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January 20, 1956

Vol. 25, No. 1

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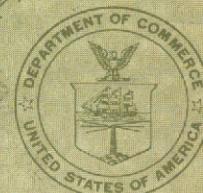
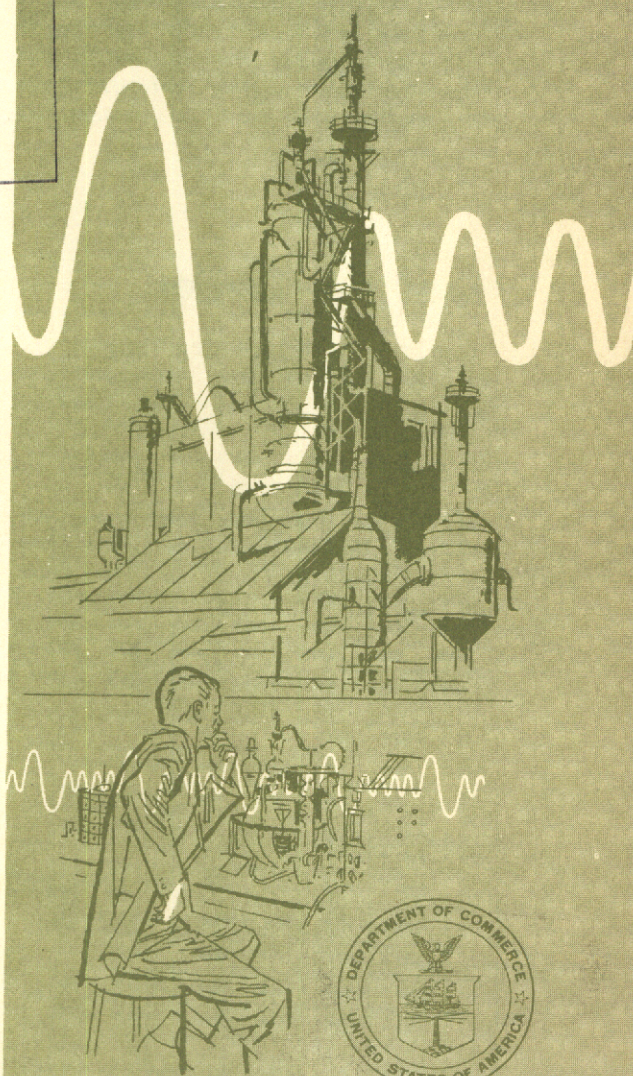
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on pages 1-2*



U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

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OFFICE OF TECHNICAL SERVICES  
John C. Green, *Director*

U. S. DEPARTMENT OF COMMERCE  
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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 22, 1955.



U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

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## CHEMICALS AND ALLIED PRODUCTS

### Organic Chemicals

Reaction of cyanogen with organic compounds containing active hydrogen. Final report under Contracts no. N7 onr-445 Task Order no. 2 and N8 onr-69200, Project no. NR 055-098, for period Oct 1, 1947 to Sep 1, 1950, by Henry M. Woodburn. Buffalo. University, Buffalo, N.Y. Sep 1950. 6p. Order from LC. Mi \$1.80 ph \$1.80. PB 118903

A summary is given of investigations concerning the reaction of organic compounds containing active hydrogen. These investigations were conducted with amines, mercaptans, mercaptoamines, and Grignard reagents. The amines reacting with

cyanogen were the aliphatic primary and secondary, aminopyridines, and aliphatic diamines. Reaction formulas are furnished, where possible, and the status of each individual research is given. Investigations concerning the chemical nature of cyanoformamidines and oxamidines are also summarized.

Stereochemistry of complex ions. Quarterly progress report for period Jun 1 through Aug 31, 1954 on Project no. Nonr 685, by Hans B. Jonassen. Tulane University. Richardson Chemical Laboratory, New Orleans, La. Aug 1954. 2p. Order from LC. Mi \$1.80 ph \$1.80. PB 118663

The purpose of this investigation is to determine the presence and stability of the complexes formed between the ferrous ion and tetraethylene-pentamine (abbreviated tetren). For final report see PB 116316.

## Detergents

Emulsion stability. Part I, by Lloyd Osipow, Saul Birsan, and Foster Dee Snell. Snell, Foster D., Inc., New York, N.Y. Sep 1954. 23p. Order from LC. Mi \$2.70 ph \$4.80. PB 118783

Presented at 126th meeting of the American Chemical Society, New York, Sep 17, 1954. The object of the present investigation is to determine the stability characteristics of emulsions of pure hydrocarbon oil in detergent solutions. An attempt has been made to interpret the experimental results in terms of the Verwey-Overbeek theory and the nature of the interfacial film. The rates of change of the optical density of oil-in-water emulsions of n-tetradecane in detergent solutions were investigated. Coalescence and flocculation rates were also examined.

## Plastics and Plasticizers

Adhesive for composite material used in printed circuitry, by Russel M. Houghton and Virgil G. Lorenzini. Houghton Laboratories, Inc., Olean, N.Y. Contract DA 36-039-sc-42708. Dept. of the Army Project no. 3-93-00-503. Signal Corps Project no. 2005 D. Order separate parts described below from LC, giving PB number of each part ordered.

Third quarterly progress report for the period Sep 15, 1953-Dec 14, 1953. Dec 1953. 20p tables. Mi \$2.40 ph \$3.30. PB 118941

1. Adhesives - Plastic to metal 2. Circuits, Electronic - Printed - Adhesives 3. Circuits, Electronic - Printed - Materials 4. Plastics, Laminated - Gluing 5. SIG Contract DA 36-039-sc-42708, Report no. 3.

Fourth quarterly progress report for the period Dec 15, 1953-Mar 14, 1954. Mar 1954. 20p tables. Mi \$2.40 ph \$3.30. PB 118942

1. Adhesives - Plastic to metal 2. Circuits, Electronic - Printed - Adhesives 3. Circuits, Electronic - Printed - Materials 4. Plastics, Laminated - Gluing 5. SIG Contract DA 36-039-sc-42708, Report no. 4.

Fifth quarterly progress report for the period Mar 15, 1954-Jun 14, 1954. Jun 1954. 26p tables. Mi \$2.70 ph \$4.80. PB 118943

1. Adhesives - Plastic to metal 2. Circuits, Electronic - Printed - Adhesives 3. Circuits, Electronic - Printed - Materials 4. Plastics, Laminated - Gluing 5. SIG Contract DA 36-039-sc-42708, Report no. 5.

Sixth quarterly progress report for the period Jun 15, 1954-Sep 14, 1954. Sep 1954. 20p tables. Mi \$2.40 ph \$3.30. PB 118944

1. Adhesives - Plastic to metal 2. Circuits, Electronic - Printed - Adhesives 3. Circuits, Electronic - Printed - Materials 4. Plastics, Laminated - Gluing 5. SIG Contract DA 36-039-sc-42708, Report no. 6.

Seventh quarterly progress report for the period Sep 15, 1954-Dec 14, 1954. Dec 1954. 28p tables. Mi \$2.70 ph \$4.80. PB 118945

The purpose of this contract is to improve the peel strength between metal foil and various base laminates. The tasks are to produce an improved composite material based on: A: copper foil, paper and phenolic resins; B: copper foil, nylon fabric and phenolic resins; C: copper foil, glass fabric and melamine resins; D: copper foil, glass fabric and silicone resin; E: copper foil, glass fabric and teflon or similar fluorinated resins; F: copper foil, glass fabric and epoxide resins. For 1st-2d and Final reports see PB 118939-118940, PB 111869.

Curing of void-free glass-cloth-reinforced laminates at room temperature, by Bruce G. Heebink. U.S. Forest Products Laboratory, Madison, Wis. Mar 1955. 35p photos, graphs, tables. Order from OTS. \$1. PB 111823

Void-free test laminates were made of 181 glass cloth that yielded acceptable strength properties when using a room-temperature curing combination with a typical polyester resin. However, durability tests, such as outdoor weathering, have not been completed yet and will be reported in a supplement. An unusual small-void formation developed with certain specific rolls of cloth, which was thought to be due to a chemical reaction between the catalyst and the finish on the cloth. Project 7340. Contract AF 33(038)-51-4326-E. AF WADC TR 55-31.

## Paints, Varnishes and Lacquers

Quality tests for black oxide coatings on steel, by Jodie Doss. U.S. Arsenal, Rock Island, Ill. Apr 1955. 11p photos. Order from OTS. 50 cents. PB 111725

Thirteen types of steel were black oxide treated in an aqueous alkaline oxidizing bath for various periods of time. Four different test methods were investigated using these specimens in order to develop a test that would indicate the quality of black oxide coatings. It is recommended that a new oxalic acid spot test replace the 1/2 hour salt fog test. RIAL R55-1515. Dept of the Army Proj-

ect no. 593-14-006. Ordnance project TB 4-302A, Report no. 3.

## Inorganic Chemicals

Hydrogen peroxide, part 3, by W.C. Schumb, C.N. Satterfield, and R.L. Wentworth. Massachusetts Institute of Technology. Dept. of Chemistry and Dept. of Chemical Engineering. Dec 1954. 238p graphs, tables. Order from LC. Mi \$10.20 ph \$36.30. PB 118913

A program of fundamental studies on hydrogen peroxide has been sponsored at M.I.T. since 1945 by various defense agencies. To cover the basic knowledge a monograph was attempted. The present report covers Chapter 7: Chemical Properties, and Chapter 8: Decomposition Properties. Literature up to July 1, 1954 has been extensively consulted and cited for this report. The entire monograph has been published by the Reinhold Publishing Company as No. 128 of the American Chemical Society Monograph series. For parts 1-2 and 4 see PB 113949, PB 112882, and PB 114632. Division of Industrial Cooperation project 6552.

Isothermal decomposition of tetryl and hydrazine mononitrate, by M.T. Abegg. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Dec 1954. 20p diagrs, graphs. Order from LC. Mi \$2.40 ph \$3.30. PB 118705

Describes the techniques used and the results obtained from weight loss measurements of the decomposition of tetryl and hydrazine mononitrate, using a sensitive quartz spring balance. UU ISRP TR 43. Contract N7-onr-45107, NR 357-239.

## Miscellaneous Chemicals

Development of room-temperature-curing structural adhesives for metals, by Johan Bjorksten, Risto P. Lappala, Luther L. Yaeger, Robert J. Roth. Bjorksten Research Laboratories, Inc., Madison, Wis. Jul 1954. 89p photos, graphs, tables. Order from OTS. \$2.25. PB 111764

The work described herein has been directed toward the development of a room-temperature low-pressure curing metal-to-metal adhesive suitable for the fabrication and field repair of certain air-frame structural parts where the use of heating and pressurizing equipment would be impractical or impossible. An adhesive designated as P-262A, consisting basically of methacrylic acid and methyl methacrylate, has been developed which meets most of the research objectives and possesses properties comparable to those required by Military Specification MIL-A 8331. Its devel-

opment, formulation, processing, and properties are presented. AF WADC TR 53-294, Contract AF 22(616)-165.

Supplement I. Apr 1955. 49p tables.  
Order from OTS. \$1.25. PB 111764s

A previous investigation on room temperature curing metal-to-metal adhesives (WADC TR 53-294) resulted in the development of an acrylic adhesive which met the specified requirements except for its short pot life and open assembly time. This report describes a supplemental investigation which was made in an attempt to improve these properties. A large number of formulations were prepared using acrylic monomers and carboxylic acids which had not been investigated previously. The best adhesive, on the basis of shear strength screening tests of aluminum-to-aluminum bonds, contained MPL monomer, methacrylic acid, Acryloid B-82, and glass fibers sized with vinyl trichlorosilane. This adhesive did not completely fulfill the requirements, but used alone or preferably in combination with the best adhesive of the previous investigation, it allowed 1/2 hour or more of open assembly time. The pot life could be adjusted by varying the proportions of catalysts. AF WADC TR 53-294, Supplement I, Contract AF 33(616)-165.

Materials for handling fuming nitric acid and properties of fuming nitric acid with reference to its thermal stability, by M.G. Fontana. Ohio State University Research Foundation, Columbus, O. May 1955. 83p photos, drawing, diagr, graphs, tables. Order from OTS. \$2.25. PB 111877

Corrosion fatigue studies were made on RC-70 titanium, titanium alloy Ti-150-A, Armco 17-7PH stainless steel, and 2S aluminum in WFNA (1.5% NO<sub>2</sub>) and RFNA (10.5% NO<sub>2</sub>) at room temperature. These experiments were made using platinum as the inert anode and current densities ranging from 1.5 to 10 ma/in<sup>2</sup> depending on test conditions. Project no. 7312, AF TR 6519, Part 5. For parts 1-2 see PB 109151, PB 110963.

Research on boron polymers. Part II: Polymer studies, by William L. Ruigh, Charles E. Erickson, Frank Gunderloy, Michael Sedlak. Rutgers University, School of Chemistry, New Brunswick, N.J. May 1955. 85p graphs, tables. Order from OTS. \$2.25. PB 111892

An exploratory study has been made of certain boron compounds and polymers in connection with the development of plastics and elastomers, which are thermally stable as well as oil and fuel resistant. This project was directed toward the synthesis of quadricovalent chelate and quasi-chelate boronic acids and borates. The diethano-

lamine ester of benzene-boronic acid has been prepared. It was stable to hydrolysis, and could be recrystallized from water. Allylboronic acid and its esters have been synthesized and studied primarily as intermediates for  $\gamma$ -dimethylamino-propane boronic acid and related compounds which as yet have not been prepared. AF WADC TR 55-26, Part II. Contract AF 33(616)-2057. Project no. 7340. For Part I see PB 111689.

Summary report on soil stabilization by the use of chemical admixtures, by R.C. Mainfort. U.S. Civil Aeronautics Administration, Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1951. 58p photos, graphs, tables. Order from LC. Mi \$3.60 ph \$9.30. PB 118810

Although no entirely successful material was found during these investigations, several have shown good soil stabilizing properties. The most effective of these are: 1. Portland cement plus certain resin admixtures. 2. Anilinefurfural resin plus certain additives. 3. Resorcinal-formaldehyde resin (Amberlite PR-115) plus hardener. 4. Phenol-formaldehyde resin (Resinox 9673) plus catalyst. CAA TDR 136.

## ELECTRICAL MACHINERY

### Communication Equipment

Harmonic radiation from the type TUI transmitter, by Samuel E. Taggart, H.F. Keary, and Arthur E. Frederick. U.S. Civil Aeronautics Administration, Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1953. 17p diags, tables. Order from LC. Mi \$2.40 ph \$3.30. PB 118922

Performance tests of the NARCO VHF omnireceiver, by David S. Crippen and W.L. Seibert. U.S. Civil Aeronautics Administration, Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1951. 20p photos, diags, graphs. Order from LC. Mi \$2.40 ph \$3.30.

### Electronics

Active filter, by G.K. Jensen and J.E. McGeogh. U.S. Naval Research Laboratory. Nov 1955. 10p photos, diags. Order from OTS. 50 cents. PB 111787

Active filters have been built and operated at 100 kc, 1Mc, and 10.5 Mc. At 10.5 Mc, the pull-in range is 2 Mc, or about 20 percent. In one form, the active filter is capable of extracting a cw sig-

nal buried more than 37 db below the noise level. Circuit innovations have made the active filter very simple thus making possible its construction in very small size. NRL R4630.

Analysis of backlash in feedback control systems of second order, by L.M. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Dec 1954. 17p diags, graphs. Order from LC; Mi \$2.40 ph \$3.30. PB 118847

The sinusoidal analysis of feedback control systems of second order involving backlash is developed in the time instead of in the frequency domain, by application of the Kryloff, Bogoliuboff method. Some interesting relations among the parameters of the output responses are found, and the conditions for the limit of stability are derived. An approximate method to take into account the harmonic content of the input is indicated. PIB 344. PIB R-411-54. Contract N6 ori-98, T.O.IV, Project NR075-214. Presented at the American Institute of Electrical Engineers and will appear as a Transaction paper of A.I.E.E.

Artificial quartz crystals, by Danforth R. Hale. Brush Development Co., Cleveland, O. Contract W 36-039-sc-32093. Dept. of the Army project 2-9-11-022. Signal Corps project 142B. Order separate parts described below from LC, giving PB number of each part ordered.

Third quarterly progress report Oct 15, 1946-Jan 15, 1947. Jan 1947. Mi \$2.70 ph \$4.80. PB 118868

1. Autoclaves - Design 2. Crystals, Quartz-Growth 3. SIG Contract W36-039-sc-32093, Report no. 3.

Fourth quarterly progress report Jan 15-Apr 7, 1947. Apr 1947. 26p photo, tables. Mi \$2.70 ph \$4.80. PB 118869

1. Crystals, Quartz - Growth 2. SIG Contract W36-039-sc-32093, Report no. 4.

Seventh quarterly progress report Jan 1948. 18p photo, tables. Mi \$2.40 ph \$3.30. PB 118870

1. Crystals, Quartz - Growth 2. SIG Contract W36-039-sc-32093, Report no. 7.

Eighth quarterly progress report Apr 1948. 13p photo, tables. Mi \$2.40 ph \$3.30. PB 118871

1. Crystals, Quartz - Growth 2. SIG Contract W36-039-sc-32093, Report no. 8.

Ninth quarterly progress report Jul 1948. 14p graph, tables. Mi \$2.40 ph \$3.30. PB 118873

1. Crystals, Quartz - Growth 2. SIG Contract W36-039-sc-32093, Report no. 9. Report no. 328.

Final report Nov 1948. 32p graph, tables.  
Mi \$3.00 ph \$6.30. PB 118872

The purpose of the contract has been in a measure achieved, in that synthetic crystals have been produced of a size and quality suitable for piezoelectric use, but production in relatively small tubular autoclaves has disadvantages, and better growing conditions are expected in modifications of autoclave design which have been proposed to the Signal Corps. Report no. 339. SIG Contract W36-039-sc-32093, Final report. Work continued under Contract W36-039-sc-38190.

