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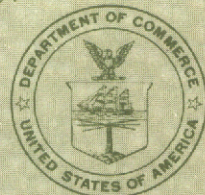
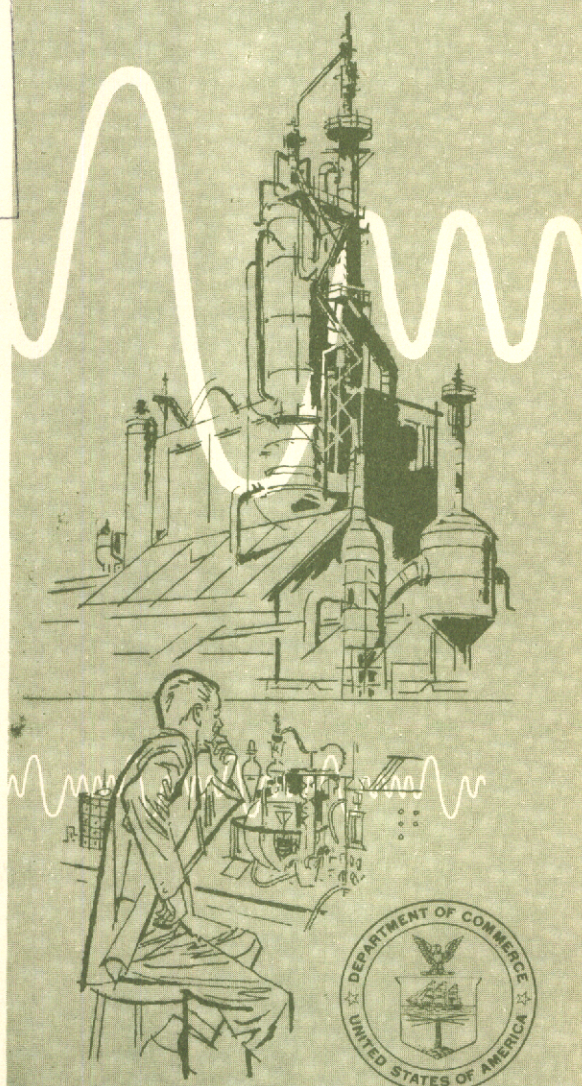
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U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

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Use of funds for printing this publication approved by the Director of the Bureau of the Budget, August 22, 1955.

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BIBLIOGRAPHY

Abstracts of published papers and list of translations, Vol. 4, No. 10, abstracts 456-506.

Australia. Commonwealth Scientific and Industrial Research Organization, Melbourne. Oct 1956. 26p. Order from LC. Mi \$2.70, ph \$4.80.
PB 125228

For other reports see PB 119617, 122458, 122887-122888 and 124710. 1. Industrial research - Bibliography - Australia 2. Scientific research - Bibliography - Australia

Aerodynamic studies: Forces acting on an air vehicle, a review of the literature, by M. Z. Krzwicki. Chicago. University, Chicago, Ill. May 1957. 99p. Order from OTS. \$2.50.

PB 131385

Phase 1 of study 6 under this contract calls for a regular review of scientific and technical literature relating to the determination of aerodynamic forces and moments that will be exerted on a given airframe under various flight conditions. It is a continuation of work by the Advisory Board on Simulation under Contract AF 33(038)-15068, Suppl. 2. As additional material is reviewed it will be issued as later parts of WADC RN56-360. Project no. 7060. Includes material reviewed during period Oct-Dec 1955. Contract AF 33(616)-2797. AF WADC TN 56-360, Part 16.

Annotated bibliography of Billet and Qualifications Research Branch studies Jan 1944 - Jun 1955.

U.S. Bureau of Naval Personnel. Personnel Analysis Division. Billet and Qualifications Research Branch. Sep 1955. 59p. Order from LC. Mi \$3.60, ph \$9.30. PB 124583

1. Personnel, Naval - Classification - Bibliography
2. Occupations - Bibliography 3. NAVPERS 18421

Annotated bibliography of meteorological observations in the United States, 1731-1818, by James M. Havens. Florida State University. Dept. of Meteorology, Tallahassee, Fla. Mar 1956. 34p.

tables., Order from LC. Mi \$3.00, ph \$6.30.
PB 125625

1. Meteorology - Observations - Bibliography
2. Contract Nonr-1600(00), NR 082-071 Technical report 5.

Bibliography of literature on degradation and stabilization of halide-containing polymers such as polyvinyl chloride. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. Jul 1956.

114p. Order from LC. Mi \$6.00, ph \$18.30.
PB 126529

It is the purpose of this survey to summarize information on (1) the nature of the degradation of the vinyls and (2) the manner in which stabilizers are believed to retard this degradation. As part of this survey, there are listed the commercial types of vinyl resins, types of commercial stabilizers and a patent survey of materials which are claimed to act as stabilizers. Quartermaster Corps project 18. Compiled by 2701st USAR Research and Development unit (REINF-TNG), Columbus, Ohio.

Bibliography of photonuclear reactions, compiled by

M. Elaine Toms. U.S. Naval Research Laboratory. Jun 1955. 64p. Order from LC. Mi \$3.90, ph \$10.80. PB 128817

The bibliography consists of 545 references published during or before 1954. An author index is included. Governmental or institutional reports have been omitted. Articles listed have been published in the standard periodicals. NRL B2.

Supplement no. 1, compiled by M. Elaine Toms. Aug 1956. 22p. Order from LC. Mi \$2.70, ph \$4.80. PB 128817s

This supplement extends the bibliography through 1955. A few references prior to 1955 have been added. An author index is included. NRL B2, Suppl. 1.

Grid-controlled rectifiers, an annotated bibliography, compiled by Mildred Benton. U.S. Naval Research Laboratory. Jul 1957. 95p. Order from OTS. \$2.75. PB 131126

Covers books, periodical articles, and unclassified research reports published from 1923 to early 1957. NRL B12.

O.N.R. research memoranda listing. Carnegie Institute of Technology. Graduate School of Industrial Administration, Pittsburgh, Pa. Nov 1955. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 125028

Lists papers written as part of a project on the planning and control of industrial operations under Contract Nonr-76001, NR 047-011. ONR RM L-4.

Temperature receptors, an annotated bibliography by George Shambaugh. U.S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Development Center, Natick, Mass. Apr 1956. 61p table. Order from LC. Mi \$3.90, ph \$10.80. PB 125896

The bibliography is divided into four sections: the

temperature receptors in man (annotated and listed chronologically); the temperature receptors in other animals (annotated and chronologically listed); The effect of chemicals on temperature receptors (annotated and listed alphabetically); and an alphabetical listing of the above references cross-indexed, together with additional pertinent references. Project reference: 7-64-12-004C. Unclassified 16 Jul 1956. QMC EP TR 24.

CARTOGRAPHY

Cartographic drafting methods and equipment. First interim report, by William C. Mahoney. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Ft. Belvoir, Va. Jul 1953. 42p photo, fold col. maps, diagrs, table. Order from LC. Mi \$3.30, ph \$7.80. PB 125217

This report covers an evaluation and analysis of present cartographic methods and equipment which was undertaken to determine those areas that can be improved most through further study and tests. To obtain background material, surveys were made of various government and private mapping agencies and tests were conducted to evaluate the glass plate and plastic scribing processes. Project 8-35-02-004. Color in maps will not reproduce. ERDL R1305.

Several methods of teaching contour interpretation, by F.J. McGuigan and James W. Grubb. George Washington University. Human Resources Research Office, Washington, D.C. Jan 1957. 22p map, graph, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 126807

Teaching soldiers to interpret contour lines on a topographic map is a difficult aspect of Army map training. Three ways of representing terrain (terrain board, 3-D slides, and 2-D slides) and two ways of representing contours (standard flat relief map and three-dimensional relief map) were tested for effectiveness in teaching a map user how to visualize terrain features. The experimental training method which consistently led to the greatest proficiency combined use of 2-D slides and 3-D relief maps. Unclassified Report. DA Proj 095-30-000. Contract DA 44-109-qm-650. GWU HRRO TR-35.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Chemistry of alkylboroxines, by John Clifford Perrine. Jun 1956. 109f diagrs, graphs. Order from LC. Mi \$5.70, enl pr \$18.30. PB 125845

This investigation centered around the chemistry of the boron compounds known as "boroxines." In these compounds boron and oxygen atoms alternate in a six-membered ring structure which is isoelectronic with and dimensionally equivalent to benzene. Alkyl, aryl, halo, alkoxy, or amino groups may be bonded to the boron atoms. Numerous compounds were investigated. Some infrared and ultraviolet studies were also undertaken. MCC-1023-TR-226.

Effect of the cation on micelle formation by sulfonates in benzene, by Samuel Kaufman and C. R. Singletery. U.S. Naval Research Laboratory. Sep 1957. 16p graphs, tables. Order from OTS. 50 cents. PB 131228

The states of aggregation of dinonylnaphthalene sulfonates of ten cations (Li, Na, Cs, NH₄, Mg, Ca, Ba, Zn, Al, and H) have been studied in benzene by fluorescence depolarization, cryoscopy, viscometry and densimetry. The relative insensitivity of the sulfonate micelle size to influences of the cation and moisture, contrasts sharply with the behavior of the phenylstearate soaps whose aggregation depends critically upon these variables. Viscosities of the sulfonate solutions exceeded those predicted by the Einstein relation for spherical particles. Cesium dinonylnaphthalene sulfonate was shown cryoscopically to have an aggregation number of 6 or more. NRL R 4994.

Preparation of simple and polymeric products from fluorinated olefins, by Murray Hauptschein, Milton Braid and Francis E. Lawlor. Pennsylvania Salt Manufacturing Co., Philadelphia, Pa. Apr 1956. 22p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125926

The formation of telomers of perfluoropropene of formula R [CF₂CF(CF₃)]_n I where R = CF₃, C₃F₇, C₄F₉CF(CF₃), C₄F₉CF(CF₃)CF₂CF(CF₃), and CF₂ClCFCl and n = 1 to >10 has been accomplished by purely thermal means. The unique advantages of this simple process as a method of producing telomers of certain types of relatively nonpolymerizable olefins are expounded. Covers portion of the work completed during period Aug 1, 1955 to Mar 31, 1956. Preprint of a paper entitled, Thermal Synthesis of Telomers of Fluorinated Olefins. I. Perfluoropropene. Contract Nonr-1614(00), NR 356-358.

Plastics and Plasticizers

Copolymers of 1, 1-dihydroperfluorobutyl acrylate with some vinyl silanes, by Eugene C. Stump, Jr. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1957. 24p graphs, tables. Order from OTS. 75 cents. PB 131375

The purpose of this investigation was to prepare an

elastomer with high temperature resistance as well as improved resistance to the deteriorating and swelling effects of fuels and oils. Four silane monomers; vinyltriethoxy-, vinylthyldiethoxy-, vinyl-dimethylethoxy-, and vinyltrimethylsilane were copolymerized with 1, 1-dihydro-perfluorobutyl acrylate. The resulting polymers were tested for thermal stability by determining percent weight loss in dry air at 350° and 400°F. The enhanced thermal stability is attributed to a unique type of cross-linking, which is discussed theoretically. Infrared spectra of the samples were recorded and discussed. AD 118247. Project no. 7340, Task no. 73404. Covers work for period Apr - Aug 1955. AF WADC TR 56-520.

High speed tensile data for cellulose acetate butyrate, by Richard E. Ely. U.S. Redstone Arsenal, Huntsville, Ala. Jul 1956. 25p drawing, graphs, tables. Order from OTS. 75 cents. PB 131242

Cellulose acetate butyrate, 265A-MH, tensile specimens were tested at room temperature for strain rates from 0.02 to over 5000 in/min/in. Loads were measured electronically and strain measurements were reduced from high-speed film records. Major trends of several mechanical properties were established. Project TB 2-0001. Contribution 31, Research Laboratories, Ordnance Missile Laboratories, Redstone Arsenal. RSA OML 2R9N1.

Résistance of plastics to outdoor exposure, by Robert B. Barrett. U.S. Picatinny Arsenal, Samuel Feltman Ammunition Laboratories, Dover, N.J. Feb 1955. 268p photos, tables. Order from OTS. \$6.00. PB 131331

The object was to determine resistance to outdoor weathering of most of the commercially available plastic materials and to investigate in this connection the effect of certain additives, fillers, and other modifiers. Of the 76 materials tested, a few were found to be essentially unaffected under any weathering conditions for periods up to three years, a significant number greatly affected in short-time intervals, and a larger number degraded to an intermediate degree. This report is a condensation of the original report. Additional information regarding (1) molding or fabricating conditions of the test specimens, (2) individual test specimen values, (3) more detailed data on climatic conditions, and (4) graphs of the different properties measured as a function of time of exposure, may be found in the original report. Condensed edition. PA TR 2102.

Plastic molding, by Robert B. Bennett. Florida. Engineering and Industrial Experiment Station. Dept. of Chemical Engineering, Gainesville, Fla. Feb 1957. 211p photos, drawings, graphs, tables. Order from OTS. \$5.50. PB 131400

The major assignments included the development of techniques for molding optically acceptable 20" hemispheres, the development of four new and simpler techniques for the construction of smooth surfaced polyester-glass laminates, and the development of a new technique for assuring accurate control of the gel

or cure of such laminates. Covers work from 27 Feb 1954 to 27 Feb 1957 under Contract AF 08(616)-36, Task no. 5. AF AC TR 57-82. AD 135979.

Rheological properties of systems containing strongly interacting polymers. Final report under Contract Nonr-839(02) for the period Oct 1, 1952-Sep 30, 1955, by Leo S. Chang, Riad H. Gobran and Herbert Morawetz. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N.Y. Oct 1955. 30p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125850

This study was initially conceived as an investigation of the properties of mixtures of two polymers containing carboxyl and amine groups. The work was concentrated on the behavior of polymers carrying varying densities of carboxyl groups. May not reproduce well.

Paints, Varnishes and Lacquers

Development of protective coating for titanium and titanium alloys. Final report for the period 1 Jun 1951 - 31 Aug 1952 under Contract DA-11-022-ORD-260. Armour Research Foundation, Chicago, Ill. Aug 1952. 13p photos. Order from LC. Mi \$2.40, ph \$3.30. PB 125203

Methods for obtaining adherent electrodeposits on titanium were investigated. Excellent adherence of copper electrodeposits was achieved by subjecting titanium to an anodic etch, in a bath based on HF and ethylene glycol. Operating variables are discussed: they can be adjusted to give electropolished as well as etched surfaces. The bond between plate and basis metal appears to be mechanical. Lesser adherence was obtained by a cathodic treatment in a "zinc strike" based on HF and ethylene glycol. Project: TB4-15B. RAD no: ORDTB-1-12045. Pages 3-5 not printed. (Distribution list only.) ARF Proj. 90-1032B. WAL R401/46-16.

Oxidation-resistant coatings for molybdenum. Part 3, by D.V. Doane. Climax Molybdenum Company, Detroit, Mich. Apr 1957. 104p drawings, photos, graphs, tables. Order from OTS. \$2.75. PB 131368

Since Part 2 of this technical report was issued in June 1955, (PB 111965) tests to evaluate the ductility and relative resistance to oxidation, thermal cycling, ballistic impact and erosion were completed on specimens of unalloyed molybdenum and 0.5% titanium-molybdenum alloy coated with the following materials: 1. aluminum-chromium-silicon sprayed-metal coating; 2. nickel-chromium-boron sprayed-metal coatings; 3. nickel-silicon-boron sprayed-metal coating; 4. composite coating of 1 and 3; 5. electroplated chromium; 6. electroplated chromium-nickel composite; 7. nickel cladding. The evaluation tests were conducted at 1800°F. Other tests included determination of ambient temperatures up to 3000°F. The reported "self-healing"

characteristics of aluminum-chromium-silicon coatings were investigated. Modifications to promising coating compositions were explored. AD 130894. Project 7351, Task 70646. For Part 2 see PB 111965. Contract AF 33(616)-2488, Final report. AD WADC TR 54-492, Part 3.

Inorganic Chemicals

Inorganic macromolecules: Silicon-oxygen-titanium systems, by Charles A. Brown and Vernon A. Zeitler. Western Reserve University. Dept. of Chemistry. Inorganic Research Laboratory, Cleveland, O. Contract Nonr-1439(02), NR 052-355. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report no. 1. Oct 1955. 40p tables. Mi \$3.00, ph \$6.30. PB 125897

Two methods for the preparation of the new compound, tetrakis(triphenylsiloxy)titanium, are reported. This substance is somewhat unusual in that it is a simple molecule with the high melting point of 501-505°C. It undergoes slow thermal decomposition at about 460-470°C. In addition, it is resistant to attack by dilute acids and bases and, some cases, concentrated acids. The similar compound, tetrakis(triphenylsiloxy)silane, has been prepared. A new compound, triphenylbutoxysilane, has been prepared and some properties determined. A new method for the synthesis of tetrakis(trimethylsiloxy)titanium is reported. The reaction of tetrabutoxytitanium and diphenylsilanediol is briefly discussed. The infrared spectra of these compounds are reported and the assignment for the Ti-O-Si bond is given. A modified apparatus for the heating of an ebulliometer by means of radio frequency induction is described.

Technical report no. 2: Boron-nitrogen systems. Nov 1955. 57p tables. Mi \$3.60, ph \$9.30. PB 127332

Covers heats of formation of B and B-N bonds, B-N polymers; reactors of o-, m- and p-phenylenediamines, with BO_3 and with phenylboron dichlorides, including preparation of the latter. Analogies in C-C and B-N bonding are discussed.

Technical report no. 3. Feb 1956. 49p tables, diagrs, graphs. Mi \$3.30, ph \$7.80. PB 126873

It has been demonstrated that triphenylsilanol will break a Ti-O-Ti bond. This indicates the greater strength of the Ti-O-Si bond, since tetrakis(triphenylsiloxy)titanium is the only product of such reactions. This was demonstrated by attempts to prepare hexakis(triphenylsiloxy)dititoxane, $[(\text{C}_6\text{H}_5)_3\text{SiO}]_3\text{Ti-O-Ti}[\text{OSi}(\text{C}_6\text{H}_5)_3]_3$, from hexabutoxydititoxane, $(\text{C}_4\text{H}_9\text{O})_3\text{Ti-O-Ti}(\text{OC}_4\text{H}_9)_3$, and by hydrolysis of the products

resulting from the reaction of triphenylsilanol with butoxychlorotitanium compounds. The infrared spectra of four related compounds have been recorded, and almost complete assignments made for each case. These spectra are here reported for the first time.

Investigation of hydrofluoric acid as a corrosion inhibitor for fuming nitric acids, by M.J. Keeler and E.F. Knöll. Aerojet General Corporation Azusa, Calif. Nov 1956. 180p photos, diagrs, graphs, tables. Order from OTS. \$4.50.

PB 121864

An investigation was made of the effect of small amounts of hydrogen fluoride in inhibiting corrosion by fuming nitric acid. This investigation revealed that corrosion rates of 6061-T6 aluminum and Type 347 stainless steel were generally reduced by a factor varying from 10 to 100, when an initial HF content of approximately 0.75% by weight was employed. The effect on the metals of exposure to the inhibited acids was determined in crevices and in stressed specimens, at weld zones, in galvanic couples, in containers with different ullages and with different sizes of vent holes, with various ratios of metal area to acid volume, with acids containing varying amounts of solid matter, and with acids flowing through orifices and impinging against metal at various velocities. The results indicated that acids inhibited with HF are satisfactory for general use. Tests conducted with other metals gave similar results of reduced corrosion in the inhibited acids. Methods for determining HF content and for determining other constituents of acids were also investigated. AD 110504. Project 7312, Task 73122. Covers work from Jun 1954 - May 1956 under Contract AF 33(616)-2516. AF WADC TR 56-310.

Studies of the rare-earth hydrides, by James C. Warf and William L. Korst. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Contract Nonr 228(03), NR 356-290. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report I: Survey of the literature concerning the rare hydrides. Jun 1956. 57p. Mi \$3.60, ph \$9.30. PB 128973

This series of reports is a physical chemical study of the rare earth hydrides. The principal lines of investigation include studies of pressure-temperature-composition relationships, and X-ray diffraction studies. These have been directed primarily toward ascertaining the structures and compositions of the various phases that might exist in the various systems. The literature survey covers publications from 1890. Some pages may not reproduce well. Pages numbered 1-47, 177-185.

Technical report III: Pressure-temperature-composition studies of the lanthanum-, seri-

um-, praseodymium-, neodymium-, samarium-, and ytterbium--hydrogen systems. Experimental. Jun 1956. 24p diagr, graphs. Mi \$2.70, ph \$.80. PB 127241

May not reproduce well. Pages are numbered 48-75, 188-191. 1. Instruments, Measuring - Pressure 2. Hydrides, Rare earth - Preparation 3. Hydrides, Rare earth - Dissociation

Technical report IV: Pressure-temperature-composition studies of the lanthanum-, cerium-, praseodymium-, neodymium-, samarium-, and ytterbium--hydrogen systems. Results. Jun 1956. 43p graphs, tables. Mi \$3.30, ph \$7.80. PB 127242

May not reproduce well. Tables numbered 7-18. Pages numbered 76-90, 193-215, 252-253. 1. Hydrides, Rare earth - Dissociation

Technical report VII: Crystal structure of the rare-earth metals. Jun 1956. 27p tables. Mi \$2.70, ph \$4.80. PB 127239

Tables numbered 19-27, 44-46. Pages numbered 91-105, 105-151, 217-243. 1. Earths, Rare - Crystal structure 2. Lanthanum - Crystal structure 3. Cerium - Crystal structure 4. Praseodymium - Crystal structure 5. Neodymium - Crystal structure

Technical report VIII: Crystal structure of the rare-earth hydrides. X-ray diffraction by rare-earth hydride amalgams. Jun 1956. 46p diagr, tables. Mi \$3.30, ph \$7.80. PB 126953

May not reproduce well. Tables numbered 28-43. Pages numbered 106-148, 226-241. 1. X-rays - Diffraction - Analysis - Equipment 2. Earths, Rare - Crystal structure

Technical report X: Discussion and summary. Jun 1956. 4p. Mi \$1.80, ph \$1.80. PB 126954

Pages numbered 173-175. May not reproduce well. 1. Hydrides, Rare earth

Technical report IX: Lanthanum monoxide. Jun 1956. 6p table. Mi \$1.80, ph \$1.80. PB 126955

May not reproduce well. Table is No. 20. Pages numbered 96-99, 218. 1. Lanthanum monoxide - Crystal structure

Analytical Chemistry

Analysis of fluorinated organo-metallics. Part I: Determination of fluorine and silicon in organic fluoro-silicon compounds, by Otto Schwarzkopf, Rosemarie Heinlein, and Nora E. Srp. Schwarz-

kopf Microanalytical Laboratory. Jun 1957. 25p tables. Order from OTS. 75 cents. PB 131359

Development of analytical methods to determine fluorine and silicon in organic fluoro-silicon compounds was the object of this project. A method having a precision of +1% for fluorine and + 0.7% for silicon was developed. AD 130855. Project no. 7360. Covers work conducted Mar-Dec 1955 under Contract AF 33(616)-3067. For Part 2 see PB 131088. AF WADC TR 56-19, Part 1.

Determination of water in jet fuels and hydrocarbons, by W.D. Garrett and J.A. Krynitsky. U.S. Naval Research Laboratory. Sep 1957. 16p diagrs, graph, tables. Order from OTS. 50 cents. PB 131247

A simple method and procedure for the determination of dissolved water in jet fuels and hydrocarbons has been developed. The method is based on the principle of water exchange between such liquids and air. The water which is removed from fuels by blowing with dry air is adsorbed on potassium hydroxide pellets and determined gravimetrically. The method was designed for the maximum control of the variables inherent in this type of determination. The theoretical equations which govern the exchange of water between air and hydrophobic liquids have been extended and applied to this method. The procedure has also been adapted to determination of insoluble dispersed water in fuels. NRL R 4997.

