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U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

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U. S. GOVERNMENT RESEARCH REPORTS

OFFICE OF TECHNICAL SERVICES
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OFFICE OF TECHNICAL SERVICES

U. S. Government RESEARCH REPORTS

Vol. 30, No. 6 Pp. 541-644 December 12, 1958

Contents

Printed Reports Available from OTS Announced in This Issue

APPAREL

Employment and suitability test of cold weather clothing for ground maintenance personnel. Final report. U.S. Air Force. Air Proving Ground Command. Eglin Air Force Base, Fla. Apr 1957. 23p photos, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134993

The Navy A-1, A-2 Cold Weather Clothing Assembly (wet or dry cold) provides more protection against precipitation and temperatures between +40° and -40°F than the USAF N-3 Dry Cold Mechanics' Assembly. However, the Navy A-1, A-2 Assembly possesses relatively minor deficiencies that reduce its efficiency and the comfort provided the user. Modifications to correct these deficiencies are recommended. APGC Proj APG/CSC/ 1462-C Final report.

Observation of experimental and standard cold weather clothing in Antarctica during Deep-freeze I and II (Dec 1955-Mar 1957), by S.A. Schwartz and A. Price. U.S. Bureau of Supplies and Accounts. Mar 1958. 62p photos, diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 135227

The effectiveness of various experimental, standard, and non-Navy cold weather clothing items was observed and evaluated under different end uses during year round operating conditions in Antarctica. Findings regarding the adequacy of experimental items presently under development are reported together with data regarding design aspects, sizing adequacy, and the general utility of present standard Navy cold weather clothing. The wide scope of the operation, which included the participation by military and civilian personnel of other services and nations, permitted additional observations relative to the adequacy of other domestic and foreign types of cold weather clothing. NAVSANDA RDR 22.

BIBLIOGRAPHY

Bibliography of the electrically exploded wire phenomenon, by William G. Chace. U.S. Air Force. Air Research and Development Command. Air Force Cambridge Research Center. Geophysics Research Directorate, Advanced Research Laboratory, Cambridge, Mass. Nov 1956. 52p. Order from LC. Mi $3.60, ph $9.30. PB 133825

In connection with a fundamental study of the Exploding Wire Phenomenon (E.W.P.) being conducted by the laboratory, a search of the literature was undertaken. At the time this work was started, no exhaustive bibliography of E.W.P. was available. Shortly before it was completed William M. Conn's paper in the Z angew. Phys. appeared with its excellent bibliography. The abstracts are from various sources. Most are original, from reading of the articles, but some were taken from abstracting journals. Contract AF 19(604)-1747. AF GRD TM 57-5.

Bibliography of unclassified research reports. Supplement number 3: Jul 1956-Jul 1957. U.S. Office of Naval Research. Psychological Science Division, Physiological Psychology Branch. Jul 1957. 14p. Order from LC. Mi $2.40, ph $3.30. PB 116382s3

Supplement to PB 116382. 1. Psychological research - Bibliography 2. Personnel, Naval - Selection and training - Bibliography

Bibliography of zirconium, by Eleanor Abshire. U.S. Bureau of Mines. Mar 1957. 283p. Order from LC. Mi $11.10, ph $43.80. Limited supply available from U.S. Bureau of Mines. Publications Division, 4800 Forbes St., Pittsburgh, Pa. PB 134528

This bibliography consists of references, with abstracts, to pertinent literature on the subject published from 1907 to date. The material in this bibliography is divided into two sections, literature and patents. Work upon which report is based was done under a cooperative project by the Bureau of Mines and the Bureau of Ships. BM IC 7771.

Cumulative list no. 5 of translations made by the American Meteorological Society in the fields of meteorology, astronomy, physics, geophysics, oceanography, and Arctic research. From 1 Jan 1952-31 Dec 1957. American Meteorological Society, Boston, Mass. Jan 1958. 90p. Order from LC. Mi $4.80, ph $13.80. PB 134384

For list no. 4 see PB 126034. 1. Meteorology - Bibliography 2. Translations - Bibliography 3. Contract AF 19(604)-1936

Index to Air Force Personnel and Training Research Center, 1957 and 1958 technical documentary reports, by Laney S. Chambers. U.S. Air Force. Air Research and Development Command mand. Personnel and Training Research Center. Lackland Air Force Base, Tex. Mar 1958. 41p. Order from LC. Mi $3.30, ph $7.80. PB 134755

This index identifies all technical documentary reports published by the Air Force Personnel and Training Research Center in calendar year 1957 and those released for publication in calendar year 1958 prior to the Center's inactivation on 15 April

1958. AD 152131. For report covering the year 1955 see PB 126705. AF PTRC TN 58-13.

Literature review on properties of praseodymium and cerium oxides, by J.M. Honig. Purdue University. Dept. of Chemistry, Lafayette, Ind. Jan 1958. 66p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 135200

The review on physical properties of cerium and praseodymium oxides is preceded by comments on some characteristics of members in the rare earth series. AD 148098. Contract AF 18(603)-45. AF OSR TN 58-57.

Review of literature concerning gumming and oxidation stability of gasoline. Screening tests to determine effect of fuel container materials and coatings on gasoline stability and gum content, by C.B. Jordan, C.F. Pickett, and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Apr 1954. 19p. Order from LC. Mi $2.40, ph $3.30. PB 132862

A compilation of publications, including patents, included in Chemical Abstracts from 1942 to 1954. Dept. of the Army project no. 551-01-010. ORD project no. TB 5-0010C-4, First report. APG LSD 209.

Study of calibration devices for wind measuring equipment. Project report no. 1: Literature survey, covering period 1 May-30 Sep 1957, under Contract no. DA 36-039-sc-73257, by William W. Hill. Purdue University. School of Aeronautical Engineering, Lafayette, Ind. Sep 1957. 116p. Order from LC. Mi $6.00, ph $18.30. PB 133599

This report covers the first phase of a study the objective of which is the design of laboratory equipment for the calibration of wind measuring instruments in the speed range of from 0.2 to 25 mph. For this initial phase a literature survey was conducted covering the work done in low speed calibration. This report, in annotated bibliography form, traces the calibration method from the earliest whirler through the use of modern low speed wind tunnels and the latest type of whirling apparatus, now primarily used for the small electrical anemometers that have been recently developed. DA project no. 3-36-00-400. SCL technical requirements 5375. PUR A 57-6.

Survey of patent literature on drying. Report II, by Emory N. Kemler and Millard H. LaJoy. Minnesota. University. Institute of Technology. Dept. of Mechanical Engineering, Minneapolis, Minn. and U.S. Chemical Corps. Biological Laboratories, Camp Dedrick, Md. Dec 1953. 317p. Order from LC. Mi $11.10, ph $48.60. PB 134803

Project no. 5192. For Part I see PB 134801. 1. Drying - Patents - Bibliography

Survey of scientific literature on drying. Report 1: Bibliography, by Emory N. Kemler, Millard H. LaJoy, and others. Minnesota. University. Institute of Technology. Dept. of Mechanical Engineering, Minneapolis, Minn. Sep 1953. 307p. Order from LC. Mi $11.10, ph $47.10. PB 134801

Cooperative Research Program. Mechanical Engineering Dept. project no. 5192. For Part II see PB 134803. 1. Drying - Bibliography

Two phase flow in gas-liquid systems. Literature survey, by J.A.S. Bennett. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Mar 1958. 60p tables. Order as AERE CE/R 2497 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.51. PB 135015

S.O. code 91-3-5-45. 1. Atomic power - Research - Gt. Brit. 2. Flow, Hydrodynamic - Theory - Gt. Brit. 3. Flow, Pressure drop - Gt. Brit. 4. AERE CE/R 2497

CARTOGRAPHY

Basic factors limiting the accuracy of mapping and aerotriangulation by photogrammetric procedures. Ohio State University Research Foundation. Mapping and Charting Research Laboratory, Columbus, O. Contract DA 44-009-eng-1490. OSURF Proj 546. Project no. 8-35-03-018. Order separate parts described below from LC, giving PB number of each part ordered.

First interim report covering period 1 Dec 1952-31 Mar 1953, by Frederick J. Doyle. Apr 1953. 22p tables. Mi $2.70, ph $4.80. PB 134929

The purpose of this research is to study, classify, evaluate, and determine the relative importance of the basic factors limiting the accuracy of mapping and aerotriangulation by photogrammetric procedures. In order to begin this study a classification of the various sources of errors has been compiled and criteria for bases of comparison of relative importance have been established. Since voluminous material has been published in scientific and technical journals on these subjects, a bibliography of pertinent references has been assembled.

Second interim technical report covering

period 1 Apr-30 Jun 1953, by Frederick J. Doyle. Jul 1953. 33p diagrs, graphs, tables. Mi $3.00, ph $6.30. PB 134971

A new listing of the subjects to be examined has been compiled. These are divided into: a. factors affecting the photography; b. factors affecting the plotting or computing instrument; c. factors affecting the instrument operator; d. interplay and correlation of factors. The influence of errors of interior orientation is studied. Includes "Influence of errors on inner orientation", by R. Roelofs, Institute of Geodesy, Technical University, Delft, Netherlands.

Third interim report covering period 1 Jul 1953-30 Sep 1953, by Frederick J. Doyle. Oct 1953. 78p diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 134912

Three phases of the photogrammetric procedure are investigated in this report: A. The accuracy of calibrating the aerial camera. B. The effect of errors in the calibration of the aerial camera. C. The influence of errors of relative orientation. Includes Section II of report by R. Roelofs.

Fifth interim technical report covering period 1 Jan-31 Mar 1954, by Bertil P. Hallert. Apr 1954. 92p diagrs, tables (part fold). Mi $5.40, ph $15.30. PB 134970

This report covers methods for determina- the primary observational errors. A. The standard errors in the measurements of image coordinates resulting from the construction of the pencils of rays in photogrammetric plotting instruments are determined by means of a numerical adjustment of the projectors. B. The standard error in the elimination of y-parallax is determined through rays. C. The standard error in the correction of x-parallaxes is determined by means of the adjustment of vertical deformations of the photogrammetric model.

Sixth interim technical report covering period 1 Apr-30 Jun 1954, by Bertil P. Hallert. Jul 1954. 114p diagrs, graphs, tables (part fold). Mi $6.00, ph $18.30. PB 134788

The formula systems derived are of fundamental importance for the determination of the accuracy of the convergent photogrammetric model. The comparison between the vertical and convergent models has shown that the geometrical accuracy conditions of convergent photography are far superior to those of vertical photography.

Seventh interim technical report covering period 1 Jul-30 Sep 1954, by Bertil P. Hallert. Oct 1954. 117p diagrs, graphs, tables. Mi $6.00, ph $18.30. PB 134981

The influence upon the photogrammetric aerial triangulation of the adjustment of residual y-parallaxes and of some sources of systematic errors has been studied. Practical investigations of the residual y-parallaxes in some stereoplotters have been performed. A practical investigation of the distortion correction in a stereo-instrument has been performed.

Eighth interim technical report covering period 1 Oct-31 Dec 1954, by Bertil P. Hallert and James M. Dowdy. Jan 1955. 58p diagrs, tables. Mi $3.60, ph $9.30. PB 135193

This report covers investigations of the error propagation from the relative orientation under other circumstances than symmetrical location of the orientation points and comparatively flat ground. Two assumptions are made: A. The orientation points have been chosen unsymmetrically. B. The orientation points have been elevation differences.

Final technical report covering period 1 Dec 1952-31 Mar 1955, by R. Roelofs, D. Hallert, and others. Apr 1955. 161p diagrs, graphs, tables. Mi $7.80, ph $25.80. PB 134846

This report contains a summary of what has been written in more detail in the previous interim reports concerning the influence of errors in camera calibration, interior orientation, relative orientation, and absolute orientation upon the accuracy of measured model coordinates from vertical convergent photography. The effect of errors in interior orientation upon the location of model points is given a thorough treatment, using vector analysis, in this report. The consequences of abnormal model lighting conditions are also studied.

Engineering test of scanning stereoscope, by J.M. Halsey. U.S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Aug 1957. 22p photos, diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 134427

This report describes the engineering test of a scanning stereoscope for stereoscopic viewing of overlapping transformed 20^{o} convergent photographs. Tests were conducted on optical and physical characteristics, high- and low-temperature storage, and limited operations. AD 140048. DA project 8-35-03-220. ERDL R-1491-TR.

Problems in mapping snow cover, by Edward B. Espenshade, Jr. and S. Valter Schytt. U.S. Army. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Dec 1956. 101p maps, diagrs, tables. Order from LC. Mi $5.70, ph $16.80. PB 135098

The investigation as carried out, was organized into the following five sections: I. The application of isolines for depecting aspects of the snow cover. - II. The development of other measures, indices, and methods for depecting snow cover conditions. - III. Snow regions: An approach to mapping snow covers. - IV. Current snow data maps. - V. Mapping snow density. SIPRE RR 27.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Tranquilizing drugs in oral surgery, by Lucian Szmyd, Clarence M. McCall, and Earl T. Enright. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Dec 1957. 6p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 134370

The use of promazine and meprobamate to control postoperative sequelae in oral surgery was clinically evaluated in 150 military patients. When the results of ataractic drug therapy were compared to those of placebo, no significant effect was noted on the postoperative sequelae of pain, swelling, or trismus. Tranquilizing drug therapy failed to influence the postsurgical narcotic demand. AF SAM R 58-31.

Organic Chemicals

Absolute absorption coefficients of benzene in the vacuum ultraviolet, by G.L. Weissler. University of Southern California. Dept. of Physics, Los Angeles, Calif. Mar 1957. 7p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 132651

Sponsored jointly by the Geophysics Research Directorate of the Air Force, Cambridge Research Center and the Office of Naval Research. 1. Benzene - Absorption - Theory 2. Contract Nonr 228(11), NR 017-505, Technical report no. 20.

Corrosion inhibition by organic amines, by Norman Hackerman and Helmut Kaesche. Texas. University. Dept. of Chemistry, Austin, Tex. Apr 1957. 26p diagr, graphs, tables. Order from OTS. 75 cents. PB 131779

The corrosion of pure iron in 1 NHCl is discussed in terms of the theory of mixed potentials and the same theory applied to the inhibition by organic compounds. Corrosion rates with and without inhibition by aniline, several aniline derivatives, and alkylamines were determined by cathodic polarization measurements as well as by colorimetric analysis of the solution. An interpretation of the data on cathodic inhibition is suggested on the basis of the assumption of a uniform metal surface and uniform adsorption. Contract Nonr-375(02).

3, 3-Dimethyl-1, 4-pentadiene, by Robert L. Burwell, Jr. and Remolo Ciola. Northwestern University, Evanston, Ill. Dec 1957. 4p. Order from LC. Mi $1.80, ph $1.80. PB 133352

AD 148055. 1. 1, 4-Pentadiene, 3, 3-Dimethyl 2. Contract AF 18(603)-132 3. AF OSR TR 58-16

Effect of solvents on the liquid phase photolysis of alkyl esters, by P. Ausloos. Rochester. University, Rochester, N.Y. Oct 1957. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 133272

The liquid phase photochemical decomposition of several alkyl esters has been studied in the presence of neopentane, n-heptane, methyl alcohol, ethyl alcohol and ethyl ether. An investigation of the effects of intensity, temperature and concentration indicated that several of the primary processes were strongly suppressed while others remained unaffected. A reaction between the electronically excited ester molecule and the solvent molecule is suggested to occur. AD 136509. Chem 20-10. Contract AF 18(600)-1528. AF OSR TN 57-525.

Effects of hydrostatic pressures on the intensity of the singlet-triplet transition of α-chloronaphthalene in ethyl iodide, by W.W. Robertson and R.E. Reynolds. Texas. University. Dept. of Physics, Austin, Tex. n.d. 22p graphs. Order from LC. Mi $2.70, ph $4.80. PB 133955

The extinction coefficient of the singlet-triplet transition of alpha-chloronaphthalene in ethyl iodide is found to increase almost linearly with the density of the compressed mixture. Study of a 1:2 volume ratio of these components over a pressure range from 1 to 3644 atmospheres resulted in about a twofold increase in light absorption, with little other changes in band envelope. No increase in absorption coefficient was obtained for pure liquid alpha-chloronaphthalene subjected to comparable increase in hydrostatic pressure. AD 154206. Date is 1956 or later. Contract AF 49(638)-35. AF OSR TN 58-297.

Factors influencing the formation and properties of chelate complexes of metal ions with various substituted hydroxamic acids. Final report covering the period 1 Jun 31 Aug 1956, under Con-

tract DA 33-008-ord-607, by Wilfred B. Howsmon, Warren M. Wise, and others. Purdue University. Purdue Research Foundation, Lafayette, Ind. Dec 1956. 43p graphs, tables. Order from LC. Mi $3.30, ph $7.80.
PB 132857

1. Hydroxamic acids - Compounds 2. Metal complexes - Formation 3. Metal complexes - Properties

Fungus inhibitive properties of organic compounds. Part V: Iodoacetates and iodoacetamides, by Dorothea E. Klemme and John M. Leonard. U.S. Naval Research Laboratory. Jun 1958. 16p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132837

Bioassays of some newly synthesized derivatives of iodoacetic acid and iodoacetamide - 11 alkyl esters and 9 N-alkyl amides - indicated that these compounds have about the same order of toxicity against Aspergillus niger and Trichoderma as the corresponding bromo and thiocyano derivatives. When chemical stability and activity against the two fungi were considered, the n-heptyl derivative proved to be the best toxicant in both classes of compounds. Branched-chain alkyl derivatives had lower antifungal activity than the corresponding straight-chain isomers. For Parts I-IV see PB 106531, 105296, 106532 and 105593. NRL R 5147.

Infrared absorption spectra of bromohydrocarbons in the 15-35 micron region, by Wilbert R. Powell. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1958. 32p graphs, table. Order from OTS. $1.00. PB 151134

The infrared spectra of a series of aliphatic and aromatic bromides have been studied with the intent of establishing the carbon-bromide stretching vibration absorption band. At least one strong absorption band, which appears to be characteristic of a C-Br stretching vibration, is present in the 15-20 micron region in all the aliphatic bromides studied. AD 151189. Project 7360. 1. Hydrocarbons, Aliphatic - Spectra - Infra-red 2. Bromides - Spectra - Infra-red 3. AF WADC TN 57-413

Microwave spectrum and barrier to internal rotation for trans-fluoro-propylene, by Seymour Siegel. Harvard University. Mallinckrodt Chemical Laboratory, Cambridge, Mass. Jun 1957. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 134446

Partially supported by a grant from the California Research Foundation. 1. Propylene, trans-Fluoro - Molecular structure 2. Propylene, trans-Fluoro -Spectrographic analysis 3. Contract Nonr 1866 (14)

Microwave spectrum and barrier to internal rotation of acetic acid, by William J. Tabor. Harvard University. Mallinckrodt Chemical Laboratory, Cambridge, Mass. Jul 1957. 4p tables. Order from LC. Mi $1.80, ph $1.80.
PB 134530

1. Acetic acid - Spectrograph analysis
2. Acetic acid - Molecular structure
3. Contract Nonr-1866(14)

Microwave spectrum, structure, dipole moment and quadrupole coupling constants of formamide, by Robert J. Kurland and E. Bright Wilson, Jr. Harvard University. Dept. of Chemistry, Cambridge, Mass. May 1957. 26p diagrs, tables. Order from LC. Mi $2.70, ph $4.80.
PB 134447

Partly supported by a grant from the California Research Corporation. 1. Formamide - Molecular structure 2. Formamide - Spectrographic analysis 3. Contract N5 ori-1866, T.O. XIV

Photoreduction of dyes. Final report covering period 1 Jun 1954-31 May 1958, under Contract AF 18(600)-1182, by Gerald Oster. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. May 1958. 20p. Order from LC. Mi $2.40, ph $3.30.
PB 134773

The kinetics of photoreduction of dyes in the presence of electron donors for the excited dyes has been studied in detail. The dyes examined include members of the fluorescein, thiazine, triphenyl methanes (bound to high polymers), and the acridines. AD 158280. AF OSR TR 58-69.

Polypeptides. XVII: Study of the kinetics of the primary amine-initiated polymerization of n-carboxy-anhydrides with special reference to configurational and stereochemical effects, by R.D. Lundberg and Paul Doty. Harvard University. Gibbs Memorial Laboratory, Cambridge, Mass. Apr 1957. 41p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 132640

The primary amine-initiated polymerization of N-carboxy-anhydride of γ -benzyl-L-glutamate in a number of solvents is shown to proceed at two successive rates following a relatively rapid initiation. The rate constant for the second propagation step is at least five times larger than that for the first. It is shown that very minor HCl contamination of the N-carboxy-anhydride can substantially lower the second propagation constant and in the limit prevent its appearance altogether. Contract N5 ori-07654.

Preparation and properties of some cyclic alpha-fluoroethers, by Clarence T. Mason. Tuskegee Institute. George Washington Carver Foundation Tuskegee, Ala. Nov 1957. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 132986

AD 136726. AF OSR Chem 30-23. 1. Metal fluorides - Ethers - Preparation 2. Metal fluorides - Ethers - Properties 3. Contract AF 18(600)-779 4. AF OSR TR 57-91

Production of perarylated monosilanes, by Amos R. Anderson, Robert W. Lerner, William E. Smith, and Russell S. Towers. Anderson Chemical Co., Weston, Mich. Sep 1957. 64p photo, diagrs, tables. Order from OTS. $1.75. PB 151202

This report investigates methods of synthesis, to characterize, and to prepare multiple pound quantities of the series of phenyl biphenylyl silanes and mixed isomeric biphenylyl phenyl silanes. A pilot plant was designed and built. Characterization work confirmed the high degree of thermal stability of these compounds. Physical data was obtained on all compounds that could be obtained in a reasonable degree of purity. Attempts to lower the melting points and to produce a more economical, thermally stable material were partially realized in the mixed isomeric biphenylyl phenyl silane series. AD 155669. Project 7023, Task 70317. Contract AF 33(616)-2375. AF WADC TR 57-620.

Reaction calorimetry: Hydrogenation of organic fluorides and chlorides, by J. R. Lascher and J. D. Park. Colorado. University, Boulder, Colo. Oct 1957. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 132311

The results which are obtained by hydrogenating some alkyl halides and some simple olefins are described in this paper. AD 136419. UC Technical note 7. Contract AF 18(600)-1151. AF OSR TN 57-430.

Reactions of diolefins at high temperatures. Final technical report under Contract AF 18(600)-546, by William D. Huntsman. Ohio State University. Dept. of Chemistry, Columbus, O. Jun 1958. 29p tables. Order from LC. Mi $2.70, ph $4.80. PB 134520

AD 158358. 1. 1, 6-Octadiene, 3, 7 - Dimethyl Kinetic reactions 2. Diolefins - Kinetic reactions 3. 1, 6-Octadiene, 7 Methyl - 1, 6-Octadiene - Kinetic reactions 4. Contract AF 18(600)-546, Final report 5. AF OSR TR 58-79

Reactions of metals with 1-alkoxy-1-chloromethanes and chloromethyl acetates, by Clarence T. Mason. Tuskegee Institute. George Washington Carver Foundation, Tuskegee, Ala. Oct 1957. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 132120

AD 136590. AF OSR Chem 30-23. 1. Ethane, 1-Alkoxy -1-chloro- Reactions with metals 2. Acetic acid, Chloro - Methyl ester - Reactions with metals 3. Contract AF 18(600)-779 4. AF OSR TR 57-66

Some chemical reactions of trifluoromethyl hypofluorite. II: Trifluoromethyl hypofluorite: Its decomposition and its reaction with carbonyl fluoride to form perfluorodimethyl peroxide, by Roger S. Porter and George H. Cady. Washington. University. Dept. of Chemistry and Chemical Engineering, Berkeley, Calif. Apr 1957. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133601

From thesis by Roger S. Porter, University of Washington. Presented at the Atlantic City meeting of the American Chemical Society, Sep 18, 1956. 1. Hypofluorite, Trifluoromethyl - Decomposition 2. Hypofluorite, Trifluoromethyl - Reaction with carbonyl fluoride 3. Contract N6 onr-113, T.O. I, NR 052-013

Sulfones from chlorosulfonylation products, by Robert B. Scott, Jr. and Morgan S. Heller. Alabama. University. Dept. of Chemistry, University, Ala. Dec 1956. 4p table. Order from LC. Mi $1.80, ph $1.80. PB 130861

Paper 1 delivered at ACS Southwide Chemical Conference, Memphis, Tenn., Dec 6-8, 11956, Session 22, Organic Chemistry. 1. Sulfones - Production 2. Sulfones - Spectrographic analysis 3. Contract Nonr 1747(00)

Detergents

Amphoteric surfactants in alkaline cleaners, by A. Mankowich. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Oct 1957. 19p tables. Order from OTS. 50 cents. PB 131685

The object of this study was to explore the detergency and physical characteristics of soak alkaline cleaning compounds containing amphoteric surfactants; to determine whether such compounds could be developed that would be satisfactory Fed. Spec. P-C-436a cleaners. Ordnance project TB 4-006A. D.A. project no. 593-25-006. APG CCL R 34.

Emulsion cleaning as a suitable cleaning technique. Second report, by R. I. Reis and C. F. Pickett. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Jan 1956. 26p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 133606

Improvements were made on the equipment and technique so as to yield statistically reproducible results. The effect of angle of spray, distance of spray, and thickness of grease were evaluated. Efforts were made to determine the optimum mechanical conditions for spraying. DA project no. 593-25-005. ORD project no. TB 4-8210, Report no. 12. APG ELR 29.

Emulsion cleaning - selection of stream spray conditions, by Horace F. Sykes. U.S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Mar 1958. 52p photo, graphs, tables. Order from OTS. $1.50. PB 131757

To evaluate emulsion cleaning, a study of the optimum conditions for spray cleaning was previously begun. The present investigation extends the range of the sensitive parameters to include those available in commercial practice. It covers phase A--pure water-standard grease. Ordnance project TB 4-006A. D.A. project 593-32-006. APG CCL R53.

Mathematical estimation of physico-chemical properties of selected surfactants, by A. Mankowich, C.F. Pickett, and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. May 1955. 31p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132864

Using 100.% active alkyl aryl polyethylene glycol ether (IOPNG), alkyl polyethylene glycol thioether (TDNGT) and alkyl aryl sulphonate surfactants, micellar size, micellar solubilization and boundary tension data were obtained and analyzed mathematically. To confirm reliability of previous data, the extrapolation and direct treatments of Hc/T data were compared. Dept. of the Army project no. 593-25-005. ORD project: TB 4-821E, Tenth report. APG LSD 248.

Micellar size and physico-chemical properties of selected surfactants as prime factors: Synthetic detergents, by A. Mankowich, C.F. Pickett, and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Oct 1954. 31p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132863

Using 100.% active alkyl aryl sulphonate and alkyl aryl polyethylene glycol ether surfactants, and neutral, polyphosphate and alkaline salt builders, micellar size, suspending power, micellar solubilization, boundary tensions and spreading coefficient of various surfactant-builder combinations were determined, and the data analyzed for prime factors. A modification was made in the method of calculating micellar size. A more basic unit of solubilization was developed. Dept. of the Army project no. 593-25-005. ORD project: TB 4-821E, Ninth report. APG LSD 237.

Relation of wettability by aqueous solutions to the surface constitution of low-energy solids, by M.K. Bernett and W.A. Zisman. U.S. Naval Research Laboratory. Oct 1958. 14p graphs, tables. Order from OTS. 50 cents. PB 151048

Contact angles of a variety of pure anionic, cationic, and nonionic surface-active agents in aqueous solutions of various concentrations were measured on smooth, clean surfaces of two low-energy solids, polyethylene and Teflon. Wettability curves were obtained for each solid surface by plotting the cosine of the contact angle versus the surface tension of each solution. The critical surface tension of each solid thus obtained agrees well with previous values established from studies with various pure organic liquids. Aqueous solutions whose surface tensions are lower than 30 dynes/cm were found to spread on polyethylene, whereas no solution had a surface tension low enough to spread on Teflon. The ability of aqueous solutions to spread on an organic low-energy solid surface was related to the value of γ_c of the solid and to the surface tension of the solution. NRL R 5207.

Self-emulsifiable cleaners, by R. Wagner, R.P. Witt, and C.F. Pickett. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Feb 1954. 21p tables. Order from LC. Mi $2.70, ph $4.80. PB 133602

Reports were received locally that some solvents, which had passed the qualification testing, left oily residues when removing grease. Studies were made to determine the difference between these unsatisfactory ones. Test methods were studied for distinguishing between these. Also methods for improving existing tests were studied. ORD project TB 4-821 C, Report no. 9. D/A project 593-25-005. APG LSD 204.

Synthetic detergents: Micellar molecular weight and shape of selected surfactant-builder combinations. 10th report on investigation of synthetic detergents, by A. Mankowich, C.F. Pickett, and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen Proving Ground, Md. Jun 1954. 14p tables. Order from LC. Mi $2.40, ph $3.30. PB 133611

Improvements were made in the method for preparing mote-free test solutions. Using 100% active alkyl aryl sulphonate and alkyl aryl polyethylene glycol ether surfactants, and neutral, alkaline salt and polyphosphate builders, micellar molecular weight and shape of various surfactant-builder combinations were determined by the light scattering technique. ORD project: TB 4-821E, Eighth report. D/A project no. 593-25-005. APG LSD 219.

Plastics and Plasticizers

Gunfire tests on transparent panels. Edited by James L. Riley. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1954. 248p photos, tables. Order from LC. Mi $11.10, ph $37.80. PB 135077

A series of bullet penetration tests were conducted on monolithic and laminated transparent plastic and

glass. Tests were performed indoors using special loaded 50 caliber and 20MM ammunition. In a phase of tests, a critical velocity projectile was utilized. The plastic sheets were tested in both curved and flat condition, mounted on an insulated airtight cell which was pressurized at 10 psi above ambient. The temperature within the cell was constant at 70°F ambient with the outside of the cell temperature range being -65°F to +120°F. AD 97347. Project 1368, Task 13428. AF WADC TR 54-461.

High-molecular-weight polyethylene ropes; evaluation of, by Leo J. Sheehan. U.S. Naval Shipyard, Boston, Mass. Materials Laboratory. Oct 1956. 17p photo, graphs, table. Order from OTS. 50 cents. PB 131687

Polyethylene ropes were tested for strength, elongation, permanent set, flexing durability, heat and weather resistance. The findings indicate outstanding resistance to weather and heat for stabilized-pigmented polyethylene, whereas unstabilized lost 90% in strength after 12 months weather exposure. Evaluation report no. 13638. NS 031-003.

Improved structural adhesives for bonding metals, by H.C. Engel. Bloomingdale Rubber Company. Jun 1952. 36p tables. Order from LC. Mi $3.00, ph $6.30. PB 126551

This program was aimed at the development of an adhesive equal to or better than present commercial adhesives, but having sufficient latitude in bonding pressure, bonding temperature, film thickness, and surface cleanliness requirements to simplify manufacturing methods and to aid in the development of consistent bond strength and environmental resistance properties. Covers period from 1 Apr 1951 to 1 Apr 1952 under Contract AF 33(038)-21669. AF WADC TR 52-156.

Interim report, covering period 1 May to 31 Jul 1953, under Contract Nonr-1129(00). Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N.Y. Aug 1953. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134985

Polyvinyl acetate samples of weight average molecular weights of 85,000 and 190,000 respectively possessing a wide molecular weight distribution but, presumably, a low degree of branching were found to have increased their molecular weights by factors of 2-3 when converted into formals. AD 18686. For other reports under this Contract see PB 114390, 114559 and 115877. Contract Nonr-1129(00), NR 036-012.

Photoluminescent dosimetry with plastics and plastic phosphors, by Donald Alexander Ramsay. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Feb 1958. 56p diagr, graphs. Order from LC. Mi $3.60, ph $9.30. PB 134686

The plastics, polystyrene and "Plexiglas," and two plastic phosphors, "NE 102" and "Sintilon," were studied for possible use in dosimetry. The photoluminescence of gamma irradiated samples was compared to that of unexposed samples. The range of doses was up to 10^8 roentgens. The "NE 102" indicated the best promise for practical use. The plastics do not emit under ultraviolet light and are not satisfactory for use in dosimetry. Some mechanisms of radiation damage to polymers are discussed. Thesis, U.S. Air Force. Institute of Technology, 1958.

Plastics and adhesives: Guide to their physical properties and uses, by Lawrence R. Dallett and William E. Donaldson. U.S. Naval Ordnance Test Station, China Lake, Calif. Oct 1956. 108p drawings, graphs, tables. Order from OTS. $2.50. PB 131686

All of the more common plastics are briefly described, together with their general properties and applications. In addition the physical properties and pertinent engineering data of a number of representative plastics are listed in tabular form. Methods of fabricating plastics are described, and a section is devoted to the design of molded plastic parts. Stresses which develop in a reinforced plastic tube, under conditions applicable to the design of rocket-motor tubes, are calculated. Adhesives are discussed from both a theoretical and a practical point of view. References are given at the end of each section, and a general bibliography concludes the report. NOTS 1335.

Progress report under Contract Nonr-1129(00), covering period 1 Feb-31 Jul 1954. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N.Y. Aug 1954. 48p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134428

Further experimental results on the adsorption of polyvinyl acetate and on polyvinyl butyral have been obtained. With respect to the reactions of the wash primer constituents, the hydroxyl groups of the butyral resin are essential for the complexing with Cr^{3+} and other ions. On precipitation in the presence of water all the chromium can be separated from the resin by strong chelating agents, but only about three-fourths of the resin can be separated from the chromium phosphate by organic solvents, the remainder of the complex being most difficult to break by this method. Viscosity and electrophoretic experiments indicate that, while in solution, the chromium ions attached to the resin endow the latter with properties of a polyelectrolyte, with phosphate as the counter ions. A detailed discussion of the general function of the resin in the wash primer, and as an assistant for corrosion protection, is put forward tentatively on the basis of the available inform-

mation. AD 41308. For earlier reports under this Contract see PB 114390, 114559, 115877. Contract Nonr-1129(00), NR 036-012.

Response of linear high polymers to hydrostatic pressure, by Shiro Matsuoka and Bryce Maxwell. Princeton University. Plastics Laboratory, Princeton, N.J. Jul 1957. 53p drawing, graphs. Order from OTS. $1.50. PB 131684

The bulk compressibility of linear high polymers has been found to be a function of temperature, pressure, and time. Linear high polymer melts are highly compressible. By subjecting a melt of polyethylene to pressure and then cooling, a material that is more dense, more rigid, and more crystalline than the original injection-molded specimen can be obtained. The effects of the bulk compressibility on the fabrication condition of plastics as well as product properties are discussed. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B. Contract DA 36-039-sc-70154, NR 356-375, Report 7a. PU PL TR 46B.

Study of the mechanism of the reactions used in the preparation of dihalodistannane and an attempt to prepare polymers from dichlorotetrabutyldistannane, by Otto H. Johnson. Minnesota. University. Dept. of Chemistry, Minneapolis, Minn. Oct 1957. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 132985

AD 136654. Chem 30-27. 1. Tin compounds - Kinetic reactions 2. Polymers - Preparation 3. Contract AF 18(600)-984 4. AF OSR TR 57-82

Ultrasonic degradation of polymers, by Winston Roberts, Ernest Yeager, and Frank Hovorka. Western Reserve University. Ultrasonics Research Laboratory. Dept. of Chemistry, Cleveland, O. Jan 1957. 73p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 133329

The rate of degradation of polystyrene in solution by ultrasonic waves has been studied at frequencies from 300 to 2000 kc/sec. as a function of the following variables: frequency, acoustical intensity, time of exposure, nature of dissolved gases in the solution, concentration of polymer, polymer molecular weight, and free radical polymerization initiators and inhibitors. The experimental results can be explained satisfactorily only on the basis that the degradation of the polymer by ultrasonic waves is mechanical rather than thermal or chemical. Contract Nonr 47002, NR 384-305, Technical report no. 18.

X-ray diffraction, birefringence and infrared dichroism of stretched polyethylene. Part II. Generalized uniaxial crystal orientation. Part III. Biaxial orientation, by Richard S. Stein. Massachusetts. University. Dept. of Chemistry, Amherst, Mass. Jul 1957. 28p diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 134680

1. Polyethylenes - Crystal structure 2. Crystals - Orientation 3. Polyethylenes - X-ray inspection 4. Contract Nonr 2151(00), NR 356-378, Technical report no. 6

Paints, Varnishes and Lacquers

Ceramic coatings for ferritic alloys, by R.M. King. Ohio State University. Dept. of Ceramic Engineering, Columbus, O. Jul 1954. 56p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134857

Studies were conducted on high-alkali, alkali-free, and high-temperature reflective ceramic coatings for ferritic alloys for aircraft power plant applications. Alkali-free coatings tested did not compare as favorably as the high-alkali types. Refractory powders added to a base coat appeared promising in extended heating tests but poor in thermal shock resistance. Some coatings tested, in which refractory powders were incorporated in the mill charge gave excellent protection to the base metal and had excellent thermal shock resistance. Using ceria as an opacifier, cover coats having reflectance values from 67-75% were produced. AD 49783. Task 70634. Covers period 1 Mar-30 Jun 1954 under Contract AF 33(616)-499. AF WADC TR 54-319, Part 1.

Development of accelerated performance tests for paint phosphate metal systems, by F. Schneiders and C.F. Pickett. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Jul 1955. 22p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 133608

The work, undertaken to verify and enlarge upon the original work of W. Machu (published in Korrosion & Metallschutz vol. 20, no. 1, 1944), has proven that the proposed technique is not applicable to the range of porosity in phosphate coatings used prior to painting. There appears to be very little measurable porosity in the usual proprietary zinc or iron phosphate coatings and the technique of measurement is not adequate in this range. D/A project 593-14-007. ORD project TB4-771B, Report no. 1. APG EL R 2.

Effect of vehicle modifications on the weathering properties of gloss enamels, Federal specification TT E-489, by L.F. Fall and C.F. Pickett. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Feb 1956. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 133605

A series of enamels were prepared in five different

colors with twelve enamels in each color. Variations were made in each color to study: (1) Three oil variations with alkyds of same phthalic anhydride and polyol content, (2) Effect of cumar modification of these alkyd resins, (3) Effect of different drier combinations. D/A project 493-14-007. ORD project TB4-771A, Report no. 17. APG EL R 31.

Investigation concerning variables in precoating materials used in investment castings, by Donald J. Kenney. Detroit. University. Research Institute of Science and Engineering, Detroit, Mich. Feb 1957. 19p photos, drawing, graph. Order from OTS. 50 cents. PB 131641

A method was developed for obtaining reproducible viscosity measurements on the thick slurries used in precoating wax patterns. Viscosity depends only on the water content of the precoat mix. Neither dipping, nor stirring, nor aging has any effect on the type of mix presently being used by the Springfield Armory, as long as the total water content remains constant. AD 121149. Contract DA 20-018-504-ORD-57, Final technical report.

Investigation on the aging effects resulting from plating methods and materials, by Richard B. Belser and Walter H. Hicklin. Georgia Institute of Technology. Engineering Experiment Station, Atlanta, Ga. Apr 1955. 124p photos, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 134544

Studies of the cleaning of glass and quartz surfaces, by positive-ion bombardment at a pressure near 3×10^{-2}mm of mercury show that the cleaning may or may not be effective dependent on the structural design and cleanliness of the vacuum chamber. D/A project no. 3-25-02-021. Signal Corps project no. 862A. Project A-156, Final report. Covers period 1 Apr 1954-31 Mar 1955 under Contract DA 36-039-sc-56753.

Salt spray resistance of Ordnance Corps paint systems. First report, by M.H. Sandler, C.F. Pickett, and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Apr 1954. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 133610

Representative Ordnance paint systems were prepared on solvent cleaned and phosphated steel (JAN-C-490, Grade I) panels, scored through to the metal, and exposed to the salt spray test. ORD project: TB 4-771E, Second report. D/A project no. 593-14-007. APG LSD 208.

Specifications for organic coatings: Revision of specification JAN-L-73, laquer, enamel, lusterless. Third report, by M.H. Sandler, C.F. Pickett, and R.P. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Mar 1954. 27p tables. Order from LC. Mi $2.70, ph $4.80. PB 133604

ORD project no. TB4-771A, Ninth report. D/A project no. 593-14-007. 1. Coatings, Organic - Specifications 2. Enamels - Specifications 3. APG LSD 206

Inorganic Chemicals

Computation of thermodynamics properties of gases from spectra, by Leonard Glatt, Jack Belzer, and Herrick L. Johnston. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, O. Contract N6 onr-225, T.O. XII, NR 058-005. OSURF Proj. 316. Order separate parts described below from LC, giving PB number of each part ordered.

NO molecule. Aug 1953. 18p tables. Mi $2.40, ph $3.30. PB 132033

AD 11678. 1. Gases, Thermodynamic properties 2. Nitrogen oxides - Spectrographic analysis 3. Spectroscopy, Molecular

N_2. Jul 1953. 14p tables. Mi $2.40, ph $3.30. PB 132034

AD 16073. 1. Gases, Thermodynamic properties 2. Spectroscopy, Molecular 3. Nitrogen - Molecular electric moments

Determination of heat transfer coefficients for air and carbon dioxide, by E.L. Katz. Purdue University. Rocket Laboratory, Lafayette, Ind. May 1957. 25p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134581

Paper presented at the ASME Diamond Jubilee Annual Metting held at Chicago, Ill., Nov 13-18, 1955. 1. Heat - Transference - Coefficients 2. Air - Heat transfer - Theory 3. Carbon dioxide - Heat transfer - Theory 4. Contract N6 ori-105, T.O. III, NR 098-038, Project Squid. 5. PUR TR 33-P

Electrical cleanup of gases. Quarterly report under Contract AF 18(600)-1049 for period Oct-Dec 1957, by J.H. Carmichael. Westinghouse Electric Corporation. Research Laboratories, Pittsburgh, Pa. Mar 1958. 6p diagrs, graph. Order from LC. Mi $1.80, ph $1.80. PB 134421

Research report 71F 191-R15. For earlier reports under this Contract see PB 116569-116571, 117718, 118391, 119370, 120232, 124846, 125915, 127247. 1. Gases - Ionization - Measuring equipment

Evaluation of inhibited and unihibited lithium chloride as an antifreeze coolant, by V.O. Hatch,

C.F. Pickett, and P.R. Witt. U.S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Feb 1955. 27p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 133613

Glassware corrosion tests and simulated circulation tests were conducted on lithium chloride solutions with and without sodium chromate as an inhibitor. Corrosion tests were conducted with distilled water with and without sodium chromate as an inhibitor. Aqueous solutions of O-E-771a, ethylene, glycol, inhibited, were used as standards of comparison. Based upon results of simulated circulation tests, inhibited and uninhibited lithium chloride solutions are inferior to water and present military antifreeze materials. ORD project: TB 5-8010A, Seventeenth report. D/A project no. 593-28-001. APG LSD 239.

Freezing point determinations on the system HNO_3-H_2O-N_2O_4, by John S. Gordon. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1954. 19p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 134902

Dynamic melting point data are presented covering the range of fuming nitric acid compositions between 0 and 15 weight percent water and 0 and 25 weight percent nitrogen tetroxide. These data are more comprehensive than theretofore available, and have important bearing on specifications for military fuming nitric acid to conform to the -65°F freezing point requirement. AD 57823. Project 3055, Task 30196. AF WADC TR 54-495.

General chemistry of the hydrides, by A.L. Grunewald. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Jun 1948. 26p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132950

AD 136294. 1. Hydrides, Metallic - Chemical reactions 2. Metals - Hydrogenation 3. NEPA 546-IHR-C9

Hall effect measurements on some alkali earth titanates, by E.K. Weise and M.C. Andrews. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Jan 1958. 23p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134660

Measurements of the Hall effect on sintered samples of Mg_2TiO_4, $MgTiO_3$, $MgTi_2O_5$, $CaTiO_3$, $SrTiO_3$, and $BaTiO_3$ were made. Approximate values of the electron mobility in cm^2/v sec as derived from the Hall effect data were as follows: 0.3 for $CaTiO_3$; 3.0 for $SrTiO_3$; 0.1 for $BaTiO_3$. The values for the magnesium titanates are still lower, between 0.01 and 0.1. The equipment used is briefly described. AD 152228. OSR project no. 52-670A-85. Contract AF 33-038-12644, Technical note no. 11. AF OSR TN 58-195.

Hydrazine decomposition flame, by Gregorio Millán and J.M. de Sendagorta. Instituto Nacional de Tecnica Aeronautica Esteban Terradas, Madrid, Spain. Aug 1957. 18p graph. Order from LC. Mi $2.40, ph $3.30. PB 133812

This report continues a previous work in which the velocity of the decomposition flame of hydrazine vapours was calculated through von Karman's method and by adopting a simplified kinetic model and approximate values for the transport coefficients. The same method is applied to the solution of the same problem but with the complete kinetic model proposed by Adams and Stock and more reliable values for the transport coefficients. AD 136659. For earlier report see PB 124972. Contract AF 61 (514)-997. AF OSR TN 57-670.

Investigation of chemical inhibitors for stress-corrosion cracking of stainless steel. Summary report covering period Jan 1954-Jun 1957, by F.E. Clarke and A.J. Ristaino. U.S. Naval Engineering Experiment Station, Annapolis, Md. Sep 1957. 17p photos, diagrs, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 134792

Coordinated phosphate-pH control has been tested with and without supplementary chemical inhibitors. The treatment originally recommended affords adequate protection for both mild steel and stainless steel surfaces completely submerged in boiler water. However, stainless steel parts exposed intermittently to the boiler water and its vapor are not protected against stress-corrosion cracking if both dissolved oxygen (or certain oxidizing agents) and chloride ion are present. There is evidence that caustic alone will cause cracking under the same conditions. This damage has been prevented by supplementary treatment with sodium sulfite oxygen scavenger. NS 140-001. NAV EES R 010359A.

Kinetics and mechanism of diborane pyrolysis, by John Rolph Morrey and George Richard Hill. Utah. University. Dept. of Fuel Technology, Salt Lake City, Utah. Jan 1958. 145p photo, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 134751

A comprehensive literature survey of reactions pertaining to the pyrolysis of boranes has been made in an effort to correlate the pertinent findings so far established. To facilitate further investigation, a heatable infrared cell was constructed. Its description along with the electronic circuit of the temperature controller and pressure measuring devices has been included. Two sets of equations are presented for the analytical determination of mixtures of diborane, tetraborane, pentaborane-9 and pentaborane-11 from infrared spectra--for high

pressures and for low pressures. A study of the kinetics of pyrolysis of diborane in the infrared cell as well as pyrex cells is herein reported. Evidence is given for second order disappearance at low temperatures and a transition from second order to 3/2 order at about 150°C. First order disappearance data are also discussed. AD 154121. Includes extensive literature survey. Contract AF 49(638)-28, Technical report no. 1. AF OSR TN 58-220.

Kinetics of hydrogen exhange between hydrogen-peroxide and water, studied by proton magnetic resonance, by M. Anbar, A. Loewenstein, and S. Meiboom. Weizmann Institute of Science, Rehovot, Israel. n.d. 16p. Order from LC. Mi $2.40, ph $3.30. PB 133243

The kinetics of hydrogen exchange between H_2O_2 and water have been investigated using the PMR method in the pH range of 2.5 to 6.5. The reaction was found to be both acid and base catalized. AD 152196. Date is 1957 or later. Contract AF 61 (052)-03. AF OSR TN 58-169.

Lithium hydride, by Kermit Anderson. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. May 1948. 40p diagrs, graphs, tables (1 fold). Order from LC. Mi $3.00, ph $6.30. PB 135172

ATI 84445. NEPA 547-IHR-C-10. 1. Lithium hydride

Low-field mobilities of the negative ions in O_2 and O_2 mixtures, SF_6, SO_2, and HCL, by E. W. McDaniel. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Jan 1958. 112p photos, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 135789

This report describes a series of experiments in which the low-field mobilities of the negative ions in a number of pure gases and gas mixtures were measured. The first experiment was concerned with pure oxygen and binary mixtures of oxygen with the noble gases, hydrogen, nitrogen, and carbon dioxide. The mobility of the ions in the mixtures was measured as a function of the oxygen concentration, and the results were extrapolated to zero oxygen concentration to obtain the mobility of the ions in the pure foreign gas. Pure sulfur hexafluoride, sulfur dioxide, and hydrogen chloride were investigated in subsequent experiments. AD 154236. Project no. 4750-47501. Project A-251, Technical report no. 1. Contract AF 18(600)-1524, Technical report no. 1. AF OSR TN 58-332.

Prevention of deterioration, hydrogen peroxide, 3%, USP, 1 lb. FSN 6505-153-8480, by Max Feinberg and R. L. Thompson. U.S. Armed Services Medical Procurement Agency, Brooklyn, N.Y. Dec 1956. 20p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134576

Technical memorandum no. 57-7. Project no. 6-59-04-049.063(7). 1. Hydrogen peroxide - Stability 2. Hydrogen peroxide - Decomposition

Reactions of silanes. Final technical report under Contract Nonr 982(02), NR 356-321, by William H. Nebergall and John S. Peake. Indiana. University, Bloomington, Ind. Jul 1957. 78p tables. Order from LC. Mi $4.50, ph $12.30. PB 134851

Ten reports are included on the following subjects: I. The preparation and infrared spectra of some dialkylsilanes. - II. The cleavage of sym-diphenyldisiloxane by organometallic compounds. - III. Formation or the silicon-hydrogen bond by the reducing action of certain sterically hindered Grignard reagents on phenyltrichlorosilane. - IV. The hydrolysis of phenyldichlorosilane. - V. Relation between the electronegativities of the adjacent substituents and the stretching frequency of the silicon-hydrogen group. -VI. The preparation of monobromosilane and organic silyl derivatives. - VII. Vibrational spectra of SiH_3Br and SiH_2Br_2.- VIII. Alkoxides of silicon containing silicon-hydrogen bonds. - IX. Disilylacetylene: preparation and spectroscopic investigation. - X. Certain reactions of silicon-hydrogen bonds with compounds containing halogens.

Search for new nongaseous nonliquid rectifying systems, by Theodore S. Shilliday, H. Clay Gorton, and others. Battelle Memorial Institute, Columbus, O. Feb 1955. 33p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134945

A large number of compounds were surveyed to determine their electrical and chemical properties at temperatures up to 200°C. Selected materials from this survey were investigated more fully to establish a basis for selection of a material or materials for development into a rectifier. TiO_2 rectifiers capable of operation at 125°C for about 1000 hours were made. Experimental TiO_2 rectifiers were made by modified techniques and found capable of operation at temperatures up to 250°C to 270°C. AD 75973. Project 4155, Task 41580. Contract AF 33(038)-2460. AF WADC TR 55-80.

Study of the oxides of silver. Fourth technical report, for the period 1 Jan-30 Jun 1957, under Contract Nonr 1682(01), NR 359-364, by T.P. Dirkse and L.A. Vander Lugt. Calvin College. Dept. of Chemistry, Grand Rapids, Mich. Jul 1957. 22p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134529

A study was made of constant-current and constant-potential oxidation of a silver electrode in potassium hydroxide solutions. A range of concentrations was used. The actual voltages that accompany the transformation of silver to silver (1) oxide to AgO are

0.05 and 0.35 volts above the silver-silver (1) oxide potential respectively. The work is primarily qualitative in nature but some conclusions regarding the nature of these electrochemical oxidation processes are drawn. For technical reports no. 1-3 see PB 127252, 127320, 130343.

