Air Force Base, Ga. n.d. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134603

Project TR & D 57-1.
1. Indicators, Attitude - Evaluation

Experiment on the coding of numerals for tape presentation, by Jerome Cohen and Ilse B. Webb. Antioch College, Yellow Springs, O. Dec 1953. 18p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133518

Twenty-four subjects were tested to determine the speed and accuracy with which they could read Arabic numerals and five systems of coded numerals. The experiment provides preliminary information about the applicability of certain principles of coding in the selection of numeral representations for the punch or printed tape method of presenting information to airborne personnel. AD 43529. Contract AF 18(600)-50. AF WADC TR 54-86.

Form recognition as a function of the number of forms which can be presented for recognition, by Ray Hyman and Harold W. Hake. Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. May 1954. 24p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 134711

The effect upon the recognition thresholds, as measured by the duration of tachistoscopic exposures, of the number of alternative forms from which one was drawn for presentation to subjects was studied for two types of visual stimuli. These were four different geometric forms and four different orientations of the same form. For each of these two sets of stimuli the average threshold for the recognition of a stimulus was measured when it was one of the possibilities in each of the combinations of two, of three, and of four alternatives. Studies of the relative visibility of forms can have very little generality. AD 50568. Contract AF 33(038)-22642. AF WADC TR 54-164.

Further on-the-job evaluation of the English fluency battery for insular Puerto Ricans, by Harry Kaplan, Nathan Rosenberg, and others. U.S. Adjutant General's Office. Personnel Research Branch. Nov 1957. 24p drawing, tables. Order from LC. Mi $2.70, ph $4.80. PB 133388

A representative group of 541 IPR's was tested prior to English training, and again after sixteen weeks of basic combat and advanced individual training and reevaluated four months after assignment. EFB was found to be very satisfactory for predicting which IPR's would show later English proficiency. DA Project 29560000. WD AGO PRB TRR-1108.

Interaction effects in judgments of curvature, by Olin W. Smith and Patricia C. Smith. Cornell University, Ithaca, N.Y. Mar 1957. 26p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132841

1. Space perception - Psychological factors
2. Contract Nonr 401(14)

Investigation of hydraulic low friction Teflon cap seals, by John O. Bruno. Hydra-Power Corporation, New Rochelle, N.Y. Dec 1957. 61p photos, drawings, diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 133979

A low friction rod seal was required for hydraulic actuators which would increase "O" ring life and minimize rod seal leakage. A test actuator, rod seals and corresponding hydraulic impulse and driving circuits were designed and built. Both static and cycling tests were conducted on various size seals with varying cross sectional "O" ring squeeze. Final design criteria are shown. AD 118213. Project 1371, Task 13495. Contract AF 33(600)-28637. AF WADC TR 57-163.

Multidimensional stimulus differences and accuracy

of discrimination, by Charles W. Eriksen. Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. Jun 1954. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 134710

This report is concerned with the effect of stimulus variation in several dimensions simultaneously upon the accuracy of discrimination in absolute judgment. The dimensions were size, hue and brightness, The discrimination measures for these dimensions were obtained separately and were compared with discrimination measures obtained by compounding these dimensions in various ways. AD 50076. Contract AF 33(038)-22642. AF WADC TR 54-165.

Operator efficiency as a function of scope size, by Stanley B. Williams, Burton R. Wolin, John K. Bare, William Wagman, and Kenneth Hageman. College of William and Mary. Dept. of Psyshology, Williamsburg, Va. n.d. 39p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 125197

Experiments have been carried out to determine the relationship between a radar operator's visual detection efficiency and the size of the radar scope, using optical simulation of real radar. A few data were also collected by a different method in order to aid in a theoretical analysis of the general scope size problem. Finally, a theoretical interpretation of the whole problem of scope size is offered. AD 61404. Contract AF 30(602)-578, Final report.

Orientation by aural clues, by I. Kohler. Jun 1957. 15p photos, drawings, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 132017

An abstract of results using as experimental material flies of the family Drosophilidae, and more recently, flies belonging to other families. AD 136462. Translated from Die Pyramide, Naturwissenchaftliche Monatsschrift, no. 6/7, May 1957 by Heller-Merricks. Contract AF 61(514)-889. AF OSR TN 57-54.

Phase-plane as a tool for the study of human behavior in tracking problems, by Harold L. Platzer. Franklin Institute. Laboratories for Research and Development, Philadelphia, Pa. Nov 1955. 16p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 134387

The phase-plane technique has been used to study human behavior in specific tracking problems. This technique is well suited to the study of the response characteristics of the human operator when step inputs are used. For these inputs, the appearance of sharp corners in the phase trajectories is evidence of non-linear behavior by the human operator. Evidence of strong non-linear behavior has been observed experimentally when the dynamic system is stable or unstable. AD 95758. Project 7182, Task 71510. Contract AF 33(038)-10420. AF WADC TR 55-444.

Punched card procedure for the method of successive intervals, by Samuel J. Messick, Ledyard R. Tucker, and Harry W. Garrison. Princeton University, Dept. of Psychology and Educational Testing Service, Inc., Princeton, N.J. Nov 1955. 25p tables. Order from LC. Mi $2.70, ph $4.80. PB 127187

A punched card procedure for a general weighted least – squares solution to successive intervals is described. Use of zero weights permits application of this procedure to cases of incomplete data. The procedure outlined suggests use of an IBM Type 101 statistical sorter for obtaining frequency counts. Conversion of frequencies to normal curve deviates and assignment of weights is accomplished on a gang punch. The main procedure is an iterative process with repetitive cycles of computation using a calculating punch, Type 602-A, and a tabulator. A numerical example is given to illustrate the machine sequences. The example employs data collected by Saffer. The resulting scale values and discriminal dispersions are approximately linearly related to corresponding values found by Saffer and Gulliksen. Project on "Mathematical techniques in psychology". National Science Foundation Grant NSF G-642. Contract N6 onr-270-20, NR 150-088.

Relationship between 1000" range and known-distance range rifle scores, by Frank J. McGuigan. George Washington University. Human Resources Research Office, Washington, D.C. Dec 1953. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 132412

1. Military training - Methods 2. Marksmanship - Training 3. GWU HRRO RM 3

Research on speech synthesis. Massachusetts Institute of Technology. Acoustics Laboratory, Cambridge, Mass. Mar 1958. 52p photo, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134597

This report summarizes the speech communication research at the M.I.T. Acoustics Laboratory. The research included studies of the production and perception of vowels and consonants and the development of instrumentation for the synthesis of speech. AD 152365. Scientific report 17. Covers period Dec 1 1956-Feb 28, 1958 under Contract AF 19(604)-2061. AF CRC TN 58-140.

Research study of the general problem of information reception by people under multi-source conditions. Summary of research, 1 Feb 1953-30 Sep 1956. Final report for Contract AF 18(600)-571, by James P. Egan. Indiana. University. Hearing and Communication Laboratory,

Bloomington, Ind. Nov 1956. 33p. Order from LC. Mi $3.00, ph $6.30. PB 126927

Presents abstracts of the research accomplished from Feb 1, 1953 - Sep 30, 1956. AD 98833. AF CRC TR 56-56.

Some determinants of the threshold for visual form, by M.E. Bitterman, and John Krauskopf. Texas. University, Austin, Tex. Sep 1953. 39p photo, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134390

A diffusion model for visual form perception was derived from the Kohler-Wallach theory of figural after-effects. Implications of the model were tested in experiments designed to measure foveal form and brightness thresholds (for intensity figures briefly exposed in a dark room) in terms of intensity of illumination. AD 23337. Contract AF 33(616)-63. AF WADC TR 53-331.

Techniques for the study of team structure and behavior, by Murray Glanzer and Robert Glaser. American Institute for Research, Pittsburgh, Pa. Contract N7 onr 37008, NR 154-079. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Analysis of structure. Jun 1957. 49p diagrs, tables. Mi $3.30, ph $7.80. PB 134349

The main purpose of this paper is to examine the work relevant to the structure of task-oriented groups or teams. Emphasis is on communication structure, as referring to a relationship or a set of relationships in a group. AIR-26-57-FR-153.

Part II: Empirical studies of the effects of structure. Jun 1957. 39p diagrs, tables. Mi $3.00, ph $6.30. PB 134462

Presents: 1. The initial work by Bavelas and his students; 2. Variations and repetitions of the basic design; 3. Further studies of Shaw and his associates; 4. Studies stemming from the Group Networks Laboratory, followed by a discussion of the implications of the work. AIR 26-57-FR 154. For Part I see PB 134349.

Temporal predictions of motion inferred from intermittently viewed light stimuli, by Robert E. Morin, David A. Grant, and Charles O. Nystrom. Wisconsin. University, Madison, Wis. Jan 1954. 18p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 133513

The accuracy of predicting when a moving object will reach a target was studied in the following procedural context: No real movement occurred, but instead the subject viewed the successive illumination of two or four cue lights which were placed at even intervals in a horizontal row. Illumination of the cue lights represented momentary viewings of a moving object as it might be seen on a radar scope. After the illumination of the last cue light, the subject estimated the time it would take the imaginary object to reach a target light by pressing a button at the moment of predicted arrival. Twenty-two Ss seated 16 ft. from the stimulus display made three estimations of "time to arrive" at the target light under each of the 16 conditions of the experiment. These 48 estimations were obtained in a suitably randomized and balanced sequence. AD 37703. Contract AF 18(600)-54. AF WADC TR 54-69.

Validity of prediction from laboratory experiments to Naval Operational situations in the area of human engineering and systems reseach, by W.R. Garner. Johns Hopkins University. Psychological Laboratory, Baltimore, Md. Dec 1950. 13p. Order from LC. Mi $2.40, ph $3.30. PB 134602

The general conclusion is made that in view of the high generality of prediction from laboratory research, and the usual accuracy with which such predictions can be made, actual operational experimentation is rarely needed. In terms of relative cost and time, certainly, it is difficult to justify operational experimentation as being superior to laboratory experimentation. Report 166-I-130. Project NR 784-001. Contract N5 ori-166, T.O. I.

Visual acuity and light adaptation, by Anthony Debons. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Oct 1957. 19p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132766

The time course of visual acuity as a function of light adaptation was determined for adapting retinal illuminances ranging from -2.36 to +4.84 log trolands. Measurements of visual acuity were obtained at periodic intervals between approximately eight seconds to 20 minutes following initial exposure to light. AD 131261. Project no. 7186, Task no. 45111. AF RADC TR 57-154.

RUBBER AND RUBBER PRODUCTS

Development of solvent ply cement for GR-S elastomers and/or a modified synthetic rubber with natural tack. Summary and final report of phase I-B covering the period 1 Apr-31 Oct 1955, under Contract DA 20-089-ord-37079, by R.G. Jennen and O.M. Grace. Burke Research Company, Van Dyke, Mich. Nov 1955. 79p diagrs, tables. Order from LC. Mi $4.50, ph $12.30. PB 132363

This project was devoted primarily to developing a satisfactory solvent cement based on synthetic materials or such natural materials, which can be made available within the border lines of the United States. The second objective, the development of a synthetic rubber with tire-building tack, was approached by (1) copolymerization of vinyl basic monomers with butadiene and styrene, (2) graft polymerization of various vinyl monomers onto GR-S 1500, and (3) use of additives with GR-S elastomers. Two hundred and nine fully synthetic cement stocks were compounded. One hundred eighty two of them could be dissolved in toluene or Rubber Makers Solvent and were tested for adhesion. Project TTI 718.

Field test of nitrile type synthetic rubber brake cups in trucks at Yuma, Arizona, by Virgil O. Hatch. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Feb 1957. 17p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 132452

Dept. of the Army project no. 593-21-094. ORD project no. TB 5-5010F, Report no. 34.
1. Brakes, Hydraulic - Fluids - Tests
2. Cylinders, Brake - Tests 3. APG CCL R 18

Vertical force-deflection characteristics of a pair of 56-inch-diameter aircraft tires from static and drop tests with and without prerotation, by Robert F. Smiley and Walter B. Horne. U.S. National Advisory Committee for Aeronautics. Feb 1957. 41p photo, drawing, graphs, tables. Order as TN 3909 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 125695

The vertical force-deflection characteristics were experimentally determined for a pair of 56-inch-diameter tires under static and drop-test conditions with and without prerotation. For increasing force, the tires were found to be least stiff for static tests, almost the same as for the static case for prerotation drop tests as long as the tires remain rotating, and appreciably stiffer for drop tests without prerotation. NACA TN 3909.

STRUCTURAL ENGINEERING

Buckling of a thin circular plate under two diametrically opposite forces, by Tsu-Tao Loo. Rensselaer Polytechnic Institute. Dept. of Mechanics, Troy, N.Y. Jan 1957. 15p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 132653

The instability of a thin circular plate under two diametrically opposite forces is investigated. The critical value for buckling under two compressive forces is obtained for a clamped edge. Contract Nonr-591(02), NR 064-405, Technical report no. 15.

Cumulative effects resulting from repeated irradiation of a simple laboratory specimen while under the influence of a static uniform bending moment, by William J. Blackstock and John C. Loria. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory, Cambridge, Mass. Jul 1957. 37p photos, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 134408

An experimental study has been conducted to determine the depreciation in load-carrying ability of simple box-beams after repeated exposures to elevated temperatures while under the influence of static uniform bending-moments. The static loads were removed between each thermal cycle and the models were allowed to cool to room temperature. All of the statically-loaded specimens were irradiated on the tension cover-plate only. Two levels of structural loading and one value of thermal flux heat input were employed in the test series. AD 130954. Project 1350, Task 13605. Contract AF 33(616)-3259. AF WADC TR 56-653.

Deformation of circular and annular plastic plates under transverse impact loads, by Roy C. Alverson. Brown University. Division of Engineering, Providence, R.I. Aug 1956. 44p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 132217

1. Plates, Circular - Plastic deformation - Theory 2. Beams - Plastic deformation 3. Contract DA 19-020-ord-3172, Technical report no. 9

Determinization of buckling criteria by minimization of total energy, by Samuel Lubkin. New York University. Institute of Mathematical Sciences, New York, N.Y. Jul 1957. 62p diagrs. Order from LC. Mi $3.90, ph $10.80. PB 132301

With the assumption of constancy of the electric constants in Hook's Law over the range of strains involved, but no limitation upon magnitude of strains or displacements, formulae for strain energy are derived for several cases of interest. Exact buckling criteria are derived from the effect of small perturbations, from displacements in an unbuckled state, upon the total energy. AD 136567. Contract AF 49(638)-161. NYU IMM 241. AF OSR TN 57-579.

Fatigue-crack propagation and residual static strength of built-up structures, by Herbert F. Hardrath and Richard E. Whaley. U.S. National Advisory Committee for Aeronautics. May 1957. 11p diagr, graphs. Order as TN 4012 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 127431

Crack-propagation and static-strength tests in several types of built-up specimens and full-scale

wings are reviewed. The results, to date, indicate that the rate of crack propagation is influenced strongly by the mode of connecting the skin to stringers and by the proportions of areas of the skin and stringers. The analysis of residual static strength of complex structures indicates the feasibility of applying simple methods, but the results are subject to questions regarding the redistribution of loads, interactions between various members, and such seemingly trivial considerations as whether or not a crack terminates at a rivet. NACA TN 4012.

Flexure. Technical report no. 20 under Contract Nonr 562(10), by L.M. Milne-Thomson. Brown University. Division of Applied Mathematics, Providence, R.I. Jan 1957. 26p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132430

This paper presents a uniform method, depending essentially on a special formulation of the boundary condition, which leads via conformal mapping of the cross-section on a unit circle and Cauchy's formula, to a single flexure function. In terms of this single flexure function, which gives the shearing stress without further calculation, displacement, torsion and center of flexure may be found directly. The method is presented here for a simply-connected cross-section, but should be capable of extension to a doubly-connected cross-section which can be mapped on a circular annulus. the whole effect of the loading is expressed by a single complex parameter. Contract Nonr 562(10), NR 064-406. BU AM TR 20. GDAM C 11-20.

Large deflections of non-uniform elastic beams subjected to transient loads, by Joseph I. Harris. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1957. 32p graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 133502

This report presents a method of solving the nonlinear equation for large flexing motions of thin beams subjected to transient loads. The small deflection linearized equation is solved by successive approximations, and this solution is extended to large deflections by a perturbation scheme. The solution shows that the apparent dynamic load on any normal mode is not equal to the applied load. Because no experimental results on non-uniform beams are available, large deflections for a uniform cantilevered beam are predicted from the general solution and compared with experimental results. Agreement between experimental results and the general solution is better than that between experiment and the predictions from the solution of the linearized equations. DA project 5B03-04-002. ORD project TB 3-0112. APG BRL M 1105.

Method for calculating the torsional strain v.s. stress on an already axially loaded thin walled cylinder, by H. Payne, S.J. Czyzak, and W. Lucas. Detroit. University, Detroit, Mich. Mar 1958. 11p diagr, table. Order from LC. Mi $2.40, ph $3.30. PB 133960

The problem involving a superposed incremental torsion strain upon an already existing tensile strain in the plastic region was derived and some preliminary calculations were made. In this problem a thin-walled circular cylinder was considered because the torsional strain can be assumed to be pure shear strain; whereas, in a solid cyclinder the torsional strain would represent a mixture of shear and tensile strains. AD 154151. Contract AF 18 (600)-1466. AF OSR TN 58-248.

Redundant trusses of elastic-strain-hardening material, by Hans Ziegler. Brown University. Division of Applied Mathematics, Providence, R.I. Mar 1957. 27p diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 132644

In a redundant truss, the distribution of the internal forces depends on the deformations and thus on the dimensions of the elements as well as on their rheological response. The final distribution under a given system of loads usually depends on the way in which these loads have been applied. A precise knowledge of this final distribution is obtained only by a careful study of the behavior of the truss during the various steps of the loading process. Contract Nonr 562(10), NR 064-406. GDAM C 11-21. BU AM TR 21.

Thermal stresses in free plates under heat pulse inputs, by Jerome H. Weiner and Harold Mechanic. Columbia University. Dept. of Civil Engineering and Engineering Mechanics. Institute of Air Flight Structures, New York, N.Y. Mar 1957. 67p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 134656

A theoretical analysis is presented evaluating three simplifying assumptions frequently made in the calculation of the thermal stresses in aircraft components due to a heat pulse input: (1) neglect of temperature variation through skin thickness, (2) neglect of inelastic effects and (3) neglect of any large-rotations effects. AD 118156. Project 1350, Task 13605. Contract AF 33(616)-2071. AF WADC TR 54-428.

TEXTILES AND TEXTILE PRODUCTS

Development and evaluation of a laboratory test device to measure resistance of textile fabrics to rain, by Norwood H. Keeney. Lowell Technological Institute Research Foundation, Lowell, Mass. Mar 1957. 73p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134898

A series of water repellent fabrics were tested using

the rainroom, hydrodynamic and hydrostatic testers. Correlations between the hydrodynamic rainroom and hydrostatic - hydrodynamic test methods were obtained. Contract DA 19-129-QM-425, Final report.