Properties of gaseous and liquid mixtures, by Walter K. Tang. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Aug 1956. 213p diagr, tables. Order from LC. Mi \$9.60, ph \$33.30. PB 126443

These assembled tables of p-v-T data of gaseous and liquid mixtures were collected from the published literature (1933-1954) for 41 binary and 2 ternary systems, representing 14,000 points from 218 different compositions and 23 compounds. The purpose of this assembly is to make such data readily available for establishing subsequently the pseudo-reduced properties and generalized correlations of mixtures. Ordnance R&D project TB 2-0001. Dept. of the Army project 599-01-004. OOR project 664. Contract DA 11-022-ord-994. WIS ONR 13.

Radiofrequency spectroscopy. Status and technical report 13 for the period 1 May -1 Aug 1955 under Contract DA-36-034-ord-1233, by William B. Ard, Jr. Duke University. Department of Physics, Durham, N.C. Aug 1955. 10p. Order from LC. Mi \$1.80, ph \$1.80. PB 124516

The work of the contract is now concentrated on magnetic resonance of electrons in solids. Spectrometers are in operation at microwave lengths of 3 mm, 6 mm, and 3 cm. Preparations are under way for making measurement at liquid helium tempera-

tures. Inorganic, as well as organic, and biochemicals are being investigated. Whenever the substance is not naturally paramagnetic, paramagnetism is produced by irradiation. A brief technical paper on NaNO_3 is enclosed. Technical report no. 13 has title: Paramagnetic resonance of color centers in NaNO_3 . AD 70062. Dept. of the Army Project: 599-01-004. ORD project: TB2-001. OOR project: TB2 291.

Research to improve spectrochemical analyses of semi-conducting materials. Final report, Feb 1955 - Apr 1955 under Contract DA-36-039-sc-63083, by Charles E. Harvey. American Spectrographic Laboratories, Inc., San Francisco, Calif. Apr 1955. 16p diagr. Order from LC. Mi \$2.40, ph \$3.30. PB 125628

Research was directed toward methods of spectrochemical analyses of semi-conducting materials, with particular reference to extending lower limits of detectability of trace elements in metallic silicon. Signal Corps project: 152B. Dept. of the Army project: 3-99-15-022. Continues research under Contract DA 36-039-sc-15441.

X-ray microscopy by reconstructed wave fronts. Annual summary report for the period Oct 1954 under Contract N-onr-17800(00), by Hussein M. A. El-Sum and Albert B. Baez. Redlands. University. Dept. of Physics. Jun 1955. 9p photos. Order from LC. Mi \$1.80, ph \$1.80. PB 123744

1. Microscopy Electron 2. X-rays - Diffraction Analysis - Equipment

Miscellaneous Chemicals

Development of a foam product for protection against thermal effects. Final report under Contract no. DA 19-129-QM382 for the period of May 1955 - Jun 1956, by James J. McBride, Jeanne D. Medler, Anthony Petrunti and Frank Testa. Evans Research and Development Corporation, New York, N.Y. n.d. 66p tables. Order from OTS. \$1.75. PB 131287

Research has been conducted on the development of a foam product which can be applied to the skin and clothing for protection against thermal energy. These foam products were formed by expelling an aqueous formulation from a metal container by means of Freon. The major components of these formulations are water (30-65%) and polyvinylpyrrolidone (20-30%). Most formulas also contain foaming agents (1-10%), titanium dioxide (2.5-10%), various film-forming agents, humectants, and plasticizers. Two types of products have been developed. One type has emphasized a durable non-tacky surface; the other type, a permanent multicellular foam structure.

Development of new foam-compatible dry chemical fire extinguishing powder, by H.B. Peterson, R.L. Tuve, R. Neill, J.C. Burnett and E.J. Jablonski. U.S. Naval Research Laboratory. Sep 1957. 29p photos, graphs, tables. Order from OTS. 75 cents. PB 131165

The problem of testing and defining the properties of a bicarbonate-type dry chemical fire extinguishing powder which can be used in conjunction with protein-type mechanical foams has required the development of new empirical methods of test for characteristics of foam compatibility, hygroscopicity, and storageability where vibrational packing and caking could render discharge equipment inoperative. The experimental development of these procedures are given in relation to the results obtained by testing two commercially obtainable compatible powders and one non-compatible powder. A procurement specification fully satisfactory to both producing and using agencies is given in the appendix. NRL R 4986.

Evaluation of anti-wear and extreme pressure characteristics of new heterocyclic compounds, by Robert J. Benzing. U.S. Air Force. Air Research and Development Command, Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jul 1957. 14p drawings, table. Order from OTS. 50 cents. PB 131377

A series of nineteen compounds were studied as possible antiwear additives or extreme pressure additives. The materials were evaluated in Di(2-ethylhexyl) sebacate in the Shell Four-Ball Wear Tester and Shell Extreme Pressure Tester. The basic types studied were compounds of heterocyclic structure containing one or more of the following heteroatoms: nitrogen, oxygen, selenium and sulfur. Some gave promise as good wear and extreme pressure additives. AD 130902. Project no. 3044. Covers period Jan 1956 - Mar 1957. AF WADC TR 57-283.

ELECTRICAL MACHINERY

Communication Equipment

Communication theory and storage and retrieval systems, by Mortimer Taube. Documentation, Inc., Washington, D.C. Oct 1955. 11p diagrs. Order from LC. Mi \$2.40, ph \$3.30. PB 124515

This article indicates in general terms, certain relations of an embryonic theory of storage and retrieval systems to the mathematical theory of communication developed by Claude Shannon and others. Contract Nonr-1305(00), Technical report no. 12.

New basic theorem of information theory, by Amiel Feinstein. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1954. 30p. Order from LC. Mi \$2.70, ph \$4.80. PB 125016

A new theorem for noisy channels, similar to Shannon's in its general statement but giving sharper results, is formulated and proven. It is shown that the equivocation of the channel defined by the present theorem vanishes with increasing code length. A continuous channel is defined in a manner that permits the application of these results. Detailed proof of the equivalence of this definition and Shannon's is given in an appendix. MIT RLE TR 282.

Electronics

AAFCS M-33 operator: A manual of operating procedures, by George H. Brown, Donald F. Haggard, and J. Daniel Lyons. George Washington University. Human Resources Research Office, Washington, D.C. Aug 1956. 34p. Order from LC. Mi \$3.00, ph \$6.30. PB 124223

1. Radar - Operation 2. GWU HRRO SR 6

Algebraic topology of networks with application to potentiometer analog circuits. Part II: Application, by Lorenzo Calabi. Parke Mathematical Laboratories, Inc., Concord, Mass. Apr 1956. 58p diags, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 125039

For Parts I and III see PB 124510 and 124234. 1. Networks, Electrical - Theory 2. Circuits, Electric - Theory 3. Potentiometers - Circuits - Theory 4. Contract AF 19(604)-1399, Technical report no. 2 5. AF CRC TN 56-174

Analysis and synthesis of sampled-data and continuous control systems with pure time delays, by W. Schroeder. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jun 1956. 90p diags, graphs. Order from LC. Mi \$4.80, ph \$13.80. PB 125876

The investigation shows that the modified z-transform can be extended so that linear sampled-data systems with arbitrary pure delays can be analyzed and synthesized to obtain responses with zero steady-state error after a finite transient response. The report discusses the development of mathematical methods, analysis and synthesis of sampled-data systems with pure time delays, and analysis and synthesis of continuous systems with pure time delays. AD 97360. Contract AF 18(600)-1512. UC IER Series 60, Issue no. 156. AF OSR TN 56-476.

Application of transistors to amplification of barium

titanate accelerometer signals (U), by R. C. Carter. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Mar 1956. 39p photos, diags, graphs. Order from OTS. \$1.00. PB 131277

Microphonism is a major problem when vacuum tube amplifiers are used in telemetering accelerometer signals. Several transistor amplifier circuits are proposed to reduce this microphonism. Three of these circuits are analyzed. AD 105 955. Project TA 3-9101. DA 506-01-001. DOFL TR 339.

Automatic component assembly system: Phase I and Phase II. Quarterly engineering report No. I covering period I Jul 1953 to Oct 1, 1953. General Electric Company. Electronics Division, Syracuse, N.Y. Dec 1953. 43p photos, diags, Order from LC. Mi \$3.30, ph \$7.80. PB 125905

The primary objective of the program covered by this project is to develop a system for the automatic assembly of lead-mounted components and printed circuit boards to form complete units of subassemblies of military electronic equipment. Army project no. 3-26-00-602. Contract DA 36-039-sc-30250.

Design of microwave low pass filters using stripline techniques, by Richard A. Van Patten. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Oct 1956. 57p photos, drawing, diags, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 125877

This report presents a design procedure for stripline low pass filters at microwave frequencies and includes the following: a. A new technique for increasing the frequency of the spurious responses for a stripline low pass filter. b. A formula, valid for high impedance, for the characteristic impedance of a strip transmission line using two dielectric materials. This formula, important to the new technique, is derived by the method of conformal transformations. AD 97719. AF RADC TR 56-84.

Development and application of automatic techniques for miniaturized electronic equipment, by Freeman M. Hom, Low K. Lee, Edward R. Gramson and Raymond F. Newton. Stanford Research Institute, Stanford, Calif. May 1955. 315p photos, (part fold) diags, graphs, tables (part fold). Order from LC. Mi \$11.10, ph \$48.60. PB 128059

This report summarizes a long-range program. The specific objectives have been to study the relationship of the design of the electronic package, the electrical performance of the product, and the problems of automatic materials processing and machine fabrication. Initial phases of the program were

carried out under Contract AF 33(038)-18976, SRI Project 413. For interim and final reports see PB 109418 and 110783. AD 85736. For 1st-8th reports under Contract AF 18(600)-141 see PB 114897, 112384, 112385, 112622, 114898-114900. Project no. 4155, Task no. 41592. AF WADC TR 55-230.

Development of a remote electronic x-ray image pick-up system. Final report for the period 1 Jul 1954-30 Jun 1956 under Contract DA 30-069-ord-1327, by Bernard R. Linden and Richard C. Palmer. Allen B. DuMont Laboratories, Inc. Tube Research Laboratory, Passaic, N.J. Jun 1956. 92p photos, drawing, diags, graphs, tables. Order from LC. Mi \$5.40, ph \$15.30. PB 125582

The purpose of the work under the subject contract was to develop a television camera system sensitive to x-rays as used in radiography of metal objects. The primary aim was the development of a camera tube directly sensitive to x-rays and the associated television equipment. The secondary aim was to compare such a system with other radiographic methods.

Evaluation of a low-powered 3-cm radar for quantitative rainfall measurements, by F. A. Huff, J. C. Neill and M. Spock, Jr. Illinois. State Water Survey. Meteorologic Laboratory, Urbana, Ill. 1956. 53p photos, diags, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 125570

Dept. of the Army project: 3-99-07-022. SC project: 172B. 1. Radar - Meteorological use 2. Rain and rainfall - Measurement - Radar 3. Contract DA 36-039-ac-64723, Research report no. 4.

Experimental study of an aerodynamic rectifier, by Frederick O. Wooten. All American Engineering Company, Wilmington, Del. Jun 1957. 38p photos, drawings, graphs, tables. Order from OTS. \$1.00. PB 131383

Design and principles of operation of an aerodynamic rectifier having no moving parts are presented. For a pressure drop of one psi, it has been possible to achieve ten times as much mass flow in one direction as the other. Steady flow test results indicate that increased performance can be obtained. Unsteady flow tests indicate that about fourteen milliseconds are required after the arrival of a pressure pulse for the rectifier to resist further passage of fluid flow. This time is longer, by a factor of about four, than the time required for the passage of a sound wave through the rectifier. Leakage during the starting interval is just equal to the mass flow through a duct having the same free flow cross-sectional area. Project 3084, Task no. 70178. AD 130779. Contract AF 33(616)-2969. AF WADC TR 57-356.

Further studies of the field effect and surface conductance on germanium, by J. R. Schrieffer and John Bardeen. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Apr 1955. 16p diags, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 125541

1. Germanium - Conductivity 2. Germanium - Electrical properties 3. Electric conductivity - Measurement - Apparatus 4. Contract N6 or-07140, NR 072-161, Technical report no. 6

Mean-square error analysis of several demodulation systems, by Bruno F. Ludovici. Stanford University. Electronics Research Laboratory, Stanford, Calif. Jan 1956. 54p diags, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 125880

Four different methods of extracting the intelligence from an amplitude-modulated carrier in the presence of noise are analyzed on a mean-square error basis. Assumed is band-limited white gaussian noise and a noise-like modulating intelligence of uniform power spectrum ranging from d-c to an upper limiting frequency equal to two-thirds of the carrier frequency. Included in the analysis are the square-law, autocorrelation, two-amplifiers and crosscorrelation demodulator. Contract N6 onr-251(07), NR 373-360. SU ERL TR 101.

Mechanism of electric conductivity in semiconductors, metals and superconductors. Final report under Contract AF 18(600)-1506, by L. Brillouin and M. Payne. Columbia University, New York, N.Y. Oct 1956. 22p. Order from LC. Mi \$2.70, ph \$4.80. PB 125867

This work has attempted to set up a criterion for superconductivity, based on the capacity of the elastic waves in a metal for trapping the free electrons. A discussion of these approximations and assumptions, and possible modifications, is included. AD 110361. AF OSR TN 56-542.

Powering transistorized electronic devices with radiated energy (U), by Lloyd R. Crump. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Feb 1956. 13p photos, drawings, diags. Order from OTS. 50 cents. PB 131264

This report describes the principle and circuitry applied in powering electronic devices entirely by means of electromagnetic energy radiated from distant sources to eliminate the need for a local power supply. The energy sources may be transmitters operated for the specific purpose of powering the devices, or the radio or television stations common in most urban areas. Project TA 3-9101, DA 506-01-001. DOFL project 51950. DOFL TR 335.

Proceedings of Symposium on Communication

Theory and Antenna Design. U.S. Air Force. Air Research and Development Command. Nov 1957. 229p photo, diags, graphs. Order from LC. Mi \$9.90, ph \$34.80. PB 128075

AD 117067. Sponsored by Antenna Laboratory, Air Force Cambridge Research Center, Research and Development Command and Physical Research Laboratory, Boston University, Jan 9, 10 and 11, 1957. Contents: Introduction, by Roy C. Gunter. - Mathematical introduction I, by Charles Bumer. - Mathematical introduction II, by F. Sheppard Holt. - Application to electronics I, by Arthur Kohlenberg. - Application to electronics II, by Peter Elias. - Application to optics I, by Edward O'Neill. - Application to optics II, by George B. Parrent, Jr. - Electro-optical systems in cascade, by Otto Schade. - Application to radio astronomy, by R.N. Bracewell. - Antennas I, by John Rize. - Antennas II, by W.H. Steel. - Antennas III, by Charles Drane. - Summary comments, by Francis J. Zucker. - Bibliography. - Attendance list.

Problems in shielding electrical and electronic equipments, by C.S. Vasaka. U.S. Naval Air Development Center. Aeronautical Electronic and Electrical Laboratory, Johnsville, Pa. Jun 1955. 29p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 127198

1. Shielding, Electromagnetic - Effectiveness 2. Shielding Electromagnetic - Materials 3. Shielding - Theory 4. NADC EL 5507

Project Vanguard report no. 21. Minitrack report no. 2. Mark II Minitrack system, by Roger L. Easton. U.S. Naval Research Laboratory. Sep 1957. 32p photo, drawings, diags, graphs. Order from OTS. \$1.00. PB 131330

A Mark II Minitrack system, based on the interferometer principle in like manner to the primary system, has been developed, and this will permit amateur volunteer groups to spot and measure the track of the in-flight satellite. This document presents all the aspects of the design, construction, and calibration of the Mark II system for the serious-minded amateur desiring to carry out radio observations of the satellite. For Minitrack report no. 1 see PB 131220. NRL R 5035.

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

24th, for the period ending Dec 1, 1951, by A.G. Hill, J.B. Wiesner and G.G. Harvey. Jan 1952. 114p drawings, diags, graphs. Mi \$6.00, ph \$18.30. PB 125923

Each report covers 10 major fields of research: I. Physical electronics. II. Microwave gaseous discharges. III. Solid state physics. IV. Low temperature physics. V. Microwave spectroscopy. VI. Molecular beam research. VII. Magnet Laboratory research. VIII. Tube research and development. IX. Communication research. X. Analog computer research.

25th, for the period ending Mar 1, 1952, by A.G. Hill, J.B. Wiesner and G.G. Harvey. Apr 1952. 101p photos, drawings, diags, graphs. Mi \$5.70, ph \$16.80. PB 125919

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

35th, for the period ending Aug 31, 1954, by J.B. Wiesner, G.G. Harvey and H.J. Zimmermann. Oct 1954. 114p photos, drawings, graphs. Mi \$6.00, ph \$18.30. PB 125924

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

Quarterly progress report under Contract AF 18

(600)-1505, by Ernst Weber. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Order separate reports described below from LC, giving PB number of each part ordered.

2nd, for the period 15 Oct 1955-14 Jan 1956. Feb 1956. 32p. Mi \$3.00, ph \$6.30. PB 125846

Lists publications and reports resulting from this contract and summarizes work on non-linear electro-dynamics, fundamental electro-dynamics, and information processes. Two main reports are on "Nonlinear and variable linear circuits", by E. Weber, L.M. Vallese and J.P. Fabbroni; and "Distributed parameter network theory", by H.J. Carlin and L. Castriota. For 1st and 3rd reports see PB 119553 and 123157. PIB R-452.2-56.

4th, for the period 15 Apr 1956 - Jul 1956. Aug 1956. 25p diags, graphs, tables. Mi \$2.70, ph \$4.80. PB 124214

1. Electro-dynamics - Theory 2. Electro-magnetic theory 3. Networks - Theory 4. Germanium - Electrical properties 5. PIB R-452.4-56

Quarterly scientific report no. 10, under Contract AF 19(604)-786, covering period Oct 1, 1955 - Jan 1, 1956. Harvard University. Cruft Laboratory, Cambridge, Mass. Jan 1956. 10p diagr,

graphs. Order from LC. Mi \$1.80 ph \$1.80.
PB 125191

Summarizes research in progress on - III. Back-scattering measurements by R. V. Row; V. Back-scattering from a dielectric-coated infinite cylinder, by C. Tang; VI. Pulse R-F back-scattering measurements, by C. Tang; VII. Scattering of plane waves by obstacles, by S. I. Rubinow and T. T. Wu. For reports 7-9, 11-12 see PB 117771, 118497, 122355, 123464 and 125152. AF CRC TN 55-975.

Radar reflections from the moon, by Donald F. Winter. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate, Cambridge, Mass. Mar 1956. 55p diags, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30.

PB 126836

The problem of receiving radar reflections from the moon has many complex and varied aspects. This report discusses those aspects of the problem which must come under examination in determining equipment requirements and operational procedures. AF CRC TR 56-106.

Study of the application of an electrolytic tank to 3-dimensional asymmetrical bodies (as applicable to aircraft icing), by W. L. Torgeson, A. F. Kitchar and B. F. Hill. Research, Inc., Hopkins, Minn. Mar 1956. 43p photos, drawings, diags, graphs, tables. Order from OTS. \$1.25.

PB 111792

Methods of simulating three-dimensional airflows about aircraft components by means of an electrolytic tank are discussed in connection with application to the calculation of water droplet trajectories with an electronic analog computer. Means for simulating sub-critical compressible flows are described. The experimental results indicate that the electrolytic tank can be used to advantage for simulation of three-dimensional incompressible airflows about radomes, nacelles, or similar aircraft components. Compressible flows can be simulated for bodies of revolution at zero angle of attack. The technique of airflow simulation by means of an electrolytic tank lends itself ideally to the computation of droplet trajectories with an electronic analog computer. Project 1111, Task 70803. Contract AF 33(616)-2592. AF WADC TR 55-354.

Synthesis of multiterminal two-element-kind network, by F. S. Boxall. Stanford University. Electronics Research Laboratory, Stanford, Calif. Nov 1955. 128p diags. Order from LC. Mi \$6.30, ph \$19.80.

PB 125070

Although the investigation has not yielded a completely general solution of the problem, a powerful synthesis method has been developed by which the designer may obtain a network realization of a given immittance matrix provided such a realization ex-

ists. That is, even though one lacks a formal statement of the sufficient conditions on a thermal immittance matrix, one may proceed with the synthesis with the assurance that, if the terminal matrix has a network realization, it may be obtained by this synthesis method. Contract N6onr 251(07), NR 373-360 SU ERL TR 95.

Theoretical predictions concerning the performance of ultrahigh-power mercury arcs (Theoretische voraussagen über das Verhalten von Quecksilberbögen höchster Leistung), by Rompe and Weizel. Translated by John G. Estam. Jan 1955. 23p table. Order from LC. Mi \$2.70, ph \$4.80.

PB 125852

German Air Force Research Report no. 1933, Dec 14, 1933. Prepared for the Studien Gesellschaft für Elektrische Beleuchtung GmbH. (Research association for Electric Lighting Inc.) 1. Electric arc-Theory - Germany 2. Electrons - Discharge - Germany 3. Cathodes, Mercury - Germany Translated under Contract AF 19(604)-1364.

Theory of switching. Bell Laboratories report no. 13, covering the period 1 July-1 Nov 1955. Harvard University. Computation Laboratory, Cambridge, Mass. Nov 1955. 277p diags, tables. Order from LC. Mi \$11.10, ph \$42.60.

PB 128023

For 1st-8th, 10th-12th, 14th-15th reports see PB 122812, 122813-122821, 122952. Contents: I. Tables for irreducible series parallel networks, by Robert Ashenurst and Gustav Tollett. II. Use of indeterminate binary Boolean functions in the synthesis of single impulse switching networks (Translation from the Czech "Stroje na Zpracovane: Informaci, Vol. 2) - III. Chart for unate functions, by Warren Semon and Roderick Gould. - IV. Switching applications of silicon carbide crystal agglomerates, by Albert Hopkins. - V. Properties of some special classes of subsets of the 2^n argument combinations of n variables, by Chan Ping Yang. VI. Circuit synthesis for network switching functions by Roderick Gould. - VII. Method for the synthesis of minimal series-parallel switching circuits, by William Wright. HU BL 13.

Thermoelectric effects in silver halides, by Walter Grattidge. Massachusetts Institute of Technology. Research Laboratory of Electronics. May 1954. 17p diags, graphs, table. Order from LC. Mi \$2.40, ph \$3.30.

PB 125014

Measurements of the electrical conductivity and the thermoelectric power as a function of temperature in the range 30°C to 300°C were made for silver chloride and silver bromide single crystals. Variations of these properties from past history were examined for annealed and quenched states. An appendix gives the details of a scale expander for a recording potentiometer used in this study. MIT RLE TR 272.

Generators, Motors, Transmission

Design methods for magnetic amplifiers and saturable reactors, by James R. Walker and Max Frank. Wayne University. Wayne Engineering Research Institute, Detroit, Mich. May 1957. 64p diags, graphs, tables. Order from OTS. \$1.75. PB 121765

This report discusses the comments made by the Magnetic Research Corporation in their evaluation studies of the final engineering report on this contract (PB 121765). Studies were also conducted on the influence of series line resistor, use of four cores, and importance of a quality ratio upon the performance of half wave magnetic amplifiers. Various core materials and sizes were checked to specify a sensitivity factor utilized in a simplified design procedure for full-wave amplifiers. Simplified methods of design for half-wave amplifiers were also considered. AD 130866. Supplement to PB 121765. Project no. 4155. AF WADC TR 56-281, Supplement 1.

Direct synthesis of servomechanisms, by Frank W. Budd. U.S. Air Force. Air Research and Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1953. 164p diags, graphs, tables. Order from LC. Mi \$7.80, ph \$25.80. PB 126736

The purpose of this report is to show how the simple and direct methods of the polynomial transform theory may be used in the analysis and synthesis of automatic control systems. Part I is an elementary presentation of the polynomial transform theory in simple and condensed fashion. Part II presents the elements of the analysis and synthesis of servomechanisms in terms of the mathematics explained in Part I. Part III works out in detail, as in an illustration of the theory in Part II, the design of a fifth order, type 1 position servomechanism with proportional, derivative and integral control. A rather detailed appendix discusses the important question of design criteria under the customary classifications of servomechanisms as to order, type and kind of control. AD 25506. Appendix A: A few component transfer functions. Appendix B: Design criteria. AF WADC TR 53-420.