Bright display equipment for surveillance radar, by Albert W. Randall and Jack S. Marshall. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 13p photos, diagr, graphs, table. Order from LC. Mi \$2.40 ph \$3.30. PB 118918

1. Radar - Visual display systems 2. CAA TDR 173.

Effect of surface conditions on characteristics of rectifier junctions, by Nick Holonyak, Jr. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Dec 1954. 76p photos, diagrs, graphs. Order from LC. Mi \$4.50 ph \$12.30. PB 118808

Report submitted as thesis. Technical report no. 4 under Contract N6 ori-07140. Describes junction geometry and fabrication, bulk-determined junction characteristics, including theory of the junction steady state current-voltage relation the junction recovery current, and junction open circuit voltage; describes experimental procedure and results, and discusses conclusions drawn from this work. Appendix A shown circular etch patterns. Appendix B is solution of continuity equation.

Electron microscope study of the surfaces of sectioned M-15 propellant grains, by Seymour M. Kaye. U.S. Picatinny Arsenal, Samuel Feltman Ammunition Laboratories, Dover, N.J. Jul 1955. 35p photos, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118875

Object of this research was to make an electron microscope study of the surfaces of sectional M-15 propellant grains in order to determine the presence of: a. Fissures or voids in grains; b. Change in structure and physical dimensions of nitroguanidine crystals; c. Possible formation of a

complex crystal as a result of reaction between nitroguanidine and one of the composition constituents, ethyl centralite. The study was also made to determine the degree of dispersion of the ingredients and the effect of the addition of assorted surface-active agents on the M-15 propellant grain. PA TR 2201.

Evaluation of V-37 electromagnetically decoupled antenna. U.S. Army. Electrical Proving Ground. Engineering and Technical Dept. Radio Communications Division. Radio Systems Branch, Fort Huachuca, Ariz. Feb 1955. 111p photos, drawing, diagrs, graphs, tables. Order from LC. Mi \$6.00 ph \$18.30. PB 118723

1. V-37 (Antenna) 2. Antennas - Tests 3. Communications - Equipment - High frequency 4. AEPG TR no. 3.

Exact treatment of antenna current wave reflection at the end of a tube-shaped cylindrical antenna, by Erik Hallen. California Institute of Technology. Electrical Engineering Dept. Mar 1955. 42p graphs. Order from LC. Mi \$3.30 ph \$7.80. PB 118719

1. Antennas, Cylindrical - Current distribution - Measuring equipment 2. Antennas, Cylindrical - Electromagnetic field 3. Antennas - Reflectors - Theory 4. Antennas, Cylindrical - Mathematical analysis 5. Mathematical equations and solutions 6. Contract AF 18(600)-1113, Technical report no. 5.

Network synthesis by impulse response for specified input and output in the time domain, by Freddy Ba Hli. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jul 1953. 67p diagrs. Order from LC. Mi \$3.90 ph \$10.80. PB 118805

Report is based on a thesis submitted in 1953. 1. Networks, Electrical - Synthesis 2. Networks, Pulse forming - Theory 3. Time study 4. MIT RLE TR 261.

On the theory of junction transistors, by R.D. Middlebrook. Stanford University. Electronics Research Laboratory, Stanford, Calif. Dec 1954. 145p diagrs, graphs, tables. Order from LC. Mi \$7.20 ph \$22.80. PB 118889

This report is one of two dealing with the theory of junction transistors. It is hoped that this first report will be of value to students and to others new to the subject of junction transistors, since the treatment begins with qualitative physical principles and ends with a first-order mathematical theory. SU ERL TR 79. Technical report no. 79 under Contract N6 onr-251 (07), NR 373-360.



Precision magnetic field regulation using nuclear magnetic resonance, by Frederick Alan Hadden. Massachusetts Institute of Technology. Servomechanisms Laboratory. Electronic Nuclear Instrumentation Group. Dec 1950. 222p photos, diags, graphs (part fold). Order from LC. Mi \$9.90 ph \$34.80. PB 118698

The phenomenon of nuclear magnetic resonance is considered as an element in feedback control systems used to regulate magnetic fields. An elementary explanation of the phenomenon and its detection is given in terms of quantum mechanics and then in terms of a simple mechanical model based on Newtonian physics. A typical automatic field control using nuclear resonance as the sensing element is described and the need for this control and the requirements upon it are given. The block diagram and the schematic diagrams of the components are also included. MIT SL TR 1-6663.

Preliminary study of unidentified targets observed on air traffic control radars, by Richard C. Borden and Tiley K. Vickers. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1953. 19p diags, graphs, tables. Order from LC. Mi \$2.40 ph \$3.30. PB 118919

1. Radar - Automatic tracking 2. Radar - Targets  
3. CAA TDR 180.

Requirement for refractive index observations in radar evaluation programs, by D.F. Metcalf. Texas University. Electrical Engineering Research Laboratory. Jul 1955. 13p graphs. Order from LC. Mi \$2.40 ph \$3.30. PB 118823

Report no. 6-10.

1. Refractometers, Microwave - Operation 2. Refraction indexes 3. Radar - Atmospheric effects 4. Radar - Evaluation tests 5. Radio waves - Refraction 6. AF CRC TN 55-390 7. Contract AF 19(604)-494, Report no. 6-10.

Research for determining the time element in photoelectric emission. Quarterly report no. 6 under Contract AF 18(600)-1018, Proj. no. R-115-032 for the period 1 Feb 1955 to 31 Apr 1955, by George L. Clark, D.F. Holshouser, and H.M. Von Foerster. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Electron Tube Research Section, Urbana, Ill. May 1955. 14p photo, diagr. Order from LC. Mi \$2.40 ph \$3.30. PB 118714

For report no. 5 see PB 117773. After extensive investigation of methods for the purification of nitrobenzene to be used in UHF Kerr cell cavities, a relatively simple and adequate procedure was developed. Means are provided for determining the conductivity and temperature of the liquid in

the Kerr cell with the still and the cell in operation. Contract AF 18(600)-1018, Quarterly report no. 6.

Research in physical electronics. Quarterly report no. 11, for the period 15 Mar 1955 to Jun 1955 under Contract AF 19(604)-524, by H.M. von Foerster and L. Goldstein. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Electron Tube Research Section, Urbana, Ill. Jul 1955. 67p photos, diags, graphs, table. Order from LC. Mi \$3.90 ph \$10.80. PB 118863

Continues research under Contract AF 19(122)-5 and Contract AF 19(600)-23. For reports 3, 5 and 9 see PB 112885, 114240, 115048, 115548, 116696. Contents: High speed oscillography and micro-time analysis, by H.M. von Foerster: - 1. Analysis of ultra-high frequency modulated electron beams (Traveling wave tubes), by O.T. Purl. - 2. Secondary electron multiplier, by O.T. Purl. - 3. Circularly deflected beam analyzer, by Fu Fang. - Gaseous electronics, by L. Goldstein: - 1. Electronic wave propagation in ionized media: - 1.1 Interaction of electromagnetic waves, cross modulation, and associated effects, by J.M. Anderson. - 1.2 Magnetic properties of a free electron gas, magneto electron resonance phenomena, by Rudolph C. Hwa. AF CRC TN 55-584. Contract AF 19(604)-524.

Simulation study, under Contract AF30(635)-2815, T.O.IV, Project 4506. Project Lion. Columbia University. Dept. of Electrical Engineering Electronics Research Laboratories. Order separate parts described below from LC, giving PB number of each part ordered.

10 Nov 1954 - 31 Jan 1955. Feb 1955. 44p photos drawings, diags (part fold). Mi \$3.30 ph \$7.80. PB 118824

Progress report P-1/128. Work has been initiated on a simulation program which includes the development of a multi-target radar simulator of high realism and precision, and further study of problems arising out of a work on Task VIII of Contract AF 30(120)-430. Primary emphasis during this period has been on the system design of the multi-target radar simulator and on defining key problems associated with its implementation. The general form of the multi-target radar simulator system has been defined. One of the key system components, a 2.5 mc dynamic binary counter which can be sampled between input count pulses, has been designed and preliminary implementations have verified its feasibility. AF CRC TN55-392.

1 Feb 1955 - 31 May 1955. Jun 1955. 86p photos, drawings, diags (part fold), graphs, tables. Mi \$4.80 ph \$13.80. PB 118857

Progress report P-2/128. During the period covered by this report, work has continued on a simulation program which includes the development of a multi-target radar simulator of high realism and precision, and the improvement and extension of the existing single target radar simulator, as well as its application to beam splitting and automatic track-while-scan problems. AF CRC M55-587.

Statistical model for the propagation of radiation in refraction ducts bounded by rough surfaces, by William C. Meecham. Michigan. University. Engineering Research Institute, Ann Arbor, Mich., and Brown University. Research Analysis Group, Providence, R.I. Nov 1954. 185p diags, graphs. Order from LC. Mi \$8.40 ph \$28.80. PB 118641

Report 1936-3-T. Joint technical report under Contract N6 onr-23221, (University of Michigan) and Contract N7 onr-35808 (Brown University). In certain physical problems involving the propagation of acoustic (or electromagnetic) radiation in inhomogeneous media near a bounding surface, conditions are such as to set up a "surface-bounded refraction duct." Two methods of solution of the basic integro-difference equation are presented. The first of these is a solution by iteration, while the second depends upon taking the Laplace transform of the equation. Existence, uniqueness, and continuity properties of the solution are shown. Finally a numerical example is treated, and plots of the field strength versus range are presented for various positions of the source and receiver. It is found that the attenuation of the field depends strongly upon the fraction of energy trapped within the duct after a surface reflection.

Status report of the microtronics section and radiochemistry section of the Communications Laboratory for the period ending Dec 1954. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Division. Communications Laboratory, Cambridge, Mass. Jul 1955. 67p photos, diags, graphs. Order from LC. Mi \$3.90 ph \$10.80. PB 118853

1. Radiochemistry - Research 2. Microtronics - Research 3. Germanium - Electrical properties 4. Germanium - Preparation 5. Germanium - Surface treatment 6. Diffusion, Grain boundary - Theory 7. Transistors, Silicon 8. Transistors, Gold bonded 9. AF CRC TR 55-100.

Transatlantic frequency-modulation experiments, by L.B. Arguimbau, John Granlund, E.E. Manna, C.A. Stutt. Massachusetts Institute of Technology. Research Laboratory of Electronics. Sep 1954. 51p photos, diags, graphs. Order from LC. Mi \$3.60 ph \$9.30. PB 118806

## Generators, Motors, Transmission

Evaluation of the Rho/theta transponder system, by David S. Crippen, Joseph E. Herman and Marvin H. Yost. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1955. 89p photos, diags, graphs, tables. Order from OTS. \$2.25. PB 111776

Project no. 6.2.4.

1. Radar - Beacons, Transponder 2. Transponders - Design 3. Transponders - Evaluation 4. Rho/theta (Transponder) 5. CAA TDR 229.

Frequency divider from 100 kilocycles/second to 60 cycles/second, by D. Makow. National Research Council of Canada. Radio and Electrical Engineering Division. Jul 1955. 19p photos, diags (1 fold), graphs. Order from National Research Council of Canada, Ottawa, Canada. 25 cents. PB 118964

A chain of frequency dividers from 100 kilocycles/second to 60 cycles/second employing regenerative modulation is described. Simplified and stable dividers have been developed which permit a reduction of the number of circuit components and the size and weight of the chassis. Operation of the system is maintained through considerable variation in the input, plate, and filament voltages, or frequency of the input. NRCC 3736. NRCC ERA-291.

Parastatic moving needle galvanometer, by John Strong. Johns Hopkins University, Baltimore, Md. Jan 1948. 5p drawing. Order from LC. Mi \$1.80 ph \$1.80. PB 118896

Reprinted from Reviews of modern physics, vol. 20, no. 1, p. 180-184, Jan 1948.

1. Galvanometers - Design 2. Galvanometers - Uses 3. Contract N5 ori-166, T.O. III.

This report describes a series of three transatlantic frequency-modulation experiments that were conducted in 1950, 1951, and 1953. The purpose of the first test was to investigate the possibility of establishing a radio link of local broadcast quality over an ionospheric path by using a special frequency-modulation receiver particularly designed to combat two-signal and two-path interference. An attempt was made in the second test to improve the quality of the received program by using a type of nonlinear filter; in the third, by using a highly directive antenna; but even with the aid of these devices, broadcast quality was not achieved. A system called frequency-shift modulation, which should be capable of providing high-quality transmission through a dispersive medium, such as the ionosphere, is described in the appendix. MIT RLE TR 278. SIG Contract DA 36-039-sc-42607.

## FUELS AND LUBRICANTS

Determination of ignition characteristics of hydraulic fluids. Part II: Flammability reference scale, by J.J. Gassmann. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1951. 11p photos, drawing, graphs, tables. Order from LC. Mi \$2.40 ph \$3.30.

PB 118924

Part I is Technical Development Report no. 64.  
1. Hydraulic fluids - Ignition 2. Lubricating oils - Ignition 3. Ignition - Testing equipment - Design 4. CAA TDR 142.

Development of qualification test methods for gear lubricants. Progress report no. 33, Aug 1955, under Contract no. DA 11-022-ord-905, by D.L. Powell and H. Ruwe Barton. Armour Research Foundation, Chicago, Ill. Aug 1955. 1p. Order from LC. Mi \$1.80 ph \$1.80.

PB 118887

Project no. TB 5-3010.  
1. Lubricants, Tests 2. ARF Proj L030, Progress report no. 33 3. Contract DA 11-022-ord-905.

Some physical properties of a number of proposed constructions of materials for nonmetallic crash-resistant aircraft fuel tanks, by Richard N. Motsinger, Melvin F. Miller, and Robert J. Schroers. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1953. 26p photos, graphs, tables. Order from LC. Mi \$2.70 ph \$4.80.

PB 118923

1. Tanks, Fuel - Aircraft - Materials 2. Rupture (Mechanics) - Testing equipment 3. CAA TDR 220.

## INSTRUMENTS

Blood film spreading machines, by K.C. Parry and R.H. Brown. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Dec 1951. 5p drawing. Available from British Information Services, 20 Rockefeller Plaza, New York 30, N.Y. 23 cents.

PB 118840

1. Blood - Testing equipment - Gt. Brit. 2. Film, Blood - Spreading equipment - Gt. Brit. 3. AERE MED/R 823.

Computer components fellowship no. 347. Quarterly report no. 7, second series, Apr 1, 1955

to Jun 30, 1955 under contract CLNAF 19/604/-943. Mellon Institute of Industrial Research, Pittsburgh, Pa. Aug 1955. 83p photos, drawings, diags, graphs, tables. Order from LC. Mi \$4.80 ph \$13.80. PB 118861

For quarterly reports 1-6, second series, see PB 114377, PB 114976, PB 117013, PB 115560, PB 117590, PB 117776. Contents: Part I. Printed circuits: 1. Circuit fabrication via vacuum evaporation, by C.H.T. Wilkins, R.L. Serenka, and A. Milch. - II. High temperature resistors, by J.J. Mazenko. - III. Surface measurements, by M.N. Haller. - Part II. Electroluminescence: IV. Thermoluminescence measurements, by R.E. Freund. - V. Dielectric imbedded phosphor films, by J.J. Mazenko - VI. Chemically deposited films, by R.E. Freund. AF CRC TN 55-759.

Computing machine components program. Eighth quarterly progress report for Apr-Jun 1954. U.S. Naval Ordnance Laboratory. Computer Components Division, Corona, Calif. Apr 1955. 36p diags, graphs. Order from LC. Mi \$3.00 ph \$6.30. PB 118715

Program formerly (since 1952) under U.S. National Bureau of Standards, Corona, Calif. See also PB 118716. Reports work on 1) magnetic film research, including fabrication of films and mechanism of magnetization reversal; 2) ferroelectrics, including properties of barium titanate single crystals and experimental procedure employed in the research; 3) high frequency circuitry; and 4) ferromagnetic resonance. NOL-Corona R252.

Development of turbulence-measuring equipment, by Leslie S.G. Kovaszny. U.S. National Advisory Committee for Aeronautics. 1954. 32p photos, diags, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 30 cents. PB 118895

Supersedes NACA TN 2839 (PB 108602). The equipment covers the frequency range from 2 to 70,000 cycles per second, and is adaptable to all-purpose turbulence work with improved utility and accuracy over that of older types of equipment. Sample measurements are given to demonstrate the performance. NACA 1209. NBS 1286 Revised.