Development of an outer shell and a functional clothing fabric, by Joseph L. Barach and Arthur S. Tingas. Celanese Corporation of America, Charlotte, N.C. Apr 1958. 78p graphs, tables. Order from OTS. $2.00. PB 151138

In the course of this program, a large number of experimental fabrics were prepared, dyed, finished, and evaluated. Details of fabric preparation, dyeing and finishing procedures followed, and results obtained are given in this report. Two fabrics were selected as the constructions most closely meeting the requirements. A Dacron/rayon blend for the functional clothing fabric and a Fortisan/cotton combination for the outer shell fabric. In addition, other constructions of interest were developed such as nylon/Verel, nylon/cotton, nylon/rayon, Fortisan/Dacron. Fortisan/Verel combinations and a nylon/rayon intimate fiber blend. AD 151133. Project 7320, Task 73202. Covers work from May 1956-Oct 1957 under Contract AF 33(600)-32556. AF WADC TR 58-30.

Development of specification requirements for mildew resistant cotton fire hose, by J.A. Miller and L.O. Lusson. U.S. Naval Shipyard, Philadelphia, Pa. Industrial Test Laboratory. Dec 1956. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 133229

An evaluation was made of samples of eleven commercially-available proprietary rotproofed cotton fire hose. The evaluation was based on the efficacy of each treatment in retarding fungus attack and the effect of the treating compound on the physical properties of the rubber lining. Eight supplementary compounds were used in fungus-proofing as many samples of fire hose specifically fabricated and treated for this investigation. Recommendation tions include specification requirements and test procedures for fungus-resistant cotton fire hose, commercial sources for such hose, and satisfactory fungicidal compounds. AD 117661. NSS 031-007. NAVSHIPS ITL 2604.

Effect of a synthetic lubricant and two dibasic acid esters on certain USAF fabrics, by Clarence D. Smith. U.S. Air Force. Air Research and Development Command. Wright Air Development Center, Materials Laboratory. Wright-Patterson Air Force Base, Dayton, O. Mar 1954. 19p tables. Order from LC. Mi $2.40, ph $3.30. PB 134712

This investigation was initiated to determine if fabrics employed by the USAF were subject to degradation or deterioration when exposed to the lubricating oil covered by Specification MIL-L-7808 and the acid esters, di-2-ethyl hexyl adipate and di-2-ethyl hexyl sebacate. AD 38147. AF WADC TR 54-12.

Evaluation of fungicidal treatments for cotton fabrics, by Joseph J. Moder and Charles W. Stuckey. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Apr 1958 119p photos, diagrs, graphs, tables. Order from OTS. $2.50. PB 151142

Separate rolls of cotton sateen fabric were treated with seven different fungicidal formulations, each formulation being applied at three concentration levels, both with or without water repellents. Six of the fungicide formulations contained copper 8-quinolinolate and one contained dehydroabietyl ammonium pentachlorophenate. Twelve months of indoor shelf storage produced a negligible strength loss both before and after agar plate exposure for all fungicides. The pattern of strength loss resulting from outdoor exposure varied among the test sites because of difference in the physical environment. A single linear equation, applicable to all test sites, was derived relating the strength retention to langleys of actinic exposure and relative humidity. Fabrics treated with dehydroabietyl ammonium pentachlorophenate consistently had the lowest breaking strength after outdoor exposure at all sites. AD 151127. Project 7312, Task 73124. Covers period of work from Nov 1952 to Jan 1958 under Contract AF 33(616)-3867. AF WADC TR 57-711.

Improvement of thermal stability of textile fibers. Progress report no. 4, covering the period 1 Jul 1956-30 Jun 1957, under Contract N 140(132) 57745B, by F.R. Eirich, I. Saad, and L. M. Leonard. Polytechnic Institute of Polymer Research, Brooklyn, N.Y. Jul 1957. 40p diagrs, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 132855

The purpose of this investigation was to increase the thermal stability of synthetic textile fibers with nylon as prototype. The literature survey showed work on cellulosic fibers but nothing of relevance for synthetic fibers. Based on known principles of polymer chemistry and experience in the field of thermal stability, a surface treatment was sought which would lead to a crosslinking or to infusible products on heating. After extensive screening, treatment with acrylonitrile seems to be the most promising approach. Among the number of methods designed to fix acrylonitrile in its polymeric form onto the nylon surface, soaking with aqueous catalyst and exposure to monomer vapor was the most promising procedure. The results of the screening tests and the various surface polymerizations were followed by a type of melting point apparatus designed to test the heat resistance of the fiber under its own weight.

Study of parachute seam design criteria. Pioneer

Parachute Co., Manchester, Conn. and Fabric Research Laboratories, Inc., Boston, Mass. Contract AF 33(616)-2807. Project 6065, Task 61512. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Investigation of the strength of nylon and rayon cloth seams, by Myron J. Coplan and Manfred G. Bloch. Jun 1956. 116p photos, diagrs, graphs, tables. Mi $6.00, ph $18.30. PB 134849

The strength of parachute canopy seams was determined for a wide range of specification fabrics. The effect of variation in stitch type, thread size, number of rows of stitches, tape reinforcing and stitiches per inch was studied. A mechanistic and semi-quantitative interpretation of the factors controlling seam efficiency was developed and it is indicated that certain intrinsic fabric characteristics, in inter-action with the seam construction, may be important in determining the ultimate strength yield at this joint. AD 110407. AF WADC TR 56-313, Part 1.

Part II: Investigation of the strength of nylon webbing joints, by Charles R. Miller. Jun 1956. 51p diagrs, tables. Mi $3.60, ph $9.30. PB 134850

The investigation attempts to evaluate the most efficient joint with respect to fabrication techniques, as well as strength considerations The variables considered were: 1. Type of joint; 2. Size of thread and sewing needle; 3. Pattern of stitching; 4. Number of stitches per inch. AD 110406. AF WADC TR 56-313, Part 2.

Study of the laws of the flow of fluids through fabrics, by Cecil D. Brown. Georgia Institute of Technology, Atlanta, Ga. Jan 1955. 82p photos, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 134273

Tests of flow were conducted with high pressure and low pressure equipment, on 14 nylon fabrics and four woven wire screens. Test results are analyzed and presented in tabular form. Theory is discussed in relation to evaluation of parameters α and β for these fabrics, to determination of the range over which theproposed law is valid, and to development of a means of obtaining these parameters from simple measurements of the cloth. AD 63438. Project 7320, Task 73201. Contract AF 33(038)-15624. AF WADC TR 54-199.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Aircraft vibrations due to brake chatter and squeal, by James L. Edman. Bendix Aviation Corp. Products Division, South Bend, Ind. Oct 1955. 152p photos, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 133991

The principal objective of this project was the determination of the design parameters that most greatly affect landing gear vibration due to braking action. To accomplish this objective, a series of static and dynamic tests were conducted on four different brake designs and brake sizes. The static tests established the design parameters of the four brakes and the test installations. The dynamic tests established the vibration characteristics of the four brakes on the test installations. Both theoretical and empirical techniques were used to predict the results of the dynamic tests. AD 95753. Project 1369, Task 13512. Contract AF 33(616)-490. AF WADC TR 55-326.

Downward crew ejection seat tests from the B-47B airplane, by Kenneth F. Hecht, Edward G. Sperry, and Francis J. Beaupre. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Wright-Patterson Air Force Base, Dayton, O. Nov 1953. 89p photos (part fold), diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 134781

It is concluded that the downward ejection seat is acceptable as an escape device for use in the B-47 airplane if provisions for automatic separation and parachute deployment are included for the crewman. AD 63501. AF WADC TR 53-443.

Flight ejection tests of the F-94 ejection seat equipped with telescoping rails, by Kenneth F. Hecht. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Nov 1953. 25p photos, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134775

A ground test of this design indicated that the loads imparted to the catapult caused rupture of the catapult innertube. As a result, telescoping rails were added to increase the guided stroke of the catapult. AD 49026. AF WADC TR 53-362.

Flight tests of downward and rearward ejected seats conducted with a B-29 airplane, by Gino P. Santi. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1953. 47p photos, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 134777

A series of 29 tests was conducted to investigate downward and rearward ejection of aircrew personnel as methods of emergency escape from disabled aircraft. All the tests were made in flight from a B-29 airplane. Test data was obtained from recording instruments and photographic airplanes. AD 76427. AF WADC TR 53-360.

Flight tests of the F-84D ejection seat, by K.F. Hecht. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1950. 31p photos, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 134780

Test results are presented, and the conclusion is drawn that the F-84D airplane ejection seat will satisfactorily withstand ejection loads, and that sufficient tail clearance will be provided for the ejected pilot up to the limit speed of the airplane. AD 49025. AF WADC TR 53-366.

Ground tests of a pilot ejection seat ejected through monolithic-, reinforced-monolithic-, and laminated-type canopies, by Kenneth F. Hecht. U.S Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1953. 26p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134776

The results of the tests indicate that the trajectory of the seat and pilot after ejection through the canopy is not seriously affected and adequate tail clearance will still be attained. AD 36306. AF WADC TR 53-361.

Parachute inflation process wind-tunnel study, by Edwin Pounder. California Institute of Technology, Pasadena, Calif. Sep 1956. 246p photos, drawings, diagrs, graphs (part fold), tables. Order from LC. Mi $11.10, ph $37.80. PB 134521

This report presents results of an experimental study of the parachute inflation process. The investigation was carried out in a low speed wind tunnel using small cloth models, and an analysis is presented which gives a basis for extrapolation of the data recorded to any reasonably low Mach number case. The drag of the parachutes and the shapes of the canopies during the inflation process are studied in considerable detail, and some qualitative studies of the flow fields are conducted. The principle variables studied are parachute type, velocity (dynamic pressure), and canopy porosity. The theoretical analysis develops a procedure by which full scale characteristics can be predicted from wind tunnel data, and several examples are computed to illustrate the technique. AD 97180. Contract W 33-038-AC-22054. AF WADC TR 56-391.

Snow as it effects aircraft ski performance, by Thomas L. Thompson. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1953. 132p photos, map, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 134454

Frozen lake snow cover is analyzed in terms of its effect on the operation of ski equipped aircraft. Included is a general analysis of the field data (including methods and equipment) obtained in various areas of Canada during the 1951-52 and 1952-53 winter field test phases of Project SOIAS (Sliding on Ice and Snow). The operational medium is discussed from the standpoint of snow crystal formation, precipitation, metamorphism and classification. the properties of snow are considered specifically as they may cause mechanical or frictional resistance to sliding of a ski. A theoretical discussion concerns the basic mechanism which causes the changes which take place in snow and ice with varying temperatures. Frozen lake areas are discussed from the standpoint of utility as an operational base for ski equipped aircraft. Appendices concern the development of equipment and methods for studying snow and international snow classification system. AD 93635. Covers period Oct 1951-Jun 1953. AF WADC TR 53-154.

Study of parachute opening, phase I., by J.R. Foote and J.B. Giever. Oklahoma. University, Norman, Okla. Sep 1956. 99p diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 134416

A model of the opening parachute is considered which permits extensive mathematical analysis. Included are the effects of nine physical parameters, governing drag, initial speed and diameter, parachute dimensions and load, altitude, cloth permeability, and a choking factor representing a difference between the model geometry and observed parachute geometry. The governing equations are developed to a point permitting calculations of system speed, opening rate, and shock force as functions of time. Numerous calculations were made in which the choking factor was varied to yield experimentally-known forces, the variation of this factor having been guided by means of analysis of motion pictures of parachute openings. Other theory was developed for calculation of the individual effects of all the parameters upon the shock force. AD 110675. Project 6065, Task 61513. Contract AF 33 (616)-2655. AF WADC TR 56-253.

Aerograph for temperature and humidity soundings from aircraft, by R.E. Ruskin, R.G. Julian, and J.M. Averitt. U.S. Naval Research Laboratory. Aug 1958. 21p photos, fold diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 135125

Aerograph AN/ AMQ-8 provides a simultaneous digital record of temperature, humidity, and static pressure vs time, and a graphical presentation of these parameters for each of the columns of digital data. The temperature recorded by this instrument is measured by an axial-flow vortex thermometer probe which automatically corrects for the dynamic heating due to the plane's speed. Humidity is measured in the same vortex probe by use of a cylindrical carbon hygrometer element surrounding the temperature bulb. Thus the temperature at the hygrometer can be directly read from the temperature indication. Washout of the hygrometer element is eliminated during flight by the centrifuging action of the vortex in which the hygrometer is mounted. Modifications permit use of this aerograph packaged in a wing nacelle or with a trailing sonde for helicopter use. NRL R 5166.

Analysis of a device for control of rotational motion, by Norris W. Carlson. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1958. 28p photo, diagrs, graphs. Order from OTS. 75 cents. PB 151135

By varying the moment of inertia of a rotating body, speed changes are possible without a reaction on the support. A mechanical decelerator, based on the above principle has been successfully tested in the laboratory. Although this device was originated to control flat spin encountered in freefall human parachute drops, other applications appear useful. AD 151106. Project 7218, Task 71719. AF WADC TN 58-81.

Analytical investigation of acceleration restriction in a fighter airplane with an automatic control system, by James T. Matthews, Jr. U.S. National Advisory Committee for Aeronautics. Jan 1958. 24p diagrs, graphs. Order as TN 4179 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 126232

1. Airplanes, Fighter - Controls 2. Gust loads - Simulation - Equipment 3. Airplanes - Control systems - Simulation 4. Controls, Automatic - Operation - Theory 5. Controls, Longitudinal - Operation - Theory 6. NACA TN 4179

Development of equipment for the experimental measurement of the moments of inertia, and product of inertia of aircraft, by Claude R. Woodard. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Jun 1954. 44p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 133821

The design and development of equipment for the experimental measurement of the moments of inertia and the product of inertia of airplanes by the spring oscillation method are discussed. Design information in the form of airplane jack point location, jacking loads, jack point clearances, estimated values of moment of inertia etc. for a variety of aircraft, are tabulated. The design evolution is discussed, indicating the reasons for various design features considered but later discarded. Structural design loads and margin of safety are given. The calibration and shakedown of the equipment are discussed, and representative test data are included. AD 80297. Project 1365, Task 13550. Report TB-822-F-3. Contract AF 33(616)-182, Suppl. agreement 5. AF WADC TR 54-237.

Diaphragms and linkages for pressure-operated flight instruments, by E.P. Gutterman. Engineering Research Associates, Arlington, Va. Apr 1956. 225p photos, diagrs (part fold), graphs (part fold), table. Order from LC. Mi $9.90, ph $34.80. PB 134858

This report covers a program of research and development concerned with improvements in diaphragms and linkages for pressure-operated flight instruments. As originally specified, the objective of this work was to study and confirm by test the characteristics of diaphragms of various materials shapes, thicknesses, etc., and to make recommendations covering the best diaphragm-linkage combination to satisfy particular requirements in instruments of the types listed below: Indicator, Airspeed, Type F-4; altimeter, Type AN 5760; Machmeter, Type A-2; Indicator, Tru Airspeed, Type B-1. AD 93636. Contract AF 33(038)-23069, Final report. AF TR 6149.

Effect of an improved orientation aid on target acquisition with the hemispheric sight, L.B. Wyckoff, C.S. Bridgman, and L. Tabory. Wisconsin. University, Madison, Wis. Jan 1954. 9p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 133514

This experiment is part of an investigation of the problem of orientation in periscopic type sights. The problem, briefly stated, is that an operator looking through the sight has no immediate indication of where the sight is pointed, and thus may not know which way to move it to pick up a target whose position is known. The present experiment was designed to test the effect of a simple orientation aid on the speed of slewing to and acquiring targets which have been spotted outside the sight. Subjects were tested on slewing and acquisition of a series of stationary targets, using "velocity" hand controls.

Two groups of subjects were tested, one with and one without the orientation aid. The aid consisted of eight illuminated lines radiating from the center of the target space and stationary with respect to the target space. This aid, although actually presented in the target space, simulated an aid which could be incorporated as a moving reticle in the focal plane of the sight. AD 28900. Contract AF 18(600)-54. AF WADC TR 54-67.

Estimate of performance of jet engine noise suppressors for flight use, by T.L.K. Smull, L.L. Beranek, and others. Central Institute for the Deaf, St. Louis, Mo. Jun 1957. 4p. Order from LC. Mi $1.80, ph $1.80. PB 134702

1. Jet engines - Noise - Reduction 2. Contract Nonr 1151(01), NR 140-069, Technical report 13 3. CHABA MR-3

Flight investigation of the acceptability of a small side-located controller used with an irreversible hydraulic control system, by Helmut A. Kuehnel and Robert W. Sommer. U.S. National Advisory Committee for Aeronautics. Jul 1958. 19p photos, diagr, graphs, tables. Order as NACA TN 4297 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 134931

1. Airplanes - Controls - Location 2. Hydraulic controls 3. NACA TN 4297

Liquid oxygen manifolded distribution systems, by Henry Steiner II. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1953. 16p photo, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 133974

The operation, test procedures, and test results of liquid oxygen manifolded distribution systems have been compiled and evaluated. Experimental data were obtained by bench tests and flight tests, conducted from July 1950 to the present. The Spring Load Check Valve Manifold System is operationally suitable for use in aircraft requiring manifolding of two liquid oxygen converters. AD 13027. AF WADC TR 53-89.

Proposed life preserver for air evacuation patients of the Military Air Transport Service, by John Kishler, Otto Kahn, and others. Dunlap and Associates, Inc., Stamford, Conn. Aug 1953. 75p photos, maps, diagrs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134514

The purpose of this study is to recommend specifications for a life preserver which will provide adequate flotation for military patients transported over water by the Military Air Transport Service. To accomplish this purpose, the medical and operational requirements for an adequate life preserver are determined, and tentative design specifications are derived to satisfy these requirements. The tentative design spedifications are then evaluated in a series of tests. AD 41629. Contract AF 33 (616)-364. AF WADC TR 53-296.

Some effects of valve friction and stick friction on control quality in a helicopter with hydraulic-power control systems, by B. Porter Brown and John P. Reeder. U.S. National Advisory Committee for Aeronautics. May 1957. 8p diagr. Order as TN 4004 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 127326

1. Helicopters - Controls 2. NACA TN 4004

Stabilizer for airborne equipment, by Russell Lowe. Barry Corporation, Watertown, Mass. Jun 1954. 82p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 133996

This report describes the development of a stabilizer for airborne equipment. Detailed data on the final prototype model are presented. The stabilizer is intended for use in conjunction with airborne equipments mounted on vibration mounting systems that are ordinarily unstable due to configuration and weight distribution. AD 58602. Project 4155, Task 41608. Contract AF 33(600)-23106. AF WADC TR 54-366.

Variable delay timer for premixed gaseous propellant rocket engines, by Loren E. Bollinger. Ohio State University. Dept. of Aeronautical Engineering, Columbus, O. Oct 1953. 27p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133511

A timer has been developed to aid in eliminating or at least minimizing the damage when flash-back occurs in rocket engine or burner experiments with premixed-gaseous propellants. Flash-back is detected by a thermocouple attached to the line carrying premixed gases to the rocket engine. When flash-back takes place, the thermocouple output is indicated on a special variable-contact type pyrometer. A programmed sequence of inert gas injection and propellant flow shut-down is initiated when the pyrometer output exceeds a pre-determined value. Nitrogen is injected into the mixing chamber to dilute the explosive mixture and reduce the temperature of the mixing chamber and lines after flash-back takes place. Propellant flow is terminated after a short time delay. AD 43310. Contract AF 33(616)-2078. AF WADC TR 53-428.