Ternary compounds. Sixth technical report covering period 1 Jun 1956-31 May 1957 under Contract Nonr-367(00), NR 052-268, by Roland Ward, Lewis Katz, and others. Connecticut. University, Storrs, Conn. Jun 1957. 52p graph, tables. Order from LC. Mi $3.60, ph $9.30.
PB 134962

For 5th report see PB 126395. 1. Oxides, Metallic - Preparation 2. Oxides, Metallic - Molecular structure 3. Contract Nonr -367(00), NR 052-268, Technical report no. 6

Thermodynamic properties of $C^{12}H^1$ and $N^{14}H^1$ in the ideal gas state, by Leonard Glatt, Joan H. Adams, and Herrick L. Johnston. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, O. 1950. 39p tables. Order from LC. Mi $3.00, ph $6.30.
PB 130414

AD 29188. 1. Gases, Methylidyne group ($C^{12}H^1$) - Thermodynamic properties 2. Gases, Imidogen group ($N^{14}H^1$) - Thermodynamic properties 3. Contract N6 onr-225, T.O. XII, NR 058-005 4. OSURF Proj 316, Report 11

Thermodynamic properties of CN between 1° and 6000° computed from spectroscopic data, by Herrick L. Johnston, Jack Belzer, and Lydia Savedoff. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, O. May 1953. 15p tables. Order from LC. Mi $2.40, ph $3.30.
PB 132039

AD 13734. 1. Cyanogen - Thermodynamic properties 2. Cyanogen - Spectrographic analysis 3. Spectroscopy, Molecular 4. Contract N6 onr-225, T.O. XII, NR 058-005 5. OSURF Proj 316, Report no. 7

Thermodynamic properties of gaseous $B^{11}O^{16}$, by Leonard Glatt and Herrick L. Johnston. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, O. Jan 1954. 13p tables. Order from LC. Mi $2.40, ph $3.30.
PB 132032

AD 31236. 1. Gases, Thermodynamic properties 2. Boron oxides - Thermal properties 3. Boron oxides - Spectrographic analysis 4. Contract N6 onr-225, T.O. XII, NR 058-005 5. OSURF Proj 316, Report no. 12

Ordnance Chemicals

Systemization of the organic reactions and methods of formation of the common explosives, by Joseph F. Cattorini and Theodore J. Williams. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1956. 120p diagrs (part fold), table. Order from LC. Mi $6.00, ph $18.30.
PB 134790

A compilation of the available unclassified data on the militarily useful detonating explosives. The manufacturing procedures for all explosives originating from each particular basic raw material are arranged in a separate flow sheet to show their interrelation. Data on explosive properties are collected in a separate table for ready correlation. AD 98359. Originally a thesis by Lt. Cattorini at Institute of Technology, U.S. Air Force. AF WADC TR 55-369.

Analytical Chemistry

Matrix isolation studies. I: Photolysis of nitromethane and of methyl nitrate in an argon matrix; infrared detection of HNO, by Harmon W. Brown and George C. Pimentel. California. University. Dept. of Chemistry, Berkeley, Calif. Sep 1958. 20p tables. Order from LC. Mi $2.40, ph $3.30.
PB 135152

AD 158232. Chem. 10-8. 1. Methane, Nitro - Decomposition 2. Methyl nitrate - Decomposition 3. Nitroxyl - Detection 4. Contract AF 49(638)-1 5. AF OSR TN 58-429

Measurements of ^{137}Cs in human beings in the United Kingdom, 1956/1957, by J. Rundo. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Jan 1958. 5p table. Order as AERE HP/M 126 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 26 cents.
PB 135021

S.O. code 91-3-5-36. 1. Atomic power - Research - Gt. Brit. 2. Body, Human - Cesium content - Gt. Brit. 3. Body, Human - Potassium content - Gt. Brit. 4. AERE HP/M 126

Method for determining carbon contaminants in anhydrous hydrazine, by Edward L. Harris. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Propulsion Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1958. 16p photos, tables. Order from LC. Mi $2.40, ph $3.30.
PB 135071

AD 151138. Project 3055-30197. 1. Carbon - Determination 2. Hydrazine - Carbon content 3. AF WADC TR 58-157

Method for the analysis of fuming nitric acid, by Edward L. Harris. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Power Plant Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1952. 36p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134944

Detailed data and procedures are given for the analysis of constituents of nitric acid contaminated by metals as a result of storage in metal containers. AD 4524. Declassified 1 Nov 1957. AF WADC TR 53-6.

Method of analyzing polysulfide-perchlorate propellants, by Charles Ribaudo. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Sep 1956. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 132571

Methods have been developed for determining the ferric oxide, magnesium oxide, and total sulfur (percentage of polysulfide polymer) contents of cured polysulfide-perchlorate propellant. Dept. of the Army project no. 517-07-005. ORD project no. TU 2-1005B. PA TR 2334.

Micro volumetric determination of uranium and plutonium, by J.L. Bounce. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1957. 25p diagrs, graphs, tables. Order as AERE C/R 2407 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 77 cents. PB 135013

S.O. code 91-3-5-35. Manuscript dated May 1951. Declassified version of AERE C/R 717. 1. Atomic power - Research - Gt. Brit. 2. Uranium - Determination - Gt. Brit. 3. Plutonium - Determination - Gt. Brit. 4. AERE C/R 2407

Nonaqueous titration method for the determination of potassium nitrate in M-8 propellant, by Henry L. Herman. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Aug 1956. 15p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 133990

ORD project WD 4700-1420-19-99105. 1. Potassium nitrate - Determination 2. PA TR 2330

Photometric titration of bismuth with EDTA and its application to the determination of zirconium, by G.W.C. Milner and A. Bacon. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Feb 1958. 19p graphs, tables. Order as AERE C/R 2494 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 68 cents. PB 135014

S.O. code 91-3-5-22. 1. Atomic power - Research - Gt. Brit. 2. Zirconium - Determination - Gt. Brit. 3. Bismuth - Determination - Gt. Brit. 4. AERE C/R 2494

Radiometric determination of zinc and phosphorous in phosphate conversion coatings, in situ, by W. Dennis McHenry. U.S. Arsenal, Rock Island, Ill. Mar 1958. 14p photo, tables. Order from LC. Mi $2.40, ph $3.30. PB 134486

The method depends upon the resolution of the radiations emitted from radiophosphorous and radiozinc into their components. The procedure is given in detail. The reproducibility of results expressed as the coefficient of variation was found to be 5%. PESD 6030-4231-15-13305. RIA X.O. 75601-9032. RIAL R 58-418.

Spectroscopic test for silicon in silico-organic compounds, by Jack Radell, Paul G. Hunt, E.C. Murray, and W. Dickinson Burrows. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force, Base, Dayton, O. 8p table. Order from OTS. 50 cents. PB 151223

The method employs the Todd Spectranal, a commercially available analytical instrument, for detection of emission lines at 6347 and 6371 A^{O}. The test is rapid and simple and is applicable to a wide range of silico-organics. AD 155512. Project no. 7023, Task no. 70343. AF WADC TN 58-153.

Whole saliva volume, sodium, potassium, and chloride; day-to-day comparisons under identical and diverse forms of stimulation, by Ira L. Shannon. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Apr 1958. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 134787

1. Dental research 2. Saliva - Analysis 3. AF SAM R 58-83

X-ray method for determining cation distribution in ferrites, by L.P. Skolnick, S. Kondo, and L.R. Lavine. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Feb 1957. 18p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 132871

By using radiation of a wave length close to the absorption edge of one of the cations (the ferric ion in this case), sufficient difference in X-ray scattering factors can be developed because of anomalous dispersion, thus allowing the cation distribution to be ascertained. This method was employed in the case of nickel ferrite. A least-squares technique was used to determine the best values of the cation distribution and the oxygen position for the intensity ratios obtained for seven reflections. Contract Nonr-1841(10), NR 017-421. MIT LIR TR 118.

Chemical Engineering and Equipment

Survey of patent literature on drying. See entry under Bibliography on page 546. PB 134803

Survey of scientific literature on drying. See entry under Bibliography on page 546. PB 134801

DETERIORATION STUDIES

Weathering of cellulosic materials, by Vernon L. Frampton. Texas. University, Austin, Tex. Dec 1953. 72p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134907

AD 89172. Project 7340, Task 70312. Covers period 30 Nov 1951-29 Nov 1953 under Contract AF 33 (616)-4. 1. Cellulose - Radiation effects 2. Cellulose - Microbiological deterioration 3. AF WADC TR 54-135

ELECTRICAL MACHINERY

Communication Equipment

Occupancy theory with application to multi-channel communication systems. Part 2: Applications, by J.A. Riley. Parke Mathematical Laboratories Inc., Carlisle, Mass. Feb 1958. 32p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134509

AD 146911. 1. Occupancy - Theory 2. Communication systems - Theory 3. Contract AF 19(604)-1396, Scientific report no. 6 4. AF CRC TN 57-763

Electronics

Additional collision cross sections for helium, especially in the ionized continuum, by Sam Silverman and E.N. Lassettre. Ohio State University. Research Foundation, Dept. of Chemistry, Columbus, O. Jul 1957. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134972

Collision cross section and oscillator strengths have been determined for several excitations in the ionized continuum. Oscillator strengths agree well with theory except in the vicinity of the double electron excitations. Two excitations which involve simultaneous excitation of two electrons have been observed. Excitation energies agree with the previous work of Whiddington. A discontinuity in the ionized continuum on passing through a peak corresponding to a double excitation has been observed, apparently for the first time. AD 152466. For Scientific reports 2-6 see PB 110870, 112121, 112255, 112474, 119182. Contract AF 19(122)-642, Scientific report no. 9. OSURF Proj 464. AF CRC TN 58-233.

Antennas for airborne ADF systems, by J.T. Bolljahn. Stanford Research Institute, Stanford, Calif. Jul 1954. 205p photos, map, diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 134579

This report presents the results of a study of the antenna requirements of the AN/ARN-6 Automatic Direction Finder (ADF) system and of antenna types of antenna design techniques that may be used with this system. Basic information on antenna requirements has been gathered by measuring the receiver sensitivity as a function of sense-antenna sensitivity, both for ADF operation and for station identification. AD 42253. Contract AF 33(616)-83, Final report. SRI Proj. 606, Task II.

Arctic radio wave propagation, Task B: Pulse techniques and extraterrestrial radio waves, by Lief Owren, C. Gordon Little and others. Alaska. University. Geophysical Institute, College, Alaska. Oct 1957. 144p photos, maps, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 134913

The purpose was to investigate the propagation of high frequency radio waves in the arctic by the systematic measurement of radio signals propagated via the ionosphere in the vicinity of auroral zone by the use of pulse technique and by the systematic measurement of extraterrestrial radio wave intensities. D/A project 3-99-03-022. SC project 182B. Contract DA 36-039-sc-71137, Task B, Final report.

Atom beam recoil method for studying the scattering of electrons by atoms, by K. Rubin, J. Perel, and B. Bederson. New York University. College of Engineering. Research Division, University Heights, N.Y. Jul 1957. 33p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134726

Cross-sections for the scattering of low energy electrons by alkalies are being investigated by a crossed beam technique. A rectangular atom beam is hit from one side by an electron beam and the loss in intensity of the direct (unscattered) atom beam yields the total cross-section. The differential cross-sections can be obtained by an analysis of measurements made on the scattered atom taking the atomic velocity distribution into account. Preliminary measurements on potassium are discussed. Electron scattering project technical report 1. Contract Nonr 285(15).

Back-scatter from a right-circular cone, by A. Shostak and D. Angelakos. California. University. Division of Electrical Engineering, Electronics Research Laboratory, Berkeley, Calif. Jun 1957. 13p diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 134744

The object of this experimental research was to determine the back-scatter characteristics of a family of right-circular metallic cones at x-band, i.e., at approximately 10,000 megacycles per second. Contract N7 onr-29529, Report 70. UC IER Series 60, Issue 191.

Calculation of the reflection of radiation from saw-tooth surfaces and the reflection and transmission of radiation by parallel cylinder systems, by W.C. Meecham, S.T. Choh, and D.W. Moomaw. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jan 1958. 41p graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 134275

This report is divided into two main parts, comprising Sections II and III. The first part is concerned with the calculation of the reflection of radiation from saw-tooth surfaces. The calculations performed for this problem are based on a variational method which has been previously published. A review of this method is presented in Section II. AD 154160. OSR project no. 47501. Covers period 1 Nov 1956-30 Nov 1957 under Contract AF 49(638)-26. MU ERI Proj. 2607-5-F. AF OSR TN 58-44.

Catalogue of refractive index profiles measured with airborne refractometers. Texas. University. Electrical Engineering Research Laboratory, Austin, Tex. Nov 1957. 31p tables. Order from LC. Mi $3.00, ph $6.30. PB 134887

All known airborne microwave refractometer index of refraction profile data are presented in catalogue form. The number of profiles and dates of observation are listed for various geographical locations. Also, the agency (or agencies) responsible for the collection of the data, and information as to where the data might be found are given. AD133769. Contract AF19(604)-2249, Task 46032. Contract AF 33(616)-5024, Task 40522. TUEERL 5-26. AF CRC TN 57-955.

Chemical and electrolytic methods of plating electrodes on crystals for frequency control, by Patrick E. Mulvihill. U.S. Signal Corps. Engineering Laboratories, Fort Monmouth, N.J. Apr 1953. 13p photos, diagr. Order from LC. Mi $2.40, ph $3.30. PB 134501

Methods are described for "base-plating" and "electroplating-to-frequency" quartz crystal blanks by chemical and electrolytic deposition of the plating. Silver base-plating is emphasized because it is economical and produces a hard, bright plate suitable for subsequent electroplating-to-frequency. Such electroplating may be silver or nickel. Sig. Corps project no. 142A. D/A project no. 3-99-11-021. SCEL ER E 1111.

Circuit equation for traveling-wave tubes, by P.N. Butcher. Stanford University. Stanford Electronics Laboratories, Stanford, Calif. Feb1957. 24p. Order from LC. Mi $2.70, ph $4.80. PB 133544

The orthonormality properties of the modes of a periodic guide are derived and used to discuss the excitation of the synchronous and anti-synchronous modes by a bunched electron beam. The coupling impedances of these two modes are generally different periodic functions of the axial coordinate. They reduce to the same constant coupling impedance only if the modes have neglibible space-harmonic content in the beam. Contract Nonr 225(25), NR 373-862. SU ERL TR 402-1.

Component evaluation and specification engineering. Final report on Task XII under Contract DA 36-039-sc-63136: High-frequency vibration and shock test on electrical components, by P.G. Perry and E.G. Lebre, Jr. Battelle Memorial Institute, Columbus, O. Jan 1955. 97p photos, diagrs, tables. Order from LC. Mi $5.40, ph $15.30. PB 134535

Throughout the investigations included in this program, damages and failures were evaluated by visual inspection and observed resistance changes both during and after the force applications. The report contains data in appropriate tabular form, descriptions of procedures, equipment, instrumentation, and specimen mounting fixtures as well as summary comments concerning each operation on each type of component. AD 115174. D/A project no. 3-26-00-600. Signal Corps project no. 2006-A.

Designing an optimum linear slotted array antenna, by Marie Prytulak. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Jan 1958. 54p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134502

In order to design an optimum linear array antenna as developed by NBS and DOFL reports must usually be consulted. The needed information is consolidated into a single report, thus making the design procedure readily available. DOFL project 4104. D/A project no. 506-01-0. DOFL TR 550.

Determination of fields in a ferrite-loaded waveguide, by R.L. Comstock and D.J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1957. 45p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 134730

The research discussed in this paper was concerned

with an experimental determination of the transverse electric field in a ferrite loaded waveguide. The field was measured with an electric probe mounted on a sliding carriage which moved transversely across the guide. Experiments were performed using thin slabs placed longitudinally in the guide for various slab positions and static magnetic biasing fields. Addenda by A. Johnson, "Effect of length of samples." Contract N7 onr 29529, Report 65. UC IER Series 60, Issue 186.

Development and evaluation of telemetry in the proficiency measurement of all-weather interceptor pilots, by John C. Townsend. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Operator Laboratory, Randolph Air Force Base, Tex. Sep 1957. 84p photos, diagrs, tables. Order from LC. Mi $4.80, ph $13.80. PB 134924

The basic Bendix TGRS-2 FM/FM station was supplemented by locally designed constructed circuitry to permit the telemetering and ground reproduction of airborne radarscope display information. Fifteen flights were flown during which the feasibility of the concept and the actual operation of the telemetry station were evaluated in light of the requirements of a tool for proficiency measurement research. AD 134250. AF PTRC TN 57-118.

Development and implementation of the radio direction finder AN/CRD-6, by Richard C. Benoit, Jr., Frank Coughlin, Jr. and Stanley Kraszewski. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Mar 1957. 25p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134880

In this report the performance and field implementation of the AN/CRD-6 are presented. Modifications brought about by operational deficiencies are covered as well as changes in the operational concept of the equipment. Descriptions and comparisons of equivalent and contemporary equipments are also given. AD 97937. Project 45176. AF RADC TN 57-72.

Development of a high-frequency silicon switching transistor. Interim report covering period 1 Apr 1956-31 Jul 1957, under Contract AF 19 (604)-1867, by R.A. Williams. Philco Corp., Philadelphia, Pa. Aug 1957. 29p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132583

The emitter contact of a gold-antimony doped n-p-n silicon transistor was developed. Methods were found to deposit gold onto the emitter region that improved the wetting of the silicon by the gold during alloying. Studies of solubility of antimony in silicon versus temperature of alloying and resistivity versus temperature of alloying were undertaken. The higher the alloying temperature the lower is the resistivity. Studies of doping effects of arsenic and phosphorous on silicon were undertaken. Lead-antimony was evaluated to be the best solder to join the emitter and collector leads to the antimony emitter dots. The use of ultrasonerated, deionized water to clean a junction has been found to produce very low average I_{CO} values. A method to decrease base resistance employs a low-resistance skin surrounding the emitter. AD 133644. Philco no. H-2088-F. AF CRC TR 57-191.

Dielectric-filled waveguide development, by Joseph I. Meulemans. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory. Wright-Patterson Air Force Base, Dayton, O. Apr 1958. 21p photos, table. Order from OTS. 75 cents. PB 151213

The maintenance of sea level power handling capacity of waveguide at high altitudes and over extreme temperature ranges is an Air Force problem. Air Force programs are analyzed and the relation of waveguide operating conditions to the quality of dielectrics for waveguide is discussed. Test data and test results are given of a dielectric-filled waveguide investigation. Includes results and test data of Contract AF 33(600)-26763, performed by Airtron, Inc., Linden, N.J.. AD 155613. Project no. 4155. AF WADC TR 58-150.

Diffraction by a smooth object, by Bertram R. Levy and Joseph B. Keller. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Dec 1957. 67p diagrs, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 134975

This paper, on the diffraction of waves by smooth convex obstacles, consists of two parts. In Part I a new geometrical theory of wave propagation is explained and applied to the problem. In Part II the diffraction problem for various obstacles is formulated as a boundary value problem and solved by the usual separation of variables method. The solutions are then asymptotically expanded for large $ka = 2\pi a/\lambda$ (a = obstacle dimensions, λ = wavelength) and compared with the results of Part I. In all cases the geometric solution is found to agree with the asymptotic expansion of the exact solution. AD 146784. Contract AF 19(604)-1717. NYU RR EM-109. AF CRC TN 57-975.

Diffraction by cylindrical reflectors II, by R. Plonsey. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1957. 32p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134483

Measurements of the diffracted field of a circular cylindrical reflector with line feed at its center were made in a parallel plane device. A descrip-

tion of some of the features of the equipment is given. The results of the measurement confirm that geometrical optics currents are themselves satisfactory, but is inconclusive with respect to the correction line currents. Contract N7onr 29529, Report no. 62. UC IER Series 60, Issue 183.

Diffraction of a plane wave by a unidirectionally conduction half-plane, by S. N. Karp. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Aug 1957. 21p. Order from LC. Mi $2.70, ph $4.80. PB 134976

Closed form expressions are obtained for the electromagnetic field produced by the diffraction of a plane wave by a semi-infinite unidirectionally conducting screen, and simple far field formulas are given. AD 133799. Contract AF 19(604)-1717. NYU RR EM-108. AF CRC TN 57-974.

Diffraction of a skew plane electromagnetic wave by an absorbing right-angled wedge, by Frank Karal and Samuel N. Karp. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Feb 1958. 68p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 134973

An exact solution of Maxwell's Equations is obtained for a plane wave of arbitrary incidence striking a partially absorbing three-dimensional right-angled wedge. In addition to the exact solution, and asymptotic representation for the far field is given. Contract AF 19(604)-1717. NYU RR EM-111. AF CRC TN 58-131.

Diffraction of a trapped wave by semi-infinite metallic sheet, by George G. Weill. California Institute of Technology. Antenna Laboratory, Pasadena, Calif. May 1956. 21p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 127073

AD 97361. 1. Waves, Electromagnetic - Diffraction - Theory 2. Dielectrics - Electrical conduction - Theory 3. Contract AF 18(600)-1113 4. CIT AL TR 7 5. AF OSR TN 56-477

Diffraction, refraction and reflection of radio waves. Thirteen papers by V.A. Fock, introduction by V.I. Smirnov, appendix by M.A. Leontovick, edited by N.A. Logan and P. Blacksmith, Jr. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Jun 1957. 413p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $63.60. PB 135692T

Contents: Introduction: V.A. Fock's contributions to diffraction theory, by V.T. Smirnov. - I. New methods in diffraction theory (Philosophical Magazine 39, 149-155, 1948). - II. The distribution of currents induced by a plane wave on the surface of a conductor (Journal of Physics, USSR, 10, 130-136, 1946). - III. Diffraction of radio waves around the earth's surface (Journal of Physics, USSR, 9, 255-266, 1945). - IV. Solution of the problem of propagation of electromagnetic waves along the earth's surface by the method of parabolic equation (Journal of Physics, USSR, 10, 13-24, 1946). - V. The field of a plane wave near the surface of a conducting body (Journal of Physics, USSR, 399-409, 1946). - VI. Propagation of the direct wave around the earth with due account for diffraction and refraction (IAN (Ser. Fiz.), 12, 81-97, 1948). - VII. Theory of radiowave propagation in an inhomogeneous atmosphere for a raised source (IAN (Ser. Fiz.), 14, 70-94, 1950). - VIII. The field from a vertical and a horizontal dipole, raised above the earth's surface (ZETF, 19, 916-929, 1949). - IX. Fresnel diffraction from convex bodies (UFN, 43, 587-599, 1951). - X. Fresnel reflection laws and diffraction laws (UFN, 36, 308-319, 1948). XI. Generalization of the reflection formulas to the case of reflection of an arbitrary wave from a surface of arbitrary form (ZETF, 20, 961-978, 1950). - XII. Approximate formula for distance of the horizon in the presence of super refraction (Radiotekh. i, Elektr. 1, 560-574, 1956). - XIII. On radiowave propagation near the horizon with superrefraction (Radiotekh. i, Elektr. 1, 5750592, 1956). - Appendix: Approximate boundary conditions for the electromagnetic field on the surface of a good conductor (Investigations on radiowave propagation, Part II, 5-12, Printing House of the Academy of Sciences, Moscow, 1948). AD 117276. AF CRC TN 57-102.

Dynamic mechanical stability in the variable reluctance transducer, by Charles H. Sherman. U.S. Navy Underwater Sound Laboratory, New London, Conn. May 1957. 44p diagr, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 134301

The effect of transients on the static stability of the variable reluctance transducer was investigated, and stability under steady-state dynamic conditions was analyzed in order to evaluate its importance as a limiting factor in high-power sound-projector operation. NE 051600-23. Thesis, University of Connecticut, 1957. DIF 4. USL RR 348.

Effects of short duration neutron radiation on semiconductor devices, by W.V. Behrens and J.M. Shaull. Diamond Ordnance Fuze Laboratories, Washington, D.C. Apr 1957. 16p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 134523

Transistors, semiconductor diodes, and solid-electrolyte batteries were exposed to short duration, high intensity neutron radiation from a U-235 critical assembly which was primarily a neutron source. The effect on these components was ascertained by composing their principal parameters before and after exposure, and in several cases operating units of equipment utilizing these components were moni-

tored during irradiation. AD 128157. DOFL project: 33.3-36430. DOFL TR 452.

Effects on radio-astronomical observations due to longitudinal propagation in the presence of field-aligned ionization, by Stanley Rush and Lawrence Colin. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Mar 1958. 31p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 134927

This report presents certain conclusions about the ionosphere which are related to the problem of electromagnetic radiation through this region of the earth's atmosphere. It is shown that strong perturbations in the extraterrestrial radiation pattern of a source (or receiver) located on the surface of the earth can be predicted with a fair degree of certainty. These phenomena may possibly be related to experimentally recorded fades and scintillations which have been reported by several observers. AD 148679. Project 5535, Task 45774. AF RADC TN 58-98.

Electrical tests on CW-396A rigid radomes with AN/FPS-6 antenna, by Joseph Vaccaro. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, N.Y. Apr 1958. 39p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134472

Tests wereconducted to determine the effects of the 55-foot, equatorial diameter, CW-396A rigid radome on the AN/FPS-6 (XW-1) height finder antenna. Measurements were made of antenna patterns, antenna beam reflection, VSWR, and relative gain at S-band. Measurement techniques, test equipment, and test results are discussed. AD 148672. AF RADC TN 58-95.

Electrode potential measurements using interstitial oxygen solutions in titanium, by I. Hornstein. Chicago Development Corp., Riverdale, Md. Jan 1958. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134892

CDC report 2. Project 19751. 1. Titanium - Electrolysis 2. Sodium - Determination 3. Contract AF 18(600)-1458 4. AF OSR TN 58-89

Electromagnetic back-scattering from thin circular disks by a microwave pulse method, by C.C. -H. Tang. Harvard University. Cruft Laboratory, Cambridge, Mass. Mar 1958. 32p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134506

The object of this research is to investigate the feasibility of adapting the conventional pulsed radar technique for close-range back-scattering measurements for obstacles of arbitrary shape and small scattering cross sections. AD 146809. Contract AF 19(604)-786. HU CL SR 15. AF CRC TN 58-110.

Electromagnetic transmission through ferrite filled coaxial cable structures, by Kurt Ikrath. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Dec 1957. 53p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 134735

The investigation into the transmission properties of ferrite filled coaxial lines is based on the selection of two consecutive sub-problems. In the first one the transmission loss mechanism is described. In the second sub-problem the non-linear aspects of the transmission phenomena are discussed. SCEL TM M-1937.

Energetical network analysis and transformation, by Frank M. Brown. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 77p. Order from LC. Mi $4.50, ph $12.30. PB 134840

Thesis, U.S. Air Force Institute of Technology. GE-58-3. 1. Networks, Electrical - Theory 2. Transformations (Mathematics)

Factors affecting choice of transmission frequencies for line-of-sight systems, by L.S. Schwartz. U.S. Naval Research Laboratory. Oct 1946. 145p diagr, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 135107

1. Radar - Beacons - Automatic frequency control 2. Airports - Air traffic control centers - Equipment 3. NRL R 3005

Ferrite rod wave-guide, by Byron N. Edwards. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Mar 1957. 35p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 133537

The electro-magnetic properties of a ferrite rod wave-guide at microwave frequencies are investigated. The rod was uniformly magnetized in the longitudinal direction and excited from the end of a circular wave-guide propagating a circularly polarized TE_{11} mode. The general behavior of ferrites at microwave frequencies is reviewed and the determinantal equation for the propagation constant of the characteristic modes of the ferrite rod is derived. Contract N7 onr 29529, Report no. 60. UC IER Series 60, Issue 178.

Fundamental studies of the properties of natural and synthetic quartz crystals. Ninth interim report, covering period 1 Mar-31 Jul 1957 under Contract DA 36-039-sc-64586, by J.C. King.

Bell Telephone Laboratories, Inc., New York, N.Y. Aug 1957. 25p diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80.
PB 134495

The mechanical absorption characteristics for shear waves have been measured (a) in natural quartz "swept" of mobile impurity atoms by a process of thermo-electric treatment and (b) in X-ray irradiated synthetic quartz grown from a seed plate oriented parallel with the z-minor rhombohedron. In general, the anelasticity of the "swept" natural quartz resonators is greater than that of untreated natural quartz throughout the temperature range 1.2^{o} to 373^{o}K. Report 27424-H. D/A project no. DA 3-21-01-010. Sig. Corps project no. 142-13.

Heterodyne generation of UHF local oscillator signals, by Hugh Gottfried. Sylvania Electric Products, Inc. Electronic Defense Laboratory, Mountain View, Calif. May 1956. 17p diagrs, table. Order from LC. Mi $2.40, ph $3.30.
PB 134883

This paper investigates the possibility of heterodyning a BWO with a fixed frequency oscillator, to obtain a beat frequency signal in the 400- to 1000-mc range for use as a local oscillator in a superheterodyne receiver. Intermediate frequencies of 30 mc and 350 mc are considered. The results have shown that spurious responses from the mixer operation make this method impracticable for receivers of sensitivity greater than about minus 75 dbm. AD 104516. Contract DA 36-039-sc-31435. EDL-M71.

HF antenna multicoupler (2-32MC) QRC project 39(T), by James B. Hickey. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Mar 1957. 31p photos, diagrs (1 fold), graphs. Order from LC. Mi $3.00, ph $6.30.
PB 134879

This report lists the technical characteristics of an HF antenna multicoupler developed by RADC for the USAF Security Service. The multicoupler provides for the connection of either five receivers each to two antenna systems or ten receivers to a single antenna system. The multicoupler provides a gain of 3 db $\pm$ 3 db throughout the pass band of 2 mc to 32 mc and furnishes an isolation between receivers in excess of 60 db. AD 114218. Project 4700. AF RADC TR 57-4.

High-frequency diffraction of electromagnetic waves by a circular aperture in an infinite plane conducting screen, by S.R. Seshadri and Tai Tsun Wu. Harvard University. Cruft Laboratory, Cambridge, Mass. Mar 1958. 27p diagr, graph, table. Order from LC. Mi $2.70, ph $4.80.
PB 134492

1. Waves, Electromagnetic - Diffraction - Theory
2. Contract AF 19(604)-786 3. HUCL SR 16
4. AF CRC TN 58-138

Image line coupler, by B.S. Packer and D.J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1957. 35p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30.
PB 134729

At about 20 K.M.C. and higher frequencies the dimensional tolerances of metal waveguide and the various components associated with it become quite critical. Furthermore as the dimensions decrease in size, resistive losses increase. Metals with high conductivity, such as silver, must be used. If, however, we use dielectric guide, we have an economical and easily manufactured means for guiding electromagnetic energy. Contract N7 onr, Report 67. UC IER Series 60, Issue 188.

Industrial preparedness study on silicon microwave diodes. First quarterly progress report, by H.I. Ellowitz. Microwave Associates, Inc., Burlington, Mass. Oct 1957. 30p fold drawing, diagr. Order from LC. Mi $3.00, ph $6.30.
PB 134921

The design and production engineering tasks required to achieve the 1N53B, an improved K_a-band microwave mixer diode, are outlined and discussed. Initial emphasis is centered in the basic study of the RF impedance characteristics of the whisker-silicon contact and in the feasibility study of an overall noise figure test equipment at 34,860 Mc. Preliminary results of the experimental work involving a substitution of graphite for silicon in the RF design study phase are reported and the additional work to be done in this area is discussed. Contract DA 36-039-sc-75933.

Industrial preparedness study, quartz crystal units CR-(XM-6)/U. Final report, by J.D. Shepherd and H. Perry. Wright Electronics, Inc., Kansas City, Mo. n.d. 21p photos, tables. Order from LC. Mi $2.70, ph $4.80.
PB 134855

Date is Dec 1950 or later. 1. Crystals, Quartz - Manufacture 2. Crystals, Quartz - Lapping 3. Contract DA 36-039-sc-70277

"Instantaneous" microwave polarimeter technique, by P.J. Allen and R.D. Tompkins. U.S. Naval Research Laboratory. Sep 1958. 12p photos, diagrs, graphs. Order from OTS. 50 cents.
PB 151111

Used as a precision dual balanced mixer with circular waveguide input, the trimode turnstile waveguide junction is the key to a simple microwave polarimeter technique which permits instantaneous viewing of input polarization. In certain applica-

tions, a variation of the method permits direct i-f recording of the polarization information. Instrument errors and ways to minimize these are discussed. The polarimeter technique has application in microwave communication, radar, countermeasures, radio astronomy, antenna studies, and in laboratory measurements of polarization. NRL R 5214.

Investigation of atmospheric radio noise. Final report under Contract AF 19(604)-876, by T. S. George. Florida. University. College of Engineering. Engineering and Industrial Experiment Station, Gainesville, Fla. Nov 1957. 129p photos, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 134488

The effect of atmospheric noise was evaluated on three common communication systems: radioteletype, radiotelegraph, and radiotelephone. It was found that in all systems, the letter errors had an approximately logarithmic-normal distribution and that communication errors could be predicted in terms of the statistical parameters. AD 133768. AF CRC TR 57-362.

Investigation of emissive materials for electron tubes, by Charles Bardsley and Frederick T. Hill. Raytheon Manufacturing C., Newton, Mass. Apr 1958. 54p tables. Order from LC. Mi $3.60, ph $9.30. PB 134953

An experimental program of investigation of the effect of variable parameters at the exhaust step of vacuum tube fabrication, upon thermionic emission qualities of radio tubes and upon the components parts of radio tubes has been performed. A laboratory tool for evaluation of sublimation from different nickel alloy cathodes has been developed and is suggested for use in studies of this nature. AD 133738. Contract AF 19(604)-1822, Final report. AF CRC TR 58-123.

Investigation of frequency swept oscillator, by Ellis L. Roney. Sylvania Electric Products, Inc. Electronic Defense Laboratory, Mountain View, Calif. Mar 1956. 56p photo, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134884

The principal advantage of slot antenna-oscillators is their simplicity of circuit and of mechanical construction. They also present possibilities as wide-range tuning systems. Their principal disadvantage, as compared to "lumped-circuit" units, lies in the presence of drag-loops which generally make it impossible for a specific unit to generate certain frequencies. AD 121204. Unclassified 16 Nov 1956. Appendix A describes an impedance calculator; Appendix B diagrams slot antenna characteristics. Contract DA 36-039-sc-71053. EDL M 32.

Investigation of highly dispersive low loss transmission line devices, by Robert A. Rivers. Aircom, Inc., Winthrop, Mass. Oct 1957. 33p photos, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134951

The utilization of ridge guide, ridge trough guide and the helix for dispersive devices has been inverstigated. The cutoff frequency for highly loaded ridge trough guide has been accuractely predicted from the transverse resonance condition. Experimental phase versus frequency data has been taken indicating the feasibility of periodically loaded structures for use in highly dispersive transmission lines. The condition for optimum slope for the phase-frequency curve has been shown. Experimental data is given for phase versus frequency for the Helix, ridge trough guide, and the ridge guide. Data is given for one ridge trough guide structure producint $+2\pi$ phase shift for $\pm 10\%$ frequency shift and having a total bandwidth in excess of 30%. AD 133767. Covers period Feb 1, 1957-Sep 1, 1957. Contract AF 19(604)-2136, Scientific report 4. AF CRC TN 57-954.

Investigation of noise generation in electron tube, by Edward L. Breen. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 44p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134843

Thesis, U.S. Air Force Institute of Technology. GE-58-2. 1. Tubes, Electron - Noise 2. Noise - Generation 3. Generators, Noise

Investigation of the transmission properties of the asymmetric "A" sandwich radome wall, by William Cermin Smith. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 56p photo, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134691

Thesis, U.S. Air Force. Institute of Technology, 1958. 1. Radar - Domes, Double wall 2. Radar - Domes - Electrical properties

Measurement of efficiency of small linearly polarized antennas by reflection coefficients, by Carl F. Arantz, Jr. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 37p photos, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 134694

Thesis, U.S. Air Force. Institute of Technology. GE-58-1. 1. Antennas - Efficiency - Measurement 2. Antennas - Efficiency - Measuring equipment 3. Antennas - Theory

Neutron irradiation of semi-conductors, by W.E. Johnson and K. Lark-Horovitz. Fairchild Engine and Airplane Corp., NEPA Division, Oak Ridge, Tenn. Oct 1949. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 135671

Neutron irradiation of Si, Ge, Se, Te, is discussed in detail, showing its effect on electrical conductance. In the case of silicon, selenium, and cuprous oxide, resistivity is increased by some orders of magnitude, depending on time of irradiation. In the case of irradiation. In the case of germanium, it has been bound that neutron irradiation produces a change from N-type to P-type, and that in the case of P-type germanium the resistivity drops mononotonously as a function of irradiation, and that by prolonged irradiation, changes of two orders of magnitude may be produced. AD 139077. Presented at the classified NEPA Radiation Damage Symposium, Dec 6-8, 1948, Oak Ridge, Tenn.; will appear in "NEPA Radiation Damage Symposium Lectures." NEPA 1178-IER-23.

Noise figure of Phillips tube type EC 56 at 500mc, by C.C. Farlow. Sylvania Electric Products, Inc. Electronic Defense Laboratory, Mountain View, Calif. May 1955. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 134882

The noise figure of the EC56 planar triode (lighthouse type) was found to be approximately 5.9 db when used in a typical grounded grid amplifier at 500 mc. This particular frequency was chosen for the test because of the availability of test equipment and the simplicity of construction of the test amplifier. AD 113746. Contract DA 36-039-sc-31435. EDL M19.

Note on the stabilised pinch, by R.J. Tayler. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Feb 1958. 10p diagrs. Order as AERE T/M 158 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 37 cents. PB 135026

S.O. code 91-3-5-37. 1. Atomic power - Research - Gt. Brit. 2. Plasma - Stability - Gt. Brit. 3. Pinch effect - Gt. Brit. 4. AERE T/M 158

On cascade resistor-transmission line synthesis, by Marian T. Wang. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Mar 1958. 27p diagrs, graph, table. Order from LC. Mi $2.70, ph $4.80. PB 134785

The necessary and sufficient conditions have been obtained for the input function of the system com posed of cascaded resistor-transmission line sections with a short circuit termination. The synthesis procedure is exceedingly straightforward. The application of such circuits for broadband matching is also discussed and illustrated by examples. AD 148727. Project no. 4548, T.O. 45736. Contract AF 30(602)-1790. PIB 578. PIB R 650-58. AF RADC TN 58-131.

On the solar control of the ionospheric absorption of radio waves, by Kenneth Davies. Brown University. Division of Engineering, Providence, R.I. Mar 1958. 19p graph, table. Order from LC. Mi $2.70, ph $4.80. PB 134490

Empirical measurements have shown that the total ionospheric absorption of high frequency radio waves can be divided into two parts: (1) a part which depends on solar zenith angle, (2) a part which is independent of solar zenith angle. AD 152462. Contract AF 19(604)-2066, Scientific report no. 1. AF CRC TN 58-228.

On the use of delay lines as network elements, by L.E. Franks. Stanford University. Stanford Electronics Laboratories, Stanford, Calif. Jul 1957. 131p diagrs, graphs, table. Order from LC. Mi $6.90, ph $21.30. PB 134795

This study concerns the development of analysis and synthesis techniques for networks containing idealized distributed-constant elements in addition to the usual set of lumped-constant elements having parameters, R, L, and C. Analysis procedures are directed toward finding transfer functions for a network containing an arbitrary interconnection of delay lines and lumped elements. A method for transient analysis based on the time-series representation is presented. Contract Nonr 225(24), NR 373-360, Technical report no. 18.

Optimum spacing for waveguide bends and corners in radar transmission line installations, by Leo A. Nadler and Harvey Dorman. U.S. Naval Shipyard, New York. Material Laboratory. Feb 1956. 32p fold graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134917

Bends and corners in RG-52/U, RG-48/U, and RG-69/U waveguide are investigated to determine the practicability of standard rules of combination currently being applied to bends in RG-69/U waveguide. It is found that the standard rules do not apply because of the presence of inherent straight lengths associated with the bends and corners. The presence of inherent straight lengths is further demonstrated for two typical cases in Rg-52/U waveguide. A more general rule is offered which takes into consideration these straight lengths. Lab. project 5315-14C, Final report.

Propagation of the TE_{10} and TE_{20} modes in circularly bent waveguides of rectangular cross section, by K. Kalinovsky, J. Wakabayashi, and D. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1957. 27p photos, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134746

The problem of wave propagation in circularly curved waveguides of rectangular cross-section has received sacttered attention in the literature during the past two decades. If it is adequately solved, the results may be used in calculating the effects of circular bends on wave propagation in rectangular waveguides and thus determining the scattering matrices of these microwave components. This report endeavors to solve the boundary value problem employing a method which also gives an estimate of the maximum possible percent error of the calculated characteristic values. Contract N7 onr 29529, Report 68. UC IER Series 60, Issue 189.

Properties of single synthetic crystals, by D.C. Reynolds, R.E. Marburger, and others. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jan 1955. 31p photos, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134848

The method of growing cadmium sulfide crystals is discussed along with some of their electrical and optical properties such as index of refraction, optical absorption, photoconductivity and rectifying properties. The photovoltaic properties of cadmium sulfide crystals are discussed in more detail and include in addition to a description of the preparation of the cells such properties as quantum yield diffusion length, spectral response and electrical output. AD 74145. Project 4155, Task 70832. AF WADC TR 55-21.

Properties of the Van Atta reflector array, by Eugene D. Sharp. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Apr 1958. 23p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134477

The Van Atta Array is an array in which the elements are interconnected to reradiate received energy back in the direction of arrival. A four-by-four array of sixteen dipoles was constructed and tested. The wide angle reflecting capability of this array was found to be equal to and better than that of a corner reflector. The array, however, is limited to the frequency band, polarization, and directivity of the radiators used in its construction. Echo area patterns are included in this report. AD 148684. Project no.: 4506, Task no.: 45389. AF RADC TR 58-53.

Radar meteorological studies. Final report covering period 1 Jul 1956-30 Jun 1957 under Contract Noas 55-620-d, by H.W. Hiser, W.L. Freseman and F.H. Stephens. Miami. University. Marine Laboratory and Radar Laboratory, Coral Gables, Fla. Jul 1957. 84f photos, diagr, table. Order from LC. Mi $4.80, enl pr $15.30. PB 135643

Several equipment modifications and developments are described, including a stepped video inversion type of iso-echo contour device for the SP-1M radar and a new low-noise preamplifier which has greatly improved the performance of this radar. A listing and discussion of suggested radar parameters, devices, and associated equipment for meteorological use is included. Report 57-16. ML-16349. Contract Noas 55-620-d, Final report.

Radiation and reception of electromagnetic energy from aircraft and guided missiles, by R.L. Tanner. Stanford Research Institute, Menlo Park, Calif. Jan 1958. 22p. Order from LC. Mi $2.70, ph $4.80. PB 133957

The present contract is the third in support of a basic research program. The aim of this program has been to provide the aircraft industry with new or improved measuring techniques, new concepts and increased understanding of radiating systems, and an ever-increasing fund of basic design data. AD 146820. For final report under previous contract see PB 113792. Contract AF 19(604)-1296, Final report. SRI Proj 1197, Final report. AF CRC TR 58-108.

Radiation from ferrite-loaded apertures, by J. Wakabayashi and D.J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1957. 35p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134731

The investigation of radiation from ferrite-loaded rectangular waveguides was initiated by Angelakos and Korman (PB 123945). The results of extended research of such radiators are presented here. Continues research reported in PB 123945. Contract N7 onr 29529, Report 64. UC IER Series 60, Issue 185.

Radiation properties of a spherical ferrite antenna (U), by Orval R. Cruzan. U.S. Ordnance Corps. Diamond Ordnance Fuze Laboratories, Washington, D.C. Oct 1956. 51p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 134430

Formulas for the radiation properties of a spherical ferrite antenna are derived theoretically. The antenna consists of a sphere of ferrite surrounded in an equatorial plane by a thin wire loop, which is driven by a slice voltage-generator. For the ferrite, the permeability K_m and the dielectric constant K_e are assumed to be scalars and, in general, complex. Orthogonal, spherical, vector -wave functions are used to facilitate relating the fields in the ferrite and in free space at the spherical boundary. The formulas given are for input impedance, current distribution, and electric and magnetic field distributions. DOFL project 50350. Project no. TA 3-9101. DA project 506-01-001. DOFL TR 387.

Realization of broadband matching networks for arbitrary impedances, by Bharat K. Kinariwala. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berekeley, Calif. Feb 1957. 103p diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 133536

The general problem of the realization of optimum lossless matching networks for an arbitrary load impedance is investigated. The starting point for this investigation is Fano's work on the theoretical limitations on the tolerance and the bandwidth of match. It is shown how any arbitrary impedance can be matched to a resistive generator by considering examples of several important types of loads. Contract N7 onr-29529, Report no. 59. UC IER Series 60, Issue 176.

Reflection of electromagnetic waves from surfaces of complex shape. II: Theoretical studies, by Ronold King and Tai Tsun Wu. Harvard University. Cruft Laboratory, Cambridge, Mass. Dec 1957. 84p diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 134505

Theoretical research related to the reflection of electromagnetic waves from surfaces of complex shape is discussed critically, primarily in terms of those aspects to which work at Harvard University has contributed. AD 133780. Contract AF 19 (604)-786. AF CRC TN 57-961. HU CL SR 13.

Research investigations on electronic properties of semi-conductors, by B.P. Fabricand and Jurij Maczuk. Pennsylvania. University. Moore School of Electrical Engineering, Philadelphia, Pa. Mar 1957. 68p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 134942

Technical and physical conditions were established for the measurement of lifetime of injected minority carriers and contact injection ratio in n-and p-type single crystals with the use of the Many bridge method and Low's pulse method. Covers period 1 Mar 1954-28 Feb 1957. DA project 3-99-15-022. SC project 152B. Contract DA 36-039-sc-56722, Final report. PEU MSEE 5714.

Research on field-controlled semiconductor devices, by E. Brock Dale, J.R. Schrieffer, and others. Battelle Memorial Institute, Columbus, O. Mar 1956. 32p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 134896

This report contains a summary of the results of experiments on field-controlled semiconductor devices, a theoretical treatment of channel conduction, a section in which the properties of field-controlled semiconductor devices are explained on the basis of channel conduction, surface trapping, and the electrolytic double layer formed at the boundary between germanium and a polar liquid (specifically, nitrobenzene), and finally, an evaluation of the fieldistor as practical device, including a quantitative estimate of its ultimate limitations. AD 96370. Covers period 1 Jan 1955-31 Mar 1956 under Contract AF 33(038)-23704.

Scanning of a planar corrugated surface wave antenna. Microwave Radiation Company, Inc., Gardena, Calif. n.d. 34p photos, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 134504

The work described in the report is concerned with an experimental study of the scanning of the beam of a planar corrugated surface-wave antenna in the plane defined by surface-wave antenna. The scanning is achieved by means of variation of the phase of the line source feeding the antenna. AD 133743. Date is 1953 or later. Report no. 221. Contract AF 19(604)-1150. AF CRC TN 57-789.

Scattering of compressional and shear waves from a cylindrical elastic discontinuity in an isotropic solid, by Richard M. White. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Mar 1957. 174p photos, diagrs, graphs, tables. Order from LC. Mi $8.10, ph $27.30. PB 134916

Expressions are obtained for the distribution-in-angle of the elastic waves scattered when a plane wave is incident on a cylinderical discontinuity in an isotropic solid. Boundary condition equations are derived for the general case of plane compressional or plane-polarized shear waves incident obliquely on a solid rod embedded in a different isotropic elastic solid. From these general equations are derived the boundary condition equations governing the simpler cases of scattering at normal incidence, and scattering from a fluid-filled or an empty bore. Contract Nonr-1866(24), NR 014-903. HU ARL TM 39.

Semiconductor devices research program, by James E. Keister. General Electric Co., Syracuse, N.Y. Jul 1958. 157p photos, diagrs, graphs (part fold), tables (1 fold). Order from OTS. $3.00. PB 151201

Silicon power transistors can be fabricated by diffusing impurities in from the surface to form the base and emitter regions. Transistor structures can be formed using a number of impurities, but gallium and phosphorus were most thoroughly studied. Either sequential or simultaneous diffusion of these impurities may be used. The simultaneous process was adopted for transistor fabrication in pilot experiments. The effects of external variables upon the diffusion process were determined. Suitable emitter, base, and collector contacts can be made using titanium or tungsten support plates and the transistors mounted in a hermetically sealed, welded package of low thermal resistance. The fabrication process, consisting of diffusion, lead attachment, etching, and packaging is described. The characteristics of preliminary laboratory units

and of over twenty production prototype units made by the process which was developed are given. The performance of the units in typical circuits is shown. AD 155719. Project no. 4156. Contract AF 33(600)-31896. AF WADC TR 57-618.

Signal size and detectability on a PPI display, by James Deese. Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. Aug 1954. 18p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134709

In the present experiment the detectability of signals of various sizes presented on an intensity-modulated CRT display was investigated. The size detectability function was investigated at two levels of CRT bias or background luminance. In addition, a technique was devised for measuring the approximate luminance-level on the face of a PPI display by means of direct comparison photometry. Sample luminance curves obtained from this method are presented in the Appendix. AD 53978. Project 7192, Task 71598. Contract AF 33(038)-22642. AF WADC TR 54-166.

Some observations of antenna-beam distortion in trans-horizon propagation, by A.T. Waterman, Jr., N.H. Bryant, and R.E. Miller. Stanford University. Stanford Electronics Laboratory, Stanford, Calif. Feb 1957. 24p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134496

3000-Mc signals from a rotating narrow-beam transmitting antenna have been observed at distances from 92 to 177 miles. The manner in which the received power builds up and falls off as the transmitting beam sweeps past the receiver shows a variety of shapes, instead of merely reflecting the transmitting-antenna pattern, as would be expected on a line-of-sight path. AD 123270. Continues Technical report 8 on Contract Nonr 225(10). Contract DA 36-039-sc-63189. SU ERL TR 461-2.

Some properties of filter helices for traveling-wave tubes, by C.T. Sah and G.A. Loew. Stanford University. Stanford Electronics Laboratories, Stanford, Calif. May 1957. 55p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 134572

This report presents a study of longitudinally and transversely capacitively loaded sheath helix circuits. The analysis given here is primarily designed for application to the external-circuit traveling-wave-tube interaction geometry. However, the results may also be used for approximations of other types of lumped-distributed circuits. Project 191. Contract Nonr 225(24), NR 373-360, Tech. report 15.

Space charge waves in Harris-flow beams, by H.C. Hsieh. Stanford University. Stanford Electronics Laboratories, Stanford, Calif. Jun 1957. 62p diagrs, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 134571

The investigation of space-charge waves in Harris-flow beams was made under the usual assumptions of small signals and non-relativistic velocities. Emphasis was on slow TM waves propagating on an axially symmetric hollow cylindrical beam focused by a radial d-c electric field. Contract Nonr 225 (24), NR 373360, Technical report 16.

Spurious signal generated by "shimming" pulses, by M. Newstein. Technical Research Group, Inc., New York, N.Y. Apr 1958. 29p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134643

In previous discussions of the reclustering experiment we idealized the "shimming" pulses in that we represented each of them by a matrix which rotated each element of the spin spectrum by precisely 180° about the direction of the applied magnetic field, say the x-axis in the rotating coordinate system. The pulses that are actually applied to the spin system differ from the idealized pulses in several respects. The effect of two of these differences is discussed. AD 136602. Contract AF18(600)-1313. AF OSR TN 57-612.

Study of magnetic resonance power source, by Samuel Silver and Elliott C. Levinthal. Levinthal Electronic Products, Inc., Palo Alto, Calif. Nov 1957. 57p diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 135258

The original idea of Professor R.V. Pound of Harvard University and the investigations of Pound and Bloembergen on radiation damping in systems of magnetic dipoles led to the idea that it may be possible to generate very short pulses of microwave energy by applying a pulsed high intensity magnetic field to a sample of magnetized ferrite in the direction normal to the magnetic moment. The results of a study to evaluate the potentialities of the technique and the problems associated with its realization are presented here. The basic principles are reviewed and estimates are made of the powers that may be realized and of the required characteristics of the materials and the magnetic fields. AD 114483. Levinthal report no. 1106. Contract AF 30(635)-2813, Final report. AF RADC TR 57-91.