Magnetically sensitive electrical resistor material. Quarterly report for the period Jun-Oct 1953 under Contract DA 36-039-sc-52601, by E. Katz. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Nov 1953. 8p. Order from LC. Mi \$1.80, ph \$1.80. PB 125568

The purpose of this contract is to develop a material that exhibits the Gauss, or magnetoresistance effect. Bismuth is studied with various contaminants. Preliminary experiments with the addition of Sn are reported. Dept. of the Army Project: 3-93-00-503. SC project: 2005-D. For Quarterly report no. 2 see PB 125572. MU ERI Proj 2136.

Progress report for the period 15 Feb 1955-15 Feb 1956 under Contract N7 onr-41906, by Nelson T. Grisamore. George Washington University, Washington, D.C. Feb 1956. 20p diags. Order from LC. Mi \$2.40, ph \$3.30. PB 125869

Report discusses the operation of a recycling pulse generator, types of feedback, frequency stability, optical feedback, and measurement and generation of electrical pulses of length ≤ 1 msec.

Miscellaneous

Progress report no. XVIII under Contract N5 ori-07801. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Dec 1955. 66p drawings, diags, graphs, table. Order from LC. Mi \$3.90, ph \$10.80. PB 125870

Main subjects treated are: I. Conduction and breakdown in gases, liquids and solids; II. Ferroelectrics; III. Ferromagnetics; IV. Dielectric spectroscopy; and V. Crystals. For reports VIII-XVI see PB 102421, 104335, 106079, 106886, 108282, 109929, 114956, 117412 and 118878.

FUELS AND LUBRICANTS

Current status of research on turbulent combustion in premixed gases, by Richard R. John. Arde Associates, Newark, N.J. Nov 1956. 18p. Order from LC. Mi \$2.40, ph \$3.30. PB 125005

It is indicated that there is a spectrum of different possible mechanisms which govern the effect of turbulence on the reaction zone. The different mechanisms are identified with the wrinkled laminar flame, the zone of extended reaction, and the zone of instantaneous mixing. The major emphasis of the review is directed towards a discussion of the zone of extended reaction. It is suggested that the differences between the various mechanisms of turbulent combustion preclude the possibility of obtaining a simple quantitative theory of turbulent flame propagation in premixed gases. Technical report 4555-1. AD 115004. Project Chem 50-16. Contract AF 18 (600)-1560. AF OSR TR 5659.

Effect of fuel droplets on flame stability, flame velocity, and inflammability limits, by J. A. Browning and W. G. Krall. Dartmouth College, Hanover, N.H. Sep 1954. 11p photos, diags, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 128901

The flame velocities, inflammability limits, and stability limits of mixtures of kerosene mist in air have been measured. The mist is composed of droplets of sub-micron diameter formed by the

rapid condensation of the fuel vapor in cold air. The maximum laminar flame velocity and the lean limit of inflammability for mist are equivalent to values obtained for a gaseous fuel counterpart. However, the rich limit is considerably higher than for the vapor, and the stability limits are wider. Technical report DART-4-P. Paper presented at the 5th Symposium on Combustion, Pittsburgh, Sep 1954. Project Squid. Contract N6 ori 105, T. O. III, NR 098-038.

Evaluation of various oils as related to performance of the 105 mm howitzer, by Harry C. Muffley. U.S. Arsenal, Rock Island, Ill. Sep 1956. 77p tables. Order from LC. Mi \$4.50, ph \$12.30. PB 125912

Ordnance project no. TR 1-1031. D. A. project no. 501-01-002. 1. Guns, Howitzer - Performance 2. Guns, Howitzer - Lubrication 3. Lubricating oils - Evaluation 4. RIAL R 56-2630

Evaporation of fuel sprays. Canada. National Aeronautical Establishment. Order separate parts described below from LC, giving PB number of each part ordered.

I: Theoretical treatment, by G.W. Benson. Nov 1956. 48p graphs, table. Mi \$3.30, ph \$7.80. PB 125562

Two models have been proposed which will predict the rate of evaporation of a spray in which the mutual effects of adjacent drops are important. The models make approximations to reality and give relatively simple final equations of identical form, but slightly different numerical values for the parameters. More exact treatments are possible but they result in more complicated expressions for the evaporation. These expressions can be shown to reduce to the more simple form in the limiting case of low volatility sprays. The advantage of the present treatment is therefore its simplicity and the fact that it leads to the definition of evaporation parameters that should be useful in empirical work. NAEC LR 181.

II: Experimental work, by G.W. Benson and R.J. Brisebois. Nov 1956. 23p photo, diags, graphs. Mi \$2.70, ph \$4.80. PB 125563

A new technique for measuring the rate of evaporation of a spray is being developed. The method is based on the cooling produced when a spray evaporates adiabatically. Results obtained are consistent with a theoretical approach expounded in an earlier report. The apparatus can be easily modified to give psychrometric data from which it is possible to calculate diffusion coefficients of vapours in air. NAEC LR 182.

Flame stability of liquid-vapor oxygen mixtures, by James A. Browning and Merle L. Thorpe. Dartmouth College. Thayer School of Engineering, Hanover, N.H. Feb 1952. 48p diags, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 128902

Flame stability curves for a variety of liquid fuels burned in oxygen have been determined under varying conditions of stream temperature, flame tube diameter, and flame tube length-to-diameter ratio. Insufficient heat has been added to vaporize the fuel completely; thus, both the liquid and vapor states of the fuel are present in mixtures. Results show a marked similarity between these flames and their gaseous fuel counterparts except at low stream temperatures and high fuel concentrations when a large portion of the fuel remains in the liquid phase. Project Squid. Technical memorandum DART - 1. Contract Nonr-438, T.O. 1, NR 090-172.

Preliminary experimental studies of liquid fuel systems, by A. Freeman and others. M. W. Kellogg Co. Special Projects Dept., Jersey City, N.J. May 1949. 264p fold photos, drawings (part fold), graphs (part fold), tables (part fold). Order from LC. Mi \$11.10, ph \$41.10. PB 125855

Broad topics include studies in heat transfer, ignition, combustion, storage and corrosion. Report covers these broad topics individually. Unclassified 16 Jul 1956. Research and Development Report SPD 236. Contract Nord 9999, Final report.

Preliminary investigation of propane combustion in a 3-inch-diameter duct at inlet-air temperatures of 1400° to 1600° F, by Erwin A. Lezberg. U.S. National Advisory Committee for Aeronautics. Jul 1957. 19p photos, diags, graphs, tables. Order as TN 4028 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 128312

Ignition delays and combustion efficiencies were determined for propane injected into a heated airstream. Delays of 7 to 49 milliseconds occurred over the range of temperatures investigated; these results followed the Arrhenius relation with an apparent activation energy of 43 kilocalories per mole. Flames stabilized at the fuel injector burned to high efficiencies in lengths of 6 inches or more and were insensitive to changes in air temperature, pressure, or fuel-air ratio. Flames stabilized downstream of the injector by spontaneous ignition burned only to 70- to 80-percent completion at a length of 18 inches. These efficiencies were strongly dependent on temperature and burner length. NACA TN 4028.

Study of incorporation of high energy substances in conventional type fuel materials by physical inclusion, by D. Horvitz, F.R. Benson, I.M.

Roberts and H. W. Weber, Jr. Metaelectro Corp., Laurel, Md. Apr 1956. 37p tables. Order from LC. Mi \$3.00, ph \$6.30. PB 126629

This technical report summarizes all the work performed under Contract AF(600)-1558 from Aug 23, 1955 to Mar 31, 1956. It describes an experimental effort which was exploratory in nature and of limited scope and duration. The concept which served as a basis for these investigations was to incorporate hydrogen or other high energy substance into fuel materials of conventional thermochemical values by a process of physical inclusion. AD 87518. AF OSR TR 56-17.

Synthetic lubricants for aircraft, by Herbert Schwenker, John A. King and James C. Mosteller. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Nov 1954. 62p photos, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 128088

Development of a -65° to 450° F grease for use in anti-friction bearings, electronic devices and other types of aircraft equipment is in progress. Emphasis is being placed on improving the wear characteristics of this grease and extending the low temperature limits. In addition, research and development in greases is being devoted to improvement of grease availability and the investigation of oils and thickening agents. Synthetic lubricants for turbo-prop and turbo-jet applications have been formulated for use at temperatures of -65° to greater than 400° F. High gear loadings encountered in some engine and accessory applications have required extensive research and development of suitable anti-wear additives. The presently available hydraulic fluids offer a maximum usable temperature range of approximately 250° F. Speed, miniaturization of equipment, together with the necessity of operating hydraulic systems near heat producing bodies has increased this temperature range to greater than 400° F. Experimental fluids of the diester and the organosilicon classes have been developed and are being evaluated. AD 63282. Project no. 7331, Task no. 73310. AF WADC TR 54-157.

INSTRUMENTS

A. C. liquid metal pumps for laboratory use, by D. A. Watt. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 33p photos, diags, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$1.21. PB 110751r

Revision of AERE CE/R 1089 (PB 110751). S. O. code no. 91-3-2-68. 1. Pumps, Liquid metal - Design - Gt. Brit. 2. Atomic power - Instru-

ments - Gt. Brit. 3. Metals, Liquid - Flow - Gt. Brit. 4. AERE ED/R 1856

Analysis of the performance of the NIO ship-borne wave recorder installed in the R. V. Atlantis, by Wilbur Marks. Woods Hole Oceanographic Institution, Woods Hole, Mass. Nov 1955. 31p graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 125035

The NIO ship-borne wave recorder is compared to the WHOI capacitance and resistance poles. Comparisons are made on a wave-by-wave basis and on statistical basis. It is found that the NIO recorder is a reliable wave measuring device in the gravity wave range. The National Institute of Oceanography, whose representative participated in this investigation, will make the final tests on the data via energy spectrum analysis. Unpublished manuscript. Contract Nonr-769(00), NR 083-069. WHOI Ref 55-64.

Application of continued fractions to computing machines, by Nathaniel Macon and Margaret Baskervill. Auburn Research Foundation, Auburn, Ala. Sep 1955. 13p. Order from LC. Mi \$2.40, ph \$3.30. PB 124203

The purpose of this paper is to obtain estimates for the error incurred in the digital evaluation of a continued fraction. It is shown that this error can be expressed as a continued fraction which, in turn, yields sharp and relatively simple error bounds. As a further consequence, one is able to select scale factors in advance so as to optimize the results. For many standard, frequently used functions a significant reduction in computation time over other methods yielding comparable accuracy has been achieved. One example, the computation of e^x , is discussed here. AD 70945. Dept. of the Army project: 599-01-004. ORD R and D project: 7B2-0001. OOR project: 1278. Contract DA 01-009-ord-397, Technical report no. 2.

Development and application of a high-temperature high-pressure storage heater, by B. V. Rhodes. U.S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Jan 1957. 29p table, photos, diags, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 125094

This report describes the development and application of a graphite-filled, storage-type heater for heating nitrogen gas to high temperatures at high operating pressures. Stagnation temperatures of 3500° R at stagnation pressures of 10,000 psi have been achieved. This high-temperature gas is being used to operate a free-jet hypersonic wind tunnel at Mach numbers from 5 to 7, with test section diameters from 1/2 in. to 1-1/2 in. AD 110829. Contract AF 40(600)-700. AF AEDC TN 56-18.

Development of the vibrating-coil magnetometer and its application to magnetite, by D.O. Smith. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Nov 1955. 79p drawings, diagrs, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30.

PB 125037

The vibrating-coil magnetometer measures the magnetizing field by converting the dipole field of the sample into an a-c electrical signal. The measurement is continuous and can be recorded on a chart as a function of time, temperature, crystallographic orientation, or magnetizing field. Based on a thesis Massachusetts Institute of Technology. Contract N5 ori-07801. MIT LIR TR 102.

Eclipse fluid metering pump, type 744, model 4. Bendix Aviation Corp. Eclipse-Pioneer Div., Teterboro, N.J. 1944. 10p drawings only. Order from LC. Mi \$1.80, ph \$1.80. PB 127611

Detailed description in TO 03-1-6 (PB 57291) or chapter 32 of Catalog "L". 1. Pumps, Metering - Design 2. NAVAER 03-20-519

Feasibility study of organic peroxide detector and analyzer, by Paul Sigal. Mine Safety Appliances Company, Pittsburgh, Pa. Nov 1956. 37p. Order from OTS. \$1.00. PB 121854

It has been found that air used to ventilate the cabins of certain jet aircraft contains contaminants deleterious to flight personnel. This contamination is believed to arise from synthetic lubricant oxidation products introduced into the air stream upon passage through the compressors. It is believed that one of the more serious contaminants is represented by organic peroxides. A literature survey and feasibility study on the design of an organic peroxide detector and analyzer were conducted. The results of that study are presented. AD 110522. Project 7159, Task 71803. Contract AF 33(616)-3622. AF WADC TR 56-565.

Functional specifications for a voice communications training device, by T.D. Hanley and M.D. Steer. U.S. Office of Naval Research. Special Devices Center, Port Washington, N.Y. Feb 1956. 25p drawings. Order from LC. Mi \$2.70, ph \$4.80. PB 125913

The present study was undertaken to examine those variables which contribute to optimum speech intelligibility and to prescribe the functional characteristics which should be incorporated into a voice communications training device. Contract N6 ori-104. SDC TR 104-2-45.

Handbook of instructions: RF wattmeter AN/URM-73 (XA-1). Radiation, Inc., Melbourne, Fla. Jun 1955. 61p photos, diagrs (1 fold), graph, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 125540

AD 70331. Drawings listed are not included.

1. AN/URM-73 (XA-1) (Wattmeter) 2. Wattmeters, RF - Operation 3. Wattmeters, RF - Maintenance and repair 4. Contract AF 33(600)-18727

High speed systems of wind tunnel data handling, by J. Lukasiewicz, J.A. van der Blik and J.G. Scott. Advisory Group for Aeronautical Research and Development. Feb 1956. 28p photos, diagrs. Order as AGard Report 17 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125759

In this note force and pressure data handling systems, which consist of commercially available components and with which it is possible to handle data at a rate of better than one point per second per channel and to record it simultaneously in analogue and in digital form are described. Presented at the eighth meeting of the Wind Tunnel and Model Testing Panel, held from Feb 20th to 25th, in Rome, Italy. Summaries in French and English. AG 17.

Method of calculating the response time for pressure measuring systems, by Robert C. Bauer. Aro, Inc., Tullahoma, Tenn. Nov 1956. 33p graphs, drawings, table. Order from OTS. \$1.00. PB 131321

In this report theoretical lag-time equations are developed for single- and double-tube pressure measuring systems connected to manometers or to measuring instruments of constant volume. Qualifying parameters which relate the applicability of the lag-time equation to any particular pressure measuring system are developed. These equations can be used to estimate generally the lag time of wind-tunnel pressure measuring systems to within 10 or 20 percent. Equations are also presented for determining the optimum diameter of the second tube in a two-tube pressure measuring system and for estimating the effect a leak in the system would have on the measured pressures. AD 98978. Contract AF 40 (600)-700. AF AEDC TR 56-7.

MTI site evaluator, by Herbert S. Artman. Sylvania Electric Products, Inc. Physics Laboratories, Bayside, N.Y. May 1956. 48p photos, diagrs (1 fold), graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125017

The object of the project discussed in this report has been to develop, construct, test and deliver one experimental model of an MTI Site Evaluator. This evaluator produces a simulated target return by amplitude modulating a CW IF signal with a delayed $1/r^2$ function in a balanced modulator. Target velocity simulation is obtained by varying the CW IF signal off 30 MC. Target range information is obtained from $1/r^2$ function and target size is simulated by inserting attenuation with output signal attenuators. Project: 1242-1770. Report YD 56-5. Contract AF 19(604)-1524, Final report. AF CRC TN 56-156.

Needed research for machine information systems, by John W. Kuipers. Advisory Group for Aeronautical Research and Development. Feb 1956. 22p. Order as AGARD Report 47 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125764

Explains the difficulties which have arisen in using machines for documentation purposes and analyses their causes. Emphasizes the need for research on the nature of the units to be handled and indicates lines along which research should be directed to overcome these difficulties. Presented at the sixth meeting of the Documentation Committee, held from Feb 20th to 25th, 1956, in Rome, Italy. Summary in French and English. AG 47.

Note on non-linear behavior of unprotected reversing thermometers, by G.G. Whitney, Jr. Woods Hole Oceanographic Institute, Woods Hole, Mass. Nov 1955. 12p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 125034

215 pressure tests were conducted on a group of five thermometers, in an attempt to prove or disprove the existence of certain general behavior characteristics of unprotected reversing thermometers under various conditions. This report discusses the equipment used, the technique involved in the various tests, and the conclusions reached as the result of evaluation of the test data. Unpublished manuscript. Contract N6onr-27701, NR 083-004. WHOI Ref. 55-62.

Nuclear resonance detector and magnetic field stabiliser, by D.A. Gray. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 17p diags, graph. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 55 cents. PB 124575

S.O. code no. 91-3-2-82. 1. Atomic power - Research - Gt. Brit. 2. Detectors, Ionization - Design - Gt. Brit. 3. Stabilizers - Research - Gt. Brit. 4. Magnetic fields - Measuring equipment - Gt. Brit. 5. AERE GP/R 1967

R-meter: An instrument for measuring gustiness, by Walter Rutkowski and Aaron Fleisher. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Oct 1955. 22p diags, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 125182

The present paper describes an instrument which makes a direct measurement of the second central moment of the gust velocity distribution which is the variance. The information which can be derived is of course much less than the complete curve but the device operates in real time and the variance can be obtained quickly. Dept. of the Army project: 3-99-07-022. Signal Corps project: 172B. Contract DA 36-039-sc-64472. MIT MET RR 24.

Standard deviation computer, by F.E. Brooks, Jr., H.W. Smith and R.M. McClure. Texas. University. Electrical Engineering Research Laboratory, Austin, Tex. Mar 1956. 18p photos, diags. Order from LC. Mi \$2.40, ph \$3.30. PB 125612

In the study of physical phenomena it frequently becomes necessary to know the standard deviation of recorded data. This report describes a device designed to determine the standard deviation and mean value of data supplied to it on various forms of recordings such as Esterline-Angus, Brush, Sanborn, or others. The data is followed manually with a ganged potentiometer to supply an input, and the output read from conventional voltmeters. Complete diagrams, operational procedures, and computation procedures are included. Contract Nonr 375(01), NR 371-032. TU EERL R 80.

Use of a shear vane in snow, by Marvin Diamond and B. Lyle Hansen. U.S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Jul 1956. 14p photos, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 125914

Two shear vanes of different size were used to measure the shear frictional resistance of snow at various normal pressures. Tests were conducted in Northern Michigan and in Greenland. These values compared favorably with values computed from data obtained in vehicular tests. The results of trials with the large-and-small-diameter shear vanes on the same type of snow indicate that the size of the instrument may influence the values obtained. SIPRE TR 40.

Wave spectrum analyzer, by W.J. Pierson, Jr. and S.S.L. Chang. New York University. College of Engineering. Research Division, New York, N.Y. n.d. 8p photo, diagr, graph. Order from LC. Mi \$1.80, ph \$1.80. PB 124548

Chapter 4 of "Ships and Waves". Date is Aug 1954 or later. 1. Analyzers, Electronic - Design 2. Spectrum analyzers - Design 3. Waves, Ocean - Measuring equipment 4. Ships - Roll and pitch - Recording devices 5. Contract Nonr-285(27)

MACHINERY

Component testing of a cooled radial-flow turbine: Development of equipment and instrumentation and performance calculation procedures, by D.W. Craft, E.N. Petrick and R.D. Smith. Purdue University. Gas Turbine Laboratory, Lafayette, Ind. Apr 1955. 162p photos, drawings, diags, graphs, tables. Order from LC. Mi \$7.80, ph \$25.80. PB 125604

MEDICAL RESEARCH AND PRACTICE

The experimental equipment described in this report was designed for the purpose of testing the turbine component of small gas-turbine powerplants. The equipment was designed in particular to test the inward-flow radial turbine, or centripetal turbine, and incorporated provisions for cooling the turbine rotor during operation. Research memorandum 55-1. Contract N7 onr-39415.

Description and operation of the N-T-U retort on Colorado oil shale, by J. R. Ruark, K. L. Berry and Boyd Guthrie. U. S. Bureau of Mines. Nov 1956. 33p photos, fold drawings, graphs, tables. Order as Report of Investigations 5279 from Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. PB 125873

The Bureau of Mines built a large-scale demonstration plant to accomplish the dual purpose of obtaining design data and to produce crude shale oil for refining studies. Two 40-ton-capacity batch N-T-U (Nevada-Texas-Utah) retorts were completed for this purpose in 1947. The plant was used to investigate process variables of air rate, recycle gas rate, and shale particle size and grade. Correlations obtained from these variables are presented in this report. The overall total for the lifetime operation of the retorts consisted of 920 runs with a total consumption of 37,547 tons of raw shale and a production of 20,265 barrels of crude shale oil. BM RI 5279.

Investigation of the applicability of high frequency sound waves (ultrasonics) for cleaning of precision parts, by Oskar E. Mattiat and Pascall P. Zapponi. Clevite Corporation. Clevite Research Center, Cleveland, O. Jun 1957. 76p photos, drawings, tables. Order from OTS. \$2.00. PB 131361

The effect of the ultrasonic factors, frequency, intensity, pulse power, coupling fluid and container for holding the parts, upon the rate of removal of field and synthetic soils from complex parts with small openings is determined. Two new methods of study are developed for evaluating available ultrasonic systems and factors, namely, the steel-removal and probe methods. Results obtained with these methods show that accessible soils of all kinds are easily removed by any of the ultrasonic systems studied; however, inaccessible soils, such as steel particles in bearings and grease soils in blindholes require high sonic intensities and a coupling fluid with optimum cavitating and solubility or dispersability properties for the particular soil. AD130820. Project no. 7312, Task no. 73123. Covers work from Sep 1955-Sep 1956 under Contract AF 33(616)-3011. AF WADC TR 56-380.

Nervous control of shivering, by Lucy Birzis and Allan Hemingway. U.S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Order separate parts described below from LC, giving PB number of each part ordered.

III: Shivering pathway in the brain stem and spinal cord. Nov 1955. 13p drawings. Mi \$2.40, ph \$3.30. PB 125847

Experimental data and results are given. Drawings and bibliography included. AF AAL Proj. 8-7951, Report no. 4.

IV: Effect of hypoxia on shivering. Apr 1956. 11p graphs. Mi \$2.40, ph \$3.30. PB 125854

With appropriate control of conditions of anesthesia, the intensity of shivering can be varied from one of considerable vigor to complete absence. Method and results are given followed by a discussion. Also published in *Journal of Applied Physiology*, v. 8, p. 577-579, May 1956. AF AAL Proj. 8-7951, Report no. 5.

METALS AND METAL PRODUCTS

I. Deformation studies of metals at elevated temperatures. II. Iron-chromium-nickel ternary system. III. Effect of structure and composition on the strength properties of stainless steel. IV. Effect of cold work on the strength properties of stainless steels. Periodic status report no. II for the period Feb 1955-Apr 1955 under Contract N5 ori-07881, by Nicholas J. Grant, H. C. Chang, Peter E. Price, Forest C. Monkman and F. B. Cuff. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. May 1955. 4p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 124102

For reports 6-10 see PB 116312, 117129, 117907, 118662 and 119213. 1. Metals - Deformation 2. Metals - Heat treatment 3. Steel, Stainless - Strength 4. Steel, Stainless - Physical properties 5. Steel, Stainless - Cold working 6. Contract N5 ori-07881, NR 039-007, Report no. 11

Effect of composition and structure on the creep rupture properties of 18-8 stainless steels, by Forest C. Monkman, Peter E. Price and Nicholas J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. 1955. 38p photos, graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 124101

Twenty-seven simple unstabilized stainless steels of the 18 chromium - 8 nickel variety were prepared in which amounts of chromium, nickel, and carbon plus nitrogen were varied. Stress-rupture tests were conducted on these alloys at temperatures of 1000°, 1200°, and 1300°F for rupture lives of about thirty seconds to five hundred hours. Variations in the chromium, nickel, or carbon plus nitrogen contents while holding the other two constant were studied to establish the effects of such composition changes on the strength and structure of the alloys at elevated temperatures. The effects of the formation and growth of carbides, ferrite, and sigma during testing were evaluated. Based on these by Forrest C. Monkman and Peter E. Price - Massachusetts Institute of Technology. Contract N5 ori-07881.