Application of the closed cycle principle to aircraft auxiliary power plants: investigation of the influence of the flow factor on turbine efficiency, by R. Tognoni. Escher Wyss Engineering Works, Ltd., Zurich, Switzerland. Jul 1957. 11p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 134276

Helium in a gas turbine cycle requires turbo machinery with a large number of stages. This penalty is particularly undesirable for the compressor. It could be reduced by increasing the flow factors of the turbine (assuming equal tip speeds). The influence of large flow factors on turbine efficiency has been investigated. AD 152244. EW report no. Sp-AK-57-043. Technical note no. 7, issued as Vol. XI of the complete report. Contract AF 61 (514)-985. AF OSR TN 58-35.

Application of the closed-cycle principle to aircraft propulsion systems. Vol. II, by R. Tognoni and W. Spillmann. Escher Wyss Engineering Works, Ltd., Zurich, Switzerland. Jul 1956. 156p photo, fold drawings, diagrs (1 fold), graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 127102

AD 97088. Contains Chapters 3 to 7. EW report Sp-AK-56-027. For Vol. V see PB 125206.
1. Jet engines - Design - Switzerland 2. Jet engines - Propulsion systems - Switzerland 3. Jet engines - Electrical systems - Switzerland 4. Jet engines - Cooling - Switzerland 5. Contract AF 61(514)-854 6. AF OSR TR 56-46

Design of pressure-atomizing swirl-chamber spray nozzles, by W.W. Hagerty, R.A. Yagle and M. R. El-Saden. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Feb 1957. 37p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134379

This report presents information for the design of pressure-atomizing spray nozzles of the simple swirl-chamber and the dual-flow-type. Nozzle performance is given in terms of nozzle geometry and physical properties of the liquid to be sprayed. A theoretical analysis of such nozzles is reviewed, and experimental data are presented to show the extent of agreement between prediction and perform ance as well as the range covered. A sample design is given to illustrate the manner of application of equations and data. AD 118037. Project 3073, Task 30236. Contract AF 33(616)-2436. AF WADC TR 56-472.

Effect of standing transverse acoustic oscillations on fuel-oxidant mixing in cylindrical combustion chambers, by William R. Mickelsen. U.S. National Advisory Committee for Aeronautics. May 1957. 50p diagrs, graphs. Order as TN 3983 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 127438

1. Jet engines - Fuels - Combustion 2. Afterburners - Noise 3. Turbines, Gas - Combustion chambers 4. NACA TN 3983

Noise survey under static conditions of a turbine-driven full-scale modified supersonic propeller with an advance ratio of 3.2, by Max C. Kurbjun. U.S. National Advisory Committee for Aeronautics. Jan 1958. 17p photo, graphs, tables. Order as TN 4172 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 126228

1. Noise, Propeller - Airplanes 2. Noise, Propeller - Measurements 3. NACA TN 4172

Progress in the development of a large residual fuel combustion chamber, by J.C. Vrana. National Research Council of Canada. Division of Mechanical Engineering, Gas Dynamics Section, Ottawa, Can. Jan 1957. 20p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127338

1. Combustion chambers - Design - Canada
2. Turbines, Gas - Combustion chambers - Canada
3. NRCC MT-35

Qualitative simulator study of longitudinal stick forces and displacements desirable during tracking, by Stanley Faber. U.S. National Advisory Committee for Aeronautics. Feb 1958. 23p photo, diagr, graphs. Order as TN 4202 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 126246

1. Airplanes - Stability, Dynamic - Tests 2. Airplanes - Control systems - Simulation 3. Control sticks - Tests 4. Flight control equipment - Tests 5. NACA TN 4202

Rotating stall in single-stage axial flow compressors, by Theodore J. Falk. Cornell University. Graduate School of Aeronautical Engineering, Ithaca, N.Y. Sep 1956. 69p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 132482

Three sets of rotating-stall data obtained using single-stage axial-flow compressors are compared with the three rotating-stall theories developed by W.B. Sears, F.E. Marble and A.H. Stenning. All of the theories predict stall propagation speed with reasonable accuracy, or can be adjusted to do so by choice of a proper value of aerodynamic lag. AD 110327. Contract AF 18(600)-1523. AF OSR TN 56-512.

Theoretical ejector performance and comparison with experimental results, by Richard D. Wood, Minnesota. University, Minneapolis, Minn. Aug 1954. 193p photos, diagrs, graphs. Order from LC. Mi $8.70, ph $30.30. PB 134701

Ejector performance characteristics are investigated by means of a one-dimensional, compressible, gas flow analysis over a complete range of operating conditions. Consideration is given ejector geometry, pumping performance, thrust, optimum conditions, and efficiency. The effects of a variation in the primary flow temperature, use of a supersonic nozzle, and operation both with and without diffuser are presented. Comparisons of theoretical and experimental ejector performance are made. Agreement is good from a qualitative point of view in describing general ejector phenomena. AD 75501. Project 1366, Task 13620. Thesis: U. of Minnesota. Contract AF 33(038)-5131. AF WADC TR 54-556.

Two dimensional inflow conditions for a supersonic compressor with curved blades, by Philip Levine. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1956. 34p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134498

Results are presented on an analytical study of the flow field existing upstream of a blade row, where the axial flow is subsonic and the relative flow is supersonic. The flow model used as a basis for the calculations assumes isentropic flow, and considers the case where the suction surface is a circular arc in the entrance region. The results clearly show the unique dependence of the flow through a blade row upon the geometry of the entrance region. Using the results, the complete flow field in the entrance region and upstream of the blade row can be easily constructed. AD 101949. Project 3066, Task 70151. AF WADC TR 55-387.

Aerodynamics

Aerodynamic noise and drag measurements on a high-speed magnetically suspended rotor, by W.L. Nelson and C.M. Alaia. Columbia University. Acoustics Laboratory, New York, N.Y. Jan 1958. 58p photo, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 133976

This report describes measurements of aerodynamic noise, drag torque, and temperature effects produced at the surface of a magnetically suspended cylindrical rotor spinning in air at high speed. The primary objective of this investigation has been the measurement of aerodynamic noise. This has led to the development of apparatus and instrumentation for controlled measurement, within the laboratory, of the noise, drag, and thermal effects encountered in high speed flight in the atmosphere. The results of this study indicate that with certain improvements recommend in this report, this apparatus can be developed as a fruitful method for the investigation of boundary layer phenomena. AD 142153. Project 1370, Task 13463. Covers period Jan 1954-Oct 1957 under Contract AF 33 (616)-2331. AF WADC TR 57-339.

Approximate solution for streamlines about a lifting rotor having uniform loading and operating in hovering or lowspeed vertical-ascent flight conditions, by Walter Castles, Jr. U.S. National Advisory Committee for Aeronautics. Feb 1957. 41p diagrs, graphs, tables. Order as TN 3921 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 125697

1. Wings, Rotating - Theory 2. Helicopters - Rotors - Velocity, Induced 3. Helicopters - Rotors - Lift 4. NACA TN 3921

Boundary layer control on 64A006 and 64A010 airfoils at high subsonic speeds, by B.M. Leadon and G.E. Anderson. Minnesota. University. Dept. of Aeronautical Engineering, Minneapolis, Minn. Oct 1953. 101p photos, diagrs, graphs. Order from LC. Mi $5.70, ph $16.80. PB 134782

The effect of suction through a single spanwise slot or through a narrow spanwise perforated strip installed in the upper surface of either the 64A006 or the 64A010 airfoil is to increase the section lift, negative quarterchord moment, and net drag coefficients. AD 49023. Contract AF 33(038)-5131. AF WADC TR 53-490.

Boundary-layer transition on an opennose cone at Mach 3.1, by Paul F. Brinich. U.S. National Advisory Committee for Aeronautics. Feb 1958. 11p diagrs, graphs. Order as TN 4214 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 126249

1. Cones - Boundary layer 2. Cones - Aerodynamics 3. Boundary layer - Transition point 4. NACA TN 4214

Cascade investigation of a related series of 6-percent guide-vane profiles, and design charts, by James C. Dunavant. U.S. National Advisory Committee for Aeronautics. May 1957. 48p graphs, (1 fold), tables. Order as TN 3959 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C. PB 126082

Supersedes RML 54102. 1. Cascades (Aerodynamics) - Tests 2. Mach number - Effect 3. Compressors, Axial - Flow 4. NACA TN 3959

Collection of zero-lift drag data on bodies of revolution from free-flight investigations, by William E. Stoney, Jr. U.S. National Advisory Committee for Aeronautics. Jan 1958. 372p graphs, tables. Order as TN 4201 from National Advisory Committee for Aeronautics, 1512 H Street, N.W., Washington 25, D.C.
PB 126245

1. Bodies of revolution - Drag 2. Bodies of revolution - Fineness ratio 3. NACA TN 4201

Development of a variable Mach number sliding block nozzle and evaluation in the Mach 1.3 to 4.0 range, by J.L. Amick, H.P. Liepman, and T.H. Reynolds. Michigan. University. Dept. of Aeronautical Engineering, Ann Arbor, Mich. Mar 1955. 67p photos, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80.
PB 134499

A sliding-block wind tunnel nozzle was developed and tested in the Supersonic Wind Tunnel Facility of the University of Michigan at Mach numbers from 1.3 to 4.0. In this range the Mach number deviation from the average within a test rhombus is less than +0.9% and the flow angle deviation, less than +0.5°. The throat-to-test rhombus distance at the highest Mach number is 8.8 times the test-rhombus height. Over-all pressure ratios required are about the same as those of conventional wind tunnels. The use of a curvature gage to control contour tolerances is discussed. AD 75870. Project 1363, Task 70122. Contract AF 33(038)-23070.

Drag due to lift of a not-so-slender configuration: Application of theory, by Robert J. Vidal. Cornell Aeronautical Laboratory, Inc. Aerodynamic Research Dept., Buffalo, N.Y. Mar 1958. 31p diagrs, tables. Order from OTS. $1.00.
PB 151144

Cheng's second-order theory for minimizing the supersonic drag due to lift of rather nonslender wing-body combinations is briefly described, and the restrictions on the theory are reviewed. Methods are presented for applying the theory to aircraft and missile design with appropriate design charts for predicting the chordwise lift distribution of a wing-body combinations. The drag due to lift is calculated for three configurations, and the significance of these calculations is discussed. AD 151015. Project 5-(1-1366), Task 70113. Covers period Jun 1957-Oct 1957 under Contract AF 33 (616)-2933. For Part 1 see PB 131702. AF WADC TR 57-316, Part 2.

Drag minimization for wings in supersonic flow, with various constraints, by Max A. Heaslet and Franklyn B. Fuller. U.S. National Advisory Committee for Aeronautics. Feb 1958. 30p diagrs. Order as TN 4227 from National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C. PB 126250

1. Wings - Aerodynamics - Theory 2. Flow, Supersonic - Theory 3. NACA TN 4227

Drag of a thin body facorably interfering with a wing in supersonic flow, by Joseph H. Clarke and Franklin D. Hains. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Oct 1956. 61p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 134607

A comparison is made between the drags of thin, wing-like bodies and slender bodies of revolution when these bodies enclose the same volume and are immersed in the same supersonic stream. It appears that the sum of the wave drag and the viscous drag can be of comparable magnitude in each case when the chords are equal and the enclosed volume is sufficiently large. AD 110310. Project R 352-30-11. Contract AF 18(600)-694. AF OSR TN 56-496. PIB AL 310.

Effects of airplane flexibility on wing strains in rough air at 35,000 feet as determined by a flight investigation of a large swept-wing airplane, by Richard H. Rhyne. U.S. National Advisory Committee for Aeronautics. Jan 1958. 23p diagr, graphs, table. Order as TN 4198 from the National Advisory Committee for Aeronautics, 1512 H St., N.W., Washington 25, D.C.
PB 126242

1. Airplanes, Bomber - Altitude effects
2. Gust loads 3. Wings, Swept - Stress analysis
4. NACA TN 4198

Effects of structural flexibility on gust loading of aircraft. Massachusetts Institute of Technology. Peroelastic and Structures Research Laboratory, Cambridge, Mass. Contract AF 33(616)-2425. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Gust loads on swept-wing airplanes free to pitch and to deform statically, by K. A. Foss. Mar 1955. 116p diagrs, graphs, tables. Mi $6.00, ph $18.30. PB 134995

A simplified numerical method is presented for finding the gust loads on swept-wing airplanes free to pitch and to deform statically. The effects of the swept-wing and the fuselage penetrating a gust front and the effects of unsteady downwash from the wing on the horizontal tail are included. Some sample calculations indicate that the combination increases the gust loads on a rigid airplane, particularly the loads on horizontal tail. AD 84480, AF WADC TR 54-592, Part I.

Part II: Dynamic stresses in swept-wing airplanes, by A. A. Kirsch, J. M. Calligeros and K. A. Foss. Aug 1955. 201p diagrs, graphs, tables. Mi $9.30, ph $31.80. PB 134845

A simplified numerical method is presented for finding the transient stresses in a swept-wing airplane after entry into a gust. The effects of the pitching motion of the airplane and of the unsteady downwash at the tail on the transient stresses are included. Some sample calculations indicate that more degrees of freedom are necessary in the analysis of gust loads on a flexible swept-wing airplane than for an unswept-wing airplane, and that the alleviation of gust loads commonly attributed to flexible swept wings is always at least partially cancelled by the increased pitching motion of the airplane. AD 78081. AF WADC TR 54-592, Part II.

Electric -tank analogy solution of a linearized theory for the normal-force on a slender closed body-of-revolution, by W. B. Brower, Jr. Rensselaer Polytechnic Institute. Dept. of Aeronautical Engineering, Troy, N. Y. Feb 1957. 56p photo, diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 134608

The problem considered is the determination of the normal-force on a slender closed body-of-revolution slightly inclined to the main stream. A theory is formulated which represents the mechanism of normal-force generation by a vortex sheet in the wake. The magnitude and distribution of vorticity is determined by imposing a new boundary condition on the body tangential velocity along the zero-meridian line due to the combined effects of the transverse-flow and the vortex sheet. AD 115081, TR AE 5701. Contract AF 18(600)-499. AF OSR TN 57-43.

Experimental influence coefficients and vibrations modes of a built-up 45° deltawing specimen, by Eldon E. Kordes, Edwin T. Kruszewski, and Deene J. Weidman. U. S. National Advisory Committe for Aeronautics. May 1957. 41p photos, diagrs, graphs, tables. Order as TN 3999 from National Advisory Committe for Aeronautics, 1512 H St., N. W. Washington 25, D. C. PB 127437

1. Wings, Triangular - Flutter - Calculation 2. Wings, Triangular - Vibration - Calculation 3. Wings, Triangular - Stress analysis 4. NACA TN 3999

Experimental investigation of a pulse-start technique applied to a choked wind tunnel at Mach number 3.47, by Tung-Sheng Liu, Julio Cordero, and Eugene G. Voltin. Minnesota. University. Institute of Technology. Dept. of Aeronatical Engineering. Rosemount Aeronautical Laboratory, Minneapolis, Minn. Jun 1953. 143p photos, diagrs, graphs. Order from LC. Mi $7.20, ph $22.80. PB 133467

A choked wind tunnel was started by the application of a pressure pulse to the stagnation chamber from a shock tube in conjunction with a vacuum pulse generated in the vicinity of the supersonic diffuser. An asymmetric nozzle of Mach number 3.47 was installed in the tunnel. Visual observation indicated complete supersonic flow in the channel for a period of about two seconds maximum. The pulse-start technique can be applied most beneficially to large wind tunnels at high Mach numbers where the savings on power equipment and power consumption to be realized are substantial. AD 63616. Contract AF 33(038)-7078. AF WADC TR 53-140.

Experimentally determined natural vibration modes of some cantilever-wing flutter models by using an acceleration method, by Perry W. Hanson and W. J. Tuovila. U. S. National Advisory Committee for Aeronautics. Apr 1957. 46p photo, diagrs, graphs, table. Order as TN 4010 from National Advisory Committe for Aeronautics, 1512 "H" street, N. W., Washington 25, D. C. PB 125714

1. Wings, Cantilever - Flutter 2. Wings, Cantilever - Stresses 3. Wings, Cantilever - Vibration 4. NACA TN 4010

Experiments at low Reynolds numbers. Part I: Isolated airfoils. Part II: Axial flow turbomachine, by Joseph Neustein. California Institute of Technology. Hydrodynamics and Mechanical Engineering Laboratories, Pasadena, Calif. Mar 1957. 332p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $51.60 PB 134922

In Part I, experimental pressure distributions for three different types of airfoils were obtained in the Reynolds number range (based on airfoil chord) between 5,000 and 2000,000. Turbulence in the

main stream, varied over a wide range, was found to be effective in sustaining relatively high lift for thick airfoils at Reynolds numbers as low as 7,000. In Part II, the performance of a single stage, axial flow turbomachine was studied experimentally at low Reynolds numbers with a mixture of glycerine and water as the working fluid. The investigation had two primary objectives; first, a quantitative evaluation of overall performance as a function of Reynolds number, and second, an examination of the details of the flow within the blade rows. Each part paged separately. Nonr 220(23), NR 097-001, Report no. 6

Flight investigation of the effects of varied lateral damping on the effectiveness of a fighter airplane as a gun platform, by Helmut A. Kuehnel, Arnold R. Beckhardt, and Robert A. Champine. U. S. National Advisory Committee for Aeronautics. Jan 1958. 30p photo, drawings, diagr, graphs, tables. Order as TN 4199 from National Advisory Committee for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 126243

1. Airplanes, Jet-propelled-Flight tests 2. Airplanes-Stability, Dynamic-tests 3. Gun sights, Aircraft-Operation-Tests 4. Airplanes-Speed-Physiological effects 5. Gyro controls-Test 6. NACA TN 4199

Flutter of thin panels at subsonic and supersonic speeds (U), by J. E. Greenspon. Martin Company, Dynamics Research Staff, Baltimore, Md. Jul 1957. 83p drawings, diagrs, graphs (1 fold), tables (part fold). Order from LC. Mi $4.80, ph $13.80. PB 132506

This study revealed: 1) Subsonic skin flutter is possible; 2) The subsonic and, to some extent, the supersonic flutter of finite skin panels is a periodical interchange between quasistatic shapes of the skin and is thus more complex than was assumed in any previous theory; 3) A simple phenomenological analysis was developed as part of this investigation. The analysis is based on possible static shapes (for the membrane case) and gives qualitative agreement with the experimental results for the subsonic case; 4) Flutter, when it occurs, is self-limited in amplitude and is not necessarily destructive. Panel response due to external noise may, on the other hand, by destructive. A brief review of available theories is presented together with certain extensions. Includes "Some experiments on panel flutter", by Peter F. Jordan and Edward Widmayer, a talk given at the second Technical Symposium on Ballistic. Contract AF 18(603)-76. AF OSR TR 57-65.