Study of techniques for increasing facsimile transmission speed, by A.E. Laemmel and S. Deutsch. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Apr 1957. 45p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 134724

A method of improving short-wave facsimile transmission by the automatic removal of multi-path echoes is described, The equalizer operates upon narrow pilot pulses that are added to the transmitted

video signal. The pilot pulses are cancelled before the video signal reaches the receiving facsimile unit. The pilot pulses can also be used to synchronize the receiving facsimile unit drum so that the distortion caused by changes in effective transmission time is minimized. D/A project 3-99-12-002. Signal Corps project 132B. Contract DA 36-039-sc-70179. PIB 499. PIB R 571-57.

Study of the cause and effect of flicker noise in vacuum tubes, by A. van der Ziel. Minnesota. University. Institute of Technology. Electron Tube Research Laboratory, Minneapolis, Minn. Dec 1957. 125p diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 134900

DA project 3-99-13-022. SC project 112B. 8th quarterly report Aug 15-Nov 15, 1957, Final report Sep 15, 1955-Nov 15, 1957 under Contract DA 36-039-sc-70171. 1. Vacuum tubes - Noise 2. Noise - Measurements

Summary of component failure rate and weighting function data and their use in systems preliminary design, by Donald E. Johnston and Duane T. McRuer. Kelsey-Hayes. Control Specialists Division, Inglewood, Calif. Dec 1957. 53p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 135050

This report provides a basis for the assignment of reliability numbers suitable for use in the assessment of the relative reliability of each of several possible system mechanizational solutions. The accuracy of the method is sufficient for the preliminary design stage of system development. To obtain basic component data, a reliability literature search was conducted and a large number of industrial and governmental agencies were visited. The results of this survey are summarized in the form of failure rate tables for electronic, electromechanical, mechanical, and hydraulic components. AD 142120. Project 1365, Task 61928. Contract AF 33(616)-3906. AF WADC TR 57-668.

Surface wave antenna studies. Final report under Contract AF 19(604)-1150. Microwave Radiation Company, Inc., Gardena, Calif. n.d. 73p diagrs. Order from LC. Mi $4.50, ph $12.30. PB 134489

The work performed was concerned with the study of surface-wave transmission lines, feeds for surface-wave transmission lines and the development of a new type of surface wave radiator. The work was, primarily, experimental and a substantial number of new antenna designs were developed on the basis of the results obtained in the program. A family of flush-mount surface wave antennas was developed. Report no. 225. AD 133745. AF CRC TR 57-358.

Survey of the nuclear radiation effects on semiconductor materials and devices, by Bernard Reich and G. Edward Pavlik. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Jun 1957. 18p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 134783

This report discusses some of the presently available information on the effects of radiation (primarily neutron and gamma radiation) on semiconductor materials and devices. Discrepancies in some of the results obtained are indicated, and suggestions are made for further experimentation. Army subtask no. 3-19-06-701. SCEL TM M 1902.

Technique for the cooling design of airborne electronic equipment, by Charles D. Jones. Ohio State University Research Foundation, Columbus, O. Dec 1957. 458p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $69.60. PB 135164

Design data, methods, and principles for cooling of airborne electronic equipment with both gaseous and liquid coolants are presented including application to the redesign of four typical equipments for which design procedures and thermal evaluation of the constructed equipment are shown. The first five sections contain general thermal design principles and thermal classification of electronic equipment. AD 150968. Project 4155, Task 41591. Contract W 33-038-ac-14987. AF WADC TR 57-331.

Theory of an omni-directional radar reflector, by Elmer M. Lipsey. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 36p photo, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134688

This report has demonstrated that a true omni-directional radar reflector can be constructed from artificial dielectrics using the method developed for the construction of the Luneberg Lens. Thesis, U.S. Air Force. Institute of Technology, 1958. GE-58-7.

Theory of the fast-pinched discharge, by J.D. Jukes. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Jan 1958. 16p diagrs, graphs, tables. Order as AERE GP/R 2293 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 50 cents. PB 135019

S.O. code 91-3-5-32. 1. Atomic power - Research - Gt. Brit. 2. Discharges, Electric - Theory - Gt. Brit. 3. AERE GP/R 2293

Transistor blocking oscillators with variable pulse lengths, by S.H. Dinsmore and D.O. Pederson. California. University. Division of Electrical Engineering. Electronics Research Laboratory,

Berkeley, Calif. Jul 1957. 22p photos, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134745

The length of the output pulse of a given transistor blocking oscillator can be electrically varied by as much as 50:1. For low power alloy junction transistors and ferrite cup transformers variations in pulse length from 2 to 100 u sec have been obtained with a variation of the bias voltage. This variation is studied for a blocking oscillator having collector-to-base feedback. Contract N7 onr-29529, Report 69. UC IER Series 60, Issue 190.

200-megacycle transistorized oscillator, by Edward B. Richter. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 53p photos, diagrs, table. Order from LC. Mi $3.60, ph $9.30. PB 134689

A test oscillator was built, using a trial-and-error method of construction, after design attempts using four-pole parameters failed. Measurements were made on this oscillator with three different transistors used as the active element. From a comparison of the power equations and the measurements obtained, it is concluded that some correlation exists between collector capacitance and bias, and the maximum possible power output for any one transistor. Thesis, U.S. Air Force. Institute of Technology, 1958. GE-58-10.

VHF units from synthetic quartz. Union Thermoelectric Corp., Forest Park and Evanston, Ill. Oct 1956. 38p graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 134299

Conclusions are: (1) No peculiarity of synthetic quartz which differentiated it from natural quartz, such as a different rate of stock removal, a different shape produced by the same lapping process, or a different surface finish produced by the same polishing process, was observed. (2) No practically significant difference in the temperature/frequency coefficient of synthetic quartz was found. Contract DA 36-039-sc-71061.

Voltage-frequency linearization of backward-wave oscillators, by Leon Heesacker. Sylvania Electric Products, Inc. Electronic Defense Laboratory, Mountain View, Calif. Aug 1956. 19p diagrs, graphs, Order from LC. Mi $2.40, ph $3.30. PB 134881

This report reviews the general characteristics of linearizers using the switching characteristics of diodes to produce segmented approximations to nonlinear curves. The design considerations and actual performance of a linearizer for the EDL type R1 receiver are discussed. Also included is a brief description of a method for producing smooth curves from these diode linearizers. AD 108570. Contract DA 36-039-sc-71053. EDL-M 88.

Development of a 3-kw gasoline engine generator set, type MC-4, by Robert J. Darby. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Nov 1957. 24p photo, tables. Order from OTS. 75 cents. PB 131693

This report presents the results of an effort initiated by the Rome Air Development Center to produce a compact lightweight 3 KW DC engine generator unit. As a result of this development, a significant advance was made in the lightweighting of power-generation equipment without materially affecting the life or reliability of such equipment. AD 131351. Project 4553, Task 45255. AF RADC TN 57-373.

Feasibility study of high power magnetic modulators, by Sheldon Plotkin. Levinthal Electronic Products, Inc., Palo Alto, Calif. Oct 1956. 29p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 135286

The feasibility of designing and building magnetic modulators of high power is considered. A brief literature survey is included as well as possible circuitry for high power applications. Contemplated problems and a proposed future program are outlined. AD 97986. Contract AF 30(602)-1177. AF RADC TR 56-179.

Magnetic pulsers, by Clarence L. Roberts. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. May 1958. 91p photos, diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 134693

This thesis represents a survey of existing literature on the magnetic pulse generator. It is also a report on the laboratory investigation of the characteristics of a low power magnetic pulser and the possible application of a magnetic-coupled multivibrator as a continuously variable frequency source. It includes a graphical and mathematical analysis of a typical pulse generator circuit which employs the Melville Line (The Melville Line is an L-C series-parallel network which uses the inductor properties of saturable reactors). Thesis, U.S. Air Force. Institute of Technology, 1958. GE-58-11.

Permanent magnet alternators, by William Kober. U.S. Army. Signal Corps Engineering Laboratories. Squier Signal Laboratory, Power Branch, Fort Monmouth, N.J. Sep 1946. 52p diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134791

By use of new principles of design, principally directed toward protecting the permanent magnet field from demagnetizing effects, of which the most

severe is generally a short circuit, it has been possible to greatly increase the efficiency of the magnet material. SCEL ER E 1004.

Photoelectric function generator, by Barbara Silverberg. Columbia University. Dept. of Electrical Engineering, New York, N.Y. Oct 1957. 25p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134952

A photoelectric function generator has been designed and implemented which permits the generation of an electrical signal varying in time proportional to the amplitude of any desired single-valued function. It will be used to generate the antenna beam pattern in the Single Target Search Radar Simulator developed at the Columbia University Electronics Research Laboratories. This and previous methods of function generation are discussed in this paper, and the relative advantages of the present system are described. AD 133755. CU 12-57-AF-1572-EE. Contract AF 19(604)-1572. AF CRC TN 57-798. CUN ERL TR T-6/133.

Process of flux reversal in grain oriented 50% nickel-iron tape cores, by Fritz J. Friedlaender. Carnegie Institute of Technology. Dept. of Electrical Engineering, Pittsburgh, Pa. Aug 1955. 81p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 135170

A model is proposed for engineering purposes, describing the mechanism of flux reversal in certain cores commonly used in magnetic amplifiers and computers. In the process considered a step of magneto-motive force is applied toa core previously brought to saturation in the opposite direction. Experimentation is described which substantiates the model, and critical remarks concerning the approximations used are added. AD 80011. Contract N7 onr 30306, Technical report 21.

Solidified wound capacitors, by Joseph A. Caputo. Emerson & Cuming, Inc., Canton, Mass. May 1958. 111p photos, graphs, tables. Order from OTS. $2.50. PB 151203

A dielectric material composed of Epon 1001, pyromellitic dyanhydride, and 70 percent titanium dioxide has been successfully applied in films of one mil or less upon aluminum foil, yielding dielectric constants of 15 to 19. Flat plate capacitors made from coated aluminum foil were put on life test at 150°C and applied voltages of 105 and 210 volts DC. The samples operated successfully over 1000 hours maintaining capacitance, dissipation factor, and insulation resistance. The highest megohms microfarads product at 150°C was 54. Wound capacitors made from coated aluminum foil with the above dielectric material were subjected to life test conditions of 150°C and applied voltages of 210 volts DC. These operated successfully over 1000 hours, the highest megohms microfarads product being 2.75. This low value is the result of low insulation resistances, in the order of 10^6 to 10^7 ohms at 150°C. Measurements showed an average dielectric constant of 15. AD 155633. Project no. 4155, Task no. 41562. Contract AF 33(616)-3245. AF WADC TR 57-721.

Study of noise in thin film capacitors, by Charles H. Smithpeter. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 46p photos, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134695

GE-58-14. Thesis, U.S. Air Force. Institute of Technology, 1958. 1. Noise - Elimination
2. Capacitors - Noise - Measuring equipment
3. Resistors - Noise - Measuring equipment

Study of self-saturating magnetic amplifiers, by Edward J. Smith. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Contract N6 ori-98(T.O. IV) NR 075-214. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Steady state response of half-wave circuit. Dec 1949. 79p diagrs, graphs. Mi $4.50, ph $12.30. PB 134475

The magnetic properties of the core material are represented by the upper branch of a large hysteresis loop in the region of high saturation, and the d-c magnetization curve in the region of low saturation. In the first region, steady state response is computed by an "idealized" method which considers the effect of lead resistance; in the second region the load current is small, and a "no-load" method is applied. The intermediate region is approximated with a straight line. Overall computed results show good agreement with test results for Hypersil and Orthonik half-wave amplifiers. ATI 155417. For Parts II and III see PB 105123, 134474. PIB R 229-49. PIB 174.

Part III: Influence of control circuit resistance on steady state preformance. Mar 1950. 52p photos, graphs. Mi $3.60, ph $9.30. PB 134474

Under conditions of finite control circuit resistance, the half-wave-amplifier behaves like a combination transformer and saturable reactor with feedback. The net result of decreasing the control circuit resistance is to "flatten out" the transfer curve and increase the minimum value of average load current; the effect is computed by an approximate method. ATI 155908. PIB R 231-50. PIB 176.

Ultra high temperature miniaturized power transformers and inductor materials, vols. 1-2, by Harold B. Harms, and James C. Fraser. General Electric Co., Schenectady, N.Y. May 1958. 452p photos, drawings, diagrs, graphs, tables. Order from OTS. $6.00. PB 151141

Contract objectives called for the development of electronic power transformers capable of operation in a 500°C. ambient temperature and in intense nuclear radiation. Steps to accomplish them involved (1) evaluation of the transformer basic materials alone (2) evaluation of combinations of the basic materials in transformers and (3) the development of ceramic processes and supporting members to give mechanical and moisture protection to the transformers. Tests were performed under combined high temperature and radiation conditions. Mechanical tests were also combined with high temperatures. Results of the materials tests indicated that mica paper, glass served silver wire and grain oriented silicon steel are prominent among materials having adequate properties for use in electronic power transformers in the specified environments for a 1000 hour aging period. Life test results showed that these materials can perform their intended functions when assembled together as transformers. The feasibility of an encapsulated protective technique using a thin ceramic coating in conjunction with a stainless steel mesh was established. AD 155527-155528. Project 4155. Covers period 1 May 1956-31 Aug 1957 under Contract AF 33(616)-3623. AF WADC TR 57-492, Vols. 1-2.

Wide-band amplifiers of high gain-bandwidth-product and improved efficiency, by Thomas R. O'Meara. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. May 1957. 203p photos, diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 134540

It is the purpose of this work to propose the ladder-transformer network as a means of interstage coupling, input coupling, and output coupling of wide-band amplifiers intended to operate with improved efficiencies and/or high power levels. The design technique consists in embedding the high frequency parameters of the wide band transformers as elements in a larger ladder coupling network. Thesis, University of Illinois, 1957. Contract Nonr 1834 (02), NR 371-161, Technical report no. 6.

Miscellaneous

Bibliography of the electrically exploded wire phenomenon. See entry under Bibliography on page 545. PB 133825

Handbook of design and performance of cable connectors for microwave use, by John W.E. Griemsmann. Polytechnic Institute of Brooklyn, Microwave Research Institute, Brooklyn, N.Y. May 1956. 154p drawings, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 120075r

Supersedes NAVSHIPS 900, 136. Revision of PB 120075. 1. Connectors, Electric - Design 2. Contract NObsr-52078. 3. PIB 520-56 4. PIB - 450 5. NAVSHIPS 900, 136A

Silver oxide-zinc alkaline storage batteries: Effect of float and normal charges on capacity and related characteristics, by C.P. Wales. U.S. Naval Research Laboratory. Aug 1958. 36p graphs, tables. Order from OTS. $1.00. PB 131925

Two 100-amp-hour silver oxide-zinc alkaline storage batteries were studied. One was a low-rate battery and the other was a new design with a provision for adding electrolyte to the positive plates whenever they become dry during a charge. NRL R 5167.

FOOD AND KINDRED PRODUCTS

Assessment of the possible toxic effects to human beings of short-term consumption of food sterilized with gamma rays, by Lester M. Levy, Lionel M. Bernstein, Eugene Francis, and others. U.S. Army. Medical Nutrition Laboratory, Fitzsimons Army Hospital, Denver, Colo. Mar 1957. 36p graphs, tables. Order from OTS. $1.00. PB 131727

18 human volunteers consumed for 15 days food exposed to 3 million rep gamma rays and stored frozen until used. For such studies were conducted in which 35%, 60%, 80% and virtually 100% of the calories were supplied by irradiated items of food. Careful clinical and laboratory observations revealed no evidence that these irradiated foods produced any toxic effects in the human beings consuming them. AD 126213. WD MNL R 203.

Nutrient requirements of domestic animals. No. IV: Nutrient requirement of beef cattle, by the Subcommittee on Beef Cattle Nutrition, Wise Burroughs, Chairman. National Academy of Sciences, Washington, D.C. Revised 1958. 37p photos, tables. Order as NRC 579 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.00. PB 135039

1. Cattle - Feeding and nutrition
2. Nutrition - Research
3. NRC 579

FUELS AND LUBRICANTS

Airframe lubricants. Part II: Development of a laboratory technique for determining rust-preventive properties of lubricating greases. Coordinating Research Council, Inc. Airframe Lubricants Group, New York, N.Y. Jul 1958. 51p photo, diagr, graphs, tables. Order from OTS. $1.50. PB 151184

This final report on rust-preventive properties of lubricating greases describes the work of CRC laboratory and service evaluation panels in their objective to develop test techniques for predicting the performance in actual service of airframe and accessory lubricants. A description is included of the three test techniques developed and the reasons for ultimately recommending one of them. AD 155726. Project 3044, Task 73312. Covers work from 15 Jun 1950-11 Jul 1956 under Contract AF 33(616)-2888. AF WADC TR 57-36, Part II. For Part I see PB 131203.

Bibliography of Bureau of Mines investigations of coal and its products 1950-1955, by E. Carman and F. Bayes. U.S. Bur. of Mines. Apr 1958. 140p. Order from U.S. Bur. of Mines, Pub. Office, 4800 Forbes St., Pittsburgh 13, Pa. PB 134915

1. Coal - Bibliography 2. BM IC 7825

Combustion studies in a stirred reactor, by H.C. Hottel, G.C. Williams, and M.L. Baker. Massachusetts Institute of Technology, Cambridge, Mass. Jun 1956. 27p photo, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134998

The studies reported here were made to compare - under conditions of as intense mixing of premixed entering fuel and air with their products of combustion as appeared feasible to attain - the combustion rates of two fuels having different chemical structure but identical molecular weights and atomic compositions and, after adiabatic combustion to equilibrium, all properties identical. Technical report MIT-11-P. Summary of a thesis "Combustion in an intensely stirred reactor" by Marvin L. Baker, Massachusetts Institute of Technology, May 1956. Submitted for presentation at the sixth Combustion Symposium in New Haven, Aug 1956. Contract N6 ori-105, T.O. III, NR 098-038.

Estimate of the particle size required in a settled slurry fuel element, by W.M. Lomer. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 10p. Order as AERE T/M 93 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 37 cents. PB 135025

S.O. code 91-3-5-39. Manuscript: Nov 1953. Declassified Aug 1957. 1. Atomic power - Research - Gt. Brit. 2. Particles - Size - Measurement - Gt. Brit. 3. Slurries, Lead-uranium alloys - Gt. Brit. 4. AERE T/M 93

Friction and wear with reactive gases at temperatures up to 1200°F, by Gordon P. Allen, Donald H. Buckley, and Robert L. Johnson. U.S. National Advisory Committee for Aeronautics. Sep 1958. 26p photos, diagr, graphs. Order as TN 4316 from National Aeronautical & Space Administration, 1520 H St., N.W., Washington 25, D.C. PB 135295

CF_2Cl_2, CF_3Cl, and SF_6 gases were used to lubricate hardened M-1 tool steel and other materials. CF_2Cl_2 was effective up to 1200°F and CF_3Cl, while not as good a lubricant, gave less corrosion. Small amounts of SE_6 added to CF_2Cl_2 improved lubrication. SF_6 alone reduced wear but not friction of tool steel sliding against tool steel. Of the iron, copper, and nickel alloys studied, silicon-nickel alloys gave the best results. With silicon nickel, SF_6 gave both low wear and low friction at 600°F. For steel, corrosion was important with all gases. NACA TN 4316.

Heat capacity determination of mineral and synthetic engine oils, lubricants, fuels, and hydraulic fluids in the temperature range 70°-500°F, by J.W. Barger, T.M. Medved, and C.C. Bolze. Midwest Research Institute, Kansas City, Mo. Jun 1958. 56p photo, graphs, tables. Order from OTS. $1.50. PB 151210

An adiabatic calorimeter for measuring heat capacities of liquids in the temperature range 70° to 500°F was designed and constructed. Experimental technique and methods of calculation were devised to minimize errors. Using these calorimeters, the heat capacities of 32 mineral and synthetic engine oils, lubricants, fuels and hydraulic fluids were measured. The heat capacities were measured at five temperatures spanning the 70° to 500° range. The calculated errors in the final results were 2 to 5 per cent. AD 155630. Project 7360, Covers work from 15 May 1957 to 16 Jan 1958 under Contract AF 33(616)-5269. AF WADC TR 58-70.

Inhibition by hydrogen peroxide of the second explosion limit of the hydrogen-oxygen reaction, by W. Forst and Paul A Giguere. Laval University, Quebec, Canada. Oct 1957. 16p graphs. Order from LC. Mi $2.40, ph $3.30. PB 132978

AD 136705. Chem 40-6. 1. Hydrogen peroxide - Explosive properties - Canada 2. Hydrogen - Reaction with oxygen - Canada 3. Contract AF 18 (600)-492 4. AF OSR TN 57-711

Research on vinylic filler lubricants and greases, by U.F. Nager, A.J. Kizer, and others. Burke Research Co., Van Dyke, Mich. Apr 1957. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 133336

The results of preliminary screening of various types of crosslinked vinylic fillers as thickening agents for available lubricating oils of high thermal stability were presented in Technical Report No. 7T. Additional vinylic fillers were prepared derived from vinyltriethoxysilane and from dichlorodifluoroethylene using divinylbenzene as cross-linking agent. Certain quaternary ammonium-type compounds employed as emulsifiers proved as satisfactory as Duponol ME heretofore used for emulsion polymerization of vinylic fillers. Covers period 1 Jan-31 Mar 1957. For reports 3A and 7T see PB 128205 and 130862. Contract Nonr 2146(00) Technical report no. 10T.

Review of literature concerning gumming and oxidation stability of gasoline. See entry under Bibliography on page 546. PB 132862

Role of surface reactions and lateral interactions in boundary lubrication, by A.V. Fraioli and others. Lehigh University. Institute of Research, Bethlehem, Pa. Jan 1957. 78p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134899

Three different experimental approaches were used. The work done in adsorption, calorimetry, and friction measurements is roughly presented in the chronological order in which it was performed. The overall problem was attacked by attempting to correlate the energetics of film formation, and also the nature of the surface lubricated, with the actual performance of the adsorbed film as a lubricant. AD 119871. D/A project 5B99-01-004. Ord project TB 2-0001. OOR project 1358. Technical report 3. Thesis: A.V. Fraioli, Lehigh University. Covers period 16 Feb-31 Dec 1956 under Contract DA 36-034-ORD-1767.

Shock-tube studies of acetylene decomposition, by W.J. Hooker. California Institute of Technology. Daniel and Florence Guggenheim Jet Propulsion Center, Pasadena, Calif. Apr 1958. 18p photo, graphs. Order from LC. Mi $2.40, ph $3.30. PB 135262

AD 154202. 1. Acetylene - Decomposition 2. Shock tubes - Uses 3. Shock waves - Kinetic reactions 4. Contract AF 18(603)-2, Technical report no. 7

Some fundamental problems of combustion, by Gregorio Millan. Institute Nacional de Tecnica Aeronautica "Esteban Terradas", Madrid, Spain. Jun 1956. 24p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134885

Reports on 18 month's study of premixed laminar flames, diffusion laminar flames and the combustion of droplets. AD 96794. Presented at the conference held in Madrid by the European Office ARDC, 27 Jun 1956. Contract AF 61(514)-734C. AF OSR TN 56-449.

Study of ultra high temperatures: Pure ozone flames, alone and with various fuel gases, by A.V. Grosse and A.G. Streng. Temple University, Philadelphia, Pa. Aug 1957. 108p photos, drawing, diagrs, graphs, tables. Order from OTS. $2.50. PB 131732

This report covers the experience obtained first, to combust pure ozone to oxygen, and, second, pure ozone with various fuel gases, such as hydrogen, cyanogen, methane, carbon monoxide, and ethylene. Static experiments have shown that all of the above gases, with the exception of carbon monoxide and ethylene, can be premixed with pure ozone. After this had been established premixed flames with pure ozone were burned successfully and the burning velocities determined and compared with the corresponding oxygen flames. An Appendix covering a critical review of the physical properties of ozone as well as of ozone-oxygen mixtures, has been prepared. AD 136497. Project 7-7968. For Technical notes 1 - 2 see PB 121074 and 121928. Contract AF 18(600)-1475, Technical note 4. AF OSR TN 57-511.

Thermal properties of aircraft engine lubricants at low temperatures, by V.E. Schrock, R.E. Gott, and E.S. Starkman. California. University. Dept. of Mechanical Engineering, Berkeley, Calif. May 1956. 149p photos, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 135147

Thermal properties of two aircraft engine lubricating oils have been determined in the temperature range between minus 100°F and room temperature. Typical oils were selected, one being a jet engine oil of military specification MIL-O-6081B (grade 1010), the other a reciprocating engine lubricant MIL-O-6082 (grade 80). Properties measured include specific heat, thermal conductivity, density, thermal diffusivity and apparent heat of fusion. AD 103097. Project 3084, Task 70139. Contract AF 33(616)-2116. AF WADC TR 56-104.

HIGHWAYS AND BRIDGES

Continuously reinforced concrete pavement: Full-scale and model tests, by Wayne R. Woolley, R.L. Schiffman, and others. Highway Research Board. 1958. 25p photos, graphs, tables. Order as NRC 548 from National Research Council, 2101 Constitution Ave., N.W., Washington 25, D.C. 60 cents. PB 135041

Presented at the thirty-sixth annual meeting 7-11 Jan 1957. Contents: Design of continuously reinforced concrete pavement, by Wayne R. Woolley. - Preliminary report on continuously reinforced concrete pavement research in Pennsylvania, by R.L. Schiffman, I.J. Taylor, and W.J. Eney. 1. Pavements, Concrete - Construction 2. Pavements, Concrete - Tests 3. HRB BUL 181 4. NRC 548

Analogue computer determination of certain aerodynamic coefficients, by C.H. Murphy. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Apr 1952. 37p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134635

An inportant problem of applied mathematics, especially in exterior ballistics, is that of obtaining the coefficients of the differential equation of motion from discrete measurements of the actual motion. In the field of modern electronic machines, precision analog computers such as the Reeves Electronic Analog Computer (REAC) seems to be quite capable of solving the problem. The REAC itself and a recent investigation of this at present novel use for it is described. The Kelley-McShane equations of yawing motion of free flight missiles were fitted and are derived in the appendix. APG BRL R 807.

Capacitance welding technique for the installation of thermocouples, by C.R. Andrews. Dayton, University, Dayton, O. Aug 1953. 21p photos, diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 134778

This junction is suitable for the measurement of dynamic temperature changes of thin aircraft skin and heavier structural members. This technique may be used to attach thermocouple junctions, capable of withstanding high temperatures, to specimens that will be subjected to high stress levels and dynamic thermal effects. AD 80390. Project 1350. Contract AF 33(616)-6. AF WADC TR 53-289.

Catalog of devices useful in automatic data reduction, by Robert S. Hollitch and Albert K. Hawkes. Armour Research Foundation, Chicago, Ill. First revision. Jul 1956. 191p photos. Order from OTS. $5.00. PB 111928r

The majority of the devices described here are digital in nature, and of these, emphasis has been placed on equipment which performs analog to digital conversion, that is, voltage to digital converters and shaft position encoders, since this class of equipment occupies a leading position in systems for recording data automatically. Also included are digital plotters, printers, digital magnetic tape transports, high capacity memory systems, digital to analog converters, airborne magnetic tape recorders, and certain semiautomatic devices, such as oscillogram and film measuring equipment which produce digital records. Revision of PB 111928. For Part I see PB 111927. Project no. 7060. Armour Research Foundation, Chicago, Ill. Contract AF 33(616)-3131. AF WADC TR 54-519, Part 2, Revised.

Circuitry errors of ladder-type thermocouple-harness assemblies, by Andrew I. Dahl and Ernest F. Fiock. U.S. National Bureau of Standards. Dec 1952. 15p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 135243

The weighting coefficients of the individual junctions of ladder-type networks of three to ten thermocouples are tabulated for the range of thermocouple-to-lead resistance ratios from zero to unity. A method of determining circuitry errors for a given installation in any known temperature distribution pattern is described and a sample calculation presented. AD 5002. Contract AF 33(616)-53-1. AF WADC TR 53-4.

Data reduction for the free flight spark ranges, by C.H. Murphy. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1954. 61p photos, diagrs, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 134638

The data reduction process for the free flight spark ranges is described with emphasis on recent modifications. The most important modification which is that of swerve reduction is treated in some detail. Criteria for quality of results are discussed and a table of time required for present machine data reduction routines is included. D/A project no. 503-03-001. Ord project no. TB 3-0108. APG BRL R 900.

Electron beam density probe for measurements in rarefied gas flows, by F.C. Hurlbut. California. University. Institute of Engineering Research, Berkeley, Calif. Jan 1958. 29p photos, diagrs, graphs. Order from OTS. 75 cents. PB 151204

This instrument utilizes the attenuation of an electron beam. The electron beam in passage through a rarefied gas becomes scattered in a number of elastic and inelastic processes and decays to a fraction of its initial intensity in the distance of a few electron mean free paths. Where the optical aperture of the detector is suitably small, the familiar linear absorption law applies. The mass absorption coefficient in this case is higher and more favorable for work at the lowest test section densities than in other absorption techniques investigated to the present. The instrument was used in an investigation of air flows about a sphere and a wedge, and in the undisturbed stream. Plots of the original and the reduced data show adequate internal consistency and a qualitative conformity with expected configurations. AD 155537. Project no. 5-(1-1363), Task 70124. Contract AF 33(616)-2852. AF WADC TR 57-644.

Electronic control of mechanical printer for telemetric data reduction, by E.D. Heberling. U.S. Naval Ordnance Laboratory, Corona, Calif. Nov 1955. 25p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134537

Electronic circuitry has been developed for controlling a high-speed mechanical printer so that it will print calibration-corrected telemetric data along with a digital plot of function trends. Because of certain limitations of the printer, recommendation is made that the electronic techniques developed for this printer be applied for the control of a multistyli type of printer. Ord project order no. 45406. BuAer project order no. 40704-55. NOLC R 296.

Evaluation of the electrical thickness gauge, by Anthony R. Durante. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 48p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134839

Fabricating a radome of constant electrical thickness and constant relative dielectric constant throughout the walls is a tedious and time consuming process. To fill an urgent need for a method of calibrating these parameters for quality control at the production line, an instrument known as the electrical thickness gauge has been developed. The theoretical development, operating procedure, measurement procedure, and evaluation of this instrument are described in detail. Thesis, U.S. Air Force Institute of Technology. GE-58-6.

Evaluation of the Umkehr effect by means of a digital electronic computer, by Hans U. Dütsch. Lichtklimatisches Observatorium, Arosa - Graubunden, Switzerland. Aug 1957. 37p diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134507

For this purpose the in reality non linear problem of computing the distribution of the atmospheric ozone into nine layers has been linearized with the help of tables which give the influence of ozone changes in a single layer on the Umkehr curve. These tables and a theoretical Umkehr curve belonging to a standard ozone distribution were calculated by an electronic computor. AD 133807. Contract AF 61(514)-905, Scientific report no. 1. AF CRC TN 57-233.

Fast neutron scintillation spectrometer, by Harry I. Axelrod. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 43p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134841

A fast neutron scintillation spectrometer consisting of a $Li^6I(Eu)$ phosphor, photomultiplier tube, and associated amplification, pulse analyzing, and counting equipment is constructed. The Li^6 enrichment and the thickness of the crystal is determined by a theoretical consideration of neutron-to-gamma sensitivity. Thesis, U.S. Air Force. Institute of Technology. GNE-58-2.

43 ton per day liquid oxygen generator. Design study, by C.Z. Howell, W.C. Meyer, and L.P. Seifert. Air Products, Inc., Emmaus, Pa. Sep 1956. 111p diagrs (part fold), graphs. Order from LC. Mi $6.00, ph $18.30. PB 134906

AD 97332 Project 6134. 1. Oxygen, Liquid - Production - Plants 2. Oxygen, Liquid - Production - Apparatus 3. Contract AF 33(616)-478 4. AF WADC TR 54-360

Free air insulator with a resistance of more than 10^{14} ohms for all climates. (A contribution to the atmospheric electrical measuring technique), by H. Dolezalek. Germany. Wetterdienst. Meteorologisches Observatorium, Aachen, Ger. Jan 1956. 14p diagrs. Order from LC. 14p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 133810

The support of the sensitive devices (antennas) for measurements of the basic atmospheric electrical elements requires insulators securing the maintenance of at least 10^{14} ohms for all weather conditions in the free atmosphere. This paper deals with some of these insulators. AD 110265. Contract AF 61 (514)-640, Technical note no. 5. AF CRC TN 57-253.

Full radiation pyrometer suitable for temperature measurements in the range 0^{o} to $100^{o}C$, by M.G. Davies and H. Kronberger. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berskshire, England. 1958. 6p drawings, diagrs. Order as AERE GP/R 2 72 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 28 cents. PB 135020

S.O. code 91-3-5-33. Manuscript dated 31 Sep 1951. Declassified version of AERE G/R 783. 1. Atomic power - Research - Gt. Brit. 2. Pyrometers, Radiation - Design - Gt. Brit. 3. AERE GP/R 2372

Gas-recoil fast neutron spectrometer, by R.E. Benenson. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1958. 37p diagrs, graphs, tables. Order from OTS. $1.00. PB 151187

A gas-recoil fast neutron spectrometer based on the collimation scheme of R. Giles has been constructed and its behavior analyzed. The principal effort has been directed to improving peak-to-valley ratio of the instrument. Electron capture has been minimized and anticoincidence end-effect counters incorporated in the present design. A graphical analysis has been made of the collimation scheme and the results predicted by the analysis compared with experiment. AD 155673. Project 7112. AF WADC TR 57-415.

Hydraulic actuator rod seal for high temperature operation, by R.B. Resek. Parker Appliance Company, Cleveland, O. Jun 1956. 33p photos, drawings (1 fold), diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 135219

A rod seal was required for hydraulic actuators which would operate with fluid and ambient temperature as high as 700°F. A test actuator and test stand were designed and built for testing sample seals from -65°F to 400°F (limited to 400°F by temperature limitations of fluids available at the time this program was initiated). Both static and cycling tests were run with metallic foil seals, tubular metal seals, and several types of asbestos seals. AD 97258. Project 1371, Task 13495. Contract AF 33(600)-29703. AF WADC TR 56-268.

Influence of gradient temperature fields on thermocouple measurements. Final report, part III, under Contract AF 18(600)-969, by Neil R. Johnson, Alvin S. Weinstein, and Fletcher Osterle. Carnegie Institute of Technology. Dept. of Mechanical Engineering, Pittsburgh, Pa. Sep 1957. 32p drawing, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 132585

1. Thermocouples - Calibration 2. Thermocouples - Thermal Conductivity 3. AF CRC TN 57-231 AD 133830. For Parts I and II see PB 125594 and PB 126701.

Nonlinear control systems research project, by W.H. Surber, H.M. Chandler and others. Princeton University. Dept. of Electrical Engineering, Princeton, N.J. Dec 1954. 121p diagrs, graphs. Order from LC. Mi $6.30, ph $19.80. PB 134897

Thesis of Richard C. Willmott and Daniel R. Scally submitted to Princeton University. Contents: Part I: A nonlinear compensating configuration for saturating servomechanisms, by Richard C. Willmott. - Part II: Performance of positional servomechanisms using two-phase induction motors, by Daniel R. Scally. 1. Servomechanisms - Design 2. Servomechanisms - Mechanical analysis 3. Motors, Induction - Control 4. Contract AF 33(038)-22614, Termination report

Optimum theodolite choice, Eglin Field range 70, by Herbert A. Meyer. Florida. University. Statistical Laboratory, Gainesville, Fla. Mar 1957. 71p tables. Order from LC. Mi $4.50, ph $12.30. PB 134478

Using the geometry of Eglin Field range 70 and points on certain missile trajectories the combinations of sets of three stations to be used for most efficient tracking were determined. Azimuth and elevation angles subtended at the theodolite stations by each of the chosen trajectory points were determined. AD 128002. Contract AF 08(616)-36, Project no. 5411, T.O. 4. AF AC TR 57-36.

Outlet valve leakage tester, photoelectric, MIT-E1, by Davis W. Beaumont. Massachusetts Institute of Technology. Chemical Warfare Service Development Laboratory, Cambridge, Mass. Oct. 1945. 95p photos, diagrs (1 fold), graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 134137

Unclassified 13 Mar 1954. Project E7a-3-MIT Job 27. 1. Respirators - Valves - Leakage 2. Respirators - Testing equipment 3. MIT MR 204.

Probe type high range gamma radiac, by G.T. Kiyoi, K. Miller, and others. U.S. Naval Radiological Defense Laboratory, San Francisco, Calif. Apr 1957. 46p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134524

An ionization chamber instrument was designed to measure high range gamma field primarily in the vicinity of nuclear reactors used for propulsion of vessels and aircraft. Unusual features of the device included: (1) the probe extensions consisting of a rigid section and a flex section, permitting location of the detector up to 33 inches from the instrument housing, and (2) the all transistor power supplies. The switch selected ranges available are 0 - 5 r/hr, 0 - 50 r/hr and 0 - 500 r/hr. Overall accuracy of the device, including detector energy and directional dependence, is better than ±20 percent over the energy range from .08 Mev to 2 Mev when referred to the true value of radiation intensity. USNRDL TR 156.

Pulse simulator for the study of flash burns, by George D. Zuidema and Neville P. Clarke. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. 10p diagr. Order from OTS. 50 cents. PB 151222

A technique is presented which modifies the beam of radiant energy from a carbon arc source. A rotating wheel, bearing a series of 22 screen filters, is interposed in the beam, and in one complete revolution simulates the pulse of thermal radiation emanating from an atomic or thermonuclear explosion. Project 6331; Task 63352. AD 155621. AF WADC TN 58-85.

Radiac dosage alarm, by E.J. Wesley, R.L. Hopton, and F.A. Rhoads. U.S. Naval Radiological Defense Laboratory, San Francisco, Calif. Oct 1957. 21p diagrs (1 fold), table. Order from LC. Mi $2.70, ph $4.80. PB 135289

A single instrument, the recycling alarm dosimeter, is proposed for the normal dose and doserate evaluation requirements of a work party entering a radiologically contaminated area. The discussion includes the capabilities and limitations of the recycling dosimeter as a measuring system and a specific

review of a hybrid transistor-tube circuit for a field radiac instrument. The instrument discussed has a digital register and is capable of integrating and displaying 1000 Roentgens in steps of 0.1 Roentgen for doserates from 0.1 Roentgens per hour to beyond 500 Roentgens per hour. In addition, a plug connection is provided for operation of the unit as the sensing element of a remote monitoring station to doserates of 10,000 Roentgens per hour. NE 051-551. Technical objective AW-5a. USNRDL TR 191.

Rotary regenerative type heat exchanger for two-ton per day liquid-oxygen generating plant. Power Generators, Inc., Trenton, N.J. Contract AF 33(600)-27524. Project 6161, Task 60231. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Preliminary design study, by J.E. Herz and A.Z. Frangos. Oct 1954. 47p diagrs, graphs (1 fold), tables. Mi $3.30, ph $7.80. PB 134905

AD 49785. 1. Heat exchangers - Design 2. Oxygen, Liquid - Production - Apparatus 3. AF WADC TR 54-483, Part 1

Part II: Detailed design study, by A.Z. Frangos, R.D. Sample, and J.E. Herz. Jul 1955. 72p diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 134904

AD 98214. 1. Heat exchangers - Design 2. Oxygen, Liquid - Production - Apparatus 3. AF WADC TR 54-483, Part 2

Part III: Design study tests, by E.K. Dabora, R.S. Lynch, and H.O. Nilsson. Nov 1955. 97p photos, diagrs, graphs, tables. Mi $5.40, ph $15.30. PB 134903

AD 97536. 1. Heat exchangers - Design 2. Oxygen, Liquid - Production - Apparatus 3. AF WADC TR 54-483, Part 3

Sensitive BF_3 ionization chamber, by E.V. Haake. Fairchild Engine and Airplane Corp., NEPA Division, Oak Ridge, Tenn. Apr 1951. 14p drawing, graphs. Order from LC. Mi $2.40, ph $3.30. PB 135679

The report describes briefly the construction and operating characteristics of a sensitive BF_3 ionization chamber developed at NEPA for detection and measurement of low thermal neutron fluxes. AD 149840. NEPA 1742.

Sensitive differential capacitor micrometer, by R. N. Work. Princeton University. Plastics Laboratory, Princeton, N.J. Apr 1955. 10p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 136285

A differential capacitor micrometer is described which has sufficient sensitivity to indicate displacement of the order of one-tenth micro-inch. Either positive, or negative displacements from a null position are indicated by a voltmeter connected to the output of a relatively simple electronic indicator circuit. A small adjustment is incorporated in the detector to minimize drift errors. PU PL TR 37 A.

Simple electrometer employing an electrified, nonconducting fiber, by Bernard Vonnegut and Donald A. McCaig. Little, Arthur D., Inc., Cambridge, Mass. Feb 1957. 25p photos, drawings, diagrs, graphs. Order from OTS. 75 cents. PB 131731

A simple, rugged, and symmetrical electrometer has been devised which employs a nonconducting, elastic fiber that has been electrically charged. The fiber is fastened at one end and mounted between two parallel conducting plates across which the potential to be measured is applied. Electrometers can be constructed having full-scale sensitivities ranging from several thousand volts to a volt or less. The response of the instrument is very nearly linear with voltage. The sensitivity decreases at a rate of the order of 1% or less per day because of charge leakage from the fiber. Contract Nonr-1684(00).

Study of calibration devices for wind measuring equipment. See entry under Bibliography on page 546. PB 133599

Temp-tapes: Improved design, construction, and calibration, by Alphonso Ambrosio and Bertram Bussell. California. University. Dept. of Engineering, Los Angeles, Calif. Jul 1953. 36p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134779

A remote maximum temperature measuring device, was redesigned, in a tape 3/4 by 1-3/4 inches containing 18 different eutectics or pure metals, 0.1 inches on a side. Temperature indications are obtained from the physical distortions appearing as changes in surface texture, rounding of edges and corners, and complete changes in shape. The temperature range is 117°F to 520°F. An accuracy of 10°F is obtainable over a large part of the range. AD 27589. Contract AF 33(616)-293. AF WADC TR 53-211.

Theory of oscillating type viscometers. V: Disk oscillating between fixed plates, by G.F. Newell. Brown University. Division of engineering, Providence, R.I. Oct 1957. 25p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 132589

A disk oscillating between two fixed plates is considered as an instrument for absolute measurements of viscosity. The existing theories relating the

viscosity to the decrement of oscillation are improved by calculating the effects of the edge. This is done by assuming that the separation between the plates is small compared with both the radius of the disk and the boundary layer thickness. A comparison is made with the experimental data of Kestin and Pilarczyk for which the present theory is estimated to be correct to 0.1%. AD 136610. AF 891/10. For Parts 1 and 4 see PB 124968 and PB 132134. Contract AF 18(600)-1548, Technical report no. 10. AF OSR TN 57-621.

Two-variable function generation for analog flight simulation, by David D. Young. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 114p photo, diagrs, graphs. Order from LC. Mi $6.00, ph $18.30. PB 134690

Thesis, U.S. Air Force. Institute of Technology, 1958. GE-18. 1. Simulators, Flight - Design 2. Computers, Analog - Research.

X-ray diffractometer attachment for maintaining various sample temperatures, by J.J. DeMarco and D.R. Chipman. U.S. Arsenal, Watertown, Mass. Materials Research Laboratory. Jun 1957. 8p photos, graphs. Order from LC. Mi $1.80, ph $1.80. PB 132091

OOTB 4-911. DA 593-26-006. 1. Diffractometers, X-ray - Design 2. Diffractometers, X-ray - Uses 3. WAL MRL 30.

LUMBER AND WOOD PRODUCTS

Study of protection against decay and termites in residental construction. Edited by Robert M. Dillon. Building Research Advisory Board. Feb 1958. 38p diagr. Order as 1958 Addendum to NRC 448 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $1.50. PB 124959s

Addendum to NRC 448 (PB 124959). Conducted by the Building Research Advisory Board for the Federal Housing Administration under Contract HA-fh-743, Amendment 1. 1. Wood - Deterioration 2. Wood - Insect proofing 3. Wood - Preservation 4. NRC 448. Addendum, 1958

MACHINERY

Evaluation of sound power and other noise characteristics of a 5 hp motor (AIEE test program), by A. Simowitz. U.S. Naval Shipyard, New York. Material Laboratory. Nov 1956. 19p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134920

The Material Laboratory, as one of several participating activities in the AIEE noise test program, was requested to determine the following principal noise characteristics of a 5 HP motor: a. Overall and octave band sound power levels. b. Directivity factor at location of maximum noise intensity. Lab. project 5280-22, Final report. NS 713-210.

Industrial preparedness measure: Improved method of gun drilling major and minor gun components; progress in the application of carbide tipped gun drills, by Millard T. Douglas. U.S. Arsenal, Watervliet, N.Y. Oct 1955. 43p photos, drawings, diagrs, graph, tables. Order from OTS. $1.25. PB 131644

Report of results of experimental and production tests in gun drilling high physical steel, using carbide tipped drills. The information consists of operational data (feeds and speeds), types of machines used, operational setups, photos, detailed sketches, and comparison charts. AD 120864.

Relation between turing machines and actual computing machines, by J. Barkley Rosser. Cornell University, Ithaca, N.Y. Oct 1957. 3p. Order from LC. Mi $1.80, ph $1.80. PB 134543

Theoretical studies of computing machinery are usually based on an idealized type of machine, known as a Turing machine. On the basis of a comparison of Turing machines with actual machines, it is concluded that this sort of theoretical study is justified. AD 136615. Project no. R 354-10-37. Report no. 71. Summary of a talk given at the Summer Institute in Symbolic Logic at Cornell University, Jul 9, 1957. Contract AF 18(600)-685. AF OSR TN 57-630.

Static strength of pressure fed gas journal bearings: Porous bearings, by C.H. Robinson and F. Sterry. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Dec 1957. 67p photo, diagrs, graphs, tables. Order as AERE ED/R 1627 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.88. PB 135017

S.O. code 91-3-5-26. 1. Atomic power - Research - Gt. Brit. 2. Bearings, Journal - Design - Gt. Brit. 3. AERE ED/R 1672.

Two (2) fuel transfer kits - 225 GPM, Marlow model 312 HACK. Bell and Gassett Co. Marlow Pumps Division, Ridgewood, N.J. May 1957. 16p photos, fold drawing, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 134748

AD 133097. 1. Fuel servicing equipment

2. Petroleum - Distribution equipment
3. Contract DA 19-129-qm-790

MATHEMATICS AND STATISTICAL ANALYSIS

Admissibility for estimation with quadratic loss, by Samuel Karlin. Stanford University. Dept. of Statistics, Stanford, Calif. Apr 1957. 51p. Order from LC. Mi $3.60, ph $9.30. PB 133543

In dealing with estimation of a single unknown parameter, the criteria most commonly employed in evaluating the worth of given estimates is to make comparisons of the expected square deviation of the estimates from the true value. Contract Nonr 225(21), NR 042-993. SU DS TR 13.

Analytical studies of thermal stresses in media possessing temperature-dependent viscoelastic properties, by Harry H. Hilton, Hassan A. Hassan, and Hal G. Russell. Illinois. University, Urbana, Ill. Sep 1953. 91p diagrs, graphs. Order from LC. Mi $5.40, ph $15.30. PB 135150

The problem of thermal stresses in thick-walled and thin-walled cylinders and circular plates is analyzed for bodies with temperature-dependent viscoelastic properties of the Kelvin, Maxwell, and standard linear solid type. Alfrey's elastic-viscoelastic analogy is extended to cover viscoelastic thermal stress problems with temperature dependent material properties. AD 27590. Contract AF 33(616)-291. AF WADC TR 53-322.

Approximation by bounded analytic functions, by J.L. Walsh. Harvard University, Cambridge, Mass. Dec 1957. 85p. Order from LC. Mi $4.80, ph $13.80. PB 134862

AD 148127. 1. Mathematical functions 2. Approximate computations 3. Contract AF 18(600)-1461 4. AF OSR TN 58-79

Boltzmann equations, by G.E. Uhlenbeck. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Aug 1957. 23p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134667

It is known that practically all processes in nature have a definite tendency to go on an equilibrium state (or state of maximum entropy), and the problem is to describe this approach from the molecular point of view, assuming that structure of the molecules and the laws of their interaction is known. Two lectures delivered at the Seminar of Applied Mathematics arranged by the American Mathematical Society and the Univeristy of Colorado at Boulder, Colo., 23 Jun-19 Jul 1957. Contract Nonr 1224(15).

Class of limited theorems, by Mark Kac. Cornell University. Dept. of Mathematics, Ithaca, N.Y. Apr 1956. 22p. Order from LC. Mi $2.70, ph $4.80. PB 134671

AD 86313. Report no. 47. Project R-354-10-37. Parts of this report may not reproduce well.
1. Mathematical equations and solutions
2. Limit control - Theory 3. Contract AF 18(600)-685 4. AF OSR TN 56-153

Commutators on a Hilbert space, by C.R. Putman. Purdue University. Dept. of Mathematics, Lafayette, Ind. Contract AF 18(603)-139. Order separate parts described below from LC, giving PB number of each part ordered.

Technical note no. 5: On the numerical ranges of commutators. May 1958. 7p. Mi $1.80, ph $1.80. PB 135085

AD 152053. 1. Hilbert space (Mathematics) 2. Mathematical research 3. AF OSR TN 58-115 4. PUR PRF 1421

Technical note no. 6: Commutators and normal operators. May 1958. 5p. Mi $1.80, ph $1.80. PB 135086

AD 152024. 1. Hilbert space (Mathematics) 2. Mathematical research 3. AF OSR TN 58-116 4. PUR PRF 1421

Conservation equations for independent coexistent continua for multicomponent reacting gas mixtures, by W. Nachbar, F. Williams, and S.S. Penner. Lockheed Aircraft Corporation. Missile Systems Division, Palo Alto, Calif. Mar 1957. 23p. Order from LC. Mi $2.70, ph $4.80. PB 134669

AD 97074. LMSD 2082. 1. Mathematical equations and solutions 2. Gases - Mixing - Theory 3. Contract AF 18(603)-146 4. AF OSR TN 56-458

Discrimination learning in a verbal conditioning situation, by Juliet Popper and Richard C. Atkinson. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1957. 17p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 134733

This study deals with an analysis of discrimination learning in a modified verbal conditioning situation. Two stimuli, designed T_1 and T_2, are employed, and two responses A_1 and A_2 are available to the subject. The primary aim of the study is to evaluate the adequacy of the Burke and Estes Component Model for stimulus Variables in Discrimination Learning in the type of experimental situation de-

scribed above. Contract Nonr-225(17), NR 171-034, Technical report 10. SU AMSL TR 10.

Experiments with mixtures, by Henry Scheffé. California. University. Statistical Laboratory, Berkeley, Calif. Jul 1957. 30p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134719

Experiments were made with mixtures, of which the property studied depends on the proportions of the components present, but not on the amount of the mixture. Examples are the tensile strength of an alloy of different metals, the wear-resistance, suitably defined, of a mixture of different kinds of rubber, and the octane rating of a blend of different gasoline stocks. Contract Nonr-222(43), Technical report 4.

Extension of Michell's theorem to problems of plasticity and creep, by Bernard Budiansky. Harvard University. Division of Engineering and Applied Physics, Cambridge, Mass. Jul 1957. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134664

It is shown in this paper that the same independence of the elastic value of Poisson's ratio holds under the same conditions even when plastic flow and creep occur. Contract Nonr 1866(02), Technical report no. 1.

Extraction of roots by repeated subtractions for digital computers, by Iwao Sugai. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Feb 1958. 26p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134512

Extraction of roots of any real number is obtained as the result of repetitive subtractions. This method is applicable for a large number of digit places, so far as computers can handle them by multiple-precision arithmetic. As a guide for the general n-th order extraction of roots, the program and coding are given for the cube root. AD 154221. Task 47501. Contract AF 18(600)-1505. PIB 568. PIB R 640-57. AF OSR TN 58-317.