Effects of inelastic action on the resistance to various types of loads of ductile members made from various classes of metals. Part III: The plastic bending of tapered members, by Montgomerie C. Steele and Hassan A. Hassan. Illinois. Engineering Experiment Station. Dept. of Theoretical and Applied Mechanics, Urbana, Ill. Jun 1957. 37p photos, diagrs, graph. Order from OTS. \$1.00. PB 131373

This report contains an exploratory investigation of the plastic bending of tapered members. Two analytical approaches are employed. The first considers a rigorous treatment by the classical theories of elasticity and plasticity while the second resorts to the more tractable mechanics of materials methods. A limited amount of experimental work is presented in support of theory. AD 130865. Project no. 7360. Covers work from Feb 1955 to March 1956 under Contract AF 33(616)-2753. For Parts 1-2 see PB 131061 and PB 131028. AF WADC TR 56-330, Part 3.

Elastic-plastic stress and strain distributions around sharp notches under repeated shear, by Frank A. McClintock and Jan A.H. Hult. Massachusetts Institute of Technology. Dept. of Mechanical Engineering, Cambridge, Mass. Apr 1956. 14p diagrs, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 125878

The difficulty of solving for the stress and strain distributions around sharp notches by means of the mathematical theory of plasticity has retarded an understanding of the development of fatigue cracks. But such a solution is possible in the case of longitudinal cracks in cylindrical bars subjected to fully plastic torsion, as shown by McClintock, 1956. In this paper the elastic-plastic stress and strain distributions around sharp notches are obtained for pure shear, which is the limiting case of a very shallow notch in a specimen subject to torsion. AD 89488. CSR R-355-10-12. Submitted to the Ninth International Congress for Applied Mechanics, Brussels, Belgium, Sep 1956. Contract AF 18(600)-957. AF OSR TN 56-278.

Experimental study of the optical properties of liquid Hg and liquid Ga in the wavelength range of 0.23 μ to 13 μ , by L.G. Schulz. Institute for the Study of Metals, University of Chicago, Chicago, Ill. Nov 1956. 22p diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125874

Methods previously developed for studying the optical properties of solid metals were modified to permit their use for studying liquid Hg and liquid Ga. Reflectivities were measured at an angle of incidence of 45° at glass-metal, quartz-metal, and NaCl-metal interfaces in the wavelength range of 0.23 μ to 13 μ . In a second type of experiment the phase change accompanying reflection at normal incidence at a mica-metal interface was measured in the range of 0.4 μ to 0.87 μ . The values thus obtained agreed to within the experimental accuracy with those calculated with the Drude free electron theory. AD 97352. Contract AF 18(600)-1489. AF OSR TN 56-468.

Fatigue investigation on high strength steel, by J.K. Childs and M.M. Lemcoe. Southwest Research Institute, Birmingham, Ala. Jul 1957. 44p drawings, photos, graphs, tables. Order from OTS. \$1.25. PB 131371

A single heat of aircraft quality SAE 4340 steel, heat-treated to 190,000, 260,000 and 300,000 psi ultimate tensile strength, was tested by the increasing load method (similar to Prot's method) in axial loading to determine the variation in fatigue properties under each of the three mean stress conditions, zero, 60,000 and 90,000 psi. Conventional S-N curves were determined by axial load tests at 190,000 psi ultimate tensile strength, under zero mean stress and 90,000 psi mean stress, to provide factors for adjusting the Prot-type failure stresses to standard mean endurance limit values. In addition, Prot rotating beam tests were performed at 190,000 psi ultimate tensile strength. AD 110474. Project no. 3346. Covers work from Apr 1954-Aug 1955 under Contract AF 33(616)-2513. AF WADC TR 56-205.

Growth of fatigue cracks under plastic torsion, by Frank A. McClintock. Massachusetts Institute of Technology. Dept. of Mechanical Engineering, Cambridge, Mass. Feb 1956. 28p photos, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125879

Theoretical distributions of stress and strain are obtained around longitudinal notches and cracks in bars subject to fully plastic torsion. Preliminary experiments support the hypothesis that cracks progress along the surfaces of highest shear strain and hence head toward the center of the remaining section. The rate of crack growth is found to be independent of notch angle, as predicted. In developing a theory for the rate of growth of fatigue cracks, it is found necessary to take the effects of size into account. It is concluded that further efforts should be devoted to obtaining the distributions of plastic

strain around fatigue cracks arising from other modes of loading. AD 89487. OSR R-355-10-12. Submitted to the International Conference on Fatigue of Metals, London, England, Sep 1956. Contract AF 18(600)-957. AF OSR TN 56-277.

High-resolution autoradiography, by George C.

Towe, Henry Jacob Gombert, and James Freeman Wright. U.S. National Advisory Committee for Aeronautics. 1955. 55p photos, graphs, tables. Order as NACA Report 1243 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 45 cents.

PB 125739

This investigation was made to adapt wet-process autoradiography to metallurgical samples to obtain high resolution of segregated radioactive elements in microstructures. Results are confined to development of the technique, which was perfected to a resolution of less than 10 microns. The radioactive samples included carbon-14 carburized iron and steel, nickel-63 electroplated samples, a powder product containing nickel-63, and tungsten-185 in N-155 alloy. Supersedes TN 3209 (PB 115011). NACA 1243.

High temperature brittleness in titanium alloys, by

Nick Markrides and W.M. Baldwin, Jr. Case Institute of Technology, Cleveland, O. Jun 1957. 29p drawings, graphs, tables. Order from OTS. 75 cents.

PB 131381

An alpha-titanium alloy (A-110-AT) containing 5% Al and 2.5% Sn, and an alpha-beta titanium alloy (Ti-140-A) containing 2% Cr, and 2% Fe, and 2% Mo were each prepared (a) free from impurities, (b) with 0.2% O, (c) 0.2% C, and (d) 0.1% N for a program designed to explore strain aging phenomena, high temperature brittleness, and stress-rupture behavior of titanium alloys. A review was made of the various types of brittleness found at elevated temperatures in metals and alloys so that any brittleness encountered in titanium could be compared and identified. AD 130847. Project no. 7351. Covers work conducted from Mar 1956- Mar 1957 under Contract AF 33(616)-3536. AF WADC TR 57-251, Part I.

High temperature deformation characteristics of several sheet alloys, by James Miller and Glen J.

Guarnieri. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Apr 1948. 39p graphs, tables. Order from LC. Mi \$3.00, ph \$6.30.

PB 128897

From constant rate tensile tests at elevated temperatures true stress-true strain characteristics have been determined for five different types of alloys over a range of temperatures and strain rates. The alloys were selected to include SAE 1020 steel as a reference material; regular Inconel X, a fully aged alloy; and S-816, both annealed and cold rolled, to represent an alloy susceptible to age hardening in

both the annealed and cold rolled conditions. The true stress-true strain plots are used to yield information on the changes effected in the properties of the alloys as they undergo high temperature plastic deformation. An attempt was made to use the data as a means of learning more about the mechanics of deformation at elevated temperatures through determination of the activation energies associated with deformation. Project Squid. Contract N6 ori-119, NR 220-041. CAL DD 420-A-18. CAL TM 17-M.

Investigation of high-temperature vacuum and hydrogen furnace brazing, by Walter E. Russell and

John P. Wisner. U.S. National Advisory Committee for Aeronautics. Mar 1957. 29p photos, tables. Order as TN 3932 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125685

The vacuum and the hydrogen brazing of four heat-resistant alloys with two types of high-temperature brazing alloy were investigated. The effect of time at various brazing temperatures on the 1200°F shear strength of joints and on the base-metal tensile strength and elongation was also studied. Brazing techniques for alloys that can be age hardened and that contain titanium and aluminum in a vacuum as well as in dry hydrogen were evaluated. NACA TN 3932.

Review of experimental investigations of liquid-metal heat transfer, by Bernard Lubarsky and

Samuel J. Kaufman. U.S. National Advisory Committee for Aeronautics. 1956. 35p graphs, tables. Order as NACA Report 1270 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 30 cents.

PB 125749

Experimental data of various investigators of liquid-metal heat-transfer characteristics were reevaluated using as consistent assumptions and methods as possible and then compared with each other and with theoretical results. The reevaluated data for both local fully developed and average Nusselt numbers in the turbulent flow region were found still to have considerable spread, with the bulk of the data being lower than predicted by existing analysis. The theoretical prediction of the heat transfer in the entrance region was found to give lower values, in most cases, than those found in the experimental work. Supersedes TN 3336 (PB 116814). NACA 1270.

Role of catalysis in corrosion processes, by Herbert

H. Uhlig. Massachusetts Institute of Technology. Dept. of Metallurgy. Corrosion Laboratory, Cambridge, Mass. Sep 1956. 25p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80.

PB 125917

Presented at International Conference on Catalysis, Philadelphia, Pa., Sep 12, 1956. 1. Metals - Corrosion 2. Metals - Electrical properties - Effect of corrosion 3. Catalysis - Research

Short-time high-temperature tensile properties of six sheet alloys, by James Miller and Glen J. Guarnieri. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Aug 1948. 20p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 128889

Short-time tensile properties at elevated temperatures and various strain rates are presented for six available sheet materials. The application and utility of such data is noted together with its limitations from the standpoint of structural design and materials evaluation. Project Squid. Contract N6 ori-119, NR 220-041. CAL DD 420-A-21. CAL TM 21-M-P.

Study of the effects of vacuum melting on 550°F tempering embrittlement, by M. Gensamer. Columbia University. School of Mines. Mechanical Metallurgy Laboratories, New York, N.Y. May 1957. 41p photos, diags, graphs, tables. Order from OTS. \$1.25. PB 131358

It has been demonstrated that 550°F tempering embrittlement, common in alloy steels and particularly in SAE 1340 steel, can be eliminated in SAE 1340 through purification by vacuum melting in a system embodying the principles of the molecular still. It is not to be expected that ordinary vacuum melting would accomplish the same results. AD 130850. Project no. 7351, Task no. 70645. Covers period 15 Nov 1953 through 14 Jan 1957 under Contract AF 33(616)-2266. AF WADC TR 57-85.

Temperature dependence of the Hall coefficients in copper nickel alloys, by Floyd E. Allison. Carnegie Institute of Technology. Dept. of Physics, Pittsburgh, Pa. Feb 1956. 78p diags, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 125888

The resistivity and Hall coefficients for Cu-Ni alloys containing 80%, 70% and 60% Ni have been measured in the temperature range for 77°K to 400°K. Based on a thesis, Carnegie Institute of Technology. Contract Nonr-760(04), Technical report no. 2.

Titanium alloys for elevated temperature application, by William F. Carew, Frank A. Crossley, Harold D. Kessler and Max Hansen. Armour Research Foundation, Chicago, Ill. May 1953. 134p photos, drawings, diags, graphs, tables. Order from LC. Mi \$6.90, ph \$21.30. PB 125211

The theoretical aspects of the development of titanium alloys for use at elevated temperatures are presented. The results of a preliminary tensile test survey of binary alloys are given. These results indicate that aluminum is one of the most promising strengtheners of titanium at elevated temperatures. Therefore, titanium-aluminum alloys were used as a base for ternary alloys which were surveyed by means of the hot hardness test. From the results

of this survey twelve ternary alloys and two binary titanium-aluminum alloys were selected for further differentiation by creep rupture testing. Some creep rupture results at 425° and 550°C are reported and give considerable promise for the development of alloys having equivalent if not better properties than Type 403 stainless steel (13 Cr, balance Fe). AD 14003. Contract AF 33(038)-22806. AF WADC TR 52-245.

Wear, and surface damage of metals as affected by solid surface films, by Edmond E. Bisson, Robert L. Johnson, Max A. Swikert, and Douglas Godfrey. U.S. National Advisory Committee for Aeronautics. 1956. 23p photos, graphs. Order as NACA Report no. 1254 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 25 cents. PB 125737

A summation is presented of NACA results obtained from friction and wear investigations from 1946 to 1954. The results are consistent with theoretical predictions that solid surface films of low shear strength can serve to reduce both friction and surface damage. Metallic oxides can have very marked effects. Wear studies show that the ability of materials to form surface films is an important factor in wear. Solid lubricants (MoS₂ and graphite) are beneficial under severe operating conditions, including temperatures approaching 1000°F; both materials are, however, subject to oxidation at these temperatures. Errata inserted. Supersedes NACA TN 3444 (PB 117580). NACA 1254.

METEOROLOGY AND CLIMATOLOGY

Absolute method of measuring the temperature of a black body (Absoliutnyi metod izmereniia temperatur chernogo tela), by K.S. Vul'fson. Translated by John G. Estam. Nov 1954. 16p. Order from LC. Mi \$2.40, ph \$3.30. PB 124157

The author outlines a new absolute method of measuring the temperatures of a radiating black body by comparing the intensities of spectral emission in various wavelengths at two temperatures. The method suggested here does not require the use of any provisionally calibrated measuring equipment. Translated from Zhurnal eksperimental'noi i teoreticheskoi fiziki, 21: 507-509, 1951 for AF Cambridge Research Center, Cambridge, Mass., by the American Meteorological Society under Contract AF 19(604)-203.

Comparison of some approaches to the diabatic wind profile, by William P. Elliot. Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, College Station, Tex. Dec 1956. 15p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 125886

AD 110235. A & M project: 85. Reference 56-36T. 1. Micrometeorology - Research 2. Adiabatic phenomena 3. Winds - Energy spectrum - Theory 4. Contract AF 19(604)-997, Scientific report no. 6 5. AF CRC TN 56-874

Condensation nuclei as connecting link for meteorological-electrical relations, by H. Israel. Germany. Wetterdienst. Meteorologisches Observatorium, Aachen, Germany. Aug 1955. 24p diagr, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 125018

Some results of the condensation nuclei at Jungfrau-jock (Switzerland), carried out with a recording nuclei counter (Verzar), are given and discussed. Measurements of the potential gradient in the free atmosphere by radiosondes show that its greatest variability is not to be found at the ground level, but at some kilometers high. This result is interpreted as an effect of the vertical mass exchange on the content of condensation nuclei at various heights. Expansion of paper presented to the Symposium on Condensation Nuclei, held at Dublin, Ireland, 26-28 Apr 1955. Contract AF 61(514)-640, Technical note no. 1. AF CRC TN 55-895.

Condensation trail prediction, by Fletcher Osterle. Carnegie Institute of Technology. Dept. of Mechanical Engineering, Pittsburgh, Pa. Oct 1956. 28p diagr, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125594

Since it is known that contrails do not always occur in jet aircraft wakes, a criterion whereby the occurrence of a trail could be predicted would be useful. A prediction criterion has already been worked out by the Air Weather Service in 1952 and checked against many flight observations since that time. When this criterion was compared with our own, it was discovered that the two were not in complete agreement, due to the fact that not enough is known at the present time about the mixing process taking place in the jet wake. A detailed study was then made of the whole problem and the results of this study are reported here. Part I of final report under Contract AF 18(600)-969, Supplemental agreement 2 (54-925), Scientific report no. 3. For Part II see PB 126701. AF CRC TR 56-459.

Contributions to the study of atmospheric ozone, by David W. Martin. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. and Wadham College, Oxford, England. Sep 1956. 55p tables. Order from LC. Mi \$3.60, ph \$9.30. PB 125621

Hitherto photochemical theories have failed to account for the observed variations of ozone over the globe, and it is generally accepted that a comprehensive theory of these variations must rely on a discussion of dynamic processes in the atmosphere. Following a summary of observational data, these dynamic processes are analysed here in two ways:

firstly, by the synoptic study of recent upper air data, information is obtained on the mechanisms of the day to day ozone changes; and secondly, a statistical examination is made of the same basic data to indicate how the movements of the atmosphere may transport ozone on a very large scale, and so cause the seasonal and global distributions. General circulation project. Contract AF 19(604)-1000, Scientific report no. 6. AF CRC TN 56-853.

Evaluation of the airplane response method for determining vertical gust velocities, by Martha W. Vaccaro. Woods Hole Oceanographic Institution, Woods Hole, Mass. Nov 1955. 9p graphs, table. Order from LC. Mi \$1.80, ph \$1.80. PB 125036

The vertical velocity computations made from Larabee's results give a good reproduction of the original input gust when deviations of V_t and \dot{a}_{att} from a total mean are used in equation (1). The computations are correct to within 0.2% when the gust is at a maximum but may increase by magnitudes as the velocity of the gust passes through zero. Unpublished manuscript. Contract Nonr 1721(00), Technical report no. 38. WHOI Ref 55-66.

Gas purity of high-temperature, high-pressure electrical discharges in air, by Daniel E. Bloxson. Aro, Inc., Tullahoma, Tenn. Nov 1956. 18p photos, drawings, diagr, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 127132

This report summarizes the results of an investigation of the contamination of air which results from electrical arc discharge. In a series of tests electrical energy was used to compress air at constant volume from 614 psia initial pressure to 5550 psia and 2600°K and from 64.2 psia initial pressure to 1850 psia and 7200°K. This method of heating proved to be approximately 50-percent efficient. The results of these tests indicate that air heated by this method is contaminated by some impurities from the walls and electrodes but contains less than one percent of frozen-in nitric oxide. AD 98977. AF AEDC TN 56-15.

Handbook on aerosols. Chapters from the summary technical report of Division 10, National Defense Research Committee, compiled by H. F. Johnston. U.S. National Defense Research Committee. 1950. 151p photos, drawings, diagr, graphs, tables. Order from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. 70 cents. PB 125198

Contents: 1. Adsorption wave, by Irving M. Klotz. - 2. General meteorological principles, by Wendell M. Latimer. - 3. Micrometeorological instruments, by Wendell M. Latimer. - 4. General properties of aerosols, by W. H. Rodebush. - 5. Stability of aerosol particles, by David Sinclair. - 6. Formation of aerosols, by David Sinclair. - 7. Optical properties of aerosols, by David Sinclair. - 8. Measurement

of particle size and size distribution, by David Sinclair. - 9. Filtration of aerosols, by W.H. Rodebush. - 10. Methods of testing smoke filters, by Frank T. Gucker, Hugh G. Pickard, Chester T. O'Konski. - 11. Travel and persistence of aerosol clouds, by W.H. Rodebush. - Bibliography. NDRC Div 10.

Influence of field of view on measurements of atmospheric transmission, by C.H. Duncan. U.S. Naval Research Laboratory. Apr 1957. 21p photos, diagrs, graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 124913

The ratio of diffuse transmission to collimated transmission has been measured for fields of view as large as 50° in diameter. This work was done over a 1.51-mile path with collimated transmission values ranging from 0.75 to 0.01. NRL R 4917.

Measurements of anisotropy of thermal conductivity of ice, by J.K. Landauer and H. Plumb. U.S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Apr 1956. 7p diagr, tables. Order from LC. Mi \$1.80, ph \$1.30. PB 125887

A comparison technique is used to measure the anisotropy in the thermal conductivity of ice. Samples of laboratory-grown monocrystals, glacial monocrystals and polycrystalline commerial ice were studied. No effects due to the grain boundaries are observed. The probable error in the results is about 2%. DA project: 8-56-02-004. SIPRE project: 22.4-14. SIPRE RP 16.

Pre-trough winter precipitation forecasting, by P. W. Funke. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Analysis Laboratory, Cambridge, Mass. Feb 1957. 72p maps, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 128340

An objective technique for the prediction of winter precipitation areas and precipitation amounts is presented. The technique is applicable in the region of central and eastern United States and eastern Canada. Forecasts are for periods of 0-12 hours and 12-24 hours, and pertain to all types of hydrometeors caused by "over-running" cyclonic activity. Work sheets are included to facilitate direct application of the method by the field forecaster. AD 117145. AF GRD SG 84. AF CRC TN 57-201.

Radiation from Mars and Jupiter at 3.15-cm wavelength, by C.H. Mayer, T.P. McCullough and R.M. Sloanaker. U.S. Naval Research Laboratory. Sep 1957. 9p graphs. Order from OTS. 50 cents. PB 131284

A number of observations of Mars were made using

the Naval Research Laboratory 50-foot reflector at 3.15-cm wavelength during September 1956 when the planet was near opposition. Of these, 71 observations were selected for a quantitative reduction which yielded a blackbody temperature for Mars of $218 \pm 76^\circ\text{K}$ (mean error). Twenty-nine observations of Jupiter were made using the same apparatus in May 1956. A blackbody temperature of $140 \pm 56^\circ\text{K}$ (mean error) was found from these data. Further observations of improved accuracy were made in March 1957 when Jupiter was near opposition. A quantitative reduction of the average of 45 of these observations gave a blackbody temperature for Jupiter at 3.15-cm wavelength of $145 \pm 26^\circ\text{K}$ (mean error). NRL R 5021.

Radiative properties of the stratosphere, by Julius London, George Ohring and Irwin Ruff. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Oct 1956. 54p graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 125595

The radiation budget of the stratosphere is determined for the months of January, April, July, and October and the latitude belts $0-10^\circ\text{N}$, $30-40^\circ\text{N}$, and $70-80^\circ\text{N}$. It is found that the stratosphere is not in radiative equilibrium. The stratospheric emission of infrared radiation is about twice as large as the stratospheric absorption of solar energy, on the average, and the largest net radiative loss occurs at high latitudes during all seasons. Carbon dioxide is the most important gas in the stratosphere as far as infrared emission is concerned. Covers period 1 Jun 1955-31 May 1956 under Contract AF 19(604)-1285. Contents: Part I. Radiation budget of the atmosphere. - Part II. Relationship between geomagnetic disturbances and the meteorology of the lower stratosphere. AF CRC TR 56-457.

Source area and age of Ice-Island T-3, by Richard E. Stoiber, John B. Lyons, William T. Elberty and Richard H. McCrehan. Dartmouth College. Dept. of Geology, Hanover, N.H. Nov 1956. 105p photos, graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 125542

Petrographic and mineralogic examination of rocks collected from the surface of T-3, and of dusts collected from the surface ice and from ice cores into the island, reveals that the debris originated from an area underlain partly by altered basic volcanics and partly by middle to high-grade metamorphics and granites. Black magnetic micrometeoritic spherules have been recovered from surface dusts and dusts in ice cores from the island. The relative scarcity of these micrometeorites, along with what we know concerning their probable rate of accretion on the earth's surface, suggests that the age of T-3 may be only a few hundred years, or less. AD 110-269. Covers research from Apr 16, 1954 to Oct 1, 1956 under Contract AF 19(604)-1075. AF CRC TR 57-251.

Study of the morphology of magnetic storms. Final report covering period 1 Mar 1954-31 May 1956 under Contract AF 19(604)-1048, by Masahisa Sugiura and Sydney Chapman. Alaska. University. Geophysical Institute, College, Alaska. Jul 1956. 132p map, diagrs, graphs, tables. Order from L.C. Mi \$6.90, ph \$21.30.

PB 125875

From the period 1902 to 1945, 346 sudden commencement magnetic storms are selected. These storms are classified by the maximum diminution of H in Dst in low and moderate latitudes, into three intensity groups: (i) weak storms (136), (ii) moderate storms (136), and (iii) great storms (74). The present paper deals with the group of the 136 weak magnetic storms. The analysis is based on the data for the three magnetic elements for the four pre-storm hours and the first seventy-two hours of these storms. The number of observatories used in this study is 26. For Scientific reports no. 1-3 see PB 117703, 122368 and 124863. AF CRC TR 56-450.

Study of the synoptic application of weather radar data, by Myron G.H. Ligda. Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, College Station, Tex. Jun 1956. 112p photos, maps, drawings, diagrs, graphs, tables (part fold). Order from L.C. Mi \$6.00, ph \$18.30.

PB 125215

Final report of research from Nov 17, 1952 - May 31, 1956. Radarscope photography operations were conducted as Texas Tornado Warning Network in 1953 and 1954 and Operation Polar Front in 1955 and 1956. These data are still being analyzed and will be reported under Contract AF 19(604)-1564. A large portion of this report consists of analysis of the storm of Sep 29-30, 1954. A & M project: 58. Reference 56-16F. Contract AF 19(604)-573, Final report. AF CRC TR 56-283.