Direct reading flamespectrometry, principles and instrumentation, by Marvin Margoshes and Bert L. Vallee. Harvard University. Medical School, Dept. of Medicine. Biophysics Research Laboratory, and Peter Bent Brigham Hospital, Boston, Mass. Jul 1955. 60p diags, graphs, tables. Order from OTS. \$1.50.

PB 111743

Project NR 119-277 of the Office of Naval Research, supported jointly by the Bureau of Medi-

cine and Surgery, Navy Dept., Dept. of the Army, and Dept. of the Air Force. Subject of flame photometry has assumed increasing importance in clinical physiology, medical practice, and biology, as well as in the analysis of water supplies and industrial products such as cement. This report is an attempt to describe the causes of inaccurate analyses by flame photometry, emphasizing the origin of the effects. In addition, a description is given of a new instrument incorporating some of the principles discussed and designed for the simultaneous determination of several cations. The results of some new investigations of interferences are also given. "References" included.

Message center clock TIE2, by Vernon Ames.  
U.S. Frankford Arsenal. Fire Control Instrument Group, Philadelphia, Pa. Mar 1955. 36p photos, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 116717

Fire Control Project 493. Dept. of the Army project 591-11-001. Ordnance project TR 5-5010. A modified message center clock has been developed which has an accuracy within +30 seconds per day in the temperature range 0° F to 105° F. FALR R-1203.

Portable direct writing drum recorder, by the staff of Columbia University Geophysical Field Station, St. Davids, Bermuda. Columbia University. Lamont Geological Observatory. Nov 1954. 12p photos, drawing, diagr. Order from LC. Mi \$2.40 ph \$3.30. PB 118570

CU-14-54-N6 onr-27124-GEOL, Technical report no. 5. A Sanborn hot wire writing pen has been modified to write on a seismograph drum with an extremely fine trace. The resultant recorder is a convenient portable rugged instrument. Construction techniques and a parts list are included. CUN LGO TR5.

Research and development in connection with metal parts for missile boosters. Negotiated contract NOrd-12639. Borg-Warner Corporation. Ingersoll Products Division, Kalamazoo, Mich. May 1952. 27p. Order from LC. Mi \$2.70 ph \$4.80. PB 118782

Spectrophotometric method for evaluating structural changes occurring in Jan-B-121 barrier material wax (microcrystalline) during accelerated aging in the atlas weatherometer, Model XW, by R.R. Freeman and Arthur J. Dierolf. U.S. Arsenal, Rock Island, Ill. Jun 1955. 13p graphs, tables. Order from LC. Mi \$2.40 ph \$3.30. PB 118794

Ordnance proj. no. TB 4-672d, Report no. 4. D.A. Proj. 593-10-010. Reports control symbol ORDTX-10.  
1. Jan-B-121 (Barrier material wax) 2. Wax acids - Tests 3. Waxes - Acid content - Effect

of aging 4. Waxes, Microcrystalline 5. Weatherometers 6. Atlas weatherometer 7. RIAL R 55-2577.

Transosonde, a new meteorological data-gathering system, by Albert D. Anderson, Henry J. Mastenbrook, and Henry D. Cubbage. U.S. Naval Research Laboratory. Nov 1955. 21p maps, graphs, table. Order from OTS. 75 cents. PB 111779

The U.S. Navy transosonde (trans-oceanic-sonde), has had its balloons tracked over distances of thousands of miles by means of a network of shore-based high-frequency radio direction-finder stations. Field tests have established the technical and meteorological feasibility of this system. The most valuable form of data has been provided by placing primary emphasis on the trajectory of the balloon. NRL R 4649.

Use of the Seeler resuscitator in man, by J.B. Hickam, H.O. Sieker, W.W. Pryor, R. Frayser. Duke University. School of Medicine, Durham, N.C. Mar 1955. 57p graphs, table. Order from OTS. \$1.50. PB 111374

Equations have been developed by means of which it is possible to describe a complete respiratory cycle of the resuscitator and to examine the results of change in the major variables of the subject resuscitator system. Particular attention has been devoted to the problem of providing adequate ventilation to a person with a high respiratory resistance. The successful use of the Seeler resuscitator in cases of carbon dioxide narcosis is described. Some observations are made on the effects on arterial blood pressure and cerebral venous blood oxygen of inducing hypocapnia by over ventilation during resuscitation. AF WADC TR55-165. Contract AF 33(616)-441. Project no. 7160.

## LEATHER AND LEATHER PRODUCTS

Production of leathers resistant to powerful oxidants and reductants, by Nicholas D. Cheronis and Marilyn A. Wentz. Synthetical Laboratories, Chicago, Ill. Jun 1955. 62p photos, diagr, graphs, tables. Order from OTS. \$1.75. PB 111882

Various methods of rendering leathers resistant to the powerful oxidants and reductants employed as fuels in guided missiles were investigated. A two-step method was developed for the production of experimental leathers resistant to the action of fuming nitric acid which was selected as the most powerful corrosive agent of the fuels employed. Experimental leathers having good physical characteristics and excellent acid-resistance were

prepared. AF WADC TR54-466. Contract AF 33(600)-23872. Project no. 7320. Covers work conducted from 11 Apr 1953 to 15 May 1954.

## MACHINERY

Dynamic forces in cranes, by J. Götzlinger and S. Johnsson. Chalmers University of Technology, Gothenburg, Sweden. 1955. 34p diags, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118584

Mechanical engineering series vol. 3, no. 7. First published in Tekniska skrifter no. 151 and Teknisk tidskrift no. 42. Formulae for the maximum hoisting factor are deduced and checked by experiment. By the aid of statistical measurements on cranes in service a reduction factor, which takes into account the actual load conditions, is arrived at. Thereafter an expression is given for the travelling factor arising when one of the crane's wheels passes a real joint. Finally an attempt is made to show the improbability of the hoisting and travelling factors occurring simultaneously and what further reductions can be made on account of this. Acta polytechnica 175.

## MEDICAL RESEARCH AND PRACTICE

Blood ACTH and corticosteroids in man exposed to environmental stress, by Katherine L. Sydnor, Max L. Sweat, George Sayers, and Henry B. Hale. U.S. Air Force. School of Aviation Medicine, Randolph Field, Texas and Western Reserve University, School of Medicine. Apr 1955. 7p tables. Order from LC. Mi \$1.80 ph \$1.80. PB 118800

Blood ACTH and plasma adrenocorticosteroid titers were determined on 9 groups of normal male subjects immediately after exposure to simulated altitude (14,000 ft. equivalent), to heat (120° F.), or to altitude combined with heat for periods of 2, 15, or 45 minutes. The difference between control and experimental groups were not highly significant. It is concluded that the conditions employed did not appreciably activate the pituitary-adrenal system of these subjects. AF SAM R55-22.

Chloropicrin: Median lethal concentration for mice; 10-min. exposure, by S.D. Silver, R.L. Ferguson, F.P. McGrath, and J. Saldick. U.S. Chemical Warfare Service, Edgewood Arsenal, Md. Apr 1942. 14p photo, graph, tables. Order from LC. Mi \$2.40 ph \$3.30. PB 118683

Project A10.2.

1. Chloropicrin - Toxicity 2. EATR 374.

Factors influencing thermal stress in tissue culture, by C.M. Pomerat, J. Nakai, T.G. Blocker, Jr. P.F. Gilliland. U.S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jan 1955. 19p graphs, tables. Order from LC. Mi \$2.40 ph \$3.30. PB 118798

AF SAM Proj. 21-1202-0001, Report no. 7. Explants cultivated in vitro after freezing and thawing under controlled conditions with precise recordings of temperature changes on a potentiometer permit the assessment of tissue vulnerability and an evaluation of the possible role of various chemicals on the course of tissue repair; they also point the way to a description of thermal injury in terms of modifications in the activity of intracellular organoids such as mitochondria.

Hydrocortisone acetate and neomycin in otic infections, by Ben H. Senturia and Verna Alford. Washington University. School of Medicine, and Jewish Hospital, St. Louis, Mo. May 1955. 6p tables. Order from LC. Mi \$1.80 ph \$1.80. PB 118801

Hydrocortisone acetate and neomycin in ointment and aqueous vehicles were used for the treatment of 114 otic infections. Consistent and remarkable results were obtained in the treatment of the neurogenic type of external otitis. Recalcitrant infections of postfenestration and postmastoid cavities showed excellent response. Very satisfactory improvement occurred in patients with chronic otitis media and with acute and chronic diffuse external otitis.

In vitro metabolism of adrenalcortico steroids and related compounds. Annual progress report under Contract no. Nonr 1035(00), NR 123-180, for period 1 Jan to 31 Dec 1954, by Benjamin N. Horwitz. Tulane University, New Orleans, La. Dec 1954. 3p. Order from LC. Mi \$1.80 ph \$1.80. PB 118761

1. Steroids, Adrenalcortical - Metabolism
2. Steroids, Adrenalcortical- Analysis.

Procurement of monkeys for the Radiobiological Laboratory, by B.D. Fremming, R.E. Benson, and R.J. Young. U.S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1955. 9p photos. Order from LC. Mi \$1.80 ph \$1.80. PB 118799

Macaca mulatta (rhesus) monkeys were procured from India for use in research at the Radiobiological Laboratory of the University of Texas and the

United States Air Force. They were tested for tuberculosis and given terramycin orally as a prophylactic measure against diarrhea. Transportation by air to the United States required daily care (a) to provide suitable food (grain) and clean crates, and (b) to control environmental temperatures and altitude. AF SAM R55-4.

Status report of Lobund study on comparative effects of total body radiation, by Helmut A. Gordon and William C. Scruggs. Lobund Institute. Physiology Laboratory. Nov 1953. 19p photos, diags, tables. Order from LC. Mi \$2.40 ph \$3.30. PB 118902

Photos will not reproduce. Some pages may not reproduce well. 1. Radiation - Physiological effects 2. X-rays - Physiological effects.

## METALS AND METAL PRODUCTS

Development of wrought and cast alloys for high temperature applications, by R.R. MacFarlane, R.S. DeFries, E.E. Reynolds, W.W. Dyrkacz. Allegheny Ludlum Steel Corporation. Water-vliet Research Laboratory. Apr 1955. 93p photos, graphs, tables. Order from OTS. \$2.50. PB 111891

Project no. 7351. Continues work under Contract AF 18(600)-149. Final report under this contract is WADC TR 54-276. Developmental studies were conducted on wrought Fe-base and both wrought and cast Co-base alloys for applications at high temperatures. A heat treatable, Fe-base, austenitic alloy containing Mn and Cr was modified with B to give excellent stress-rupture properties at 1200° F. Oxidation resistance was greatly improved by small A additions. A wrought Co-base alloy with good stress-rupture properties at 1600 and 1700° F and improved oxidation resistance was developed. Composition levels giving optimum properties were determined for the cast Co-base alloys. Modifications involving B were investigated in both wrought and cast Co-base alloys. AF WADC TR 55-23. Contract AF 33(616)-2463.

Effect of grain size on the mechanical properties of titanium and its alloys, by Frank C. Holden, Horace R. Ogden, and Robert I. Jaffee. Battelle Memorial Institute, Columbus, O. Mar 1955. 150p photos, drawings, graphs, tables. Order from OTS. \$3.75. PB 111881

Project no. 7351. A study has been made of the effects of grain size on the mechanical properties of commercial-purity titanium, an alpha-beta-titanium alloy, and a metastable beta-titanium alloy. The mechanical properties studied in this research were tensile, notched-tensile, hardness, bend, impact, and fatigue endurance. AF WADC TR 54-487. Contract AF 33(616)-412.

High temperature project. Eighth progress report, Jan 1, 1953-Jul 1, 1953, under Contract no. N9 onr-87301, by J.B. Conway and A.V. Grosse. Temple University. Research Institute, Philadelphia, Pa. Jul 1953. 33p drawings, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118900

The experimental work performed during this period concerned: 1. Radiation measurements on the oxy-aluminum flame at elevated pressures. 2. The combustion of aluminum at sub-atmospheric pressures. 3. The combustion of titanium powder. 4. The thermodynamics of the titanium-oxygen system. Contract N9-onr-87301, Report no. 8.

Investigation of compressive-creep properties of aluminum columns at elevated temperatures. Part III: Comparisons with other metals, by R.L. Carlson and G.K. Manning. Battelle Memorial Institute, Columbus, O. May 1955. 68p photos, graphs, tables. Order from OTS. \$1.75. PB 111896

Project no. 7360. An application of the time-dependent tangent-modulus method is made to test results for the titanium alloy RC-130A. The load-capacity estimates obtained are conservative for the test temperatures of 700° F and 800° F. For temperatures and times for which the use of this alloy can be considered efficient, the estimates are considered satisfactory. The creep-buckling data obtained on the aluminum alloy 2024-T4 and on the titanium alloy RC-130A indicate that the column load for a given failure time is approximately a constant fraction of the immediate-failure load for an appreciable range of slenderness-ratio values. The resistance of stainless steel Type 302 to creep and to creep buckling is good up to 1000° F. Since the resistance to time-independent plastic deformation is low, however, the load capacity of columns of this alloy cannot be considered exceptional at 1000° F. AF WADC TR 52-251, Part 3. Contract AF 33(038)-9542.

Métallographie de l'aluminium et de ses alliages. Emploi du polissage électrolytique (Metallography of aluminum and its alloys. Use of electrolytic polishing), by P.A. Jacquet. Translated by Mary L. Mahler. Nov 1955. 82p photos, diags, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 118965

Translated from France. Office National d'Etudes et de Recherches Aeronautiques. Publication no. 51, 1952. Recent methods are described for electropolishing aluminum and aluminum alloys. Numerous references are included of electrolytic micrographic investigations carried out during the period 1948 to 1952. A detailed description of a commercial electrolytic polishing unit, suitable for micrographic examination of aluminum and its alloys, is included. NACA TM 1384.

Structural changes of commercial titanium and titanium-base alloys on heat treatment, by D.W. Levinson and W. Rostoker. Armour Research Foundation, Chicago, Ill. May 1954. 123p photos, diagr, graphs, tables. Order from OTS. \$3.25. PB 111767

A resistometric procedure for determination of transformation kinetics of transforming titanium alloys has been developed and results of studies on selected alloys of the systems titanium-manganese and titanium-iron are presented. The tensile and impact properties, and microstructures of three representative alloys in the system titanium-manganese, heat treated according to schedules dictated by the TTT curves established resistometrically and practical considerations, are presented. The influence of dispersed carbides, presumably TiC, on grain growth characteristics and tensile properties of three representative titanium-molybdenum alloys was determined. AF WADC TR 54-244. Contract AF 33(038)-16347.

Tensile properties and rheotropic behavior of titanium alloys and molybdenum, by E.J. Rippling. Case Institute of Technology, Cleveland, O. May 1955. 135p photos, graphs, tables. Order from OTS. \$3.50. PB 111898

Project no. 7351. The unnotched and notched tensile properties are described as a function of testing temperature for a series of titanium-nitrogen, and titanium-manganese binary alloys as well as for the commercial alloy, Ti 140A, and the experimental 3 Mn-complex alloy. It was shown that the nitrogen embrittles alpha titanium by elevating its transition temperature. This brittleness can be partially eliminated by taking advantage of a rheotropic recovery. The Ti 140A alloy in the "as-received" conditions was high in hydrogen so that a brief investigation of the effect of hydrogen in this alloy was also conducted. Recrystallization embrittlement in commercial unalloyed molybdenum was found to be a manifestation of rheotropic embrittlement. AF WADC TR 55-5. Contract AF 33(616)-2223.

## METEOROLOGY AND CLIMATOLOGY

Advances in the physics of the upper air since 1950, by E.O. Hulburt. U.S. Naval Research Laboratory. Oct 1955. 35p photo, diagrs, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118963

The report describes progress which has been made since about 1950 in investigating the upper atmosphere. Important data up to great heights were obtained by means of instruments on rockets. The vertical distribution of atmospheric density was measured to 219 km, of pressure to 130 km, of ozone to 70 km, and of electron density to 219 km. The various facts of the ionosphere were

gathered together in a theory which attributed the cause of the normal D region to solar hydrogen, of normal E region to X-rays below 100A, and of F2 to ultraviolet light in the thus far unobserved spectrum from 200A to 600A. A working model atmosphere based on the observed pressure, density, and composition was drawn up and extrapolated to 500 km. A new theory of the aurora was outlined based on magnetically self-focused proton streams from the sun. NRL R4600.

### Atlantic-European weather types, 1899-1945:

Classification, calendar, uses and climatology. U.S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D.C. Aug 1955. 42p maps, drawings, graphs, tables. Order from LC. Mi \$3.30 ph \$7.80. PB 118813

1. Weather charts - Atlantic Ocean
2. Weather charts - Europe
3. Climatology - Research
4. Weather - Classification
5. AF AWS TR 105-137.