Ferromagnetic dynamical equation, by Herbert B. Callen. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Jun 1957. 38p diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 134950

Based on general considerations concerning the dissipative mechanism, a general ferromagnetic dynamical equation is proposed. This equation contains three parameters, which have definite quantum-mechanical significance. A simple theory for one such parameter is given, and an explicit rotational dynamical equation is obtained in the special case in which the spin-wave transitions dominate the dissipative process. Contract Nonr-698(00), Technical report 10.

Formal analysis of normative systems, by Alan Ross Anderson. Yale University. Interation Laboratory, New Haven, Conn. Nov 1956. 103p tables. Order from LC. Mi $5.70, ph $16.80. PB 134666

AD 116654. 1. Logic (Mathematics)
2. Contract Nonr 609(16), Technical report no. 2

Generalization of a lemma of G.F. Rose, by L.L. Gal, J.B. Rosser, and D. Scott. Cornell University, Ithaca, N.Y. n.d. 3p. Order from LC. Mi $1.80, ph $1.80. PB 134889

Date is 1953 or later. 1. Calculus
2. Contract Nonr - 401(20), NR 043-167

Investigations in the mathematical theory of vibrations of anisotropic bodies, by R.D. Mindlin. Columbia University. Dept. of Civil Engineering, New York, N.Y. Mar 1953. 76p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134893

The purpose of this contract was to support an effort to advance the mathematical theory of the vibrations of crystals. During the year in which the contract was in effect, four advances were made in the theory of thickness-shear and flexural vibrations of plates. DA project 3-99-11-002. SC project 33-142B. CU 4-53-SC-15481-CE. Covers period 1 Mar 1952-28 Feb 1953. Contract DA 36-039-sc-15481, Final report.

Lotockii (or Lotosky) method for evaluation of series, by Ralph Palmer Agrew. Cornell University. Dept. of Mathematics, Ithaca, N.Y. Jun 1956. 38p. Order from LC. Mi $3.00, ph $6.30. PB 134670

A.V. Lotockii (On a linear transformation of sequences and series. In Russian. Ivanov. Gos. Ped. Inst. Uc. Zap. Fiz. - Mat. Nauki, Vol. 4 (1953) pp 61-91) has introduced a triangular matrix method for evaluation of series. This method seems to be new and to have fundamental significance which may make it rival in importance the classic methods of Cesàro, Abel, Euler-Knopp, Borel, and others. Numerous properties of this method are obtained, and it is found to be exceptionally effective. AD 90009. Report no. 50. Project no. R 354-10-37. Contract AF 18(600)-685. AF OSR TN 56-297.

Many-valued logics, by J. Barkley Rosser. Cornell University, Ithaca, N.Y. Oct 1957. 4p. Order from LC. Mi $1.80, ph $1.80. PB 134542

AD 136614. Report no. 70. Project no. R 354-10-37. Summary of a talk given at the Logic Institute on July 2, 1957. 1. Logic (Mathematics) 2. Contract AF 18(600)-685 3. AF OSR TN 57-629

Mathematics for digital computers. Vol. I: Multivariate interpolation, by William Edmund Milne Wendell Arntzen, Nan Reynolds, and James Wheelock. Oregon State College, Corvallis, Ore. Feb 1958. 117p diagrs, tables. Order from OTS. $2.50. PB 151200

The subject of multivariate interpolation, with attention to its use in connection with modern stored program digital computers, is presented in this report. The discussion is primarily limited to the case of polynomial interpolation, although brief mention is made of trigonometric interpolation. Univariate interpolation is briefly introduced and then bivariate interpolation is discussed in detail. A selection bibliography of 352 references appears at the end of the report. AD 131033. Project no. 7-7062; Task no. 70924. Contract AF 33(616)-3216. AF WADC TR 57-556, Part 1.

Model for logarithmic dependence of transmission of infrared windows, by Donald A. Melnick. Operations Research Inc., Silver Spring, Md. May 1958. 38p graphs. Order from LC. Mi $3.00, ph $6.30. PB 134957

The logarithmic factor of Elder and Strong, in the transmission of the "windows" between infrared water absorption bands, is explained (1) by suggesting that it is proportional to the width of the windows, (2) by showing that this implies an exponential dependence of the absorption constant on wave length, and (3) by demonstrating that this exponential dependence is essentially due to the Boltzmann factor which determines the intensity of the rotational fine structure of the vibrational lines. Technical report 49. Contract AF 19(604)-1422, Scientific report 5. AF CRC TN 58-277.

Multiplier transformations on $l^{2,\alpha}$, by A Devinatz and I.I. Hirschman, Jr. Washington University. Dept. of Mathematics, St. Louis, Mo. n.d. 22p. Order from LC. Mi $2.70, ph $4.80. PB 134648

Date is 1957 or later. AD 152210. 1. Transformations (Mathematics) 2. Mathematical function 3. Contract AF 18(600)-568 4. AF OSR TN 58-77

Multi-ring plates: a step function approach, by Patrick M. Quinlan. Ireland. National University. University College, Cork, Ireland. Jan 1958. 29p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 134277

By introducing suitable functions a single, discontinuous, differential equation is written for the symmetrical bending of an elastic plate consisting of a number of concentric discs, each of constant thickness. A calculus is developed for each new function as introduced, so that the continuity requirements of the problem may, as far as possible be incorporated in the resulting integrations. AD 154112. Contract AF 61(514)-1163, Technical report no. 2. AF OSR TN 58-211.

Note on confidence bounds connected with the hypothesis of equality of two dispersion matrices, by S.N. Roy. North Carolina. University. Institute of Statistics, Chapel Hill, N.C. Feb 1958. 7p. Order from LC. Mi $1.80, ph $1.80. PB 134650

AD 152168. 1. Matrix theory 2. Contract AF 18(600)-83 3. AF OSR TN 58-141 4. NCSC IS M 190

Note on inverting a certain type of patterned matrix, by S.N. Roy. North Carolina. University. Institute of Statistics, Chapel Hill, N.C. Feb 1958. 4p. Order from LC. Mi $1.80, ph $1.80. PB 134649

AD 152170. 1. Matrix theory 2. Contract AF 18(600)-83 3. NCSC IS M 191 4. AF OSR TN 58-143

Note on the deformable region in a rigid-plastic structure, by R. M. Haythornthwaite and R. T. Shield. Brown University, Division of Applied Mathematics, Providence, R.I. Jul 1957. 12p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 134725

A theorem due to Bishop, Green and Hill (1956) which leads to a method for determining the extent of the deformable region in a rigid-plastic body at yield is shown to be applicable to structures. As an example the extent of the deformable region is determined in the bending of a clamped thin plate of arbitrary shape as a concentrated transverse load. Contract Nonr 562(10)-NR 064-406. BU AM TR 26. GDAM C 11-26.

Note on the Menger-Wieser theory of imputation, by Hirofumi Uzawa. Stanford University. Dept. of Economics, Stanford, Calif. Jul 1957. 27p graphs. Order from LC. Mi $2.70, ph $4.80. PB 134678

1. Menger-Wieser theory (Production) 2. Economics - Research 3. Industrial research 4. Contract N6 onr-25133, NR 047-004 5. SU DE TR 45

Note on the span of translations in L^p, by Carl S. Herz. Cornell University. Dept. of Mathematics, Ithaca, N.Y. Jun 1956. 9p. Order from LC. Mi $1.80, ph $1.80. PB 134672

AD 88984. R 354-10-37. Report no. 49. 1. Fourier analysis 2. Transformations (Mathematics) 3. Mathematical functions 4. Contract AF 18(600)-685 5. AF OSR TN 56-264

On asymptotically efficient consistent estimates of the spectral density function of a stationary time series, by Emanuel Parzen. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1957. 66p tables. Order from LC. Mi $3.90, ph $10.80. PB 134732

1. Time series (Statistics) 2. Stochastic methods 3. Contract N6 onr-25140, NR 342-002 4. SU AMSL TR 36

On convergent perturbation expansions, by Richard Bellman and Tomlinson Fort. South Carolina. University. Columbus, S.C. May 1958. 7p. Order from LC. Mi $1.80, ph $1.80. PB 134659

AD 152238. 1. Mathematical equations and solutions 2. Perturbation theory 3. Contract AF 18 (603)-23 4. AF OSR TN 58-205

On multiplier transformations, by I.I. Hirschman, Jr. Washington University. Dept. of Mathematics, St. Louis, Mo. n.d. 32p. Order from LC. Mi $3.00, ph $6.30. PB 134646

Date is 1957 or later. AD 152212. 1. Transformations (Mathematics) 2. Contract AF 18(600)-568 3. AF OSR TN 58-179

On similarity, reducing manifolds, and unitary equivalence of certain Volterra operators, by G.K. Kalisch. Cornell University. Dept. of Mathematics, Ithaca, N.Y. Oct 1956. 13p. Order from LC. Mi $2.70, ph $4.80. PB 134668

AD 110328. Project R-354-10-37. Report no. 54. 1. Volterra equations 2. Mathematical research 3. Contract AF 18(600)-685 4. AF OSR TN 56-513

On the deviations of the empiric distribution function of vector chance variables, by J. Wolfowitz and J. Kiefer. Cornell University, Ithaca, N.Y. Aug 1956. 22p. Order from LC. Mi $2.70, ph $4.80. PB 134770

AD 95815. Project R354-10-37. Report no. 54. 1. Mathematical equations and solutions 2. Variance - Analysis 3. Contract AF 18(600)-685 4. AF OSR TN 56-379

On the probability of large deviations of random variables, by I.N. Sanov. Translated by Dana E.A. Quade, University of North Carolina. Mar 1958. 51p diagr. Order from LC. Mi $3.60, ph $9.30. PB 134754

The problem of determining the probability of large deviations of random variables attracts continual attention. This paper presents an approach to the problem for deviations which are sufficiently large. AD 154161. Translation of article appearing in Mathematicheskii Sbornik, 42(84): 1, pp. 11-44. Contract AF 18(600)-458. NCSC IS M 192. AF OSR TN 58-257.

On the shortest distance between two point sets in E^n, by K.N. Majumdar. Purdue University. Statistical Laboratory, Lafayette, Ind. Jun 1957. 12p. Order from LC. Mi $2.40, ph $3.30. PB 134676

1. Mathematical equations and solutions 2. Geometry, Plane 3. Contract N7 onr-394, T.O. IV, NR 042-074, Technical report no. 21 4. PUR PRF 451

On vector spaces with an alternate inner product, by D.S. Ornstein. Princeton University. Institute for Advanced Study, Princeton, N.J. Nov 1957. 4p. Order from LC. Mi $1.80, ph $1.80. PB 135084

AD 136753. 1. Vector analysis 2. Mathematical research 3. Contract AF 18(600)-1109, Supplemental agreement no. 4 (56-339) 4. AF OSR TN 57-763

Projections associated with Jacobi polynomials, by I.I. Hirschman. Washington University. Dept. of Mathematics, St. Louis, Mo. n.d. 6p. Order from LC. Mi $1.80, ph $1.80. PB 134645

Date is 1953 or later. AD 126476. 1. Legendre functions 2. Polynomials 3. Mathematical research 4. Contract AF 18(600)-568 5. AF OSR TN 57-181

Reliability of redundant systems, by Clarence R. Gates. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Aug 1952. 24p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134503

The purpose is to evaluate and compare certain of the more elementary parallel systems and to indicate means for expressing the reliability of a given parallel system in terms of the reliabilities of its components. In general, the approach has been heuristic rather than rigorous. No specific physical system has been considered, but it is believed that the material presented is sufficient to evaluate most specific problems likely to be encountered. Contract DA 04-495-ord-18. CIT JPL M 20-76.

Some observations on Saint-Venant's principle, by Bruno A. Boley. Columbia University. Dept. of Civil Engineering and Engineering Mechanics. Institute of Flight Structures, New York, N.Y. Jul 1957. 16p graph. Order from LC. Mi $2.40, ph $3.30. PB 134727

Extensions of the von Mises-Sternberg statement of Saint-Venant's principle to various boundary value problems in elasticity theory and other fields are considered; a general form of the principle is then given as a property of elliptic differential equations. The possible applications to transient phenomena

are discussed. An alternative formulation of the principle in terms of upper bounds rather than of orders of magnitude is outlined. CU 10-57-onr-266(20)CE. Contract Nonr 266(20), NR 064-401, Technical report 10.

Some uses of the distribution of the largest root in multivariate analysis, by D. L. Heck. North Carolina. University of Statistics, Chapel Hill, N.C. Mar 1958. 47p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134753

In this paper, testing procedures for three tests in multivariate analysis are given, and numerical examples are worked out for two of the test situations which require the distribution of the largest characteristic root. AD 154195. Contract AF 18 (600)-83. AF OSR TN 58-290. NCSC IS M 194.

Spectra of multiplier transforms on X^p, by A. Devinatz and I. I. Hirschman, Jr. Washington University, Dept. of Mathematics, St. Louis, Mo. n.d. 21p. Order from LC. Mi $2.70, ph $4.80. PB 134647

Date is 1957 or later. AD 152211. 1. Transformations (Mathematics) 2. Mathematical functions 3. Contract AF 18(600)-568 4. AF OSR TN 58-178

Study of the learning of two stories by means of Cloze technique, by Charles N. Cofer and Patricia M. Jenkins. Maryland University. Dept. of Psychology, College Park, Md. Jul 1957. 7p tables. Order from LC. Mi $1.80, ph $1.80. PB 134736

The purpose of the investigation was to explore the value of Cloze technique in uncovering characteristics and processes involved in learning of this type material. Cloze procedure simply involves the mutilation of a passage or a story by the deletion of every Nth word or by random deletion of a portion of the words. Contract Nonr 595(04) Technical report no. 14.

Upper bound for the variance of certain statistics, by Wassily Hoeffding. North Carolina. University. Institute of Statistics, Chapel Hill, N.C. Mar 1958. 12p. Order from LC. Mi $2.40, ph $3.30. PB 134661

AD 154145. 1. Mathematics - Statistical theory 2. Contract AF 18(600)-458 3. AF OSR TN 58-243 4. NCSC ISM 193

Variance in least square attitude solutions, by Frank Reed. U.S. Naval Ordnance Test Station, Inyokern, Calif. Jun 1954. 24p. Order from LC. Mi $2.70, ph $4.80. PB 134871

In TM 293 three possible approaches to the least attitude problem were presented. The present paper contains the mathematical development of the variance in the results of each of these methods due to the variance of v-angle measurements. This paper also contains a discussion of a practical definition for over-all variance in a vector. This definition leads to a simple expression in the case of attitude for the over all variance in the unit vector along the missile axis. The final result for the variance in the individual direction cosines of the missile axis. Supplement to NOTS TM 293. NOTS TM 1783.

Weak law of large numbers for double sequences with applications to sample successive differences, by Emanuel Parzen. Stanford University. Dept. of Statistics, Stanford, Calif. Jul 1957. 15p. Order from LC. Mi $2.40, ph $3.30. PB 134718

1. Stochastic methods 2. Probability - Theory 3. Contract Nonr 225(21), NR 042-993 4. SU DS TR 14

MEDICAL RESEARCH AND PRACTICE

Acoustical properties of blood and hemoglobin solutions, by Edwin L. Carstensen and Herman P. Schwan. Pennsylvania. University. School of Medicine, Philadelphia, Pa. Aug 1956. 68p graphs. Order from LC. Mi $3.90, ph $10.80. PB 135220

Section I deals with the acoustic properties of the flood and Section II with that of hemoglobin solutions. AD 97148. Project 7210, Task 71703. Contract AF 33(616)-2494. AF WADC TR 56-389.

Acute and chronic effects following exposure to a mixed median lethal dose of fast neutrons and gamma rays, by Quentin L. Hartwig. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Nov 1957. 8p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 134873

Three hundred sixty female Sprague-Dawley rats, three months old, were exposed in one hour to an acute dose of 320 rep of fast neutrons plus 110 r of gamma rays emanating from a uranium reactor. The exposure resulted in 57 percent fatalities within 30 days. AF SAM R 57-153.

Clinical comparison of the symptons of hypoxia and hyperventilation, by Howard H. Wayne. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Sep 1957. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 134874

A total of 165 to 183 subjects approximately half of whom were medical officers was exposed to hypoxia at 25,000 feet and hyperventilation at ground level. Symptoms were recorded in all cases. Tabulation of frequency of symptoms revealed that it was not possible on clinical grounds to differentiate between these two conditions. AF SAM R 57-128.

Epidemiologic study of a hospital outbreak of staphylococcal infections, by Joseph A. Bass, Warren R. Stinebring, and others. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Oct 1957. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 134872

1. Epidemiology - Research 2. Staphylococcus infections - Therapy 3. AF SAM R 57-133

Investigation of means and materials to combat thermal radiation flash burns. Final report under Contract DA 19-129-qm-187, by A. Goldsmith, A.N. Takata, and I.B. Fieldhouse. Armour Research Foundation, Chicago, Ill. Jan 1957. 126p graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 134519

This report is designed to serve as a guide for the chemist in the development and formulation of means of protection from thermal radiation flash burns. Included is a discussion of basic heat transfer principles with special emphasis on thermal radiation resulting from the explosion of an atomic bomb. Criteria are developed for predicting the degree of burn based on the maximum temperature reached at a particular depth beneath the surface of the skin. Equations are included whereby the temperature distribution in the protective material and skin can be calculated under various circumstances. For cases where heat loss from the exposed surface by reradiation can be neglected, simple charts are presented which permit a solution in a matter of minutes. The same charts can also be used to obtain a quantitative comparison of the relative importance of the various properties of possible protective materials. Heat sink materials are treated in some detail, and tables of pertinent properties of materials are included as an appendix. AD 127857. Project no. 7-12-01-002B. ARF Proj D 046.

Long-term effect of radiation on creatine metabolism in the rat, by George M. Krise, Clyde M. Williams, and Donald R. Anderson. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Oct 1957. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 134854

1. Rats - Radiosensitivity 2. Radiation - Physiological effects 3. Urine - Creatine and creatinine 4. AF SAM R 57-151

Metabolic studies with lactobacillus under certain space flight conditions, by John A. Kooistra, Jr. and Norman O. Harris. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Dec 1957. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 134875

Results obtained in this investigation demonstrated that short-term exposure of Lactobacillus casei to an altitude of 16,000 feet in an atmosphere of 40 percent oxygen, 0.06 percent carbon dioxide, and 59 percent nitrogen (space flight conditions) did not affect the growth, the acid production, nor the potassium and sodium uptake. Exposure to other reduced pressures ranging from 13,000 to 55,000 feet without oxygen enrichment also had no effect on metabolic patterns studied. AF SAM R 58-39.

Radiation biology relative to nuclear energy powered aircraft. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Jan 1950. 41p tables. Order from LC. Mi $3.30, ph $7.80. PB 135173

ATI 135814. Unclassified 1-13-58. Recommendations to NEPA Medical Advisory Committee.
1. Atomic power - Research 2. Radiation - Biological effects 3. Power plants, Atomic 4. NEPA 1254-IER-25

Relative biologic effectiveness of X-rays, gamma rays, and fast neutrons in the production of weight loss of the small intestine of the mouse, by M.A. Patetta-Queirolo, M.L. Randolph, and J.A. Sproul, Jr. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Apr 1958. 6p tables. Order from LC. Mi $1.80, ph $1.80. PB 134786

1. Neutrons - Biological effects 2. Gamma rays - Biological effects 3. X-rays - Biological effects 4. Mice - Radiosensitivity 5. AF SAM R 58-72

Spatial vectorcardiogram during acceleration, by Stuart Bondurant and William A. Finney. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1958. 12p graphs, table. Order from OTS. 50 cents. PB 151216

Electrocardiographic and spatial vectorcardiographic effects of several patterns of positive, negative, and transverse acceleration have been studied. The observed effects essentially confirm previous observations with the exception that no dangerous arrythmias were observed with prolonged positive acceleration. AD 155653. Project 7216, Task 71712, AF WADC TR 58-263.

Studies of the mechanism of action of alkylating agents on microorganisms, by George H. Mangum, Marshall E. Deutsch, and others. Warner-Lambert Pharmaceutical Co., Inc. Warner-

Chilcott Laboratories Division. Jul 1955. 146p diagr, graphs, tables. Order from LC. Mi $2.70, ph $22.80. PB 135623

The alkylating agents used were propiolactone, ethylene oxide and ethyleneimine; and the test organisms were Western Equine Encephalomyelitis virus, Influenza A virus and Bacillus globigii sources. The results of the kinetic studies of inactivation were compared with the results obtained in two kinds of model kinetic experiments: a) inactivation of test organisms by "group-specific" reagents and b) reaction of simple compounds with alkylating agents. An expression is derived for calculating total inactivating effect, and tables of pertinent data are included. Final report covering period 1 Jul 1953 to 30 Jun 1955 under Contract DA 18-064-CML-2400.

METALS AND METAL PRODUCTS

Acoustic emission under applied stress, by B. H. Schofield, R. A. Bareiss, and A. A. Kyrala. Lessells and Associates, Inc., Boston, Mass. Apr 1958. 41p photos, diagrs, graphs. Order from OTS. $1.25. PB 151215

The initial experiments on commerical grades of carbon steel, 24ST-4 aluminum, and cast tin verified the existence of the acoustic emission effect but did not verify the correlation of the frequency and amplitude spectrums with applied stress in the specimen, as reported by Kaiser in Germany. The frequency and amplitude spectrums did show shaped distributions, as opposed to random behavior; however, the distributions were not consistent for a given material. The frequency spectrums indicated a relatively narrow range of predominant frequencies and a consistency from specimen to specimen in a group of the frequency values. Preliminary investigations on pure aluminum specimens of varying grain density did not conclusively verify dependency of the acoustic generation on grain boundaries. Experiments on pure aluminum single crystals showed the existence of the acoustic phenomenon. AD 155674. Project no. 7021; Task no. 70663. Covers the period of work from 15 Dec 1954 to 31 Mar 1958 under Contract AF 33(616)-2800. AF WADC TR 58-194.

Activation energies for creep of polycrystalline copper and nickel, by P. R. Landon, J. L. Lytton, L. A. Shepard, and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Jul 1957. 23p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134743

Activation energies for creep of polycrystalline Cu and Ni were obtained by the technique involving the effect of an abrupt change in temperature on the creep rate. The activation energy for creep was found to increase with increasing temperatures from a low value of about 3,000 to 5,000 calories per mole at 78°K to that for self-diffusion at the highest temperatures. Contract Nonr 222(49), 2nd technical report. UC IER Series 103, Issue 2.

Adhesion, pure-shear and friction measurements and welding aspect of friction: Welding aspect of sliding friction between metallic surfaces, by F. F. Ling. Rensselaer Polytechnic Institute. Research Division, Troy, N. Y. Jan 1958. 31p photo, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 133966

This paper proposes a mechanism of recrystallization recovery for the welding mode of adhesion in contradistinction to the surface tension mode of adhesion. A new relationship is proposed between adhesion, 'pure-shear' and friction. Measurements of adhesion, 'pure-shear' and friction on lead specimens in limited quantity seem to substantiate the proposed theory. AD 154183. Research project no 19751. Contract AF 49(638)-67, Technical note 2. AF OSR TN 58-281.

Aluminum bronze and aluminum brass for condensers and salt water piping, by W. G. Schreitz. U. S. Naval Engineering Experiment Station. Physical Metallurgy Branch, Annapolis, Md. Sep 1954. 42p photos, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134291

Composition 3 aluminum bronze had a tendency to pit and had less resistance to corrosion and corrosion-erosion in sea water than the other materials. The Composition 5 aluminum bronze and the aluminum brass showed to better advantage, although they were not equal in performance to the cupro-nickel alloys. The Composition 5 bronze is being studied further for condenser head and tube sheet applications. NS 013-118. NAV EES 040037B(9).

Behavior of magnesium and fiberglas panels subjected to thermal radiation, by Morris Feigen and Alphonso Ambrosio. California. University. Dept. of Engineering, Los Angeles, Calif. Jul 1953. 48p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134908

AD 49782. 1. Panels, Stiffened - Buckling 2. Magnesium - Thermal properties 3. Fiberglas - Thermal properties 4. Plastics, Laminated - Thermal properties 5. Contract AF 33(616)-293 6. AF WADC TR 54-103

Bibliography of zirconium. See entry under Bibliography on page 545. PB 134528

Compressive creep buckling of metal columns. Part 5: Cyclic loading, by A. Rudnick, R. L. Carlson, and G. K. Manning. Battelle Memorial Institute, Columbus, O. Jun 1958. 69p photos, graphs, tables. Order from OTS. $1.75. PB 151218

Tests were conducted to determine the effect of load cycling on the creep buckling behavior of metal columns. Two materials were investigated: 2024-T4 aluminum alloy columns with length to radius of gyration ratios of 81.2 and 55.7 were tested at 350°F and 450°F; C-110M titanium alloy columns having a length to radius of gyration ratio of 90 were tested at 700°F and 800°F. The cycling period used was 24 hours, the time the load was on in that period was the variable. In addition to the cyclic load tests, constant load tests were conducted to obtain background information. A linear relationship was found between the time to creep buckling under constant load and the reciprocal of the minimum creep deflection rate. This relationship was used in interpreting the cyclic load test results. The effect of load cycling provided to be dependent upon the properties of the material at the testing temperature. Two criteria, based upon material stability characteristics, are set up to help classify the cyclic load data. Project no. 7360. AD 155604. Covers work from 1 Jan 1956 - 31 Jan 1957 under Contract AF 33(616)-3317. AF WADC TR 52-251, Part 5.

Cooling transformations in selected deep-hardening steels, by E.P. Klier and V. Weiss. Syracuse University. Research Institute. Metallurgical Engineering Dept., Syracuse, N.Y. Jun 1957. 67f photos, drawing, graphs, tables. Order from LC. Mi $3.90, enl pr $12.30. PB 135631

The cooling transformations in a series of deep-hardening structural steels have been determined by a dilatometric study. The results are reported in suitable cooling transformation (CT) diagrams. End-quench bar hardenability data are also reported for a limited number of test conditions so chosen as to emphasize the conditions under which an increase in hardenability may be obtained with 4340 steel austenitized by a two-step treatment. The transformation structures are discussed with reference to the kinetics of their formation. MET 385-576F1. Contract NOas 56-152-d, Final report 1.

Correlation of titanium phase diagrams. Final report under Contract DA 30-069-ORD-1284, by Irving Cadoff. New York University. College of Engineering. Research Division, University Heights, N.Y. May 1956. 25p graphs. Order from OTS. 75 cents. PB 131691

The data for twenty-five binary titanium phase diagrams was surveyed. These diagrams were grouped and analyzed according to similarities exhibited. Correlations based on size factor, electronegativity, valence, crystal structure and free energy were made. D.A. project no. 593-08-021. D.O. project no. TB 4-15. WAL R 401/85-32.

Creep behavior of extruded electrolytic magnesium. Dow Chemical Co., Midland, Mich. Jun 1954. 35p photos, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 134708

The creep mechanism and kinetics of fine-grained magnesium have been studied over the temperature range 200 to 600F. As a result of the photographic study of microstructural changes, transient and steady-state creep components have been correlated with slip, subgrain formation, and cyclic deformation at the grain boundaries. AD 44978. Contract AF 33(038)-16655, Suppl. agreement S2(52-286). AF WADC TR 54-230.

Department of Defense titanium sheet-rolling program: Uniform testing procedures for sheet materials, by George Gerard, Samuel A. Gordon, Dean C. Lauver, and Don A. Shinn. Battelle Memorial Institute. Defense Metals Information Center, Columbus, O. Sep 1958. 42p diagrs, graphs, tables. Order from OTS. $1.25. PB 121649

These uniform testing procedures were recommended in a series of reports issued by the Materials Advisory Board. This report is intended to be a broad description of the types of design data to be collected as part of the program. The mechanical properties presented are considered to be of fundamental importance in airframe design. AD 201871. BMI DMIC 46 D.

Design and evaluation data for structural metals. Part I: Creep properties of metals under intermittent stressing and heating conditions, by Lawrence A. Shepard, C. Dean Starr, Carl D. Wiseman, and John E. Dorn. California. University. Institute of Engineering Research, Berkeley, Calif. Sep 1953. 113p photo, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 135149

Constant and intermittent load creep tests were performed on clad aluminum alloys 75S-T6 and 24S-T3 at 300°, 450° and 600°F, and on cold rolled titanium at 400°F. Constant load creep tests were also conducted on annealed titanium Ti-75-A at 400°F. Two groups of intermittent load tests were performed, An empirical method for estimating and correlating creep curves for various stresses at constant temperature has been determined and shown to be applicable to both static and intermittent creep of a number of metals and alloys. AD 23715. For Parts 2-5 see PB 131016, 130204, 121435,and 121476. Contract AF 33(038)-11502. AF WADC TR 53-336, Part I.

Development and fabrication of the F-80C magnesium alloy airframe, by Arthur Kenger and George Leavy. East Coast Aeronautics, Inc., Pelham Manor, N.Y. Dec 1955. 238p photos, diagrs, graphs, tables (part fold). Order from LC. Mi $10.20, ph $36.30. PB 134844

It is concluded that primary aircraft structural components can be satisfactorily fabricated from the non-strategic magnesium alloys that are commerically available at the present time; the basic design of

aircraft can be simplified through the use of thick skin type of construction; primary aircraft structures utilizing thick skin with a minimum of auxiliary stiffeners will compare favorably on a strength-weight basis with conventional reinforced thin-skin type of design. AD 97491. Contract AF 33(038)-5121. AF WADC TR 55-293.

Development of filler wire for welding Army Ordnance armor by the inert-gas-shielded consumable-electrode process, by S.M. Silverstein, R. P. Sopher, and P.J. Rieppel. Battelle Memorial Institute, Columbus, O. Mar 1956. 34p drawings, table. Order from OTS. $1.00.
PB 131689

Studies were conducted to develop a ferritic steel filler wire with desired strength, ductility, crack resistivity, and notch toughness when deposited in Army Ordnance Mn-Mo armor plate. The only commercial filler wire considered to be suitable for welding Ordnance armor was obtained and the mechanical properties of the weld metal determined. Studies were made of experimental filler wires containing misch metal. A Mn-Ni-Mo-V ferritic steel and a Mn-Mo-V ferritic steel filler wire were developed in this study. Additions of 0.30 per cent misch metal to each of these heats improved the cracking resistance and notch toughness of the weld deposits. The strength and notched-bar properties of the weld metals made with the commercial and experimental filler wires were comparable with mechanical properties of weld metals produced with low-hydrogen coated electrodes of the Grade 260 class. The major improvement of the experimental weld metals as compared with weld metal made with the commercial filler wire was in cracking resistance. Summary report for the period 28 Sep 1954 - 31 Mar 1956 under Contract DAI 33-019-505 ORD(P)-2, Subproject TB 4-31. AD 119064. WAL R641/17.

Development of a weldable titanium-base alloy of medium strength, by Joseph P. McAndrew and David W. Levinson. Armour Research Foundation, Chicago, Ill. Jun 1958. 36p photos, drawing, tables. Order from OTS. $1.00.
PB 151214

This work reported was undertaken with the object of finding a titanium-base sheet alloy having a minimum room-temperature tensile yield strength of 130,000 psi, which would be weldable without requiring a post-welding heat treatment to restore ductility or strength. The following alloys were prepared and evaluated: Ti-13Sn-10Zr, Ti-13Sn-2Al, Ti-20Zr-4Al, Ti-22Mo-8Mn, Ti-17.5Mo-10Mn, and Ti-22Mo-8Mn-3Cr. These compositions were selected primarily from strength considerations and secondly, in the hope that the first three would be all- and the last three all-β alloys. AD 155671. Project no. 7351. Covers period of work from 1 Feb 1957 to 28 Feb 1958 under Contract AF 33(616)-3958. AF WADC TR 58-173.

Effect of uniform hydrostatic pressure and temperature on the magnetic properties of a nickel-zinc ferrite, by C.Q. Adams and C.M. Davis, Jr. U.S. Naval Ordnance Laboratory, White Oak, Md. Feb 1958. 39p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30.
PB 134943

Magnetic properties of a nickel-zinc ferrite (15% NiO, 35% ZnO, 50% Fe_2O_3) were measured over a temperature range of 23°C to 110°C at hydrostatic pressures up to 40,000 psi. Thesis: Charles Q. Adams, Harvard University. NAVORD 4285.

Effects of rare-earth additions upon the mechanical properties of two experimental gun steels, by R.E. Boni and D.C. Buffum. U.S. Arsenal, Watertown, Mass. Aug 1957. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80.
PB 134742

In general the addition of rare earth caused increases in the impact strength at the transition temperature. The effect is greatest on those specimens with a bainite-martensite structure. For the martensite structure and the bainite-martensite mixture, the improvement of toughness effected by rare-earth addition was greatest in the bars tested in the transverse direction. O.O. project TB 4-121. D/A project 5B93-08-023. WAL R 310/211.

Electrical resistance effects associated with the allotropic transformation in high purity iron, by K. Shimura, E. Eichen, and J.W. Spretnak. Ohio State University Research Foundation, Columbus, O. Jan 1958. 72p photos, diagrs, graphs, tables. Order from OTS. $2.00.
PB 151205

The electrical resistance changes associated with the allotropic transformation in high purity iron and the possibility of employing this property to discern the mechanism of the transformation were investigated. Under the conditions of the experiments, the results were too uncertain to deduce the mechanism of the transformation. In the transformation from alpha to beta, a sharp decrease (about 1.3%) in resistance is observed; however, in the reverse direction, no sharp increase in resistance is noted and a permanent decrease is experienced in each cycle. It is believed that the wire undergoes a change in geometry with each thermal cycling through the critical temperature. AD 142207. Project no. 7021. Contract AF 33(616)-3101. AF WADC TR 57-738.

Electrodeposition of titanium from aqueous solutions, by Thomas C. Franklin and Francis J. Denisa. Virginia Institute for Scientific Research, Richmond, Va. Aug 1953. 64p diagrs, graph, tables. Order from LC. Mi $3.90, ph $10.80.
PB 134911

AD 18240. 1. Titanium - Electrodeposition 2. Contract DA 36-034-ord-1048, Final technical report.

Fuel oil ash corrosion resistance of aluminum bearing nickel-base alloys, by D. Carosiello. U.S. Naval Boiler and Turbine Laboratory, Philadelphia, Pa. Apr 1957. 12p photo, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 134675

A nickel base alloy with 9 levels of aluminum (0 to 9.5%) was tested for corrosion resistance to high vanadium and high sodium synthetic fuel oil ashes at 1700 F for five hours. Only the alloy containing 6% Al was superior to type 310 (25 Cr:20 Ni) alloy. NBTL Test R-229. NSM 013-120.

Hot extruded ductile cast iron, by Ernest B. Blake, and Stuart V. Arnold. U.S. Arsenal, Watertown, Mass. Apr 1957. 24p photos, tables. Order from OTS. 75 cents. PB 131690

The purpose of this investigation was to investigate, on limited scale, the extrudability of ductile cast iron and to determine the mechanical properties of tubular and round sections as-extended and after selected treatments. Twelve 7-inch-diameter x 10-inch-long billets were cast of ductile iron, six to each of two compositions. These compositions differed principally in that one made use of a nickel-magnesium alloy as inoculant, the other a ferrosilicon-magnesium alloy. The billets were extruded into 1.10", 1.56", and 2.21"-diameter rounds and 2.375"-O.D. x 2.00"-I.D. tubes at approximately 1800°F using glass lubrication by the Ugine-Sejournet practice. The mechanical properties of the extrusions were determined in the as-extruded, annealed, and three quenched and tempered conditions. D/A Project 5B 93-08-023 SR-12. O.O. Project TB 4-121. WAL R 330/15.

Influence of heat treatment on microstructure and high-temperature properties of a nickel-base precipitation-hardening alloy, by R.F. Decker, John P. Rowe, W.C. Bigelow, and J.W. Freeman, University of Michigan. U.S. National Advisory Committee for Aeronautics. Jul 1958. 53p photos, graphs, tables. Order as TN 4329 from National Arronautical and Space Administration, 1520 H. Street, N.W., Washington 25, D.C. PB 134940

Studies were made of the influence of various heat treatments on the rupture properties and microstructure of a 55Ni-20Cr-15Co-4Mo-3Ti-3Al alloy to provide more fundamental information on the relationships between structure and high-temperature properties in alloys of this type. The effects of variations in solution treatment, cooling rate after solution treatment, and aging treatment on the stress-rupture properties of the alloy at 1,600°F and 25,000 psi were measured and related to variations in the size and distribution of precipitates within the alloy and to residual rolling effects. NACA TN 4329.

Literature review on properties of praseodymium and cerium oxides. See entry under Bibliography on page 546. PB 135200

Literature survey on properties of bismuth, by Hans R. Stephan. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Mar 1949. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 135171

This report covers bismuth in general, gives its physical properties, and briefly describes the phase relations existing with certain other elements. The elements Cr and Fe give indications of having the lowest reactivity with bismuth. Among the more reactive metals is nickel. The phase diagrams in the appendix of this report are taken from Hansen, Der Aufbau der Zweistofflegierungen. Berlin, Julius Springer, 1936). NEPA 929.

Mechanical properties of metals at low temperatures, by H.M. Rosenberg. Illinois. University. Dept. of Mining and Metallurgical Engineering, Urgana, Ill. Oct 1957. 33p tables. Order from LC. Mi $3.00, ph $6.30. PB 134541

Low temperature techniques have been applied to the systematic study of some of the mechanical properties of metals. In the case of metals, the strength is enhanced down to the temperature of liquid helium, and it is only in a few metals that brittleness sets in. This paper also deals with elasticity, creep, fatigue and internal friction. AD 136655. MEDUI 20-AF. Contract AF 18(603)-22. Contract AF 18(600)-13. AF OSR TN 57-666.

Metallography of titanium alloys, by H.R. Ogden and F.C. Holden. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. May 1958. 119p photos, graphs. Order from OTS. $2.75. PB 121645

This report contains both a general description of titanium metallography as it is affected by composition and thermal treatment and specific illustrations of microstructures of commercial alloys as they are affected by fabrication and thermal treatments. An index is provided in Appendix A for the various structures illustrated in the sections of commercial alloys. Appendix B contains a glossary of terms that are often used in describing titanium microstructures and Appendix C describes methods of preparing titanium samples for metallographic examination. BMI TML 103.

Metallurgical factors affecting tensile properties of Fe-Al base alloys, by William J. Buehler and Charles G. Dalrymple. U.S. Naval Ordnance Laboratory, White Oak, Md. Oct 1957. 35p photos, drawing, diagrs, tables. Order from OTS. $1.00. PB 131633

The effects of order-disorder transformations and alloy additions upon the mechanical properties of

Thermenol are discussed. Through proper thermal treatment and minor additions of zirconium and carbon, the room temperature tensile elongation of Thermenol, in warm rolled sheet specimens, is greater than 8%. Preparation of the alloys by non-consumable electrode arc melting is also described. NAVORD 5744.

Notch-toughness properties of a sample of fractured hull plating removed from USCGC Eastwind (WAGB 279), by J.J. Gabriel and E.A. Imbembo. U.S. Naval Shipyard, New York. Material Laboratory. May 1956. 15p photos, graph, tables. Order from LC. Mi $2.40, ph $3.30.
PB 134919

This report deals with an investigation of the properties of fractured high-tensile steel plating removed from the USCGC EASTWIND, the hull of which was punctured by ice. The plate fractured in a brittle mode. Navy tear tests indicated the material to be highly notch-sensitive. It is considered that the combination of poor notch-toughness, low operating temperatures, and impact was responsible for brittle failure of the plate. Lab. project 5208-5, Final report. NS 011-084.

Phenomenological relation between stress, strain rate, and temperature for metals at elevated temperatures, by Elbridge Z. Stowell. U.S. National Advisory Committee for Aeronautics. 1958. 8p. Order as NACA 1343 from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 15 cents.
PB 135305

A phenomenological relation between stress, strain rate, and temperature is suggested to account for the behavior of polycrystalline metals above the equicohesive temperature. The properties of the metal included in the relation are elasticity, linear thermal expansion, and viscosity. The relation may be integrated under various conditions to provide information on creep rates, creep rupture, stress-strain curves, and rapid-heating curves. It is shown that for one material - 7075-T6 aluminum-alloy sheet - the information yielded by the relation for these four applications agrees reasonably well with test data. Supersedes NACA TN 4000 (PB 125659). NACA 1343.

Pilot production, fabrication and evaluation of promising titanium alloys, by Frank A. Crossley, Benjamin R. Rajala, and David W. Levinson. Armour Research Foundation, Chicago, Ill. Mar 1958. 47p photos, graphs, tables. Order from OTS. $1.25. PB 131978

Approximately 300 pounds of Ti-7Al-3Mo alloys were fabricated to bar stock and distributed to various jet engine manufacturers. The endurance limit for blades bench-tested at room temperature under completely reversed stress was 75,000 psi, 5000 psi higher than Ti-6Al-4V alloy blades of the same configuration. Tensile properties for specimens cut from blades and heat treated: 1560°F-1/2 hour-air cooled, 1020°F-24 hours, were as follows: 170,000 psi ultimate tensile strength, 167,000 psi 0.2% offset yield strength, 49% reduction in area, and 16% elongation. Wire was produced in sizes down to 0.020 in. diameter from Ti-7Al-3Mo 9/32 in. diameter rod. The high strength condition produced by applying the heat treatment: 1800°F-1 hour-water quench, 1000°F-2 hours to equiaxed Ti-7Al-3Mo alloy material was found to be unstable to aging under stress at 800°F. Tests indicated that the alloy is stress-relieved by 2 hours at 1300°F. AD 151010. Project 7351, Task 73510. Covers work from 1 Apr 1955-31 Aug 1957 under Contract AF 33(616)-2060. AF WADC TR 54-546, Part 2.

Preliminary study of the system titanium-aluminum oxide extruded alloys, by Pierre Turillon and Nicholas J. Grant. Massachusetts Institute of Technology, Cambridge, Mass. Mar 1958. 15p photos, tables. Order from OTS. 50 cents.
PB 151207

A series of titanium base alloys, containing three and ten volume percent of alumina, were studied. An additional alloy, containing three percent of rare earth oxides, was included in this study. These alloys were prepared by powder metallurgy methods that included mechanical mixing, sintering and extrusion; they were evaluated by a variety of tests. In several of the samples, the sintering step was omitted after cold compacting, but the density of the extrusion was the same as that obtained when using sintering. Reduction of the alumina and rare earth oxides by titanium took place in each of the extrusions, resulting in an alloy which was hard and brittle. Evidence of the reduction of the oxide by titanium was noted by means of X-ray analysis as well as by chemistry. AD 155559. Project 7021. Contract AF 33(616)-284. AF WADC TR 58-29.

Proposed mechanism for the strengthening of SAP-type alloys, by G.S. Ansell. U.S. Naval Research Laboratory. Oct 1958. 4p. Order from OTS. 50 cents. PB 151047

Wrought materials produced from sintered and extruded flake metal powders (SAP-type alloys) containing a finely dispersed stable second phase possess enhanced elevated temperature properties. Based upon an extension of the results found previously by Ansell and Weertman of NRL in investigating the creep properties of the MD 2100 aluminum SAP-type alloy, it is proposed that the extrusion process causes motion of the grain boundaries, sweeping dislocation sources into the vicinity of the second phase, where they are pinned in place and no longer active. NRL R 5206.

Relationship of metal surfaces to heat-aging properties of adhesive bonds, by J.M. Black and

R. F. Blomquist. U.S. National Advisory Committee for Aeronautics, Washington, D.C. Sep 1958. 30p graphs, tables. Order as TN 4287 from National Aeronautical and Space Administration, 1520 H Street, N.W., Washinton 25, D.C. PB 135294

A study has been made to determine the probable causes of deterioration of each of several adhesives in bonds to stainless steel at temperatures from 400° to 500°F. Preliminary studies of aluminum surfaces on which ions of metals used in stainless steel were introduced showed that iron was probably catalyzing a thermal deterioration of the adhesive. The addition of zinc naphthenate, cerium naphthenate, or manganese dioxide increased the adhesive resistance to thermal deterioration. Other observations indicated probable specific relationships among the chemical structure of the adhesive the metal adherent, and the resultant thermal stability of bonds after aging at high temperatures. NACA TN 4287.

Report on lithium, by D.S. Jesseman. Fairchild Engine and Airplane Corporation. NEPA Division, Oak Ridge, Tenn. Oct 1949. 55p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 135169

Includes properties, fabrication, preparation, chemical analysis, equilibrium studies with other elements or compounds, structural studies and changes in properties under exposure to radiation, nuclear data, and a bibliography of 82 references. AD 84444. Project TIB 3c-NG6. NEPA 1193-SCR-53.

Role of recovery and recrystallization on the creep rupture behavior of 2S aluminum, by Marvin B. Happ and Nicholas J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. Jun 1957. 27p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134967

The normal transition to intercrystalline cracking and failure with increasing temperature, with attendant decrease in ductility, is shown to reverse itself with further increase in temperature or decrease in strain rate, as certain recovery processes become operative. With this reversal there is an increase in ductility. The inhibiting effect of intercrystalline cracking on recrystallization is demonstrated. Contract Nonr 1841(28).

Role of subgrains in high temperature creep, by Lawrence A. Shepard and John E. Dorn. California. University. Institute of Engineering Research, Berkeley, Calif. May 1958. 39p photos, diagrs, graphs. Order from OTS. $1.00 PB 151208

The role of the subgrain structure in the high temperature creep process is evaluated in the light of recent experimental and theoretical developments in creep theory. The origin of subgrains is discussed, as well as the specific deformation modes which produce the variety of observable substructures. The effect of creep variables on the subgrain development, size and structure is described. Finally, an attempt is made to analyse the manner in which the subgrain structure effects creep rate, recovery and grain boundary shearing. AD 155565. Project no. 7360. Contract AF 33(616)-3860. AF WADC TR 58-63.

Single crystal elastic constants of Cu-Ni alloys, by R.E. Schmunk. Case Institute of Technology. Dept. of Physics, Cleveland, O. Jul 1957. 22p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 134947

The elastic constants of single crystals of copper and of dilute alloys of copper, with nickel, have been measured using the ultrasonic pulse-echo technique. This report is interpreted as indicating a stiffening of short-range crystal forces because the natural nickel ion core is larger than the isoelectronic copper ion core, and a decrease in the long range elastrostatic forces because of the decrease in the average ion-core charge. Thesis: Case Institute of Technology. Contract Nonr 114103, NR 017-611, Technical report 22.

Single crystal elastic constants of indium, by D.R. Winder. Case Institute of Technology. Dept. of Physics, Cleveland, O. Jul 1957. 26p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 134948

The elastic constants of single crystals of indium have been measured by the ultrasonic pulse echo method. The constants are referred to axes coincident with the deformed cubic axes. Contract Nonr 114103, NR 017, 611, Technical report 21.

Some observations relating to recovery of internal friction during fatigue of aluminum, by S.R. Valluri. U.S. National Advisory Committee for Aeronautics. Sep 1958. 30p diagrs, graphs, table. Order as TN 4371 from National Aeronautical and Space Administration, 1520 H Street, N.W., Washington 25, D.C. PB 135300

The effective heat of activation for the process is found to be about 10,000 calories per gram molecule or less. The dislocations responsible for the recovery of internal friction may be the same as those responsible for fine slip which, according to one existing theory, is the mechanism responsible for fatigue failure. Experimental results indicate that obtaining a recovery factor independent of stressing history may possibly be associated with installing a cyclic process in which the subgrain structure is well established. NACA TN 4371.

Stress-induced transformation of retained austenite in hardened steel, by B.L. Averbach, S.G. Lor-

ris, and M. Cohen. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. Aug 1951. 27p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80.
PB 135318

The transformation of retained austenite in tapered tensile bars of hardened and tempered AISI 2340 steel was studied as a function of distance from the fracture. Complete transformation of the retained austenite was found at the fracture and some transformation was detected in all sections where plastic strain had occurred. The retained austenite was completely converted before necking was observed. ATI 123905. Contract N5ori-078(24), NR 031-256, Technical report no. 3.

Study of hydrogen embrittlement of iron by internal-friction methods, by R.E. Maringer, E.B. Swetnam, L.I. Marsh, and G.K. Manning. U.S. National Advisory Committee for Aeronautics. Sep 1958. 62p photos, diagr, graphs, table Order as TN 4328 from National Aeronautical and Space Administration, 1520 H Street, N.W., Washington 25, D.C. PB 135298

The effects of electrolytic charging on the properties of relatively pure iron and tempered 4340 steel were investigated metallographically and by observing internal-friction behavior from -196° to 430°C. Severe structural damage, consisting of blisters and internal cracks, resulted even after comparatively short charging times. The internal friction of recrystallized iron was particaularly sensitive to hydrogen charging. Internal friction of iron and steel below room temperature exhibits phenomena resulting from the interaction of hydrogen atoms and moving dislocations. NACA TN 4328.

Study of technique for refinement of cast structures in aluminum. Final report, 1954 - 1955, under Contract no. DA 19-020-ORD-2004. Massachusetts Institute of Technology. Dept. of Metallurgy. Metals Processing Division, Cambridge, Mass. Jul 1955. 83p photos, drawings, diagr, graphs, tables. Order from OTS. $2.25.
PB 131688

A rapid accurate procedure for quantitatively measuring the presence of hydrogen in molten aluminum is described and a tentative evaluation of the important sources of hydrogen in aluminum founding is given. The same equipment used in this evaluation of sources was applied to the problem of degassing aluminum. Consequently, several methods of degassing were compared quantitatively. Alloy 195 was used to judge the effects of hydrogen on tensile properties of plate castings, with and without grain refining, in the solution-treated and aged condition. A study of several types of chills has been made in search of a chill that will give uniformly high tensile properties. This work leads to the recommendation of a special type of chill that yields essentially uniform tensile strength values for grain refined alloy 195. The effect of chilling castings of alloys 195 (1% Si), 220, 356, and Ternalloy 8 under certain conditions was also determined. AD 71539. DIC Project no. 7030. See PB 123907 for earlier report.

Theory for the effect of mean stress on fatigue of metals under combined torsion and axial load or bending, by W.N. Findley. Brown University. Division of Engineering. Engineering Materials Research Laboratory, Providence, R.I. Mar 1958. 28p graphs. Order from LC. Mi $2.70, ph $4.80. PB 134750

The concept that alternating shear stress is the primary cause of fatigue with the normal stress on the critical shear plane as an influencing factor has been developed for the case of mean (or static) stresses superimposed on combinations of torsion and axial load or bending. The theory explains the fact that the influence of mean stress is small for torsion and stronger for bending of ductile metals but strong for both torsion and bending of cast irons. AD 137083. D/A project no. 5B99-01-004. ORD project no. TB 2-0001. Office of Ordnance Research project no. 1348. Contract DA 19-020-ord-3520, Technical report no. 6. BU EMRL 12.

Thermodynamics and magnetic structures of the allotropic modifications of manganese, by K.J. Tauer and R.J. Weiss. U.S. Arsenal, Watertown, Mass. Materials Research Laboratory. Nov 1957. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 132564

The free energy, entropy and enthalpy of the allotropic modifications of Mn are separated into their magnetic, electronic and lattice components. The energy difference at absolute zero of the various modifications is determined and it is shown that the high temperature body centred modification would be stable at low temperature if not for the presence of the complicated α and β phases which gain sufficient intra atomic exchange energy to more than compensate for the distortional energy of the complex structure. The thermodynamic parameters are consistent with recent ideas on the electronic structure of transition metals and some suggestions are made concerning the presence of these complicated phases. In particular the α, β and δ phases appear related electronically. Dept. of the Army project no. 5-93-32-001. TB 4-001. WAL MRL 33.

Thin ferromagnetic films II, by Solomon J. Glass and Martin J. Klein. Case Institute of Technology. Dept. of Physics, Cleveland, O. Jul 1957. 17p graphs. Order from LC. Mi $2.40, ph $3.30. PB 134703

The spontaneous magnetization of thin films of ferromagnetic materials has been studied by means of the spin wave theory. Results have been obtained for the magnetization as a function of temperature and film thickness for body centered and face centered cubic materials. Contract Nonr 1141(03), NR 017-611, Technical report no. 20.