Heat transfer measurements on a flat plate model at Mach number 5.0, by John L. Harkness. Texas. University. Defense Research Laboratory, Austin, Tex. Jan 1958. 61p photos, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 133481

This report presents the results of heat transfer measurements made on a flat plate model in a 6 x 7-inch wind tunnel at a free-stream Mach number of 5.05. The internal surface of the model was cooled and the heat transfer rate was determined by measuring the temperature drop across the model once temperature stabilization was achieved. A general description of the wind tunnel facility used is presented as well as a complete description of the design and construction details of the heat transfer model. The results of the tests are discussed and the data are presented both in tabular form and on plots for comparison with existing theories. AD 148118. Contract AF 18(600)-589, T.O. 17500. TU DRL 423. AF OSR TN 58-74.

Hilbert problem for an airfoil in unsteady flow, by Patrick Leehey. U. S. David W. Taylor Model Basin, Washington, D. C. Jan 1957. 34p graphs. Order from LC. Mi $3.00, ph $6.30. PB 132393

Birnbaum's linearization of the equations of motion for unsteady incompressible flow about a thin airfoil in arbitrary accelerated motion leads to a particular Hilbert problem with the complex perturbation velocity representing a sectionally holomorphic function which vanishes at infinity and satifies a condition on the real axis. General lift and pitching moment expressions are obtained and applied to special cases of a stop, change in angle of attack, a translatory oscillation, and that of an airfoil in an oscillating moving stream. DWTMB 1077.

Interference effects between total-pressure probes in the boundary layer of a supersonic wind tunnel, by Jack R. Lacy. Texas. University. Defense Research Laboratory, Austin, Texas. Jan 1958. 44p photos, diagrs, graphs. Order from L.C. Mi $3.30, ph $7.80. PB 133356

An experimental investigation was undertaken in a 6 x 6 inch, Mach number 5 wind tunnel to determine the extent of any mutual interference effects between total-pressure probes in supersonic flow. Blunt-nosed total-pressure probes of 0.035 inch outside diameter were tested at several different positions in the wall boundary layer of the wind tunnel. AD 148045. Project 17500. Contract AF 18(600)-589. TU DRL 420. AF OSR TN 58-6.

Investigation of the effects of leading-edge chord-extensions and fences in combination with leading-edge flaps on the aerodynamic characteristics at Mach numbers from 0.40 to 0.93 of a 45° sweptback wing of aspect ratio 4, by Kenneth P. Spreemann and William J. Alford, Jr. U. S. National Advisory Committee for Aeronautics. Apr 1957. 45p photo, drawings, graphs, tables. Order as TN 3845 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W. Washington 25, D. C. PB 125715

Supersedes RML53A09a. 1. Wings, Swept - Stability 2. Wing Flaps - Leading edges 3. Wing flaps-Wind tunnel tests 4. Stability, Longitudinal - Static tests 5. NACA TN 3845

Investigation of spoilers at a Mach number of 1.93 to determine the effects of height and chordwise location on the section aerodynamic characteristics of a two-dimensional wing, by James N. Mueller. U. S. National Advisory Committee for Aeronautics. Feb 1958. 52p photos, diagrs, graphs. Order as TN 4180 from National Advisory Committee for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 126233

1. Spoilers - Controls 2. Spoilers - Wind tunnel tests 3. Flow, Supersonic - Pressure distribution 4. Flow, Viscous - Pressure distribution 5. Loads, Aerodynamic 6. Wings - Aerodynamics - Effect of spoilers 7. NACA TN 4180

Investigation of the frequency response of pitot probes and preliminary measurements of the pitot pressure fluctuations in the N. A. E. 5-in pilot supersonic wind tunnel, by R. Westley. Canada. National Aeronautical Establishment. Aerodynamics Section, Ottawa, Canada. Dec 1957. 26p drawings, diagrs, graphs, tables. Order from L. C. Mi $2.70, ph $4.80. PB 132931

The frequency response characteristics of pitot probes were investigated with a view to the use of probes for the measurement of the pitot head fluctuations in a high speed wind tunnel. A sound source method was used to calibrate the responses of four pitot probes and a hypodermic boundary layer probe. The useful frequency range of a probe was found to decrease markedly with increase of the length of tube between the probe inlet and the pressure transducer. Preliminary measurements were made of the spectra of the pitot head pressure fluctuations in the contraction entry and working section of the N. A. E. 5-in. Pilot Wind Tunnel for a Mach number of 1.2. NAEC LR-214

Investigation of the heat-transfer characteristics of spheres in forced convection, by G. Xenakis, A. E. Amerman and R. W. Miche lson. Smith, Hinchman & Grylls, Inc. Aeronautical Icing Research Laboratories, Ypsilanti, Mich. Apr 1953. 53p photos, diagrs, graphs, tables. Order from L. C. Mi $3.60, ph $9.30. PB 134469

An investigation was conducted at the five-foot wind tunnel at Wright-Patterson Air Force Base to determine the heat-transfer characteristics of three different diameter spheres subjected to forced convective airflow. The spheres were steam-heated and utilized a heat-meter plug to obtain the local values of the unit thermal convective conductances, from which the average heat-transfer characteristics were determined. From these data equations relating the average Nusselt number and the Reynolds number were determined. AD 16376. Contract AF 33(600)-8114. AF WADC TR 53-117.

Investigation of variation in base pressure over the Reynolds number range in which wake transition occurs for nonlifting bodies of revolution at Mach numbers from 1.62 to 2.62, by Vernon Van Hise. U. S. National Advisory Committe for Aeronautics. Jan 1957. 41p photo, drawing, diagr, graphs. Order as TN 3942 from National Advisory Committee for Aeronautics, 1512 H St. N. W., Washington 25, D. C. PB 125703

1. Bodies of revolution - Aerodynamics - Effect of Mach number 2. Reynolds number - Effect 3. Flow, Laminar - Theory 4. Flow - Supersonic - Theory 5. Flow, Turbulent - Theory 6. NACA TN 3942.

Investigations on the stalling characteristics of delta wings in incompressible flow, by E. Truckenbrodt and E. G. Feindt. Braunschweig. Technische Hochschule. Institute fur Stromungsmechanik, Braunschweig, Germany. Jun 1957. 54p diagrs, graphs (part fold), table. Order from LC. Mi $3.60, ph $9.30. PB 132349

The stalling characteristics of delta wing plan-forms in symmetrical flow have been investigated for Reynolds numbers up to Re = $1,7.10^6$ in incompressible flow. The critical angle of incidence at which separation begins has been determined from wake measurements according to a method due to X Hafer. Thus the spanwise distribution of the critical angle of incidence was obtained, and also the vertical position of the maximum loss in total head in the wake. AD 136524. Report no. 57/11a. Contract AF 61(514)-935, Final report. AF OSR TN 57-538.

Lift and moment responses to penetration of sharp-edged traveling gusts, with application to penetration of weak blast waves, by Joseph A. Drischler and Franklin W. Diederich, U. S. National Advisory Committee for Aeronautics. May 1957. 84p graphs, tables. Order as TN 3956 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 126085

1. Gust loads 2. Wings - Loading - Calculations 3. Wings, Rotating - Theory 4. Stability, Longitudinal - Theory 5. Stability, Longitudinal - Dynamic 6. NACA TN 3956.

Low-speed cascade investigation of compressor blades having loaded leading edges, by James C. Emery. U. S. National Advisory Committee for Aeronautics. Jan 1958. 76p photos, diagrs, graphs, tables. Order as TN 4178 from the National Advisory Committee for Aeronautics, 1512 G St., N. W., Washington 25, D. C. PB 126231

1. Cascades (Aerodynamics)-Tests 2. Compressors - Blades - Aerodynamics 3. Wings - Camber 4. Wings - Angle of attack 5. NACA TN 4178

Method for calculation of hydrodynamic lift for submerged and planing rectangular lifting surfaces, by Kennth L. Wadlin and Kenneth W. Christopher. U. S. National Advisory Committee for Aeronautics. Jan 1958. 34p graphs. Order as TN 4168 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 126227

1. Hydrofoils - Hydrodynamics 2. Hydrofoils - Theory 3. Planing surfaces - Hydrodynamics - Theory 4. NACA TN 4168

Methods for estimating aeroelastic effects on subsonic lateral-directional stability derivatives of aircraft, by George L. Cahen and Albert E. Preyss. Glen L. Martin Company, Baltimore, Md. Oct 1956. 136p diagrs, graphs, tables. Order from L. C. Mi $6.90, ph $21.30. PB 134556

Simple procedures are presented for estimating the effects of static aeroelasticity on the important lateral-directional-stability and control derivatives for the purpose of preliminary design. The effects of wing, horizontal tail and vertical tail distortions are considered with regard to their individual contributions which are significant to the complete airframe stability derivatives. The effects of distortions of the aft portion of the fuselage on the vertical tail effectiveness are also considered. AD 110566. Project 1365, Task 13542. Covers period 1 May 1955-1 Aug 1956 under contract AF 33(616)-2960. AF WADC TR 56-345.

NOL hypersonic tunnel no. 4 results VIII: Development and calibration of mass flow probes in hypersonic flow, by L. L. Liccini. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1955. 22p photos, diagrs, graphs. Order from L. C. Mi $2.70, ph $4.80. PB 134292

Rectangular and circular mass flow probes were investigated in the NOL 12 x 12 cm hypersonic tunnel No. 4 at Mach numbers of 5.0 to 6.8 over a Reynolds number range from 2,000 to 34,000, based on the probe height. It was found that a boundary layer profile could be accurately measured with a mass flow probe. This is shown by a comparison between the mass flow probe data and the data obtained with conventional Pitot and temperature probes. For parts I-VII se PB 120917, 120959, 122081, 120885, 122021, 122051 and 120871. NOL ARR 297. NAVORD 4078.

Nonuniformities in shock-tube flow due to unsteady-boundary-layer action, by Harold Mirels and W. H. Braun. U. S. National Advisory Committee for Aeronautics. May 1957. 45p diagrs, graphs. Order as TN 4021 from National Advisory Committee for Aeronautics, 1512 H St., N. W. Washington 25, D. C. PB 127439

1. Flow, Compressible 2. Flow, Laminar - Theory 3. Flow, Turbulent - Theory 4. NACA TN 4021.

On flow of electrically conducting fluids over a flat plate in the presence of a transverse magnetic field, by Vernon J. Rossow. U. S. National Advisory Committee for Aeronautics. May 1957. 54p diagrs, graphs, tables. Order as TN 3971 from National Advisory Committee for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 127434

1. Boundary layer, Laminar - Flow 2. Boundary layer, Laminar - Heat transference 3. Plates, Flat - Heat transference 4. NACA TN 3971.

Perforated sheets as the porous material for a suction-flap application, by Robert E. Dannenberg, James A. Weiberg, and Bruno Gambucci. U. S. National Advisory Committee for Aeronautics. May 1957. 35p photos, diagrs, graphs, table. Order as TN 4038 from National Advisory Comcittee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 126097

1. Airfoils - Boundary layer - Suction effect 2. Wing flaps - High lift devices 3. Airfoils - Lift - Effect of suction 4. Wing flaps - Suction 5. NACA TN 4038.

Preliminary study of the supersonic induction type wind tunnel for Cornell Aeronautical Laboratory, by J. L. Moore, O. B. Finamore, and J. G. Wilder. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Sep 1947. 28p diagr, graphs (part fold). Order from OTS. $1.00. PB 131858

This paper presents a theoretical analysis of the feasibility of employing a high pressure, low volume air source as the primary (inducing) air supply for a supersonic induction type combustion channel. Well-known thermodynamic relationships are employed in analyzing the mixing process. The only assumptions made are those of no wall friction, complete mixing, and an isothermal expansion of the reservoir air. Variation of actual reservoir conditions from this isothermal assumption is accouted for in the time analysis. Both constant pressure and constant area mixing are treated. Project Squid. Contract N6 ori-119. CAL DD 420-A-8. CAL TM 9.

Shock wave curvature for hypersonic axisymmetric flow, by R. Sedney. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1957. 8p graph. Order from L. C. Mi $1.80, ph $1.80. PB 132518

Measurements are reported of the radius of curvature and detachment distance of the detached shock wave for high speed flow about blunt bodies. The Mach number range covered is between 2.5 and 9. Comparisons are made with theoretical predictions for the radius of curvature. Dept. of the Army project no. 5B03-03-001. ORD project no. TB 2-0108. APG BRL M 1093.

Simplified calculations of pressure distribution of unyawed slender bodies of revolution in hypersonic flight, by R. F. Probstein and K. N. C. Bray. Princeton University. Gas Dynamics Laboratory, Princeton, N. J. Jul 1954. 19p graphs. Order from L.C. Mi $2.40, ph $3.30. PB 134526

An approximate analysis is developed which predicts, within engineering accuracy, the inviscid pressure distribution and drag on pointed slender unyawed bodies of revolution in supersonic flow. The theory is shown to give good results when the free-stream Mach number and body fineness ratio are greater than three. In the case where the hypersonic similarity parameter (the ratio of freestream Mach number to body fineness ratio) is greater than unity the theory is formulated by combining the tangent-cone approximation with a relation for the pressure distribution valid for a slender unyawed cone when the shock is not too far from the cone surface. AD 62118. Project 1363, Task 70114. Contract AF 33(038)-250. WADC TR 54-258.

Some effects of tail height and wing plan form on the static longitudinal stability characteristics of a small-scale model at high subsonic speeds, by Albert G. Few, Jr. and Thomas J. King, Jr. U. S. National Advisory Committee for Aeronautics. May 1957. 62p. Order as TN 3957 from National Advisory Committee for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 127433

1. Wings - Aspect ration 2. Mach number - Effect 3. Stability, Longitudinal - Static tests 4. Airplanes, High-speed - Stabilization 5. NACA TN 3957.

Structures of supersonic flow, by Richard E. Meyer. Brown University. Division of Applied Mathematics, Providence, R. I. Jan 1958. 21p graph. Order from L.C. Mi $2.70, ph $4.80. PB 133221

The invariant properties in the general structure branch lines and limit lines in the steady, two-dimensional, irrotational and homentropic flow of perfect gas are discussed. AD 148094. Contract AF 49(638)-232. AF OSR TN 58-52.

Super-cavitating flow past bodies with finite leading edge thickness, by J. N. Newman. U. S. David Taylor Model Basin, Washington, D. C. Sep 1958. 34p diagr, graphs. Order from L.C. Mi $3.00, ph $6.30. PB 132395

The problem to be considered is the effect of increasing the leading edge thickness of a super-cavitating foil beyond the cavity thickness, such that a portion of the back near the leading edge becomes wetted and cavitation does not commence until some point downstream from the leading edge. The investigation has resulted in an approximate solution for the lift and drag on a foil with a finite leading edge. DWTMB 1081.

Supersonic flutter trends as revealed by piston theory calculations, by Holt Ashley and Garabed Zartarian. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory, Cambridge, Mass. May 1958. 98p. graphs. Order from OTS. $2.25. PB 151140

The report discusses and interprets an extensive series of calculations on the bending-torsion, bending-aileron and torsion-aileron flutter properties of a typical-section airplane wing model which have already been presented in tabular form (WADE TN 57-310). The airloads in the flutter equations were predicted by two-dimensional piston theory, thus generally limiting the results to higher supersonic and low hypersonic flight speeds. The manner of preparation of the tables is reviewed, and their use for preliminary estimation of high-speed flutter characteristics of lifting surfaces is discussed. A dimensionless number is defined, equivalent to the structural stiffness required for preventing aeroelastic instability of a given typical-section wing flying at a given speed and altitude in the standard atmosphere. AD 155513. Project no. 1370, Task no. 13478. Contract AF 33(616)-2482. AF WADC TR 58-74.

Theoretical and experimental effect of sweep upon stress and deflection distribution in aircraft wings of high solidity. Part 10: Stresses and deflections of unswept and swept thin-walled beams, by H. H. Dixon. California Institute of Technology. Guggenheim Aeronautical Laboratory, Pasendena, Calif. Dec 1951. 141p diagrs, graphs, tables. Order from L.C. Mi $7.20, ph $22.80. PB 134274

Although the primary concern has been with wings of relatively high solidity, there still remained a need for a practical engineering solution of conventional (thin skin and stiffeners) construction. This report therefore presents such an analysis method for these wings. The method is based on a finite difference representation of the differential equation for a shell, a solution of which is obtained by relaxation procedures. ATI 154242. Covers period Nov 1950-Dec 1951 under Contract W 33-038-ac-16961. For Parts 1-4 see PB 102745-102748. AF TR 5761, Part 10.

Theoretical and experimental investigation of random gust loads. Part II: Theoretical formulation of atmospheric gust response problem, by A. S. Richardson, Jr. U. S. National Advisory Committee for Aeronautics. May 1957. 50p diagrs, graphs, table. Order as TN 3879 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 127221

1. Gust loads - Mathematical analysis 2. NACA TN 3879.

Theoretical investigation of flutter of two-dimensional flat panels with one surface exposed to supersonic potential flow, by Herbert C. Nelson and Herbert J. Cunningham. U. S. National Advisory Committee for Aeronautics. 1956. 26p diagr, tables, graphs. Order as Report 1280 from the National Advisory Committee for Aeronautics, 1512 H St. N. W., Washington 15, D. C. PB 127440

1. Boundary layer - Aerodynamics 2. Panels - Stability 3. Flow, Supersonic - Pressure distibution 4. Aeroelasticity 5. Flutter - Theory 6. NACA rept. 1280. Supersedes TN 3465 (PB 118012).

Theoretical study of the effect of upstream transpiration cooling on the heat-transfer and skin-friction characteristics of a compressible, laminar boundary layer, by Morris W. Rubesin and Mamoru Inouye. U. S. National Advisory Committee for Aeronautics. May 1957. 41p diagrs, graphs, table. Order as TN 3969 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 127218

1. Boundary layer, Laminar - Compressibili ty 2. Flow, Compressible - Heat transfer 3. Plates, Flat - Boundary layer - Cooling 4. NACA TN 3969.

Thin airfoil theory based on approximate solution of the transonic flow equation, by John R. Spreiter and Alberta Y. Alksne. U. S. National Advisory Committee for Aeronautics. May 1957. 82p diagrs, graphs. Order as TN 3970 from National Advisory Committee for Aeronautics, 1512 H St. N. W., Wasington 25, D. C. PB 127325

1. Flow, Transonic - Mach number effects 2. Airfoil theory 3. Flow, Subsonic - Theory 4. NACA TN 3970.

Transonic flows past symmetrical airfoils with attached shock wave ($M_\infty < 1$), by Silvio Nocilla. Politechnico di Torino. Laboratorio di Meccanica Aplicata, Turin, Italy. Dec 1957. 29p diagrs. Order from L.C. Mi $2.70, ph $4.80. PB 134861

The symmetrical flow around an airfoil, with a compression shock starting from the airfoil and vanishing inside the flow is considered. The research is based on the hypothesis that the shock line vanishes at a point J inside the supersonic region of the field, instead of on the sonic line as usually. After a qualitative discussion of this hypothesis, the flow is analitically determined near the point J, in both the hodographand physical plane. AD 148106. Technical note no. 4. Contract AF 61(514)-1124. AF OSR TN 58-63.