### Evaluation of the Eastern Air Lines prognostic chart method. Part I: Cyclogenesis.

U.S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D.C. Aug 1955. 30p graphs, tables. Order from LC. Mi \$2.70 ph \$4.80. PB 118814

1. Cyclones - Forecasting - Methods
2. AF AWS TR 105-138/1.

### Experimental studies of small scale turbulence.

Final report under Contract no. AF 19(122)-261, by James E. Miller, Alfred K. Blackadar, Wancheng Chiu, and Warren A. Dryden. New York University. College of Engineering. Research Division. Aug 1955. 145p photos, drawing, diagrs, graphs, tables. Order from LC. Mi \$7.20 ph \$22.80. PB 118818

For 3d, 5th-6th reports see PB 115638-115640. This is the final report of a project to study small scale turbulence in air by means of a specially devised photographic technique. The spectrum of eddy energy and its rate of dissipation are determined for one of the experiments. A function representing the rate of transformation of mean energy into eddy energy is computed and discussed. Eddy thermodynamics and the flux of eddy energy are investigated theoretically and by means of data from experiments of this project and other experiments. A number of miscellaneous investigations are described. AF CRC TR 55-277.

### Final report under Contract AF 19(122)-249, by

A.L. Quirk. Rhode Island. Engineering Experiment Station. Upper Air Research Laboratory, Kingston, R.I. Jun 1955. 9p table. Order from LC. Mi \$1.80 ph \$1.80. PB 118621

Two approaches to the problem of measuring the intensity of solar radiation in the upper atmosphere were used. The first involved the use of instruments in rockets, and the second in plastic balloons. The rocket phase of the program was unsuccessful. The balloon equipment used Weather Bureau global pyrhelimeters, with minor modifications, as the radiation detectors. Three successful flights on 12 and 20 May 1954 and 9 September 1954 gave much data. AAF CRC TR 55-272.

Mechanism of vorticity change associated with a selected cyclone, by M.A. Estoque. Chicago. University. Dept. of Meteorology. May 1955. 31p maps, diags, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118817

A quantitative estimate of the factors affecting the vorticity changes associated with a storm over the United States is obtained. It is found that the increase of vorticity in the lower troposphere during the formation and subsequent movement of the storm was due mainly to horizontal convergence, while the accompanying intensification of the upper trough was associated with the rotation of the vortex lines toward the vertical. AF CRC TN 55-670. Contract AF 19(604)-1293, Technical report no. 4.

Meteorological analysis of selected offshore California refractive index profiles, by V.E. Moyer. Texas. University. Electrical Engineering Research Laboratory. Jun 1955. 56p maps, diags. Order from LC. Mi \$3.60 ph \$9.30. PB 118825

Meteorological explanations are sought for the results of 12 daytime refractometer flights over areas centered some 150 nautical miles off the coast of central California. Meso-analyses of pressure, temperature, and mixing ratio, and the construction of vertical N-profiles from radiosonde data are used to examine the vertical variation of atmospheric refractive index over waters that normally induce the formation of marine ducts. AF CRC TN 55-365. TU EERL 6-09. Contract AF 19(604)-494.

Project Mint Julep: Investigation of smooth ice areas of the Greenland ice cap, 1953. U.S. Air Force. Air University. Research Studies Institute. Arctic, Desert, Tropic Information Center, Maxwell Air Force Base, Ala. Order separate parts described below from LC, giving PB number of each report ordered.

Part I: Introduction, narrative, and general reports. May 1955. 94p photos, maps (1 fold), diags (part fold). Order from LC. Mi \$5.40 ph \$15.30. PB 118849

For Parts III, and IV see PB 116564 and PB 117534. ADTIC publication A-104a.

Contents: Introduction, by Paul H. Nesbit. - Narrative of the expedition. - Summaries of the scientific studies. - Practical applications of the investigations. - Conclusions. - Recommendations. - General reports: - Construction and maintenance of the Mint Julep Station, by John H. Nelles. - Mapping program, by Karl N. Hendrickson. - Ice cap transportation, by John H. Nelles and G. William Holmes. - Communications, by Edward H. Tanner. - Aerial photographs of the Mint Julep study area, by G. William Holmes.

Part II: Special scientific reports. May 1955. 116p photos, (fold) maps, graphs (part fold), tables. Order from LC. Mi \$6.00 ph \$18.30. PB 118848

ADTIC publication A-104b. Contents: 1. Morphology and hydrology of the Mint Julep Area, Southwest Greenland, by G. William Holmes. - 2. Ablation studies in the Mint Julep Area, Southwest Greenland, by Edward LaChapelle. - 3. Minor surface features of the southwest Greenland ice cap, by L.R. Wilson. - 4. Snow and ice residues: Cryoconite, by L.R. Wilson.

Rocket instruments for the measurement of total solar radiation in the upper atmosphere, by M.J. Prince and A.L. Quirk. Rhode Island. University, Dept. of Physics. Upper Air Research Laboratory, Kingston, R.I. 1955. 56p photos, drawings, diags, graphs, tables. Order from LC. Mi \$3.60 ph \$9.30. PB 118511

Scientific report no. 1 under Contract AF 19(122)-249. This report summarizes the rocket phase of the program directed toward the measurement of the intensity of solar radiation in the upper atmosphere. A description of the four instruments used in Aerobee rocket flights is given and the reasons for the changes during the development of the final instrument are discussed. AAF CRC TN 55-256.

Solar eclipse, 30 Jun 1954. Final report under Contract no. AF 19(604)-878, by Weikko A. Heiskanen. Ohio State University Research Laboratory. Mapping and Charting Research Laboratory, Columbus, O. Feb 1955. 129p photos, map, drawings, diags, tables. Order from LC. Mi \$6.30 ph \$19.80. PB 118639

1. Eclipses, Solar 2. OSURF Proj 574, Final report.

Standard deviation as a measure of variability of monthly mean temperature in the Northern hemisphere, by Lois C. Anderson. U.S. Army. Quartermaster Research and Development Command. Environmental Research Branch,



Quartermaster Research and Development Center, Natick, Mass. Jul 1955. 47p maps (1 fold), graph, tables. Order from LC. Mi \$3.30 ph \$7.80. PB 118304

Project reference 7-83-05-003C. Maps prepared by Clark University, Graduate School of Geography. A series of maps showing standard deviation of monthly mean temperature in the Northern Hemisphere is presented, together with a description of their construction and application. The maps indicate that variability of the monthly mean is greater in winter than in summer, and more marked in northern latitudes. QMC EP TR 16.

Summary of atmospheric electrical data at selected land and sea stations, 1954, by R.E. Holzer and P.L. Ruttenberg. California. University. Institute of Geophysics, Los Angeles, Calif. May 1955. 180p graphs, tables. Order from LC. Mi \$8.10 ph \$27.30. PB 118520

Numerical data from measurements of electric potential gradient, conductivity, and air-earth current density at selected sites in California, the Pacific Ocean, Hawaii, and Austria for the year 1954 are presented. Tables of hourly mean values are introduced by notes indicating the experimental and evaluation procedures, and explaining the terminology used. Graphs of the mean diurnal variation of the several variables are shown for purposes of visual comparison. Other pertinent information, including indices of field test sites and dates, is presented in an appendix. AAF CRC TN 55-678. Contract AF 19(122)-254, Scientific report no. 10.

Summary of derived gust velocities obtained from measurements within thunderstorms, by Harold B. Tolefson. U.S. National Advisory Committee for Aeronautics. Oct 1955. 19p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 118740

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

Surface winds over Puget Sound and the Strait of Juan de Fuca and their oceanographic effects, by Russell G. Harris and Maurice Rattray, Jr. Washington. University. Dept. of Oceanography, Seattle, Wash. Jul 1954. 143p maps (part fold), graphs, tables. Order from LC. Mi \$7.20 ph \$22.80. PB 118295

Technical report 37. Some of the oceanographic effects of these surface winds are discussed, and

approximate calculations are made of the maximum heights of wind waves which may have occurred on Sound waters during the three year period for which high surface wind data were compiled. With the use of empirical formulae, semi-quantitative estimations have also been made of the stress on the water surface due to the surface wind flow, and of the currents and water level slopes which might result. WU OR 54-27.

## MINERALS AND MINERAL PRODUCTS

Stability relations of silicate-carbonates at elevated temperatures and pressures. Fifth progress report for the period Oct 1 to Dec 31, 1954 under Contract Nonr-656, Task Order 6, no. NR 081-204, by R.I. Harker and O.F. Tuttle. Pennsylvania State University. School of Mineral Industries, State College, Pa. Dec 1954. 8p. Order from LC. Mi \$1.80 ph \$1.80. PB 118852

NSF-G896. For 1st-2d and 4th reports see PB 114987, PB 116311, PB 118329. Attention was concentrated on three important reactions in the decarbonization series. These three reactions involve the formation of the index minerals wollastonite, monticellite, and akermanite which may occur in thermally metamorphosed magnesium bearing siliceous limestones.

## PERSONNEL APTITUDE TESTING

Field study of voice communication problems as related to training devices, procedure and equipment, by J.W. Asher, T.D. Hanley, and M.D. Steer. U.S. Office of Naval Research. Special Devices Center, Port Washington, N.Y. Apr 1955. 48p tables. Order from LC. Mi \$3.30 ph \$7.80. PB 118851

A survey of personnel charged with communications duties was undertaken. Three broad categories of respondents were interviewed, namely, senior offices, communications officers, and enlisted personnel. The responses were generally related to four critical areas in which the major sources of difficulty can be summarized in terms of: inadequate training, unstandardized communications procedures, inefficient use of equipment and lack of proper supervision. SDC TR 104-2-41. Contract N6 ori-104.

Follow-up of officer candidate school graduates. U.S. Bureau of Naval Personnel. Personnel Analysis Division. Personnel Measurement Research Branch. Jun 1955. 10p graphs, tables. Order from LC. Mi \$1.80 ph \$1.80. PB 118812

Officer candidates from Class 2 were followed up in order to determine the effectiveness of selection procedures which lead to commissioning. The results of this study indicate that initial selection procedures are very effective in predicting OCS performance and that OCS performance is effective in predicting later officer performance as evaluated by the first fitness report. NAVPERS 18378. NAVPERS RR 55-2.

## PHOTOGRAPHIC AND OPTICAL GOODS

Abridged bibliography of photographic interpretation, selected with emphasis upon keys, techniques and research, compiled by J.H. Roscoe, S.D. Wells and V.W. Pace. U.S. Naval Photographic Interpretation Center, U.S. Naval Receiving Station, Washington, D.C. Nov 1950. 46p. Order from LC. Mi \$3.30 ph \$7.80.

PB 118906

PIC report no. 102 A/50.

1. Photography, Aerial - Interpretation - Bibliography.

Anisotropic photographic and related properties of monocrystalline silver chloride, by Frances H. Cook and Henry Leidheiser, Jr. Virginia Institute for Scientific Research, Richmond, Va. Mar 1955. 33p photos, tables. Order from OTS. \$1.00. PB 111897

Project no. 6273. Studies on spherical and flat single crystals of silver chloride indicated that the various crystal faces behaved differently in the following processes: etching, development in photographic developers, etching of the silver formed by development, reduction of the chloride to free silver in reducing gases at high temperature, wetting, and electrolytic treatment. X-ray diffraction revealed the presence of a greater amount of preferred orientation of the silver obtained on the (100) face than on the (111) face of the silver chloride crystals developed in commercial Dektol. AF WADC TR 54-486. Contract AF 33(616)-323.

Bibliography on interpretation of vegetation from aerial photography, by Thomas Hart. Catholic University of America, Washington, D.C. Aug 1950. 41p. Order from LC. Mi \$3.30 ph \$7.80. PB 118905

PIC report no. 113/50.

1. Photography, Aerial - Interpretation- Bibliography.

Selected papers on photogeology and photo interpretation, presented at meetings sponsored by the Committee on Geophysics and Geography.

U.S. Research and Development Board. Committee on Geophysics and Geography. Apr 1953. 223p photos, maps. Order from LC. Mi \$9.90 ph \$34.80. PB 118464

GG 209/a. Contents: Introduction, by A.C. Lundahl. - Photo interpretation of terrain, by H.T.U. Smith. - Photogeography, by J.H. Roscoe. - Terrain intelligence and the future of mineral prospecting, by D.J. Belcher. - Aerial photographic interpretation of vegetation as an aid to the estimation of terrain conditions, by R.N. Colwell. - Procedure for the construction of photo-interpretation keys, by R.N. Colwell. - Procedures and problems of photogeologic evaluation, by R.F. Thurrell, Jr. - Development of methods and materials for teaching photogeologic interpretation, by H.R. Wanless. - Photogeologic studies of arctic Alaska and other areas, by W.A. Fisher. - Research aspects of military photo interpretation, by P.E. Truesdell. - Geologic exploration and mapping with aerial photographs, by F.A. Melton. RDB GG 209/1.

## PHYSICS

### General

Absorption and scattering of radiation in an infinite homogeneous atmosphere, by C.J. Tsao and A.M. Sessler. Ohio State University Research Foundation, Columbus, O. May 1955. 38p tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118826

Studies the problem of the radiation intensity, from a point source, in an infinite, homogenous medium. The medium is assumed to absorb the radiation, and scatter it anisotropically. Two methods of solution are discussed. The first is the spherical harmonics method, which expresses the solution as an infinite series, the convergence being most rapid for scattered radiation distributions which are smooth functions of direction. A closed expression is obtained for any order of approximation. A numerical example is also given. In the second method, the intensity is obtained exactly as a definite integral which, however, is very complicated but may be evaluated asymptotically. AF CRC TN 55-679. OSURF Proj 535. Report no. 3. Contract AF 19(604)-516.

Application of high hydrostatic pressures at liquid helium temperatures, by C.A. Swenson. Massachusetts Institute of Technology. Cryogenic Engineering Laboratory. Jun 1955. 19p diags, graphs. Order from LC. Mi \$2.40 ph \$3.30. PB 118710

Based on a paper presented at the meeting of the Instrument Society of America at Philadelphia in

Sep 1954. 1. Helium, Liquid - Thermal properties 2. Helium - Thermodynamic properties 3. Hydrogen - Compressibility 4. Deuterium - Compressibility 5. Pressure - Effect of temperature 6. Instruments, Measuring - Pressure 7. ORD OOR TM 55-1 8. Contract DA 19-020-ORD-189.

Compressible laminar boundary layer and heat transfer for unsteady motions of a flat plate, by Simon Ostrach. U.S. National Advisory Committee for Aeronautics. Nov 1955. 26p diags, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 118973

The laminar compressible boundary layer and heat transfer over an isothermal semi-infinite flat plate moving with a time-dependent velocity has been analyzed. First-order deviations from the quasi-steady velocity and temperature profiles and boundary-layer characteristics have been computed. A plate oscillating about a steady velocity is considered as an example. NACA TN 3569.

Differential space theory of quantum mechanics.

Part I, by Norbert Wiener and Armand Siegel. Massachusetts Institute of Technology and Boston University. Nov 1954. 47p. Order from LC. Mi \$3.30 ph \$7.80. PB 118643

Included with report are: Annual progress report under Contract Nonr-492(02) by Armand Siegel, 1953, and *Mecanique quantique* (Quantum mechanics), by Norbert Wiener and Armand Siegel. (Text in French.) Reprinted from *Compte rendus des seances de l'Academie des Sciences* v. 237, p. 1640-1642, 21 Dec 1953. 1. Quantum mechanics 2. Contract Nonr-492(02).

Generalized theory of plasticity involving the virial theorem, by Henry Eyring and Taikyue Ree. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Dec 1954. 6p. Order from LC. Mi \$1.80 ph \$1.80. PB 118859

The theory of plastic deformation proceeds by considering a series of relative displacements of patches lying on the two sides of each shear surface. Displacements along such shear surfaces occur as relaxations obeying a generalized absolute reaction rate equation. A general statistical formulation has been achieved which fits the usual cases of shear. A generalization of the absolute reaction rate equation is also presented. UU ISRP TR 46. Contract N7-onr-45101, NR-032-168.

Heats and entropies of adsorption of gases and vapors on solid surfaces. Final report under Research Contract N8 onr-66902, Proj. no. 057-151, for the period 1 Dec 1948 to 31 Dec 1954, by R.A. Beebe and others. Amherst Col-

lege. Dept. of Chemistry, Amherst, Mass. Dec 1954. 11p. Order from LC. Mi \$2.40 ph \$3.30. PB 118709

Summaries of Technical reports 1-7.

1. Gases - Adsorption 2. Gases - Heat transfer - Theory 3. Gases - Radiochemical reactions 4. Adsorption - Research 5. Vapors - Adsorption 6. Contract N8 onr-66902, NR 057-151.

Impingement of water droplets on a sphere, by Robert G. Dorsh, Paul G. Saper, and Charles F. Kadow. U.S. National Advisory Committee for Aeronautics. Nov 1955. 29p diagr, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D. C. PB 118979

Droplet trajectories about a sphere in ideal fluid flow were calculated. From the calculated droplet trajectories, the droplet-impingement characteristics of the sphere were determined. Impingement data and equations for determining the collection efficiency, the area, and the distribution of impingement are presented in terms of dimensionless parameters. NACA TN 3587.