Self-absorption of radiation and the physical conditions in solar prominences. (O sam pogloshchenii izlucheniya i fizicheskikh usloviyakh v solnechnykh protuberantsakh), by A.B. Severnyi. Translated by David Kraus. Feb 1956. 14p photos, diagrs, table. Order from L.C. Mi \$2.40, ph \$3.30.

PB 125851

The aim of this work is to define the physical condition in the prominences on the basis of the theory of the curves of growth with application to the emission lines that have considerable self-absorption. By the proposed method it is possible to find the number of Ca^{+} ions in the ground state, the number of hydrogen atoms in the second quantum state, the orthohelium atoms in the 2s ground state, and others. Translated from *Astronomicheskii zhurnal*, 31(2): 131-136, 1954 for the American Meteorological Society under Contract AF 19(604)-1364. Edited copy.

Summary of derived gust velocities obtained

from measurements within thunderstorms, by H.B. Tolefson. U.S. National Advisory Committee for Aeronautics. 1956. 9p graphs, tables. Order as NACA Report 1285 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents. PB 125746

Available measurements of the derived gust velocities within thunderstorms are summarized for altitudes from 5,000 to 34,000 feet. The results indicate that the intensity of the derived gust velocity is essentially constant up to altitudes of 20,000 feet and that an approximate 10-percent reduction in the gust intensity occurs for altitudes from 20,000 to 30,000 feet. Supersedes TN 3538 (PB 118740). NACA 1285.

Suppression of condensation trails, by Wilfred T. Rouleau. Carnegie Institute of Technology. Dept. of Mechanical Engineering, Pittsburgh, Pa. Nov 1956. 69p photos, diagrs, graphs, tables. Order from L.C. Mi \$3.90, ph \$10.80.

PB 126701

Theoretical and experimental studies have been made concerning the effect on droplet size in condensation trails caused by the addition of hygroscopic particles. These studies, which are directed toward eventual control of droplet size in the trail, lend encouragement for further development of the method described. AD 110252. Part II of final report under Contract AF 18(600)-969, Supplemental agreement 2 (54-925). For Part I see PB 125594. AF CRC TR 56-465.

MINERALS AND MINERAL PRODUCTS

Mineralogical study of several hydrous vanadates, by Lois W. Luedemann and Thomas F. Bates. Pennsylvania State University. Mineral Industries Experiment Station. Jan 1956. 248p photos, map, graphs (part fold), tables. Order from L.C. Mi \$11.10, ph \$37.80. PB 127074

This study was undertaken primarily to investigate a group of nonsilicate fine grained minerals with respect to the relationships among composition, structure and morphology in order to learn whether or not these relationships were analogous to those discovered in the study of the clay minerals. The following group of hydrous vanadates was selected as the subject of the investigation: 1. Hewettite, 2. "Meta"-Hewettite, 3. Sodium Hewettite, 4. Carnotite, 5. Tyuyamunite, 6. Pascoite, 7. Hummerite, 8. Metarossite. Contract N6 onr 26914, NR 081-098, Tech. report no. 8.

Preliminary investigation of the effect of surface treatment on the strength of a titanium carbide - 30 percent nickel base cermet, by Leonard Robins and Edward M. Grala. U.S. National Advisory Committee for Aeronautics. Feb 1957. 16p

photos, tables. Order as TN 3927 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125664

Specimens of a nickel-bonded titanium carbide cermet were given the following surface treatments: (1) grinding, (2) lapping, (3) blast cleaning, (4) acid roughening, (5) oxidizing, and (6) oxidizing and re-finishing. Room-temperature modulus-of-rupture and impact strength varied with the different surface treatments. NACA TN 3927.

Stability relations of silicate-carbonates at elevated temperatures and pressures. Third-fifth technical reports under Contract Nonr-656, T.O. 6, NR 081-204, by R. I. Harker and O. F. Tuttle. Pennsylvania State University. College of Mineral Industries, State College, Pa. Jul 1955. 55p photo, diags, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 124800

NSF-G 896. Contents: Report 3. Synthesis of spurrite and the reaction: Wollastonite + calcite \rightleftharpoons spurrite + carbon dioxide. - Report 4. Experimental data on the P_{CO_2} -T curve for the reaction: calcite + quartz \rightleftharpoons wollastonite + carbon dioxide. - Report 5. Preliminary report on the lower limit of stability of akermanite. Contract Nonr-656, T.O. 6, NR 081-204, Technical reports 3, 4 and 5.

PACKING AND PACKAGING

Proceedings of the second Joint Military Industry Packaging and Materials Handling Symposium, 2d, Departmental Auditorium, Washington, D.C. Oct 9, 1956. n. d. 307p photos, drawing, diagr, graphs, tables. Order from LC. Mi \$11.10, ph \$ 47.10. PB 128964

Sponsored by the Dept. of the Air Force with the cooperation of the Dept. of the Army, Dept. of the Navy, Dept. of Commerce and the National Security Industrial Association. For 1st symposium see PB 121350. Contents: Part I: General meeting: Introductory remarks, by C. S. Irvine. - Welcome address, by Dudley C. Sharp. - Military keynote address, by Robert C. Lanphier, Jr. - Industry keynote address, by William S. Stolk. - Remarks by Brig. Gen. R. L. "Cowboy" Winn. - Future air freight handling system, by Col. Sam P. Triffy. - Management recognition of packaging and handling, by George R. Bell. - Packaging and handling in amphibious operations, by W. T. Shafer. - Foreign packaging and materials handling developments, by F. W. Langer. - Packaging and handling for the Army of the future, by P. W. Mirras. - Unitization in industry, by Walter E. Schirmer. - Mobile support of the fleet, by E. D. Stanley, Jr. - Part II: Materials handling panels: Warehouse and supply operations, by Stephen D. Grady. - Freight terminal operations, by John Kilpatrick. - Loading operations, by L. T. Skelton. - Production operation, by S.

S. Nicholson. - Selection and utilization of powered industrial truck equipment, by Don W. Kelsey. - Exploiting the unit load concept, by Ransom Quinton. - New concepts in materials handling, by James A. Mustard, Jr. - Part III: Packaging panels: Developments in cushioning material, by Albert Olevitch. - Barrier materials, by Malcolm J. Odell. - Packaging testing programs and techniques, by T. A. Johnston. - Humidity control in packages and warehouses, by Harold M. Lovelace. - Packaging cost determination, by Robert de S. Couch. - Reinforced plastics in packaging, by John C. Clay. - Part IV: Registration list: Government representatives. - Industry representatives.

Test to evaluate and compare various open crate specifications for aircraft surfaces, by Thomas B. Heebink. U.S. Forest Products Laboratory, Madison, Wis. Jul 1957. 21p photos, tables. Order from OTS. 75 cents. PB 131376

Thirteen open crates for aircraft surfaces were tested to evaluate the construction details of various open crate specifications. The results of these tests suggested various advantageous modifications which were incorporated into a final design and tested. The result was that the three crates built according to the final modified design were superior generally in all respects including performance, tare weight, cubic displacement, and cost. AD 130873. Project no. 7312, Task no. 73127. Covers work for period 10 Jun-Sep 1956 under USAF Purchase order no. (33-600)53-4023. AF WADC TR 56-539.

PERSONNEL APTITUDE TESTING

AAFCS M-33 mechanic proficiency test, by Robert D. Baldwin, Robert F. Mager, Robert Vineberg and James E. Whipple. George Washington University. Human Resources Research Office, Washington, D.C. May 1957. 58p photo, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 129373

D. A. project 095-30-000. Contents: Part I: Comparison of mechanics with and without field experience. - Part II: Development and cross-validation, by Robert D. Baldwin, Robert F. Mager, Robert Vineberg and James E. Whipple. As part of a long-range research program in electronic maintenance and operator training, maintenance proficiency attained by AAFCS M-33 mechanics at time of graduation from the AAA & GM School, Fort Bliss, Texas, and after on-the-job experience was assessed. Experienced and inexperienced mechanics were tested with the AAFCS M-33 Mechanic Proficiency Test, consisting of 14 problems in trouble shooting, adjustment, preventive maintenance, energizing and operation of the M-33 radar. Results suggest that after the general improvement in skills during the first six months on the job, additional experience

has little effect on the skills tested—except for trouble shooting ability, which continues to develop with field experience. Contract DA 44-109-qm-650. GWU HRRO TR 38.

Research into basic methods and techniques of Air Force job analysis. Part I, by Jesse C. Rupte. U.S. Air Training Command. Human Resources Research Center. Technical Training Research Laboratory, Chanute Air Force Base, Ill. Dec 1952. 69p graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 125207

The purpose of the research undertaken was to determine the relative value of the more common methods of performing job analysis. Five methods of job analysis were selected for this investigation. These are: (1) questionnaire-survey; (2) group interview; (3) individual interview; (4) observation interview; and (5) technical conference. Project: 507-015-0002. AF HRRC TR 52-16.

Results of investigation of low-intensity reciprocity law failure, by Robert L. Martin and Ernst Katz. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Aug 1956. 154p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$7.20, ph \$22.80. PB 125856

The physical properties of the photographic emulsion, the nature of the photographic latent image, the Mott and Gurney theory of latent-image formation, and a simple model used by Webb to calculate an effective electron trap depth are briefly described. This "single-trap-depth" model predicts a simple, isodense, low-intensity reciprocity-law-failure (rlf) curve whose slope rapidly approaches -1 with decreasing intensity of exposure. A quantitative theory of the mechanism of latent-image formation proposed by Katz (outlined in Chapter II) predicts noninteger low-intensity rlf slopes when an exponential distribution of trap depths is assumed, and therefore agrees better with experimental results. Experiments are described in Chapters III and IV. A new type of apparatus for use with very low intensities and long times of exposure is described in detail. It is shown that a simple model assuming two discrete trap depths provides low-intensity rlf curves of considerable structure which are qualitatively similar to experimental curves. A method of obtaining these parameters by analysis of experimental curves is given. Suggestions for improvement of the experimental technique and possible additional experiments suggested by the "two-trap-depth" model are offered. ARDC project no. R-355-40-10. Project 2158. Also submitted as thesis, University of Michigan. Contract AF 18 (600)-750. MU ERI Proj 2158-T.

Simplified utilization of the Dawton method for measuring integrated intensities, by R.J. Robinson, Donald A. Pontarelli and Leonid V. Azaroff. Armour Research Foundation, Chicago, Ill. Jul

1956. 8p graph. Order from LC. Mi \$1.80, ph \$1.80. PB 125076

A simple procedure for calibrating positive films prepared as part of the Dawton method is described. No special treatment of the x-ray negative is required and the criteria for properly preparing the positive are described. ARF Technical note AO52-3. Contract AF18(600)-1168. AF OSR TN 55-351.

PHYSICS

General

Alternative to Hadamard's method for the normal hyperbolic equation, by E.W. Titt, R.B. Deal and Paul Sanders. Oklahoma Agriculture and Mechanical College. Research Foundation, Stillwater, Okla. Jun 1955. 22p diagrs. Order from LC. Mi \$2.70, ph \$4.80. PB 124206

Presented to the American Mathematical Society, December 28, 1954, under a different title. 1. Hyperbolic functions 2. Equations, Integral 3. Volterra equations 4. Green's function 5. Hadamard's equation 6. Contract Nonr-1500(01), Technical report A-1

Application of limit analysis to the determination of the strength of butt joints, by R.T. Shield. Brown University. Division of Applied Mathematics, Providence, R.I. Feb 1956. 20p diagrs. Order from LC. Mi \$2.40, ph \$3.30. PB 125890

The technique of limit analysis is applied to determine upper and lower bounds for the tensile strength of a butt joint consisting of a thin layer of adhesive joining the parallel flats of two rigid adherends. The adhesive is assumed to be an elastic-perfectly plastic material which yields when the maximum shear stress reaches a critical value. The methods used apply to any joint with a convex area of cross-section. Particular application is made to joints whose cross-sections are circular, rectangular, or a polygon circumscribed about a circle. Contract Nonr-562(10), NR 064-406. GDAM TR 10. GDAM C 11-10.

Calculation by integral methods of laminar compressible boundary without pressure gradient, by Morris Morduchow. U.S. National Advisory Committee for Aeronautics. 1955. 22p graphs, tables. Order as NACA Report 1245 from Superintendent of Documents, Government Printing Office, Washington, D.C. 25 cents. PB 125740

A survey of integral methods in laminar-boundary-layer analysis is given. Simple and fairly accurate methods of calculating the properties (including sta-

bility) of the laminar compressible boundary layer in an axial pressure gradient with heat transfer at the wall and of determining the separation point in a compressible flow with an adverse pressure gradient over a surface at a given uniform wall temperature are developed. From the equations derived here, conclusions regarding the effect of pressure gradient, Mach number, and wall temperature on the boundary-layer characteristics are derived and illustrated. In particular the effects on skin-friction, heat-transfer coefficient, separation point in an adverse pressure gradient, and stability of the laminar boundary layer are analyzed. Errata inserted. NACA 1245.

Complex vector bundles over an algebraic curve, by Shigeo Nakano. Princeton University. Institute for Advanced Study, Princeton, N.J. Jul 1956. 41p. Order from LC. Mi \$3.30, ph \$7.80. PB 124212

Given a non-singular algebraic curve V , the set \mathcal{F}_r of vector bundles over V which come from representations of the fundamental group of V into $GL(r, C)$ is considered. AD 96515. Project no. R-354-10-60. Contract AF 18(600)-1109, Supplemental agreement 3 (55-782). AF OSR TN 56-432.

Concerning some current misuses of statistical procedures in the treatment of geophysical data, by Blair Kinsman. Johns Hopkins University. Chesapeake Bay Institute. May 1955. 24p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125196

It is pointed out that the data in geophysical problems in contrast to laboratory problems are characterized by samples which are small in size and which cannot be readily extended. It is suggested that small sample theory makes it feasible to divide the data randomly into two groups, one to be used in the formulation of hypotheses and the other to be used as test material. In this way, the validity of any hypothesis may be estimated without the long delays inherent in gathering more data. It has been stressed that χ^2 and not the correlation coefficient is the appropriate measure of agreement between predicted and observed values. An analysis of a paper by Post has served to illustrate the difficulties which arise when such a procedure is not adopted. Technical report 8. Reference 55-3. Contract Nonr-248(20), NR 083-016. Contract Nonr-248(30), NR 083-070.

Confidence intervals for the ratio of two probabilities and some measures of effectiveness, by Gottfried E. Noether. Boston. University. Dept. of Mathematics, Boston, Mass. Dec 1955. 30p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 124235

The report shows that identical methods can be used in finding confidence intervals for P and P' . The remainder of the paper is concerned with confidence

intervals for the parameter μ . Contract Nonr-1636(00), NR 042-036.

Construction of wave diagrams for the study of one-dimensional non-steady gas flow, by George Rudinger and Leonard D. Rinaldi. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Mar 1948. 55p diags, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 128898

This paper is an introduction to the method of characteristics for solving problems of one-dimensional, non-steady gas flow. By following Riemann's approach, it can be shown that wave elements propagate along certain lines which are identical with characteristics lines. Construction of these lines in the position-time plane gives a clear picture of the motion of waves in ducts. Several new techniques for obtaining solutions of special problems are suggested. Project Squid. Contract N6 ori-119. CAL DD 420-A-12. CAL TM 14-M.

Convergence of Airy series, by W.J. Klimczak. Trinity College, Hartford, Conn. Sep 1956. 9p. Order from LC. Mi \$1.80, ph \$1.80. PB 125884

AD 97086. 1. Convergence - Mathematics
2. Airy's stress function 3. Equations, Differential 4. Contract AF 18(600)-1397 5. AF OSR TN 56-467

Effect of non-normality on "staircase" methods of sensitivity testing, by D.F. Votaw, Jr. Princeton University. Statistical Research Group. May 1948. 41p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125920

The purpose of this report is to present the results of a study of the accuracy and efficiency of "Staircase" methods of sensitivity testing when the probability-of-detonation curve is not normal. This report should be considered as supplementary to NAVORD Report 65-46 which deals with "Staircase" methods of sensitivity testing when the probability-of-detonation curve is normal. The investigation has been restricted to the seven recommended methods in NAVORD Report 65-46 for four non-normal distributions. A brief account of the nature of sensitivity testing and of "Staircase" methods is given in section 2. Section 3 contains an outline of the non-normality investigation. The computational procedures are discussed in Section 4. The results and conclusions are presented mainly in the form of graphs and tables and are discussed in section 5. Supplements NAVORD Report 65-46 of 21 Mar 1946 (PB 36952). Contract N6 onr-270, Task 1.

Effect of stretching of a vortex core, by J.M. Burgers. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Aug 1956. 24p. Order from LC. Mi \$2.70, ph \$4.80. PB 125226

General relations are established for axially symmetrical non-viscous, rotational flows between converging or diverging meridional streamlines when initially the axial velocity is constant, the radial velocity zero and the radial distribution of peripheral velocity is known. The equations are solved in detail for numerical evaluation for the particular case of a vortex core with solid body rotation, either contained in a duct or surrounded by a potential vortex. A theoretical treatment is given of the problem of stability connected with this type of flow. AD 95812. Contract AF 18(600)-893. UM BN-80. AF OSR TN 56-376.

Electrical cleanup of gases. Quarterly report no. 10 under Contract AF 18(600)-1049 for period Jul 1956-Sep 1956, by L. J. Varnerin, Jr. and J.H. Carmichael. Westinghouse Electric Corp. Westinghouse Research Laboratories, East Pittsburgh, Pa. Nov 1956. 4p. Order from LC. Mi \$1.80, ph \$1.80. PB 125915

Research report 71F-191-R10. For 1st-9th reports see PB 116569-116571, 117718, 118391, 119370, 120232, 127247 and 124846. 1. Gases - Ionization - Measurement 2. Helium - Ionization - Measurement

Extension of the optimum property of the sequential probability ratio test, by M. A. Girshick, edited by T. W. Anderson. Columbia University, New York, N. Y. n. d. 4p. Order from LC. Mi \$1.80, ph \$1.80. PB 125603

CU 9-56. 1. Sequential analysis 2. Probability - Theory 3. Contract Nonr-266(33)

Free-stream boundaries of turbulent flows, by Stanley Corrsin and Alan L. Kistler. U.S. National Advisory Committee for Aeronautics. 1955. 34p photos, drawings, diags, Order as NACA Report 1244 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 30 cents. PB 125738

The instantaneously sharp and irregular front which separates turbulent fluid from contiguous "nonturbulent" fluid at a free-stream boundary is studied. The overall behavior of the front is described statistically in terms of its wrinkle-amplitude growth and its lateral propagation relative to the fluid as functions of downstream coordinate. Theoretical analysis is backed up by experimental results. Supercedes TN 3133 (PB 112794). NACA 1244.

Investigation of mathematical methods for the analysis and synthesis of computer circuits, by Shree-ram Abhyankar. Columbia University, New York, N. Y. Sep 1956. 65p diagr. Order from LC. Mi \$3.90, ph \$10.80. PB 125865

Part A is Minimal "sum of products of sums" expressions of Boolean functions. Part B is Absolute expressions of Boolean functions. AD 110120. Con-

tract AF19(604)-1818, Final report. AF CRC TR 56-171.

Linearized solution of nonsteady flows through ducts, by William Squire and T. R. Goodman. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Mar 1950. 42p diagr, graphs, table. Order from LC. Mi \$3.30, ph \$7.80. PB 128891

An attempt is made to solve the problem of pressure oscillations in duct of slowly varying cross section submerged in a subsonic flow, by linearizing the Lagrangian equation of motion. A numerical example is worked out and the solution is compared with those obtained by the method of characteristics and by a linearization of the Eulerian equations. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL DD 420-A-20. CAL TM 33.

Methods of measuring the thermal conductivity of solids, by G. L. Cooper. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 11p. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 124573

S.O. code no. 91-3-2-84. 1. Thermal conductivity - Measurements - Gt. Brit. 2. AERE INF/BIB 104

Modified minimax principle, by Oscar Wesler. Stanford University. Dept. of Statistics, Stanford, Calif. Oct 1955. 39p. Order from LC. MI \$3.00, ph \$6.30. PB 124513

The minimax principle suffers from the defect of being an over-simplification. Yet it suggests, by means of a simple modification, a natural way of approximating to the problem. The theory of invariance provides the most powerful of slicing principles and plays a central role in these considerations. The theory of composite hypotheses is also discussed in this light, and an example of theoretical interest is given illustrating these concepts, in which a difficult problem undergoes a striking simplification. Finally, the use of previous experience as a slicing principle is discussed, and related to a purely game-theoretic model which we have constructed for the modified minimax principle and which we have called a mixed game. Contract N6 onr-251, T.O. III, NR 042-993. SU IS TR 35.

Multi-decision procedure related to the analysis of single degrees of freedom, by Allan Birnbaum. Columbia University. Dept. of Mathematical Statistics. Apr 1956. 20p. Order from LC. Mi \$2.40, ph \$3.30. PB 125918

CU 8-56. 1. Statistical analysis 2. Decision theory 3. Contract N6 onr-271, T.O. XI, NR 042-034.

Newton-Rapheon composite gradient method for the solution of systems of equations, by William L. Hart and Theodore S. Motzkin. California. University. Dept. of Mathematics. Jul 1955. 12p. Order from LC. Mi \$2.40, ph \$3.30.

PB 124198

The development of modern high speed digital computing machines has enhanced the importance of methods of successive approximation for the solution of systems of equations, linear or not. The present results are restricted to the real case, and deal with a composite gradient method leading to an infinite sequence of approximations to a solution of the given system, linear or not. Presented in incomplete form at the meeting of the American Mathematical Society at Stanford University, Apr 1955.

On the interaction of a weak upstream disturbance with an infinitely-extended plane shock of arbitrary strength, by Che-Tyan Chang. Johns Hopkins University, Baltimore, Md. May 1956. 40p diags, graphs. Order from LC. Mi \$3.00, ph \$6.30.

PB 128888

The problem of the interaction between an upstream disturbance and a plane shock of infinite extent is investigated. An illustrative example is given by considering the interaction of a plane normal shock with a sinusoidal entropy "wave". Thesis - Johns Hopkins University. To be submitted to Quarterly of Applied Mathematics for publication in 1956. Project Squid. Contract N6 ori-105, T.O. III, NR 098-038. JHU 13-P.

On the supremacy of viscosity in the control of turbulent fluid motion, by Max M. Munk. Catholic University of America. Washington, D.C. Apr 1956. 27p. Order from LC. Mi \$2.70, ph \$4.80.

PB 125861

1. Flow, Turbulent - Theory 2. Flow, Turbulent-Viscosity effects 3. Correlation functions 4. Contract N6 onr-255, T.O. 5

Perturbation theory of periodic surfaces, by Stephen P. Diliberto. Princeton University. Institute for Advanced Study, Princeton, N.J. Oct 1956. 116p. Order from LC. Mi \$6.00, ph \$18.30.

PB 125212

The notion of "periodic surface" is introduced as a device for studying ordinary differential equations. The fundamentals of a "perturbation theory" are developed. Various applications are indicated. AD 97358. Project R-354-10-60. Contract AF 18 (600)-1109. AF OSR TN 56-474.

Production of high-temperature, moderate-pressure gases by means of electrical spark discharge, by Daniel E. Bloxson. Aro, Inc., Tullahoma, Tenn. Nov 1956. 36p photos, diags, graphs.

Order from LC. Mi \$3.00, ph \$6.30.

PB 126409

This report summarizes the results of a series of experiments at the Gas Dynamics Facility, AEDC, to determine the nature of high-pressure heating by spark discharge. The experiments were conducted by discharging high-energy-level sparks in air, argon, and helium under constant volume conditions. These tests show that the efficiency of heating by spark discharge is relatively high, and thus a method is available whereby high pressure air may be heated up to 5900°K. AD 98980. Appendix A: Thermodynamics of real gases, air and helium. - Appendix B: Circuit theory. AF AEDC TN 56-17.