Turbulent boundary layer on a yawed cone in a supersonic stream, by Willis H. Braun. U. S. National Advisory Committee for Aeronautics. Jan 1958. 39p diagr, graphs. Order as TN 4208 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Wasington 25, D. C. PB 126247

1. Boundary layer - Flow 2. Flow, Turbulent - Theory 3. Cones - Boundary layer 4. NACA TN 4208.

Two-dimensional supersonic wind tunnel simulation of the flow over the external surface of ducted bodies with and without spillover, by Murray Kamrass. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Jun 1947. 21p photos, fold graphs. Order from L.C. Mi $2.70, ph $4.80. PB 132880

1. Airfoils - Wind tunnel tests 2. Flow, Supersonic - Pressure distribution 3. Flow, Supersonic - Photographic analysis 4. Project Squid 5. Contract N6 ori-119 6. CALDD 420-A-5. Squid Technical memorandum CAL-5.

Wall effect in cavitating flow about a hydrofoil (finite cavity case), by Hirsh Cohen and C. D. Sutherland. Rensselaer Polytechnic Institute. Dept. of Mathematics, Troy, N. Y. Apr 1957. 13p diagrs, graphs. Order from L.C. Mi $2.40, ph $3.30. PB 133548

This report shows that a finite cavity solution may be obtained by using a linearized Roshko flow model. The relation between the cavitation parameter and a cavity length measure and the variation of lifting coefficient with cavitation number are computed for the case where the hydrofoil is a flat plate. RPI Math. Report no. 7. Contract Nonr 591(08).

Wind-tunnel investigation of effect of sweep on rolling derivatives at angles of attack up to 13° and at high subsonic Mach numbers, including a semiempircal method of estimating the rolling derivatives, by James W. Wiggins. U. S. National Advisory Committee for Aeronautics. Jan 1958. 47p drawings, diagr, graphs, table. Order as TN 4185 from National Advisory Committee for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 126235

1. Damping derivatives - Stability 2. Wings, Swept-Aspect ration 3. Wings - Angle of attack 4. Wings - Rolling moments 5. NACA TN 4185.

Wind-tunnel investigation of the high-subsonic static longitudinal stability characteristics of several wing-body configurations designed for high lift-drag ratios at a Mach number of 1.4, by Paul G. Fournier. U. S. National Advisory Committee for Aeronautics. Jul 1958. 42p photos, drawing, diagrs, graphs, table. Order as TN 4340 from National Advisory Committee for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 134342

1. Stability, Longitudinal - Static tests 2. Bodies of revolution - Aerodynamics - Effect of Mach number 3. Wings, Swept - Wind tunnel tests 4. NACA TN 4340

Rockets and Jet Propulsion

Combustion instability in liquid propellant rocket motors: Determination of combustion time lag parameter in a liquid bipropellant rocket motor, by George B. Matthews. Princeton University. Dept. of Aeronautical Engineering, Princeton, N. J. Mar 1957. 298p photos, diagrs, graphs, tables. Order from L. C. Mi $11.10, ph $44.60. PB 132760

1. Rocket motors - Combustion - Theory 2. Contract NOas 53-817-C 3. PU AEL R 372

Contributions to jet pump theory. VI: Perfect mixing processes in subsonic jet pumps, by H. B. Helmbold. Wichita. University. School of Engineering, Wichita, Kansas. Jun 1954. 13p diagr. Order from L. C. Mi $2.40, ph $3.30. PB 127086

A study of the perfect mixing process is made to include the effects of compressibility as well as different initial densities of the primary and secondary fluids. The results for both the constant-pressure and the constant-diameter jet pumps are given as an ideal efficiency involving an ideal transmission coefficient, and the final state of the mixture. These results form a basis for comparaing the two types of jet pumps. AD 41735. For Parts I-5 see PB 127093, 124625-124626, 127031, 126312. Contract Nonr 201(01). UW ER 145.

Criteria for evaluating turbojet engine power controls, by M. J. Easterbrook and R. A. Hameister. Holley Carburetor Co. Advanced Engineering and Research Dept., Van Dyke, Mich. Oct 1956. 44p diagr, graphs, tables. Order from L. C. Mi $3.30, ph $7.80. PB 134560

At the request of the Bureau of Aeronautics, studies have been made to determine suitable criteria by which turbojet power controls can be evaluated. After investigating several possible approaches to this problem, value and cost were selected as the criteria which provide the best evaluation of the power control system in its relationship to the engine and airplane. Contract NOa(s) 53-1040f.

Evaluation of corrosivity of rocket blast residues and cleaning methods to minimize corrosion, by Alfred H. Pagano. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1955. 62p photos, diagrs, tables. Order from L. C. Mi $3.90, ph $10.80. PB 134587

Five cleaning methods were tested to remove residues from six rocket type blasts on fifteen metal finish combinations. Standard cleaning methods were most effective in removing residues produced. Steam cleaning alone was not effective. Several of the finishes tested held up very well and may be suitable for application on aircraft to prevent corrosion by rocket blast. AD 72051. Project 7312, Task 73122. Covers period Jan-Jun 1955. AF WADC TN 55-212.

Evaluation of the heat transfer encountered in a rocket motor operating at high chamber pressure, by C. F. Warner and M. J. Zucrow. Purdue University. Purdue Research Foundation, Lafayette, Ind. Jul 1949. 27p graphs, table. Order from OTS. 75 cents. PB 131886

The theoretical rates of heat transfer between the walls of a five hundred-pound thrust rocket motor and the combustion gases resulting from the oxidation of oxtane and aniline by white fuming nitric acid are obtained as a function of the rocket motor chamber pressure. The convective heat transfer coefficients, obtained by using the McAdams correlation, are compared with the rates obtained by the Humble, Lowdermilk, Grele correlation. The radiant heat transfer rates are obtained by the Hottle, Egbert method. It was found that the chamber and nozzle heat transfer rates increase linearly with chamber pressure and that the nozzle heat transfer rates become extremely high at chamber pressures beyond 1500 psia. Project Squid. Contract N6ori-104, T.O. 1, NR 220-042. PU TR18.

Flame and particle motions in a small pulse jet engine, by Paul Elias. New York University, New York, N. Y. Jul 1948. 21p photos, diagrs. Order from OTS. 75 cents. PB 131870

The methods developed and the data obtained during fourteen months of laboratory experiments with several small pulse jet model are presented in this report. Intrinsic flame speeds, i. e. flame speeds relative to the gases, and particle speeds, i. e. speeds of gas regions relative to the engine, are studied in some detail and valve action is correlated with these data. Many investigations were made in an effort to determine the location of the point where reignition occurs in the pulse jet engine, and the time

of reignition was correlated with the operation of the valves. In this way a fairly complete description of the method of operation of a small pulse jet has been obtained. Thesis: New York University Project Squid. Contract N6 ori-11, T. O. 2, NR 220-040. NYU TR 16.

Hydrodynamic characteristics over a range of speeds up to 80 feet per second of a rectangular modified flat plate having an aspect ratio of 0.25 and operating at several depths of submersion, by Victor L. Vaughan, Jr. and John Albert Ramsen. U. S. National Advisory Committee for Aeronautics. Apr 1957. 23p drawing, graphs. Order as TN 3908 from National Advisory Committee for Aeronautics, 1512 H St., N. W. Washington 25, D. C. PB 125709

1. Reynolds number - Effect 2. Wings - Aspect ratio 3. Wings - Hydrodynamics 4. Wings - Thickness 5. Hydrofoils - Hydrodynamics 6. NACA TN 3908.

Literature of space science and exploration. See entry under Bibliography on page 332. PB 131755

Merits of fuel vaporization blade cooling in supersonic turbojets with afterburning, by Demetrios G. Samaras. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1953. 68p photo, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 133505

A supersonic flying turbojet with afterburning, employing fuel vaporization for turbine-blade cooling required by the lack of suitable high-temperature materials, approaches closely the performance of the ideal turbojet with no temperature limitations. The turbojet with fuel turbine-blade cooling is superior to the one employing air cooling; its superiority increases with flight Mach speed. The vaporization of fuel in the turbine blades may be attended by high afterburner combustion efficiencies and/or shorter length afterburners. As the afterburner length decreases, a lighter and more compact propulsion system results; this may be attended by a substantial change of the aircraft configuration with a beneficial reduction of structural weight. AD 85732. AF WADC TR 53-141.

Missile geophysics program of the U. S. Army White Sands Signal Agency, by Willis L. Webb. U. S. Army. White Sands Signal Agency, White Sands Proving Ground, N. Mex. Oct 1957. 21p photos, graphs. Order from LC. Mi $2.70, ph $4.80. PB 132391

The field of work of the Missile Geophysics Program is in the determination and the application of atmospheric physical techniques to the Whie Sands Missile program. The need for such support is evident when one considers the effect of wind on unguided missiles, or the possible results of loss of communications with guided missiles from atmospheric causes. The operational activities of the program center around the collection of data on various atmospheric parameters during the period in which a missile is fired.

Noise evaluation of Air Force ground support units, by John N. Cole. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1956. 29p diagrs, graphs, table. Order from L.C. Mi $2.70, ph $4.80. PB 134481

One of the many Air Force noise problems is presented by auxiliary ground power units. This report gives information on the degree and character of noise generated by several types of reciprocating and gas turbine units. Discussion and evaluation of their noise generation, and its influence on both hearing damage, and speech communication are presented. Some general conclusions together with recommendation for quieting the units are formulated. AD 97160. Project 7211, Task 71705. AF WADC TN 56-335.

Noise radiation from fourteen types of rockets in the 1,000 to 130,000 pounds thrust range, by J. N. Cole, H. E. Von Gierke, and others. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1957. 71p photos, diagrs, graphs, tables. Order from L.C. Mi $4.50, ph $12.30. PB 134382

Near field and far field levels on static fired and vertical launched rockets were measured. Measurement and data reduction methods are described. Final results are given as near field sound pressure spectra, far field directivities, acoustic power spectra and pressure-time histories. This noise enviroment is studied as a function of several nozzle configurations and as a function of flame front action in the jet stream. Generalization and correlation of the data results in a formula for the overall acoustic power level output of rockets, OA PWL 78 $13.5 \log_{10} W_m$ db re 10^{-13} watts, where W_m is the rocket jet stream mechanical power in watts. AD 130794. Project 7210, Task 71705. AF WADC TR 57-354.

Optimum thrust programming along arbitrarily inclined rectilinear paths, by Angelo Miele and Carlos R. Cavoti. Purdue University. School of Aeronautical Engineering, Lafayette, Ind. Dec 1957. 31p graphs. Order from L.C. Mi $3.00, ph $6.30. PB 133970

An analysis of the theory of the thrust programming is presented for the case where a variable mass

body is moving along an arbitrarily inclined rectilinear path. The optimum acceleration law is determined and some numerical examples are presented emphasizing the engineering aspects of the present theory in connection with the flight analysis of rockets. AD 148-088. * Research project no. 1303. Project: Ae-27. Report no. A 57-8. AF OSR TN 58-48.

Origin and prevention of crash fires in turbojet aircraft, by I. Irving Pinkel, Solomon Weiss, G. Merritt Preston, and Gerard J. Pesman. U. S. National Advisory Committee for Aeronautics. May 1957. 60p photos (part col), diagrs, graphs, table. Order as TN 3973 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Wasington 25, D. C. PB 127220

1. Jet engines, Turbojet-Fire prevention 2. NACA TN 3973.

Physical characteristics and test conditions of an ethylene-heated high temperature jet, by Roland D. English, Abraham Spinak, and Eldred H. Helton. U. S. National Advisory Committee for Aeronautics. Jan 1958. 28p photos, drawings, graphs. Order as TN 4182 from National Advisory Committe for Aeronautics, 1512 H St., N. W., Washington 25, D. C. PB 126234

1. Wind tunnel tests 2. Gases - Thermodynamic properties 3. Exhaust gases - Properties 4. NACA TN 4182.

Project Vanguard report no. 31: Vanguard sequence diagram, a graphical method of presenting complex system operation, by W. J. D. Escher and R. W. Foster. U. S. Naval Research Laboratory. Aug 1958. 19p diagrs (1 fold). Order from OTS. 75 cents. PB 131922

This diagram represents system components and their changing states as they interact sequentially. Thus it shows at a glance the state of every component at any instant in a nominal operation of the system, as well as all the events occurring at any instant and the components involved in each event. The utility of the sequence diagram is discussed and various applications are suggested. The method of interpreting the diagram is explained and illustrated in a simple example. To demonstrate a complete application, the complete nominal flight operation of the first Project Vanguard rocket test vehicle is presented as an appendix, in both sequence diagram and conventional narrative forms. NRL R 5185.

Record of conference on problems of heat transfer in rocket motors, held 2 and 3 Dec 1949 at Princeton, N. J., compiled by Clair M. Beighley and Frank Kreith, edited by Martin Summerfield. Princeton University, Princeton, N. J. Jul 1950. 115p photos, diagrs, graphs. Order from OTS. $2.50. PB 131882

The purpose of the conference was to examine, on an informal basis, some of the more important heat transfer problems of current interest, as they occur in rocket motors. The first such conference was held in conjunction with the Heat Transfer and Fluid Mechanics Institute in Los Angeles in Jun 1948. Session I was intended to provide an opportunity to bring out the practical problems of heat transfer and cooling that presented themselves to engineers engaged in rocket motor development. Sessions II, III, and IV were arranged to force attention upon three areas of current interest: boiling heat transfer, sweat cooling and film cooling, and convective heat transfer with large temperature differences. Project Squid. Contract N6 ori-105, T.O. III, NR 220-038.

Report on full scale pulse jet testing, by J. H. Hett. New York University, New York, N. Y. Nov 1951. 27p photos, diagrs. Order from OTS. 75 cents. PB 131866

A P. J. 31 pulse jet engine mounted on a trailer and fired statically. An instrument trailer was built having 16 channels for information on cathode ray tubes which were viewed by four drum cameras. Tests were made of the flame flow pattern in the engine using windows and a strip camera and simultaneous determinations were made of valve position. To measure instantaneous pressures and instantaneous flame temperatures special instruments were developed and mounted on the P. J. 31. Experiments were also made with instanteous liquid flow meters employing thermistors. Other experiments were performed with pulsating manometer systems. Covers work from 1 Jun 1947 - 30 Sep 1949 under Contract N6 ori-11, T.O. 2, NR 220-040. Project Squid. NYU TM 12.

Studies of nondestructive test methods for evaluating deterioration in booster and missile fins, by R. A. Kauffmann and A. Frank. U. S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. May 1957. 31p photos, diagrs. Order from L.C. Mi $3.00, ph $6.30. PB 134296

This report gives a detailed description of ultrasonic techniques that were studied in an attempt to detect internal corrosion in NIKE missile and booster fins. Details are presented concerning an eddy current instrument which was developed during this study and which successfully detected internal corrosion in magnesium booster fins. An evaluation of the materials and process standards used in the manufacture of the NIKE missile and booster fins under current production is also included, as well as the results of an accelerated environmental testing program designed to determine if the new missile and booster fins are subject to internal or external corrosion. Project M167. FALR Memo 649.

Symposium of Soviet research on artificial earth satellites and related subjects. Papers presented

by the Soviet delegates at the Conference on Earth Satellites held in Washington, D. C., 2-5 Oct 1957. Translated by U. S. Joint Publications Research Service Project NY-1377. Order separate parts described below from L. C., giving PB number of each part ordered.

Part I. Jan 1958. 215p diagrs, graphs, tables. Mi $9.30, ph $31.80. PB 135484-T

Contents: Certain variational problems connected with launching of an artificial earth satellite. - Determining the lifetime of an artificial earth satellite and an investigation of secular perturbations of its orbit. - The motion of an artificial satellite in the noncentral gravitational field of the earth in the presence of atmospheric resistance. - The effect of geophysical factors on satellite motion. - Certain problems on the dynamics of flight to the moon. - The use of artificial earth satellites for the purpose of proving general relativity theory. - Silicon solar batteries as electric power sources for artificial earth satellites. - Investigation of the composition in primary cosmic rays. Translated from Uspekhi Fizicheskikh Nauk (Progress in Physical Sciences) Vol. 63, no. 1-a, Sep 1957. JPR S 187, Part I.

Part II. Mar 1958. 203p photo, diagrs, graphs, tables. Mi $9.30, ph $31.80. PB 135485-T

Contents: Research on variations of cosmic radiation. - Investigation of short-wave ultraviolet solar radiation. - Rocket investigations of the composition of the atmosphere at high altitudes. - Measurement of pressure in the upper atmosphere. - The problem of the measurement of pressure and density of the upper layers of the atmosphere with the aid of an artificial earth satellite. - Investigation of the ion composition of the inonized layers of the atmosphere. - Measurement of the concentration of positive ions along the orbit of the artificial earth satellite. - Investigation of solid components of interplanetary matter by means of rockets and artificial earth satellites. - Measurement of electrostatic fields in the upper layers of the earth's atmosphere. Translated from Uspekhi Fizicheskikh Nauk (Progress in Physical Sciences) Vo. 63, no. 1-b, JPRS-187, Part II.

Theoretical study of the vibratory forcing functions in axial-flow turbojet engines due to flow pulsations, by Vito D. Agosta and Domenick A. Mazzitelli. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Apr 1956. 62p diagrs, graphs, tables. Order from L. C. Mi $3.90, ph $10.80. PB 134436

The analytical determination of the vibratory forcing functions generated in a normally operating axial-flow turbojet engine under steady state conditions which contribute to significant vibrations of the engine frame and inlet and exit duct walls is investigated. AD 103962. Project 1370. Contract AF 33(616)-2477. AF WADC TR 56-74.

Theory of the spin of a conducting satellite in non-equatorial orbits, by John P. Vinti. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1957. 65p diagr, graphs, tables. Order from L. C. Mi $3.90, ph $10.80. PB 133504

For orbits which are precessing circles, the theory of the spin of a conducting spherical satellite, as affected by the magnetic field of the earth, is greatly simplified by smoothing out the high frequency fluctuations at the start, in the differential equations. Complete solutions are worked out for the smoothed spin in two special cases. DA project 5B0306011. ORO project TB 3-0538. APG BRL R 1031.

Upper atmosphere research report no. XXXIV: The Aerobee-Jr NRL-51 (Aerobee-100) firing, by Eleanor C. Pressly. U. S. Naval Research Laboratory. Aug 1958. 19p photos, drawing, diagr, graphs, tables. Order from L. C. Mi $2.40, ph $3.30. PB 134298

The first flight firing of this vehicle was conducted by the Naval Research Laboratory in cooperation with Aerojet on February 18, 1958. The flight was a success, the rocket reaching a maximum altitude of 56 miles, although an early burnout caused by propellant sloshing prevented the rocket from reaching its predicted altitude of 68 miles. NRL R5179.

Vertical descent trajectories including re-entry into the atmosphere, by Reinhard Krause and William F. Haldeman. U. S. Air Force. Air Research and Development Command. Missile Development Test Center, Holloman Air Force Base, N. M. Mar 1958. 86p diagr, graphs, tables. Order from L. C. Mi $4.80, ph $13.80. PB 133971

Trajectories for bodies descending vertically through the atmosphere have been calculated for a wide range of initial altitudes and body characteristics to provide information required for design purposes. Parameters and equations used, as well as the method of calculation by means of an analog computer, are discussed. The results are plotted as velocity-versus-altitude and time-versus-altitude. A guide for using the graphs is included, and deceleration data are evaluated and plotted. AD 135011. Project 7851. AF MDC TR 58-4.