Impingement of water droplets on NACA 65A004 airfoil at 0° angle of attack, by Rinaldo J. Brun and Dorothea E. Vogt. U.S. National Advisory Committee for Aeronautics. Nov 1955. 28p diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D. C. PB 118978

The amount of water in droplet form impinging on the airfoil, the area of droplet impingement, and the rate of droplet impingement per unit area on the airfoil surface were calculated from the trajectories and presented to cover a large range of flight and atmospheric conditions. These impingement characteristics are compared briefly with those previously reported for the same airfoil at angles of attack of 4° and 8°. NACA TN 3586.

Interferometric study of supersonic phenomena.

Part II: Gas flow around various objects in a free homogeneous supersonic air stream, by R. Ladenburg, C.C. Van Voorhis, and J. Winckler. Princeton University. Palmer Physical Laboratory, Princeton, N.J. Sep 1946. 65p photos (part fold.), drawings, diags, tables. Order from LC. Mi \$3.90 ph \$10.80. PB 118682

Part I is NAVORD 69-46. This report describes interferometric measurements of the flow of air about cones, a sphere and a projectile at a Mach no. of 1.70. The models were mounted in a homogeneous free jet emerging into the room through a circular Laval nozzle from a valve and pressure tank. The available cone-shaped test region of the jet was located in one beam of the interfero-

meter. All interferograms were obtained with light from a magnesium air spark of 1 microsecond duration. Interferograms were analyzed using the exact solution of the Abel integral equation for axially symmetric flow patterns, the evaluation being mechanized and carried out on I.B.M. calculators. Values of density, pressure, temperature, velocity and Mach number are given for the flow fields of all of the bodies. Surface pressure coefficients have been determined in each case. NAVORD 93-46. Contract Nord-9240.

Mechanism of detonation, by M.A. Cook, Utah University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Nov 1954. 36p photos, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118563

The requirements of the laws of conservation of energy and reaction kinetics are applied, in addition to the requirement (of conservation of mass and momentum) that conditions in the reaction zone fall along the Rayleigh line, in an investigation of the validity of the "jump condition" of the Zeldovich-von Neumann theory in gaseous explosives. It is shown that this jump condition apparently is not a satisfactory solution, but that pressures in the reaction zone are limited to values no greater than the pressure  $p_1$  at the Chapman-Jouguet "plane" (except possibly for an extremely short distance of perhaps several mean-free paths at the extreme front where thermal equilibrium may not exist). UU ISRP TR 41. Contract N7 onr-45107, NR 357-239.

New two-sided acceptance region for sampling by variables, by George J. Resnikoff. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Nov 1952. 32p diags, graph, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118911

1. Sampling (Statistics) - Variables 2. Statistical methods 3. Manufactures - Inspection 4. Contract N6 onr-25126 (NR 042-002) 5. SU AMSL TR 8.

On distributions  $p(x|CU)$  for which  $\frac{P(x|W1)}{P(x|W2)}$  is monotone, by Samuel Karlin. Stanford University. Dept. of Statistics, Stanford, Calif. Sep 1954. 7p. Order from LC. Mi \$1.80 ph \$1.80. PB 118340

1. Mathematical equations and solutions 2. Density - Mathematical analysis 3. Contract N6 onr-251, T.O. III, NR 042-993, Technical report no. 26.

On limiting states of equilibrium, by William Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Dec 1954. 14p diags. Order from LC. Mi \$2.40 ph \$3.30. PB 118720

1. Equilibrium - Theory 2. Mathematical equations and solutions 3. GDAM All-117 4. GDAM TR 117 5. Contract N7 onr-35801, T.O. 1, NR 064-406.

Rayleigh-Ritz and the Weinstein methods for approximation of eigenvalues. III: Application of Weinstein's method with an auxiliary problem of type I, by N.Aronszajn. Oklahoma Agricultural and Mechanical College. Dept. of Mathematics, Stillwater, Okla. 1950. 41p tables. Order from LC. Mi \$3.30 ph \$7.80.

PB 118897

1. Approximate computations 2. Rayleigh principle (Mathematics) 3. Weinstein's method (Mathematics) 4. Mathematical equations and solutions 4. Plates, Rectangular - Vibration - Theory 6. Contract N9 onr-85101, Project NR 041-090.

Reduced inspection for characteristics with infrequent defects, by Gerald J. Lieberman. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Oct 1951. 20p table. Order from LC. Mi \$2.40 ph \$3.30. PB 118910

This report deals with the obtaining of a satisfactory procedure for reduced inspection which will not result in a serious lowering of the general quality protection given by the acceptance criteria stipulated under normal inspection in MIL-STD-105A. SU AMSL TR 5. Contract N6 onr-25126 (NR 042-002).

Sampling tables for variables inspection based on the range, by W. Grant Ireson and George J. Resnikoff. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Nov 1952. 51p graphs, tables (2 fold). Order from LC. Mi \$3.60 ph \$9.30.

PB 118909

The purpose of this report is to present a set of variables sampling plans which, while providing a wide range of protection, offers relative ease of computation for its users as compared with existing variables plans utilizing the sample standard deviation. It is not intended to be a manual or a standard, but simply a set of plans which may be used where appropriate. SU AMSL TR 11. Contract N6 onr-25126 (NR 042-002).

Some permutation problems relating to circulant permanents, June 15, 1954 to Sep 15, 1954, by Charles L. Carroll, Jr. and Jack Levine. North Carolina State College. Dept. of Engineering Research, Raleigh, N.C. Sep 1954. 30p. Order from LC. Mi \$2.70 ph \$4.80.

PB 118376

1. Permutation - Theory 2. Mathematical equations and solutions 3. Contract Nonr-870(00).

Sound propagation into the shadow zone in a temperature-stratified atmosphere above a plane boundary, by David C. Pridmore-Brown and Uno Ingard. U.S. National Advisory Committee for Aeronautics. Oct 1955. 57p photo, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 118738

A theoretical and experimental study of the sound field about a point source over a plane boundary in the presence of a vertical temperature gradient has been made. Methods are presented for analyzing the effects of temperature gradients on the attenuation of sound in the shadow zone of a sound field. NACA TN 3494.

Synthesis of procedures for the computation of various characteristics of simultaneous equations, by R.E. Wheeler and John Schmid, Jr. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1955. 30p tables. Order from LC. Mi \$2.70 ph \$4.80. PB 118612

1. Mathematical equations and solutions 2. AAF PTRC TN 55-9.

Theoretical analysis of the field of a random noise source above an infinite plane, by Peter A. Franken. U.S. National Advisory Committee for Aeronautics. Nov 1955. 20p diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D. C. PB 118892

The sound field about a random noise source above a plane as measured by a receiver with finite band width is studied theoretically. For simplicity, only the far field is considered. The special case of a perfectly reflecting plane is discussed first and the analysis is then extended to include the case of a plane of arbitrary impedance. NACA TN 3557.

Transonic flow past a wedge at zero angle of attack, by Leon Trilling. Massachusetts Institute of Technology. Dept. of Aeronautical Engineering. Mar 1952. 59p graphs. Order from LC. Mi \$2.60 ph \$9.30. PB 118907

The steady plane flow of an ideal inviscid non-conducting gas past a thin symmetric diamond wedge at zero angle of attack was investigated theoretically at speeds just below the velocity of sound. A solution approximately satisfying these conditions and depending only on the transonic similarity parameter  $\xi$ : was constructed. The pressure drag, the location and the strength of the shocks and the shape of the supersonic region were computed for several values of  $\xi$ . AF WADC TR 52-61. Contract AF 33(038)-22184.

Conversion of a controller from single to multi-point operation, by R. D. Semmens. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1950. 11p diags. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 37 cents. PB 118839

1. Controllers, Electric - Gt. Brit. 2. Furnaces - Controls - Gt. Brit. 3. AERE M/R 576.

Counting pulsed neutron fluxes in the presence of pulsed X-rays, by A. Brodsky and W. J. Willis. U. S. Naval Research Laboratory. Nov 1955. 9p diagr, graphs. Order from OTS. 50 cents. PB 111769

A method is described for determining pulsating fluxes of neutrons in the presence of pulsating x-rays by the use of proportional counters with high neutron-to-gamma pulse height ratios. Typical curves of response to x-ray and neutron pile-up are given, and a theoretical calculation of response to x-ray pile-up from pulsed sources is shown to agree with experimental measurements. The techniques described are particularly suitable for expediting health physics surveys, but are also applicable to other experiments with pulsed radiations. NRL R4643

Differential elastic scattering of 14-MEV neutrons in bismuth tantalum, indium, iron, and sulfur, by J. O. Elliot. U. S. Naval Research Laboratory. Oct 1955. 98p photos, diagr, graphs, tables. Order from LC. Mi \$5.40 ph \$15.30. PB 118324

The differential elastic scattering cross sections of Bi, Ta, In, Fe, and S for 14-Mev neutrons were measured at scattering angles between  $5^\circ$  and  $55^\circ$  with an angular resolution varying from  $\pm 1^\circ$  to  $\pm 3^\circ$  using a cylindrical geometry and a biased scintillation detector with a threshold of 12 Mev. Multiple scattering corrections were made using an approximate theoretical method. The experimental results were compared to calculated cross sections using a phase-shift analysis based on the complex square-well model of the nuclear interaction. NRL R4640.

Diffusion in a cylindrical reactor with all round reflector, by A. Hassitt. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Apr 1955. 12p. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 118842

1. Neutrons - Diffusion - Theory - Gt. Brit. 2. Reactors, Neutron - Flux distribution - Gt. Brit. 3. Reflectors - Gt. Brit. 4. Relaxation methods (Engineering) - Gt. Brit. 5. Atomic

power - Research - Gt. Brit. 6. Title: Diffusion in a cylindrical reactor. 7. AERE T/M 123.

Effect of contaminants on the operational behavior of BF<sub>3</sub> counters, by Nancy Dorny, Serge A. Korff, and Harold K. Work. New York University. College of Engineering. Research Division. 1954. 46p diags, graphs. Order from LC. Mi \$3.30 ph \$7.80. PB 118718

This experiment was intended to study the effect on the counting characteristics of: 1) reactive organic contaminants, 2) argon; 3) various cathode materials; and 4) to develop a purification and filling procedure which will produce satisfactory BF<sub>3</sub> gas fillings whose counting characteristics are reproducible. NYU RR 183.02. Contract N6 onr-279, T.O.12.

Flow of a compressible coolant through a channel, by J. Woodrow. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 23p graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 68 cents. PB 118831

Date of manuscript: Feb 10, 1948.

1. Reynolds number - Effect - Gt. Brit. 2. Gas flow - Theory - Gt. Brit. 3. Dynamics, Gas - Theory - Gt. Brit. 4. Flow, Compressible - Thermodynamics - Gt. Brit. 5. Flow, Turbulent - Viscosity - Gt. Brit. 6. Atomic power - Research - Gt. Brit. 7. Coolants - Flow - Theory - Gt. Brit. 8. AERE E/R 173.

Flux measurements with the BF<sub>3</sub> 'long counter', by W. D. Allen. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1955. 19p diags, graphs. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 59 cents. PB 118841

1. Atomic power - Research. 2. Neutron fluxes - Measurements - Gt. Brit. 3. Counters, Electronic - Sensitivity - Gt. Brit. 4. Counters, Van de Graaff - Sensitivity - Gt. Brit. 5. Neutrons - Energy measurements - Gt. Brit. 6. Boron fluoride - Counters - Gt. Brit. 7. AERE NP/R 1667.

Gas handling system suitable for use with a mass spectrometer, by G. H. Palmer. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Apr 1950. 7p diags. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 28 cents. PB 118835

1. Mass spectrometers - Auxiliaries - Gt. Brit. 2. Gases - Handling - Gt. Brit. 3. Atomic power - Research - Gt. Brit. 4. AERE G/M 50.

Graphs and tables for the hit frequencies from heavy nuclei of the primary cosmic radiation. III: Statistical variation of hit frequencies in a population of exposed specimens, by Hermann J. Schaefer. Feb 1955. 23p diags, graphs, table. Order from LC. Mi \$2.70 ph \$4.80. PB 118888

The report gives a brief derivation of the Poisson distribution interpreting it in terms of a population of biological specimens exposed to heavy nuclei bombardment of the primary cosmic radiation. It supplements the three preceding reports ('07 - '09) by presenting graphs and formulae from which the statistical variance of the hit frequencies for any special experimental system and altitude and duration of exposure can be read. The application to exposures of large numbers of microscopic targets is discussed in particular and the consequences for a reasonable experimental technique are pointed out. NMRI Proj NM001 101 100.10.

Isolation of americium 241, by J. Milsted. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 12p graphs. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 118828

Date of manuscript: Feb 1953.

1. Americium - Separation - Gt. Brit. 2. Atomic power - Research - Gt. Brit. 3. AERE C/R 1102.

Laminar free convection between heat producing vertical plates in a liquid, by D. V. Wordsworth. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 21p diags, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 59 cents. PB 118832

Date of manuscript: Oct 1953.

1. Thermal conductivity - Gt. Brit. 2. Heat - Transference - Theory - Gt. Brit. 3. Convection (Free) - Mathematical analysis Gt. Brit. 4. Convection (Free) - Heat transfer - Gt. Brit. 5. AERE E/R 1270.

List of reports and published papers by A.E.R.E. staff (papers published mainly between 1952 and 1954), by P. M. Harris and K. E. B. Jay. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 57p. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$1.43. PB 118836

1. Atomic power - Research - Bibliography - Gt. Brit. 2. AERE Inf/Bib 96.

List of translations issued by the library up to 30th April, 1955. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. May 1955. 6p. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 23 cents. PB 118837

1. Translations - Bibliography - Gt. Brit.
2. Atomic power - Research - Bibliography - Gt. Brit.
3. AERE Lib/M.2.

9<sup>th</sup> expansion cloud chamber, by H. S. Tomlinson, E. W. Titterton, and G. F. Snelling. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 14p photos, diags, graphs. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 59 cents. PB 118846

Date of manuscript: Oct 3, 1952.

1. Cloud chambers - Design - Gt. Brit.
2. Atomic power - Research - Gt. Brit.
3. AERE G/R 1010.

Non-linear equations of motion in the synchrotron, by M. Bell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1955. 14p. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 118843

1. Synchrotrons - Theory - Gt. Brit.
2. Beta-trons - Theory - Gt. Brit.
3. Equations, Integral - Non-linear - Gt. Brit.
4. Equations of motion - Gt. Brit.
5. Atomic power - Research - Gt. Brit.
6. AERE T/M 125.

Note on internal pair production associated with the emission of high energy gamma rays, by Norman M. Kroll and Walter Wada. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Nov 1954. 19p graphs. Order from LC. Mi \$2.40 ph \$3.30. PB 118856

The theory of inner pair production associated with the radiative capture of  $\pi$ -mesons and with the decay of the  $\pi^0$  meson is discussed. Appropriate distribution functions are derived and compared with recently obtained experimental results. The weak dependence of the theoretical predictions upon the details of meson theory is emphasized. The possible utility of the double conversion process, in which the  $\pi^0$  meson decays into two electron-positron pairs, for the determination of the  $\pi^0$  parity is also discussed. Nevis-6. R-88. CU-73. Contract N6-ori-110, T.O.I.

Nuclear shielding studies. Massachusetts Institute of Technology. Laboratory for Nuclear Science and Engineering. Contract N5 ori-07818. Order separate parts described below from LC, giving PB number of each part ordered.

II: Gamma ray ionization in spherical geometry, by Jules S. Levin, John W. Weil and Clark Goodman. Jun 1949. 48p photos, drawings, diags, graphs, tables. Mi \$3.00 ph \$6.30. PB 118692

For report no. 1 in this series see PB 116549.

Measurements were made of gamma-ray ionization intensity at distances of from 18 to 63 cm. from a point source located in a sphere immersed in water and filled with various absorbing materials. Two sources were used, a one-gram Ra-Be gamma-ray and neutron source and a two-curie Co<sup>60</sup> gamma-ray source. Measurements were made with air, water, iron shot, and lead shot in the sphere for the Ra-Be source and with water and lead shot in the sphere for the Co<sup>60</sup> source. Resultant distributions were plotted and absorption coefficients for the essentially linear portion of the curve beyond 43 cm. were calculated. MIT LNS TR22.

III: Shielding properties of various materials against neutrons and gamma rays, by John E. Dacey, Roger W. Paine, Jr., and Clark Goodman. Oct 1949. 213p photos, diags, graphs, tables. Mi \$9.60 ph \$33.30. PB 118693

Thermal and indium resonance (1.44 ev) neutron fluxes were determined with indium foils in aluminum and cadmium holders, and the gamma-ray ionization intensity was measured with pocket-type dosimeters, as functions of distance from a 1.03 gram Ra-Be source centrally located in a 4-foot cubical tank. The source was centered in 6-, 4-, and 2-inch radius spherical shells. Various combinations of materials were used in the experiments. MIT LNS TR23.

VI: Determination of neutron spectra by density measurements in paraffin blocks, by Leigh Secrest. Dec 1949. 24p diags, graphs, table. Mi \$2.40 ph \$4.80. PB 118694

The proposed method of neutron monitoring will perhaps be practical for low energy neutrons if the following conditions are met: 1) the slabs must have lateral dimensions of the order of magnitude of 10.0 cm., and 2) the foils will have to be calibrated empirically using controlled-energy neutron sources. MIT LNS TR36.