Transverse magnetoresistance and Hall effect in n-type InSb, by R.T. Bate, R.K. Willardson, and A.C. Beer. Battelle Memorial Institute, Columbus, O. Jul 1958. 27p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 136148

Data are given for fixed temperatures between 50°K and 200°K covering the range from the weak magnetic-field region to the strong-field quantum limit in InSb samples of high mobility and sufficient purity that classical statistics are applicable. AD 162173. Technical note no. 1. Contract AF 49(638)-222. AF OSR TN 58-641.

Ultrasonic welding of structural aluminum alloys, by J. Byron Jones and E.E. Weismantel. Aeroprojects Inc., West Chester, Pa. Jan 1957. 91p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.25. PB 131680

It was shown that ultrasonic welding will produce spot-type solid-state junctions in 1100-H14, 2024-T3 and 7075-T6 Alclad, and 2024-T3 bare aluminum alloys, meeting the shear strength requirements of MIL-W-6860 for resistance spotwelds in 9.081-inch, 0.064-inch, and 0.051-inch sheet thicknesses respectively. The process was shown to be effectively supplemented with heat at low temperatures. Continuous-seam type ultrasonic welds were shown to be feasible. Cleaning preparatory to welding was indicated to be less critical than for aircraft-quality resistance spotwelding. AD 124881. Research report 57-13. Contract NOas 56-161-c.

METEOROLOGY AND CLIMATOLOGY

Artificial atmospherics generation. Part I, by N. M. Newman. Lightning & Transients Research Institute, Minneapolis, Minn. Sep 1957. 58p photos, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 134715

Artificial lightning atmospherics generators, of high enough power, provide a decided advantage in continuing atmospherics propagation investigations, since the source pulse is accurately known both as to exact radiated wave shape and original magnitude. Plans are presented for extended distance wave shape measurements using a 2,000,000 volt generator installed in a "sea-going" schooner laboratory. This would permit varying geomagnetic location in producing high power pulses in the frequency range below 10 KC of interest in "whistler" radiation theory. AD 152376. L and T report 326. Covers period Nov 1955-Sep 1957 under Contract AF 19(604)-1556. AF CRC TR 58-134.

Atmospheric transmission at the center of the great water vapor band at 6.3 microns, by Arthur Adel. Arizona State College. Atmospheric Research Observatory, Flagstaff, Ariz. Mar 1958. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 135285

Thirty-two observations of atmospheric transmission at 6.3 microns are summarized, and several of the unique solar-telluric spectra of the region are reproduced. AD 152480. Scientific report no. HB-2. Contract AF 19(604)-2177. AF CRC TN 58-245.

Cloud albedo, by Laura V. Peugh and Donald A. Melnick. Operations Research Inc., Silver Spring, Md. May 1958. 46p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134914

This report is the result of an extensive literature survey and personal interviews in an attempt to find information on the transmission and albedo of clouds. Because of the scarcity of information found to be available, the present report is limited to the discussion of transmission and albedo as function of cloud type and thickness. AD 152523. Technical report 47. Contract AF 19(604)-1422, Scinetific report no. 4.

Cloud refractive index studies. Part I: Gradient distributions, by Roscoe R. Braham, Jr. and Edward L. Harrington. Chicago. University. Dept. of Meteorology. Cloud Physics Laboratory, Chicago, Ill. Mar 1958. 63p photos, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134959

A study has been made of the small-scale gradients of refractive index found within and around a group of 71 cumulus clouds studied 15 and 19 June 1956 in the vicinity of the Bahama Islands. Data were obtained with a University of Texas microwave refractometer mounted in an Air Force B-29. These flights were a part of the Air Force Geophysics Research Directorate program of refractive index studies. AD 152510. Contract AF 19(604)-1931, Technical note no. 11, Part I. AF CRC TN 58-265.

Cloudiness and precipitation in relation to large scale vertical motion and moisture, by Frederick Sanders. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Mar 1958. 96p diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 134956

The theory of large-scale vertical motion in a simple baroclinic model of the atmosphere is discussed, with particular reference to approximate methods of rapidly calculating this motion. A method of combining dynamical, orographic and frictional contributions to vertical motion is described. AD 152532. Contract AF 19(604)-1305, Scientific report 4. AF CRC TN 58-284. AF CRC TN 58-284.

Cumulative list no. 5 of translations made by the American Meteorological Society. See entry under Bibliography on page 545. PB 134384

Disturbances in sensitive electrometer tube amplifiers. (A contribution to atmospheric electrical measuring technique), by H. Dolezalek. Germany. Wetterdienst. Meteorologisches Observatorium, Aachen, Ger. Jan 1956. 25p. Order from LC. Mi $2.70, ph $4.80. PB 133806

As a supplementary note to Technical Note No. 2 this paper communicates some experiences made in the construction and use of electrometer tube amplifiers in atmospheric electrical measuring technique; it offers some not always self-evident suggestions in this field. AD 110264. For technical note 2 see PB 133805. Contract AF 61(514)-640, Technical report 3. AF CRC TN 57-252.

Electrometer - tube - amplifier in the atmospheric-electrical measuring technique, by H. Dolezalek. Germany. Wetterdienst. Meteorologisches Observatorium, Aachen, Ger. Jan 1956. 41p diagrs, graph. Order from LC. Mi $3.30, ph $7.80. PB 133805

After a short discussion of the amplifiers required for measurements in the field of atmospheric electricity there is given a description of the two basic types of power amplifiers operated with special electrometer tubes. The paper closes with a discussion of amplifiers with electrometer tubes used in the years 1954 to 1956 for synoptical atmospheric electrical and meteorological investigations in the Swiss Alps. AD 110263. For technical report 3 see PB 133806. Contract AF 61(514)-640, Technical note no. 2. AF CRC TN 57-251.

Generalized concept of frontogenesis, by G. Bruce Brown. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Mar 1958. 59p diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 134954

The frontogenesis or development vector is defined as the individual time derivative of any scalar gradient. The frontogenesis vector is composed of a non-conservative term and a kinematical term. It measures both magnitude and direction changes of the vector. Application of the frontogenesis vector to frontal zones, where it becomes discontinuous, is discussed. AD 152553. Contract AF 19(604)-1305, Scientific report 3. AF CRC TN 58-403.

Gravity waves in the lower troposphere over Southern California, by E.E. Gossard. U.S. Navy Electronics Laboratory, San Diego, Calif. Aug 1956. 48p photos, maps, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134876

This study resulted from the observation that long-period sea level fluctuations, called tsunamis, were often accompanied by atmospheric pressure oscillations of approximately the same period (5 to 20 minutes). Deciding whether a relationship between the two existed required a better understanding of both phenomena. SR 06401. NE 120308-1 (NEL-M1-1). NEL R 709.

Hurricane development, by C.S. Ramage. Hawaii. University. Hawaii Institute of Geophysics. Meteorology Division, Honolulu, Hawaii. Jun 1958. 31p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 135252

AD 152593. 1. Hurricanes - Development - Pacific Ocean 2. Contract AF 19(604)-1942, Scientific report no. 3 3. AF CRC TN 58-423

Icing problems and recommended solutions. (Quelque problemes concernant le givrage et solutions recommandees), by E.A. Brun. Advisory Group for Aeronautical Research and Development. Nov 1957. 256p photos, diagrs, graphs, tables (part fold). Order as Agardograph 16 from National Aeronautical and Space Administration, 1520 H Street, N.W., Washington 25, D.C. PB 134811

Presented to the Flight Test Techniques and Instrumentation Panel of AGARD, Jul 1956. Amendments included up to Nov 1957. Text in French and English. 1. Airplanes - Icing 2. Icing tunnels 3. Ice - Thermodynamic properties 4. Ice prevention systems - Wind tunnel tests 5. AGARDograph 16

IGY solar flare studies, by R. Coates, S. Edelson, T. McCullough, and N. Santini. U.S. Naval Research Laboratory. Sep 1958. 10p photos, graphs, Order from LC. Mi $1.80, ph $1.80. PB 134921

An analysis of the time and intensity relationships between solar flares photographed in H-alpha and radio bursts recorded at 10 cm is reported for the period July 1, 1957 - June 30, 1958. The optical data are based on the observations conducted at the Naval Research Laboratory with a flare patrol instrument using a Lyot birefringent filter having a 0.7A bandpass. Comparisons have been made with the 9.4-cm records made at the Naval Research Laboratory and the 10.7-cm observations reported by the National Research Council in Ottawa, Canada. NRL R 5203.

Meteor train measurements by radio echo detection means, by J.S. Greenhow. Manchester. University. Jodrell Bank Experimental Station, Macclesfield, Cheshire, England. May 1957. 17p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 134508

The reflection of radio waves from the ionized trails produced by meteors as they burn away in the upper

atmosphere is discussed. In particular the process of evaporation of meteor atoms is considered in relation to upper atmosphere pressures and temperatures. Expressions relating atmospheric pressure at the point at which a meteor produces its maximum ionisation, to meteor velocity and other physical properties of meteors are given. AD 133818. Covers period 1 May 1956-30 Apr 1957 under Contract AF 61(514)-948, Scientific report no. 1. AF CRC TN 57-240.

Observations on heavy primary cosmic ray nuclei above the atmosphere, by Herman Yagoda. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Ionospheric Physics Laboratory, Bedford, Mass. 43p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 151230

The flux of heavy primaries of $Z \geq 6$ has been evaluated from small emulsion blocks flown on Aerobee rockets especially designed to keep condensed matter below 0.2 g cm^{-2} after penetrating the atmosphere. Parachute recoveries were effected from a day and a night flight. AD 152585. AF GRD P 60. AF CRC TR 58-241.

Research directed toward the application of recording, tabulating and analyzing techniques developed for high frequency fluctuation studies of the scale of turbulence in the boundary layer, by Robert M. Stewart, Jr., James E. Carson, Glen A. Richardson, and Walter H. Evans. Iowa State College. Physics Dept., Ames, Iowa. Apr 1958. 21p. Order from LC. Mi $2.70, ph $4.80. PB 134768

Objectives of the research were: (a) to develop a data processing system suitable for the analysis and reduction of atmospheric high-frequency fluctuation data; (b) to process the field data gathered by cooperating institutions; and (c) to analyze the spectral and scale data in terms of atmospheric stability, mean wind speed, and energy budget factors. AD 152588. Contract AF 19(604)-1042, Final report. AF CRC TR 58-242.

Research on objective weather forecasting: Transformation of potential and internal energy into energy of irrotational motions and into energy of non-divergent motions, by F. Wippermann. Germany. Wetterdienst, Frankfurt/M., Ger. n.d. 9p. Order from LC. Mi $1.80, ph $1.80. PB 133807

This article deals with balance equations for both these kinds of energy as well as for the potential and internal energy. These equations prove that internal and potential energy can be transformed into energy of irrotational motion only; the latter can be further transformed into energy of non-divergent motions. Date is 1952 or later. AD 117251. Contract AF 61(514)-735-C, Technical note 5. AF CRC TN 57-486.

Studies on the interaction between ocean and atmosphere with application to long range weather forecasting, by G. Neumann, E. Fisher, and others. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography, New York, N.Y. Apr 1958. 109p maps, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 135213

Variations of the sea surface temperature appear large enough even in the monthly mean for a given oceanic region to be significant as a source of possible changes in large amounts of energy made available to the atmosphere. The origin and behavior of monthly mean sea surface temperature anomalies is studied for the central and eastern part of the North Atlantic Ocean. A detailed analysis of the pronounced warming trend in the periods 1876-1900, followed by a period of cooling between 1900 and 1925 and subsequent warming from 1925 through 1950 is carried out with regard to seasonal and geographical distribution. AD 152555. Contract AF 19(604)-1284, Final report. AF CRC TR 58-236.

Temperature differences in Harvard Forest and their significance, by Herbert H. Rasche, U.S. Army. Quartermaster Research and Engineering Command. Quartermaster Research and Engineering Center. Environmental Protection Research Division, Natick, Mass. Jan 1958. 168p maps, photos, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 135290

1. Forests and forestry - Temperature - Measurements 2. Harvard forest -Temperature
3. QMC EP TR 80

MINERALS AND MINERAL PRODUCTS

Preparation of tungsten carbide-uranium compacts of high density and high hardness. Final report under Contract no. DA 19-020-ORD-2053, by P.A. Kulin and N.S. Dallas. Manufacturing Laboratories, Inc., Boston, Mass. Dec 1953. 41p photos, drawing, diagr, tables. Order from OTS. $1.25. PB 131751

The combinations with 27 wt. % tungsten carbide, 72 wt. % uranium, and 1 wt. % of either cobalt, iron, nickel, or chromium were found to possess both densities greater than 16 g/cc. and Rockwell "A" hardness values between 80 and 85. During either sintering or hot pressing, the uranium metal reacted (at around 800°C) with the tungsten carbide to form free tungsten and uranium monocarbide. By employing hotpressing techniques densities between 16.1 and 16.3 g/cc. (96 to 97% of theoretical) could be achieved. AD 29261. O.O. project TA 1-5002. D.A. project 504-01-001. WAL R 762/634-13.

Proceedings of symposium on barium titanate accelerometers, Washington, D.C., May 14-15, 1953. U.S. National Bureau of Standards. Aug 1953. 252p photos, diagrs, graphs. Order from OTS. $4.00. PB 151161

1. Accelerometers, Barium titanate 2. NBS 2654

Progress report no. VII, Covering period 1 Jun-1 Sep 1954, by E.J. Smoke, A.V. Illyn, and B.R. Eichbaum. New Jersey Ceramic Research Station. Rutgers University, New Brunswick, N.J. Oct 1954. 84p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 134901

Discusses development of ceramic bodies with high thermal conductivity, high thermal shock resistance, low electrical loss, and high impact resistance, and precision molded and machined radio ceramics. For reports 1-2 see PB 116690-116691. DA 36-039-sc-42577, Report 7.

Report on hafnium carbide, by M.A. Schwartz. Fairchild Engine and Airplane Corp. NEPA Division, Oak Ridge, Tenn. Dec 1948. 14p. Order from LC. Mi $2.40, ph $3.30. PB 135174

ATI 186868. 1. Atomic power - Research 2. Hafnium carbide - Properties 3. NEPA 878-EMR-43

Stability of zirconium boride in hydrogen at elevated temperatures in the program on the stability of refractory elements and compounds in a hydrogen atmosphere at elevated temperatures, by L.A. Ohlinger. Northrop Aircraft, Inc., Hawthorne, Calif. Sep 1948. 15p photos, diagr, tables (1 fold). Order from LC, Mi $2.40, ph $3.30. PB 135668

AD 146565. Report NRR-167. Declassified 25 Nov 1957. 1. Zirconium boride - Thermal properties 2. NEPA 783-NOR-58

ORDNANCE AND ACCESSORIES

Effect of variation of cavity geometry upon small arms tracer burning, by R. Shulman. U.S. Frankford Arsenal. Pitman-Dunn Laboratories Group, Philadelphia, Pa. Nov 1957. 16p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134631

Using two standard tracer compositions, R-256 and R-257, and working within the cavity limitations of small arms tracer ammunition, data have been compiled which satisfactorily correlate tracer performance with variation in tracer column dimensions. D/A project no. 5S0405028. OCO project no. TSI-46. FALR R 1421.

Prediction of the motion of missiles acted on by non-linear forces and moments, by Charles H. Murphy. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1956. 74p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 134636

It is shown that for an important subset of the set of fourth order systems, the use of the complex variable allows the quick derivation of the required results. This technique is applied in some detail to the prediction of missile yawing motion. The effects of gravity-induced yaw of repose and of small aerodynamic asymmetries on the general non-linear problem are discussed in an appendix. D/A project no. 5B03-03-001. Ord project no. TB 3-0108. APG BRL R 995.

Study of the resonating yawing motion of asymmetrical missiles by means of analog computer simulation, by Jo Ann M. Schmidt. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Nov 1954. 26p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 134637

A study was made with the aid of an analog computer of the yawing motion of asymmetrical missiles whose rolling velocities were in or near the resonance region. This was done in an effort to determine whether this motion is adequately described by the linearized theory. The technique of curve fitting is described and qualitative and quantitative results are presented. D/A project no. 503-03-00. Ord project no. TB 3-0108. APG BRL R 922.

PACKING AND PACKAGING

Studies of special-purpose rigid containers. Texas. University. Structural Mechanics Research Laboratory, Austin, Tex. Contract DA 19-129-qm-287. Project no. 7-91-03-015A. Order separate reports described below from LC, giving PB number of each part ordered.

Phase V: Wood blocks as energy absorbers, by Horace E. Staph. Oct 1957. 98p photos, diagrs, graphs, tables. Mi $5.40, ph $15.30. PB 134890

The capacity of wood for absorbing impact energy and also the principles which should govern the design of wood blocking for effective energy absorption have been studied. Average stress-strain curves are presented for impacts on small blocks of dense Southern Yellow Pine. The effects of variations in the weight of the impacting mass, the impact velocity, block dimensions, and moisture content of the wood are shown. R-303-Report no. 5.

Phase VI: Fatigue tests on nail-wood joints, by Hudson Matlock and J. Neils Thompson. Oct 1957. 56p photo, diagrs, graphs, table. Mi $3.60, ph $9.30. PB 135451

An endurance limit of about 100 lb per nail was established for 7d nails in Southern Yellow Pine. No particular difference in strength was observed between loading parallel to or perpendicular to the grain. Three machines developed for fatigue testing of nailed joints are described, and results obtained using each machine are presented and compared.

Phase VII: Impact studies of nailed-wood joints, by Horace E. Staph. Nov 1957. 44p photo, diagrs, graphs, tables. Mi $3.30, ph $7.80. PB 135452

Lap joints of nominal 1 x 4 Southern Yellow Pine fabricated with 6d and 7d cement-coated coolers were impact loaded and the results compared with static tests on similar joints. Maximum resisting load and the energy absorbed during impact are proportional to the number of nails in the joint. Joint strength per nail increases as the size of the nail increases, provided the nail size is not so large as to split the wood. Nailing pattern is critical, because joints having two aligned along the grain are prone to split under load. Maximun resistance to loading under impact is less than maximum resistance due to static loading.

Tin coating weight of cans for certain subsistence items, Phase II. Period 19 Jun 1954 - 31 Jan 1956, by D. F. Sampson. American Can Company. Research and Technical Dept. Technical Service Division, Maywood, Ill. n.d. 19p tables. Order from OTS. 50 cents. PB 131637

The primary objective was to determine the relative service life value from the standpoint of internal corrosion of cans made from plate of different weights of tin coating for several different classifications of products for which there was no specific information, or the products were not commercially packed for normal civilian trade. Based on the 98° 98°F. storage results, two products: (1) pork and apple sauce, and (2) meat and beans with tomato sauce, were the most corrosive of the twelve products under investigation. None of the others exhibited significant failures after two years storage at this temperature. American Can Company project 7-91-03-014. Report no. 3 (Final) Appendix 1: Product and container examination - Appendix 2: Service life examination. Contract DA 21-018-Eng-500, Final report.

PERSONNEL APTITUDE TESTING

Study of the validity of educational and occupational ability patterns, by David V. Tiedeman. Harvard University, Cambridge, Mass. Apr 1957. 5p. Order from LC. Mi $1.80, ph $1.80. PB 134869

1. Ability tests - Evaluation 2. Education - Research 3. Contract N5 ori-07669, Final report

PHOTOGRAPHIC AND OPTICAL GOODS

Flash rate as a visual coding dimension for information, by Jerome Cohen and Albert J. Dinnerstein. Antioch College, Yellow Springs, O. May 1958. 17p diagr, graphs, table. Order from OTS. 50 cents. PB 151185

An experiment was performed to determine the relationship between flash frequency of a light and the ability to correctly identify the various rates. This information is needed to make recommendations about flash rate as a stimulus dimension for the coding of information for visual displays. Ten subjects made absolute judgements of nine flash rates varying from one flash per four seconds to twelve per second. The rates were presented by a high intensity blue-white strobotron tube, masked to a point source. AD 118018. Project 7186; Task 71545. Contract AF 33(616)-3404. AF WADC TR 57-64.

Inverse scattering problem in geometrical optics and the design of reflectors, by Joseph B. Keller. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research New York, N.Y. Jan 1958. 14p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 134974

The inverse scattering problem considered here is that of finding the shape of a reflector which produces a precribed scattered wave. The scattered wave is characterized by its angular pattern, which determines the differential scattering cross section of the reflector. The problem is solved by means of explicit formulas for cylindrical and for rotationally symmetric objects. Plane, cylindrical and spherical incident waves are considered. The general three dimensional object is also treated. The method of geometrical optics is used throughout. AD 146887. Contract AF 19(604)-1717. NYU RR EM-110. AF CRC TN 58-130.

Investigations of the effect of gas collisions upon the Doppler breadth of spectral lines, Radio frequency transitions between hyperfine levels of atomic hydrogen. Final report covering period 15 Jun

1952-31 Aug 1955, by R.H. Romer, J.P. Wittke, and others. Princeton University. Palmer Physical Laboratory, Princeton, N.J. Sep 1955. 358p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $54.60. PB 134910

Contents: Appendix I: A redetermination of the hyperfine splitting in the ground state of atomic hydrogen. Thesis: J.P. Wittke. II: A method for the reduction of the Doppler width of microwave spectral lines. Thesis: R.H. Romer. 1. Spectral lines - Broadening - Theory 2. Doppler effect 3. Atomic power - Research 4. Molecules - Collisions 5. Contract DA 36-039-SC-42539, Final report

Retinal light distribution for circular apertures seen in Maxwellian view, by Gerald Westheimer. Ohio State University. Research Foundation, Columbus, O. May 1957. 13p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 134867

A theoretical treatment is presented of the effect of the size of the pupil of the eye on the intensity distribution in retinal images of circular apertures seen in Maxwellian view. Amplitude and intensity distributions have been evaluated for a given aperture diameter for various pupil sizes and for various aperture diameters for a given pupil size. The effect of these on resolution is discussed and some applications of the results are indicated. Contract Nonr-495(09), NR 140-105. OSURF Proj 654, Technical report no. 2.

X-ray focusing by diffraction, by Albert V. Baez. Redlands. University, Redlands, Calif. Jun 1957. 7p. Order from LC. Mi $1.80, ph $1.80. PB 134510

1. X-rays - Focusing 2. X-rays - Diffraction - Analysis 3. Contract Nonr 1780(00), NR 011-709, Final report

PHYSICS

General

Bond strengths and activation energies. Decomposition kinetics of simple molecules, by Virginia F. Griffing and Francis Owen Rice. Catholic University. Dept. of Chemistry, Washington, D.C. n.d. 8p. Order from LC. Mi $1.80, ph $1.80. PB 134764

AD 87527. Date is 1956 or later. Final report on Tasks no. 1 and 2 under Contract AF 18(600)-64. 1. Atomic power - Research 2. Molecular interactions 3. Kinetic reactions, Molecular 4. Decomposition, Thermal 5. AF OSR TR 56-18

Cooling of a hot surface by drops boiling in contact with it, by P. Savic. National Research Council of Canada. Division of Mechanical Engineering Ottawa, Canada. Apr 1958. 47p photo, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134270

A theory is developed which describes the growth and collapse of a vapour bubble in a liquid with temperature gradient. It is shown that the results of the calculations agree in some measure with observation of other workers. In the appendix the fluid dynamical treatment of a previous report is extended and it is shown that the thickness of the forward edge of the drop advancing over the solid surface can be calculated by a "boundary layer" type of treatment, taking account of capillary effects which elsewhere in the drop may be neglected. NRCC MT-37.

Damping of transverse vibrations of thin beams of air, by W.E. Baker and F.J. Allen. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1957. 46p photos, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 134497

A non-linear partial differential equation describing the free transverse vibration of thin beams in air is formulated. The equation accounts for two types of force on the beam caused by its motion through the air and for the force caused by internal friction of the beam material, in addition to the usual elastic and inertia forces. An approximate solution to the equation is obtained by a perturbation method. A series of experiments were conducted at large initial vibration amplitudes to corroborate the theory, which predicts that "pressure drag" air damping is proportional to amplitude and that "viscous drag" air damping and internal damping are independent of amplitude. The dependance of pressure drag damping on air pressure is also predicted. The experimental results show reasonable agreement with the theory; however, the importance of viscous air drag damping relative to that of internal friction cannot be determined. D/A project no. 5B03-04-002. ORD project no. TB 3-0112. APG BRL R1033.

Experiment on the axisymmetric free-convection field along a vertically-suspended wire, by Francis R. Hama and Jean Christiaens. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. May 1958. 32p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 134714

In order to extend previous investigations on thick axisymmetric free-convection field to a higher range of the x-parameter, temperature profile along an electrically-heated vertical wire of 0.02 inch diameter and 5 foot length is measured by use of an interferometer. Experimental results are again in good agreement with the theory. AD 158249. Contract AF 18(600)-1014. AF OSR TN 58-444. UM BN 138.

Natural convection inside a flat rotating container, by Simon Ostrach and Willis H. Braun. U.S. National Advisory Committee for Aeronautics Sep 1958. 27p diagrs, graphs. Order as TN 4323 from National Aeronautical and Space Administration, 1520 H Street, N.W., Washington 25, D.C. PB 135297

Froude number is found to be the parameter that determines the effect of body rotations on internal natural convection flows. Explicit forms of Froude number are determined for the cases of predominant rotation and predominant axial force. In a heated flat cylindrical container no significant convective effects are generated by rotations alone. Moreover, rotation tends to inhibit the flow and heat transfer generated by an axial body force in such a configuration. Insertion of radial vanes in the container eliminates the detrimental effects of rotation and improves the heat transfer. NACA TN 4323.

Note on acoustic energy flow in a moving medium, by H.S. Ribner. Toronto. University. Institute of Aerophysics, Toronto, Canada. Apr 1958. 13p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 134663

Comparison is made of similarities and discrepancies in the formulas of three investigators in order to infer a correct formulation. Example applications show how variations in the velocity of a stream carrying plane sound waves can change the "linear theory" acoustic energy density from positive through zero to negative, with corresponding changes in the energy flow. AD 154265. UTIA Technical note no. 21. Defense Research Board of Canada Grant no. 9551-02. Contract AF 49(638)-249. AF OSR TN 58-360.

Rectangular plates; a new approach, by Patrick M. Quinlan. Ireland. National University. University College, Cork, Ireland. Jan 1958. 49p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 134511

In introducing a delta function into the plate equation for a concentrated load a Fourier double sine series expansion is obtained for the deflection in a simple supported rectangular plate. The series is then summed to produce a single infinite series. AD 154163. Contract AF 61(514)-1163, Technical note no. 3. AF OSR TN 58-259.

Structure of a hydromagnetic shock in steady plane motion, by G.S.S. Ludford. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Apr 1958. 28p graphs. Order from LC. Mi $2.70, ph $4.80. PB 134620

This paper considers the transition solutions (depending on one coordinate x only) of the equations of steady plane motion of an electrically conducting perfect viscous gas in the presence of a magnetic field in its own plane, on the basis of classical continuum theory. AD 158221. Project: 47500. Contract AF 49(638)-154. AF OSR TN 58-418. UM BN 131.

Study of a family of Laves-type intermediate phases. Final technical report under Contract AF 18(603)-130, by Rodney P. Elliott. Armour Research Foundation, Chicago, Ill. Feb 1958. 17p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134513

Ternary alloys between binary Laves-type phases of transition elements have been used to investigate the valencies of the transition elements. Systems containing constant atomic proportions of niobium, tantalum, and hafnium indicate that the valencies of the first transition series decrease continuously with increasing atomic number. Unreconcilable data indicate that factors other than the free electronic valency are affecting the free energy and hence the miscibility ranges of the ternary Laves phases. AD 154199. Previous reports are under Contract AF 18(600)-1399. ARF Proj B-113, Final report. AF OSR TR 58-49.

Thermal conductivity of pure liquids, by W.J. Scheffy and E.F. Johnson. Princeton University. James Forrestal Research Center, Princeton, N.J. Aug 1957. 42p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 135108

The first section describes a general correlation of thermal conductivity based on a limited theoretical picture and inadequate experimental data, but having the advantages of simplicity and ease of application. The second section concerns an experimental apparatus and some results for thermal conductivities at ordinary temperatures, and finally, in the third part, is a description of the high-temperature apparatus and the results obtained for a number of liquids. Technical report PR-71-M. Contract N5-ori-105, T.O. III, NR 098-038. Project Squid.

Torsion of cylindrical and prismatic bars in the presence of primary creep, by Sharad A. Patel and K.A.V. Pandalai. Polytechnic Institute of Brooklyn, Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N.Y. Apr 1958. 12p diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 134662

This paper is concerned with the primary creep behavior of cylindrical and prismatic bars in which the deformations are caused by pure torsion. The creep problem is first reduced to one in nonlinear elasticity by means of the elastic analog. The solutions for certain cross sections are presented in closed-form. AD 154213. Project no. 17500. Contract AF 49(638)-302. PIBAL 417. AF OSR TN 58-303.

Turbulence theory in the light of the circular pipe, by Max M. Munk. Catholic University of America, Washington, D.C. May 1957. 26p. Order from LC. Mi $2.70, ph $4.80. PB 134868

The author's turbulence theory is applied to and examined by the classical pipe flow tests of Nikuradse. It results that the lump size varies proportional to the square root of the wall distance. The sublayer thickness observed is consistent with the result and with the theory. Contract N6 onr 255, T.O. V.

Two-phase flow in gas-liquid systems. See entry under Bibliography on page 546. PB 135015

X-ray determination of the number of 3d electrons in Cu, Ni, Co, Fe and Cr, by R.J. Weiss and J.J. DeMarco. U.S. Arsenal, Watertown, Mass. Materials Research Laboratory. Jul 1957. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 132089

Widely varying suggestions have been made concerning the basic nature of ferromagnetic in metals in terms of the 3d electron configuration. There is at present little experimental evidence to substantiate any of the theories. This paper presents experimental measurements made of the x-ray scattering factors in the first transition group of elements. OO TB 4-911. DA 593-26-006. WAL MRL 32.

Nuclear

Calculation of the energy absorption potential for the blast shield of the Argonne National Laboratory nuclear reactor, EBR-II, by Walter R. Wise, Jr. U.S. Naval Ordnance Laboratory, Feb 1957. 21p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 134895

The blast shield fo the Argonne National Laboratory reactor, EBR-II consists of cylindrical laminae of steel, celotex, and wood; the function of which is to absorb a portion of the energy which would be released by the reactor in the event of a nuclear excursion. General equations are derived for determining the energy absorption potential for the shield in terms of radial strain of the outermost steel cylinder. NAVORD 4470.

Calculation of the radiation dose delivered by beta emitting isotopes. Part I: Point and thin plane sources in air, by Edward A. Burke. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1957. 23p graphs. Order from OTS. 75 cents. PB 131343

This report is the third in a series concerned with the development of methods for calculating the radiation dose delivered by the beta emitting isotopes. The previous reports were issued as WADC TN 56-101 and WCRT TM 56-27. This report extends the basic equations previously developed for all beta emitting isotopes. An empirical function for the dosage distribution around a point source of phosphorous -32 presented in WADC TN 56-101 has been extended to include all other beta emitting isotopes and found to be in excellent agreement with available experimental data. AD 130864. Project 7360, Task 73607. Covers work from Mar-Apr 1956. AF WADC TN 56-191, Part 1.

Crystal structures of plutonium: Delta and epsilon phases, by J.G. Ball, P. Greenfield, P.G. Mardon and J.A.L. Robertson. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 14p diagr, tables. Order as AERE M/R 2416 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 50 cents. PB 135022

S.O. code 91-3-5-31. Manuscript dated Apr 1954. Declassified version of AERE M/R 1409. 1. Atomic power - Research - Gt. Brit. 2. Plutonium - Crystal structure - Gt. Brit. 3. AERE M/R 2416

Effective removal cross section with a monodirectional source of fission neutrons, by R.D. Schamberger. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. 49p diagrs, graphs, tables. Order from OTS. $1.25. PB 151217

The effective fast neutron removal cross section with a monodirectional fission source has been obtained for hydrogen, lithium, beryllium, boron, carbon, oxygen, fluorine, sodium, aluminum, sulfur, chlorine, titanium, iron, nickel, copper, cadmium, tungsten, lead and bismuth. The cross section per atom for those elements with an atomic weight greater than twelve are approximated quite well by the expression $\sigma = 0.4A \cdot 43.10^{-24}$ cm^2 where A is the atomic weight. These cross sections are significantly larger than the conventional removal cross sections obtained with a sample close to a distributed isotropic source. The increased effective cross section is ascribed to the fact that the angular distribution of the incident neutrons is very strongly peaked in the forward direction. AD 155598. Project 7112, Task 70717. AF WADC TR 58-266. Covers period fall 1954-Dec 1957.

Excited state wave functions, excitations, excitation energies, and oscillator strengths for argon ($3p^5 4s$), by Robert S. Knox. Rochester. University. Institute of Optics, Rochester, N.Y. Dec 1957. 23p tables. Order from LC. Mi $2.70, ph $4.80. PB 133311

AD 148023. R-355-20-7. 1. Hartree - Foch equa-

tions 2. Argon - Spectrographic analysis 3. Argon - Absorption 4. Contract AF 18(600)-688 5. AF OSR TN 57-791

Experimental nuclear physics. Fairchild Engine and Airplane Corp. NEPA Division, Oak Ridge, Tenn. USAF project MK 821(NEPA). Order separate parts described below from LC, giving PB number of each part ordered.

Volume I, by S. DeBenedetti. Aug 1948. 188p diagrs, graphs, tables. Mi $8.40, ph $28.80. PB 135175

A.T.I. 62595. NEPA -637-IER-7. Lecture notes used in presenting Part I of the course "Experimental Nuclear Physics" at the NEPA Summer Seminar, Jun-Sep 1947. 1. Atomic power - Research

Volume II, by A.C.G. Mitchell. Sep 1947. 79p diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 135176

ATI 55220. 1. Atomic power - Research 2. NEPA 926-IER-11

Form factors in quantum electrodynamics, by S.D. Drell and F. Zachariasen. Stanford University. Dept. of Physics, Stanford, Calif. May 1958. 39p. Order from LC. Mi $3.00, ph $6.30. PB 134761

The electromagnetic form factors of an electron in pure quantum electrodynamics (QED) are analyzed with the techniques of dispersion relations. The viewpoint is adopted here that no subtractions are required in the construction of dispersion relations for the electronmagnetic vertex. This leads to coupled integral equations for the form factors in terms of other physical amplitudes; electron-positron scattering, for example. The relation between this and the usual perturbation approach to QED, and the validity and consequences of the "no subtraction" philosophy, are discussed. Project 3750-37504. AD 158214. Contract AF 18(600)-545. AF OSR TN 58-411. SU DP TR 31.

Geometric factors for resonance capture in cylindrical fuel elements, by Raymond L. Murray. Alco Products, Inc., Schenectady, N.Y. Dec 1956. 21p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 134723

APAE memo 74. 1. Neutrons - Scattering 2. Neutrons - Resonance levels 3. Contract DA 44-009-Eng-2868

Heat transfer in static granular beds, compiled by E. McCoy and A.J. Townend. Gt. Brit. Atomic Energy Authority. Industrial Group, Warrington, Lancashire, England. May 1957. 6p. Order as IGRL/IB/CA-23 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 32 cents. PB 135009

S.O. code 91-10. 1. Atomic power - Research - Gt. Brit. 2. Heat - Transference - Bibliography - Gt. Brit. 3. IGRL-IB/CA-23

High current proton source, by P.C. Thoneman and E.R. Harrison. Gt. Brit. Atomic Engergy Authority. Research Group, Harwell, Berkshire, England. 1958. 18p photos, diagrs, graph, tables. Order as AERE GP/R 1190 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 77 cents. PB 135018

S.O. code 91-3-5-24. Manuscript dated 1955. 1. Atomic power - Research - Gt. Brit. 2. Accelerators, Linear - Ions - Sources - Gt. Brit. 3. Protons - Sources - Design 4. AERE GP/R 1190

Hydromagnetic instabilities of a cylindrical gas discharge, by R.J. Tayler. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 52p diagr, graphs, tables. Order as AERE TP/R 2374 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.34. PB 135033

S.O. code 91-3-5-27. Manuscript: Jan 1956. Declassified version of AERE T/R 1859. 1. Atomic power - Research - Gt. Brit. 2. Gas - Discharge - Gt. Brit. 3. AERE TP/R 2374

Inelastic scattering of cold neutrons by crystals. Part I: Theory, by P.A. Egelstaff. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 37p diagrs, graphs, table. Order as AERE N/R 1164 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.04. PB 135023

S.O. code 91-3-5-4. Manuscript: 20 Apr 1953. Declassified 7 Nov 1956. 1. Atomic power - Research - Gt. Brit. 2. Neutrons - Scattering - Theory - Gt. Brit. 3. Neutrons - Cross sections - Gt. Brit. 4. AERE N/R 1164

Investigation of the effects produced in solids by irradiation or otherwise, by C.V. Heer. Ohio State University. Dept. of Physics and Astronomy, Columbus, O. Jan 1958. 11p. Order from LC. Mi $2.40, ph $3.30. PB 134763

This report is a summary of a four-year investigation of the effects of defects produced in solids by irradiation or otherwise, and serves as a final report under Contract No. 18(600)-1003 which was in force from October 15, 1953 through December 14, 1957. A partial description of the activities of the various participants, and their prime contributions

to the research program, are given via references to publications, papers, theses, etc. A more detailed discussion of some of the activities then follows. AD 154297. Project no. 15791. Contract AF 18(600)-1003. OSURF Proj 582, Final technical report. AF OSR TR 58-59.

Magnetic susceptibilities of uranium (IV) ions in cubic crystalline fields, by Clyde A. Hutchison, Jr., and George A. Candela. Chicago. University. Enrico Fermi Institute for Nuclear Studies, and Dept. of Chemistry, Chicago, Ill. 1958. 14p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134677

ONR contract not listed. 1. Atomic power - Research 2. Uranium compounds - Magnetic properties 3. Uranium ions - Magnetic properties 4. Contract N6 ori-02027

Migration length of neutrons in an infinite lattice. Third report, by D.J. Behrens. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 11p tables. Order as AERE T/R 239 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 50 cents. PB 135027

S.O. code 91-3-5-42. Manuscript: Aug 1948. 1. Atomic power - Research - Gt. Brit. 2. Neutrons - Migration length - Gt. Brit. 3. AERE T/R 239

Monte Carlo method for computing the transmission of fast neutrons through a lead shield, by Jack Thomas Humphries. U.S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 63p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 134685

A digital computer program, employing Monte Carlo techniques, has been designed to compute the transmission of fast neutrons through a spherical lead shield. The source is contained in a void at the center of the shield and surface fluxes are computed. Both elastic and inelastic scattering of the neutrons are considered by the program. Flow charts have been constructed to facilitate coding. Thesis, U.S. Air Force. Institute of Technology, 1958.

Naval Research Laboratory research reactor. Part VI: A compilation of core loadings, by K.W. Marlow, E.I. Nowstrup, and R.H. Vogt. U.S. Naval Research Laboratory. Sep 1958. 32p photos, diagrs, tables. Order from OTS. $1.00. PB 131959

A compilation has been made of core loadings of the NRL research reactor from September 1956 to July 1958. Properties measured include critical mass, excess reactivity, total mass, and critical rod positions. Configurations investigated include external reflector variations, split cores, and cores containing fuel-free regions. For Parts 1-5 see PB 111859, 121050, 131303, 121879, 131734. NRL R 5184.

Neutron attenuation in concrete, by K.T. Spinney. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Feb 1958. 14p graphs. Order as AERE T/R 2507 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 50 cents. PB 135030

S.O. code 91-3-5-34. Manuscript: Feb 1955. Declassified version of AERE T/R 1617, SWP/P21. 1. Atomic power - Research - Gt. Brit. 2. Neutrons - Attenuation - Gt. Brit. 3. Neutrons - Shielding - Materials - Gt. Brit. 4. AERE T/R 2507

Neutron beam characteristics from the University of California 60-inc. cyclotron, by E. Tochilin and G.D. Kohler. U.S. Naval Radiological Defense Laboratory, San Francisco, Calif. Jan 1957. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 135166

NS-081-001. Technical objective AW-7. 1. Cyclotrons - Beams 2. USNRDL TR 129

PC conservation in strong interactions, by S.D. Drell, S.C. Frautschi, and A.M. Lockett, III. Stanford University. Dept. of Physics, Stanford, Calif. May 1958. 8p. Order from LC. Mi $1.80, ph $1.80. PB 134760

Gupta has suggested combined PC reflection (P-parity; C - charge conjugation) as the appropriate symmetry operation, both for strong and weak interactions. This note extends Gupta's considerations to include charged mesons, hyperons, and K mesons, and considers experimental complications of the application of the PC selection rule to the strong interactions. AD 158215. Project no. 3750-37504. Contract AF 18(600)-545. AF OSR TN 58-412. SU DP TR 30.

Plasma jet and its application, by Gabriel M. Giannini. Giannini Research Laboratory, Santa Ana, Calif. Aug 1957. 31p photo, diagrs, graphs. Order from OTS. $1.00. PB 131647

This is a basic discussion on the principals and theories of plasmas, its interrelationships to other physical and astrophysical phenomena, its present and future applications and its many potentialaties. AD 136505. Contract AF 49(638)-54. AF OSR TN 57-520.

Problem in the slowing down and diffusion of neutrons in hydrogeneous media with complex geometry, by K. T. Spinney. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 32p diagrs. Order as AERE T/M 53 from British Information Services 30 Rockefeller Plaza, New York 20, N.Y. PB 135024

S.O. code 91-3-5-13. Manuscript dated 10 Dec 1951. 1. Atomic power - Research - Gt. Brit. 2. Neutrons - Shielding - Materials - Gt. Brit. 3. Neutrons - Attenuation - Gt. Brit. 4. AERE T/M 53

Proceedings of the Tripartite Conference on cross-sections of fissile nuclei, edited by N. J. Pattenden. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Jan 1957. 154p photos, diagrs, graphs, tables. Order as AERE NP/R 2076 (Rev.) from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $3.91. PB 135011

S.O. code 91-3-3-44. T.N.C.C. (U.K.) 9 1. Atomic power - Research - Gt. Brit. 2. Nuclei - Energy levels - Gt. Brit. 3. Fission theory - Gt. Brit. 4. Uranium - Fission - Gt. Brit. 5. Plutonium - Fission - Gt. Brit. 6. AERE NP/R 2076 (Revised)

Production of high density proton currents for colliding beam accelerators at 15 GeV, by J. W. Burren, D. Morgan, and W. Walkinshaw. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Mar 1958. 41p diagrs, graphs, table. Order as AERE T/R 2519 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.16. PB 135032

S.O. code 91-3-5-40. 1. Atomic power - Research - Gt. Brit. 2. Protons - Beams - Gt. Brit. 3. AERE T/R 2519

Programme for solving the multigroup neutron diffusion equations in two space dimensions on the Ferranti mercury computer, by A. Hassitt. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Feb 1958. 41p diagrs. Order as AERE T/R 2487 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $1.16. PB 135028

S.O. code 91-3-5-20. 1. Atomic power - Research - Gt. Brit. 2. Mathematical functions - Symmetrization - Theory - Gt. Brit. 3. AERE T/R 2487

Radiation shielding. Gt. Brit. Atomic Energy Authority. Industrial Group, Warrington, Lancashire, England. Sep 1957. 14p. Order as IGRL-IB/R-30 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 40 cents. PB 135008

S.O. code 91-10. 1. Atomic power - Research - Gt. Brit. 2. Radiation - Shielding - Bibliography - Gt. Brit. 3. IGRL-IB/R-30

Some fission product partition data for butex (dibutyl carbitol), by H.A.C. McKay, K. Alcock, and D. Scargill. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 6p graph, tables. Order as AERE C/R 2221 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 37 cents. PB 135012

S.O. code 91-3-5-41. Declassified version of C/R 1212. 1. Atomic power - Research - Gt. Brit. 2. Fission products - Separation - Gt. Brit. 3. AERE C/R 2221

Some properties of the spheroidal square-well nuclear potential, by Jack L. Uretsky. Massachusetts Institute of Technology, Cambridge, Mass. Jun 1957. 61p graphs (1 fold), tables. Order from LC. Mi $3.90, ph $10.80. PB 134964

The extension of the nuclear shell model to the case where nucleons move in a potential of short range finite depth, and spheroidal symmetry presents an imposing computational problem. The behavior of the two sets of solutions as functions of the well deformation have been found to be very similar. DSR project 6915: Machine methods of computation and numerical analysis. For other reports under this Contract see PB 123131, 123132, 124888 and 134979. Contract N5 ori-60, Technical report 7.

Spectral distribution of gamma rays propagated in air, by L.D. Gates, Jr., and C. Eisenhauer. U.S. Armed Forces Special Weapons project. Weapons Effects Division, Washington, D.C. Jan 1954. 119p graphs, tables. Order from LC. Mi $9.60, ph $33.30. PB 134737

Theoretical calculations are presented for the special distribution of gamma rays in an infinite homogeneous medium emanating from geometrically idealized sources. Graphical material is presented in the form of differential energy spectra for monoenergetic sources of various energies. The calculations were based on the so called "method of moments", and the mathematical explanation underlying this method is presented in some detail. References on this method and general background material are given in the bibliography. AFSWP 502A.

Steady state temperature distributions in a type of reactor channel with reversal of coolant flow, by D.V. Wordsworth. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. 1958. 16p diagr, graph. Order as AERE E/M 72 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 50 cents. PB 135016

S.O. code 91-3-5-28. Manuscript dated 22 Jun 1953. 1. Atomic power - Research - Gt. Brit. 2. Reactors - Cooling systems - Gt. Brit. 3. AERE E/M 72

Variational principle of one-group diffusion theory for anisotropic and inhomogeneous media, by R.T. Ackroyd. Gt. Brit. Atomic Energy Authority. Industrial Group, Warrington, Lancashire, England. Apr 1957. 7p. Order as IGR-R/R-209 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 41 cents PB 135010

S.O. code 91-10. 1. Atomic power - Research - Gt. Brit. 2. Reactors, Neutron - Flux distribution - Gt. Brit. 3. IGR-R/R-209

Weisskopf units, by D.H. Wilkinson. Gt. Brit. Atomic Energy Authority. Research Group, Harwell, Berkshire, England. Mar 1958. 4p diagrs. Order as AERE T/R 2492 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 26 cents. PB 135029

S.O. code 91-3-5-29. 1. Atomic power - Research - Gt. Brit. 2. Waves, Electromagnetic - Mathematical analysis - Gt. Brit. 3. AERE T/R 2492

PHYSIOLOGY

Aircrew fatigue problems during extended endurance flight. Phase I: Planning, by O. S. Adams. Lockheed Aircraft Corporation, Marietta, Ga. May 1958. 93p photos, diagrs. Order from OTS. $2.25. PB 151189

A plan is outlined for an experimental program designed to determine the effects of confinement-induced stresses on a five-man crew isolated in a flight station for a period of 120 hours. The experimental crew compartment is described and illustrated, and the performance tasks, programming and recording instrumentation, together with the laboratory techniques planned for use in the experiment, are explained. AD-130 983. Task 63614. Contract AF 33(616)-3745. AF WADC TR 57-510.

Effect of dry and wet clothing on body cooling at low air temperatures, by John F. Hall, Jr., Allan P. Kearny, Johannes W. Polte, and Stanley Quillette. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1958. 34p photos, graphs, tables. Order from OTS. $1.00. PB 151206

Skin, rectal, and extremity temperatures of clothed subjects, immersed in cold water (0°C) for brief periods and then exposed, while occupying a life raft, to ambient air temperatures ranging from +4.4° to -28.9°C, were measured. Amount and partitioning of the water absorbed by the clothing and effects of water immersion upon metabolic level were determined. For comparative purposes, cooling rates of these subjects wearing dry clothing at the various air temperatures were also determined. On the basis of total body-heat-storage loss, a series of predictive curves for human tolerance for subjects clothed in wet and dry garments while exposed to various low air temperatures in a life raft is presented. AD-155639. Task 71830. AF WADC TR-57-769.

Effects of severe whole body vibration on mice and methods of protection from vibration injury, by J. Roman. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1958. 38p. photos, diagrs, graphs. Order from OTS. $1.00. PB 151212

A pilot study was carried out to investigate the mechanism and cause of death as well as other effects of severe vibration. Sinusoidal vibration of varying frequency and amplitude was used. Data showing the relationship between frequency and duration of exposure are given for a constant acceleration and they point to a "maximum effect frequency" of 25 cps for transverse vibration and 18 cps for longitudinal vibration. Tissue damage appears to have been caused by distortion and relative displacement of tissues or organs. Pure pressure effects were not observed. Task 71703. Proj. 7210. AF WADC TR 58-107.

General health physics. Gt. Brit. Atomic Energy Authority. Industrial Group, Warrington, Lancashire, England. Sep 1957. 12p. Order as IGRL-IB/R-21 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 28 cents. PB 135005

S.O. code no. 91-10. 1. Atomic power - Research - Gt. Brit. 2. Radiation - Physiological effects - Bibliography - Gt. Brit. 3. IGR-IB/R-21

Health, physics, monitoring instruments, and methods. Gt. Brit. Atomic Energy Authority. Industrial Group, Warrington, Lancashire, England. Sep 1956. 21p. Order as IGRL-IB/R-26 from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 50 cents. PB 135006

S.O. code no. 91-10. 1. Atomic power - Research - Gt. Brit. 2. Radiation - Monitoring - Bibliography - Gt. Brit. 3. IGRL-IB/R-26

Physical action of intense high frequency sound on vertebrate tissue, by W. J. Fry, L. L. Dreyner, F. Dunn, F. J. Fry, E. K. Kelly. Illinois. University. Bioacoustics Laboratory, Urbana, Ill. Mar 1958. 46p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 151219

The work described and the results presented in Part A of this report relate to the initiation of an elaborate series of experiments designed to yield information regarding the fundamental physical mechanisms involved in the irradiation of biological materials with ultrasound. The work was undertaken to demonstrate that it is possible to realize accurately reproducible results on a suitably prepared and precisely irradiated biological specimen. In Part B some aspects of the muscle contraction problem are discussed and an elaborate precision muscle irradiation laboratory, including a new type of myograph are discussed. Proj. 7210; Task 71703. AD-151 086. Covers period, Jan 1954-31 Dec 1955 under Contract AF 33(038)-20922. AF WADC TR 54-152, Part II.

Report of relationship of oxygen debt to oxygen lag, by R. P. Riendeau and C. F. Consolazio. U. S. Army. Medical Nutrition Laboratory, Fitzsimons Army Hospital, Denver, Col. Dec 1957. 9p photo, tables. Order from LC. Mi $1.80, ph $1.80. PB 134888

Five determinations of the oxygen uptake during a pre-exercise post-absorptive period, during exercise at speeds of 2, 3, and 4 mph on a horizontal motor-driven treadmill, and during recovery therefrom, were made on a healthy young man. Comparison of the oxygen intake lag at the beginning of exercise to the oxygen debt after exercise indicates that there is no significant difference between the two measures. The results of this limited study suggest the use of steady state oxygen intake values when assessing the energy cost of work that can be performed in a steady state which would not increase the lactic acid level of the blood. Proj. np. 6-60-11-020. USA MNL Subproj. no. 15-2. WD MNL R 217.

Survey of theories and experiments on the shortening of life span by ionizing radiation, by N. I. Berlin and F. L. Dimaggio. U. S. Armed Forces Special Weapons Project. Weapons Effects Division, Washington, D. C. Jun 1956. 57p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 135165

The effect of total body radiation, both acute and chronic, on life span has been reviewed from the stand-point of the Gompertz function, Sacher, Blair, and Smith theories. The equations of EAW purportiong to calculate the effective dose resulting from chronic irradiation have been reviewed. AFSWP-608.