Land Transportation

Artificial soils for laboratory studies in land locomotion, by B. Hanamoto. U. S. Ordnance Corps. Ordnance Tank Automotive Command. Research and Development Division. Land Locomotion Research Branch, Detroit, Mich. Nov 1957. 34p photos, graphs, tables. Order from L. C. Mi $3.00, ph $6.30. PB 134554

1. Soils, Artificial - Properties 2. Soils - Trafficability 3. ORD OTAC 20.

Automotive crash injury research. Annual report to the Commission of Accidental Trauma of the Armed Forces Epidemiological board, covering the period 1 Apr 1955-31 Mar 1956, by John O. Moore, Robert M. Tracy, and Boris Tourin. Cornell University Medical College, New York, N. Y. Apr 1956. 33p. Order from L. C. Mi $3.00, ph $6.30. PB 134584

1. Automobiles - Accidents 2. Contract DA 49-007-MD-483.

Development of light weight truck wheel under technical supervision of Detroit Arsenal. Final report under Contract no. DA 20-089-ord-36642, by D. G. Davis. Budd Company, Detroit Mich. Apr 1956. 88p photos, drawings (part fold), diagrs, graphs (part fold), tables. Order from L. C. Mi $4.80, ph $13.80. PB 132313

Materials investigated were heat treated steel, aluminum alloy, and magnesium alloy. Detroit Ordnance District project no. TT-1-718-E.

Dray coefficients in locomotion over viscous soils. Part I, by E. Hegedus. U. S. Ordnance Corps. Ordnance Tank Automotive Command. Research and Development Division. Land Locomotion Research Branch, Detroit, Mich. Jan 1958. 22p photos, graphs. Order from L. C. Mi $2.70, ph $4.80. PB 134553

1. Soil mechanics 2. Soils - Testing equipment 3. Soils - Viscosity 4. Soils - Trafficability 5. ORD OTAC 25.

Effect of impenetrable obstacles on vehicle operational speed, by F. C. Brooks. U. S. Ordnance Corps. Ordnance Tank Automotive Command. Research and Development Division. Land Locomotion Research Branch, Detroit, Mich. Feb 1958. 16p diagrs. Order from L. C. Mi $2.40, ph $3.30. PB 134552

1. Vehicles - Speed - Effect of obstacles 2. Transportation. Military 3. ORD OTAC 28.

Effects of cavity resonators coupled to pulse jet engine combustion chambers, by Jerome Lemelson. New York University, New York, N. Y. Aug 1951. 12p diagrs, graphs. Order from L. C. Mi $2.40, ph $3.30. PB 134254

Tubes of various diameters and lengths were attached to the combustion chamber of a Dynajet engine. Thrust and fuel flow were measured for various configurations. It is shown that both thrust and fuel flow are markedly affected by the phase relation between the gas flow in the pulse jet engine and that in the tube. A suggestion is made to use a resonant cavity with ram air. Project Squid Technical memorandum NYU 13-M. Contract N6 ori-11, T.O. II, NR 220-040, Phase 6.

Heating and ventilating personnel compartment of Ordnance vehicles, by B. C. Dial. Southwest Research Institute. Division of Engines, Fuels and Lubricants Research, San Antonio, Tex. Apr 1956. 67f tables. Order from L. C. Mi $3.90, pr $12.30. PB 134827

This report is concerned with the heating and ventilating of personnel compartments of Ordnance vehicles under cold weather conditions, particularly artic conditions. It endeavors to present and analyze some of the more serious obstacles to the achievement of satisfactory atmospheric conditions within personnel compartments for military operations in the Arctic and similar cold weather areas. SRI 30C. Contract DA 23-0720ord-836, T.O. 10, Suppl. agreement 4.

Introduction to research on vehicle mobility. Part I: Stability problem, by M. G. Bekker. Revised by Samuel H. Woods. U. S. Ordnance Corps. Ordnance Tank Automotive Command. Research and Development Division. Land Locomotion R search Branch, Detroit, Mich. May 1957. 179p photos, diagrs, graphs, tables. Order from L. C. Mi $8.10, ph $27.30. PB 134551

1. Soils - Trafficability 2. Vehicles - Mobility-Research 3. ORD OTAC 22.

Minutes of the second meeting of the Scientific Advisory Committee, 28-29 May 1957, by Roger H. Hemion. U. S. Ordnance Corps. Research and Development Division. Land Locomotion Research Branch, Washington, D. C. Oct 1957. 45p photos, diagr, tables. Order from L. C. Mi $3.30, ph $7.80. PB 132954

This volume presents: 1. Progress in research on Land Locomotion during the previous year; 2. The future needs pertaining to Land Locomotion throughout the entire mechanical-automotive engineering fields 3. The proposed research to be performed during the period 1957-1958; 4. Comments and reactions by the Scientific Advisory Committee Members. ORD OTAC 16.

Review and analysis of automotive environmental test procedures. Final report under Contract DA 23-072-ord-836. Southwest Research Institute. Division of Engines. Fuels and Lubricants Research, San Antonio, Tex. Apr 1956. 79p graphs, tables (part fold). Order from L. C. Mi $4.50, ph $12.30. PB 132047

The objective of this project was to review, analyze, and compile automotive climatic testing criteria and procedures as an aid to the conduct of environ-

mental tests. The scope of the undertaking was divided into two phases: the first being a compilation of performance specifications to guide the conduct of quality control type testing on equipment sampled from production; the second being a review and analysis of currently employed automotive test procedures plus the formulation of written procedures designed to produce accurate and repeatable data for use in the modification or development of automotive material capable of satisfactory performance specifications were made for a selected group of vehicles and components and are presented in Appendix B, while a test procedure for the conduct of vehicle cooling studies is presented in Appendix A. Contract DA 23-072-ord-836, Supplemental agreement no. 4, T.O. 6, Final report.

Study of the effects of dust on Ordnance automotive material, by J. Pauly. Southwest Research Institute. Dept. of Engines, Fuels and Lubricants Research. Environmental Research Section, San Antonio, Tex. Feb 1956. 206f photos, map, diagrs, graphs, tables. Order from L.C. Mi $9.30, ph $33.30. PB 134830

Through a review of literature and consultation with qualified personnel associated with military, governmental, and industrial organizations, it has been possible to present some of the effects of dust on military automotive-type equipment. It was found that a natural dust affects the operation of equipment in two distinct ways, i.e., by causing excessive and abnormal wear, and by fouling, plugging, or physically impeding the function of a component. These effects, in turn, created additional problems of servicing, maintenance, and a reduction in crew efficiency and morale. The final appendix, which includes the references cited, is an annotated bibliography of the literature reviewed. This bibliography is divided into three parts: civilian articles, military reports, and a cross-index of reference titles. AD 89530. Contract DA 23-072-ord-836, T.O. 9, Suppl. agreement 4.

Test of special tire chains, by L. S. Weaver. U. S. Aberdeen Proving Ground. Development and Proof Services. Automotive Division, Aberdeen Proving Ground, Md. Feb 1957. 15p photos, tables. Order from L.C. Mi $2.40, ph $3.30. PB 132911

The special tire chains received at this station for evaluation were for 9.00 X 20 tires; the set included one pair of chains for single tires and two pairs for dual tires. Construction of the chains was similar to conventional chains except for the cross chain links. Hardness tests showed that the cross chain links of the special tire chain were rather brittle compared to those of the standard chains. After several miles of mobility testing, twenty-three cross chains failed on the special tire chains compared to three on the standard chains. Due to the excessive cross chain failures, the tests were terminated. OCO project TTI-649. Dept. of the Army project 572-01-002. APG R-46.

Comparison of two normal mode propagation problems, by William C. Meecham and Ralph Guernsey. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Dec 1956. 19p diagrs, graph, tables. Order from L.C. Mi $2.40, ph $3.30. PB 133349

Calculations have been made for two corresponding acoustic propagation problems. The computations were accomplished in connection with model experiments carried out in a large tank of water with a six inch concrete slab for bottom. It is concluded that for frequencies of 4 kc and less the soil underlying the tank influences propagation within the tank, whereas it is reasonable to assume that for frequencies above 10 kc the tank may be supposed to have a bottom of infinite thickness. Contract N6 onr-23221, Nr 385-203. MU ERI Proj. 1936-8-T.

Experimental studies of air ventilation of vertical, semi-submerged bodies, by J. M. Wetzel. Minnesota. University. St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minn. Jul 1957. 79p photos, diagrs, graphs, tables. Order from L.C. Mi $4.50, ph $12.30. PB 134705

Experimental studies were conducted to investigate the scale-effect problem associated with the ventilation of vertical, semi-submerged cylindrical rods and streamline liftin g surfaces. Several of the rods were coated Teflon, a non-wetting material. Two types of ventilation--creeping and flash--have been observed for these shapes. Data for the large-diameter rods can be correlated with the Froude number, whereas uncoated rods of small diameter require consideration of several parameters. The use of Teflon-coated rods improved the Froude number correlation for the rods of small diameter. Project report 57. Covers period from Dec 1954-Jul 1957 under Contract Nonr 710(04), NR 062-192.

Freezing of slurry around wood and concrete piles, by Ronald F. Scott. U. S. Army. Corps of Engineers. New England Division. Artic Construction and Frost Effects Laboratory, Boston, Mass. May 1956. 10p graphs. Order from L.C. Mi $1.80, ph $1.80. PB 127112

The work described in this report was carried out on the electronic analog computer of the Arctic Construction and Frost Effects Laboratory, New England Division, Corps of Engineers, U. S. Army, as part of a program of investigations into heat flow phenomena involving freezing and thawing in soil. Since such problems are very complicated mathematically, and only a few exact solutions have been obtained in simple cases, the use of approximate methods of solutions, such as the computer, is mandatory for practical problems. Various checking procedures have been employed to insure the accuracy of the results presented.

Hydrography of Oregon estuaries prior to Jun 1956, by Wayne V. Burt. Oregon State College. School of Science, Corvallis, Ore. Jun 1956. 23p tables. Order from L. C. Mi $2.70, ph $4.80. PB 126925

1. Sea water - Salinity - Measurement 2. Sea water - Temperature - Measurement 3. Tides - Depths - Measurement 4. Currents Ocean - Velocity - Measurement 5. Contract Nonr-1286(02), NR 083-102, Data report. Ref 56-2.

Investigation of the mechanics of cavitation and cavitation damage, by Robert T. Knapp. California Institute of Technology. Hydrodynamic Laboratory, Pasadena, Calif. Jun 1957. 47p photos, graphs, tables. Order from L. C. Mi $3.30, ph $7.80. PB 134573

Four phases of this investigationof cavitation are reported, as follows: I. Effect of pressurization on cavitation properties of water II. Mechanics of fixed cavitation III. Hydromechanics of cavitation damage and IV. Preliminary field tests of intensity of cavitation. Contract Nonr 220(08), NR 062-166, Final report.

Measurement of thrust fluctuation and free space oscillating pressures for a propeller, by A. J. Tachmindji and C. M. Dickerson. U.S. David W. Taylor Model Basin, Wasington, D. C. Jan 1957. 32p photo, diagrs, graphs, table. Order from L. C. Mi $3.00, ph $6.30. PB 132396

This report gives the instrumentation and technique of measurement of the thrust fluctuation produced by a propeller when operating in a variable inflow field. It also describes the method of measurement of the oscillating pressure at a point in space in the vicinity of the screw. Representative results are given for a propeller operating in a series of similar wake distributions of varying magnitudes. DWTMB 1107.

Performance of model ships in restricted channels In relation to the design of a ship canal, by R. S. Garthune, B. Rosenberg, and others. U. S. David W. Taylor Model Basin, Washington, D. C. Aug 1948. 245p photos, drawings, diagrs (1 fold), graphs, table. Order from L. C. Mi $11.10, ph $37.80. PB 134886

Tests were made to determine the effect of channel dimensions on the relative controllability and the sinkage of ships in straight channels and to determine the effect of channel-bend design on the controllability of ships. The hydrodynamic phenomena of major importance in the study are bank suction, interaction between ships, and the change of level of the water surface in the vicinity of a moving vessel. The major test variables include the width and depth of the channel, bend design, ship speed, position of the ships in the channel, type of ships represented, and the velocity and direction of channel currents. DWTMB 601.

Technical studies in cargo handling. California University. Dept. of Engineering, Los Angeles, Calif. Contract Nonr-238(07). Order separate parts described below from L. C., giving PB number of each part ordered.

Part I: Formulation of recurrence equations for shuttle process and assembly line, by Richard Bellman. Nov 1956. 22p diagrs. Mi $2.70, ph $4.80. PB 129917

This report applies the recurrence technique to two mathematical models, in the "link-node" model and the assembly line model. The object is to derive the basic equations which may be used to describe the process. UC DE R 56-53.

Part II: Computation of delays in the multi-stage shuttle process, by Richard Bellman, Yoichiro Fukuda, and Maurice Pollack. Apr 1957. 41p graphs, tables. Mi $3.30, ph $7.80. PB 133217

This report describes a Monte-Carlo approach to the calculation of delays in the multi-stage shuttle process by means of SWAC, a high-speed digital computer. Several codes were developed for SWAC to generate the random time elements, and to calculate the delays in the 2nd stage for 3- , 4- , 5- , and 6- stage shuttle processes. It was found that the 2nd stage delays did not seem to be influenced by the item number but were affected slightly by the number of stages, the delays tending to increase with increasing number of stages. UC DE R 57-13.

Part III: Distribution of delay in the three stage shuttle process, by Yoichiro Fukuda. Feb 1957. 25p graphs. Mi $2.70, ph $4.80. PB 132627

This report describes an attempt to analyze the delays found in the three stage shuttle process. Owing to the special character of these recurrence relations between the delays, it is feasible to derive the exact distribution of every delay which occurs in transportation of each unit commodity. Several numerical examples are give, and the results are illustrated by means of graphs together with the results of SWAC computation. UC DE R 57-6.

Part IV: Methods of computing delays in a N-stage shuttle process, by Maurice Pollack. May 1957. 26p graphs, table. Mi $2.70, ph $4.80. PB 133230

Two basic approaches exist which may be used as a form for the computation of delays in the N-stage shuttle process with random working times. The two simulation and recurrence equations are each investigated for use on a high speed digital computer. UC DE R 57-37.

Water gravity waves generated by a moving low pressure area, by R. L. Wiegel, C. M. Snyder, and J. E. Williams. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1957. 28p maps, diagr, graphs, table. Order from L. C. Mi $2.70, ph $4.80. PB 134302

Hurricanes (typhoons) have an intense low pressure area which often moves rapidly over the surface of the ocean. The coupled water gravity waves generated by such a moving low pressure area have been studied in a towing tank. It was found that the waves generated in this manner had a phase velocity identical to the velocity of the moving low pressure area. Contract 233(35). Contract Nonr-222(42), NR 0870-54. UC IER Series 99, Issue 2.

Water waves of finite amplitude on a sloping beach, by G. F. Carrier and H. P. Greenspan. Harvard University. Division of Engineering and Applied Physics, Cambridge, Mass. Jul 1957. 51p diagrs, graphs. Order from L. C. Mi $3.60, ph $9.30. PB 134681

This paper presents an analysis of the non-linear shallow water theory. Explicit solutions are obtained for a number of important cases and, in particular, it is shown that there are waves that can climb a sloping beach without breaking. The initial shape and particle velocity distribution determines whether or not a given wave will break and no simple criterion for the occurrence of breaking has been found. Contract Nonr 1866(20).

MISCELLANEOUS

Certain economic factors influencing ARDC's resources, costs, and purchasing power, by Eric D. Bovet. U. S. Air Force. Air Research and Development Command. Plans and Programming Office. Analysis and Evaluation Division, Baltimore, Md. Sep 1956. 101p graphs (part fold), tables. Order from L. C. Mi $5.70, ph $16.80. PB 127006

This study is the first in a series planned to determine the influences of certain economic conditions on ARDC's mission. This first investigation is devoted to an analysis of the economic environment within which ARDC operates and of the influence which it exerts upon the progress of ARDC's program. Several facets of the study are recognized to merit more detailed investigation. It is proposed that the Analysis and Evaluation Division will develop additional data, and conduct other studies in such areas as cost variations, funding requirements, the size of ARDC's physical input, the earnings and output of scientific and engineering personnel, the productivity of in-house and contractor operations, and related fields. AD 110823. AF ARDC TR 56-54.

Report of NRL progress. U. S. Naval Research Laboratory. Oct 1958. 45p. Order from OTS. $1.25. Also available at annual subscribtion rate of $10.00 a year in the U. S. A., foreign rate of $13.00 a year. PB 151167

Contents: Articles: Performance of organic coatings in tropical environments, by B. W. Southwell and A. L. Alexander. - Observations of Venus at 8.6 mm wavelength, by J. E. Gibson and R. J. McEwan - Scientific program: Problem notes: Applications research: Some problems in the design of human operated target data processing systems. - Chemistry: High-temperature aircraft engine lubricants from aromatic acids and fluoroalcohols.... Distribution of acetic acid between solvent and soap micelles in benzene solutions. - Mechanics: Table impedance of a large electrodynamic vibration machine.... Dual pressure-gain burner adapted to gas turbine application. - Metallurgy and ceramics: Ultrasonic inspection of titanium.... Determination of trace amounts of chromium in high-purity beryllium.... Radiation damage of materials ....Normalization procedures for the NRL drop-weight test. - Nuclear and atomic physics: Electron gun for ionization efficiency studies has beam energy continuously variable from 10 ev to 25 kev. - Radio: Multiplechannel elasped-time recorders of voltage amplitudes.... An instantaneous microwave polarimeter technique.... Characteristics of radar sea clutter: observations at 220 Mc.... Ferrite-loaded transmission lines as electronically controlled phase shifters at ultrahigh frequencies. - Sound: Apparent path elongation due to acoustic pulse reflection. - Published reports. - Papers by NRL staff members. - Patents.

Subject matter analysis and coding -- some fundamental considerations, by James W. Perry. Western Reserve University. School of Library Science, Cleveland, Ohio. May 1958. 44p diagr, tables. Order from L. C. Mi $3.30, ph $7.80. PB 134516

Developments in methods for searching and correlating recorded information have been accompanied by specialized uses of the word code, e. g., direct code, numerical code, random superimposed code. Such specialized usage has also been accompanied by increasing awareness of the relationships between searching and selecting operations as performed with the aid of various devices and equipment, on the one hand, and the analysis both of information and questions in terms of words and of more precisely defined code designations on the other hand. Exploring these relationships is a principle purpose of this report. AD 158311, Contract AF 49(638)-357, Technical note no. 2 AF OSR TN 58-501.