VII: Effect of ducts on the attenuation of neutrons and gamma rays in the MIT cyclotron shield, by J. W. Crawford, Jr., E. E. Kintner, and Clark Good. Sep 1950. 80p photos, drawing, diags, graphs, tables. Mi \$4.50 ph \$12.30. PB 118695

In the present work concrete blocks containing six-inch ducts were used. The effects of ducts on the neutron and gamma ray attenuations in the shield were investigated. The practical results of such a study assist in determining the optimum shape and position of openings and voids in shields. The particular experimental arrangement which has been used at the M.I.T. cyclotron provides data of direct value in the theoretical understanding of ducts. MIT LNS TR38.

IX: Interaction of fast neutrons with nuclei, by H. B. Willard, W. M. Preston, and Clark Goodman. Sep 1950. 104p diagrs, graphs, tables. Mi \$5.70 ph \$16.80. PB 118696

The theory for such interactions as elastic and inelastic scattering and charged particle production was developed on the basis of an ideal set-up. The actual experiments were performed using an electrostatic accelerator in conjunction with the  $\text{Li}^7(p,n)\text{Be}^7$  reaction to produce monoenergetic neutrons from 0.1 to 2.4 MEV. The total cross sections measured were  $\text{B}^{10}$ ,  $\text{B}^{11}$ , C, F<sup>19</sup>, Fe, and Pb. These measurements were made in good geometry, the closest approximation to the ideal set-up described above, and detected with a propane (hydrogen recoil) counter which could be biased against the lower energy neutron group. MIT LNS TR45.

XII: Quadrature method for computing neutron distributions in two dimensions, by E. L. Secrest. Jul 1951. 122p diagrs, graphs, tables. Mi \$6.30 ph \$19.80. PB 118697

It has been the purpose of this work to investigate the possibility of arriving at a method which can be used for problems in two dimensions. Although the transport equation has not been solved exactly in two dimensions, an iterative method has been developed, which, when combined with a quadrature approximation, allows derivation of approximate solutions of the transport equation. MIT LNS TR 52.

Periodic status report no. 5 for the period Oct 1, 1948 to Jan 1, 1949 under Contract no. N5 ori-07818. NR 022-075, by Clark Goodman. Massachusetts Institute of Technology. Laboratory for Nuclear Science and Engineering. Jan 1946. 10p. Order from LC. Mi \$1.80 ph \$1.80. PB 118699

Excerpts from a complete report of the work of the Laboratory. Progress is reported on various neutron and gamma ray shielding research projects. Among the projects reviewed are those concerning neutron slowing down and diffusion, spherical ionization chamber, monoenergetic neutron source, and scintillation counters. Spherical

ionization measurements were made to determine the effect of Po-Be neutrons on film. The status of various component parts for a 5 Mev Van Der Dragg generator is given. Also, a program to find a phosphor sensitive to gammas but relatively insensitive to neutrons is described.

Proceedings of the Conference on Interfacial Phenomena and Nucleation, Boston, 1951, edited by H. Reiss. Order separate parts described below from OTS, giving PB number of each part ordered.

Vol. I: Conference on nucleation edited by H. Reiss. Jul 1955. 225p photos, drawings, diagrs, graphs, tables. PB 111893

Contents: Experimental proof of the Volmer theory of the formation of nuclei on ions, by W. Rathje and I. N. Stranski. - Thin films of supersaturated solutions for detecting, counting, and identifying very small crystalline particles, by B. Vonnegut. - The statistical mechanical theory of irreversible condensation. I, by H. Reiss. (Reprinted from Journal of Chemical Physics, vol. 20, no. 8, 1216-1227, Aug 1952) - The spherical interface. I: Thermodynamics, by F. Buff. (Reprinted from Journal of Chemical Physics, vol. 19, no. 12, 1591-1594, Dec 1951) - Low temperature cloud chamber studies on water vapor, by G. M. Pound, L. A. Madonna, and C. M. Sciulli. - Time lag in the self-nucleation of a supersaturated vapor, by R. F. Probst. (Reprinted from Journal of Chemical Physics, vol. 19, no. 5, 619-626, May 1951) - The thermodynamic properties of supercooled liquids, by W. Kauzmann. - Time lag in spontaneous nucleation due to non-steady state effects, by F. C. Collins. - Nucleus formation and growth in azides, by J. G. N. Thomas and F. C. Tompkins. AF CRC TR55-211. AF GRD P37.

Vol. II: Conference on nucleation and surface tension. Jul 1955. 182p diagrs (1 fold), graphs, tables. \$4.75. PB 111894

Contents: Recent experimental work at NOL on condensation in compressible flows, by G. A. Lundquist. - On the thermodynamic relation between surface tension and curvature, by F. O. Koenig. (Reprinted from Journal of Chemical Physics, vol. 18, no. 4, 449-459, Apr 1950) - Statistical thermodynamics of the transition region between two phases. I: Thermodynamics and quasi-thermodynamics, by T. L. Hill. (Reprinted from Journal of Physical Chemistry, v. 56, p. 526, 1952) - II: One component system with a plane interface, by T. L. Hill. (Reprinted from Journal of Chemical Physics, vol. 20, no. 1, p. 141-144, Jan 1952) - Some calculations with the assumption that the surface tension is a function of the radius of a droplet, by H. Köhler. - The kinetics of phase transitions in binary systems, by



H. Reiss. (Reprinted from Journal of Chemical Physics, vol. 18, no. 6, p. 840-848. Jun 1950) - Surface structure of water and some of its physical and chemical manifestations, by W. A. Weyl. - Surface tension of super-cooled water, by P. T. Hacker. - The experimental determination of the surface tension of magnesium oxide, by G. Jura and C. W. Garland. - The abnormal behavior of the modifications of arsenious oxide, by I. N. Stranski and U. Winkler. AF CRC TR55-211A. AF GRD P37.

Vol. III: Conference on adsorption, Jul 1955. 116p graphs. \$3.00. PB 111895

Contents: Some remarks on physical adsorption, by G. D. Halsey, Jr. and M. P. Freeman. - The rates of evaporation from different faces of rhombic sulphur, by E. Rideal and P. M. Wiggins. (Reprinted from Proceedings of the Royal Society, A, vol. 210, 1951) - Note on the physical adsorption of gases in capillaries and on small particles (nucleation of condensation), by T. L. Hill. (Reprinted from Journal of Physical and Colloid Chemistry, vol. 54, no. 8, Nov 1950) - Thermodynamics of the dependence of sorption on temperature, by E. A. Guggenheim. - The anomalous first layer of adsorbed helium and a modified B. E. T. theory, by J. G. Aston and S. V. R. Mastrangelo. (Reprinted from Journal of Chemical Physics, vol. 19, no. 8, p. 1067-1068, Aug 1951) - Thermodynamic data and some notes on the nature of adsorbed helium, by S. V. R. Mastrangelo and J. G. Aston. (Reprinted from Journal of Chemical Physics, vol. 19, no. 11, p. 1370-1375, Nov 1951) - Heats of adsorption of nitrogen and argon on porous and on non-porous carbon adsorbents at  $-195^{\circ}$ , by R. A. Beebe, B. Millard and J. Cynarski. (Reprinted from Journal of the American Chemical Society, v. 75, p. 839, 1953) - The heat of adsorption of methanol on carbon adsorbents at  $0^{\circ}$ , by B. Millard, R. A. Beebe and J. Cynarski. (Reprinted from Journal of Physical Chemistry, v. 65, p. 468, 1954) - Sorption of  $H_2$  by evaporated iron films, by F. C. Tompkins and A. S. Porter. AF CRC TR55-211B. AF GRD P37.

Pulse analysis, a discussion of effects in the radiochemistry of the heavy elements, by K. M. Glover. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1955. 17p diagr, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 50 cents. PB 118829

1. Atomic power - Research - Gt. Brit. 2. Analyzers, Pulse - Performance - Gt. Brit. 3. Radiochemistry - Research - Gt. Brit. 4. Counters, Electronic - Gt. Brit. 5. Ionization chambers -

Gt. Brit. 6. Gases - Ionization - Measurement - Gt. Brit. 7. AERE C/R 1358.

Reduction of relativistic two-particle wave equations to approximate forms, by Zenobius Chraplyvy and Francis Glover. St. Louis University, St. Louis, Mo. Aug 1955. 55p tables. Order from LC. Mi \$3.60 ph \$9.30. PB 118704

Final report. Technical report no. 3 under Contract AF 18(600)-789. Contents: Introduction. - Chap. VII. Energy levels of hydrogen. - Chap. VIII. Method of large components. - IX. Comparison of the results of the Foldy-Wouthuysen and the large component method. - Appendix. This report considers more in detail the amplified Breit equation developed in the Technical Note issued Aug 16, 1954, and also presents a new formulation of the large component method of reduction. This new formulation enables us to compare in some detail the large component reduction method for one and two-particle problems with the method of successive canonical transformations due to Foldy and Wouthuysen in the one-particle and extended by us to the two-particle case. OSR TN55-230.

Research investigation of ionization chambers, by J. R. Parker. Radio Corporation of America. R.C.A. Victor Division, Camden, N. J. Contract DA36-039-sc-5561. Dept. of the Army project 3-12-01-023. Signal Corps project 26-211-3. Order separate parts described below from LC, giving PB number of each part ordered.

Second quarterly report for the period Aug 1, 1951 - Oct 31, 1951. Nov. 1951. 42p diags (part fold), graphs, tables. Mi \$3.30 ph \$7.80. PB 118807

Continuation of work accomplished under Contract DA 36-039-SC-17. A thorough investigation of ionization chambers with a view to obtaining chambers which may be used as the detecting element of integrating type instruments for the measurement of gamma and X-radiation and beta superimposed upon gamma radiation.

Third quarterly report for the period Nov 1, 1951-Jan 31, 1952. Feb 1952. 64p photos, diags (part fold), graphs, tables. Mi \$3.90 ph \$10.80. PB 118867

A thorough investigation of ionization chambers with a view to obtaining chambers which may be used as the detecting element of integrating type instruments for the measurement of gamma and X-radiation.

Scattering of neutrons by the walls of a laboratory, by M. B. Biram and J. H. Tait. Gt. Brit.

Ministry of Supply. Atomic Energy Research Establishment. 1950. 25p diags, graphs. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 68 cents. PB 118844

1. Neutrons - Scattering - Theory - Gt. Brit.
2. Neutron fluxes - Measurements - Gt. Brit.
3. Neutrons - Diffusion - Theory - Gt. Brit.
4. AERE T/R 563.

Self-absorption and window-absorption corrections in the  $2\pi$  b-proportional counter for certain fission products, by J. G. Cuninghame, M. L. Sizeland, and H. H. Willis. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1955. 30p diagr, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 86 cents. PB 118830

1. Atomic power - Research - Gt. Brit.
2. Fission products - Absorption - Gt. Brit.
3. Counters, Electronic - Components - Gt. Brit.
4. AERE C/R 1646.

Simple, air bearing, rotor for very high rotational speeds, by A. G. Montgomery and Frank Sterry. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1955. 11p photos, diagr. Order from British Information Services, 30 Rockefeller Plaza, New York 20, New York. 50 cents. PB 118833

1. Atomic power - Research - Gt. Brit.
2. Rotors - Design - Gt. Brit.
3. Lubricants, Air - Design - Gt. Brit.
4. AERE ED/R 1671.

Simple device for obtaining X-ray diffraction patterns from coarse-grained materials, by R. W. Cahn and T. W. Baker. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1951. 6p photos. Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 23 cents. PB 118838

1. X-rays - Diffraction - Measuring equipment - Gt. Brit.
2. Goniometers - Gt. Brit.
3. Atomic power - Research - Gt. Brit.
4. AERE M/M 35.

Spherical harmonics method in plane and spherically symmetric geometry in multi-velocity-group theory, and its application in the two-velocity-group  $P_3$  approximation, by M. E. Mandl. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Nov 1953. 17p. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 50 cents. PB 118845

1. Geometry, Plane - Gt. Brit.
2. Geometry, Symmetric - Gt. Brit.
3. Spherical harmonics -

Gt. Brit. 4. Neutrons - Velocity - Theory - Gt. Brit. 5. Boltzmann equation. 6. Atomic power - Research - Gt. Brit. 7. AERE T/R 1295.

Standard support for Geiger counter, by G. B. Cook and D. Lee. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 14p photo, diags (1 fold). Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 50 cents. PB 118827

Date of manuscript: Jan 1950.

1. Geiger counters - Supports - Gt. Brit.
2. Atomic power - Research - Gt. Brit.
3. AERE C/R 484.

Study in design of travelling field electromagnetic pumps for liquid metals, by D. A. Watt. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1955. 57p diags, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$1.32. PB 118834

1. Nuclear theory - Gt. Brit.
2. Pumps, Electromagnetic - Design - Gt. Brit.
3. Metals, Liquid - Handling - Gt. Brit.
4. Atomic power - Research - Gt. Brit.
5. AERE ED/R 1696.

Theory of the optically focused synchrotron, by D. C. dePackh. U. S. Naval Research Laboratory. Oct 1955. 33p diags, graphs, table. Order from LC. Mi \$3.00 ph \$6.30. PB 118287

Those features of the theory of synchrotron operation particularly appropriate to the accelerator being constructed at the Naval Research Laboratory are presented. A discussion of the alternating gradient accelerator is included together with the analysis of the NRL solenoid focused machine to permit an appreciation of the distinction between the two forms of optically focused machines. Particular attention is given to the specific effects of stray fields and focal errors, as well as of nonlinearity in the focal forces, as they occur in the optically focused accelerator. NRL R 4608.

## PHYSIOLOGY

Instructors manual for physiological training. Jul 1953. 110p drawings, diags, graphs, tables. Order from LC. Mi \$5.70 ph \$16.80. PB 118874

1. Flying - Physiological effects
2. Airplanes - Escape - Procedures
3. Oxygen equipment
4. Decompression chambers
5. Pressure

breathing 6. Heat - Physiological effects.  
7. Cold - Physiological effects 8. AF M 52-13.

Foundation, Columbus, O. Jun 1955. 9p graph,  
tables. Order from LC. Mi \$1.80 ph \$1.80.  
PB 118819

## PRINTING, PUBLISHING

Calibration of a reduction printer with compensating plate, by Joseph B. Theis. U. S. Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. Nov 1954. 27p diags, graphs, tables. Order from LC. Mi \$2.70 ph \$4.80. PB 118809

Dept. of the Army Project 503-06-011. Ordnance and Development Project TB 3-0538. A test was performed to determine the absolute and residual distortion of a Wild reduction printer. A reduction factor ( $t$ ) and the mean error of  $t(m_t)$  were computed. Detailed information is given on the methods used in measuring the original and reduced grids. APG BRL M861.

## PSYCHOLOGY

Comparison of hyponasality, hypernasality, and normal voice quality on the intelligibility of two-digit numbers, by Henry M. Moser, John J. Dreher, and Sol Adler. Ohio State University Research Foundation, Columbus, O. Jul 1955. 7p table. Order from LC. Mi \$1.80 ph \$1.80. PB 118820

1. Speech - Intelligibility - Tests 2. Voice - Physiology 3. AF CRC TN 55-60 4. Contract AF 18(600)-316 5. OSURF Proj 519, Technical report no. 25.

Effect of different methods of motivating men to apply for OCS, by Irving F. Richardson and Milton G. Holman. George Washington University. Human Resources Research Office, Washington, D. C. Jul 1954. 12p graph. Order from LC. Mi \$2.40 ph \$3.30. PB 118879

The effects of different methods of motivating men to apply for Officer Candidate School were investigated in a study made during 1953. Three experimental motivating conditions were set up in three basic training regiments: (1) an intensive information program, including an OCS manual and an orientation lecture by a recent OCS graduate, (2) a buddy nomination procedure, and (3) a combination of conditions (1) and (2). GWU HRRO TR9.

Effects of controlled affective tone on intelligibility, by Henry M. Moser, John J. Dreher, and Sol Adler. Ohio State University Research

1. Speech - Intelligibility - Effects of sidetone  
2. Speech - Intelligibility - Effects of emotion  
3. OSURF Proj 519, Technical report no. 24  
4. AF CRC TN 55-59. 5. Contract AF 18(600)-316.

Exploratory study of the applicability of critical incident techniques to the assessment of curricula for officer candidate training, by Albert S. Glickman and T. R. Vallance. American Institute for Research, Inc., Pittsburgh, Pa. Dec 1954. 60p tables. Order from LC. Mi \$3.60 ph \$9.30. PB 118885

The objective of this research was to identify those aspects of the OCS curriculum which are most and least relevant to duties of newly commissioned ensigns aboard destroyers; thus to provide responsible authorities with information useful in preparing recommendations aimed toward the improvement of training. NAVPERS TB 54-23. Contract Nonr 890 (01).

Training achievement in basic combat squads with controlled aptitude, by Donald C. Findlay, Seymour M. Matyas, and Hermann Rogge, III. George Washington University. Human Resources Research Office, Washington, D. C. Jan 1955. 25p drawings, graphs, tables. Order from LC. Mi \$2.70 ph \$4.80. PB 118877

This study was designed to test (1) a method of raising the performance of basic trainees of below average intelligence, and (2) a method of raising the motivation-to-learn of trainees of all aptitudes. GWU HRRO TR16.