Transient response studies of the blood volume receptor system in dogs, by K. M. Chapman. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1958. 16p diagrs, graphs, table. Order from OTS. 50 cents. PB 151146

Transient responses of the left atrial stretch receptors in dogs have been studied with the use of indwelling atrial ballons in which step-function changes were produced. Receptor transients have been described in terms of the parameters of a simple passive mechanical analog model. No consistent pattern is seen in the calculated parameters. A comparison of pressure and receptor response transients leads to the conclusion that sensory adaptation of the end organs probably exists. AD-155584. Project 7216, Task 71712. Presented before the National Biophysics Conference at Columbus, O. in Mar 1957. AF WADC TR 58-101.

PSYCHOLOGY

Application of the critical-incident technique to Air Force combat leadership, by Robert Reveal, Jr. and Floyd L. Ruch. U. S. Air Force. Air Research and Development Command Personnel and Training Research Center. Office for Social Science Programs, Lackland Air Force Base, Tex. Feb 1958. 53p tables. Order from LC. Mi $3.60, ph $9.30. PB 134740

The objective of this study was to determine if the critical-incident technique could be used to secure descriptions of specific behaviors associated with effective officer combat leadership, as described by other officers. AD 152120. Proj. 7731. AF PTRC TN 58-8.

Man's senses as information channels, by G. H. Mowbray and J. W. Gebhard. Johns Hopkins University. Applied Physics Laboratory, Baltimore, Md. May 1958. 71p graphs, tables. Order from OTS. $2.00. PB 151160

This review attempts to survey in a general fashion what is known about man's ability to make use of his sensory capacities for the gathering of information. Where possible, comparisons between different sense modalities are made and the problem of sensory interactions is discussed. Finally some suggestions are offered relative to the possible unburdening of men in complex environments by the judicious use of some of the subordinate sensory channels. Includes bibliography of 128 references. JHU APL CM 936.

Some problems in the design of human-operated target data processing systems, by T. J. Coonan. U. S. Naval Research Laboratory. Sep 1958. 8p graph. Order from OTS. 50 cents. PB-151113

This report examines with reference to human capabilities some tasks commonly assigned to operators in such systems. Two aspects of detection and tracking task design are discussed: (a) the type and number of tasks which can profitably be assigned to an operator and (b) some suggestions for facilitating performance of the basic tasks of detection, tracking, and monitoring. The discussion is particularly applicable to semiautomatic systems in which electronic data storage is provided. NRL R 5219.

Study of the effects of filtering on the performance of a manual compensatory tracking task, by J. S. Sweeney, H. P. Birmingham, and W. D. Garvey. U. S. Naval Research Laboratory. Sep 1958. 7p. diagrs, graph. Order from LC. Mi $1.80, ph $1.80. PB 136149

Analysis of a closed-loop man-machine tracking system indicates that when a low-pass filter is inserted either ahead of the display or beyond the control, the effect should be the same, provided all elements in the loop are linear and noise free. However, the presence of a "noisy" human operator in the loop would be expected to cause serious deterioration of system performance where low-pass filtering occurs ahead of the display. These

results are demonstrated using an analog computer (a) with a human in the loop and (b) replacing the human operator with a high-gain amplifier and associated noise source. The conclusion is reached that the position of a low-pass filter is a critical variable in a closed-loop tracking system containing a nonlinear, noise-emitting element, such as the human operator. NRL R 5205.

RUBBER AND RUBBER PRODUCTS

Field test of RIA formula no. 432 DC synthetic (SBR) rubber brake cups, by Virgil O. Hatch. U. S. Aberdeen Proving Ground. Coating and Chemical Laboratory, Aberdeen, Md. Apr 1958. 16p. tables. Order from LC. Mi $2.40, ph $3.30. PB 134994

RIA Formula No. 432DC synthetic rubber brake cups and natural rubber brake cups were installed in the brake systems of five class M37, 3/4 ton, 4x4 trucks. The trucks were operated under desert conditions for 10,000 miles at Yuma, Arizona. All brake cups satisfactorily completed 10,000 miles of service under desert conditions. Formula No. 432DC rubber cups were considered equal in operational characteristics to the natural rubber cups. A slight amount of sludge, observed on the synthetic rubber brake cups and not on the natural rubber cups, was believed insufficient to cause malfunctioning at a future date. D. A. project 593-21-094. ORD project TB5-5010F. APG CCL R 55.

Improved structural adhesives for bonding metals, by H. C. Engel. Bloomingdale Rubber Co. Jun 1952. 36p tables. Order from LC. Mi $3.00, ph $6.30. PB 126551

An improved structural adhesive for bonding metals, designated as PA-101, has been developed and tested under this contract. The formulation has been evaluated as a two-part liquid adhesive. ATI 173209. For supplement see PB 126551s. AF WADC TR 52-156.

STRUCTURAL ENGINEERING

Creep buckling of rectangular section columns, by Sharad A. Patel and Vasant D. Wagle. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N. Y. Jun 1957. 13p graphs. Order from LC. Mi $2.70, ph $4.80. PB 134482

A nonlinear differential equation is derived in terms of the creep strains at the midheight of the column. A direct numerical procedure for the solution of these equations is described. Contract Nonr 839 (18), NR 064-298. PIB AL 358.

Effects of thermal radiation on aircraft structures. Massachusetts Institute of Technology. Dept. of Aeronautical Engineering, Cambridge, Mass. Project no. 1350. Contract AF 33(038)-8906. Order separate parts from LC., giving PB number of each part ordered.

Part I: The M.I.T. Mark I radiant heating structural test facility, by John C. Loria, William J. Blackstock, and James W. Mar. Oct 1954. 60p. photos, graphs, tables. Mi $3.60, ph $9.30. PB 136145

A high-temperature radiation source, which measures 7-by 24-inches and utilizes Globar heating elements, has been constructed at the Aeroelastic and Structures Research Laboratory, Massachusetts Institute of Technology, for the exposure of aircraft structural components to high intensity radiation on one surface. Although designed primarily for the study of the thermal effects from an atomic explosion on aircraft structures, the radiant heater can be adopted to other problems, e.g. the uniform heating of all surfaces in aerodynamic heating and the static or dynamic loading of a specimen which is subject to high intensity radiation. AD 84474. AF WADC TR 54-384, Part I.

Part II: The response of a simple structure to radiant heating, by Lucien A. Schmit and Francis L. Williams. Feb 1955. 79p. photos, diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 136146

Theoretical and experimental methods are used to determine both temperature and stress responses for a thin-walled extruded beam of rectangular cross section which is exposed to radiant heating. The model cross section does not have any joints, and thus the difficulties which usually arise from joint contact resistance are avoided. Thermal buckling does not occur at the temperature and stress levels attained in the experimental work and is not considered in the theoretical analysis. AD 97527. AF WADC TR 54-384, Part 2.

Part III: Structural behavior of box-beams under combined static and thermal loads, by John C. Loria, Seymour J. Engel, and James W. Mar. Jun 1957. 115p photos, diagrs, graphs, tables. Mi $6.00, ph $18.30. PB 134527

This report is concerned with an examination of the structural behavior of a simple box-beam under the combination of an external static load and a thermal input, the definition of failure criteria, and the development of

methods for predicting failure. The situation considered is one in which a box-beam under a uniform bending moment is heated on the tension cover plate until failure occurs. AD 130767. AF WADC TR 54-384, Part 3.

Part IV: The M.I.T. Mark II radian heating structural test facility, by William J. Blackstock and John C. Loria. Jul 1957. 47p. photos, diagrs, graphs. Mi $3.30, ph $7.80. PB 136147

Provisions have been incorporated for the control of the time rate of change of irradiation rates by means of programmed source motion and through the employment of a louver-type interrupting device. An evaluation of the applicability of this facility to research into problems of both the aerodynamic heating type, and those associated with highly transient heating is given. Possible methods for increased flexibility are also briefly considered. AD 130943. AF WADC TR 54-384, Part 4.

Elastic instability of rectangular sandwhich panel of orthotropic core with different face thickness and materials, by Chieh C. Chang and Ibrahim K. Ebcioglu. Minnesota University. Institute of Technology. Dept. of Aeronautical Engineering, Minneapolis, Minn. Mar 1958. 61p diagrs, graphs, tables. Order from LC. Mi $8.90, ph $10.80. PB 134752

This paper treats the elastic instability of rectangular sandwich panel of orthotropic core and faces with different materials and unequal thickness. The panel is simply supported and loaded with edge compression. The differential equations and corresponding boundary conditions are derived from the classical energy integral by means of the variational method. A number of illustrating examples are shown. AD 154122. Sandwich structure research, report no. 1. Contract AF 18(603)-112. AF OSR TN 58-221.

Experimental study relating to the prediction of elevated-temperature structural behavior from the results of tests at room temperature, by Harold F. Allen. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jun 1956. 48p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 135218

A series of 26 aluminum-alloy semi-monocoque box beams was subjected to structural tests comprising rapidly applied loads, and also steady and cyclic loads less than the ultimate load, at temperatures ranging from 75° to 700°F. The test specimens were mounted on a steel jig enclosed in an oven, and loads were applied by means of a hydraulic strut and also by dead weight. Deflections and loads were recorded automatically in the case of rapidly applied loads and manually in the case of steady cyclic loads. Typical test results are presented in the form of graphs which show the maximum load which can be supported by the box beams at various temperatures and the manner in which the deflection varies with time, load, temperature. and type of loading. AD 97344. Proj. 1347, Task 13702. Contract AF 33(616)-2437. AF WADC TR 56-227.

Finite bending and buckling of shallow spherical shells, by Hubertus J. Weinitschke. Massachusetts Institute of Technology. Cambridge, Mass. Jun 1957. 85p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 134979

The report is concerned with the problem of non-linear bending and buckling of a thin shallow spherical shell subjected to uniform pressure normal to the surface. At the edge, the shell is assumed to be either simply supported, or held fixed and clamped. The system of non-linear partial differential equations for large deflections (but small strains) of thin shallow shells was obtained by Marguerre and independently by Chien. DIC project: 6915: Machine methods of computation and numerical analysis. For other reports under this report no. see PB 123131, 123132, 124888, and 134967. Contract N6 ori-60, Technical report no. 8.

Nodal patterns of the free flexural vibrations of stiffened plates, by W. H. Hoppman II and L. S. Magness. Johns Hopkins University. Dept. of Mechanical Engineering, Baltimore, Md. Jul 1956. 18p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 134536

A study is made of the nodal patterns of a particular plate with orthogonally placed stiffeners. The pertinent theory of vibration of stiffened plates is introduced. Experiments are described. Frequencies of flexural vibration are given for theory and experiment. AD 121759. Contract DA 36-034-ord-1297.

Various aspects of the distribution of fatigue lives, by E. J. Gumbel. Columbia University, New York. N. Y. Jul 1958. 46p graphs, tables. Order from OTS. $1.25. PB 151211

The report deals with the following aspects of the asymptotic probability function of limited smallest values that is being used for the representation and interpretation of both constant stress-amplitude and random fatigue tests and for the estimate of the minimum fatigue life: (a) Transformation of the probability functions for large values of the scale parameter, (b) Probability function for the relative life defined as the fatigue life divided by the characteristic value: (c) Relation between scale-parameter and mimimum life (d) Nomograms for the rapid estimation of the parameters of the probability function.

AD 155747. Project no. 7360, Task no. 73604. Covers period of work from Feb 1 to June 30, 1957 under Contract AF 33(616)-3982. AF WADC TR 58-72.

TEXTILES AND TEXTILE PRODUCTS

Coated fabric for use in protective clothing, by H. N. Homeyer, Jr. and J. Becker. Connecticut Hard Rubber Co. New Haven, Conn. Oct 1954. 102p photos, diagr, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 134847

Experimental work leading to the development of a chemically resistant coated fabric, suitable for use in protective clothing for personnel handling various fuels and oxidizers used in guided missiles, is described in this report. It is recommended that the coated fabric be used in the fabrication of all clothing designed for the protection of personnel engaged in handling oxidizers and most rocket fuels. AD 55694. Project 7320. Contract AF 33(616)-155. AF WADC TR 54-93.

Research program for the development of a design procedure to engineer parachute fabrics, by William G. Klein, Charles A. Lermond, and Milton M. Platt. Fabric Research Laboratories, Inc., Boston, Mass. May 1958. 66p photos, diagrs, graphs. Order from OTS. $1.75. PB 151209

This report presents an analysis which it is felt comes closer to defining the mechanisms of air flow through parachute materials than previous attempts have done. The significant difference from prior work is that the fabric is treated as a more accurate characterization of the actual flow region. The fabrics considered are those conforming to the physical specifications of MIL-C-7020, Types I and II, but with permeabilities ranging from well below to well above current specifications. While very satisfactory results are obtained in explaining permeability on the basis of fabric structure, it is also shown that some of the variables controlling permeability must, for specified permeability ranges, be held closer than is possible by present commercial practice. AD 155517. Project no. 7320. Contract AF 33(616)-3845. AF WADC TR 58-65.

Specification development report on breaking strength method for woven roving glass cloth, by Geo. J. Dashefsky and A. B. Jones, Jr. U. S. Naval Shipyard, New York. Material Laboratory. 16p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 134918

1. Fabrics, Glass - Laminated - Elasticity 2. NAVSHIPS ML Proj. 5693. Lab. project 5693, Final report. NSS 034-045.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Defrosting of high performance fighter aircraft, by E. M. Knoernschild and L. V. Larson. U. S. Air Force. Air Material Command. Equipment Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1950. 49p diagrs, graphs. Order from L.C. Mi $3.30, ph $7.80. PB 134707

The general problem of defrosting fighter aircraft is investigated to develop an appropriate theory and the transient heat flow problem is investigated for a typical case. The results indicate that descending rapidly from cold upper altitudes into a warm, humid atmosphere is the most severe condition to be met. Possible methods of meeting this requirement are investigated. AF TR 6116.

Kaman K-600-3 helicopter limited flight evaluation, by V. Keith Putnam and Robert G. Ferry. U. S. Air Force. Air Research and Development Command. Flight Test Center, Edwards Air Force Base, Calif. Aug 1957. 58p photos, drawings, graphs, tables. Order from OTS. $1.50. PB 151168

1. Helicopters - Flight tests. 2. AF FTC TR 57-15. AD 124113.

Seat design for crash worthiness, by I. Irving Pinkel and Edmund G. Rosenberg. U. S. National Advisory Committee for Aeronautics, Washington, D. C. 1957. 18p photos, diagrs, graphs. PB 134930

On the basis of deceleration data obtained in full-scale crashes, a description of crash deceleration pulses is presented which is suitable for seat design. Charts are presented for obtaining the maximum deceleration loads experienced by the seat and passenger in response to their crash deceleration pulses. Finally, a method is presented for determining the seat strength, spring stiffness, and deformation beyond the elastic limit required to serve in a crash deceleration pulse of given description. Measurement of passenger decelerations in full-scale laboratory and crash studies shows that the general principles presented in the report apply. Supersedes NACA TN 3777 (PB 122892). NACA TN 3777 Revised. NACA 1332.

Stability and control of tandem helicopters: Phases III and IV, Static and dynamic lateral stability

and control, by John H. Goldberg and Robert R. Piper. Princeton University. Dept. of Aeronautical Engineering, Princeton, N. J. Jul 1957. 132 p photo, graphs, tables. Order from L. C. Mi $6.90, ph $21.30. PB 134988

A theory is presented for the study of tandem helicopter lateral stability and control. Complete expressions for all the static and dynamic derivatives are developed and applied to appropriate equations of motion based on a convenient body axis system. Aeronautical Engineering Dept. report no. 395. Phases I and II "Static and dynamic longitudinal stability and control", by J. Goldberg are Princeton University Aeronautical Laboratory report no. 362, Sep 1956. Contract N6 onr-27024, Nr 212-026.

Instruments

Aircraft ski landing gear development, by Charles W. Dreyer. U. S. Air Force. Air Researc and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1953. 207p photos, graph, tables. Order from L. C. Mi $9.30, ph $31.80. PB 135075

The aircraft ski is discussed with reference to a landing gear system that approaches universal utility for unprepared snow, ice, and water surfaces, in addition to present airports. Factors concerning the design with respect to performance on all snow conditions, application, and operation are analyzed. AD 27934. AF WADC TR 53-155.

Analysis of flight test data on evaluation of instrument landing systems, by Abraham Tatz. Airborne Instruments Laboratory, Inc. Mineola, N. Y. Oct 1956. 36p graphs, table. Order from L. C. Mi $3.00, ph $6.30. PB 135223

The data obtained from flight tests in the ILS evaluation program are analyzed by statistical techniques. These techniques are designed to describe ILS performance characteristics in quantitative terms. The analytical procedures are explained, the computing procedures are described and sample results are presented. AD 97350. Project 6465, Task 64501. Contract AF 33(616)-2300. AF WADC T R 56-510.

Design, manufacture, and static test of an F-100 titanium horizontal stabilizer for use at 500°F, by Don L. Sabin, Jr. North American Aviation, Inc., Los Angeles, Calif. Apr 1958. 103p photos, diagrs, graphs. Order from L. C. Mi $5.70, ph $16.80. PB 135052

The design and manufacture of a horizontal stabilizer control surface, made entirely from titanium, designed to F-100 airplane flight load criteria, plus a design operating temperature of 500°F, and static testing data to substantiate the design, is reviewed in this report. Full detail information is given concerning design engineering, manufacturing methods, and testing procedures at room and elevated temperatures. AD-151 137. Project 1368, Task 13738. Contract AF 33(600)-27696. AF WADC TR 57-729.

Design study on a research periscope for piloting aircraft. Chicago Aerial Industries, Inc. Melrose Park, Ill. Apr 1958. 33p diagrs, graphs, 1 illus., 3 refs. Order from OTS. $1.00. PB 151188

Since the conventional windshield of subsonic aircraft is many times incompatible with supersonic flight, a research piloting periscope encompassing the wildest possible range of visual requirements has been designed. Types of presentation and the optical design of this instrument are described. Pertinent mechanical and optical characteristics are summarized in Section I. Different optical arrangements of field flatteners are proposed and discussed in detail. An improved type of field flattener which also acts as two Fresnel lenses has also been investigated. The methods of fabrication and alignment are described, and a working model using 200-micron-diameter glass fibers is discussed. AD-130 995. Proj. 6334; Task 63606. Contract AF 33(600)-31623. AF WADC TR 57-419.

Effect of backlash on manual control of pitch of a simulated aircraft, by John W. Senders and James V. Bradley. U. S. Air Force. Air Research and Development Command Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1956. 8p graphs, table. Order from L. C. Mi $1.80, ph $1.80. PB 135239

Five subjects, including two pilots, operated a simulated backlash in the control system. Their integrated error, generated in attempting to compensate for an external disturbance, was determined as a function of backlash. The results suggest a straight line function at perceptible backlash values. No evidence of instability was seen for any of the conditions studied. The results, although tentative, have implications and applications in the fields of control design and trainer design. AD 95404. Project 7182, Task 71555. AF WADC TR 56-107.

Final engineering report on the effect of smooth terrain on ILS glide-slope facilities, by Abraham Tatz. Airborne Instruments Laboratory, Inc. Mineola, N. Y. Oct 1956. 12p (1 fold) diagr. Order from L. C. Mi $2.40, ph $3.30. PB 135224

The terrain in front of a glide-slope station at Patterson Field was smoothed. This report summarized the comparison in glide-slope performance before and after smoothing. It is concluded that the smoothing provided an increase in the

preciseness of the position-to-signal relation; the improvement is at least 1.5:1, that is, the dispersion of signal and the dispersion of position were reduced to less than two-thirds of their former values after the terrain was smoothed. AD 110401. Project 6465, Task 64501. For techniques used see WADC TR 56-510 (PB 135223). Contract AF 33(616)-2300. AF WADC TR 56-511.

Flight evaluation of visual approach angle indicators, by F. J. Burke. U. S. Air Force Air Research and Development Command. Directorate of Flight and All Weather Testing, Wright-Patterson Air Force Base, Dayton, O. Jul 1958. 38p. photos, graphs. Order from OTS. $1.00. PB 151224

This report summarizes the data and information obtained in flight evaluation of the WADC Two-Bar System, two types of Tri-colored Glide Angle Lights, the British Royal Aircraft Establishment (RAE) System. Nearly 500 landings were made during this test program at WADC in various type aircraft. Of the several systems evaluated, the Two Bar System, and the Navy Mirror Landing System afforded the most approach angle aid to pilots, although problems existed with high performance aircraft. AD-15 5676. Project 6061. AF WADC TN 58-181.

Fundamentals of design of piloted aircraft flight control systems. Vol. I: Method of analysis and synthesis, Chapter V. Optimum synthesis methods, by B. C. Axley, R. G. Halliday and others. U. S. Bureau of Aeronautics. N. D. 66p diagrs, graphs. Order from L. C. Mi $3.90, ph $10.80. PB 134518

1. Airplanes - Control systems - Design 2. Contract NOas 51-514(c) 3. NAVAER AE 61-4, Vol. I, Chap. V. Date is 1951 or later. For Vols. II, III, IV and VI see PB 109367, 121073, 130740, and 123834.

Ground and flight tests on an automatic-opening lab belt for ejection seats, by K. F. Hecht. U. S. Air Force. Air Research and Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1953. 111p photos, diagr, graphs, tables. Order from L. C. Mi $6.00, ph $18.30. PB 135076

Test results are presented, and the conclusion is drawn that automatic separation, immediate or time-delay, is feasible from an engineering viewpoint. Test results further indicated that a time-delay system is more desirable than an immediate separation system. AD 76528. Project 1362. AF WADC TR 53-365.

Guide to aircrew personal and aircraft installed equipment, by Betty K. Bogart. U. S. Air Force Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1958. 72p photos. Order from OTS. $2.00. PB 151225

This catalog contains new and old Aero Medical Laboratory end items of special interest to aircrews and includes information on special high altitude and long range flight clothing, personal and aircraft installed oxygen equipment, survival kits, life rafts and preservers, parachutes, in-flight feeding systems, survival food packets, and aircraft installed food service equipment. A brief description of 94 items is included there are 104 photographs. This technical note is intended as a supplement to Air Force supply catalogs and Air Force Manual 64-4, "Handbook of Survival Training and Personal Equipment Personnel." Supersedes WADC TN 57-331. AD 155895. Project 6325, AF WADC TN 58-259.

History of aircraft cockpit instrumentation, by Douglas R. Nicklas. University Illinois, Aviation Psychology Laboratory, Urbana, Ill. Apr 1958. 123p photos, diagrs. Order from OTS. $2.75. PB 151186

This report is an historical review of aircraft cockpit instrumentation from 1903 to 1946. This report attempts to relate how information is sensed, transmitted, and displayed, with the principles related to these brought forth. It deals with the evolution of instruments and with their combination, simplification, and arrangement. In the main, the report concentrates on instruments used in operational aircraft. AD-118 299. Project 6190, Task 71573. Contract AF 33(616)-3000.

Study of evaporative heat transfer in air-to-air heat exchangers, by J. L. Mason and J. Fukuzawa. Air Research Manufacturing Co., Los Angeles, Calif. Apr 1958. 216p diagrs, graphs, tables. Order from OTS. $3.50. PB 151221

The first phase of the study was concerned with heat and mass transfer occurring under relatively simple boundary conditions, e.g., known wall temperatures and simple heat transfer surface geometrics. The results of Phase I tests confirmed the heat and mass transfer analogy. Phase II tests were conducted under more complicated boundary conditions. Two methods have been developed for the analysis of wet air-to-air heat transfer. One makes use of digital computers which perform a point by point analysis throughout the heat exchanger. The basis of this method is the heat and mass transfer analogy. The other more simple overall method treats a wet heat exchanger in the same manner as a dry heat exchanger with the exception that the specific heat of air is increased in the ratio of the total heat transfer to the sensible heat transfer. It should be noted that this report describes methods of performance analysis rather than design analysis. AD 151092. Project 6146, Task 61203. Covers period of work from 1 Dec 1954 to 13 Jan 1958 under Contract AF 33(616)-2671. AF WADC TR 56-200.

Study to determine the optimum package flight pressure refueling system, by C. H. Smith and W. M. Iwanowski. Flight Refueling, Inc. Baltimore, Md. Jan 1955. 347p drawings (part fold.), diagrs, graphs, tables. Order from OTS. $5.00. PB 151220

The object of the work recorded in this report is the compilation of a catalog of ideas in mechanisms for the transfer of fuel between similar aircraft in flight and the development of analytical routines for the solution of specific applications. The research is restricted to consideration of the probe and drogue system of aerial refueling and the study is specifically concerned with three different installations. These are an internal package system, an external reusable package, and an external disposable or "one-shot" package. All component parts of the systems have been examined and methods are evolved for their development to varied requirements. Equations and graphical data are presented on power systems, drogue aerodynamics, hose dynamics, and surge suppression. Project 1356-30288. Contract AF 33(616)-2451. AF WADC TR 56-91.

Theoretical studies and computations on the influence of servo-mechanisms on the flutter of servo-controlled aircraft, by Walter E. Hinds. Dynalysis Development Laboratories, Inc., Los Angeles, Calif. Nov 1956. 125p photos, diagrs, graphs, tables. Order from L.C. Mi $6.30, ph $19.80. PB 135221

A method is presented for studying the dynamic interactions between a power control system and the flutter motion of an aircraft. The analysis is performed, including the non-linearities of the power control system, on a general purpose analog computer. A typical fighter aircraft is used to illustrate the method. The study indicates that the method and techniques developed are particularly suited for the analysis of any servo-aeroelastic system and that such an analysis is necessary whenever the control system natural frequency is greater than twenty five percent of the flutter system frequency. AD 110561. Project 1370, Task 13475. Contract AF 33(616)-2541. AF WADC TR 56-432.

Engines and Propellers

Design study for an optimum turbine engine air to oil cooler, by Y. T. Tsui and K. Staiger. Stewart-Warner Corporation. South Wind Division, Indianapolis, Ind. Jun 1956. 118p photos, diagrs (part fold), graphs, tables. Mi $6.00, ph $18.30. PB 135054

Performance of various plate-fin and tubular heat exchanger surfaces has been compared on the basis of heat trasfer versus friction power characteristics per unit surface area, per unit volume, and per unit weight. Test cores were built, tested, and correlated to support the design data. On the basis of the theoretical and experimental data it is shown that the performances of plate-fin designs come closer to meeting the given overall requirements than that of tubular designs. Solution to the optimum cooler problem is shown to be primarily a solution of selecting an optimum fin on the air side of the cooler. Two recommended plate-fin cooler designs are presented which very nearly conform to the given specification requirements. AD 151129. Project 3060, Task 30333. Contract AF 33(600)-29611. AF WADC TR 58-149.

Evaluation of cermets for jet engine turbine blading, by T. S. Bragdon. United Aircraft Corporation. Pratt and Whitney Aircraft Division, East Hartford, Conn. Jan 1955. 64p photos, diagrs, graphs (part fold), tables. Order from LC. Mi. $3.90, ph $10.80. PB 134946

Physical properties of forty cermets were evaluated to determine their adaptability to jet engine turbine blading. Resistance to thermal shock, oxidation, and impact received particular attention. Because of the low impact strength, no engine testing and only limited rotating rig testing of cermet parts were undertaken. Since increased thickness of airfoil trailing edges would be a method of compensating for low impact strength, the aerodynamic penalities of using such airfoils were investigated. Contract AF 33(616)-203. AD 76792. Project 3066, Task 30253. AF WADC TR 55-215.

Experimental evaluation of a ceramic pilot chamber for turbojet engines, by Herbert R. Hazard. Battelle Memorial Institute, Columbus, O. Feb 1955. 32p diagrs, graphs, table. Order from L.C. Mi $3.00, ph $6.30. PB 134891

A small ceramic-lined pilot chamber was fired into two tubular turbo-jet combustors at the crossover-tube location. In a test rig operated at a combustor pressure of 15 psia the pilot chamber extended the fuel/air ration for lean blowout from 0.002 to 0.0006. In addition, the cumbustor could be lighted off from the pilot chamber under conditions simulating full engine speed at a fuel/air ratio 0.0006. In tests at pressures from 2.6 psia to 14.7 psia, it was found that the pilot chamber increased combustion efficiency at low pressures, and that the lean operating limit was extended a moderate amount by the pilot chamber. Ignition from the pilot chamber was demonstrated at conditions simulating windmilling at 33,000 ft, with the probability of ignition to 42,000 ft with suitable selection of air flow through the pilot chamber. AD 58998. Contract AF 33(038)-841. AF WADC TR 55-106.

Internal characteristics and performance of an aerodynamically controlled, variable-discharge convergent nozzle, by Jack G. McArdle. U. S. National Advisory Committee for Aeronautics. Jul 1958. 33p photo, diagrs, graphs, tables. Order as TN 4312 from National Aeronautical and

Space Admistration, 1520 H. Street, N. W. Washington 25, D. C. PB 134939

1. Jet engines, Turbo-jet-Nozzles. 2. Nozzles, Exhaust 3. Jet engines, Turbo-jet-Thrust 4. NACA TN 4312.

Optical measurements on a stationary turbine grid and on radial flow turbine, by Theodor W. Zobel, Philip von Doepp, and Paul G. Forster. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1956. 66p photos, drawing, diagrs, graphs. Order from L. C. Mi $3.90, ph $10.80. PB 135217

Experimental investigations were made on turbine airfoils in cascade to study the mutual influences between nozzle and bucket blade rows at low Mach numbers. Tests were made on two-dimensional stationary arrangements and on a radial-flow turbine with partial admission at various operating conditions. An interference method was applied for obtaining the density of the flow in the field around the test airfoils. A large number of interference pictures were taken from which evaluations were made to obtain pressure distributions within the fields. AD 102532. Project 1363, Task 70824. AF WADC TR 56-221.

Preliminary design study of the PRC wave engine. Propulsion Research Corporation, Santa Monica, Calif. Feb 1958. 40p fold diagrs, graphs, tables. Order from L. C. Mi $3.00, ph $6.30. PB 134473

Preliminary design studies were made of the PRC wave engine and a configuration was selected for a model engine to conduct feasibility tests and to determine mechanical problems and real fluids effects associated with this type of engine. Initial layouts were completed for the engine and test rig, and are presented in this report. PRC R-284. AD 154-207. Contract AF 18(603)-77. AF OSR TR 58-55.

Vibration survey of four representative types of air-cooled turbine blades, by Howard F. Calvert and Gordon T. Smith. U. S. National Advisory Committee for Aeronautics. Jul 1958. 22p photos, diagrs, graphs, tables. Order as TN 4100 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 134934

1. Turbines, Gas-Blades-Cooling 2. NACA TN 4100.

Training and Training Devices

Index to Air Force Personnel and Training Research Center 1957 and 1958 technical documentary reports. See entry under Bibliography on page 545. PB 134755

Airports and Airways

Exit taxiway location and design, by Robert Horonjeff, Dan M. Finch, Daniel M. Belmont, and Gale Ahlborn. California. University. Institute of Transportation and Traffic Engineering, Berkeley, Calif. Aug 1958. 95p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.25. PB 151162

Tests were conducted to provide information to aid the airport designer in the design and location of exit taxiways as a means of reducing runway occupancy time and thus increase traffic handling capacity of the airport-airways system. The purpose was to determine the speeds at which representative civil and military aircraft could safely and confortably turn off a runway, to develop taxiway configurations appropriate to these speeds, to obtain information which would aid the designer in locating taxiways, and to obtain data on visual guidance. Special study conducted for the Airways Modernization Board under Contract no. AMB-4.

Aerodynamics

Application of the electric spark method to the investigation of transonic flow past airfoils and airfoil grids, by John R. Weske. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Apr 1958. 12p photos, diagrs. Order from L. C. Mi $2.40, ph $3.30. PB 133956

1. Flow, Transonic-Theory 2. Flow, Transonic-Wind tunnel tests 3. Grids-Flow Characteristics 4. Electric spark method 5. Contract AF 18(603)-92 6. AF OSR TN 58-304 7. UM BN 128.

Approximate method for calculating motions in angles of attack and sideslip due to step pitching- and yawing-moment inputs during steady roll, by Martin T. Moul and Teresa R. Brennan. U. S. National Advisory Committee for Aeronautics. Sep 1958. 42p graphs, tables. Order as TN 4346 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 135299

1. Angles of attack-Measurement 2. Pitching moments 3. Loads, Aerodynamic-Theroy 4. NACA TN 4346.

Body modification to reduce drag due to wedge angle of wing with unswept trailing edge, by William C. Pitts and Jack N. Nielsen. U. S. National Advisory Committee for Aeronautics. Jul 1958. 13p diagrs. Order as NACA TN 4277 from National Aeronautical and Space Administration, 1520 H

Street, N. W., Washington 25, D. C.
PB 134932

1. Bodies of revolution-Drag, Viscous-Theory 2. Wings-Dray-Effect of trailing edge 3. NACA TN 4277.

Buckling characteristics of spherical or spherically-dished shells, by Erich Goerner. U. S. Army Ballistic Missile Agency, Huntsville, Ala. Feb 1956. 19p photo, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30.
PB 135163

In the tests described herein, a number of thin walled shells was subjected to uniform external pressure up to the buckling load. One portion of the test specimens was spherical segments and the rest has a spherically dished shape. The actual buckling pressure of spherical segments is in good agreement with values obtained by using the equation for the so-called "lower" buckling load given by Th. vonKarman and Hsue-Shen Tsien. The actual buckling pressure of the spherically dished speciments was about 50% higher than predicted by the euqation mentioned if the radius of curvature at pole of the shell is used in the calculation. Some results from buckling tests made by Massachusetts Institute of Technology with thinwalled spherical segments and specimens with ellipsodial shapes are shown for comparison. ABMA RR-1R9.

Coanda effect, by Kuo-Tai Yen. Rensselaer Polytechnic Institute. Dept. of Aeronautical Engineering, Troy, N. Y. Jan 1957. 9p diagr. Order from L.C. Mi $1.80, ph $1.80. PB 134941

This study of the Coanda Effect was performed to achieve a clear understanding of the basic mechanism underlying this effect and its possible extension to high speed flow. In its practical side, the purpose was to evaluate the potential benefit and possible utilization of this effect in connection with some aerodynamic or propulsive devices. Only a two-dimensional study of this problem was made, but both compressibility and viscosity effects were considered whenever possible. AD 120442. Contract AF 18(600)-J.

Effect of favorable pressure gradients on transition for several bodies of revolution at Mach 3.12, by John R. Jack. U. S. National Advisory Committee fro Aeronautics. Jul 1958. 28p photo, drawing, graphs. Order as TN 4313 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C.
PB 134935

1. Boundary layer-Transition point 2. Bodies of revolution-Pressure distribution 3. Mach number-Effect 4. NACA TN 4313.

Effects of fixing transition on the transonic aerodynamic characteristics of a wing-body configuration at Reynolds number from 2.4 to 12 million, by Lynn W. Hunton. U. S. National Advisory Committee for Aeronautics. Jul 1958. 56p drawing, diagrs, graphs. Order as TN 4279 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C.
PB 134936

1. Boundary layer, Laminar-Stability 2. Wings, Trapezoidal-Wind tunnel tests 3. Boundary layer-Transition point 4. Reynolds number-Effect 5. NACA TN 4279.

Effects of frequency and amplitude on the yawing derivatives of triangular, swept, and unswept wings and of a triangular-wing-fuselage combination with and without a triangular tail performing sinusoidal yawing oscillations, by William Letko and Herman S. Fletcher. U. S. National Advisory Committee for Aeronautics. Sep 1958. 52p photos, diagrs, graphs, tables. Order as TN 4390 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C.
PB 135303

1. Stability, Lateral-Dynamic 2. Damping derivatives-Stability 3. Yawing moments-Calculation 4. NACA TN 4390.

Gust loading of rigid and flexible aircraft in continous atmospheric turbulence, by Kenneth A. Foss and Warren L. McCabe. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory, Cambridge, Mass. Jan 1958. 152p diagrs, graphs, tables. Order from OTS. $3.00.
PB 151229

A general method has been outlined for computing the stresses and accelerations experienced by a rigid or flexible airplane when responding to the vertical-gust components of continuous atmospheric turbulance. Through the use of theoretical deductions and parametric studies it has been found that power spectral methods give results comparable to discrete-gust methods because they both depend on statistical measurements of gust velocity. The chief difference between the two methods is the failure of the discrete-gust approach to take into account the continuous nature of atmospheric disturbances, which is particularly important when a natural frequency of the airplane is in tune with the frequency spectrum of the turbulence. Because of the need for more spectral measurements of the nature of atmospheric turbulence, it is proposed that gust loads criteria be based on random-gust alleviation factors (or similar concepts) while still making use of design gust velocities obtained from statistical measurements of gust peaks (V-G data, e.g.). AD 142170. Project no. 6-(8-1367). Task 13580. Contract AF 33(616)-3508. AF WADC TR 57-704.

Influence of solid-body rotation on screen-produced turbulence, by Stephen C. Traugott. Johns Hopkins University, Baltimore, Md. Aug 1958. 100p photos, diagrs, graphs. Order as TN 4135 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 134807

1. Flow, Turbulent-Theory 2. NACA TN 4135.

Linearized transonic flows past isolated non-lifting airfoils, by P. F. Maeder and A. D. Wood. Brown University. Division of Engineering, Providence, R. I. Jun 1957. 78p photos, diagrs, graphs. Order from L. C. Mi $4.50, ph $12.30. PB 134532

A linearized approximation of the non-linear transonic differential equation for flow past a two-dimensional slender body is developed. This equation is solved for the special case of an isolated non-lifting airfoil with the help of the method of Fourier transforms. The transonic solution so found contains, as special cases, the incompressible, linearized subsonic and linearized supersonic solutions. Numerical calculation of the pressure distribution and pressure drag is carried out for a biconvex airfoil of parabolic thichness distribution, and the results are compared with experimental investigations performed with the same airfoil. Technical report WT-24. Contract Nonr 562(09) NR 061-100.

Measurement of dynamic stability derivatives in the wind tunnel. Part II: Evaluation of testing techniques, by H. Daughaday, F. DuWaldt, and I. Statler. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. May 1957. 77p diagrs, tables. Order from L. C. Mi $4.00, ph $12.30. PB 135148

This report presents the results of an evaluation of wind tunnel testing techniques for determining dynamic stability characteristics. A study was made which showed the need for the dynamic measurement of stability derivatives and in particular the usefulness of finding the separate parts of the rotary damping derivatives. Various methods were reviewed for measuring dynamic stability derivatives in the wind tunnel and the inexorable forcing technique was found most promising for the high speed range. AD 118258. Project 1365, Task 13544. Contract AF 33(616)-3206. AF WADC TR 57-274, Part 2.

Method for determining three-dimensional flutter coefficients for wings of arbitrary planform in incompressible flow, by Peter F. Jordan. Martin Company, Baltimore, Md. Jan 1958. 134p diagr, graphs (part fold), tables (part fold). Order from L. C. Mi $6.90, ph $21.30. PB 135226

An analytical method, based on linear airfoil theory, is presented which allows one to calculate the pressure distribution over wings of arbitrary plan-form oscillating in arbitrary modes. The cause of incompressible flow and of 2 x 7 pivot points is described in detail, and the graphs of auxiliary functions are given for this case. The present method is compared with other procedures, and some numberical results are presented. AD 142309. Project 1370, Task 13471. Contract AF 33(616)-3548. AF WADC TR 57-228.

Methods for predicting aeroelastic effects on subsonic static longitudinal stability of aircraft, by B. Paraghamian and R. L. Lohman. Martin Company. Dept. of Aerodynamics, Baltimore, Md. Sep 1954. 186p diagrs, graphs, tables. Order from L. C. Mi $8.40, ph $28.80. PB 135146

Effects of aeroelasticity on wing lift curve slope, aerodynamic center, elevator or horizontal tail effectiveness are considered. In addition to these, effect of the presence of concentrated loads and torques on an elastic wing as well as built-in twist and camber are studied and procedures outlined for determining their influence on zero lift angle of attack and zero lift pitching moment. Quick methods for estimating the structural and rigid airplane aerodynamic parameters from information available in the preliminary design stage are described and used in the aeroelastic analysis. Declassified 9 Jun 1958. Project 1365. Contract AF 33(616)-2061. AF WADC TR 54-265.

Pressure distribution and dimensional data on free streamline shapes having wedge shaped noses, by Jesse Pierce and A. M. O. Smith. Douglas Aircraft Company, Inc. Engineering Dept., El Segundo, Calif. Jun 1955. 82f diagrs, graphs (part fold), tables. Order from L. C. Mi $4.80, enl pr $15.30. PB 135633

1. Wedges-Pressure distribution 2. Profiles-Pressure distribution 3. Profiles-Theory 4. Cavitation-Theory 5. Noses (Aircraft)-Shape 6. Contract N0as 52-981. AD 135725. Report ES 17922.

I. Report on the final calibration of the low turbulence wind tunnel including dynamic pressure and angularity surveys and free tunnel turbulence measurements. 2. Turbulence studies behind square mesh grids. 3. Boundary-layer velocity profiles and turbulence studies on a flat plate in the presence of a zero longitudinal static pressure gradient, by Arnold L. Ducoffe. Georgia Institute of Technology. Engineering Experiment Station, Atlanta, Ga. Jul 1957. 41p diagr, graphs. Order from L. C. Mi $3.30, ph $7.80. PB 134949

Data on the final calibration of the low turbulance wind tunnel are presented herein. These data include the variation in longitudinal static pressure

gradient obtained with the moveable tunnel wall, dynamic pressure and angularity surveys, and free tunnel turbulence intensity. Project 219. Contract Nonr 991(01).

Second-order slender-body theory: Axisymmetric flow, by Milton D. Van Dyke. U. S. National Advisory Committee for Aeronautics. Sep 1958. 46p diagrs, graphs, tables. Order as TN 4281 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 135302

1. Flow, Axially symmetric-Theory 2. Bodies of revolution-Aerodynamics-Theory 3. NACA TN 4281.

Simplified method for approximating the transient motion in angles of attack and sideslip during a constant rolling maneuver, by Leonard Sternfield. U. S. National Advisory Committee for Aeronautics. 1958. 13p graphs, tables. Order as NACA report no. 1344 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 135304

Supersedes RML 56F04. 1. Angle of attack-Coefficients 2. Airplanes-Rolling-Calculation 3. NACA 1344.

Some characteristics of the flexural vibrations of orthogonally stiffened cylindrical shells, by W. H. Hoppmann, II. Johns Hopkins University. Dept. of Mechanical Engineering, Baltimore, Md. Jul 1957. 24p photos, tables. Order from L. C. Mi $2.70, ph $4.80. PB 134728

This paper presents a resume of a theoretical study of the problem of flexural vibrations of the walls of orthogonally stiffened cylindrical shells. Frequency equations are given for the stiffened shells. An experimental method of verifying the theory is described. Experimentally determined frequencies for an isotropic as well as two different designs of orthogonally stiffened shells are given in tables. Contract Nonr 248(12), Technical report 12.

Study of the control of an aircraft operating in the unstable power region, by John W. Croan and Calvin W. Thomas. U. S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force, Dayton, O. Mar 1958. 95p photos, diagrs, graphs, tables. Order from L. C. Mi $5.40, ph $15.30. PB 134687

Thesis, U. S. Air Force. Institute of Technology, 1958, by John W. Croan and Calvin W. Thomas. GAS-58-2. 1. Aircraft, High-speed-Stabilization 2. Aircraft, Jet propelled-Controls.

Study of the flow about simple bodies at Mach numbers from 11 to 15, by A. G. Hammitt and S. M. Bogdonoff. Princeton University. Dept. of Aeronautical Engineering, Princeton, N. J. Sep 1954. 64p photos, diagrs, graphs. Order from L. C. Mi $3.90, ph $10.80. PB 134713

Using the Princeton helium hypersonic wind tunnel, the flows over the fore part of several simple bodies have been studied at Mach numbers from about 11 to 15. Pressure and surface temperature distributions and optical studies have been used to investigate the viscous-inviscid interaction phenomena. AD 53975. This is a preliminary issue of WADC TR 54-257. Contract AF 44(038)-250. PU AEL R 277. AF WADC TR 54-257.

Supersonic flow around quasi-conical bodies, with application to wing-body interference, by Hans J. Stetter. Munich. Technische Hochschule, Munich, Ger. N. C. 24p diagrs. Order from L. C. Mi $2.70, ph $4.80. PB 134870

In generalization of Nielsen's "quasi-cylindrical" theory and some previous work of the author of this paper, expressions for the linearized supersonic flow around a quasi-conical body are derived. AD 152194. Date is 1957 or later. Technical note no. 3. Contract AF 61(514)-1080. AF OSR TN 58-167.

Transonic simplifications of the hodograph equation, by Gottfried Guderley. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1953. 23p graphs. Order from LC. Mi $2.70, ph $4.80. PB 134771

In a previous report (PB 96095) the author has shown a new derivation of the transonic hodograph equation which gives a closer approximation to the exact hodograph. The present report dicusses this idea in detail. AF WADC TR 53-183.

Two-dimensional tests of a model with an exterior, auxiliary, airfoil-shaped duct and slot for the application of circulation control to a flapped airfoil, by Royal J. Bondie, Jr. Wichita. University. Dept. of Engineering Research, Wichita, Kans. Nov 1956. 93p photos, drawings, diagr, fold graphs, tables. Order from L. C. Mi $5.40, ph $15.30. PB 135225

An experimental, two-dimensional, wind-tunnel program was conducted on an NACA 23015 airfoil section equipped with a 0.20 chord, sealed flap and blowing circulation control. The air mass for the circulation control was blown from the trailing edge of a small airfoil mounted forward of the flap bend above the upper surface of the model. The physical variables investigated were the angle of attack of the small airfoil measured with respect to the upper surface of the model, and the distance of the jet exit forward of the upper tangency point of the flap bend.

AD 110646. Project 1366, Task 13723. Contract AF 33(616)-2330. AF WADC TR 56-30.

Two-dimensional wind-tunnel tests of a jet-type spoiler on an NACA 64A010 airfoil section equipped with high-lift devices, by Donald C. Ballentine and George A. Barnard. U. S. David W. Taylor Model Basin. Aerodynamics Laboratory. Jun 1954. 71f photo, diagrs, graphs (part fold). Order from L. C. Mi $4.50, enl pr $13.80. PB 135630

Unclassified 10 Apr 1958. 1. Spoilers-Wind tunnel tests 2. Spoilers-Controls 3. Grumman F9F-5 (Airplane) 4. DWTMB AERO R 862.

Unsteady laminar boundary layer over a flat plate in the downstream region, by S. I. Cheng and I. D. Chang. Princeton University. Dept. of Aeronautical Engineering, Princeton, N. J. Mar 1956. 31p graphs. Order from L. C. Mi $3.00, ph $6.30. PB 134546

The unsteady motion of a flat plate in an incompressible viscous fluid is studied by using Rayleigh's method. Formulas for calculating velocity profiles and skin friction are presented together with many examples to show their application. These results are then applied to the problem of a moving plate and the relationship between the velocity of the plate and the force applied is given and discussed. AD 126475, Contract AF 18(600)-498. AF OSR TN 57-180. PU AEL R 339.

UTIA air duct facility for investigation of vibration noise induced by turbulent flow past a panel (boundary-layer noise), by L. Maestrello. Toronto. University. Institute of Aerophysics, Toronto, Canada. Apr 1958. 25p photos, drawing, diagrs, graphs, tables. Order from L. C. Mi $2.70, ph $4.80. PB 134706

An acoustically-quieted air-duct facility has been constructed for the purpose of investigating noise generated by turbulence flow past a flexible ('boundary layer noise'). The facility is basically an open-circuit wind-tunnel with interchangeable 33 foot rectangular duct sections 12" wide and 1", 4", or 8" deep. The downstream end of the duct, where fully developed channel flow is obtained, contains the test panel, fitted flush in one wall. Maximum speed (4" duct) with the 10 hp blower is 200 fps. Details of design and aerodynamic performance--e. g., velocity profiles and pressure gradient--are given. AD 154263. Contract AF 49(638)-249. UTIA TN 20, AF OSR TN 58-358.

Wind-tunnel investigation at low speeds of flight characteristics of a sweptback-wing jet transport airplane model equipped with an external-flow jet-augmented slotted flap, by Joseph L. Johnson, Jr. U. S. National Advisory Committee for Aeroanutics. Jul 1958. 32p photos, diagrs, graphs. Order as TN 4255 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 134938

1. Wings, Swept-back Flaps 2. Wings, Sweptback-Stability 3. NACA TN 4255.

Wind-tunnel investigation of effects of spoiler location, spoiler size, and fuselage nose shape on directional characteristics of a model of a tandem-rotor helicopter fuselage, by James L. Williams. U. S. National Advisory Committee for Aeronautics. 44p photos, drawings, diagrs, graphs, table. Order as TN 4305 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 134937

1. Helicopters-Rotors, Tandem-Stability 2. Spoilers-Wind-tunnel tests 3. NACA TN 4305.

Wind-tunnel investigation of various T-tails on two types of aircraft. Part I: 1/16-scale model P5M-1 airplane, by John J. Foster. U. S. David W. Taylor Model Basin. Aug 1954. 146f photos, drawings, diagrs, graphs (part fold), tables. Order from L. C. Mi $7.20, enl pr $24.30. PB 135632

Unclassified APR 10, 1958. TED TMB AD-3108 (formerly DE 3108). 1. Tail surfaces-Design 2. Tail surfaces-Wind tunnel tests 3. Fuselages-Pressure distribution 4. DWTMB AERO R 833.

Rockets and Jet Propulsion

Analytical study of turbulent and molecular mixing in rocket combustion, by David A. Bittker. U. S. National Advisory Committee for Aeronautics. Sep 1958. 22p diagr, graphs, table. Order as TN 4321 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 135296

1. Rocket motors-Combustion 2. Combustion-Effect of fuel atomization 3. Flow, Jet mixing-Theory 4. NACA TN 4321.

On the strength distribution of noise sources along a jet, by H. S. Ribner. Toronto. University. Institute of Aerophysics, Toronto, Canada. Apr 1958. 33p diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 132745

The spatial distribution of noise sources along a jet is investigated theoretically. The analysis refers to the noise power emitted by a 'slice' of jet (section between two adjacent planes normal to the axis) as a function of distance x of the slice from the nozzle. It is found that this power is essentially constant with x in the initial mixing region (x^0 law), then further downstream (says 8 to 10 diameters from the nozzle) falls off extremely fast (x^7

law or faster) in the fully developed jet. Because of this striking attenuation of strength with distance, the 'fat' part of the jet must contribute much less to the total noise power than is commonly supposed. Further implications, especially for multiple-nozzle and corrugated mufflers, are discussed. AD 154-264. Defense Research Board of Canada Grant no. 9551-02. Contract AF 49 (638)-249. UTIA R 51. AF OSR TN 58-259.

Project Vanguard report. U. S. Naval Research Laboratory. Order separate parts described below from OTS, giving PB number of each part ordered.

No. 33. Minitrack report no. 7: Calibrating the Mark II Minitrack system with radio stars as signal sources, by V. R. Simas and G. C. Kronmiller, Jr. Oct 1958. 29p photos, diagrs, graphs, tables. Order from OTS. 75 cents. PB 151163

The Mark II Minitrack System is described briefly and an operational analysis is made. A means of external calibration of the system by tracking radio stars is described and illustrated. Results obtained by this method are presented and compared with results obtained by the complex but more precise method used in calibrating Prime Minitrack stations. It is shown that the tracking of radio stars does in fact provide an adequate system calibration if sufficient data are taken. NRL R 52-15. For Minitrack report no. 1-5 see PB 131220, 131330, 131390, 131396, 131961.

No. 34: Application of the simplified phase plane to the analysis and design of missile jet-relay control systems, by J. L. Hieatt. Sep 1958. 34p diagrs, graphs. Order from OTS. $1.00. PB 151059

The application of phase plane analysis to a missle jet relay control system is reviewed, explained, and illustrated. Only a single lead network is considered under conditions in which aerodynamic damping is negligible. The assumption that all forces occur as step inputs is used to simplify analysis techniques and does not constitute a significant limitation on the application of this method for design purposes. NRL R 5216.