Research on semi-groups of linear bounded operators. Final report for the period 1 Feb 1955-14 Sep 1955 under Contract DA 04-495-ord-613, by Ralph S. Phillips. University of Southern California, Los Angeles, Calif. Oct 1955. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 124202

AD 70775. Dept. of the Army project: 5B99-01-004. OOR project: 1362. 1. Equations, Differential - Linear 2. Mathematical research 3. Contract DA 04-495-ord-613, Final report

Some algebraic aspects of logic, by Marshall H. Stone. Chicago. University. Dept. of Mathematics, Chicago, Ill. Sep 1956. 79p. Order from LC. Mi \$4.50, ph \$12.30. PB 125859

AD 96517. Project no. R-354-10-67. Covers period 1 Jul 1955-30 Jun 1956 under Contract AF 18 (600)-1125. 1. Equations, Differential 2. Logic (Mathematics) 3. AF OSR TN 56-434

Stresses and displacements in an elastic-plastic wedge, by P.M. Naghdi. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Mar 1956. 23p graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 125626

An elastic-perfectly plastic wedge of an incompressible isotropic material in the state of plane strain is considered, where the stress-strain relations of Prandtl-Reuss are employed in the plastic domain. Contract Nonr-1224(01), NR 064-408, Technical report no. 6. MU ERI Proj. 2150-6-T.

Tensile strength of liquids, a review of the literature, by F.G. Blake, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jun 1949. 72p graph, table. Order from LC. Mi \$4.50, ph \$12.30. PB 125858

This report, one of a series on the subject of cavitation in liquids, discusses previously published observations and theories concerning the tensile strength of liquids. It includes observations on the static breaking strengths and of the pressures at which hydraulic and acoustical cavitation occur.

It is found that application of the kinetic theory of liquids leads to predicted tensile strengths far greater than those observed. The part played by solid boundary-surface effects is discussed. Re-issued Aug 1954. Contract N5 ori-76, T.O. X, NR 014-903. HU ARL TM 9.

Thickness-effect in observed structure near absorption edges, by L.G. Parratt, C.F. Hempstead and E.L. Jossem. Cornell University. Dept. of Physics, Ithaca, N.Y. Jul 1956. 17p graphs. Order from LC. Mi \$2.40, ph \$3.30.

PB 125019

The details of the observed absorption spectrum in the neighborhood of an absorption edge are shown to depend upon the thickness of the absorber. This effect is present, at least in principle, regardless of the type of radiation although it is discussed here specifically for x-rays. Widths and relative intensities of component structure are most sensitively involved, but the accuracy of precision measurements of wavelengths is also slightly affected. This explanation lies in the role of the effective spectral window of the spectrometer. Features of the extent and shape of the spectral window are roughly determined from the thickness-effect for the (1, +1) position of the spectrometer used in this work. AD 95207. Project: R-355-20-1. Contract AF 18(600)-300, Technical report no. 5. AF OSR TN 56-331.

Underpolynomials and infrapolynomials, by T.S.

Motzkin and J.L. Walsh. Harvard University, and California. University. Dept. of Mathematics, Los Angeles, Calif. Jul 1956. 34p. Order from LC. Mi \$3.00, ph \$6.30. PB 125234

The object of this paper is to investigate systematically the properties of the class of infrapolynomials of given degree on a bounded set. AD 95445. Contract AF 18(600)-998. AF OSR TN 56-359.

Unsteady-state method for measuring thermal diffusivity at high temperatures, by Herman S. Levine. Alfred University, Alfred, N.Y. Jun 1950. 38p fold drawing, graphs (1 fold), tables. Order from LC. Mi \$3.00, ph \$6.30, PB 125863

An unsteady-state method for measuring thermal diffusivity at high temperatures was developed in which experimental heating curves are compared with the simplified solution of the heat conduction problem for various bodies. This method is based on a radiation boundary condition. The thermal diffusivity of refractory oxides measured by this method at 1400°C compares favorably with reported values. The apparatus used was a modification of standard laboratory equipment. Experimental procedures were simple and results were obtained rapidly. ATI 78715. Contract N6 ori-143, NR 032-022.

Wave propagation in anelastic materials, by E.H. Lee. Brown University. Graduate Division of

Applied Mathematics, Providence, R.I. Dec 1955. 17p diags, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 124213

Recent experimental and theoretical work on the propagation of plastic waves is surveyed, with particular emphasis on the influence of strain-rate effects. It is shown that a fundamental difficulty which has appeared in attempting to introduce rate influences in agreement with experimental measurements may be avoided. Wave propagation in visco-elastic materials is discussed where in contrast to plastic flow in metals, rate effects play a dominant role. Application of one of the visco-elastic wave solutions to a problem of plastic wave propagation with a strain rate effect is made, and the interrelation between the two problems is discussed. C-11-5. Presented at the International Union of Theoretical and Applied Mechanics Colloquium on the Deformation and Flow of Solids in Madrid, Spain, Sep 1955. Contract Nonr-562(10), NR 064-406. GDAM TR 5. GDAM C11-5.

Nuclear

Application of reciprocity to gamma-ray shielding studies (U), by Ralph R. Fullwood and Donald R. Roberts. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Mar 1956. 18p diags, graph, tables. Order from LC. Mi \$2.40, ph \$3.30.

PB 125085

The attenuation of gamma radiation by common structures is studied on the basis of reciprocating source and detector, and the solution for an infinite plane field of radiation outside of the structures is obtained by using the observation point as an influence function. The attenuation of three buildings is obtained under conventional and reciprocal techniques. Suggestions for the improvement of the agreement between the two techniques are made and the advantages of the reciprocal techniques are discussed. Unclassified. Project 4-12-10-007-04. CC CRL R 607.

Cosmic ray neutrons. New York University. College of Engineering, New York, N.Y. Jun 1955. 3p. Order from LC. Mi \$1.80, ph \$1.80.

PB 124179

Summarizes work done and lists publications resulting from Contract N6 onr-279, T.O. II.

Diffusion theory of fine structure in thermal neutron reactor assemblies consisting of cylindrical fuel elements set in a square lattice array, by A.C. Clark and D.A. Newmarch. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 20p diags, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 59 cents. PB 124585

Unclassified 25 Oct 1955. S.O. code no. 91-3-2-80.
1. Atomic power - Research - Gt. Brit. 2. Diffusion theory - Gt. Brit. 3. Reactors, Thermal - Gt. Brit. 4. Reactors, Neutron - Flux distribution - Gt. Brit. 5. Uranium - Nuclear properties - Gt. Brit. 6. AERE RP/R 1657

Extrapolation techniques applied to matrix method in neutron diffusion problems, by Robert R. McCready. U.S. National Advisory Committee for Aeronautics. 1956. 12p drawings, tables. Order as NACA Report 1283 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents. PB 125755

An iterative scheme is developed for the matrix solution of the type of characteristic-value problem arising from homogeneous linear equations. The scheme is shown to minimize a suitable form at each step. Extrapolation techniques for speeding convergence are developed and refined. An example from nuclear-reactor theory is presented. Supersedes TN 3511 (PB 118022). NACA 1283.

Gas scattering in proton synchrotrons, by L. B. Mullett. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 38p diags, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. \$1.04. PB 124577

S.O. code no. 91-3-2-86. 1. Atomic power - Research - Gt. Brit. 2. Synchrotrons, Proton - Theory - Gt. Brit. 3. Gases - Scattering - Gt. Brit. 4. AERE GP/R 2072

Ionization and dissociation of molecules due to collisions with atomic ions (Ionisierung und zerfall von molekulen durch stosse mit atomionen), by Einar Lindholm. Translated by Rudolf Vogel. Revised by James Gough, Jr. Aug 1955. 38p tables. Order from LC. Mi \$3.00, ph \$6.30. PB 124108

The charge transfer in a collision between atomic ions and molecules is investigated and the fragments originating from the molecules are analyzed magnetically. The molecules CC_2 , H_2O , H_2S , NH_3 , CH_4 , and N_2O are bombarded with 16 different atomic ions. Translated from Zeitschrift für naturforschung 9a: 535-46, 1954, for the Geophysics Research Directorate, Air Force Cambridge Research Center, Cambridge, Mass., by the American Meteorological Society under Contract AF 19(604)-1364.

Leak detection in water mains using radioisotopes, by S. Jefferson, J.F. Cameron, A.M. Wildblood and J.L. Putman. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 22p photos, diags. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 91 cents. PB 124571

S.O. code no. 91-3-2-45. 1. Atomic power - Research - Gt. Brit. 2. Water pipe lines - Leaks - Detection - Gt. Brit. 3. Radioisotopes - Uses - Gt. Brit. 4. AERE I/R 1693

Phase stability in cyclotrons with the fixed frequency field law, by L.B. Mullett. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 11p graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 41 cents. PB 124572

S.O. code no. 91-3-2-85. 1. Atomic power - Research - Gt. Brit. 2. Synchrotrons - Theory - Gt. Brit. 3. Cyclotrons - Frequency modulation - Gt. Brit. 4. AERE GP/R 2071

Preliminary report on the determination of submicrogram quantities of individual rare earths by radioactivation using ion exchange separation, by F.W. Cornish. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 55p diags (1 fold), graphs, tables (part fold). Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. \$1.43. PB 124574

S.O. code no. 91-3-2-79. 1. Atomic power - Research - Gt. Brit. 2. Activators, Rare earth - Gt. Brit. 3. Earths, Rare - Ion exchange - Gt. Brit. 4. Earths, Rare - Properties - Gt. Brit. 5. Earths, Rare - X-ray inspection - Gt. Brit. 6. AERE C/R 1224

Progress report for the period 1 Jul - 30 Sep 1956 under Contract AF 18(600)-380, by M.F. Kaplon. Rochester. University. Dept. of Physics. Cosmic Ray Group, Rochester, N.Y. Sep 1956. 5p. Order from LC. Mi \$1.80, ph \$1.80. PB 124244

1. Atomic power - Research 2. Nuclear theory
3. Particles, Cosmic ray - Interactions 4. Cosmic radiation - Theory

Quarterly progress report no. 20. Massachusetts Institute of Technology. Solid-State and Molecular Theory Group. Apr 1956. 72p diags, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 125544

Contents: Survey, by J.C. Slater. - 1. Projection operators and the configuration interaction problem, by R.K. Nesbet. - 2. Heisenberg exchange operator, by R.K. Nesbet. - 3. Molecular calculations by the one-center method, by R.K. Nesbet. - 4. Atomic wave functions, by R.E. Watson. - 5. Lithium hydride molecule, by A.M. Karo and A.R. Olson. - 6. Electronic energy of the OH molecule, by A.J. Freeman. - 7. Configuration interaction calculation on the ground state of the hydrogen molecule, by H.A. Aghajanian. - 8. Polarization effects of the fluorine ion, by L.C. Allen. - 9. Multi-center

integrals, by F.J. Corbató. - 10. Electronic structure of KCl and KCl with V-center, by L. P. Howland. - 11. Calculations on atomic iron, by G.H. Wood. - 12. Augmented plane wave method for iron, by J.H. Wood. - 13. Augmented plane wave method as applied to sodium, by M.M. Saffren. - 14. Augmented plane wave method as applied to chromium, by M.M. Saffren. - 15. On the assessment and improvement of wave functions, by J. Hawgood. - 16. Combination of multi-particle orbitals for electronic wave functions, by J. Hawgood. - 17. Theory of the polaron, by T.D. Schultz. Contract N5 ori-07856.

Radiological dose to persons in the U. K. due to debris from nuclear test explosions prior to Jan 1956, by N.G. Stewart, R.N. Crooks and E.M.R. Fisher. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 29p graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 82 cents. PB 124578

S.O. code no. 91-3-2-81. 1. Bombs, Atomic - Radiation - Determination - Gt. Brit. 2. Radiation - Dosage determination - Gt. Brit. 3. AERE HP/R 2017

Selected abstracts of atomic energy project unclassified report literature in the field of radiation chemistry, and bibliography of the published literature, by R.W. Clarke. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Order separate parts described below from British Information Services, 30 Rockefeller Plaza, New York 20 N.Y., giving AERE number of each part ordered.

Part 4: Solid systems (excluding organic compounds), 1956. 138p. \$3.28. PB 124584

S.O. code no. 91-3-2-76. For Parts 1-3 see PB 123626-123628. 1. Atomic power - Research - Gt. Brit. 2. Radiochemistry - Bibliography - Gt. Brit. 3. AERE C/R 1574(4)

Part 6: Miscellaneous. 1956. 57p. \$1.43. PB 124586

S.O. code no. 91-3-2-77. 1. Atomic power - Research - Gt. Brit. 2. Radiochemistry - Bibliography - Gt. Brit. 3. AERE C/R 1575 (6)

Steric effects in elimination reactions. VI-X, by H.C. Brown, I. Moritani, M. Nakagawa, Y. Okamoto and O.H. Wheeler. Purdue University. Dept. of Chemistry, Lafayette, Ind. Oct 1955. 70p diags, tables. Order from LC. Mi \$3.70, ph \$10.80. PB 125848

For Parts I-V see PB 118330. Contents: VI. The effect of the steric requirements of the alkyl group

on the direction of bimolecular elimination. - VII. The effect of the steric requirements of alkoxide bases on the direction of bimolecular elimination. - VIII. The effect of the steric requirements of pyridine bases on the direction of the elimination reaction. - IX. The effect of the steric requirements of the leaving group on the direction of bimolecular elimination in 2-pentyl derivatives. - X. Steric strains as a factor in controlling the direction of bimolecular eliminations. The Hofman Rule as a manifestation of steric strain. Contract Nonr-394, T.O. III, NR 055-127.

Tables of two-center Coulomb integrals between 1s 2s, and 2p orbitals, by C.C.J. Roothaan. Chicago. University. Dept. of Physics. Laboratory of Molecular Structure and Spectra, Chicago, Ill. 1955. 53p tables. Order from LC. Mi \$3.60, ph \$9.30. PB 125853

1. Coulomb integrals - Tables 2. Contract N6-ori-20, T.O. IX, NR-019-101

Two problems in the theory of the slowing down of neutrons by collisions with atomic nuclei, by Nils Svartholm. Chalmers University of Technology, Gothenburg, Sweden. 1955. 16p. Order from LC. Mi \$2.40, ph \$3.30. PB 124919

The moderating properties for neutrons of materials containing light atomic nuclei are usually described in terms of neutron distribution functions with time, energy, velocity direction and space coordinates as independent variables. The distribution functions are governed by transport equations which are essentially continuity equations including certain assumptions concerning the elementary processes occurring to the neutrons, such as scattering and capture. Through the transport theory of neutrons is in some respects simpler than the transport theory of gases, only very few problems permit rigorous treatment. Two such problems, previously dealt with in R MARSHAK's article in Rev. Mod. Phys. (1947), are investigated anew in the present paper. Acta polytechnica 177. Chalmers University of Technology. Transactions nr. 164.

PHYSIOLOGY

Effects of radiations, infrared to ultraviolet, on physiological reactions of animals with different hair and skin color and structure. Final progress report for the period of 1 Oct 1951-30 Sep 1954, extended to 1 Jun 1955 under Contract N7 onr-292-4, NR 160-172. Missouri. University, Columbia, Mo. Jun 1955. 5p graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 124008

The objectives were to measure the reflectivity of hair and skin of animals having different hair and skin color and structure, when exposed to different

light intensities at various ambient temperatures; and the effects of these radiations on rectal, skin, and hair temperatures; on respiration and pulse rates; on thyroid activity; on milk production, feed and water consumption, and several aspects of blood and urine chemistry.

Ingestion of sea water, by P. D. G. V. Whittingham. Advisory Group for Aeronautical Research and Development. Jun 1955. 10p. Order as AGard Report 1 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125757

In this paper the importance of the difference in composition between urine and sea water is discussed. Methods of reducing the loss of body water are stressed in their importance in survival. It is concluded that sea water should never be drunk. Presented at the seventh meeting of the Aeromedical Panel, held on 13th June, 1955 at Toronto, Canada. Summary in French and English. AG 1.

Investigation of the mechanism of the "carry-over period" in the photoperiodic gonadal response in birds. Annual progress report for period 1 Jul 1954- 11 May 1955 under contract Nonr-1520(00), NR-164-263, by Donald S. Farner. Washington. State College of Washington, Pullman, Wash. May 1955. 12p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124074

General procedures, measurement and expression of photoperiodic responses, and experiments are discussed.

Linear distance changes over body joints, by Irvin Emanuel and James T. Barter. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1957. 43p diagrs, tables. Order from OTS. \$1.25. PB 131271

Linear distance changes over the body surface resulting from various joint movements were studied on a series of thirty young men. The following joints and joint complexes were studied: head and neck, shoulder, elbow, wrist, fingers, trunk, hip, knee, and ankle. Summary statistics and design values are presented for 48 linear distance changes measured over these joints. The information is designed for application to close fitting altitude clothing which must provide both physiological protection and body mobility. In addition, these data can serve as a guide for determining easement factors for more commonplace types of clothing. AD 118003. Project 7214, Task 71727. Contract AF 18(600)-30. AF WADC TR 56-364.

Physicochemical aspects of toxic action (U), by V. A. Gordleyeff. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center,

Md. Aug 1956. 19p photos, table. Order from LC. Mi \$2.40, ph \$3.30. PB 125600

Physicochemical studies of the mechanism of toxic action at surfaces and interfaces are reported. The studies cover description of methods and equipment used, reaction kinetics between adsorbed enzyme films and inhibitors, permeability of protein films, diffusion of toxic vapors in animal membranes, effects of rate of intoxication on toxic symptoms, the carrier effect on toxicity of vapors, retention of inhaled aerosols. The theoretical and experimental problems of membrane permeabilities and a new approach to their solution by use of monolayer membranes are discussed in the appendix to the paper. Project No. 4-08-02-016-05. CC CWL R 2061.

Some acclimatizing responses of man to prolonged cold exposure, by Robert Wellington Elsner. U.S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Nov 1955. 40p graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 125849

Slow, general responses to prolonged cold exposure have been demonstrated in four subjects. These changes are regarded as beneficial in nature because of the probability that they provide for greater protection of the extremities from local cold injury. Improved hand function in the cold is also implied. An increased readiness and ability of the cold acclimatized man to increase heat production by muscular activity as required by the heat debt imposed by his environment is also suggested. Evidence is presented which suggests that the adjustment to an increased extremity vasodilation is not dependent upon any marked change in blood volume. The experimental results suggest that an increased heat production during long exposure to cold is dependent upon a high level of physical fitness with concomitant muscular exercise. AF AAL Proj 9-7951, Report no. 1.

PSYCHOLOGY

Conditions affecting the military utilization of peer ratings: The Newport study, by E. P. Hollander. Carnegie Institute of Technology. Psychological Laboratories, Pittsburgh, Pa. Contract Nonr-760(06). Order separate parts described below from LC, giving PB number of each part ordered.

I: Reliability. 24p tables. Mi \$2.70, ph \$4.80. PB 125170

From research conducted with 23 trainee sections at the Naval OCS in Newport, data are presented relative to the reliability of peer nominations as it is affected by three variables: the period of time the group has spent together; the nature of the set given, i. e., "for research purposes" or "for administrative purposes";

and, the quality or characteristic to be evaluated by the nominator in making his nominations. For final summary report see PB 123140. Navy technical report 1-56.

II: Validity against in-training criteria. Feb 1956. 32p tables. Mi \$3.00, ph \$6.30.
PB 125564

Conclusions arrived at indicate that an early peer nomination will yield an adequate approximation to the prediction obtained for later ratings. Navy technical report 2-56.

III: Friendship choice. Apr 1956. 25p tables. MI \$ 2.70, ph \$4.80. PB 125590

Data are presented regarding the effect of friendship choice on the in-training validity of peer nominations using different characteristics to be rated, different instructional sets, and varying time levels of administration. The basic criterion applied was final academic average. Five major findings are reported. Navy technical report 3-56.

Effect of recall and problem-solving tasks, concurrently presented with intelligibility testing materials, upon listener responses to the intelligibility materials, by Robert W. Peters and John W. Black. Ohio State University Research Foundation, Columbus, O. and U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Aug 1955. 21p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125862

Reception values for the listeners were evaluated with respect to the conditions of no task and each of five conditions of increasing difficulty of the recall and problem-solving. The recall materials were digits, nonsense syllables, or words; the problem-solving tasks were arithmetic problems or arranging scrambled letters into words. With the recall of digits and nonsense syllables, reception values of listeners decreased with increased difficulty of the task; with the recall of words and the solution of arithmetic and scrambled letters problems, listener reception improved when the task was moderately difficult. Contract N6onr-22525. NM RI Proj NM 001-104500 Report no. 59.

Effects of an instruction to be intelligible upon a speaker's intelligibility, sound pressure level, and message duration, by Gilbert C. Tolhurst, John W. Black and Ashton Graybiel. Ohio State University Research Foundation. Columbus, O. and U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jul 1955. 18p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 125866

Three criterion measures, namely, multiple-choice intelligibility scores, sound pressure level, and message duration measurements of five-syllable phrases, were obtained on 48 Naval Aviation flight

students. One-half received an instruction to be as intelligible as possible before a second reading; one-half received no instructions. The results of the instruction were to improve intelligibility scores and to prolong the reading. No increase in sound pressure level of voice was found. Contract N6 onr-22525. NM RI Proj NM 001-104500 Report no. 58.

Effects of "Task-induced stress" on man-machine system performance, by W. D. Garvey. U.S. Naval Research Laboratory. Sep 1957. 12p diagrs, graphs, table. Order from OTS. 50 cents. PB 131278

Three experiments were conducted to determine the effect of stressing the human element in a man-machine tracking system on the performance of three systems--an acceleration aided control system, and a position control system. These results demonstrate how such balances under one conditions are sometimes destroyed in another. The results are discussed in terms of implications for training, selection, and human engineering as well as for scientific evaluations of man-machine systems. NRL R 5015.

Human dynamics study. Final report under Contract NOa(s)-51-083-c. Goodyear Aircraft Corporation, Akron, O. Apr 1952. 61f diagrs, graphs, tables. Order from LC. Mi \$3.90, enl pr \$12.30. PB 129060

The study included a review of pertinent literature, experimentation to determine the dynamic characteristics of the pilot in control of the airplane, including simulation apparatus and techniques of gathering and handling data. Bibliography is included as Appendix D. ATI 199678. GER-4750. Unclassified. Some pages will not reproduce well.

Interrelations among measurements of leadership and associated behavior, by Bernard M. Bass. Louisiana State University. Dept. of Psychology, Baton Rouge, La. Dec 1955. 22p tables. Order from LC. Mi \$3.00, ph \$6.30. PB 124233

1. Leadership - Statistical analysis 2. Group behavior 3. Contract N7 onr-35609, Technical report no. 5.

Legibility of symbols of the AND 10400, Mackworth, and Berger type-faces at vertical and horizontal angles of presentation and the construction and test of legibility of a revised type face, by F. L. Reinwald. Colgate University. Dept. of Psychology, Hamilton, N. Y. n.d. 43p graph, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 124242

Because of spatial restrictions, individuals employing visual displays as sources of information often must be displaced from the axis normal to the plane of the display-panel. Understanding the effects of such angular displacement upon legibility was the

general aim of this investigation. AD 75629. Contract AF 30(602)-212, Final report. AF RADC TR 55-78.

RUBBER AND RUBBER PRODUCTS

Pigeon project. Final report for the period 15 Jun 1952-14 Jun 1955 under Contract N5 ori-07656, NR 114-055, by C.B. Ferster and B.F. Skinner. Harvard University. Psychological Laboratories, Cambridge, Mass. Jun 1955. 12p. Order from LC. Mi \$2.40, ph \$3.30. PB 125889

The present work is a survey of the main types of schedules of reinforcement and of their effects at representative values, together with an analysis of these effects and their use as baselines for studying other processes. The research is directed toward the behavior of a single organism. Actual experimental control is the criterion used in evaluating a formulation. PP-11. For final report see PB 107724. Summary of Schedules of Reinforcement" (to be published by Appleton-Century Crafts, Inc. as detailed report of work under this contract. Revised.

Relationship of measured interests to career data of officers in personnel and comptroller positions, by Donald G. Paterson and George W. England. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Officer Education Research Laboratory, Maxwell Air Force Base, Ala. Feb 1956. 47p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125868

This report describes part of a study concerned with the possible use of vocational interest measures in the Air Force officer personnel program. The Industrial Relations Center, University of Minnesota, used the Strong Vocational Interest Blank to measure the vocational interests of Air Force officers in the personnel and comptroller areas and to compare these interests with personal history factors as reported on a specially devised personal history blank. Project 7730, Task 77355. Contract AF 18(600)-337. AF PTRC TN 56-44.