## RUBBER AND RUBBER PRODUCTS

Investigation of techniques and apparatus for dynamic testing of rubber. Final report under Contract DA-11-022 ord-1628 for the period July 8, 1954 to May 31, 1955, by J. S. Islinger, V. F. Petrie, and W. T. Savage. Armour Research Foundation, Chicago, Ill. Jul 1955. 49p photos diags, graphs, tables. Order from LC. Mi \$3.30 ph \$7.80. PB 118816

Ordnance Project TB 4-521 E and RIA-XO-755 209. Exploratory cutting-type dynamic tests were conducted on several rubber compounds with a special pendulum-type cutting apparatus. The tests were conducted in an attempt to establish various significant parameters involved in the dynamic failure of rubber and to provide information which can serve as the basis for development of a satisfactory dynamic test. Results of these

exploratory tests indicate that the special pendulum-type cutting apparatus is capable of distinguishing, on the basis of cutting energy, between various rubber compounds. Further investigations are necessary before a system of grading rubber compounds for resistance to cutting may be established. ARF Proj M059, Final report.

Investigation of the use of a rubber analog in the study of stress distribution in riveted and cemented joints, by Louis R. Demarkies. U. S. National Advisory Committee for Aeronautics. Nov 1955. 97p diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118966

Results are presented of an investigation made to study the stress distribution within cemented and riveted joints by use of an analogous joint constructed of a highly flexible material. Displacement measurements obtained from foam-rubber analogs, and rational though not rigorously sound formulas for shear stress distribution in joints, are given. NACA TN 3413.

Research on the preparation and properties of high-temperature resistant copolymers, by Gerald A. Edwards. Tuskegee Institute. George Washington Carver Foundation. May 1954. 23p tables. Order from OTS. 75 cents. PB 111765

The reaction between para-dichlorobenzene and alkali metals in the presence of various unsaturated compounds has been investigated for the purpose of determining whether heat resistant copolymers could thus be prepared. Among the unsaturated compounds used in these reactions are vinyl acetate, ethylene, isobutylene, methyl acrylate, acrylonitrile, and butadiene-1,3. From each of these reactions polymeric material melting above 250°C was obtained. From a consideration of the method of preparation and properties of these materials, it is concluded that they are copolymers whose molecules contain rigid segments of phenylene units interspersed with segments consisting of flexible carbon-carbon chains. Thus in these copolymers the properties of polystyrene, an infusible material, are modified by those of the vinyl polymers. AF WADC TR 54-433. Contract AF 33 (616)-366.

## STRUCTURAL ENGINEERING

Failure of materials under combined repeated stresses with superimposed static stresses, by George Sines. U. S. National Advisory Committee for Aeronautics. Nov 1955. 69p photos, drawings, diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118890

Experiments on biaxial alternating stresses and simple combinations of static stress with alternating stress are reviewed. A general criterion for the effect of static stress on the permissible amplitude of alternating stress is proposed and compared with results of tests performed under more complex stress states. Tests were performed to determine the effect of static compression on alternating torsion and the results are compared with the general criterion. A modification of Orowan's theory of fatigue to include the effect of static stress is presented. NACA TN 3495.

Funktionssättet hos elastiska balkar, averkade av detonationsbelastningar med hänsyn tagen till rotationströghet och skjuvkrafter (Behavior of elastic beams under action of detonating charges with special reference to rotatory inertia and shearing forces), by Bo Adamson. Jun 1955. 128p photos, diags, graphs, tables (Text in Swedish). Order from LC. Mi \$6.30 ph \$19.80. PB 118689

Report no. 109:10. Summary in English. The present investigation deals with the dynamic behavior of elastic beams which are simply supported at both ends and submitted to loads caused by explosions. The object of this investigation is twofold, first, to compare various theories of vibration of elastic beams, and second, to check some of these theories by means of experiments.

Propagation of elastic impact stresses. Progress report no. 3 under Contract no. Nonr-704(00), Project no. 709-E-327, by M. Dengler, M. Goland, and P. Wickersham. Midwest Research Institute. Engineering Division, Kansas City, Mo. Oct 1952. 39p diagr, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118899

A theoretical and experimental comparison is made of the strain propagation in steel beams impacted by a sharp, transverse blow. The theoretical analysis is based on an earlier paper by Dengler and Goland, in which a solution based on the Timoshenko bending mechanism is deduced. The experimental work was performed on a square beam, impacted by a steel sphere. Measurements are reported both for the strain propagation in the beam, and also for the history of forces acting between the ball and beam.

Thermo-elastic stress effects due to aerodynamic heating in supersonic wings. Colorado. Engineering Experiment Station, Boulder, Colo. Contract W 33-038-ac-17240. Order separate parts described below from LC, giving PB number of each part ordered.

Part 1, by Franklin P. Durham. Jul 1950. 72f diags, graphs. Mi \$4.50 enl pr \$13.80. PB 118983

## TRANSPORTATION EQUIPMENT

### Aeronautics

#### Aircraft

Methods are presented for the determination of temperature distributions, thermal stresses and deflections in solid diamond-shaped wings in supersonic flight, along with experimental verification of the methods. Effects of important flight and configuration conditions on thermal stresses and deflections are presented. AF TR6351, Part 1.

Part 2: Determination of temperatures, stresses and deflections for various heat flow cases, by B. T. Arnberg, M. A. Brull, F. P. Durham, D. L. Loving, R. C. Maydew, H. W. Sibert, F. A. Stephenson. Aug 1953. 328p diags, graphs (part fold), tables. Mi \$11.10 ph \$49.85. PB 118984

Results of studies are presented showing methods of calculating the temperature distribution throughout a supersonic aircraft wing for various heat flow cases. A method for determination of deflections due to thermal gradients is developed. Further data are presented showing the effect of significant parameters on the thermal stresses present. AF TR 6351 Part 2.

Part 3: Experimental investigation of the distribution of temperature and thermal stresses and deflections, by D. L. Loving and F. A. Stephenson. Aug 1953. 213p photos, drawings, diags, graphs (part fold), tables. Mi \$9.60 ph \$33.30. PB 118985

Results are presented of the experimental determination of temperature distributions, thermal stresses and deflections in plates subjected to external heat sources. Development of techniques and procedures and determination of possible errors in results are also discussed. AF TR 6351, Part 3,

## TEXTILES AND TEXTILE PRODUCTS

Shelf life of neoprene coated nylon fabrics, by R. Briganti. U. S. Naval Supply Activities. Clothing Supply Office, Brooklyn, N. Y. Apr 1955. 20p tables. Order from OTS. 75 cents. PB 111728

Project no. NT 001-008 (Cold and wet weather clothing), Report no. 2. BUSANDA reports control symbol 3950-2. A total of 19 coated fabrics which had been in storage for periods varying from 1 to over 4 years were selected for evaluation. These samples included 4 types of neoprene and one of Buna-N applied to several constructions of nylon. The coated fabrics, before and after storage, were evaluated for pertinent physical properties; the resultant values were then compared to determine the nature and extent of deterioration.

Erection and maintenance instructions for model N3N-3 airplane. U. S. Naval Aircraft Factory, Philadelphia, Pa. Feb 1940. 100p photos, drawings, diags, tables. Order from LC. Mi \$5.40 ph \$15.30. PB 118691

Includes revised pages through Mar 1941. 1. N3N-3 (Airplane) 2. Airplanes - Maintenance and repair 3. Airplanes - Erection 4. Airplanes - Lubrication systems 5. NAF M-4094.

Pilot's handbook: Model N3N-3 airplane. U. S. Naval Aircraft Factory, Philadelphia, Pa. Feb. 1940. 35p photos, graphs. Order from LC. Mi \$3.00 ph \$6.30. PB 118690

1. N3N-3 (Airplane) 2. Airplanes - Operation 3. NAF M 4093

Study of the problem of designing airplanes with satisfactory inherent damping of the Dutch roll oscillation, by John P. Campbell and Marion O. McKinney, Jr. U. S. National Advisory Committee for Aeronautics. 1954. 20p diags, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 118982

Supersedes NACA TN 3035 (PB 112298) 1. NACA TN 3035 2. NACA 1199.

#### Instruments

Counter-type distance indicator for aircraft, by C. C. Trout, R. C. Borden and E. C. Williams. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1951. 7p photos, diags. Order from LC. Mi \$1.80 ph \$1.80. PB 118917

1. Indicators, Distance - Design 2. Indicators, Distance - Tests 3. CAA TDR 140.

Flight calibration of four airspeed systems on a swept-wing airplane at Mach numbers up to 1.04 by the NACA radar-phototheodolite method, by Jim Rogers Thompson, Richard S. Bray, and George E. Cooper. U. S. National Advisory Committee for Aeronautics. Nov 1955. 41p photos, drawings, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118969

1. Mach number - Effect 2. Instruments, Aeronautical - Calibration 3. Airplanes - Speed - Measurements 4. Calibration, Airspeed 5. NACA TN 3526.

Helicopter instrument flight and precision maneuvers as affected by changes in damping in roll, pitch, and yaw, by James B. Whitten, John P. Reeder, and Almer D. Crim. U. S. National Advisory Committee for Aeronautics. Nov 1955. 14p photos, diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118891

1. Helicopters - Stability 2. Helicopters - Controls, Automatic 3. Helicopters - Instrument panels 4. NACA TN 3537.

Some recent developments in radio-controlled flight and landing, by Chester B. Watts, Jr. and Logan E. Setzer. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1950. 24p photos, diagrs, graphs. Order from LC. Mi \$2.70 ph \$4.80. PB 118915

1. Flying, Instrument 2. Landing, Instrument 3. Radio, Long range - Navigation 4. Pilots, Automatic - Tests 5. CAA TDR 118.

Vortex interference on slender airplanes, by Alvin H. Sacks. U. S. National Advisory Committee for Aeronautics. Nov 1955. 19p diagrs, graph. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118968

1. Vortex motion - Theory 2. Interference, Aerodynamic - Theory 3. Tail surfaces - Interference 4. NACA TN 3525.

### Engines and Propellers

Aerodynamic characteristics of a small-scale shrouded propeller at angles of attack from 0° to 90°, by Lysle P. Parlett. U. S. National Advisory Committee for Aeronautics. Nov 1955. 12p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118970

1. Propellers - Angle of attack 2. Propellers - Drag 3. Propellers - Lift-Tests 4. Propellers - Pitch - Measurement 5. NACA TN 3547.

Bestimmung der widerstandsbeiwerte handelsüblicher runddrahtsiebe (Resistance coefficient of commercial round wire grids), by B. Eckert and F. Pfluger. Jan 1942. 16p diagrs, graphs, table. Order from LC. Mi \$2.40 ph \$3.30. PB 118901

Translated by J. Vanier from Luftfahrtforschung, vol. 18, no. 4, Apr 22, 1941, p. 142-146. Resistance coefficients of commercial types of round wire grids were examined for the purpose of obtaining the necessary data on supercharger test stands for throttling the inducted air to a pressure corresponding to a desired air density. The measurements of the coefficients ranged up to Reynolds numbers of 1000. NACA TM 1003.

Charts of boundary-layer mass flow and momentum for inlet performance analysis Mach number range, 0.2 to 5.0, by Paul C. Simon and Kenneth L. Kowalski. U. S. National Advisory Committee for Aeronautics. Nov 1955. 32p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118977

1. Boundary layer, Turbulent - Theory 2. Ducts, Air - Design 3. Flow, Turbulent - Theory 4. Mach number - Effect 5. NACA TN 3583.

Determination of inflow distributions from experimental aerodynamic loading and blade-motion data on a model helicopter rotor in hovering and forward flight, by Gaetano Falabella, Jr., and John R. Meyer, Jr. U. S. National Advisory Committee for Aeronautics. Nov 1955. 184p photos, diagrs, graphs table. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118980

Appendix A: Expansion of trigonometric functions encountered in helicopter analyses. - Appendix B: Analysis of an offset flapping blade, including reverse-flow effects. - Appendix C: Experimental investigation of forces and moments on a typical offset model rotor and a comparison with theory. - Appendix D: Experimental records of other rotor conditions.

1. Helicopters - Rotors - Theory 2. Helicopters - Rotors - Wind tunnel tests 3. Helicopter blades - Pressure distribution 4. Helicopters - Rotors - Models - Tests 5. NACA TN 3492.

Determination of means to safeguard aircraft from power plant fires in flight. Part IV: The Boeing B-29, by Lyle E. Tarbell and H. R. Keeler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1950. 39p photos, drawings (1 fold), graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118914

For parts 1-2 see PB 99660-99661.

1. Fire prevention - Airplanes 2. B-29 (Airplane) 3. Power plants - Fire prevention 4. CAA TDR 107.

Theoretical and experimental analysis of low-drag supersonic inlets having a circular cross sec-

tion and a central body at Mach numbers of 3.30, 2.75, and 2.45, by Antonio Ferri and Louis M. Nucci. U. S. National Advisory Committee for Aeronautics. 1954. 39p photos, diags, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 35 cents. PB 118894

1. Mach number - Effect
2. Flow, Supersonic - Theory
3. Ducts, Air - Design
4. Ducts, Air - Inlet pressure
5. Ducts, Air - Supersonic
6. NACA 1189.

Three-dimensional effects in supersonic compressors. Part 3: The design of two stator passages and comparison between theory and experiment, by Aldo LaRocca. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Dec 1954. 81p photos, diags, tables. Order from LC. Mi \$4.80 ph \$13.80. PB 118883

For Part 2 see PB 114382. The analytical method described in the previous report of this series and a second method permitting a slight modification of the hub contour to be analyzed easily have been applied to the design of two stator passages which change the flow angle by  $36^\circ$  and which have an inlet Mach number of 2.0. The first passage did not have an overall pressure rise while the second involved both turning and pressure rise. Tests of the passages were carried out in a blow-down wind tunnel. PIB AL 271. Contract Nonr 741(00) NR 094-215.

## Training and Training Devices

Index to Air Force Personnel and Training Research Center. 1954 technical documentary reports, by Marjorie M. Adams. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center, Lackland Air Force Base, San Antonio, Tex. Dec 1954. 53p. Order from LC. Mi \$3.60 ph \$9.30. PB 118822

The reports which are indexed in this publication comprise all of the unclassified research reports prepared for general release by AFPTRC in 1954. The Air Force Personnel and Training Research Center came into existence on 1 February 1954, and the first report published by this Center is dated March 1954. AF PTRC TR 54-132.

Two simulators for training pilots and controllers in air traffic control procedures, by Beatrice J. Matheny. U. S. Office of Naval Research. Special Devices Center, Port Washington, N. Y. Jun 1955. 25p diags. Order from LC. Mi \$2.70 ph \$4.80. PB 118850

Disruption of air traffic in large metropolitan areas is often caused by itinerant civil and military pilots who are not familiar with the complex-

ity of radio ranges, reporting procedures, holding patterns, approach courses, departing routes, etc. usually found in large terminal areas. This report describes two possible training solutions to this problem. SDC TR 71-16-15. Contract N60R1-71(16).

VOR-DME simulator for Link trainers, by Edward M. Blount, Hugh A. Kay and Raymond E. McCormick. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1953. 15p photos, diags, graph. Order from LC. Mi \$2.40 ph \$3.30. PB 118921

1. Simulators, Flight - Design
2. Distance measuring equipment
3. Link trainers - Instruments
4. CAA TDR 193.

## Airports and Airways

Lighting pattern distortion caused by rain on an airplane windshield, by Arthur T. Tiedemann. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1953. 10p photos. Order from LC. Mi \$1.80 ph \$1.80. PB 118920

1. Runways - Markers - Distortion
2. Windshields - Effects on vision
3. Rain and rainfall - Effects on vision
4. Visual perception - Effect of rain
5. CAA TDR 189.

## Aerodynamics

Approximate solution for axially symmetric flow over a cone with an attached shock wave, by Richard A. Hord. U. S. National Advisory Committee for Aeronautics. Oct 1955. 32p diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118737

1. Mach number - Effect
2. Flow, Supersonic - Theory
3. Bodies of revolution - Aerodynamics
4. Flow, Axially symmetric - Theory
5. NACA TN 3485.

Calculated spanwise lift distributions and aerodynamic influence coefficients for swept wings in subsonic flow, by Franklin W. Diederich and Martin Zlotnick. U. S. National Advisory Committee for Aeronautics. Oct 1955. 173p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118736

Supplements and may be used in conjunction with NACA TN 3014 (PB 112071).

1. Wings, Swept - Span load distribution
2. Wings, Swept - Aspect ratio
3. Wings, Swept - Taper and twist
4. Wing flaps - Control
5. Wing flaps - De-

flection 6. Loads, Aerodynamic 7. NACA TN 3476.

Down wash behind wings at supersonic speeds, a simplified method for calculation and experimental results for wings with small aspect ratio, by Willi Jacobs. Flygtekniska Försöksanstalten (FFA), Sweden. 1955. 52p diags, graphs, table. Order from LC. Mi \$3.60 pb \$9.30. PB 118758

1. Wings - Aspect ratio - Sweden
2. Wings - Downwash - Sweden
3. Wings - Drag - Sweden
4. Wings - Pressure distribution - Sweden
5. Flying, Supersonic--Sweden
6. FFA 61.