No. 35. Minitrack report no. 6: The Vanguard satellite command receiver, by D. S. Hepler. Sep 1958. 11p photos, diagrs, graphs. 50 cents. PB 151112

This receiver turns on the satellite instrumentation upon command from a ground-based Minitrack station. The receiver is a VHF double-superheterodyne type utilizing a small portion of the 108-Mc Minitrack transmitter power as the first oscillator. The basic design of the various components provides for economical use of satellite battery power and at the same time a reasonable degree of security against accidental interrogation from unauthorized sources. NRL R 5217.

Propellant vaporization as a criterion for rocket-engine design; calculations of chamber length to vaporize various propellants, by Richard J. Priem. U. S. National Advisory Committee for Aeronautics. Sep 1958. 36p graphs, table. Order as TN 3883 from National Aeronautical and Space Administration, 1520 H Street, N. W., Washington 25, D. C. PB 135301

1. Combustion-Gas dynamics 2. Rocket motors-Combustion-Theory 3. Combustion-Effect of fuel atomization 4. Propellants, Rocket-Performance 5. NACA TN 3883.

Simplified graphical construction of the wind-produced impact-point shift of a rocket sonde, by Hermann O. F. Scharn. U. S. Air Force. Air Research and Development Command. Missile Development Center, Holloman Air Force Base, N. M. May 1958. 17p photos, diagrs, table. Order from L. C. Mi $2.40, ph $3.30. PB 134769

A geometrical construction of the total displacement of the impact point of a rocket due to wind is presented. The construction uses theodolite measured azimuth angles of the pibal, and the wind weighting function of the rocket. This method has fewer sources of errors than the standard method generally in use, and the time necessary for the whole procedure is practically reduced to the time which the balloon needs for ascending. A feature of this method is that the number of balloon measurements can be diminished without noticeable loss of accuracy. AD 135015. AF MDC TN 58-7.

Two-dimensional librations of a dumbell-shaped satellite in a uniform gravitational field, by Trevor A. J. Stocker and Rinaldo F. Vachino. U. S. Air Force. Air University. Institute of Technology. School of Engineering, Wright-Patterson Air Force Base, Dayton, O. Mar 1958. 117p diagrs, graphs, tables. Order from L. C. Mi $6.00, ph $18.30. PB 134696

The purpose of this thesis is to investigate the motion of a dumbbell-shaped satellite orbiting in the gravitational field of a spherical, homogeneous earth and to determine the relationship between the orbit of the dumbbell about the earth and the libration of the dumbbell about the local vertical. Thesis U. S. Air Force. Institute of Technology, 1958, by Trevor A. J. Stocker and Rinaldo F. Vachino. GAS-58-11.

Land Transportation

Allocation of a resource to alternative probabilistic demands transport equipment pool assignments, by Vernon L. Smith, Rubin Saposnik, and A. R. Lindeman. Purdue University. School of Industrial Engineering and Management, Lafayette, Ind. Feb 1957. 25p graph, tables. Order from L. C. Mi $2.70, ph $4.80. PB 132786

This paper presents an analysis and generalization of a decision problem as it was found to exist on a large American railroad. The problem was suggested as a consequence of discussions between the authors and members of the management staff of the cooperating railroad concerning the line haul "piggyback" transportation of truck trailers by railroad flatcar. The problem arose in the form of assigning a scarce resource to alternative probabilistic ends. For report no. I see PB 126393. Transportation systems research report III. Contract Nonr-1100(05), NR 047-016. ONR RM-12.

Marine Transportation

Blackstone River flood-control project at Woonsocket, Rhode Island: Hydraulic model investigation, by J. J. Franco and G. B. Fenwick. U. S. Waterways Experiment Station, Vicksburg, Miss. Dec 1957. 38p photos, map, diagrs, graphs, table. Order from L. C. Mi $3.00, ph $6.30. Limited supply available from U. S. Army. Engineer Waterways Experiment Station, Vicksburg, Miss. 50 cents. PB 134877

A 1:50-scale, fixed-bed model of a 2225-ft reach of the Blackstone River was used to study flood-control plans that included channel improvement, replacement of an existing, fixed-crest industrial dam, and excavation below and under an existing masonry arch bridge. Model investigations were conducted to check the hydraulic performance of the proposed new dam and approaches, determine the most effective treatment of rock excavation downstream of the dam and under the bridge, and develop such design modifications as might be found desirable. WES TR 2-468.

Effect of method of towing on ship model motions, by O. J. Sibul. California. University. Institute of Engineering Research, Berkeley, Calif. Jun 1957. 31p diagrs, graphs. Order from L. C. Mi $3.00, ph $6.30. PB 134485

A series of experiments were performed to study the effect of different towing methods on the heaving and pitching motions in seaworthiness tests. The 5 foot model, Series 60 of 0.60 block coefficient was towed inwaves of two lengths (5.0 feet and 7.25 feet) and a constant height/length ratio of 1:40. For each given speed and wave condition the model was towed using three different methods of connection: a) constant thrust - that is, the model was free to surge; b) constant speed - the surging was completely restricted for the model; and c) with a spring arrangement, giving the model an opportunity to move backward and forward (to surge) by a limited amount. Project NS 715-102. Contract Nonr 222(18). UC IER Series 61. Issue 13.

Model tests of Yarrows 80-ft. fishing vessel, by J. T. Tothill. National Research Council of Canada. Division of Mechanical Engineering, Ottawa, Canada. Jun 1958. 26p diagr, graphs, tables. Order from L. C. Mi $2.70, ph $4.80. PB 135291

1. Fishing boats 2. Ship models-Tests 3. NRCC MB-215.

Navigation conditions at Greenup Locks and dam, Ohio River: Hydraulic model investigation, by J. J. Franco and G. B. Fenwick. U. S. Waterways Experiment Station, Vicksburgh, Miss. Jan 1958. 86p photos, diagrs. Order from L. C. Mi $4.80, ph $13.80. Limited supply available from the U. S. Army Engineer: Waterways Experiment Station, Vicksburg Miss. 75 cents. PB 134878

A 1:120 scale, undistorted model of 2-1/2 miles of the Ohio River and the lock and dam structures was used to determine the best arrangment of the locks and appurtenant structures to provide satisfactory navigation conditions in the lock approaches and entrances under various flows and methods of operation, and to provide a means for navigation interests to satisfy themselves as to the acceptability of the proposed design from a navigation standpoint. WES TR 2-469.

Simulated shipboard fire test of improved fasteners for fibrous glass hull insulation, by D. H. Nusbaum, R. Grubb, and C. J. Reber. U. S. Naval Shipyard, Philadelphia, Pa. Industrial Test Laboratory. Jan 1957. 27p photos, graph, table. Order from L. C. Mi $2.70, ph $4.80. PB 135134

This report contains the results of a full scale simulated shipboard fire test conducted at the Fire Fighters' School. Naval Damage Control: Training Center, Philadelphia, Pa., to determine the relative durability, in fire, of molded nylon and two types of steel fasteners for fibrous glass hull insulation board. NS-065-008. NAVSHIPS ITL 3243.

Water waves generated by the translatory and oscillatory surface disturbance, by T. Yao-tsu Wu. California Institute of Technology. Engineering Division, Pasadena, Calif. Jul 1957. 36p diagrs, graphs. Order from L. C. Mi $3.00, ph $6.30. PB 134721

The problem under consideration is that of two-dimensional gravity waves in water generated by a surface disturbance which oscillates with frequency /2 and moves with constant rectilinear velocity U over the free water surface. The present treatment may be regarded as a generalization of a previous paper by De Prima and Wu who treated the surface waves due to a disturbance which has only the rectilinear motion. Report 85-3. Contract Nonr-220(28).

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Sterilization of sewage containing pathogenic microorganisms. Armour Research Foundation, Chicago, Ill. Apr 1956. 134p diagrs, graphs, tables. Order from L. C. Mi $6.90, ph $21.30. PB 134802

A preliminary evaluation of ten methods of sterilizing sewage has been made. Ten methods were examined on the basis of literature surveys, experimental work done, contacts with equipment manufacturers and specialists, and theoretical examinations of the methods. The methods were evaluated on the basis of bactericidal efficiency, costs, safety, reliability, maintenance, and operation. Formal report, Phase I, revised. For Addendum to Report no. 9 see PB 129374. Contract DA 18-064-404-cml-93. ARF Proj. C076, Report no. 9, revised.

MISCELLANEOUS

Comptroller: Functions and responsibilities. U. S. Air Force. Apr 1958. 121p diagrs. Order from L. C. Mi $6.30, ph $19.80. PB 134271

1. Government-Budgets-Manuals 2. AFM 170-6.

Culture of algae. Part of report on the engineering biotechnology of handling wastes resulting from a closed ecological system, by Gail P. Edwards. New York University. College of Engineering, New York, N. Y. Jun 1957. 30p table. Order from L. C. Mi $2.70, ph $4.80. PB 134644

The types of algae commonly used in the studies of photosynthesis are the green algae, Chlorella and Scenedesmus. The four main strains of Chlorella used for the study are: C. pyrenoidosa (Emerson strain), C. vulgaris (Trelease or Columbia strain), C. vulgaris (Wann or Cornell strain). AD 132452. Contract AF 18(603)-71. AF OSR TN 57-378.

Improving college biology teaching, by Thomas S. Hall. National Academy of Sciences, Washington, D. C. Jun 1957. 74p diagrs, graph, tables. Order as NRC 505 from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. $1.00. PB 135040

1. Biology-Teaching 2. Teaching methods 3. NRC 505.

Nonconventional retrieval systems in documentation: Preliminary comparative analysis, by Allen Kent. Western Reserve University. School of Library Science, Cleveland, O. Jun 1958. 26p diagrs, table. Order from L. C. Mi $2.70, ph $4.80. PB 134517

104 nonconventional information retrieval systems are analysed with regard to a number of basic characteristics in order to discern those features that these systems have in common and those features by which they differ. Two basically different types of systems are identified: document and aspect, and the typical functioning of these types of information retrieval systems is described. AD 158396. Contract AF 49(638)-357. AF OSR TN 58-575.

On the stability of the competitive equilibrium, by Kenneth J. Arrow and Leonid Hurwicz. Stanford University. Dept. of Economics, Stanford, Calif. Jul 1957. 64p. Order from L. C. Mi $3.90, ph $10.80. PB 134837

1. Economics-Theory 2. Equilibrium-Theory 3. Contract N6 onr-25133, NR 047-004 4. SU DE TR 46.

Races of maize in Central America, by E. J. Wellhausen, Alejandro Fuentes O., Antonio Hernandez Corzo, and Paul C. Mangelsdorf. National Academy of Sciences. 1957. 134p photos, maps, tables. Order as NRC 511 from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. Funds supplied by Contract with the Institute of Inter American Affairs of the International Cooperation Administration. PB 135038

1. Corn-Central America 2. NRC 511.

Races of maize in Columbia, by L. M. Roberts, U. J. Grant, and others. National Academy of Sciences. 1957. 159 p photos, maps, diagrs, graphs, tables. Order as NRC 510 from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. $1.00. PB 135037

1. Corn-Columbia 2. NRC 510.

Recommendations on undergraduate curricula in the biological science. National Academy of Sciences, Washington, D. C. 1958. 82p. Order as Publication 578 from NAS-NRC Publications Office, 2101 Constitution Ave., Washington 25, D. C. $1.75. Report of a conference held at Washington D. C., Dec 8-9, 1956, and Chapel Hill, N. C., Apr 1-4, 1957, Chairman, Willis H. Johnson. PB 135293

1. Biology-Teaching 2. NRC 578.

Report of NRL progress. U. S. Naval Research Laboratory. Nov 1958. 52p. Order from OTS. $1.25. Also available at annual subscription rate of $10.00 a year in U.S.A., foreigh rate of $13.00 a year. PB 151270

Contents: Articles: Cloud modification by "carboning", by Florence W. van Straten, R. E. Ruskin, J. E. Dinger, H. J. Mastenbrook, - Effect of irradiation on the electric strength of air, by J. W. Kallander. - Photographic method for hypervelocity measurements, by D. A. Hall. Scientific program: Problem notes: Astronomy and astrophysics: Ultraviolet observations of Mars and Jupiter by rocket astronomy technique.... Radiochemical analysis of air-filter samples collected during 1957.... Evidence for correlations between microseisms and earthquakes. - Chemistry: Tautomerism in phosphorus chemistry, part 1--deuterium exchange studies with dibutyl phosphonate.... Influence of pyrolytic products on the heat-transfer properties of organic coolants (heat-transfer studied on a forced convection loop with monoisopropylibiphenyl). - Mechanics: Fracture strength relative to onset and arrest of crack propagation.... Performance improvement in the NRL pulsejet combustor for gas turbine applications. - Metallurgy and ceramics: Effects of environment on the high-temperature properties of metals.... Effect of chromium on the stability of cementite.... Corrosion mechanisms in ferrous systems. - Nuclear and atomic physics: Experiments related to solar energy and creation of the elements.... Nuclear resonance fluorescence.... Measurement of fast neutron beam currents from the NRL reactor. - Radio: Direct-reading, six-decade precision frequency generator.... Gas cell atomic frequency standard.... Ferrite, four-port circulator has low loss; isolations and reflections greater than 18 db from 9400 Mc. - Solid state physics: Dipolar fields and normal modes in magnetic garnet.... Dosimetry by luminescence degradation.... Absorption spectrum of KCL:T1 at low temperature.... Red luminescing quartz.... Magnetoresistance of copper. - Published reports. - Papers by NRL staff members. - Patents.

Seismic refraction study of the sub-surface geology of the Atlantic Coastal Plain and continental shelf between Virginia and Florida, by G. P. Woollard, W. E. Bonini, and R. P. Meyer. Wisconsin. University. Dept. of Geology, Madison, Wis. Jul 1957. 142p maps (part fold), diagrs, graphs, tables. Order from L. C. Mi $7.20, ph $22.80. PB 134836

1. Geology - Research 2. Refraction, Seismic - Measurement 3. Earth - Structure 4. Contract N7 onr-28512.

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Administrative

A study of student-company decisions in technical recruiting, by John Paul Blakley and William Charles Kuykendall. Union Carbide Nuclear Company. Division of Union Carbide Corporation, Oak Ridge, Tenn. May 1958. Contract W-7405-eng-26. 75p. Order from OTS. $2.00. K-1390

Some thoughts bearing on national defense policy, by Oskar Morgenstern. Princeton University. Department of Econometrics, Princeton, N. J. for Sandia Corporation. Research Colloquium. Albuquerque, N. Mex. Jul 1958. Contract AT-(29-1)-789. 15p. Order from OTS. 75 cents. SCR-33

Bibliographies of interest to the atomic energy program, by Hugh E. Voress and Naomi K. Smelcer. USAEC. Technical Information Service Extension, Oak Ridge, Tenn. May 1958. 161p. Order from OTS. $3.00. TID-3043(Rev. 1)

Nuclear science and technology. A selective bibliography. USAEC. Technical Information Service Extension. Oak Ridge, Tenn. May 1958. 247p. Order from OTS. $4.00. TID-3085

Biology and Medicine

Biological and medical research division semi-annual report. July through December, 1957. Argonne National Laboratory. Lemont, Ill. Mar 1958. Contract W-31-109-eng-38. 204p. Order from OTS. $3.50. ANL-5841

Homeostatic mechanisms. Report of symposium held June 12 to 14, 1957. Brookhaven National Laboratory. Biology Department, Upton, New York. 1957. 275p. Order from OTS. $3.00. BNL-474

Hanford biology research annual report for 1957, by H. A. Kornberg and others. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jan 1958. Contract W-31-109-Eng-52. 226p. Order from OTS. $3.50. HW-53500

Research and development activities in the field of radiological sciences quarterly progress report [for] October-December 1957, by J. W. Healy, ed. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Feb 1958. Decl. May 1958. Contract W-31-109-Eng-52. 43p. Order from LC. Mi $3.00, ph $6.30. HW-54938

Effect of separan on rainbow trout, by P. A. Olsen and R. F. Foster. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Mar 1958. Contract W-31-109-Eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. HW-55292

Experimental determination of fast-and thermal-neutron tissue dose, by J. A. Sayeg and others. Los Alamos Scientific Lab. Los Alamos, N. Mex. Jan 1958. Contract W-7405-eng-36. 65p. Order from LC. Mi $3.90, ph $10.80. LA-2174

Effects of X irradiation on cholesterol, fatty acid and protein synthesis, by R. Gordon Gould. Los Alamos Scientific Laboratory of the Uni-

versity of California. Los Alamos, New Mex. Jan 1957. Contract W-7405-ENG-36. 44p. Order from OTS. $1.25. LA-2179

A comparison of the effects of radioactive internal emitters and X-rays on antibody formation, by Paul R. Salerno, M. D. and Hymer L. Friedell, M. D. Western Reserve University. Atomic Energy Medical Research Project, Cleveland, Ohio. May 1958. Contract W-31-109-eng-78. 18p. Order from OTS. 50 cents. NYO-2058

Agricultural research program. Semi-annual progress report for July 1, 1957 to December 31, 1957. University of Tennessee. Atomic Energy Commission Agricultural Research Program, Knoxville, Tennessee. May 1958. Contract AT-40-1-GEN-242. 45p. Order from OTS. $1.25. ORO-174

Bibliography on metabolism and toxicology of internally deposited elements and their isotopes, by Robert L. Shannon. Technical Information Service, AEC. Jan 1951. Decl. Sep 1957. 31p. Order from LC. Mi $3.00, ph $6.30. TID-451

The metabolism and toxicity of radium-223 in rats, by Patricia W. Durbin and others. University of California. Radiation Lab., Berkeley, Calif. Feb 1958. Contract W-7405-eng-48. 77p. Order from OTS. $2.00. UCRL-8189

Biology and medicine semiannual report October 1957 through March 1958. University of California. Radiation Lab., Berkeley, Calif. Apr 1958. Contract W-7405-eng-48. 66p. Order from OTS. $1.75. UCRL-8265

The disposal of radioactive waste materials at the University of California radiation laboratory, by John A. Kaufmann and Nelson B. Garden. University of California Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 13p. Order from OTS. 50 cents. UCRL-8380

Radiological laboratory. Semiannual report for period ending June 30, 1958, by Robert S. Stone, M. D. and Gail D. Adams, Ph. D. University of California School of Medicine. Department of Radiology, San Francisco, Calif. Aug 1958. Contract AT-11-1-GEN-10, project no. 2. 24p. Order from OTS. $1.00. UCSF-17

On the mechanism of skeletal fixation of strontium, by J. Boyd and others. Univ. of Rochester. Atomic Energy Project, Rochester, N. Y. Nov 1957. Contract W-7401-eng-49. 16p. Order from LC. Mi $2.40, ph $3.30. UR-512

The biological hazard to man of carbon-14 from nuclear weapons, by John R. Totter and others. U. S. Atomic Energy Commission. Division of Biology and Medicine. N.D. 18p. Order from OTS. 50 cents. WASH-1008

Chemistry—General

Carbon dioxide absorption on thoria. Technical report no. 1, by Charles H. Pitt and Milton E. Wadsworth. Univ. of Utah. Inst. for the Study of Rate Processes. Salt Lake City, Utah. For Oak Ridge National Lab. Feb 1958. Contract W-7405-eng-26, subcontract 1075. 22p. Order from LC. Mi $2.40, ph $3.30. AECU-3752

Temperature dependence of Tafel slope in the formation of very thin anodic oxide films on niobium, by George B. Adams, Jr. and Timothy Kao. University of Oregon Medical School. Department of Pediatrics, Portland, Oregon. 1957. Contract AT(45-1)-535. 12p. Order from OTS. 50 cents. AECU-3769

Hydrogen and oxygen isotopes applied to the study of water-metal reactions. Exchange of D_2O^{18} with alpha alumina monohydrate, by R. B. Bernstein. Argonne National Laboratory. Chemistry Division, Lemont, Ill. Aug 1958. Contract W-31-109-eng-38. 15p. Order from OTS. 50 cents. ANL-5889

Polarography of europium and ytterbium, by James O. Hibbits and others. General Electric Co. Atomic Products Division, Aircraft Nuclear Propulsion Department, Cincinnati, Ohio. Aug 1958. Contracts AF 33(038)-21102 and AT (11-1)-171. APEX-405

Vapor pressure and equilibrium studies of the sodium fluoride-beryllium fluoride system, by Karl A. Sense and others. Battelle Memorial Inst. Columbus, Ohio. May 1957. Contract W-7405-eng-92. 32p. Order from LC. Mi $3.00, ph $6.30. BMI-1186

The nondestructive analysis of ancient potsherds through neutron activation, by Edward V. Sayre and others. Brookhaven National Lab. Upton, N. Y. Apr 1958. 18p. Order from OTS. 75 cents. BNL-508(T-122)

Aircraft nuclear propulsion chemical processing. Quarterly report for February 10, 1953 to May 10, 1953, by G. I. Cathers and D. E. Ferguson. Oak Ridge National Lab. Oak Ridge, Tenn. May 1953. Decl. Jul 1957. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-53-5-210

Dissociation of nitric acid in aluminum nitrate solutions, by R. C. Axtmann and B. B. Murray. E. I. du Pont de Nemours & Co. Explosives Dept., Atomic Energy Div., Technical Div., Savannah River Laboratory, Augusta, Ga. Jun 1958. Contract AT(07-2)-1. 11p. Order from OTS. 50 cents. DP-297

Kinetics of the reaction of uranium hexafluoride with sodium fluoride powder, pellets, and crushed pellets, by F. E. Massoth and W. E. Hensel, Jr. Goodyear Atomic Corp. Technical Div. -Chemistry Dept., Portsmouth, Ohio. Apr 1958. Contract AT-(33-2)-1. 39p. Order from OTS. $1.25. GAT-230

Reactions of freon-114 with fluorine, by F. E. Massoth. Goodyear Atomic Corporation. Technical Div. -Chemistry Dept., Portsmouth, Ohio. May 1958. Contract AT-(33-2)-1. 39p. Order from OTS. $1.25. GAT-234

A solids filter for hot corrosive gases, by G. A. Nicholson. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Mar 1958. Contract W-31-109-Eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-55353

Oxidation of MTR graphite reflector, by C. F. Leyse. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Dec 1952. Decl. May 1958. 8p. Order from LC. Mi $1.80, ph $1.80. IDO-16052-PPCo

Some properties of sulfoacetic acid and 3-sulfopropionic acid and their use as analytical masking agents, by Joseph Zimmerman and Charles V. Banks. Iowa State College. Ames Laboratory, Ames, Iowa. Jun 1956. Contract W-7405-eng-82. 31p. Order from OTS. $1.00. ISC-780

United States Atomic Energy Commission research and development report. Isotopic equilibria of nitrosyl chloride, by Riley Schaeffer and Hampton Smith. Iowa State College. Ames Laboratory, Ames, Iowa. Jun 1957. Contract W-7405-eng-82. 11p. Order from OTS. 50 cents. ISC-867

Annotated bibliography of 2-(2-hydroxy-3, 6-disulfo-1-naphthylazo)-benzenearsonic acid, by Charles V. Banks and Gerald L. Weiss. Iowa State College. Ames Laboratory, Ames, Iowa. Jul 1957. Contract W-7405-Eng-82. 16p. Order from OTS. 50 cents. ISC-873

United States Atomic Energy Commission research and development report. Semi-annual summary research report in chemistry. Iowa State College. Ames Laboratory, Ames, Iowa. Mar 1958. Contract W-7405-eng-82. 67p. Order from OTS. $1.75. ISC-976

Behavior of UO_2 bodies subjected to temperature transients, by W. C. Cohen and D. F. Molino. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1957. Contract W-31-109-Eng-52. 25p. Order from OTS. $1.00. KAPL-1873

The determination of dissolved argon in water, by E. L. Shirley and others. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1957. Contract W-31-109-Eng-52. 12p. Order from OTS. 50 cents. KAPL-1890

Evaluation of mercury vapor removal methods for confined compartments, by F. G. Haag. Knolls Atomic Power Lab. Schenectady, N. Y. Feb 1956. Contract W-31-109-Eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-FGH-2

Qualitative observations on the zirconium-water reaction at atmospheric pressure, by Douglas C. Layman. Knolls Atomic Power Lab. Schenectady, N. Y. Jul 1955. Decl. May 1957. Contract W-31-109-Eng-52. 40p. Order from LC. Mi $3.30, ph $7.80. KAPL-M-SAR-RES-9

Residual VPI 220 in reactor steam generators, by V. F. Consalvo and E. L. Shirley. Knolls Atomic Power Lab. Schenectady, N. Y. Jun 1958. Contract W-31-109-Eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-VFC-3

Collected radiochemical procedures (radiochemistry group J-11), by Jacob Kleinberg. University of California. Los Alamos Scientific Lab., Los Alamos, N. Mex. Jan 1958. Contract W-7405-ENG-36. 345p. Order from OTS. $5.00. LA-1721, 2nd Ed.

Electroplating of tapered silver deposits on stainless steel and inconel tubes for a high-capacity mercury-column rheostat, by L. J. Quintana and J. M. Taub. University of California, Los

Alamos, N. Mex. Jan 1958. Contract W-7405-ENG-36. 16p. Order from OTS. 75 cents. LAMS-2206

Density of fused mixtures of sodium fluoride, beryllium fluoride, and uranium fluoride, by B. C. Blanke and others. Mound Lab. Miamisburg, Ohio. Apr 1956. Contract AT-33-1-GEN-53. 89p. Order from LC. Mi $4.50, ph $12.30. MLM-1076

Diffusion of cerium and zirconium in molten uranium, by T. Smith. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Jul 1958. Contract AT(11-1)-GEN-8. 23p. Order from OTS. 75 cents. NAA-SR-2628

Vapor pressure of thorium tetrafluoride, by A. J. Darnell and F. J. Keneshea, Jr. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Sep 1958. Contract AT(11-1)-GEN-8. 14p. Order from OTS. 50 cents. NAA-SR-2710

The enzymatic phosporylation of deoxyribonucleotides, by Milton M. Mozen and Paul S. Lavik. Western Reserve Univ. Atomic Energy Medical Research Project, Cleveland, Ohio. Aug 1957. Contract W-31-109-eng-78. 14p. Order from LC. Mi $2.40, ph $3.30. NYO-2055

An investigation of the chemical nature of the organic matter of uraniferous shales. Semi-annual report covering the period October 1, 1956 to March 31, 1957. Dept. of Fuel Technology, by C. R. Kinney and others. Pennsylvania State Univ. Coll. of Mineral Industries, University Park, Pa. Apr 1957. Contract AT(30-1)-1442. 31p. Order from LC. Mi $3.00, ph $6.30. NYO-6676

A summary of density measurements on molten fluoride mixtures and a correlation for prediction densities of fluoride mixtures, by S. I. Cohen and T. N. Jones. Oak Ridge National Lab. Oak Ridge, Tenn. Jul 1954. Decl. with deletions Feb 1957. Contract W-7405-eng-26. 36p. Order from LC. mi $3.00, ph $6.30. ORNL-1702(Del.)

An evaluation of asphalt and other materials for lining radiochemical waste storage basins, by Arnold J. Hoiberg. Oak Ridge National Lab., Chemical Technology Division, Unit Operation Section, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 48p. Order from OTS. $1.50. ORNL-2508

An electrolytic procedure for the removal of ruthenium and nitrate from alkaline waste solutions, by A. F. Messing and I. R. Higgins. Oak Ridge National Lab. Chemical Technology Division, Chemical Development Section B, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 34p. Order from OTS. $1.00. ORNL-2532

Equipment decontamination methods for the fused salt--fluoride volatility process, by R. L. Jolley and others. Oak Ridge National Lab. Chemical Technology Division, Chemical Development Section A, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 14p. Order from OTS. 50 cents. ORNL-2550

First conference analytical chemistry in nuclear reactor technology November 4 - 6, 1957 Gatlinburg, Tenn., by C. D. Susano and others. Oak Ridge National Lab. Oak Ridge, Tenn. Aug 1958. 261p. Order from OTS. $3.50. TID-7555

Electrochemical studies in cyclic esters, by William Sidney Harris (thesis). University of California. Radiation Lab., Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 78p. Order from OTS. $2.00. UCRL 8381

I. A method for determining radiative lifetimes of high-temperature molecules. II. The probability of spontaneous nuclear reaction in molecular hydrogen, by Richard G. Brewer (thesis). University of California. Radiation Lab., Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 74p. Order from OTS. $2.00. UCRL-8387

Chemistry—Radiation and Radiochemistry

Boron isotope enrichment: Pilot plant proposal for the anisole-BF_3 system, by Kenneth O. Hambrock and George T. Miller. Hooker Electrochemical Company. Niagara Falls, N. Y. Dec 1957. Contract AT(30-1)-1524. 96p. Order from OTS. $1.75. HEC-82

Gas-handling system for the processing refabrication experiment, by H. Bernard. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Aug 1958. Contract AT(11-1)-GEN-8. 78p. Order from OTS. $2.00. NAA-SR-2309

Radiation intensities associated with chemical processing of metallic uranium fuel, by Sheldon Berger. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Jul 1958. Contract

AT(11-1)-GEN-8. 32p. Order from OTS. $1.00. NAA-SR-2543

The radiation chemistry of the symmetrical dichloroethylenes, by Jean H. Futrell (thesis). University of California. Radiation Lab., Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 59p. Order from OTS. $1.75. UCRL-8362

Chemistry—Separation Processes for Plutonium and Uranium

Chemical process to recover uranium from phosphate rock, by Iver Igelsrud. Battelle Memorial Inst. Columbus, Ohio. Nov 1947. Decl. Mar 1956. Contract W-38-094-eng-27. 45p. Order from LC. Mi $3.30, ph $7.80. BMI-99

Processing of power reactor fuels. The Enrico Fermi fast breeder reactor fuel progress report no. 1, by C. W. Pierce and B. Manowitz. Brookhaven National Lab. Nuclear Engineering Dept., Chemical Reprocessing Studies, Upton, N. Y. Jun 1958. 10p. Order from OTS. 50 cents. BNL-511-(T-124)

1200 area pilot plant manual of operations, by D. G. Reid and N. J. Rifstad. Oak Ridge National Lab. Oak Ridge, Tenn. Sep 1947. Decl. Feb 1957. Contract W-7405-eng-26. 246p. Order from LC. Mi $11.10, ph $37.80. CF-47-10-230

Estimate of potential fuel reprocessing, revision no. 22-part A, by J. W. Ullmann. Oak Ridge National Lab. Oak Ridge, Tenn. Mar 1958. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-58-3-85

Progress reports for October 1948, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. (DOW-8, Nov 5. Changed from Official Use Only Mar 1957. Contract AT-30-1-GEN-236. 22p. Order from LC. Mi $2.70, ph $4.80. DOW-8

Progress reports for February 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. Mar 10. Decl. Dec 1955. Contract AT-30-1-GEN-236. 28p. Order from LC. Mi $2.70, ph $4.80. DOW-12

Progress reports for March 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. DOW-13, Apr 14. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 37p. Order from LC. Mi $3.00, ph $6.30. DOW-13

Progress report for April 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. (Dow-14 May 1949. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 25p. Order from LC. Mi $2.70, ph $4.80. DOW-14

Progress report for May 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. DOW-15 May 1949. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 39p. Order from LC. Mi $3.00, ph $6.30. DOW-15

Progress report for June 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. DOW-16 Jun 1949. Decl. Dec 1955. Contract AT-30-1-GEN-236. 37p. Order from LC. Mi $3.00, ph $6.30. DOW-16

Progress reports for July 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. Jul 1949. Decl. Dec 1955. Contract AT-30-1-GEN-236. 37p. Order from LC. Mi $3.00, ph $6.30. DOW-17

Progress reports for August 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. Aug 1949. Decl. Mar 1958. Contract AT-30-1-GEN-236. 72p. Order from LC. Mi $4.50, ph $12.30. DOW-18

Progress reports for September 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. Sep 1949. Decl. Dec 1955. Contract AT-30-1-GEN-236. 89p. Order from LC. Mi $4.80, ph $13.80. DOW-19

Progress reports for October 1949, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. (DOW-20, Oct 1949. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 67p. Order from LC. Mi $3.90, ph $10.80. DOW-20

Uranium recovery from low-grade ores. Progress reports for July 1950, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. (DOW-33 Jul 1950. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 53p. Order from LC. Mi $3.60, ph $9.30. DOW-33

Uranium recovery from low-grade ores. Progress reports for September 1950, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. DOW-35, Sep 1950. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 60p. Order from LC. Mi $3.90, ph $10.80. DOW-35

Uranium recovery from miscellaneous materials. Progress report for December 1950, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. Dec 1950. Decl. Mar 1958. Contract AT-30-1-GEN-236. 50p. Order from LC. Mi $3.30, ph $7.80. DOW-40

Uranium recovery from miscellaneous materials. Progress reports for January 1951, by R. H. Bailes. Dow Chemical Co. Great Western Div., Pittsburg, Calif. (DOW-42, Jan 1951). Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 32p. Order from LC. Mi $3.00, ph $6.30. DOW-42

Uranium recovery from miscellaneous materials. Progress reports for February 1951, by R. H. Bailes. Dow Chemical Co. Western Div., Pittsburg, Calif. DOW-44, Feb 1951. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 33p. Order from LC. Mi $3.00, ph $6.30. DOW-44

A pilot plant for the recovery of uranium from industrial phosphoric acid. [Part I], by Ray S. Long and James T. Mitchell. Dow Chemical Co. Western Div., Pittsburg, Calif. (Pt. I, May 1951. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 167p. Order from LC. Mi $7.80, ph $25.80. DOW-52

A pilot plant for the recovery of uranium from industrial phosphoric acid. Part II, by D. E. Garrett and G. E. Moore. Summary status report. Dow Chemical Co. Western Div., Pittsburg, Calif. Feb 1952. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 151p. Order from LC. Mi $4.20, ph $22.80. DOW-52A

Recovery of uranium by ion exchange from an acid leach of Marysvale ore, by D. A. Ellis. Dow Chemical Co. Western Div., Pittsburg, Calif. Aug 1951. Changed from Official Use Only Mar 1957. Contract AT-30-1-GEN-236. 16p. Order from LC. Mi $2.40, ph $3.30. DOW-54

The recovery of uranium from industrial phosphoric acid. Progress reports for July 1951. Research Dept., by R. H. Bailes. Dow Chemical Co. Western Div., Pittsburg, Calif. (DOW-58, Aug 1951). Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 81p. Order from LC. Mi $4.50, ph $12.30. DOW-58

Recovery of uranium by an ion-exchange pilot plant from concentrated phosphoric acid (29% P_2O_5). Summary status report, by D. E. Garrett and G. R. Moore. Dow Chemical Co. Western Div., Pittsburg, Calif. Mar 1952. Changed from Official Use Only Mar 1958. Contract AT-30-1-GEN-236. 69p. Order from LC. Mi $3.90, ph $10.80. DOW-70

Adsorption of ruthenium by ion exchange resins, by C. A. Prohaska. E. I. du Pont de Nemours & Co. Explosives Department - Atomic Energy Division, Technical Division- Savannah River Laboratory, Atlanta, Ga. Jun 1958. Contract AT(07-2)-1. 16p. Order from OTS. 50 cents. DP-291

Removal of silica from solutions of nuclear fuels, by Harold J. Groh. E. I. du Pont de Nemours & Co. Explosives Department-Atomic Energy Division, Technical Division-Savannah River Laboratory, Atlanta, Ga. Jun 1958. Contract AT(07-2)-1. 12p. Order from OTS. 50 cents. DP-293

Plant-scale concentration of Am and Pu III using tributyl phosphate, by W. J. Maraman and others. Los Alamos Scientific Lab. Los Alamos, N. Mex. Aug 1954. Decl. Nov 1957. Contract W-7405-eng-36. 13p. Order from LC. Mi $2.40, ph $3.30. LA-1699

Chemical technology division monthly progress report for January 1957. Oak Ridge National Lab. Oak Ridge, Tenn. Jun 1957. Decl. Jul 1957. Contract W-7405-eng-26. 75p. Order from LC. Mi $4.50, ph $12.30. ORNL-2251

Controlled Thermonuclear Processes

Controlled thermonuclear processes. A selective bibliography, by Thomas W. Scott. USAEC. Technical Information Service Extension. Oak Ridge, Tenn. May 1958. 34p. Order from OTS. $1.00. TID-3072

Microwave diagnostics for controlled fusion research, by Charles B. Wharton. University of California. Radiation Lab., Livermore Site, Livermore, Calif. Sep 1957. Contract W-7405-eng-48. 35p. Order from OTS. $1.00. UCRL-4836

Bibliography of reports relating to project Sherwood (controlled thermonuclear reactions) written at University of California radiation laboratory, Livermore and Berkeley--1953 through 1957--un-

classified section, by Frederick E. Frost, comp. Univ. of California. Radiation Lab. Livermore, Calif. May 1958. Contract W-7405-eng-48. 10p. Order from LC. Mi $1.80, ph $1.80. UCRL-5225

Criticality Studies

Nuclear merchant ship reactor critical experiment. Hazards evaluation final report. Babcock and Wilcox Co. Atomic Energy Division, Lynchburg, Va. Oct 1957. Contract AT(30-3)-274 and AEJ-48. 93p. Order from OTS. $2.25. BAW-1023 and Suppl. 1

Experimental studies of slightly enriched uranium, water moderated lattices. Part I. 0.600-in. -diameter rods, by Herbert Kouts and Rudolph Sher. Brookhaven National Laboratory, Upton, N. Y. Sep 1957. 42p. Order from OTS. $1.25. BNL-486(T-111)

Critical mass studies. Part III, by C. K. Beck and others. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Apr 1949. Decl. Jan 1957. Contract W-7405-eng-26. 77p. Order from LC. Mi $4.50, ph $12.30. K-343

Studies in nuclear safety. Lectures presented at the Nuclear Safety Training School conducted by Union Carbide Nuclear Company June 3-14, 1957, by H. F. Henry. Aug 1958. Contract W-7405-eng-26. 149p. Order from OTS. $3.00. K-1380

Some qualitative observations of zirconium-water reactions, by D. C. Layman and H. L. Mars. Knolls Atomic Power Lab. Schenectady, N. Y. Apr 1956. Decl. Apr 1957. Contract W-31-109-Eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. KAPL-1534

Analysis of DCTF criticality and reactivity data, by Ely M. Gelbard. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Dec 1955. Contract AT-11-1-GEN-14. 18p. Order from LC. Mi $2.40, ph $3.30. WAPD-P-695

Slab experiments. III. Uranium oxide reflector, by W. H. Hartley. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Jul 1956. 41p. Order from LC. Mi $3.00, ph $6.30. WAPD-PWR-Ph-126

Geology and Mineralogy

Annual report for April 1, 1957 to March 31, 1958, by John W. Gruner. Univ. of Minnesota. Minneapolis, Minn. May 1958. Contract AT(30-1)-610. 13p. Order from LC. Mi $2.40, ph $3.30. RME-3155

Health and Safety

Efficiency of scavenging devices used in determining fallout. Report no. 7 (final report), by Jan Rosinski. Armour Research Foundation of Illinois Institute of Technology, Technology Center, Chicago, Ill. Feb 1958. ARF project C 082. Contract AT(11-1)-275. 28p. Order from OTS. $1.00. AECU-3666

Environmental contamination from weapon tests. USAEC. Health and Safety Lab., New York Operations Office, New York, N. Y. Oct 1958. 367p. Order from OTS. $3.50. HASL-42

Analytical procedures of the industrial hygiene group, by Jean McClelland. Univ. of California. Los Alamos Scientific Lab., Los Alamos, N. Mex. Aug 1958. Contract W-7405-ENG-36. 260p. Order from OTS. $4.00. LA-1858(2nd edition)

The effect of the "tendency to report injuries" on minor accident statistics, by J. A. Barker. Oak Ridge National Lab. Personnel division, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 59p. Order from OTS. $1.75. ORNL-2549

Status report on waste disposal in natural salt formations, by F. L. Parker and others. Oak Ridge National Lab. Health physics division, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 56p. Order from OTS. $1.75. ORNL-2560

Nuclear safety guide, by A. D. Callihan, ORNL. Univ. of Calif. Los Alamos Scientific Lab., Los Alamos, N. Mex. 1956. 28p. Order from OTS. $1.00. TID-7016

Radiation exposures of personnel at the 60-inch cyclotron, by Peter F. McWalters and others. Univ. of California. Radiation Lab., Berkeley Calif. May 1958. Contract W-7405-eng-48. 15p. Order from OTS. 50 cents. UCRL-8276

Blast effects on glass vacuum containers, by Edwin P. Laug and Harold V. Leininger. Food and Drug Administration, Dept. of Health, Education, and Welfare, Washington, D. C. Mar 1958. Project 38.1-II. 8p. Order from OTS. 50 cents. WT-1461

Accidental radiation excursion at the Y-12 plant. Union Carbide Nuclear Co. Div. of Union Carbide Corp., Oak Ridge, Tenn. Jun 1958. Contract W-7405-eng-26. 117p. Order from OTS. $2.75. Y-1234

Instruments

Applications of an oscillating capacitor, by K. E. Pope and T. H. Martin. Sandia Corp. Albuquerque, N. Mex. May 1957. Contracts AT (29-1)-789. (TM-112-57-14). 17p. Order from LC. Mi $2.40, ph $3.30. AECU-3479

Use of Sandia Corporation analog computer in sled design, by F. J. Maloney. Sandia Corp. Albuquerque, N. Mex. Jan 1957. Contracts AT(29-1)-789. (TM-267-56-21). 23p. Order from LC. Mi $2.70, ph $4.80. AECU-3490

Passive digital translator design, by G. R. Bussey. Sandia Corp. Albuquerque, N. Mex. May 1957. Contracts AT(29-1)-789. (TM-91-57-14). 10p. Order from LC. Mi $1.80, ph $1.80. AECU-3493

Installation and interference problems in reactor instrumentation systems, by William K. Brookshier. Argonne National Laboratory. Lemont, Ill. Aug 1958. Contract W-31-109-eng-38. 12p. Order from OTS. 50 cents. ANL-5901

An eddy current thickness tester for copper plated on uranium, by A. P. Holt, Jr. and L. H. Cook, Jr. Applied Physics Division. E. I. du Pont de Nemours & Co. Explosives Department - Atomic Energy Division, Technical Division - Savannah River Laboratory, Atlanta, Ga. Nov 1957. Contract AT(07-2)-1. 11p. Order from OTS. 50 cents. DP-252

Constant temperature blender for synthetic uranium isotopic standards, by W. S. Stringham. Goodyear Atomic Corporation. Works Laboratory-Sampling Department, Portsmouth, Ohio. Sep 1958. Contract AT-(33-2)-1. 6p. Order from OTS. 50 cents. GAT-250

What is static switching?, by A. A. Maupin, Jr. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Nov 1957. Contract W-31-109-Eng-52. 10p. Order from LC. Mi $2.40, ph $3.30. HW-53504

A static switching interlock between radiation and pressure monitoring instruments, by A. A. Maupin, Jr. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Mar 1958. Contract W-31-109-Eng-52. 30p. Order from LC. Mi $3.00, ph $6.30. HW-53956

Uranium analysis by gamma absorptiometry, by R. E. Connally and others. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. May 1958. Contract W-31-109-Eng-52. 27p. Order from OTS. 75 cents. HW-54438

A remotable float-type liquid interface controller, by K. J. Hahn and H. M. Jones. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Feb 1958. Contract W-31-109-Eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. HW-55166

An experimental scintillation dose-rate meter--model II, by W. G. Spear and L. V. Zuerner. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jun 1958. Contract W-31-109-Eng-52. 18p. Order from OTS. 75 cents. HW-55633

Development of a new process for cutting stainless steel, by R. A. Gahr. Knolls Atomic Power Lab. Schenectady, N. Y. Apr 1957. Changed from Official Use Only Jun 1958. Contract W-31-109-Eng-52. 27p. Order from LC. Mi $2.70, ph $4.80. KAPL-1774

A three-stage research mass spectrometer, by F. A. White and others. General Electric Company. Knolls Atomic Power Laboratory, Schenectady, N. Y. May 1958. Contract W-31-109-Eng-52. 48p. Order from OTS. $1.50. KAPL-1843

Transistorized trip circuit for critical assemblies, by E. J. Wade and D. S. Davidson. General Electric Company. Knolls Atomic Power Laboratory, Schenectady, N. Y. Feb 1958. Contract W-31-109-Eng-52. 15p. Order from OTS. 75 cents. KAPL-1910

Non-destructive determination of U-235 content of rod-shaped fuel elements by gamma pulse spectrometry, by W. C. Judd and M. B. Leboeuf. General Electric Company. Knolls Atomic Pow-

er Lab., Schenectady, N. Y. Jul 1958. Contract W-31-109-Eng-52. 24p. Order from OTS. $1.00. KAPL-1925

Reactor controls analog facility (RCAF) operations manual, by F. P. Green. Oak Ridge National Lab. Oak Ridge, Tenn. Feb 1958. Contract W-7405-eng-26. 67p. Order from OTS. $2.00. ORNL-2405

Instrumentation and controls division annual progress report for period ending July 1, 1957, by C. J. Borkowski and C. S. Harrill. Oak Ridge National Lab. Oak Ridge, Tenn. Contract W-7405-eng-26. 125p. Order from OTS. $2.75. ORNL-2480

A computer for a position indicating system, by D. J. Knowles. Oak Ridge National Lab. Instrumentation and Controls Division, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 83p. Order from OTS. $2.25. ORNL-2534

Contact-resistance symposium, Bendix Aviation Corporation, Kansas City Division, Sandia Corporation, June 14, 1957, Albuquerque, New Mexico. Sandia Corp. Albuquerque, N. Mex. May 1958. Contract AT(29-1)-789. 40p. Order from LC. Mi $3.00, ph $6.30. SCR-18

Manually operated oscilloscope camera positioning mechanism, by Paul L. Kerley and Chester J. Smith. Sandai Corp. Albuquerque, N. Mex. May 1958. Contract AT(29-1)-789. 7p. Order from LC. Mi $1.80, ph $1.80. SCTM-162-58(14)

A transitorized linear ramp generator with bias and pedestal controls and its application in digital voltmeters, by Robert E. Daniels and Ross J. Sinkey. Sandia Corp. Albuquerque, N. Mex. Feb 1958. Contract AT(29-1)-789. 22p. Order from LC. Mi $2.70, ph $4.80. SCTM-346-57(14)

A time of arrival indicator for radioactive fallout, by Ross W. Farmer and Oscar Reiner, Jr. Univ. of California. Atomic Energy Project, Los Angeles, Calif. Nov 1957. Contract AT-(04-1)-GEN-12. 17p. Order from LC. Mi $2.40, ph $3.30. UCLA-413

Transient behavior of the Berkeley bubble chamber motor generator magnet system during emergency procedure, by Alper Garren and Warren Heckrotte. University of California. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 24p. Order from OTS. 75 cents. UCRL-8333

A constant flow suction unit for aerosol sampling work, by A. C. Schmidt and L. L. Wiltshire. Naval Radiological Defense Lab. Oct 1954. 23p. Order from LC. Mi $2.70, ph $4.80. USNRDL-TR-21

Test results of the Bettis high-pressure oxygen analyzer, by J. M. Wright and T. R. Druga. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. 1958. 46p. Order from LC. Mi $3.30, ph $7.80. WAPD-CDA(AD)-339

An automatic control system for oxyacetylene torches, by Brandt Kuperstock. Union Carbide Corporation. Union Carbide Nuclear Company, Y-12 Plant, Oak Ridge, Tenn. Aug 1958. Contract W-7405-eng-26. 13p. Order from OTS. 50 cents. Y-1236

Metallurgy and Ceramics

Specification for cleaning zircaloy fuel rod components, by R. L. Fischer. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. May 1956. Decl. Mar 1957. 4p. Order from LC. Mi $1.80, ph $1.80. AECD-4164

Reactions of titanium with water and aqueous solutions. Quarterly report no. 4 (report no. 11) for December 16, 1957-March 15. 1958, by Fred E. Littman and Franklin M. Church. Oak Ridge National Lab. Stanford Research Inst. Menlo Park, Calif. Mar 1958. Contracts W-7405-eng-26. SRI project no. SD-2116. 14p. Order from LC. Mi $2.40, ph $3.30. AECU-3675

Zirconium hazards research. Progress report no. 2 for September 1, 1957 to February 28, 1958, by J. A. Herickes and others. Bureau of Mines. Div. of Explosives Technology, Pittsburgh, Pa. Feb 1958. Contract AT(11-1)-473. 31p. Order from LC. Mi $3.00, ph $6.30. AECU-3682

Evaluation of mechanical and physical properties of annealed hafnium. Research report 100FF1005-R1, by E. T. Wessel. Westinghouse Electric Corp. Research Lab., East Pittsburgh, Pa. Mar 1956. 46p. Order from LC. Mi $3.30, ph $7.80. AECU-3693

An investigation of scaling of zirconium at elevated temperatures. Quarterly status report no. 20 for March 2, 1958 to June 2, 1958, by H. B. Probst and others. Case Inst. of Tech. Pittsburgh, Pa. Jun 1958. Contract AT(11-1)-258. 4p. Order from LC. Mi $1.80, ph $1.80. AECU-3706

Specification for cleaning metal components and systems for liquid-metal cooled power reactors. Specification no. 10-16, by L. R. Kovac. Atomic Power Development Associates, Inc., Detroit, Mich. Jan 1958. 10p. Order from LC. Mi $1.80, ph $1.80. AECU-3747

Casting uranium - 5 w/o zirconium - 1.5 w/o niobum alloys into zirconium and zircaloy - 2 containers, by J. W. Frank and R. E. Macherey. Argonne National Lab. Metallurgy Div., Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. Program I. 1. 24. 48p. Order from OTS. $1.50. ANL-5442

"Pin-cushion" irradiation tests of uranium and its zirconium alloys, by S. H. Paine and F. L. Brown. Argonne National Lab. Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. Metallurgy program 6. 1. 1. 41p. Order from OTS. $1.25. ANL-5538

A pulsed eddy current technique for measuring clad thickness, by D. L. Waidelich and others. Argonne National Lab. Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. Metallurgy program 12. 1. 2. 49p. Order from OTS. $1.50. ANL-5614

Effects of irradiation on some uranium-plutonium alloys, by J. H. Kittel and L. R. Kelman. Argonne National Lab. Lemont, Ill. Jun 1958. Final report. Contract W-31-109-eng-38. Metallurgy program 6. 5. 3. 23p. Order from OTS. 75 cents. ANL-5706

Properties and handling practices for magnesium: A literature survey, by M. Beederman and others. Argonne National Lab. Chemical Engineering Div., Lemont, Ill. Mar 1958. Contract W-31-109-eng-38. 132p. Order from OTS. $2.75. ANL-5749

"Pin-cushion" irradiation tests of uranium-chromium alloys, by S. H. Paine and F. L. Brown. Argonne National Lab. Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. Metallurgy program 6. 1. 1. 21p. Order from OTS. 75 cents. ANL-5854

Zirconium progress report for the period of March 15-April 15, 1952. Bureau of Mines. Northwest Electrodevelopment Lab., Albany, Oreg. 1952. Decl. Feb 1957. Contract AT(11-1)-140. 22p. Order from LC. Mi $2.70, ph $4.80. BMII-24

Zirconium progress report for the period of June 15-July 15, 1953. Bureau of Mines. Northwest Electrodevelopment Lab., Albany, Oreg. 1953. Decl. Feb 1957. Contract AT(11-1)-140. 20p. Order from LC. Mi $2.40, ph $3.30. BMII-70

Hydrogen embrittlement of zirconium, by R. W. Dayton and others. Battelle Memorial Inst. Columbus, Ohio. Aug 1952. Decl. Mar 1958. Contracts W-7405-eng-92 and NObs-50352. 29p. Order from LC. Mi $2.70, ph $4.80. BMI-767

Core shape of fuel elements clad with zirconium alloy, by J. W. Holladay and others. Battelle Memorial Inst. Columbus, Ohio. Jun 1953. Decl. Mar 1957. Contract W-7405-eng-92. 31p. Order from LC. Mi $3.00, ph $6.30. BMI-841(Del.)