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Biology and Medicine

March 1957 medical survey of Rongelap and Utirik people three years after exposure to radioactive fallout, by Robert A. Conard and others. Brookhaven National Laboratory, Upton, N. Y. June 1958. 29p. Order from OTS. $1.00. BNL-501(T-119)

Escape of radon and thoron when produced in bone, Charles William Mays, Jr. Utah. Univ., Salt Lake City. Mar. 1958. Contract AT-11-1-119. 54p. Order from LC. Mi $3.60, ph $9.30. COO-216

Progress report electronoscopic particle studies, by R. Borasky. Hanford Atomic Products Operation, Richland, Wash. May 1958. Contract W-31-109-Eng-52. 15p. Order from OTS. 50 cents. HW-55172

Isotope techniques in biological sciences, by J. A. McCormick. Technical Information Service Extension, Oak Ridge, Tenn. Feb. 1958. 41p. Order from OTS. $1.25. TID-3512

Radiation hazards in space flight, by Cornelius A. Tobias. California. Univ., Berkeley. Radiation Lab. Jan. 1958. Contract W-7405-Eng-48. 32p. Order from LC. Mi $3.00, ph $6.30. UCRL-8115

The hemoglobin content of single erythrocytes in cell aging and hemopoietic disturbance, by Charles Anderson Sondhaus. Univ. of Calif., Radiation Lab., Berkeley, Calif. Mar. 1958. Contract W-7405-Eng-48. 81p. Order from OTS. $2.25. UCRL-8203

Interactions between cells and tissues following radiation, by George W. Casarett. Rochester, N. Y. Univ. Atomic Energy Project. Feb. 1958. Contract W-7401-Eng-49. 38p. Order from LC. Mi $3.00, ph $6.30. UR-521

The relationship between the surface appearance and depth of damage of subfabric and bare skin burns produced by radiant thermal energy, by Kelly M. Berkley. Univ. of Rochester, Atomic Energy Project, Rochester, N. Y. Apr. 1958. Contract W-7401-Eng-49. 23p. Order from OTS. 75 cents. UR-523

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Reaction of zircaloy-2 with water and with uranyl sulfate fuel solution. Monthly progress report no. 4 for October 1 through October 31, 1957. Aerojet-General Corp., Azusa, Calif. Nov. 1957. Contract W-7405-Eng-26. Subcontract no. 1089. 7p. Order from LC. Mi $1.80, ph $1.80. AGC-AE-39

The effect of pulsation on liquid-liquid mass-transfer resistances, by Manuel R. Eugenio. Argonne National Lab., Lemont, Illinois. Jul. 1958. Contract W-31-109-Eng-38. 120p. Order from OTS. $2.50. ANL-5874

Fused salt mixtures as potential liquid fuels for nuclear power reactors, by R. C. Crooks and others. Battelle Memorial Inst., Columbus, Ohio. Sep. 8, 1953. Decl. with deletions Feb. 1957. Contract W-7405-Eng-92. 50p. Order from LC. Mi $3.30, ph $7.80. BMI-864(Del.)

The extraction of protactinium from solid thorium fluoride, by F. T. Miles and others. Brookhaven National Lab., Upton, N. Y. Nov. 1954. 27p. Order from OTS. $1.00. BNL-482(T-109)

Measurement of the viscosity of composition 70, by S. I. Cohen and T. N. Jones. Oak Ridge National Lab., Tenn. Sep. 6, 1955. Decl. with deletions Mar. 1957. Contract W-7405-Eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-55-9-31(Del.)

Heat capacity of composition no. 81, by W. D. Powers and G. C. Blalock. Oak Ridge National Lab., Tenn. May 14, 1956. Decl. with deletions Mar. 1957. Contract W-7405-Eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-56-5-68(Del.)

Second quarterly report, 1956 on: I. Preparation of thoria sols. II. Measurement of physical properties of sols and slurries, by J. J. Donovan. Houdry Process Corp. Research and Development Labs., Linwood, Penna. n.d. Contract W-7405-Eng-26. Subcontract 904. 17p. Order from LC. Mi $2.40, ph $3.30. CF-56-7-36

The crystal structures of 7:6 type compounds of alkali fluorides with uranium tetrafluoride, by L. A. Harris. Oak Ridge National Lab., Tenn. Mar. 1958. Contract W-7405-Eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-58-3-15

Proposed method for removal of radioiodine vapor from experiment off-gas system of the ORR, by R. E. Adams and W. E. Browning. Oak Ridge National Lab., Tenn. May 1958. Contract W-7405-Eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-58-5-59

The crystal structure of RbU_6F_{25}, by L. A. Harris. Oak Ridge National Lab., Tenn. May 1958. Contract W-7405-Eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-58-5-63

High-altitude sampling techniques. Progress report for November 1957, by H. Halle. Chicago. Univ. Chicago Midway Labs. Contract AT-11-1-508. 20p. Order from LC. Mi $2.40, ph $3.30. CML-M-124-3

Chemical research—production and extraction of 94. Report for period April 16—April 30, 1943. Chicago. Univ. Metallurgical Lab. Decl. Feb. 1957. 20p. Order from LC. Mi $2.70, ph $4.80. CN-633

Electrostatic effects in the deposition of aerosols on cylindrical shapes. Technical report no. 15, by George S. Dawkins. Illinois. Univ., Urbana. Engineering Experiment Station. Mar. 1958. Contract At-11-1-276. 72p. Order from LC. Mi $4.50, ph $12.30. COO-1017

Information for application of gamma absorptometers for chemical processes, by G. J. Alkire. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Sep. 1956. Decl. Jul. 1957. Contract W-31-109-Eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. HW-45664

Problems associated with the chemical processing of aluminum-silicon-plutonium fuel materials, by E. E. Voiland. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Apr. 1958. Contract W-31-109-Eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. HW-54819

Fabrication of glass bearings, by B. B. Brenden. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Apr. 1958. Contract W-31-109-Eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. HW-55178

Non-metallic materials evaluation for January-March 1958, by J. H. Kleinpeter. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. May 1958. Contract W-31-109-Eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-56137

Solubility of water in molten alkali chlorides, by William J. Burkhard and J. D. Corbett. Ames Lab., Iowa State College, Ames, Iowa. Jul. 1957. Contract W-7405-Eng-82. 47p. Order from OTS. $1.50. ISC-929

Project SIR—revised proposal for the radioactive materials laboratory at the Knolls Atomic Power Laboratory, by H. H. Race and others. Knolls Atomic Power Lab., Schenectady, N. Y. Aug. 3, 1950. Decl. Feb. 1957. Contract W-31-109-Eng-52. 44p. Order from LC. Mi $4.50, ph $12.30. KAPL-387

Removal of perchlorethylene from blind access holes by use of vacuum and heat, by Max E. Thiebaud and C. W. Donnelly. Appendix I: minutes of meeting to discuss cleaning of reactor parts held in building D-4 on December 3, 1954, by R. G. Townsend. Dec. 1954. Appendix II: drying time for perclene trapped in blind holes by the use of heat and vacuum, by C. W. Donnelly. Dec. 1955. Appendix III: determination of residual chloride upon vacuum evaporation of perclene solvent, by C. W. Donnelly. Knolls Atomic Power Lab.,

Schenectady, N. Y. Jan. 1955. Contract W-31-109-Eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-RCD-29

Elimination of special gas requirements of S3G/S4G plant, by A. Lagani, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Feb. 1956. Contract W-31-109-Eng-52. 20p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-SMS-16

Determination of mercury in solids from S3G/S4G main coolant pump, by V. F. Consalvo. Knolls Atomic Power Lab., Schenectady, N. Y. Jun. 1958. Contract W-31-109-Eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-VFC-2

Homogeneous reactor fuel reprocessing, quarterly progress report for April 1-June 30, 1955, by Harold F. Reichard and others. Vitro Labs., West Orange, N. J. Jul. 29, 1955. Decl. Feb. 1957. Contract W-7405-Eng-26, Subcontract no. 535. 15p. Order from LC. Mi $2.40, ph $3.30. KLX-10006

Modified hot-cave facility for reprocessing experiments, by S. Strausberg and others. Atomics International, Canoga Park, Calif. Jun. 1958. Contract AT-11-1-Gen-8. 80p. Order from OTS. $2.25. NAA-SR-2687

Epoxy resins as cryogenic structural adhesives, by R. M. McClintock and M. J. Hiza. National Bureau of Standards. Cryogenic Engineering Lab., Boulder, Colo. 1956? 11p. Order from LC. Mi $2.40, ph $3.30. NBS-5039

Determination of thorium in uranium ores and feeds by solvent extraction employing thenoyltrifluoroacetone, by Paul G. Laux and Ernest A. Brown. National Lead Company of Ohio, Cincinnati, Ohio. May 1958. Contract AT-30-1-1156. 18p. Order from OTS. $1.00. NLCO-742

Engineering study of plant to produce 1000 liters per hour of liquid 92% para hydrogen; Appendix A, process specifications; Appendix B, mechanical engineering drawings. Hydrocarbon Research, Inc., New York. Sep. 14, 1951. Decl. Feb. 1957. Contract AT-30-1-1104. 150p. Order from LC. Mi $11.10, ph $37.80. NYO-3146

An investigation of ThF_4—fused salt solutions for homogeneous breeder reactors, by J. O. Blomeke. Oak Ridge National Lab., Tenn. Jul. 19, 1951. Decl. with deletions Feb. 1957. Contract W-7405-Eng-26. 22p. Order from LC. Mi $2.70, ph $4.80. ORNL-1030(Del.)

Analytical chemistry division semiannual progress report for period ending October 20, 1953. Oak Ridge National Lab., Tenn. Jan. 5, 1954. Decl. with deletions Feb. 1957. Contract W-7405-Eng-26. 42p. Order from LC. Mi $3.00, ph $6.30. ORNL-1639(Del.)

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Solubility and stability of PuF_3 in fused alkali fluoride-beryllium fluoride mixtures, by C. J. Barton and others. Oak Ridge National Lab., Oak Ridge, Tenn. n.d. Contract W-7405-Eng-26. 34p. Order from OTS. $1.25. ORNL-2530

Research and development in the field of thorium chemistry and metallurgy. Volume III. Cost estimate for 1,000 ton/yr. Thorium metal production plant. Final report, by James L. Wyatt. Horizons, Inc., Cleveland. Jun. 30, 1956. Decl. Jun. 1957. Contract AT-30-1-1335. 41p. Order from LC. Mi $3.30, ph $7.80. SRO-13

Master analytical manual. Oak Ridge National Lab., Oak Ridge, Tenn. Apr. 1958. 1516p. Order from OTS. $9.00. TID-7015(Section 1)

Recent total neutron yield measurements, by W. Crandall and G. Millburn. California. Univ., Berkeley. Radiation Lab. Jan. 1951. 4p. Order from LC. Mi $1.80, ph $1.80. UCRL-1648

Alpha-decay studies in the heavy-element region, by John Philip Hummel. California. Univ., Berkeley. Radiation Lab. Jul. 1956. Contract W-7405-Eng-48. 161p. Order from LC. Mi $7.80, ph $25.80. UCRL-3456

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Stability of boric acid, by H. K. Lembersky. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Sep. 1954. 4p. Order from LC. Mi $1.80, ph $1.80. WAPD-CP-687

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Neutron irradiation of benzene and of toluene in 2-methylpyrazine. An investigation of synthesis versus re-entry, by Alfred P. Wolf and others. Brookhaven National Lab., Upton, N. Y.; and Shell Oil Co., New York. 1957? 2p. Order from LC. Mi $1.80, ph $1.80. BNL-3039

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Darex process: Batch dissolution and chloride removal steps for Yankee atomic fuel, by J. H. Goode and J. R. Flanary. Oak Ridge National Lab., Tenn. Feb. 1958. Contract W-7405-Eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-58-2-135

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A recent model of the miniature mixer-settler, by H. W. Alter and J. W. Codding. Knolls Atomic Power Lab., Schenectady, N. Y. Dec. 15, 1954. Decl. Apr. 1957. Contract W-31-109-Eng-52. 17p. Order from LC. Mi $2.70, ph $4.80. KAPL-1246

Calcium oxalate carrier precipitation of Pu, by W. J. Maraman and others. Los Alamos Scientific Lab., N. Mex. Feb. 25, 1954, Decl. Oct. 1957. Contract W-7405-Eng-36. 9p. Order from LC. Mi $1.80, ph $1.80. LA-1692

Construction, process, and operation report. Step II. Linde Air Products Co., Tonawanda Lab., Tonawanda, N. Y. Oct. 1, 1946. Decl. Mar. 1957. Contract W-7401-Eng-14. 98p. Order from LC. Mi $5.70, ph $16.80. M-333 Step II(Pt. III)

Problems of refining uraniferous residues. Progress report for March 1953, by H. Fleck and J. E. Summers. Vitro Mfg. Co., Pittsburgh. Apr. 15, 1953. Decl. Mar. 1957. 18p. Order from LC. Mi $2.40, ph $3.30. NYO-1157

Research and development in the field of thorium chemistry and metallurgy. Monthly progress report for April 16 to May 15, 1955, by James L. Wyatt. Horizons, Inc., Cleveland, Ohio. May 25, 1955. Decl. Mar. 1957. Contract AT-30-1-1335. 24p. Order from LC. Mi $2.70, ph $4.80. SRO-21

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Stability effects of surface currents on a pinched plasma containing a uniform volume current, by O. G. Harrold, Jr. Oak Ridge National Lab., Oak Ridge, Tenn. n.d. Contract W-7405-Eng-26. 19p. Order from OTS. 75 cents. ORNL-2542

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Progress report on experiments to determine infinite multiplication factors of enriched UO_3-H_2O mixtures, by Harry E. Handler. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jul. 1, 1957. Decl. Aug. 1957. Contract W-31-109-Eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. HW-51168

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Spectroscopy of high-temperature systems, by William T. Hicks. California. Univ., Berkeley. Radiation Lab. Feb. 1957. Contract W-7405-Eng-48. 92p. Order from LC. Mi $5.40, ph $15.30. UCRL-3696

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The total cross sections for 190-Mev positively charged K mesons in complex nuclei, by Leroy Thomas Kerth. California. Univ., Berkeley. Radiation Lab. Apr. 1957. Contract W-7405-Eng-48. 40p. Order from LC. Mi $3.00, ph $6.30. UCRL-3747

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The electrical design of a heavy-ion accelerator, by Ferdinand Voelker. California. Univ., Berkeley. Radiation Lab. Aug. 1957. Contract W-7405-Eng-48. 13p. Order from LC. Mi $2.40, ph $3.30. UCRL-3777

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A method of solving the two-end-point problem for second-order differential equations, by James E. Faulkner. California. Univ., Livermore. Radiation Lab. Oct. 1956. Contract W-7405-Eng-48. 4p. Order from LC. Mi $1.80, ph $1.80. UCRL-4764

Plasma confinement at uniform temperature, by Cornelius H. Woods. California. Univ., Livermore. Radiation Lab. Oct. 1956. Contract W-7405-Eng-48. 31p. Order from LC. Mi $3.00, ph $6.30. UCRL-4769

Beehive and Hornet—reactor codes for spherical geometry, by Stuart P. Stone. California. Univ., Livermore. Radiation Lab. Feb. 1957. Contract W-7405-Eng-48. 72p. Order from LC. Mi $4.50, ph $12.30. UCRL-4813

Microwave diagnostics for high-temperature plasmas, by Charles B. Wharton. California. Univ., Livermore. Radiation Lab. Mar. 1957. Contract W-7405-Eng-48. 18p. Order from LC. Mi $2.40, ph $3.30. UCRL-4836

Initial conditions for the dynamic pinch, by Stirling A. Colgate. California. Univ., Livermore. Radiation Lab. May 1957. Contract W-7405-Eng-48. 20p. Order from LC. Mi $2.40, ph $3.30. UCRL-4895

The equation of state of the alkali halides at high pressure, by Russell H. Christian. California. Univ., Livermore. Radiation Lab. May 1957. Contract W-7405-Eng-48. 89p. Order from LC. Mi $4.80, ph $13.80. UCRL-4900

Dissociation of H_2^+ by photons, by W. Linlor and others. California. Univ., Livermore. Radiation Lab. Jun. 1957. Contract W-7405-Eng-48. 21p. Order from LC. Mi $2.70, ph $4.80. UCRL-4917

Ion oscillations in a magnetic field, by William A. Newcomb. California. Univ., Livermore. Radiation Lab. Jul. 1957. Contract W-7405-Eng-48. 30p. Order from LC. Mi $2.70, ph $4.80. UCRL-4941

Radiative capture of protons in Ne^{20}, by R. E. Pixley and others. California. Univ., Livermore. Radiation Lab. Oct. 1957. Contract W-7405-Eng-48. 10p. Order from LC. Mi $1.80, ph $1.80. UCRL-4969

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Measurement of high temperature. A bibliography, by G. R. Maynard. California. Univ., Livermore, Radiation Lab. Sep. 1957. Contract W-7405-Eng-48. 10p. Order from LC. Mi $1.80, ph $1.80. UCRL-5070

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Pressure induced metallic transitions in insulators, by B. J. Alder and R. H. Christian. Univ. of California, Radiation Lab., Livermore, Calif. Nov. 1957. Contract W-7405-Eng-48. 7p. Order from OTS. 50 cents. UCRL-5210

The slowing-down distribution of energetic nuclei in a fully ionized gas, by Ray E. Kidder. Univ. of California, Radiation Lab., Livermore, Calif. May 1958. Contract W-7405-Eng-48. 11p. Order from OTS. 50 cents. UCRL-5212

Energy transfer between charged particles by Coulomb collisions, by Ray E. Kidder. Univ. of California, Radiation Lab., Livermore, Calif. May 1958. Contract W-7405-Eng-48. 21p. Order from OTS. 75 cents. UCRL-5213

Stability of the interface between two immiscible liquids of unequal viscosity in a porous solid, by Ray E. Kidder. Univ. of California, Radiation Lab., Livermore, Calif. May 1958. Contract W-7405-Eng-48. 7p. Order from OTS. 50 cents. UCRL-5214

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Longitudinal dispersion in solvent-extraction columns: Peclet numbers for ordered and random packings, by Gabriel L. Jacques and Theodore Vermuelen. California. Univ., Berkeley. Radiation Lab. Nov. 1957. Contract W-7405-Eng-48. 152p. Order from LC. Mi $7.50, ph $24.30. UCRL-8029

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Reflection and scattering coefficients for several types of terrain, by Allen R. Edison. New Mexico. Univ., Albuquerque. Engineering Experiment Station. Sep. 1957. For Sandia Corp. Contract AT-29-1-789. 17p. Order from LC. Mi $2.40, ph $3.30. UNM-TR-EE-8

Agglutination of submicronic dust particles with a sodium chloride aerosol—a technical study, by L. Dautrebande and others. Rochester, N. Y. Univ. Atomic Energy Project. Aug. 1957. Contract W-7401-Eng-49. 30p. Order from LC. Mi $2.70, ph $4.80. UR-505

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Multigroup, integral network method, by Daniel Schiff. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jul. 1954. Decl. Mar. 1957. Contract AT-11-1-Gen-14. 78p. Order from LC. Mi $4.50, ph $12.30. WAPD-108

Mechanical design of heat exchangers. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Aug. 1954. 102p. Order from LC. Mi $2.70, ph $16.80. WAPD-AD(T)-1086

MTR A-33 pressure tube feasibility study, by M. Doumas and W. R. Gibson. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh Apr. 1956. 16p. Order from LC. Mi $2.40, ph $3.30. WAPD-A1W(M)-307

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Survey of high capacity steam generator design, by R. E. Bruckner. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Oct. 1954. 33p. Order from LC. Mi $3.00, ph $6.30.
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Proposal for fuel rod proof-test in WAPD-CR-5, central thimble loop, NRX Reactor, AECL, by A. P. Miller. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. May 31, 1955. Decl. Mar. 1957. Contract AT-11-1-Gen-14. 10p. Order from LC. Mi $1.80, ph $1.80.
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Allis Chalmers 4000 GPM main coolant pump inspection report, by W. B. Garvey. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. 1957? 3p. Order from LC. Mi $1.80, ph $1.80.
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Pressure drop through a rotated plate subassembly, by R. A. DeBortoli. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jun. 23, 1954. Decl. Mar. 1957. 20p. Order from LC. Mi $2.40, ph $3.30. WAPD-FE-175

Analog computer solutions for the xenon concentration in a reactor, by R. R. Leonard. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Nov. 18, 1952. Decl. Apr. 1957. 10p. Order from LC. Mi $2.40, ph $3.30.
WAPD-IC-111

Statistical tests of significance involving the means and standard deviations of small samples with applications in the materials department, by Lloyd B. Kramer. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jun. 17, 1953. Changed from Official Use Only Sep. 1957. 56p. Order from LC. Mi $3.60, ph $9.30.
WAPD-M-35

Developmental work on non-destructive test methods of inspecting subassemblies for corrosion, by Frank Cain, Jr. and Richard Alto. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. May 13, 1952. Decl. Apr. 1957. 8p. Order from LC. Mi $1.80, ph $1.80.
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Transport theory of neutrons. III. Approximation methods, by Allan F. Henry. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. May 24, 1951. Decl. Mar. 1957. 15p. Order from LC. Mi $2.40, ph $3.30. WAPD-P-91

The gamma ray shielding of in-pile experiments, by Sumner Mayburg and Warren F. Witzig. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. May 12, 1952. Decl. May 1957. Contract AT-11-1-Gen-14. 15p. Order from LC. Mi $2.40, ph $3.30. WAPD-P-192

Flux distribution in a heavily loaded removable subassembly, by G. Hopkins. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Aug. 1955. 5p. Order from LC. Mi $1.80, ph $1.80. WAPD-P-681(Rev.)