Vocabulary of college students in classroom speeches, by John W. Black and Marian Ausherman. Ohio State University Research Foundation, Columbus, O. and U.S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Aug 1955. 71p graph, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 125864

Formal classroom speeches of over 200 military personnel, assigned to a college program, were recorded. A frequency tabulation of the sample of 300,000 words showed that fewer than 7,000 different words were used, and that approximately 2,000 of these occurred only one time. Enumerations of the vocabulary, ordered alphabetically and in keeping with the frequency of occurrence, are included. Contract N6onr-22525. NMRI Proj NM 001 104 500, Report no. 60.

Copolymer development reports, no. 1 - 3399, Jan 3, 1944 - June 15, 1955, along with related reports in the OPI series. Federal Facilities Corporation. 1944-55. Prices for individual reports in microfilm or photocopy will be furnished upon request by the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D.C. Complete set is available at \$400. PB 126248

These reports were prepared by research contractors participating in the synthetic rubber research and development program conducted under the auspices of the Federal Facilities Corporation and its predecessor agencies. These reports are indexed in PB 126248s. Some of these were previously listed in USGRR, vol. 28, no. 1, July 1957.

Degradation studies on condensation polymers, by Maurice Morton. Akron. University. Rubber Research Laboratory, Akron, O. Contract DA 039-sc-64641. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B. Order separate parts described below from LC, giving PB number of each part ordered.

First quarterly report for period Mar 15, 1955 to Jun 15, 1955. Jun 1955. 7p diags. Mi \$1.80, ph \$1.80. PB 125546

Research is directed toward studying the stability of the various types of polycondensate linkages along the lines: a. To establish the equilibrium constant of each type of condensation reaction involved in building a particular type of polymer; b. To study the kinetics of the hydrolytic cleavage of various polycondensates, in order to explain the rates of such degradation reactions; c. To include in these studies reactions which help the formation of long chains from short ones, such as the linking of short chain polyesters by diisocyanates, or similar reactions. This report describes the chemical method for following the reactions between diisocyanates and monoalcohols.

Second quarterly report for period Jun 15 to Sep 15, 1955. Sep 1955. 17p diags, graphs, tables. Mi \$2.40, ph \$3.30. PB 125547

Work of this quarter dealt with hydrolytic degradation of polydimethylsiloxane and a study of the kinetics of the reaction between diisocyanates and monoalcohols.

Third quarterly report for the period 15 Sep-15 Dec 1955. Dec 1955. 29p diagr, tables. Mi \$2.70, ph \$4.80. PB 126535

Second order rate constants for the TDI/n-butanol reaction have been determined for certain ratios at 25°C and 15°C. The dependence of the rate constant upon temperature and alcohol concentration has been demonstrated. Six possible reactions involved in the extension of a linear polyester by reaction with diisocyanate are discussed. Degradation constants for unfractonated polydimethylsiloxane were determined in ethyl acetate containing 1.0% of different concentrations of sulfuric acid.

Fourth quarterly report for period Dec 15, 1955 to Mar 31, 1956. Mar 1956. 34p diags, graphs, tables. Mi \$3.00, ph \$6.30.

PB 125548

The second order rate constant for the MDI/n-butanol reaction has been determined for alcohol/isocyanate ratio of 2:1 at 25°C. in xylene. Phenyl isocyanate was reacted with water and butyric acid, and the rates of reaction compared with the alcohol reaction. Preparation of polyesters to be used in the study of polyester-urethane formation is described. Degradation constants for two fractions of polydimethylsiloxane in ethyl acetate containing 1.0% of 1.60 N. sulfuric acid were determined at 22.0, 35.0 and 50.0°C. The viscosity-molecular weight relation, Adiprene B in tetrahydrofuran, was determined using a series of fractions for viscometry and osmometry.

Fifth quarterly report for period Apr 1, 1956 to Jun 30, 1956. Jun 1956. 28p diags, tables, graphs. Mi \$2.70, ph \$4.80.

PB 125549

Gives results of work for the period on kinetics of the reaction between diisocyanates and mono-alcohols and between isocyanate and active hydrogen compounds, polyester-urethane formation and its hydrolytic degradation.

Sixth quarterly report for period Jul 1, 1956 to Sep 30, 1956. Sep 1956. 32p graphs, tables. Mi \$3.00, ph \$6.30.

PB 125550

Hydrolytic degradation of polysiloxane was studied in more detail. Polyester-urethanes and polyether-urethanes were prepared in varying molar ratios of reactants.

STRUCTURAL ENGINEERING

Safety of aircraft structures, by A.M. Freudenthal. Ohio State University Research Foundation, Columbus, O. Jul 1957. 43p graphs, tables. Order from OTS. \$1.25. PB 131382

The concept of structural safety of airframes is analyzed on the basis of its relation to the probability of structural failure, with a view of establishing procedures of quantitative evaluation of safety factors for a predetermined "acceptable" risk of failure. The difference in the approach to the concept of safety for ultimate strength and for fatigue is discussed, considering recent developments in fatigue research, particularly the results of fatigue tests under random loading, and methods of safety analysis for both conditions are proposed. Project no. 7360, Task 73604. AD 130910. Covers work for period 15 Feb - 30 Nov 1956 under Contract AF 33(616)-2729. AF WADC TR 57-131.

Some aspects of the mechanical testing of nonmetallic solids, by H. Kolsky. Brown University.

Division of Engineering, Providence, R.I. Apr 1956. 19p. Order from LC. Mi \$2.40, ph \$3.30. PB 125601

The difficulties encountered in measuring the elastic properties of rubbers, plastics and fibrous materials are considered and tests on the mechanical strength of glass-like materials are discussed. The significance of static and dynamic hardness measurements on non-metals is then considered in detail and the way in which such quantities as rebound hardness may depend on the conditions of test rather than on the properties of the material being investigated is described. Based on a lecture delivered to the Non-Destructive Testing group of the Institute of Physics, 16 Dec 1955. Contract Nonr-562(14), NR 064-421, Technical report no. 1.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Method of predicting skin, compartment, and equipment temperatures for aircraft, by Lawrence Slote and William D. Murray. New York University. College of Engineering. Research Division, New York, N. Y. Jul 1953. 105p diags, graphs (part fold), table. Order from LC. Mi \$5.70, ph \$16.80. PB 129120

This report presents a method for the calculation of the equilibrium skin temperature of aerodynamic shapes in steady flight. Graphical methods are presented for the calculation of equipment temperature and compartment air temperature. The numerical and graphical solutions are presented for aircraft flying at speeds to Mach number 5 and for altitudes from 0 to 100,000 feet in the proposed USAF hot and cold atmospheres. AD 19722. Errata, Sep 1954, included. 1. Airplanes - Cabins - Temperature - Calculation 2. Airplanes - Equipment - Temperature - Calculation 3. Airplanes - Skin -

Temperature 4. Contract AF 33(616)-122. AF WADC TR 53-119

New standard for the prediction of full scale spin and recovery characteristics from model tests, by T.H. Kerr. Advisory Group for Aeronautical Research and Development. Feb 1956. 24p graphs, table. Order as AGard Report 25 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington, D. C.

PB 125760

The important features of a model, which affect the scale effect in the spin and recovery are discussed in the light of several models to full scale comparisons and the general background of spinning experience. These features have been shown to be the non-dimensional rate of rotation (λ) of the spin, the thickness/chord ratio of the wing and the inertia ratio B/A of the model. Presented at the joint session of the Flight Test Panel and the Wind Tunnel and Model Testing Panel, held from February 20th to 25th, 1956, in Rome, Italy. Formerly R.A.E. Report no. Aero 2538. Summaries in French and English. AG 25. RAE TN Aero 2538.

Engines and Propellers

Compressors for high-speed wind tunnels, by Andrew A. Fejer and James Clark. Advisory Group for Aeronautical Research and Development. Jan 1956. 227p photos, drawings, diags, graphs. Order as AGardograph 14 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C.

PB 125872

This study is concerned with the compressor drive systems for high-speed wind tunnels of the continuous type. It contains information regarding the aerodynamic characteristics of wind tunnel circuits from which the compressor requirements can be established, presents a method to guide in the selection of the compressor type, and discusses compressor drives utilizing various types of prime movers. It outlines some of the aerodynamic and mechanical considerations underlying the design and operation of wind tunnel drives including a discussion of vibrational problems encountered in systems of this type. Summary in French. AGardograph 14.

Experimental investigation of temperature feedback control systems applicable to turbojet-engine control, by C.E. Hart, L.M. Wenzel and R.T. Craig. U.S. National Advisory Committee for Aeronautics. Mar 1957. 58p diags, graphs, tables. Order as TN 3936 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125683

Temperature - fuel-flow and temperature-area feedback control systems were investigated as means of controlling tailpipe gas temperature of a turbojet engine during transient operation in the high-speed

region. Time integrals of temperature-error functions were used as criteria for determining optimum transient response. A description of engine dynamics was obtained from frequency-response data. NACA TN 3936.

Suggested forms of air duct motors utilizing intermittent combustion. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Project Squid. Contract N6ori - 119. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Intermittent jet engines. Part II: Intermittent combustion turbines, by Joseph C. Logan, Jr. Feb 1948. 53p diags, graphs. Mi \$3.60, ph \$9.30. PB 128900

The first section considers theoretical and experimental studies of wave propagation in tubes, and suggested modification of existing jet devices utilizing intermittent combustion. The second section considers application of resonating principles to the combustion chambers of intermittent gas turbines. CAL TM 15. CAL DD 420-A-14.

Part III: Modification of combustion cycle to obtain wave reinforcement, by Joseph G. Logan, Jr. Mar 1948. 16p diags, graphs. Mi \$2.40, ph \$3.30. PB 128899

Modifications of the usual pulse jet cycle are proposed to obtain wave reinforcement which may yield the extremely high efficiencies indicated for jets, produced by mechanical oscillations, at tube resonance frequencies. Possible designs of intermittent combustion engines operating on this cycle are suggested. CAL TM 16. CAL DD 420-A-15.

Part IV: Intermittent combustion experiments, by Joseph G. Logan, Jr. and O. B. Finamore. Apr 1948. 16p photos, drawings. Mi \$2.40, ph \$3.30. PB 128896

Preliminary experiments conducted with valveless jet models have verified the theoretical conclusion that intermittent combustion processes could be sustained without the use of flapper valves. Experiments with a dynajet also indicate that the use of flapper valves may contribute to pulse jet inefficiency. These experiments, combined with previous observations of rough and explosive burning phenomena indicate that intermittent burning may be a very stable process in certain types of tubes. CAL TM 20. CAL DD 420-A-19.

Summary of 65-series compressor-blade low-speed cascade data by use of the carpet-plotting technique, by A. Richard Felix. U.S. National Advisory Committee for Aeronautics. Feb 1957.

31p fold graphs. Order as TN 3913 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C.

PB 125667

Supersedes RM L54H18A. 1. Cascades (Aerodynamics) - Tests 2. Compressors, Axial - Blades - Design 3. Compressors, Axial - Blades - Flow 4. NACA TN 3913

Systematic two-dimensional cascade tests of NACA

65-series compressor blades at low speeds, by L. Joseph Herrig, James C. Emery and John R. Erwin. U.S. National Advisory Committee for Aeronautics. Feb 1957. 223p photo, diagrs, graphs, tables. Order as TN 3916 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C.

PB 125663

Supersedes RM L51G31. 1. Compressors, Axial - Blades - Design 2. Compressors, Axial - Blades - Flow 3. Compressors, Axial - Rotors - Design 4. Cascades (Aerodynamics) - Tests 5. Airfoils - Cascade tests 6. NACA TN 3916

Aerodynamics

Asymptotic suction characteristics of the boundary layer on a circular cylinder, by H.G. Lew.

Pennsylvania State University. Dept. of Aeronautical Engineering, State College, Pa. Jan 1956. 42p graphs. Order from LC. Mi \$3.30, ph \$7.80. PB 125183

The asymptotic suction characteristics of the boundary layer over a circular cylinder are considered for a rotating and non-rotating cylinder. Both the incompressible and compressible cases are treated. In the non-rotating case, the assumption that the radius may be of the same order as the boundary layer thickness is retained and the effect of this is to increase the displacement thickness when suction is present. In all cases the skin friction intensity in the axial direction is independent of the rotation and transverse curvature. AD 90005. Contract AF 18(600)-575, Technical report no. 7. AF OSR TN 56-293.

Axially symmetric shapes with minimum wave drag,

by Max A. Heaslet and Franklyn B. Fuller. U.S. National Advisory Committee for Aeronautics. 1956. 18p drawings, graphs. Order as NACA Report 1256 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 125743

Optimum bodies consisting of a basic cylinder with added peripheral volume are derived and presented in terms of the effective radius-length ratio. Variation of this parameter encompasses the spectrum of results from slender to two-dimensional. A reciprocal theorem leads to simple interpretation of

variational problems. Supersedes TN 3389 (PB 116687). NACA 1256.

Effect of spanwise variations in gust intensity on the lift due to atmospheric turbulence, by Franklin W. Diederich and Joseph A. Drischler. U.S. National Advisory Committee for Aeronautics. Apr 1957. 56p graphs, tables. Order as TN 3920 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125728

1. Loads, Structural - Dynamic 2. Loads, Structural - Theory 3. Wings - Span loads distribution 4. Gust loads - Mathematical analysis 5. NACA TN 3920

Flight determination of drag of normal-shock nose inlets with various cowl profiles at Mach numbers from 0.9 to 1.5, by R. I. Sears, C. F. Merlet and L. W. Putland. U.S. National Advisory Committee for Aeronautics. 1956. 21p photos, graphs, drawings, tables. Order as NACA 1281 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 125753

Supersedes RM L53I25a. 1. Bodies, Ducted - Drag - Effect of nose design 2. Mach number - Effect 3. NACA 1281

Flutter prediction in practice, by E. G. Broadbent, Advisory Group for Aeronautical Research and Development. Apr 1956. 34p drawings, tables. Order as AGard Report 44 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125763

Gives a brief summary of the resources available for flutter prediction, both experimental and theoretical. Specific flutter investigations are described for four actual recent flutter incidents, in all of which good agreement is eventually obtained between calculations and full scale experience. Conclusions for future guidance are drawn from all the examples, and a few points are given from a more general statistical survey of recent incidents. Summary in French and English. Presented at the third meeting of the Structures and Materials Panel, held from April 17th to 23rd, 1956, in Washington, U.S.A. AG 44.

Flutter research at the Royal Aircraft Establishment, Farnborough, by H. Templeton. Advisory Group for Aeronautical Research and Development. Sep 1955. 34p photos, drawings. Order as AGard Report 4 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125758

This report outlines the basic objective and the main activities of flutter research at the R. A. E. Some examples of these activities are described. Pre-

sented at the second meeting of the Structures and Materials Panel, held from September 5th to 9th, 1955, in London, England. AG 4.

Function of the integral equation relating the lift and downwash distributions of oscillating finite wings in subsonic flow, by Charles E. Watkins, Harry L. Runyan and Donald S. Woolston. U.S. National Advisory Committee for Aeronautics. 1955. 18p table. Order as NACA Report 1234 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 25 cents. PB 125736

Supersedes NACA TN 3131 (PB 112792). 1. Equations, Integral 2. Downwash (Aerodynamics) - Theory 3. Lift - Theory 4. Flow, Subsonic - Theory 5. Wings - Aspect ratio 6. NACA 1234 7. NACA TN 3131, Rev.

Measurement of the aerodynamic forces on oscillating aerofoils, by W.G. Molyneux. Advisory Group for Aeronautical Research and Development. Apr 1956. 45p drawings, diagrs, graphs, table. Order as AGard Report 35 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125761

Considers various techniques for oscillatory force measurements in relation to their application to the measurement of the aerodynamic coefficients for a rectangular wing oscillating in modes of vertical translation and uniform pitch. Discusses also the corrections which must be applied to such measurements. Presented at the third meeting of the Structures and Materials Panel, held from Apr 17th to 23rd, 1956, at Washington, D.C. Summary in French and English. AG 35.

Method for solving dynamic problems of modern transonic and supersonic wings, by Luigi Broglio. Advisory Group for Aeronautical Research and Development. Apr 1956. 30p drawings, graphs. Order as AGard Report 38 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125762

Presents a method for the general solution of dynamic problems of delta, swept or crescent wings, or those of a more general type. The first part gives a method for the determination of frequencies and modes of vibration, with the influence coefficients and mass distribution assumed known. In the second part the calculation of the influence functions is discussed and, in the third, the methods of the previous two parts are applied to practical problems. The Appendix shows how to determine the influence functions in specific simplified cases. Presented at the third meeting of the Structures and Materials Panel, held from 10th to 17th Apr 1956 in Washington. Summary in French and English. AG 38.

Papers presented at the seventh meeting of the Wind

Tunnel and Model Testing Panels, Ottawa, Canada. Advisory Group for Aeronautical Research and Development. Jun 1955. 336p photos, drawings, diagrs, graphs, tables. Order as AG 19/P9 from National Advisory Committee for Aeronautics, 1512 "H" Street N.W., Washington 25, D.C. PB 125871

Thirteen papers by different authors are included. The main subjects dealt with are the effect of engine induced airflow both in model and full scale, the measurement and calculation of boundary layer flow, aerodynamic heating at high speeds and icing investigations. AG 19/P9.

The proper combination of lift loadings for least drag on a supersonic wing, by Frederick C. Grant. U.S. National Advisory Committee for Aeronautics. 1956. 11p drawings. Order as NACA Report 1275 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 15 cents. PB 125751

Lagrange's method of undetermined multipliers is applied to the problem of properly combining lift loadings for the least drag at a given lift on supersonic wings. The interference drag between the optimum loading and any loading at the same lift coefficient is found to be constant on a given plan form. The best combination of four loadings on a delta wing with subsonic leading edges is calculated as a numerical example. Supersedes TN 3533 (PB 118751). NACA 1275.

A reevaluation of data on atmospheric turbulence and airplane gust loads for application in spectral calculations, by Harry Press, May T. Meadows and Ivan Hadlock. U.S. National Advisory Committee for Aeronautics. 1956. 31p graphs, tables. Order as NACA Report 1272 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 30 cents. PB 125752

Supersedes TN 3362 (PB 116795) and TN 3540 (PB 118357). 1. Gust loads - Mathematical analysis 2. Atmosphere - Turbulence - Spectrographic analysis 3. NACA 1272 4. NACA TN 3362, Revised 5. NACA TN 3540, Revised.

Special method for finding body distortions that reduce the wave drag of wing and body combinations at supersonic speeds, by Harvard Lomax and Max. A. Heaslet. U.S. National Advisory Committee for Aeronautics. 1956. 40p drawings, graphs, tables. Order as NACA 1282 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 35 cents. PB 125756

Supersedes RM A55B16. 1. Airplanes - Drag - Effect of fuselage 2. NACA 1282

Studies of the speed stability of a tandem helicopter in forward flight, by Robert J. Tapscott and Kenneth B. Amer. U.S. National Advisory Committee for Aeronautics. 1956. 14p photos, table, graphs. Order as NACA Report 1260 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents.

PB 125744

Supersedes recently declassified RM L53F15a.

1. Helicopters - Speed 2. NACA 1260

Theoretical calculations of the pressures, forces, and moments at supersonic speeds due to various lateral motions acting on thin isolated vertical tails, by Kenneth Margolis and Percy J. Bobbitt. U.S. National Advisory Committee for Aeronautics. 1956. 46p diags, tables. Order as NACA Report 1268 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents.

PB 125750

Supersedes TN 3373 (PB 117006) and TN 3240 (PB 116004). 1. Airplanes - Stability - Effect of tail 2. Flow, Supersonic - Theory 3. NACA 1268 4. NACA TN 3373, Revised 5. NACA TN 3240, Revised

Theoretical span load distributions and rolling moments for sideslipping wings of arbitrary plan form in incompressible flow, by M.J. Queijo.

U.S. National Advisory Committee for Aeronautics. 1956. 17p graphs. Order as NACA Report 1269 from Superintendent of Documents, Government Printing Office, Washington 25, D.C.

PB 125747

Supersedes TN 3605 (PB 119396). 1. Wings - Span load distribution 2. Flow, Incompressible - Theory 3. NACA 1269 4. NACA TN 3605, Revised

Theory of wing-body drag at supersonic speeds, by Robert T. Jones. U.S. National Advisory Committee for Aeronautics. 1956. 9p drawings. Order as NACA Report 1284 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 15 cents.

PB 125741

Supersedes RM A 53H18a. 1. Flow, Supersonic - Theory 2. Mach number - Effect 3. Airplanes - Drag 4. NACA 1284

Transonic flow past cone cylinders, by George E. Solomon. U.S. National Advisory Committee for Aeronautics. 1955. 18p photos, drawings, graphs. Order as NACA Report 1242 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents.

PB 125745

Supersedes recently declassified RM L 53F15a.

1. Flow, Transonic - Theory 2. Cones - Aerodynamics 3. NACA 1242

Wind-tunnel and flight investigations of the use of leading-edge area suction for the purpose of increasing the maximum lift coefficient of a 35° swept-wing airplane, by Curt A. Holzhauser and Richard S. Bray. U.S. National Advisory Committee for Aeronautics. 1956. 26p photos, graphs, tables. Order as NACA Report 1276 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 25 cents.

PB 125748

Supersedes RM A52G17 and RMA55C07. 1. Airplanes - Lift 2. Boundary layer - Control 3. NACA 1276

Wind-tunnel test technique for measuring the dynamic rotary stability derivatives at subsonic and supersonic speeds, by Benjamin H. Beam. U.S. National Advisory Committee for Aeronautics. 1956. 16p photos, drawings, graphs. Order as NACA Report 1284 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 20 cents.

PB 125742

Supersedes TN 3347 (PB 116507). 1. Stability, Dynamic - Mathematical analysis 2. Wind tunnel tests - Methods 3. Damping derivatives - Stability 4. NACA 1258 5. NACA TN 3347, Revised

Rockets and Jet Propulsion

Compilation of turbojet noise data, by Norman Doelling and Derwent M. A. Mercer. Bolt, Beranek and Newman, Inc., Cambridge, Mass. Jul 1956. 131p graphs, tables. Order from LC. Mi \$6.90, ph \$21.30.

PB 128001

Turbojet noise data have been compiled from measurements in engine test facilities and under static open field conditions. All of the measurements were made on conventional engines which have no jet stream modifiers such as teeth or corrugations. About one hundred measurements on 20 types and models of turbojets are included, of which 4 types are English and 16 American. No critical evaluation has been made of the data herein, however, the far field measurements give more accurate source acoustic power than do the test cell measurements. Project 7210. Contract AF 33(616)-2151. AF WADC TR 54-401.

Flow in ejectors driven by supersonic jets, by K. Dexter Miller, Jr. Princeton University. Aeronautical Engineering Dept., Princeton, N.J. May 1948. 67p diags, graphs, table. Order from LC. Mi \$3.90, ph \$10.80.

PB 127617

A gas ejector is a device for pumping gas, operating through the entraining action of a high-speed gas jet contained in the apparatus. In this paper the equations for compressible flow in such a device are presented and solved, subjected to the limitations of complete mixing and of frictionless flow. The

form of the solution was devised specifically for an ejector pumping air through the action of the exhaust jet of a rocket motor, but was kept general enough so that it would be readily applicable to other gas induction problems involving a supersonic jet. Appendix illustrating this application to other problems is included. ATI 96725. Project Squid. Contract N6 ori-105, Task III. PU AEL R 138.

Investigation of acoustic jets. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Project Squid. Contract N6 ori-119. Order separate parts described below from LC, giving PB number of each part ordered.

Part I, by George Rudinger, Joseph Logan, Jr. and William Dashifsky. Feb 1948. 25p photos, diags, graphs. Mi \$2.70, ph \$4.80. PB 128893

Preliminary studies of a small "acoustic jet" driven by the membrane of a loudspeaker indicate the possibility of extremely high specific impulses for this type of propulsion devices. Photographs of the flow pattern indicate that one characteristic of the jet formation is the vortex flow pattern at the tube exit. CAL TM 13. CAL DD420-A-13.