A study of aluminum-uranium alloys, by Henry A. Saller and others. Battelle Memorial Inst. Columbus, Ohio. Jan 1956. Decl. Mar 1957. Contract W-7405-eng-92. 47p. Order from LC. Mi $3.30, ph $7.80. BMI-1066

Progress relating to civilian applications during December 1957, by Russell W. Dayton and Clyde R. Tipton, Jr. Battelle Memorial Inst. Columbus, Ohio. Jan 1958. Contract W-7405-eng-92. 48p. Order from OTS. $1.50. BMI-1247

Progress relating to civilian applications during February 1958, by Russell W. Dayton and Clyde R. Tipton, Jr. Battelle Memorial Inst. Columbus, Ohio. Mar 1958. Decl. Apr 1958. Contract W-7405-eng-92. 62p. Order from LC. Mi $3.90, ph $10.80. BMI-1256

Survey of ternary and quaternary metastable gamma-phase uranium alloys, by Victor W. Storhok and others. Battelle Memorial Inst. Columbus, Ohio. Jul 1958. Contract W-7405-eng-92. 38p. Order from OTS. $1.25. BMI-1278

Corrosion and creep behavior of tantalum in flowing sodium, by Gilbert E. Raines and others. Battelle Memorial Inst. Columbus, Ohio. Aug 1958. Contract W-7405-eng-92. 29p. Order from OTS. $1.00. BMI-1284

The bonding of uranium to nickel, by H. A. Saller and J. R. Keeler. Battelle Memorial Inst. Columbus, Ohio. Feb 1949. Decl. Feb 1957. Contract W-7405-eng-92. 25p. Order from LC. Mi $2.70, ph $4.80. BMI-T-6

Solid fuel plates of aluminum and U_3O_8, by E. S. Bomar. Oak Ridge National Lab. Oak Ridge, Tenn. Sep 1953. Decl. Feb 1957. Contract W-7405-eng-26. 13p. Order from L. C. Mi $2.40, ph $3.30. CF-53-9-179

Examination of fluoride pump loops 4935-5 and 4935-7, by R. S. Crouse and others. Oak Ridge National Lab. Oak Ridg, Tenn. Oct 1955. Decl. with deletions Mar 1957. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-55-10-31(Del.)

Carbon steel in high temperature water, by G. E. Moore. Oak Ridge National Lab. Oak Ridge, Tenn. Jan 1957. Contract W-7405-eng-26. 34p. Order from LC. Mi $3.00, ph $6.30. CF-57-1-26

Examination of corrosion specimens from slurry blanket mockup run SM-4, by S. A. Reed and E. L. Compere. Oak Ridge National Lab. Oak Ridge, Tenn. Jun 1958. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-58-6-59

Progress report on metallurgy of tuballoy [uranium] to the University of Chicago. Battelle Memorial Inst. Columbus, Ohio. Sep 1944. Decl. Feb 1957. 19p. Order from LC. Mi $2.40, ph $3.30. CT-2144

Corrosion by solutions containing HNO_3, HF, and reducing agents, by M. L. Holzworth, Pile Materials Div. E. I. du Pont de Nemours & Co. Explosives Dept. - Atomic Energy Div., Technical Div. - Savannah River Lab., Atlanta, Ga. May 1958. Contract AT(07-2)-1. 24p. Order from OTS. 75 cents. DP-284

Standard operating procedure for heat treating of N. A. A. enriched rods. Section 1.4.3.13, by Reed E. Yount. National Lead Co. of Ohio. Cincinnati, Ohio. Nov 1954. Decl. Feb 1957. Contract AT(30-1)-1156. 7p. Order from LC. Mi $1.80, ph $1.80. FMPC-488

Development of fusion welding process for metal joining in a high vacuum, by H. W. LeFevre and others. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Apr 1957. 11p. Order from LC. Mi $2.40, ph $3.30. HW-49816

Fabrication behavior of some uranium dioxide powders, by D. R. Stenquist and R. J. Anicetti. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Dec 1957. Contract W-31-109-Eng-52. 24p. Order from OTS. 75 cents. HW-51748

Evaluation of welded and seamless zirconium and zircaloy-2 tubing. Interim report--initial metal preparation and seamless tube fabrication and testing, by S. H. Bush. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Feb 1958. Contract W-31-109-Eng-52. 28p. Order from LC. Mi $2.70, ph $4.80. HW-54932

Organic coolant development, ORA-3 loop. Interim report III, by G. E. Neibaur. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Mar 1958. Contract W-31-109-Eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-55516

Burnup and specific power calculations for the thermal neutron irradiation of thorium-uranium alloys, by A. L. Bement. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jul 1958. Contract W-31-109-Eng-52. 20p. Order from OTS. 75 cents. HW-56631

Precipitation of thorium as thorium hydride from thorium-magnesium solutions, by Paul F. Woerner and P. Chiotti. Iowa State College, Ames Laboratory, Ames Iowa. Aug 1957. Contract W-7405-Eng-82. 43p. Order from OTS. $1.25. ISC-928

Development of ferritic stainless steel--UO_2 dispersion fuel elements, by W. K. Barney and others. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1958. Contract W-31-109-Eng-52. 16p. Order from OTS. 75 cents. KAPL-1908

Interim progress report on the creep-rupture properties of zircaloy. Part B. Extruded and annealed zircaloy-2, by R. L. Mehan and F. W. Wiesinger. Knolls Atomic Power Lab. Schenectady, N. Y. Mar 1958. Contract W-31-109-Eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-RLM-14

Fission product separations study. Quarterly progress report for September 27-November 30, 1956. Vitro Job 2077, by R. A. Keeler and others. For Oak Ridge National Lab. Oak Ridge, Tenn. Vitro Labs. West Orange, N. J. Dec 1956. Contract W-7405-eng-26. Subcontract 994. 11p. Order from LC. Mi $2.40, ph $3.30. KLX-10057

Cyclotron irradiation of type 347 stainless steel welds in NaK at elevated temperatures, by A. A. Epp, Jr. and others. North American Aviation, Inc. Downey, Calif. Jan 1953. Decl. with deletions 4/57. Contract AT-11-1-GEN-8. 42p. Order from LC. Mi $3.30, ph $7.80. NAA-SR-74(Del.)

Measurement of the crystallographic thermal expansion of alpha-alumina and beryllia to elevated temperatures emphasizing anisotropic effects, by David J. Klein. North American Aviation, Inc. Atomic International, Canoga Park, Calif. Aug 1958. Contract AT(11-1)-GEN-8. 23p. Order from OTS. 75 cents. NAA-SR-2542

Creep and anelastic studies of AL_2O_3, by Roger Chang. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Sep 1958. Contract AT(11-1)-GEN-8. 23p. Order from OTS. 75 cents. NAA-SR-2770

The cold working of extruded zircaloy tubing, by N. R. Gardner and P. Loewenstein. Nuclear Metals, Inc. Cambridge, Mass. Apr 1958. Contract AT(30-1)-1565. 52p. Order from OTS. $1.50. NMI-1194

Quarterly progress report to the AEC Research Division for the period January 1, 1958 through March 31, 1958. Nuclear Metals, Inc. Cambridge, Mass. Apr 1958. Contract AT(30-1)-1565. 9p. Order from OTS. 50 cents. NMI-1202

Process development quarterly progress report for July, August, and September 1952, by A. J. Stonehouse and W. W. Beaver. Brush Beryllium Co. Cleveland, Ohio. Oct 1952. Decl. Mar 1957. 29p. Order from LC. Mi $2.70, ph $4.80. NYO-1117(Rev.)

The adaptation of new research techniques to mineral engineering problems progress report. Massachusetts Institute of Technology. Department of Metallurgy, Cambridge, Mass. Jul 1958. Contract AT(30-1)-956. 23p. Order from OTS. 75 cents. NYO-2290

Ultrasonically accelerated dissolution of corrosion-resistant metals, by J. L. Straughn and others. Aeroprojects, Inc. West Chester, Pa. Mar 1958. Contract AT(30-1)-1836. 83p. Order from LC. Mi $4.80, ph $13.80. NYO-7920

Ultrasonically produced dispersions of thorium bismuthide in molten bismuth, by M. L. Bromberg and others. Aeroprojects, Inc. West Chester, Pa. Mar 1958. Contract AT(30-1)-1836. 29p. Order from LC. Mi $4.80, ph $13.80. NYO-7924

Feasiblity study on ultrasonic dispersion of uranium dioxide in molten metals. Interim report, by H. L. Bromberg and W. B. Tarpley. Aeroprojects, Inc. West Chester, Pa. May 1958. Contract AT(30-1)-1836. 21p. Order from LC. Mi $4.80, ph $13.80. NYO-7929

Preliminary report on the metal powder slip casting process. Part II, by Henry H. Hausner. Hausner (Henry H.). New York, N. Y. May 1958. Contract AT(30-1)-2131. 12p. Order from LC. Mi $2.40, ph $3.30. NYO-8664

Components of the fused-salt and sodium circuits of the aircraft reactor experiment, by H. W. Savage and others. Oak Ridge National Lab. Oak Ridge, Tenn. Feb 1958. Contract W-7405-eng-26. 41p. Order from OTS. $1.25. ORNL-2348

Uranium recovery--acidulation of phosphate rock, by Harold W. Long, Jr. and others. International Minerals and Chemical Corps. Chicago, Ill. Feb 1955. Decl. Oct 1955. Contract AT(49-1)-545. (IMCC-2206). 14p. Order from LC. Mi $2.40, ph $3.30. RMO-2035

Analytical procedures for uranium, by Maxon T. Esterdahl and others. International Minerals and Chemical Corp. Chicago, Ill. Feb 1955. Decl. Oct 1955. Contract AT(49-1)-545. (IMCC-2214). 11p. Order from LC. Mi $2.40, ph $3.30. RMO-2043

Reactivity of certain uranium oxides with aluminum. Terminal report, by A. L. Eiss. Sylvania-Corning Nuclear Corp. Div. of Reactor Development, Bayside, Long Island, N. Y. Feb 1958. Contract AT-30-1-GEN-366. Project 1948. 24p. Order from OTS. 75 cents. SCNC-257

Solid lubricant coatings, by L. M. Berry. Sandia Corp. Albuquerque, N. Mex. Apr 1958. Contract AT(29-1)-789. 26p. Order from LC. Mi $2.70, ph $4.80. SCR-12

The self-diffusion of niobium--II. Second Annual Progress Report, July 1, 1957 to June 30, 1958, by R. Resnick and others. Sylvania Electric Products Inc. Metallurgical Research Lab., Bayside, N. Y. Jun 1958. Contract AT(30-1)-2102. AEC Div. of Research. 10p. Order from OTS. 50 cents. SEP-248

An in-pile measurement of the effective thermal conductivity of UO_2, by J. D. Eichenberg. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Sep 1958. Contract AT-11-1-GEN-14. 12p. Order from OTS. 50 cents. WAPD-200

The effect of residual cold work and straightening method of some mechanical properties and failure characteristics of zircaloy-2 tubing, by L. C. Cochrun. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. Aug 1955. Decl. Mar 1957. 6p. Order from LC. Mi $1.80, ph $1.80. WAPD-FE-956

Qualitative effect of concentric grooves on fracture characteristics of zircaloy-2 tubes, by K. M. Goldman. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. Sep 1955. Decl. Mar 1957. 6p. Order from LC. Mi $1.80, ph $1.80. WAPD-FE-978

Progress report on metallurigical studies of zirconium alloys. [Period covered]: November 15, 1957 to February 15, 1958; by J. G. Goodwin and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Feb 1958. 41p. Order from LC. Mi $3.30, ph $7.80. WAPD-NCE-7532

Intercomparison of cadmium-indium-silver, hafnium, and cadmium-silver control rods, by R. F. Valentine. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Jul 1957. 5p. Order from LC. Mi $1.80, ph $1.80. WAPD-PWR-Ph-197

Outline of PWR alternate control material information obtained at Bettis. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Jun 1957. 41p. Order from LC. Mi $3.30, ph $7.80. WAPD-PWR-PMM-1220

Amenability testing of Homestake North Alice mine ore, by H. I. Viklund and E. J Hammond. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. May 1957. Contract AT(49-6)-924. 23p. Order from LC. Mi $2.70, ph $4.80. WIN-68

Development of a method for roll cladding, silver, boron-carbide cermets with AISI 304 stainless steel, by Lawrence Lewis--Jean F. Soppet, ed. For Yankee Atomic Electric Co. Westinghouse Electric Corp. Atomic Power Dept., Pittsburgh, Pa. May 1958. Contract AT(30-3)-222, subcontract no. 1. 23p. Order from LC. Mi $2.70, ph $4.80. YAEC-59

Particle Accelerators and High-Voltage Machines

Annual progress report for year ending June 15, 1957 on cyclotron research. Univ. of Washington. Seattle, Wash. 1957. Contract AT (45-1)-293. 64p. Order from LC. Mi $3.90, ph $10.80. AECU-3670

Theory of the constant gradient linear electron accelerator, by R. B. Neal. Stanford Univ. Microwave Lab., Calif. May 1958. Contract AT(04-3)-21. 36p. Order from LC. Mi $3.00, ph $6.30. AECU-3749

Transient beam loading in linear electron accelerators, by Richard B. Neal. Stanford Univ. Microwave Lab., Calif. May 1958. Contract AT(04-3)-21. (ML-388). 17p. Order from LC. Mi $2.40, ph $3.30. AECU-3754

Resonance survey in the electron model spiral sector FFAG accelerator, by W. A. Wallenmeyer. Midwestern Universities Research Assn. Madison, Wis. Jun 1958. Contract AT(11-1)-384. 21p. Order from LC. Mi $2.70, ph $4.80. MURA-407

Report on Arkansas 400 KV Cockcroft-Walton accelerator and nuclear chemistry research, by R. W. Fink. University of Arkansas. Dept. of Chemistry, Fayetteville, Arkansas. Mar 1958. Contract AT(40-1)-277. 52p. Order from OTS. $1.50. ORO-172

Bevatron operation and development XVI November, December 1957, January 1958, by Walter D. Hartsough and William W. Salsig. Univ. of California. Radiation Lab., Berkeley, Calif. May 1958. Contract W-7405-eng-48. 23p. Order from OTS. 75 cents. UCRL-8261

Analog tracking of the bevatron beam during acceleration and deceleration, by Harry G. Heard. Univ. of California. Radiation Lab. Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 15p. Order from OTS. 50 cents. UCRL-8296

The electrical system of the bevatron rapid beam ejector (beam kicker), by Charles G. Dols. Univ. of California. Radiation Lab. Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 25p. Order from OTS. 75 cents. UCRL-8346

Physics and Mathematics

Ryerson metal diffusion pump-mercury type. Univ. of Chicago. Mettalurgical Lab., Chicago, Ill. Mar 1945. Decl. Jul 1954. 6p. Order from LC. Mi $1.80, ph $1.80. A-3351

Fast transient heating and explosion of metals under stagnant liquids, by A. J. Bendler and others. Columbia Univ. Engineering Research Laboratories, New York, N. Y. Feb 1958. Contract AT(30-3)-187. 110p. Order from OTS. $3.00. AECU-3623

Research and investigation leading to methods of generating and detecting radiation in the 100 to 1000 micron wavelength range of the spectrum.

Quarterly progress report no. 7 for September 1, 1957 to December 1, 1957, by P. D. Coleman and others. Univ. of Illinois. Electrical Engineering Research Lab., Urbana, Ill. Dec 1957. Contract AT(11-1)-392. 68p. Order from LC. Mi $3.90, ph $10.80. AECU-3626

Transient thermal stresses in pressure vessels. Part II. Thermal stress calculation, by J. P. de Vries and R. C. Nicoll. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Apr 1958. Project 2500. Contract IWR-73-A-129146. 48p. Order from LC. Mi $3.30, ph $7.80. AECU-3643(Pt. 2)

Thermal cycle test of an APDA fuel pin. Engineering Lab. and Research Dept. report 56E30, by J. J. Bodzin and others. Detroit Edison Co. Detroit, Mich. Jan 1957. Contract AT(11-1)-476. 32p. Order from LC. Mi $3.00, ph $6.30. AECU-3648

Thermal cycle test in sodium of an APDA fuel pin. Engineering Lab. and Research Dept. report 57C05-1, by J. J. Bodzin and T. A. Alessi. Detroit Edison Co. Detroit, Mich. Jun 1957. Contract AT(11-1)-476. 25p. Order from LC. Mi $2.70, ph $4.80. AECU-3650

Fission fragment ionization and electrical power production, by R. W. Bussard. Los Alamos Scientific Lab. Los Alamos, N. Mex. Feb 1947. Contract W-7405-eng-36. 5p. Order from LC. Mi $1.80, ph $1.80. AECU-3661

A study of parallel one's complement arithmetic units with separate carry or borrow storage (thesis). Report no. 81, by Gernot Metze. Univ. of Illinois. Digital Computer Lab., Urbana, Ill. Nov 1957. Contract AT(11-1)-415. 81p. Order from LC. Mi $4.50, ph $12.30. AECU-3668

Compilation of uranium-10 W/o molybdenum fuels alloy properties. Technical memorandum no. 3, by A. Del Grosso. Atomic Power Development Associates, Inc. Detroit, Mich. Jun 1957. 71p. Order from LC. Mi $4.50, ph $12.30. AECU-3679

Steady state performance of a thermal circulation loop containing a parallel path heat sink, J. J. Foster. Knolls Atomic Power Lab. Schenectady, N. Y. Jan 1958. Contract W-31-109-Eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. AECU-3694

Sodium boiling calculations, by R. B. Nicholson. Atomic Power Development Associates, Inc. Detroit, Mich. Jul 1957. 7p. Order from LC. Mi $1.80, ph $1,80. AECU-3698

Sodium boiling—explanation of section IV. 4 of my July 2, 1957 memorandum on "sodium boiling calculations", by R. B. Nicholson. Atomic Power Development Associates, Inc. Detroit, Mich. Oct 1957. 4p. Order from LC. Mi $1.80, ph $1.80. AECU-3699

Annual progress report for year ending March 1958. Univ. of Minnesota. Linear Accelerator Lab. Minneapolis, Minn. 1958. Contract AT (11-1)-50. (M-6499). 125p. Order from LC. Mi $6.30, ph $19.80. AECU-3707

A report on the kinematics of high energy electron scattering, by Jeremy Bernstein. Cambridge Electron Accelerator, Cambridge, Mass. May 1957. Contract AT(30-1)-1909. CEA-31(M H). 23p. Order from LC. Mi $2.70, ph $4.80. AECU-3731

Precise vapor pressure measurement at high temperature, by Robert E. Machol and Edgar F. Westrum, Jr. Univ. of Mich. Ann Arbor, Mich. Nov 1957. Project no. 5. Contract AT(11-1)-70. (M-6404). 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3753

Technical progress report. Part I. High-speed computer program. Part II. Mathematical methods. Part III. Illiac use and operation—general laboratory information. Univ. of Illinois. Digital Computer Lab., Urbana, Ill. Mar 1958. Contracts AT(11-1)415; N6ori-07130 and Nonr-1834(15). 21p. Order from LC. Mi $2.70, ph $4.80. AECU-3756

A Monte Carlo study of neutron thermalization, by H. D. Brown. Du Pont de Nemours (E. I.) & Co. Savannah River Lab. Augusta, Ga. 1957. Contract AT(07-1)-1. 22p. Order from LC. Mi $2.70, ph $4.80. AECU-3758

Reactor physics constants. Argonne National Lab. Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. 538p. Order from OTS. $7.00. ANL-5800

On the photofission cross sections near threshold of nuclei in the region of the very heavy elements (thesis), by Kenneth M. Clarke. Argonne National Lab. Chemistry Div., Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. 91p. Order from OTS. $2.25. ANL-5853

Efficiencies and photofractions for gamma radiation on sodium iodide (thallium activated) crystals, by W. F. Miller and others. Argonne National Lab. Lemont, Ill. Aug 1958. Contract W-31-109-eng-38. 17p. Order from OTS. 75 cents. ANL-5902

Heat transfer in turbulent flow through nonconcentric annuli, by J. F. Heyda. General Electric Co. Atomic Products Div., Aircraft Nuclear Propulsion Dept., Cincinnati, Ohio. Jun 1957. Contracts AT(11-1)-171 and AF 33(038)-21102. 25p. Order from OTS. $1.00. APEX-391

Stresses in rings deformed out of their planes, by Bernard W. Shaffer and Eric E. Ungar. General Electric Co. Aircraft Nuclear Propulsion Dept., Atomic Products Div., Cincinnati, Ohio. Aug 1958. Contracts AT(11-1)-171 and AF 33 (038)-21102. 42p. Order from OTS. $1.25. APEX-399

Some simplified solutions for relatively stiff beams on elastic foundations, by Bernard W. Shaffer. General Electric Co. Aircraft Nuclear Propulsion Dept., Atomic Products Div., Cincinnati, Ohio. Aug 1958. Contracts AT(11-1)-171 and AT 33(038)-21102. 14p. Order from OTS. 50 cents. APEX-400

Stress resultants and out-of-plane deformations in stiff rings attached to elastic cylinders and subject to concentrated loads, by Bernard W. Shaffer and Eric E. Ungar. General Electric Co. Aircraft Nuclear Propulsion Dept., Atomic Products Div., Cincinnati, Ohio. Aug 1958. Contracts AT(11-1)-171 and AF 33(038)-21102. 49p. Order from OTS. $1.50. APEX-401

Shielding computer program 12-0 gamma ray penetration point source, by W. E. Edwards and J. J. Loechler. General Electric Co. Atomic Products Div., Aircraft Nuclear Propulsion Dept., Cincinnati, Ohio. Aug 1958. Contracts AT(11-1)-171 and AF 33(038)-21102. 21p. Order from OTS. $1.00. APEX-404

Gamma ray energy spectra from thermal neutron capture, by F. E. Deloume. General Electric Co. Atomic Products Div., Aircraft Nuclear Propulsion Dept., Cincinnati, Ohio. Aug 1958. Contracts AT(11-1)-171 and AF 33(038)-21102. 52p. Order from OTS. $1.50. APEX-407

A general purpose Monte Carlo program for the IBM 704. Part I. Method, by Edward J. Leshan. American Radiator and Standard Sanitary Corp. Atomic Energy Div., Redwood City, Calif. Sep 1956. 27p. Order from LC. Mi $2.70, ph $4.80. ASAE-2

A multigroup, multiregion, one-space dimensional program using neutron diffusion theory, by Joel Franklin and Edwrd J. Leshan. American Radiator and Standard Sanitary Corp. Atomic Energy Div., Redwood City, Calif. Dec 1956. Contract AT(04-3)-109. 28p. Order from LC. Mi $2.70, ph $4.80. ASAE-4

Progress relating to civilian applications during April 1958, by Russell W. Dayton and Cyde R. Tipton, Jr. Battelle Memorial Inst. Columbus, Ohio. May 1958. Decl. Jun 1958. Contract W-7405-eng-92. 71p. Order from LC. Mi $3.90, ph $10.80. BMI-1262

Maximum utilization of P-9 [D_2O] in homogeneous slurry piles, by J. R. Huffman. Univ. of Chicago. Metallurgical Lab. Chicago, Ill. Dec 1943. Decl. Feb 1957. Contract W-7405-eng-37. A-1630. 40p. Order from LC. Mi $3.00, ph $6.30. CE-1143

Thermal test report—PWR test vessel with plain hemispherical head, by J. S. Hucks and H. K. Williams. For Westinghouse Electric Corp. Bettis Plant. Combustion Engineering, Inc. Nuclear Components Engineering Dept., Chattanooga, Tenn. May 1957. CE contract no. 7954-14. 102p. Order from LC. Mi $6.00, ph $18.30. CENC-1001

Operating instructions for the UNIVAC program OCUSOL-A, a modification of the eyewash program, by L. G. Alexander and others. Oak Ridge National Lab. Oak Ridge, Tenn. Jun 1957. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-57-6-4

A Monte Carlo code for deep penetrations of gamma rays, by S. K. Penny. Oak Ridge National Lab. Oak Ridge, Tenn. Jun 1958. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-58-6-30

Inelastic scattering of fast neutrons by Fe^{56}, 0.5 MEV E_n 5.0 MEV, by C. E. Mandeville. Curtiss-Wright Corp. Research Div., Quehanna, Pa. Nov 1956. Contract AT(30-3)-220. 40p. Order from LC. Mi $3.00, ph $6.30. CWR-444

Inelastic scattering of fast neutrons by Fe^{56}, 5.0 MEV $\leq E_n \leq$ 10.0 MEV, by C. E. Mandeville. Curtiss-Wright Corp. Research Div., Quehanna, Pa. Feb 1957. Contract AT(30-3)-220. 47p. Order from LC. Mi $3.30, ph $7.80. CWR-459

Calculation of cross-sections for inelastic scattering of neutrons from Pb^{207} and Pb^{208}, by M. A. Rothman and D. M. Van Patter. Curtiss-Wright Corp. Research Div., Quehanna, Pa. Contract AT(30-3)-220. 57p. Order from LC. Mi $3.60, ph $9.30. CWR-495

Formation of U-232 during the irradiation of thorium, by D. S. St. John and E. C. Toops, Theoretical Physics Div. E. I. du Pont de Nemours & Co. Explosives Dept. - Atomic Energy Div., Technical Div. - Savannah River Lab., Augusta, Ga. Apr 1958. Contract AT(07-2)-1. 19p. Order from OTS. 75 cents. DP-279

IBM 650 routine III solution of simultaneous differential equations, by R. R. Haefner, Theoretical Physics Div. E. I. du Pont de Nemours & Co. Explosives Dept. - Atomic Energy Div., Technical Div. - Savannah River Lab. Augusta, Ga. Jul 1958. Contract AT(07-2)-1. 24p. Order from OTS. 75 cents. DP-299

A modified special purpose slide rule for computing solid angles. Revision no. 1, by J. L. Feuerbacher. Goodyear Atomic Corp. Portsmouth, Ohio. Nov 1957. Contract AT(33-2)-1. 6p. Order from LC. Mi $1.80, ph $1.80. GAT-DM-619(Rev.)

Analysis of errors to be expected in measuring the neutron absorption cross section of C^{12}, by E. J. Seppi. Hanford Atomic Products Operation, Richland, Wash. Oct 1953. Decl. Feb 1957. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. HW-29569

Tables of the "V" functions, by C. L. Childress and H. E. Hanthorn, comps. Hanford Atomic Products Operation, Richland, Wash. May 1957. Contract W-31-109-eng-52. 191p. Order from LC. Mi $16.50, ph $43.20. HW-51820

A generalized calculation of material and reactivity balance in recycled plutonium reactors, by R. E. Peterson and G. S. Busselman. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jan 1958. Contract W-31-109-Eng-52. 34p. Order from OTS. $1.00. HW-54074

Correlation of theoretical and experimental values to the ratio of fast to thermal fissions, by M. T. Lee. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Jun 1958. Contract W-31-109-Eng-52. 26p. Order from OTS. 75 cents. HW-54687

Neutron attenuation in magnetite concrete heated to 200° C, by D. E. Wood and E. G. Peterson. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Mar 1958. Contract W-31-109-Eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. HW-55372

Tests and analysis of magnetic quadrupole lenses, by Philip J. Lynch and D. J. Zaffarano. Iowa State College. Ames Lab., Ames, Iowa. Aug 1957. Contract W-7405-eng-82. 55p. Order from OTS. $1.50. ISC-927

Faraday cup monitor for the Iowa State College synchrotron electron beam, by Roderick D. Riggs and C. L. Hammer. Iowa State College. Ames Lab., Ames, Iowa. Dec 1957. Contract W-7405-eng-82. 39p. Order from OTS. $1.25. ISC-1008

Neutron spectra measurements, by R. S. Stone and R. E. Slovacek. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1957. Contract W-31-109-Eng-52. 22p. Order from OTS. $1.00. KAPL-1916

Comparison of one, two, and six, group reactor kinetics computer models, by Daniel R. MacNaughton. Knolls Atomic Power Lab. Schenectady, N. Y. Mar 1958. Contract W-31-109-Eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-DOM-2

Airborne activity from the void space between the SAR reactor pressure vessel and inner wall of the primary shield tank, by David W. Johnson. Knolls Atomic Power Lab. Schenectady, N. Y. Mar 1956. Contract W-31-109-eng-52. 31p. Order from LC. Mi $3.00, ph $6.30. KAPL-M-DWJ-5

An approximate method for calculating reactor temperatures during complete loss of flow accidents, by Jack H. Pigott. Knolls Atomic Power Lab. Schenectady, N. Y. Jul 1957. Decl. Feb 1958. Contract W-31-109-Eng-52. 18p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-JHP-6

Variational calculation of thermal-average cross sections, by John C. Stewart and others. Knolls Atomic Power Lab. Schenectady, N. Y. Jun 1958. Contract W-31-109-Eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JS-3

S3G/S4G main coolant pump vibration monitoring system preliminary design description, by V. B. Scoville. Knolls Atomic Power Lab. Schenectady, N. Y. Oct 1956. Contract W-31-109-Eng-52. 9p. Or-

der from LC. Mi $1.80, ph $1.80. KAPL-M-SSD-41(Rev.1)

Some foil absorption calculations, by Glen A. Graves and William H. Roach. Los Alamos Scientific Lab. Los Alamos, N. Mex. Jun 1955. Contract W-7405-eng-36. 37p. Order from LC. Mi $3.00, ph $6.30. LA-1964

On the production of heavy uranium isotopes in a very high density fast neutron flux, by Joseph J. Devaney and others. Univ. of California. Los Alamos Scientific Lab., Los Alamos, N. Mex. May 1958. Contract W-7405-ENG-36. 15p. Order from OTS. 75 cents. LAMS-2226

Nuclear battery-thermocouple type. Quarterly progress report no. 5 for January 1, 1958 to March 31, 1958, by Bertram C. Blanke. Mound Lab. Miamisburg, Ohio. Mar 1958. DA project no. 3-99-15-102. Contract R-65-8-99811-SC-01-91. 27p. Order from LC. Mi $2.70, ph $4.80. MLM-CF-58-4-49

Application of fast neutron removal theory to the calculation of thermal neutron flux distributions in reactor shields, by D. S. Duncan and H. O. Whittum, Jr. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Jul 1958. Contract AT(11-1)-GEN-8. 41p. Order from OTS. $1.25. NAA-SR-2380

Low-temperature irradiation and annealing experiments in graphite, by S. B. Austerman. North American Aviation, Inc. Atomics International, Canoga, Park, Calif. Jul 1958. Contract AT (11-1)-GEN-8. 24p. Order from OTS. 75 cents. NAA-SR-2457

Slow neutron activation of test specimen and capsule components to be used at the Nevada test site, by J. C. Lang and B. L. Smith. North American Aviation, Inc. Downey, Calif. Mar 1953. Decl. Mar 1958. 9p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-618

Summary of NDA unclassified results of moments calculations for the penetration of neutrons through various materials, by A. D. Krumbein. Nuclear Development Corporation of America. White Plains, New York. Aug 1957. Sub-contract AT-74)-ANPG-05339. 38p. Order from OTS. $1.25. NDA-92-2(Rev.)

Scattering of 80 MEV π^- mesons by complex nuclei (thesis), by Winslow F. Baker. Columbia Univ. Nevis Cyclotron Labs., Irvington-on-Hudson, N. Y. Mar 1957. Contracts A6-ori-110, task no. 1 and AT(30-1)-1932. (CU-137-57-ONR-110-1-Phys.). 58p. Order from LC. Mi $3.60, ph $9.30. NEVIS-48

Angular distribution of K^+ mesons in reaction $\gamma + p \rightarrow K^+ \Lambda^o$, by A. Fujii. Univ. of Rochester. Rochester, N. Y. Aug 1957. Contract AT(30-1)-875. 7p. Order from LC. Mi $2.40, ph $3.30. NYO-2094

Theory of Maxwell's equations without displacement current. Magneto-hydrodynamics note no. V, by A. A. Blank and others. New York Univ. Atomic Energy Commission Computing and Applied Mathematics Center, New-York, N. Y. Nov 1957. Contract AT(30-1)-1480. 147p. Order from LC. Mi $7.20, ph $22.80. NYO-6486 MH-V

Non-linear bending and buckling of circular plates, by Herbert B. Keller and Edward L. Reiss. New York Univ. Atomic Energy Commission Computing and Applied Mathematics Center, New York, N. Y. Feb 1958. Contract AT(30-1)-1480. 46p. Order from LC. Mi $3.30, ph $7.80. NYO-7978

Digital pressure indicator system. Ford Instrument Co. Long Island City, New York. Jan 1958. Contract AT(30-1)-1969. 30p. Order from LC. Mi $2.70, ph $4.80. NYO-8504

Solid state division quarterly progress report for period ending January 31, 1952, by J. T. Howe, ed. Oak Ridge National Lab. Oak Ridge, Tenn. Oct 1952. Decl. with deletions Feb 1957. 47p. Order from LC. Mi $3.30, ph $7.80. ORNL-1261(Del.)

Radiation attenuation characteristics of structural concrete, by E. P. Blizard and J. M. Miller. Oak Ridge National Lab. Applied Nuclear Physics Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 50p. Order from OTS. $1.50. ORNL-2193

A study of the nuclear and physical properties of the ORNL graphite reactor shield, by T. V. Blosser and others. Oak Ridge National Lab. Neutron Physics Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 41p. Order from OTS. $1.25. ORNL-2195

Effective neutron removal cross sections for carbon and oxygen in continuous mediums, by D. K. Trubey and G. T. Chapman. Oak Ridge National Lab. Neutron Physics Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 30p. Order from OTS. $1.00. ORNL-2197

An estimation of photoneutrons from carbon-13 in an oil shield, by D. K. Trubey. Oak Ridge National Lab. Neutron Physics Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 16p. Order from OTS. 75 cents. ORNL-2200

Attenuation in water of radiation from the bulk shielding reactor: Measurements of the gamma-ray dose rate, fast-neutron dose rate, and thermal-neutron flux. Oak Ridge National Lab. Oak Ridge, Tenn. Jul 1958. Contract W-7405-eng-26. (chart). ORNL-2518

Nuclear reaction cross sections from the nitrogen bombardment of sulfur, by D. E. Fisher. Oak Ridge National Lab. Electronuclear Research Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 71p. Order from OTS. $2.00. ORNL-2535

Nuclear structure effects in internal conversion coefficients by configuration mixing, by L. S. Kisslinger. Oak Ridge National Lab. Physics Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 52p. Order from OTS. $1.50. ORNL-2556

Development of high speed electron accelerator structures. Quarterly report no. 5 for August 1, 1957-October 31, 1957, by M. H. Greenblatt and others. David Sarnoff Research Center. Princeton, N. J. Feb 1958. Contract AT(30-1)-1958. 22p. Order from LC. Mi $2.70, ph $4.80. RIB-27

Lectures on game theory, Markov chains, and related topics, by Gerald L. Thompson. Sandia Corp. Albuquerque, N. Mex. Mar 1958. Contract AT(29-1)-789. 85p. Order from LC. Mi $4.80, ph $13.80. SCR-11

Tables on factors for one-sided tolerance limits for a normal distribution, by Donald B. Owen. Sandia Corporation Systems Analysis Dept. Statistical Div., Albuquerque, N. Mex. Apr 1958. Contract AT-(29-1)-789. 129p. Order from OTS. $2.75. SCR-13

Ozalid-photo-chemical method of producing printed wiring boards, by H. L. Hawk. Sandia Corp. Albuquerque, N. Mex. Mar 1958. Contract AT (29-1)-789. 6p. Order from LC. Mi $1.80, ph $1.80. SCTM-102-58(12)

Uses of the table of the circular coverage function, by G. P. Steck-5125. Sandia Corp. Albuquerque, N. Mex. Jul 1958. Contract AT-(29-1)-789. 31p. Order from OTS. 75 cents. SCTM-214-58(51)

Design and materials as affected by elevated temperatures, by D. R. Adolphson - 1621-1. Sandia Corp. Albuquerque, N. Mex. Aug 1958. Contract AT-(29-1)-789. 30p. Order from OTS. $1.00. SCTM-225-58-(16)

Printed circuits, by George Voida. Sandia Corp. Albuquerque, N. Mex. Nov 1957. Contract AT (29-1)-789. 35p. Order from LC. Mi $3.00, ph $6.30. SCTM-316-57(14)

High-altitude psychrometric tables, by L. D. Oppliger - 1611. Sandia Corp. Albuquerque, N. Mex. Sep 1958. Contract AT-(29-1)-789. 15p. Order from OTS. 75 cents. SCTM-323-58(16)

Heat transfer and fluid flow. A bibliography of selected report literature, by James M. Jacobs. USAEC. Technical Information Service Extension, Oak Ridge, Tenn. Jun 1958. 434p. Order from OTS. $6.00. TID-3305(Suppl. 1)

Liquid thermal diffusion, by Philip H. Abelson and others. Naval Research Lab. Physics Special Research Div., Washington, D. C. Sep 1946. Decl. Aug 1958. 255p. Order from OTS. $4.00. TID-5229

United States Atomic Energy Commission research and development report. Thermomagnetic and galvanomagnetic effects, by R. D. Redin. Iowa State College. Ames Lab., Ames, Iowa. Sep 1957. Contract W-7405-eng-82. 21p. Order from OTS. 75 cents. UC-34

Fission of uranium with 5.7-BEV protons (thesis), by Rex H. Shudde. Univ. of California. Radiation Lab., Berkeley, Calif. Jun 1956. Contract W-7405-eng-48. 74p. Order from LC. Mi $4.50, ph $12.30. UCRL-3419

TCP theorem and green functions, by Gerhart Luders. Univ. of California. Radiation Lab., Berkeley, Calif. Sep 1957. Contract W-7405-eng-48. 138p. Order from LC. Mi $6.90, ph $21.30. UCRL-3928

The operator approach to problems of stability and convergence, by Arnold N. Lowan. Univ. of California. Radiation Lab., Livermore, Calif. 1957. 111p. Order from OTS. $3.00. UCRL-4812

Tabulated neutron cross sections. Part I. 0.001-14.5 Mev, by Robert J. Howerton. Univ. of California. Radiation Lab., Theoretical Physics Div., Livermore, Calif. May 1958. Contract W-7405-eng-48. 391p. Order from OTS. $6.00. UCRL-5226(Pt. 1)(Vol. 1)

Tabulated neutron cross sections. Part I. 0.001-14.5 Mev, by Robert J. Howerton. Univ. of California. Radiation Lab. Theoretical Physics Div., Livermore, Calif. May 1958. Contract W-7405-eng-48. 347p. Order from OTS. $6.00. UCRL-5226(Pt. I)(Vol. II)

Tabulated neutron cross sections. Part I. 0.001-14.5 Mev, by Robert J. Howerton. Univ. of California. Radiation Lab., Theoretical Physics Div., Livermore, Calif. May 1958. Contract W-7405-eng-48. 231p. Order from OTS. $4.00. UCRL-5226(Pt. I)(Vol. III)

The Themis code: An astronomical numerical integration program for the IBM 704, by Edna Vienop and Joseph L. Brady. Univ. of California. Radiation Lab., Livermore, Calif. Mar 1958. Contract W-7405-eng-48. 34p. Order from OTS. $1.00. UCRL-5242

On the Prager-Synge "hypercircle method in mathematical physics", by Arnold N. Lowan. Univ. of California. Radiation Lab., Livermore, Calif. Jul 1958. Contract W-7405-eng-48. 45p. Order from OTS. $1.75. UCRL-5243

On the problem of best "approximation", by Arnold N. Lowan. Univ. of California. Radiation Lab., Livermore, Calif. Jun 1958. Contract W-7405-eng-48. 19p. Order from OTS. 50 cents. UCRL-5246

On the Bliss algorithm and its application to the treatment of many-point boundary problems, by Arnold N. Lowan. Univ. of California. Radiation Lab., Livermore, Calif. Jun 1958. 16p. Order from OTS. 50 cents. UCRL-5248

On the Kantorovich treatment of boundary value problems for partial differential equations, by Arnold N. Lowan. Univ. of California. Radiation Lab., Livermore, Calif. Jun 1958. Contract W-7405-eng-48. 14p. Order from OTS. 50 cents. UCRL-5249

On the use of Chebyshev polynomials in numerical analysis, by Arnold N. Lowan. Univ. of California. Radiation Lab., Livermore, Calif. Jun 1958. Contract W-7405-eng-48. 22p. Order from OTS. 75 cents. UCRL-5250

450-Mev/c K^- and $\bar{p}$ beams at the northwest target area of the bevatron separated by the coaxial velocity spectrometer, by Nahmin Horwitz and others. Univ. of California. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-ent-48. 19p. Order from OTS. 50 cents. UCRL-8269

Physics division semiannual report November 1957 through April 1958. Univ. of California. Radiation Lab., Berkeley, Calif. May 1958. Contract W-7405-eng-48. 68p. Order from OTS. $2.00. UCRL-8281

Rotanger: A program for calculating orbits in a cyclotron by the use of the IBM-650 data-processing computer, by Warren Fenton Stubbins. Univ. of California. Radiation Lab., Berkeley, Calif. May 1958. Contract W-7405-eng-48. 29p. Order from OTS. $1.00. UCRL-8282

Theoretical studies of the alpha decay of deformed nuclei, by Richard R. Chasman (thesis). Univ. of Calif. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 41p. Order from OTS. $1.25. UCRL-8294

Determination of the pion-nucleon coupling constant from photoproduction angular distribution, by John G. Taylor and others. Univ. of California. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 10p. Order from OTS. 50 cents. UCRL-8317

High-energy beta decay of light elements, by James F. Vedder (thesis). Univ. of California. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 88p. Order from OTS. $1.75. UCRL-8324

Survey of tritium-producing nuclear reactions, by Jose Gonzalez-Vidal (thesis). Univ. of California. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 62p. Order from OTS. $1.75. UCRL-8330

Nuclear reaction mechanisms in the heavy element region, by Paul F. Donovan (thesis). Univ. of California. Radiation Lab., Berkeley, Calif. Jun 1958. Contract W-7405-eng-48. 58p. Order from OTS. $1.75. UCRL-8347

Angular distribution of photopions from hydrogen, by Edward A. Knapp (thesis). Univ. of California. Radiation Lab., Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 61p. Order from OTS. $1.75. UCRL-8354

The deuteron-pickup reaction in an optical-model approximation, by Kenneth R. Greider (thesis). Univ. of California. Radiation Lab., Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 73p. Order from OTS. $2.00. UCRL-8357

Analysis of the bevatron K^- beam by means of an emulsion stack, by John N. Dyer. Univ. of

California. Radiation Lab. Berkeley, Calif. Jul 1958. Contract W-7405-eng-48. 8p. Order from OTS. 50 cents. UCRL-8364

Tables of spherical bessel functions for complex argument, by Kenneth R. Greider. Univ. of California. Radiation Lab., Berkeley, Calif. Aug 1958. Contract W-7405-eng-48. 23p. Order from OTS. 75 cents. UCRL-8415

Converting measured antenna patterns to spherical coordinates, by John M. Usry and Robert B. Glascock. For Sandia Corp. Univ. of New Mex. Engineering Experiment Station, Albuquerque, N. Mex. Mar 1957. Project 56-12EE, Contract AT(39-1)-789. 18p. Order from LC. Mi $1.80, ph $1.80. UNM-TR-EE-3

Bettis technical review. Reactor, physics, and mathematics. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Jun 1958. Contract AT-11-1-GEN-14. 159p. Order from OTS. $3.00. WAPD-BT-8

Saturated water orifice tests. Preliminary test report T-612150, by R. T. Graulty. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Feb 1957. 62p. Order from LC. Mi $3.90, ph $10.80. WAPD-CTA-EL-3581

Swap Mu and Nu, by N. L. Barnett. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. Oct 1956. 8p. Order from LC. Mi $1.80, ph $1.80. WAPD-P-707

On the application of multivariant analysis to nuclear design, by J. M. McCampbell. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. 195? 11p. Order from LC. Mi $2.40, ph $3.30. WAPD-T-538

F0010 -- a two-dimensional IBM-704 code for the calculation of thermal stresses in a long, hollow cylinder with internal heat generation, by K. W. Brand and others. Westinghouse Electric Corp. Bettis Plant, Pittsburgh, Pa. May 1958. Contract AT-11-1-GEN-14. 24p. Order from OTS. 75 cents. WAPD-TM-133

Radiation Effects on Materials

Development of radiation resistant oils. Report no. 11, by J. G. Carroll and others. California Research Corp. Richmond, Calif. Jun 1958. Contract AT(11-1)-174. 41p. Order from OTS. $1.25. AECU-3764

Radiation damage to concrete, by R. G. Clark. General Electric Corp. Hanford Atomic Products Operation, Richland, Wash. Mar 1958. Contract W-31-109-Eng-52. 22p. Order from OTS. 75 cents. HW-56195

Reactors—General

Safeguard report-Livermore pool type reactor, by Robert L. Detterman. Foster Wheeler Corp. New York, N. Y. Jul 1956. Decl. Jan 1957. Contract AT(04-3)-70. 129p. Order from OTS. $2.75. AECD-4258

Containment of fragments from runaway reactor, by N. R. Zabel. Stanford Research Inst. Menlo Park, Calif. Apr 1958. SRI project no. GU-2164. Contract AT(04-3)-115. Modification no. 2. 94p. Order from OTS. $2.25. AECU-3031

Steam explosions during a violent reactor transient. Covering the period of November 1, 1957 to February 1, 1958, by W. E. Loewe and D. Krucoff. Illinois Institute of Technology. Armour Research Foundation, Technology Center, Chicago, Ill. Feb 1958. ARF project no. D132A01. Contract AT(11-1)-528. 53p. Order from OTS. $1.50. AECU-3659

Measurement of the Doppler temperature effect in an EBR-I type assembly, by W. Y. Kato and D. K. Butler. Argonne National Lab. Reactor Engineering Div., Lemont, Ill. Jul 1958. Contract W-31-109-eng-38. 32p. Order from OTS. $1.00. ANL-5809

Selected values of the physical properties of various materials, by F. J. Tebo. Argonne National Lab. Lemont, Ill. Sep 1958. Contract W-31-109-eng-38. 257p. Order from OTS. $4.00. ANL-5914

Stability analysis of the ETR with reactivity feedback through the temperature coefficient, by S. R. Grossmann. Phillips Petroleum Co. Atomic Energy Div., Idaho Operations Office, Idaho Falls, Idaho. Sep 1958. Contract AT(10-1)-205. 19p. Order from OTS. 75 cents. IDO-16448

Reactor technology quarterly report no. 5. General Electric Corp. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1958. Contract W-31-109-Eng-52. 102p. Order from OTS. $2.25. KAPL-2000-2

Economic analysis of an OMR-powered 38,000-DWT tanker. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Mar 1957. Contract AT(11-1)-1GEN-8. 16p. Order from OTS. 75 cents. NAA-SR-1879

Research and development program for an OMR power plant for propulsion of 38,000-DWT tanker. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Mar 1957. Contract AT(11-1)-GEN-8. 13p. Order from OTS. 50 cents. NAA-SR-1880

Annual technical report AEC unclassified programs January-December 1957. North American Aviation, Inc. Atomics International, Canoga Park, Calif. Mar 1958. Contract AT(11-1)-GEN-8. 196p. Order from OTS. $7.25. NAA-SR-2400(Pt. I of II)

Safeguard report for a stainless steel research reactor for the BSF (BSR-11), by E. G. Silver and J. Lewin. Oak Ridge National Lab. Neutron Physics Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 102p. Order from OTS. $2.50. ORNL-2470

Segregation in uranium-aluminum alloys and its effect on the fuel loading of aluminum-base fuel elements, by W. C. Thurber and R. J. Beaver. Oak Ridge National Lab. Metallurgy Div., Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 22p. Order from OTS. 75 cents. ORNL-2476

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Reactors—Power

Process heat generation and consumption, 1939 to 1967, by W. Lawrence Prehn, Jr. and Richard R. Tarrice. Stanford Research Inst. Menlo, Calif. Jan 1958. SRI project no. IU-2169. 93p. Order from OTS. $1.50. AECU-3664

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Corrosion product activity in the primary system on the Army Package Power Reactor, by W. S. Brown and others. Alco Products, Inc. Schenectady, N. Y. Apr 1958. Contract AT(11-1)-318. 73p. Order from OTS. $2.00. APAE-29

Simulation of various accident considerations for a merchant-ship pressurized-water reactor, by Roger S. Boyd and others. Battelle Memorial Inst. Columbus, Ohio. Aug 1958. Contract W-7405-eng-92. 70p. Order from OTS. $2.00. BMI-1269

Neutron and gamma dose distribution beyond primary shield mockup no. 2 (beryllium, solid iron, water, and solid iron), by C. E. Clifford. Oak Ridge National Lab. Oak Ridge, Tenn. Jul 1952. Decl. with deletions Apr 1957. Contract W-7405-eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-52-5-1(Pt. 5)(Del.)

Comparison of optimum natural uranium nuclear power plant and optimum enriched uranium power plant. Kaiser Engineers. Div. of Henry J. Kaiser Co., Oakland, Calif. and Nuclear Products ERCO. Div. of ACF Industries, Inc., Washington, D. C. Aug 1958. Report no. 58-19-RE. Contract AT(10-1)-925. 289p. Order from OTS. $3.50. IDO-24026

Request for technical design approval of the A1W core I support plate weldment and the A1W core I forged support plate for the purpose of obtaining manufacturing release, by G. W. Hardigg. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. Sep 1956. Contract AT-11-1-GEN-14. 9p. Order from LC. Mi $3.60, ph $9.30. KAPL-A1W(RDM)-320

Accessibility to lower reactor compartment. Part IV. Contribution of sodium and impurities in evaporator, expansion tank. Superheater and pipes, by D. G. Chappell. Knolls Atomic Power Lab. Schenectady, N. Y. Jul 1953. Decl. Mar 1957. Contract W-31-109-Eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-DGC-14

Preliminary design and cost estimate of a heavy water moderated and cooled fifty megawatt nuclear power plant. Section 1. Summary and conclusions. Section 2. Details and analysis. Nuclear Power Group Chicago, Ill. Apr 1954. Decl. with deletions Apr 1957. 126p. Order from LC. Mi $6.30, ph $19.80. NPG-16(Del.)

A modified procedure for radiographing PWR Core I fuel rod end closure welds and the establishment of visual X-ray acceptance standards, by A. E. Oaks. Westinghouse Electric Corp. Bettis Plant,

Pittsburgh, Pa. Feb 1957. 12p. Order from LC. Mi $2.40, ph $3.30. WAPD-NCE-3608

PWR core (fuel rod size), by P. A. Halpine. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Pa. Jun 1955. Decl. Apr 1957. Contract AT-11-1-GEN-14. 6p. Order from LC. Mi $1.80, ph $1.80. WAPD-RD-58

Quarterly progress report for the period October 1, 1957 to December 31, 1957, by I. H. Coen and R. W. Garbe. Yankee Atomic Electric Company. Research and Development Program. Westinghouse Electric Corp. Atomic Power Dept., Pittsburgh, Pa. Jan 1958. R&D contract no. 1 of Contract AT(30-3)-222. 93p. Order from OTS. $2.25. YAEC-52

Stable Isotope Separation

Chemistry associated with the electromagnetic separation of chromium isotopes, by Boyd Weaver and others. Oak Ridge National Lab. Isotopes Division, Oak Ridge, Tenn. N. D. Contract W-7405-eng-26. 6p. Order from OTS. 50 cents. ORNL-2482

Technology—Feed Materials

Uranium recovery from slag by fluoride volatilization:a process proposal, by R. M. Edwards and others. Mallinckrodt Chemical Works. Uranium Division, St. Louis, Mo. Sep 1958. 24p. Order from OTS. $1.00. MCW-1418

The tributyl phosphate-nitric acid complex and its role in uranium extraction, by Thomas J. Collopy. National Lead Company of Ohio. Technical Division, Cincinnati, Ohio. Apr 1958. 15p. Order from OTS. 75 cents. NLCO-749

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