A BF_3 filled ionization chamber for power reactor control, by J. C. Connor. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Dec. 1955. Contract AT-11-1-Gen-14. 11p. Order from LC. Mi $2.40, ph $3.30.
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WAPD-PM-41

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Theoretical calculations on ZPR experimentation. Part III. Worth of a single central cylindrical control rod, by H. L. Garabedian. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jan. 26, 1951. Decl. Mar. 1957. Contract AT-11-1-Gen-14. 37p. Order from LC. Mi $3.00, ph $6.30. WAPD-RM-38

Boost of ionization chamber pulse by chamber subdivision or transformer, by W. W. Ramage and R. H. Frazier. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Dec. 1953. Changed from Official Use Only Jan. 1958. Contract AT-11-1-Gen-14. 35p. Order from LC. Mi $3.00, ph $6.30. WAPD-RM-206

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Magnetic latch analysis, by John G. Murray. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Aug. 1955. 73p. Order from LC. Mi $4.50, ph $12.30. WAPD-T-173

Electrical resistance of zirconium and titanium, by W. A. Bostrom. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Apr. 14, 1954. Changed from Official Use Only Sep. 1957. Contract AT-11-1-Gen-14. 13p. Order from LC. Mi $2.40, ph $3.30. WAPD-T-176

Steady state thermal stress distribution in long hollow cylinders experiencing a radial exponential internal heat generation, by Harry J. Honohan. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. 1956. 68p. Order from LC. Mi $4.50, ph $12.30. WAPD-T-310

Investigation of burnout heat flux in rectangular channels at 2000 psia, by H. S. Jacket and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Jun. 1956. Contract AT-11-1-Gen-14. 29p. Order from LC. Mi $2.70, ph $4.80. WAPD-T-319

P-cyclic matrices: a generalization of the Young-Frankel successive overrelaxation scheme, by Richard S. Varga. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Aug. 1957. Contract AT-11-1-Gen-14. 14p. Order from LC. Mi $2.40, ph $3.30. WAPD-T-567

Nucleate boiling detection techniques, by K. Katz and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. 1957. Contract AT-11-1-Gen-14. 25p. Order from LC. Mi $2.70, ph $4.80. WAPD-T-588

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Pressure drop through rectangular orifices, by B. W. LeTourneau and R. E. Grimble. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Aug. 5, 1955. Decl. Apr. 1957. 7p. Order from LC. Mi $1.80, ph $1.80. WAPD-TH-106

Cobra instrumentation mixing tests, by J. R. Parrette and R. E. Grimble. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Sep. 9, 1955. Changed from Official Use Only Nov. 1956. 5p. Order from LC. Mi $1.80, ph $1.80. WAPD-TH-131

Correlation of burnout data, by G. Sonnemann. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Jul. 1956. 15p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-160

An analysis of mixing in parallel flow rod bundles, by R. E. Grimble and W. H. Bell. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Mar. 1956. 20p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-178

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Additional burnout data for a rectangular channel having a cosine axial heat flux distribution, by R. A. DeBortoli and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Aug 1956. 11p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-227

Atmospheric pressure free convection burnout tests, by R. A. DeBortoli and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Sep 1956. Contract AT-11-1-GEN-14. 16p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-229

Test specifications for the PWR tests in the Columbia University transient loop, by R. Masnovi and J. D. Roarty. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. Aug 1956. 19p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-238

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Additional 2000 PSIA vertical upflow burnout data for 0.053 in. x 1 in. x 12.06 in. long rectangular channels with an inlet water temperature of 500°F, by R. Masnovi. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. N.D. 5p. Order from LC. Mi $1.80, ph $1.80. WAPD-TH-306

Upflow burnout data for water in rectangular channels at pressures from 600 to 1870 PSIA, by M. Troy. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. Sep 1957. 30p. Order from LC. Mi $2.70, ph $4.80. WAPD-TH-321

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Heat transfer and fluid flow program of the Bettis Thermal and Hydraulics Section (advanced development and planning activities) for period July 1-December 31, 1957. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. 21p. Order from LC. Mi $2.70, ph $4.80. WAPD-TH-344

Heat transfer and velocity profile near the corners of rectangular channels, by W. H. Bell and B. W. LeTourneau. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Pa. Jul 1957. 7p. Order from LC. Mi $1.80, ph $1.80. WAPD-TH-348

Estimated film boiling heat transfer coefficients, by O. J. Mendler. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Mar 1958. 16p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-404

Rates of convergence in one-dimensional codes, by Ely Gelbard. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Oct 1956. Contract AT-11-1-GEN-14. 12p. Order from LC. Mi $2.20, ph $3.30. WAPD-TM-18

Candle—a one-dimensional few-group depletion code for the IBM-704. Addendum 2. Candle 3, by L. M. Culpepper. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Oct 1957. Contract AT-11-1-GEN-14. 3p. Order from LC. Mi $1.80, ph $1.80. WAPD-TM-53(Add. 2)

Cell calculations and flux approximations for simple slab geometry, by G. W. Simon and A. W. Gray. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Jul 1957. Contract AT-11-1-GEN-14. 33p. Order from LC. Mi $3.00, ph $6.30. WAPD-TM-71

The prep code for calculating group and angle transfer cross sections of elastic scattering for the RDR-5 transport code on the NORC computer, by Harvey J. Amster and Linwood M. Culpepper. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Feb 1958. Contract AT-11-1-GEN-14. 14p. Order from LC. Mi $2.40, ph $3.30. WAPD-TM-117

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Permissible exposures of U^{233} —thorium fuel elements in reactors having continuous fuel feed, by B. E. Prince. Oak Ridge National Lab. Oak Ridge, Tenn. Sep 1957. Contract W-7405-eng-26. 33p. Order from LC. Mi $3.00, ph $6.30. CF-57-9-95

Test of HRT recombiners, by B. A Hannaford. Oak Ridge National Lab. Oak Ridge, Tenn. Sep 1957. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-57-9-98

Report of slurry blanket test run SM-3, by L. F. Parsly, Jr. Oak Ridge National Lab. Oak Ridge, Tenn. Oct 1957. Contract W-7405-eng-26. 39p. Order from LC. Mi $3.00, ph $6.30. CF-57-10-2

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Investigation of effect of seal configuration on mixing flow and radiation damage in HRT-type circulating pumps, by H. A. Rundell and others. Oak Ridge National Lab. Oak Ridge, Tenn. Oct 1957. Contract W-7405-eng-26. 26p. Order from LC. Mi $2.70, ph $4.80. CF-57-10-48

Test of Koby oil filter on HRT shield vacuum pumps, HRT test X.C. 5.c, by S. I. Kaplan. Oak Ridge National Lab. Oak Ridge, Tenn. Oct 1957. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-57-10-77

Life of HRE-3 core tanks, by J. A. Larrimore. Oak Ridge National Lab. Oak Ridge, Tenn. Oct 1957. Contract W-7405-eng-26. 47p. Order from LC. Mi $3.30, ph $7.80. CF-57-10-110

Power calibration for BSR loading 33, by E. B. Johnson. Oak Ridge National Lab. Oak Ridge, Tenn. Nov 1957. Contract W-7405-eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. CF-57-11-30

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Possibility of peroxide precipitation when the reactor cell is flooded, by P. N. Haubenreich. Oak Ridge National Lab. Oak Ridge, Tenn. Nov 1957. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-57-11-83

Inlet nozzles for slurry for HRT blanket, by J. M. Trummel. Oak Ridge National Lab. Oak Ridge, Tenn. Nov 1957. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-57-11-148

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Heat generation rate in core tank of HRE-3, by H. C. Claiborne and T. B. Fowler. Oak Ridge National Lab. Oak Ridge, Tenn. Dec 1957. Contract W-7405-eng-26. 27p. Order from LC. Mi $2.70, ph $4.80. CF-57-12-45

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Evaluation of check valve materials in uranyl sulfate and in distilled water, by R. Blumberg. Oak Ridge National Lab. Oak Ridge, Tenn. Dec 1957. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-57-12-72

Entrainment in 5000 gpm gas separator, by B. A. Hannaford. Oak Ridge National Lab. Oak Ridge, Tenn. Dec 1957. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-57-12-74

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Two-group constants for aqueous homogeneous reactor calculations, by T. B. Fowler and M. Tobias. Oak Ridge National Lab. Oak Ridge, Tenn. Jan 1958. Contract W-7405-eng-26. 21p. Order from LC. Mi $2.70, ph $4.80. CF-58-1-79

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A molten salt natural convection reactor system, by F. E. Romie and B. W. Kinyon. Oak Ridge National Lab. Oak Ridge, Tenn. Feb 1958. Contract W-7405-eng-26. 27p. Order from LC. Mi $2.70, ph $4.80. CF-58-2-46

Phase I—foreign reactor fuel sample irradiation. Irradiation request ORNL-MTR-35, by C. F. Leitten and W. C. Thurber. Oak Ridge National Lab. Oak Ridge, Tenn. Feb 1958. Contract W-7405-eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. CF-58-2-109

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Flux-trap reactor with absorber in the center, by W. K. Ergen. Oak Ridge National Lab. Oak Ridge, Tenn. Mar 1958. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-58-3-27

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Pressurization of HRE-3 with an oxygen-inert gas mixture, by N. Hilvety. Oak Ridge National Lab. Oak Ridge, Tenn. Apr 1958. Contract W-7405-eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-58-4-44

Review of HRT feedwater control system, by R. L. Moore. Oak Ridge National Lab. Oak Ridge, Tenn. Apr 1958. Contract W-7405-eng-26. 28p. Order from LC. Mi $2.70, ph $4.80. CF-58-4-63

Some nuclear characteristics of spherical double-blanket reactors, by Melvin Tobias and T. B. Fowler. Oak Ridge National Lab. Oak Ridge, Tenn. Apr 1958. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-58-4-66

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Rates of corrosion product removal from circulating system by film formation and settling, by J. C. Suddath. Oak Ridge National Lab. Oak Ridge, Tenn. Apr 1958. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-58-4-119

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The recovery of uranium from industrial phosphoric acid. Progress reports for May 1951, by R. H. Bailes. Dow Chemical Co. Western Div., Pittsburg, Calif. Jun 1951. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 72p. Order from LC. Mi $4.50, ph $12.30. DOW-54

The recovery of uranium and vanadium from Monticello leach liquors by ion exchange, by D. A. Ellis. Dow Chemical Co. Western Div. Pittsburg, Calif. Aug 1951. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 72p. Order from LC. Mi $4.50, ph $12.30. DOW-55

The recovery of uranium from industrial phosphoric acid. Progress reports for Jun 1951, by R. H. Bailes. Dow Chemical Co. Western Div., Pittsburg, Calif. Jun 1951. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 73p. Order from LC. Mi $4.50, ph $12.30. DOW-56

The recovery of uranium from industrial phosphoric acid. Progress report for November 1951. Research Dept., by R. H. Bailes. Dow Chemical Co. Western Div., Pittsburg, Calif. Dec 1951. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 66p. Order from LC. Mi $3.90, ph $10.80. DOW-64

The recovery of uranium from Canadian leach liquors by ion exchange. Summary status report, by David A. Ellis and others. Dow Chemical Co. Western Div., Pittsburg, Calif. Mar 1952. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 92p. Order from LC. Mi $5.40, ph $15.30. DOW-73

Recovery of uranium from phosphate rock during the manufacture of wet process phosphoric acid, by K. Glenn Shaw. Dow Chemical Co. Western Div., Pittsburg, Calif. Feb 1954. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 21p. Order from LC. Mi $2.70, ph $4.80. DOW-111

Progress report for the period June 13, 1951 to August 31, 1951, by John C. Huggins and Edward P. Bullwinkel. Merrill Co. San Francisco, Calif. Sep 1951. Decl. Aug 1955. Contract AT(49-1)-540. 36p. Order from LC. Mi $3.00, ph $6.30. RMO-2601

Progress report for the period January 1, 1952 to February 29, 1952, by Leslie A. McClaine and others. Merrill Co. San Francisco,

Calif. 1952. Decl. Aug 1955. Contract AT (49-1)-540. 28p. Order from LC. Mi $2.70, ph $4.80. RMO-2604

Progress report for the period March 1, 1952 to April 30, 1952, by Leslie A. McClaine. Merrill Co. San Francisco, Calif. 1952. Decl. Aug 1955. Contract AT(49-1)-540. 44p. Order from LC. Mi $3.30, ph $7.80. RMO-2605

Progress report for the period May 1, 1952 to June 30, 1952, by Leslie A. McClaine. Merrill Co. San Francisco, Calif. Jul 1952. Decl. Aug 1955. Contract AT(49-1)-540. 38p. Order from LC. Mi $3.00, ph $6.30. RMO-2606

Progress report for the period July 1, 1952 to August 29, 1952, by Leslie A. McClaine. Merrill Co. San Francisco, Calif. Dec 1952. Decl. Aug 1955. Contract AT(49-1-540. 38p. Order from LC. Mi $3.00, ph $6.30. RMO-2608

A preliminary economic analysis of the sodium-amalgam process, by Leslie A. McClaine and Boyd L. Mahan. Merrill Co. San Francisco, Calif. Nov 1952. Decl. Aug 1955. Contract AT(49-1)-540. 41p. Order from LC. Mi $3.00, ph $6.30. RMO-2609

Progress report for the period September 1, 1952 to October 31, 1952, by Leslie A. Mc Claine. Merrill Co. San Francisco, Calif. Jan 1953. Decl. Aug 1955. Contract AT(49-1)-540. 62p. Order from LC. Mi $3.60, ph $9.30. RMO-2610

Summary and cost estimates using electrolytic reduction in selected flowsheets, by John C. Huggins and Robert A. Carlson. Merrill Co. San Francisco, Calif. Apr 1954. Decl. Aug 1955. Contract AT(49-1)-540. 32p. Order from LC. Mi $2.70, ph $4.80. RMO-2613

Extraction of uranium from La Ventana lignite, by I. F. Schwien. Merrill Co. San Francisco, Calif. Mar 1954. Decl. Aug 1955. Contract AT(49-1)-540. 28p. Order from LC. Mi $2.70, ph $4.80. RMO-2615

Solvent extraction of uranium from sulfuric acid eluates, by Henry G. Petrow and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Mar 1956. Changed from Official Use Only Jan 1957. Contract AT(49-6)-924. 17p. Order from LC. Mi $2.40, ph $3.30. WIN-28

Resin-in-pulp pilot plant testing of hidden splendor ores, by D. O. Skiles and R. L. Shimin. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Jan 1956. Changed from Official Use Only Sep 1957. Contract AT(49-6)-924. 50p. Order from LC. Mi $3.30, ph $7.80. WIN-32

Resin-in-pulp pilot plant testing of White Canyon ores, by J. Q. Jones and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Feb 1956. Changed from Official Use Only Sep 1957. Contract AT(49-6)-924. 45p. Order from LC. Mi $3.30, ph $7.80. WIN-35

Laboratory testing of Little Man Claim ore, by George Trueman. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Feb 1956. Changed from Official Use Only Sep 1957. Contract AT(49-6)-924. 17p. Order from LC. Mi $2.40, ph $3.30. WIN-36

Amenability testing of Homestake Little Beaver and Richardson Claim ores, by George Trueman and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Sep 1956. Changed from Official Use Only Sep 1957. Contract AT(49-6)-924. 30p. Order from LC. Mi $3.00, ph $6.30. WIN-38

Alkaline resin-in pulp process for the recovery of uranium from its ores, by J. Q. Jones and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Jan 1956. Changed from Official Use Only Sep 1957. Contract AT(49-6)-924. 71p. Order from LC. Mi $3.00, ph $6.30. WIN-39

Four Corners Uranium Company Ore, by J. B. Breymann and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. 1957. Contract AT (49-6)-924. 21p. Order from LC. Mi $2.30, ph $4.80. WIN-51

Acid Leach CCD-Columns Pilot Plant testing of Rio de Oro Dysart Shaft Ore, by W. A. Millsap and R. L. Shimmin. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Nov 1957. Changed from Official Use Only Jun 1958. Contract AT(49-6)-924. 36p. Order from LC. Mi $3.00, ph $6.30. WIN-76

Laboratory investigation of Moonlight Claim ore, by E. S. Porter and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Mar 1958. Contract AT(49-6)-924. 19p. Order from LC. Mi $2.40, ph $3.30.
WIN-87

Preparation of dense, metal-grade UF_4 from ores and concentrates, by H. G. Petrow and others. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. May 1958. Contract AT(49-6)-924. 64p. Order from LC. Mi $3.90, ph $10.80.
WIN-90

Chemical stream pollution from uranium mills, by A. Whitman and E. S. Porter. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. Jun 1958. Contract AT(49-6)-924. 43p. Order from LC. Mi $3.30, ph $7.80.
WIN-99

Y-12 chemical research division progress report for January 1, 1950 to March 31, 1950, by C. H. Clewett. Oak Ridge National Lab. Y-12 Area, Oak Ridge, Tenn. Apr 1950. Decl. with deletions Mar 1957. Contract W-7405-eng-26. 80p. Order from LC. Mi $4.50, ph $12.30.
X-585(Del.)

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