Part II, by George Rudinger, Joseph Logan, Jr. and O.B. Finamore. Apr 1948. 17p photos, graphs. Mi \$2.40, ph \$3.30. PB 128894

Experiments with an "acoustic" jet operated by a mechanical piston are described. High values of specific impulse, similar to those found previously for "acoustic" jets operated by a loudspeaker, were obtained. Maximum thrust was obtained at tube resonance frequencies. Visual observation of the flow patterns indicated that a vortex flow pattern was established at the exit of a straight tube when a jet was formed. CAL TM 18. CAL DD 420-A-16.

Intensity, scale, and spectra of turbulence in mixing region of free subsonic jet, by James C. Laurence. U.S. National Advisory Committee for Aeronautics. 1956. 29p photos, graphs, table. Order as NACA Report 1292 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 30 cents. PB 125754

Supersedes TN 3561 (PB 118527) and TN 3576 (PB 123682). 1. Flow, Subsonic - Measurements 2. Flow, Turbulent - Measurements 3. Flow, Jet mixing - Measurements 4. NACA 1292 5. NACA TN 3561, Revised 6. NACA TN 3576, Revised

Turbojet cycle analysis: The effects of liquid injection at several points in the cycle, by E. P. Cockshutt. Canada. National Aeronautical Establishment. Apr 1956. 33p diagr, graphs. Order from LC. Mi \$3.00, ph \$6.30. PB 125026

The effects of injecting an evaporating liquid into the gas stream in a turbojet engine are calculated for liquid injection both upstream and downstream of the turbine. The response of the peak cycle temperature, engine fuel flow, tailpipe pressure, gross thrust and turbine pressure ratio, to the liquid injection are presented for a range of liquid latent heats and gas Mach numbers. It is shown that pre-turbine injection, unlike tailpipe injection, automatically requires that the engine be overheated when operating with a fixed propelling nozzle. NAEC LR 164.

Marine Transportation

Details for painting the separate parts of a vessel and corrosion of the hulls of naval vessels, by A. M. Markovich. Translated by Lloyd G. Robbins. Nov 1956. 41p diags, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125015

Pages 100-110 and 125-135 of "Combating corrosion of the ship's hull" (Berba s kerroziei kerpusa sudna), published in Moscow, 1955. 1. Hulls - Corrosion - Prevention - Russia 2. Paints, Anti-corrosion - Russia 3. Ships - Painting - Russia 4. STS 243 5. NAVSHIPS T 616

Investigation of shoreline-like features in the Galveston Bay region, Texas, by Vernon J. Henry. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Tex. Apr 1956. 89p photos, maps (part fold), diagr, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 125605

Features appearing to result from a higher stand of sea level in the Galveston Bay area, Texas, were studied to seek evidence of postulated Late Quaternary sea level oscillations in this region. The subsidence in the area of investigation has been calculated to be approximately 20 feet at the maximum. This figure was arrived at by determining the gradient of the Ingleside and the effect of local faulting and water withdrawal. Fold maps are separate and in a folder. A & M project 24. Reference 56-12T. Bur. of Ships: NE 120219-5. Contract N7 onr- 48702, NR 083-036.

Investigation of the planing lift of a flat plate at speeds up to 170 feet per second, by Kenneth W. Christopher. U.S. National Advisory Committee for Aeronautics. Mar 1957. 15p photos, drawings, graphs, table. Order as TN 3951 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 125684

An experimental investigation was made in the Langley high-speed hydrodynamics facility to determine whether the planing lift coefficient of a flat-bottom planing surface remains constant with increasing speed at the high towing speeds of this facility. No effect of speed was noted for the range of speeds tested. In addition, the data agreed well with that recently obtained in lower speed towing tanks. A brief description of the facility is included. NACA TN 3951.

Preliminary investigation of an underwater jet, by George Rudinger, Joseph Logan, Jr. and O.B. Finamore. Apr 1948. 11p diags, graphs. Order from LC. Mi \$2.40, ph \$3.30.

PB 128895

Preliminary studies of a small underwater jet driven by a mechanical piston indicate the possibility of extremely large specific impulse values for this type of propulsion device. Strong jet formation was observed at definite piston frequencies although these frequencies were much lower than resonance frequency values computed on the basis of propagation of sound in water. Studies of the flow pattern established during jet formation indicated that a characteristic feature is the creation of vortex rings similar to those observed in "acoustic" jet investigations. Project Squid. Contract N6 ori-119. CAL TM 19. CAL DD 420-A-17.

Research project in transportation geography and regional interrelations. Final report under Contract Nonr-477(03), by Edward L. Ullman. Washington. University, Seattle, Wash. n.d. 21p maps. Order from LC. Mi \$2.70, ph \$4.80.

PB 125602

Date is 1956 or later. Appendix: Notes on British Columbia ports and transportation. Includes Report no. 17: Japanese rice flows, by John D. Eyre. 1. Geography, Economic 2. Transportation - Geographic aspects 3. Trade routes - Japan 4. Trade routes - Brit. Columbia 5. Rice - Distribution - Japan

Technical innovations on the survey ship MS "Nord" of the Waterways and Navigation Administration (Technische neuerungen auf dem vermessungsschiff "Nord" der Wasser-und Schifffahrtsverwaltung), by H. Waas and H. Walter. Aug 1956. 34p photos, drawings, diags, graphs, tables. Order from LC. Mi \$3.00, ph \$6.30.

PB 124229

On a motor ship built for survey and towing operations, innovations were introduced, some of which were tried for the first time. These were designed particularly for the suppression of vibrations and noise. Especially, a propeller shaft stern tube, projecting far aft of the deadwood, reduced the ship vibrations ascribable to the propeller to an unusually low factor. A rubber plate, recessed into the ship's skin above the propeller, served the same

purpose. The new-type design of the ship's stern structure related to the two foregoing measures proved favorable from the standpoint of propulsion and revealed no deleterious effects otherwise. Translated from Schiffstechnik-Forschungshefte für Schiffbau und Schiffsmaschinenbau, vol. 3, no. 12/13, Nov 1955, pp. 61-71. NAVSHIPS T 620. STS-247.

Theoretical and experimental studies of the reflection of sound from rough surfaces and the propagation of sound in shallow water, by Julian R. Frederick, William C. Meecham, Irene V. Schensted and James E. Lesch. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Apr 1956. 100p photos, diags, graphs (1 fold), tables. Order from LC. Mi \$5.40, ph \$15.30. PB 125605

Contents: I: Introduction. - II: Theoretical investigation of the reflection of radiation from periodic and irregular surfaces, by William C. Meecham. - III. Investigation of the propagation of sound from a point source in a liquid layer over concrete: - 3.1. Theoretical considerations, by Irene Schensted. - 3.2. Experimental investigation of the propagation of sound in a shallow water model, by James E. Lesch and Julian R. Frederick. - IV. Summary of conclusions. - Bibliography. Contract N6 onr-23221, NR 385-203. MU ERI Proj. 1936-7-P.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Sterilization of sewage containing pathogenic microorganisms. Addendum to Report no. 9: Nuclear reactor, Phase I. Armour Research Foundation Chicago, Ill. May 1956. 27p diagr. Order from LC. Mi \$2.70, ph \$4.80. PB 129374

Discusses the use of a nuclear reactor as a source of heat and radiation for the sterilization of raw sewage containing pathogenic microorganisms. ARF Proj C 076, Report no. 9, Addendum.

Sterilization of sewage with ozone, by Sol Miller. Armour Research Foundation, Chicago, Ill. Nov 1956. 34p tables. Order from LC. Mi \$3.00, ph \$6.30. PB 129375

This report is a summary of experimental results on sterilization of liquid effluents from infectious disease laboratories. The program was carried out for the Biological Warfare Laboratories, Fort Detrick, during the period from July 1955 to Sept. 1956. The results indicate that ozone can be successfully used for sterilization of spores of *Bacillus subtilis* var. *niger*, and *Bacillus anthracis*, *Escherichia coli* phage T-3, influenza virus, and for inactivation of toxin produced by *Clostridium botulinum*. ARF Proj C076, Report no. 22 (Report supplement no. 4).

MISCELLANEOUS

Operational problems requiring documentation research, by Verner W. Clapp. Advisory Group for Aeronautical Research and Development. Feb 1956. 10p. Order as AGard Report 48 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125765

Presented at the sixth meeting of the Documentation Committee, held from 20th to 25th Feb 1956, in Rome, Italy. Summary in French and English. 1. Documentation - Research 2. AG 48

Report of NRL progress. U.S. Naval Research Laboratory. Nov 1957. 53p. Order from OTS. \$1.25. Also available at annual subscription rate of \$10 a year in the U.S.A., foreign rate \$13 a year. PB 131462

Contents: NRL contributions to an automatic approach and landing system, by H.W. Chitty, P.J. LaRochelle and R.R. Zirm. - Fracture strength, by G.R. Irwin. - Radiation-induced formation of ammonia, by C.H. Cheek and V.J. Linnenbom. - Problem notes: Astronomy and astrophysics: Lyman-alpha and x-ray emissions during solar flares

measured instantaneously with instruments flown in thirteen IGY "Dan" rockets .. New airdrag anemometer measures wind speed from 2 to 100 knots. - Chemistry: Physical properties of monolayers absorbed at the solid air inter-face-friction and durability of films on stainless steel .. Positive plate characteristics of the nickel oxides in several different types of electrolytic cells. - Mechanics: Measurements of anelastic microstrain which occurs prior to gross yield of tensile specimens subjected to both dynamic and static loading conditions .. Measurement of the elastic constant (C44) of indium .. Thermoelectric power of dilute indium-tin alloys relative to pure indium for several cold junction temperatures .. Performance of valveless pulse combustor incorporating new inlet enclosure. - Metallurgy and ceramics: Investigation of betaphase "recrystallization" in Ti-3%Al-5%Cr alloy .. Cracking of martensitic (Type 410) stainless steel in sea water .. Comparison of the creep-rupture properties of nickel in air and in vacuum .. Radiation effects in magnetic materials .. An investigation of cracked A-212 catapult steam receivers. - Nuclear and atomic physics: Comparison of solutions to the one-velocity neutron diffusion problem. - Radio: Secondary emission ratio of storage tube insulator films .. Maintenance of fractional degree phasing between two separate ac voltages or rotating shafts. - Solid state physics: A method for eliminating the spurious signal in nuclear magnetic resonance instrumentation .. Production of F-centers in NaCl containing colloids. - Published reports. - Papers by NRL staff members. - Patents.

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Biology and Medicine

Oak Ridge National Laboratory proposal for mammalian radiation injury and protection facilities.

Oak Ridge National Lab., Tenn. Aug. 1956. Contract W-7405-Eng-26. 14p. Order from LC. Mi \$2.40, ph \$3.30. CF-56-8-86

Electron microscopy of magnesium oxide particles collected on membrane filters, by R. Borasky and B. Mastel.

Hanford Atomic Products Operation. Richland, Wash. Jan. 1956. Contract W-31-109-Eng-52. 9p. Order from OTS. 50 cents. HW-46722

Mercury toxicity. A bibliography of published literature.

Compiled by Hugh E. Voress and Naomi K. Smelcer. Technical Information Service Extension. Oak Ridge, Tenn. July 1957. 52p. Order from OTS. \$1.50. TID-3067

Quarterly progress report for period ending Mar. 31, 1956.

California. Univ., Los Angeles. Atomic Energy Project. Apr. 1956. Decl. with deletions Mar. 4, 1957. Contract AT-04-1-Gen-12. 104p. Order from LC. Mi \$5.70, ph \$16.80. UCLA-362 (Del.)

Quarterly progress report for period ending December 31, 1956.

California. Univ., Los Angeles. Atomic Energy Project. Jan. 1, 1957. Decl. Mar. 14, 1957. Contract AT-04-1-Gen-12. 121p. Order from LC. Mi \$6.30, ph \$19.80. UCLA-386

Distribution of plutonium in the soils of Central and Northeastern New Mexico as a result of the atomic bomb test of July 16, 1945, by J. H. Olafson, H. Nishita, and K. H. Larson.

The Univ. of California. School of Medicine. West Los Angeles, Calif. Sept. 1957. Contract AT(04-1)-Gen-12. 25p. Order from OTS. 75 cents. UCLA-406

Biology and medicine quarterly report. April, May, June 1957.

University of Calif. Radiation Lab. Berkeley, Calif. July 29, 1957. Contract W-7405-Eng-48. 33p. Order from OTS. \$1.00. UCRL-3880

Proceedings of the second annual meeting on bioassay and analytical chemistry - October 11 and 12, 1956.

Sponsored by Industrial Hygiene Laboratory, Health Div. Los Alamos Scientific Lab. Los Alamos, N. Mex. Sept. 1957. 160p. Order from OTS. \$4.00. WASH-736

Chemistry—General

Properties of some refractory uranium compounds,

by M. Jack Snyder and Winston H. Duckworth. Battelle Memorial Institute. Columbus, Ohio. Sept. 1957. Contract W-7405-Eng-92. 34p. Order from OTS. \$1.00. BMI-1223

Differential infrared absorption techniques for characterizing the surface of ThO₂, by V. D. Allred.

Oak Ridge National Lab., Tenn. Mar. 1956. Contract W-7405-Eng-26. 5p. Order from LC. Mi \$1.80, ph \$1.80. CF-56-3-151

Procedure for the determination of oxygen in sodium and NaK by the distillation method, by J. C. White.

Oak Ridge National Lab., Tenn. Apr. 1956. Contract W-7405-Eng-26. 11p. Order from LC. Mi \$2.40, ph \$3.30. CF-56-4-31

Further information on the cake formed during slurry test 200A-3, by D. G. Thomas.

Oak Ridge National Lab., Tenn. Apr. 1956. Contract W-74 5-Eng-26. 43p. Order from LC. Mi \$3.30, ph \$7.80. CF-56-4-120

Neutron activation analysis, by G. W. Leddicotte and S. A. Reynolds. Oak Ridge National Lab., Tenn. July 1956. Contract W-7405-Eng-26. 18p. Order from LC. Mi \$2.40, ph \$3.30.
CF-56-7-106

Scientific technician manual -- sampling, by G. E. Woodall. Oak Ridge National Lab., Tenn. Aug. 1956. Contract W-7405-Eng-26. 7p. Order from LC. Mi \$1.80, ph \$ 1.80. CF-56-8-122

Preliminary investigation of the differential infrared spectra technique for characterizing the surface of thorium oxide, by M. A. Tamers. Oak Ridge National Lab., Tenn. Sept. 1956. Contract W-7405-Eng-26. 7p. Order from LC. Mi \$1.80, ph \$1.80. CF-56-9-126

Preparation of standard oxide, by R. B. Gallaher and A. S. Kitzes. Oak Ridge National Lab., Tenn. Oct. 1956. Contract W-7405-Eng-26. 14p. Order from LC. Mi \$2.40, ph \$3.30.
CF-56-10-8

Special chemistry of 94--analytical. Chemical Research report for the month ending June 1, 1944. Chicago. Univ. Metallurgical Lab. June 15, 1944. Decl. Feb. 16, 1957. 35p. Order from LC. Mi \$3.00, ph \$6.30. CK-1756

Freezing point determinations of the uranium hexafluoride-hydrogen fluoride system, by H. L. Bullard, A. S. Ostroski, and W. S. Stringham. Goodyear Atomic Corp. Portsmouth, Ohio. Oct. 1957. Contract AT-(33-2)-1. 13p. Order from OTS. 50 cents. GAT-213

Direct reaction of calcium fluoride-boron trifluoride complex with aluminum chloride, by E. A. Belmore and A. M. Teller. Hooker Electrochemical Co., Niagara Falls, N. Y. Feb. 1957. Contract AT-(30-1)-1524. 16p. Order from LC. Mi \$2.40, ph \$3.30. HEC-77

Determination of free nitric acid in solutions containing uranyl nitrate, aluminum nitrate and sodium dichromate, by Robert Lee Moore and H. R. Schmidt. Hanford Works, Richland, Wash. Oct. 1949. Decl. Feb. 19, 1957. Contract W-31-109-Eng-52. 12p. Order from LC. Mi \$2.40, ph \$3.30. HW-14603

Uniform aqueous corrosion of aluminum -- effects of various ions, by V. H. Troutner. Hanford Atomic Products Operation, Richland, Wash. June 1957. Contract W-31-109-Eng-52. 57p. Order from OTS. \$1.50. HW-50133

Corrosion of aluminum-uranium fuel assemblies in SF storage basin water. Supplementary report No. 1, by W. J. Guay. American Cyanamid Co. Atomic Energy Div., Idaho Falls, Idaho. Feb. 1953. Decl. with deletions Feb. 8, 1957. Contract AT (10-1)-177. 3p. Order from LC. Mi \$1.80, ph \$1.80. IDO-14213 (Del.)

Routine laboratory preparation of uranium hexafluoride by direct fluorination of uranium oxide, by F. W. Hurd and J. LaGriff. Carbide and Carbon Chemicals Corp., Oak Ridge, Tenn. Dec. 1947. Decl. Feb. 7, 1957. 14p. Order from LC. Mi \$2.40, ph \$3.30. K-98

Methods for the preparation of cubes containing uranium compounds and the recovery of the uranium salts, by W. L. Maroney and others. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. July 1948. Decl. Feb. 25, 1957. Contract W-7405-Eng-26. 35p. Order from LC. Mi \$3.00, ph \$6.30. K-240

Spray decomposition of uranyl nitrate solutions to uranium trioxide, by A. L. Allen and others. Carbide and Carbon Chemicals Corp. K-25 Lab. Div., Oak Ridge, Tenn. July 1949. Decl. Feb. 25, 1957. Contract W-7405-Eng-26. (KLO-124). 17p. Order from LC. Mi \$2.40, ph \$3.30. K-444

Review of the joint AECL-KAPL studies of the transuranium elements, compiled by R. P. Schuman. General Electric Co. Knolls Atomic Power Laboratory. Schenectady, N. Y. July 1957. Contract W-31-109-Eng-52. 35p. Order from OTS. \$1.00. KAPL-1781

Electrokinetic processes -- nuclear aspects. Quarterly progress report for November 1, 1955--January 31, 1956, by H. F. Reichard and others. Vitro Laboratories. West Orange, N. J. Feb. 15, 1956. Decl. Oct. 23, 1957. Contract AT(30-1)-850. 11p. Order from OTS. 50 cents. KLX-10021 (Del.)

Filtration of thiocyanic acid condensation products in the zirconium-hafnium separation plant, by G. R. Jansy and H. T. Tupper. Massachusetts Inst. of Tech., Oak Ridge, Tenn. Engineering Practice School. June 1950. Decl. Mar. 4, 1957. (For Carbide and Carbon Chem. Div). Contract W-7405-Eng-26, sub-contract 70. 10p. Order from LC. Mi \$ 1.80, ph \$1.80. KT-71

Vapor phase conversion of boron trifluoride to boron trichloride, by Anthony Loverde. Hooker Electrochemical Co., Niagara Falls, N. Y. May 1954. Decl. Mar. 12, 1957. Contract AT(30-1)-1524. 15p. Order from LC. Mi \$2.40, ph \$3.30. NYO-1235

Chemistry—Radiation and Radiochemistry

Recovery of boron trichloride from hydrogen, hydrogen chloride and boron trichloride mixtures, by E. A. Belmore and J. A. Spina. Hooker Electrochemical Co., Niagara Falls, N. Y. Aug. 1955. Decl. Mar. 1, 1957. Contract AT(30-1)-1524. 50p. Order from LC. Mi \$3.30, ph \$7.80.
NYO-1255

Preliminary report on analysis of thorium metal, by Harold R. Mullin and Joseph J. Tregoning. New Brunswick Lab. AEC., N. J. Aug. 1952. Decl. Feb. 28, 1957. 30p. Order from LC. Mi \$2.70, ph \$4.80.
NYO-2029

Organo-phosphorus compounds for solvent extraction, by C. E. Higgins, W. H. Baldwin and J. M. Ruth. Oak Ridge National Lab., Tenn. Aug. 1952. Decl. Mar. 11, 1957. Contract W-7405-Eng-26. 15p. Order from LC. Mi \$2.40, ph \$3.30.
ORNL-1338

Analytical chemistry division semiannual progress report for period ending October 20, 1954. Oak Ridge National Lab., Tenn. Jan. 3, 1955. Decl. Mar. 1, 1957. Contract W-7405-Eng-26. 57p. Order from LC. Mi \$3.60, ph \$9.30.
ORNL-1788 (Rev.)

Aqueous uranium slurry studies, by J. O. Blomeke. Oak Ridge National Lab., Tenn. Oct. 1955. Decl. Jan. 17, 1957. Contract W-7405-Eng-26. 63p. Order from LC. Mi \$3.90, ph \$10.80.
ORNL-1904

F¹⁸ exchange between fluorocarbons and some fluorine-containing compounds, by T. A. Gens. Oak Ridge National Lab., Tenn. n. d. Contract W-7405-Eng-26. 123p. Order from OTS. \$3.25.
ORNL-2363

Solvent extraction of iron with tri-n-octylphosphine oxide, by W. J. Ross and J. C. White. Oak Ridge National Lab., Tenn. n. d. Contract W-7405-Eng-26. 22p. Order from OTS. 75 cents.
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Chemistry division quarterly report - September, October, November 1950. California. Univ., Berkeley, Radiation Lab. Jan. 1951. Decl. Mar. 22, 1957. Contract W-7405-Eng-48. 52p. Order from LC. Mi \$3.60, ph \$9.30.
UCRL-1054

Bettis Technical Review - Vol. 1 - No. 3. Reactor chemistry and plant materials. Westinghouse Electric Corp. Bettis Plant--Pittsburgh, Pa. August 1957. Contract AT-11-1-Gen-14 and appropriate NObs-contracts. 145p. Order from OTS. \$4.00.
WAPD-BT-3

Effects of nuclear radiations on lubricants and gasoline, by Clark Goodman. Massachusetts Inst. of Tech., Cambridge. (Lexington Project). Sept. 1948. Decl. with deletions Mar. 12, 1957. 4p. Order from LC. Mi \$1.80, ph \$1.80.
LP-146 (Del.)

Chemistry—Separation Processes for Plutonium and Uranium

Tributyl phosphate solvent extraction process for recovery and decontamination of uranium 235 fuel discharged from experimental breeder reactor, by Leslie Burris, Jr. and Richland C. Vogel. Argonne National Lab., Lemont, Ill. Sept. 1950. Decl. Feb. 13, 1957. Contract W-31-109-Eng-38. 143p. Order from LC. Mi \$7.20, ph \$22.80.
ANL-4530

Effect of processing losses on breeding gain and doubling (converting) time for EBR-II and PBR reactors, by I. G. Dillon. Argonne National Lab., Lemont, Ill. May 1956. Decl. Mar. 9, 1957. Contract W-31-109-Eng-38. 5p. Order from LC. Mi \$1.80, ph \$1.80. ANL-LB-SL-1053

Dissolution of thorium oxide-uranium oxide fuel elements, by R. P. Larsen. Argonne National Lab., Lemont, Ill. Aug. 1956. Decl. Mar. 9, 1957. Contract W-31-109-Eng-38. 3p. Order from LC. Mi \$1.80, ph \$1.80.
ANL-RCV-SL-1090

Dissolution of thorium metal and thorium dioxide in HNO₃-HF and HNO₃-(NH₄)₂SiF₆ mixtures. Work done September 15, 1944-June 30, 1945, by F. W. Schuler, F. L. Steahly, and R. W. Stoughton. Chicago. Univ. Metallurgical Lab. Aug. 1946. Decl. Feb. 15, 1957. Contract W-7405-Eng-39. 16p. Order from LC. Mi \$2.40, ph \$3.30.
CC-3576

A survey of homogeneous reactor chemical processing, by F. R. Bruce. Oak Ridge National Lab., Tenn. Mar. 1951. Decl. with deletions Feb. 14, 1957. 41p. Order from LC. Mi \$3.00, ph \$6.30.
CF-51-3-78 (Del.)

Design specification and calculations for MTR dissolver condenser, by W. L. Carter and J. M. Holmes -- L. H. Landrum, comp. Oak Ridge National Lab., Tenn. Oct. 1951. Decl. with deletions Feb. 14, 1957. Contract W-7405-Eng-26. 59p. Order from LC. Mi \$3.60, ph \$9.30.
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K-429

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KLX-1603

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KLX-1607

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