Effect of Reynolds number on the stalling characteristics and pressure distributions of four moderately thin airfoil sections, by George B. McCullough. U. S. National Advisory Committee for Aeronautics. Nov 1955. 24p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118967

1. Reynolds number - Effect
2. Airfoils - Pressure distribution
3. Stalling - Research
4. NACA TN 3524.

Effect of variable viscosity and thermal conductivity on high-speed slip flow between concentric cylinders, by T. C. Lin and R. E. Street. U. S. National Advisory Committee for Aeronautics. 1954. 41p diags, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 35 cents. PB 118815

Supersedes NACA TN 2895 (PB 108902).

1. Flow, Slip - Theory
2. Flow, Viscous - Coefficients
3. Dynamics, Gas - Theory
4. Heat - Transference - Aerodynamics
5. NACA 1175
6. NACA TN 2895 Revised.

Experimental investigation of blade flutter in an annular cascade, by J. R. Rowe and A. Mendelson. U. S. National Advisory Committee for Aeronautics. Nov 1955. 24p photos, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118976

1. Airfoils-Cascade tests
2. Airfoils - Flutter
3. Cascades (Aerodynamics) - Tests
4. NACA TN 3581.

Flight investigation at Mach numbers from 0.6 to 1.7 to determine drag and base pressures on a blunt-trailing-edge airfoil and drag of diamond and circular-arc airfoils at zero lift, by John D. Morrow and Ellis Katz. U. S. National Advisory Committee for Aeronautics. Nov 1955.

19p photos, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118971

1. Mach number - Effect
2. Airfoils - Drag - Tests
3. Airfoils - Drag - Theory
4. Airfoils, Trailing-edge - Aerodynamics
5. NACA TN 3548.

Lift hysteresis at stall as an unsteady boundary-layer phenomenon, by Franklin K. Moore. U. S. National Advisory Committee for Aeronautics. Nov 1955. 32p diags, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118974

1. Boundary layer, Laminar - Flow
2. Compressors - Blades - Aerodynamics
3. Airfoils - Lift coefficient
4. Stalling - Research
5. NACA TN 3571.

Low-speed static lateral and rolling stability characteristics of a series of configurations composed of intersecting triangular plan-form surfaces, by David F. Thomas, Jr. U. S. National Advisory Committee for Aeronautics. Oct 1955. 29p photos, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118752

1. Wind tunnel tests
2. Stability, Lateral - Static tests
3. Stability, Directional - Static tests
4. Stability, Directional - Dynamic tests
5. Stability, Lateral - Dynamic tests
6. Damping capacity - Wind tunnel tests
7. Damping derivatives - Stability
8. NACA TN 3532.

Measurements of the effect of trailing-edge thickness on the zero-lift drag of thin low-aspect-ratio wings, by John D. Morrow. U. S. National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118893

1. Wings - Drag - Effect of trailing edge
2. Ailerons - Trailing edges - Effect on drag
3. NACA TN 3550.

Method for studying helicopter longitudinal maneuver stability, by Kenneth B. Amer. U. S. National Advisory Committee for Aeronautics. 1954. 19p photos, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 118981

1. NACA TN 3022 Revised
2. NACA 1200.

Proper combination of lift loading for least drag on a supersonic wing, by Frederick C. Grant.



## Rockets and Jet Propulsion

U. S. National Advisory Committee for Aeronautics. Oct 1955. 21p diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118751

1. Lagrange equation
2. Wings - Loading - Calculation
3. Wings, Triangular - Lift
4. Wings, Triangular - Drag
5. Mach number - Effect
6. Flow, Supersonic - Theory
7. NACA TN 3533.

Some effects of system nonlinearities in the problem of aircraft flutter, by Donald S. Woolston, Harry L. Runyan, and Thomas A. Byrdson. U. S. National Advisory Committee for Aeronautics. Oct 1955. 20p drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118741

Appendix A: Analog representation of nonlinear flutter equations.

1. Flutter - Calculation
2. Flutter - Theory
3. Aerolasticity - Calculations
4. Circuits, Nonlinear - Mathematical analysis
5. NACA TN 3539.

Some flow characteristics behind a wing in supersonic flight, by Max G. Scherberg and Joe R. Foote. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright Patterson Air Force Base, Dayton, O. Jul 1953. 41p graphs, tables. Order from LC. Mi \$3.30 ph \$7.80. PB 118908

The Schlichting linearized theory of the lifting line in supersonic flow is used to calculate the velocity components at various stations in the flow behind the lifting line. Certain properties of the solution are examined in some mathematical detail, including validity of using sums of trapezoidal approximations to an arbitrary lift distribution. A method of numerical integration is outlined which applies to tabulated data for general lift distributions. AF WADC TR 53-257.

Summary of results obtained by transonic-bump method on effects of plan form and thickness on lift and drag characteristics of wings at transonic speeds, by Edward C. Polhamus. U. S. National Advisory Committee for Aeronautics. Nov 1955. 33p diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington, D. C. PB 118972

1. Wings, Lift - Effect of thickness
2. Wings - Lift - Effect of aspect ratio
3. Wings - Lift - Effect of sweep
4. Wings - Drag - Effect of sweep
5. Wings - Drag - Effect of aspect ratio
6. Wings - Drag - Effect of thickness
7. Flow, Transonic - Wind tunnel tests
8. NACA TN 3469.

Acoustic analysis of ram-jet buzz, by Harold Mirels. U. S. National Advisory Committee for Aeronautics. Nov 1955. 33p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 118975

1. Ducts, Air - Effects
2. Jet engines, Ram-jet - Vibration - Mathematical analysis
3. NACA TN 3574.

Velocity tests of NRL valve pulsejet and whirling loss evaluation, by C. D. Porter and M. A. Persechino. U. S. Naval Research Laboratory. Nov 1955. 19p photos, drawings, diagrs, graphs. Order from LC. Mi \$2.40 ph \$3.30. PB 118286

Thrust and drag measurements were made of NRL pulsejets mounted on the ends of 12, 4-ft and 20, 6-ft whirling arms. The thrust observed, at both radii, was less than that previously measured on static test stands, also less than that at comparable wind-tunnel speeds. Further thrust and drag measurements were made in a Langley Field free jet. The chief cause for decrease of thrust in whirling tests is believed to be distortion of the fuel spray by the high centrifugal force (almost 500 g). Drag increases came, in part, from the yawing motion of the fore and aft portions of the straight engine body. NRL R4621.

## Marine Transportation

Bibliography on tidal hydraulics. Supplementary material compiled through May 1955. U. S. Army. Corps of Engineers. Committee on Tidal Hydraulics. Jun 1955. 71p. Available from the Recorder, Committee on Tidal Hydraulics, Waterways Experiment Station, P.O. Box 631, Vicksburg, Miss. PB 113697s

Report no. 2, Supplement no. 1.

1. Trade waste - Disposal - Effect of tides - Bibliography
2. Sea water - Pollution - Bibliography
3. Sediment - Deposition - Bibliography
4. Tides - Theory - Bibliography.

Catalogue of electric potentials observed on the sea surface (N. Atlantic and N. Pacific Oceans, 1948-1953). Foreword, by Lansing P. Wagner and Nellie E. Andersen. Woods Hole Oceanographic Institution, Woods Hole, Mass. Dec 1954. 9p tables. Order from LC. Mi \$1.80 ph \$1.80. PB 118706

Unpublished manuscript. The observations tabulated in this catalogue were obtained during the years 1948 through 1953 from research vessels of the Woods Hole Oceanographic Institu-

tion, International Ice Patrol Oceanographic Unit, Scripps Institution of Oceanography, Canadian Defense Research Establishment, U. S. Fish and Wildlife Service, University of Miami Marine Laboratories, and the Oceanographic Division of the U. S. Navy Hydrographic Office. WHOI Ref 54-91. Contract N6 onr-27701 (NR-083-004).

Gravity values obtained with the Gulf quartz pendulums over the North American gravity range, by John C. Rose and George P. Woolard. Woods Hole Oceanographic Institution, Woods Hole, Mass. Aug 1955. 91p maps, diagrs, graphs, tables. Order from LC. Mi \$5.40 ph \$15.30. PB 118499

Continuation of Reference no. 53-36 (PB 112377) and revision of measurements reported in Reference 53-36 (PB 116842). Results for multiple observations made with two different sets of quartz pendulums are given for a series of locations between Fairbanks, Alaska, and Paso Cortes, Mexico. WHOI Ref 55-44. Contract AF 19(604)-585. Contract AF 19(122)-234.

Laboratory studies of wave transformation, by Oswald J. Sibul. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Dec 1954. 26p photos, diagrs, graphs. Order from LC. Mi \$2.70 ph \$4.80. PB 118882

Four synchronized 35 mm. movie cameras were used to obtain a continuous record of non-uniform waves as they traveled over a bottom with a 1:40 slope. The data were used to measure the travel time for wave crests between two points along the bottom. UC IER Series 29, Issue 57. Contract Nonr-222(15).

Laboratory study of wind tides in shallow water, by Oswald Sibul. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Sep 1954. 47p photos, drawing, diagrs, graphs, table. Order from LC. Mi \$3.30 ph \$7.80. PB 118880

Wind tides and wave conditions in shallow water were studied in a laboratory channel. The experiments were conducted with smooth and rough bottom conditions, and with strips of cheesecloth in the channel to stimulate the roughness effects of vegetation in nature. The results indicate a rapidly increasing set-up when the still-water depth decreases below a certain limit. UC IER Series 71, Issue 4. Contract DA 49-005-eng-31.

Laboratory study of wind waves in shallow water by Oswald Sibul. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Oct 1954. 33p photos, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118707

See also PB 118880. The data indicate that Sverdrup-Munk-Bretschneider curves may be used to predict the wave height and periods for relatively deep water. In shallow water the wave heights may be considerably lower than predicted by the curves, depending upon the relative depth of water. UC IER Series 71, Issue 3. Contract DA-49-005-eng-31.

On the integration over depth of the equations for the wind-driven ocean circulation, by G. W. Morgan. Woods Hole Oceanographic Institution, Woods Hole, Mass. Dec 1954. 16p. Order from LC. Mi \$2.40 ph \$3.30. PB 118858

Unpublished manuscript. The validity of the theories of wind-driven ocean circulation developed to date is at present being questioned on various grounds, and attention is being directed toward the possible importance of some of the terms which have previously been neglected. The purpose of this report is to present a careful derivation of the equations governing the transport components in the hope that it will aid other investigators in their considerations concerning the significance of each of the terms that arise in these equations. WHOI Ref 54-89. Contract N6 onr-27701(NR 083-004).

Proceedings of the underwater physiology symposium, Jan 10-11, 1955, Washington, D. C., by Loyal G. Goff, editor. National Research Council. Committee on Undersea Warfare. Panel on Underwater Swimmers, Washington, D. C. 1955. 167p photos, diagrs, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$1.50. PB 118811

Publication 377 Contents: 1.1. General welcome, by C. J. Lambertsen. - 1.2. Outline of major problems of underwater swimming and self-contained diving, by O. D. Yarbrough. - 2.0. Seminar on oxygen toxicity: - 2.1. Introduction to seminar on oxygen toxicity, by C. J. Lambertsen. - 2.2 Effect of high oxygen tensions upon enzymes, by N. Haugaard. - 2.3. Hormonal aspects of oxygen toxicity, by J. W. Bean. - 2.4 Neurophysiological effects of oxygen at high partial pressure, by S. N. Stein. - 2.5. Respiratory and circulatory actions of high oxygen pressure, by C. J. Lambertsen. - 2.6. Panel-floor discussion of oxygen toxicity. - 3.0. Seminar on decompression and bends: 3.1. Outline of problems of decompression and bends, by A. R. Behnke. - 3.2. Bubble formation, by E. N. Harvey. - 3.3. Oxygen decompression, by A. R. Behnke. - 3.4. Use of nitrogen-oxygen mixtures in diving, by E. H. Lanphier. - 3.5. Some theoretical aspects of the use of multiple-gas mixtures for deep-sea diving, by A. P. Webster. - 3.6. Panel-floor discussion of decompression and bends. - 4.0. Respiratory problems in diving: - 4.1. Introduction to respiratory problems in diving, by H. Rahn. - 4.2. Breath holding, by A. B. DuBois. - 4.3. Respir-

atory dead space, by J. R. Pappenheimer. - 4.4 Resistance to breathing at increased ambient pressures, by J. Mead. - 4.5. Inert gas narcosis, by F. G. Carpenter. - 4.6. Role of carbon dioxide in the physiology of human diving, by K. E. Schaefer. - 5.0. Symposium attendees. - 6.0. Bibliography. NRC 377.

Short term fluctuations in the structure and transport of the Gulf Stream system, by William S. von Arx, Dean F. Bumpus, and William S. Richardson. Woods Hole Oceanographic Institution, Woods Hole, Mass. Nov 1954. 58p maps, diags, graphs, tables. Order from LC. Mi \$3.60 ph \$9.30. PB 118635

Unpublished manuscript. Studies of the fluctuations of surface velocity and volume transport of the Gulf Stream System by means of aircraft, serial sections from shipboard, and a laboratory model of the wind-driven ocean circulation indicate that marked changes occur during the course of one week, one half week and less than one day. These results are discussed together with other new evidence obtained through measurements of the motional electromotive force developed by the volumes of water transported through the Straits of Florida with fixed and drifting apparatus. WHOI Ref 54-76. Contracts N6 onr-27701 (NR-083-004) and Nonr-769(00).

Studies of the electric potential between Key West, Florida, and Havana, Cuba, no. II, by Gunther K. Wertheim. Woods Hole Oceanographic Institution, Woods Hole, Mass. Sep 1954. 24p graphs. Order from LC. Mi \$2.70 ph \$4.80. PB 118432

For Part I see WHOI Ref 53-95 (PB 113320) Unpublished manuscript. Continued study of the electric potential between Key West, Florida and Havana, Cuba has brought the suggestion of a new mechanism to account for the large rapid changes in the level of the transport observed in 1953. The detailed structure of the total transport remains in good agreement with the observed surface slope. A more complete treatment of the origin of the geomagnetic noise is given. WHOI Ref 54-68.

## WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Abstracts of articles on oligodynamic sterilization, by Ralph G. Berk. U. S. Army. Corps of Engineers. Engineer Research and Development Board, Ft. Belvoir, Va. May 1947. 114p. Order from LC. Mi \$6.00 ph \$18.30. PB 118443

Appendix to investigation of oligodynamic sterilization (PB 81369). Project WS 768. Abstracts of

297 articles issued before March 1947, giving the language of the original paper.

Report of sediment lining investigations, fiscal years, 1954-1955, by R. D. Dirmeyer, Jr. with subsections by G. E. Johnson, B. N. Rolfe, D. F. Peterson, R. B. Curry, E. W. Lane and I. S. Dunn. Colorado Agricultural and Mechanical College. Dept. of Civil Engineering, Fort Collins, Colo. Jun 1955. 152p photos, map, diags, graphs, tables. Order from LC. Mi \$7.50 ph \$24.30. PB 118766

CER no. 55RDD7. Contents: I. Advance summary. - II. Project organization. - III. Review of previous work. - IV. Installation materials and procedures. - V. Experimental installation results: - (a) Dispersion characteristics of clay minerals, by B. N. Rolfe. - (b) Studies of penetration and sealing, by D. F. Peterson and R. B. Curry. - (c) Mixing of bentonite for sedimenting purposes, by George B. Johnson. - (d) Procedures for intermittently operated canals. - (e) Stabilizing effect of sedimenting bentonite, by E. W. Lane, and I. S. Dunn. - (f) Effect of sedimenting bentonite on irrigated land. - VII. Conclusions. - VIII. Recommendations. - Bibliography. - Appendix. 1. Sediment - Deposition 2. Bentonite - Mixing 3. Canals, Irrigation - Linings 4. Dispersing agents 5. Clay minerals - Dispersion characteristics 6. Contract no. 14-06-700-129.

Wave transformation: Field operations, by R. L. Wiegel. California. University. Institute of Engineering. Wave Research Laboratory, Berkeley, Calif. Dec 1954. 31p photos, map, diags, graphs, tables. Order from LC. Mi \$3.00 ph \$6.30. PB 118881

See also PB 118882. Presented herein are the data on the installation of wave recorders at Davenport, California, together with the necessary refraction coefficients and calibration curves for interpreting the records. UC IER Series 29, Issue 56. Contract Nonr 222(15).

## MISCELLANEOUS

Baccalaureate origins of the science doctorates awarded in the United States from 1936 to 1950 inclusive, by M. H. Trytten. National Research Council. Office of Scientific Personnel. 1955. 162p graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$2.00. PB 118821

1. Education, Technical 2. NRC 382.

Development of glass color standards, by H. C. Hellige. Hellige, Inc., Garden City, N. Y. Apr

1953. 9p. Order from LC. Mi \$1.80 ph \$1.80  
PB 118898

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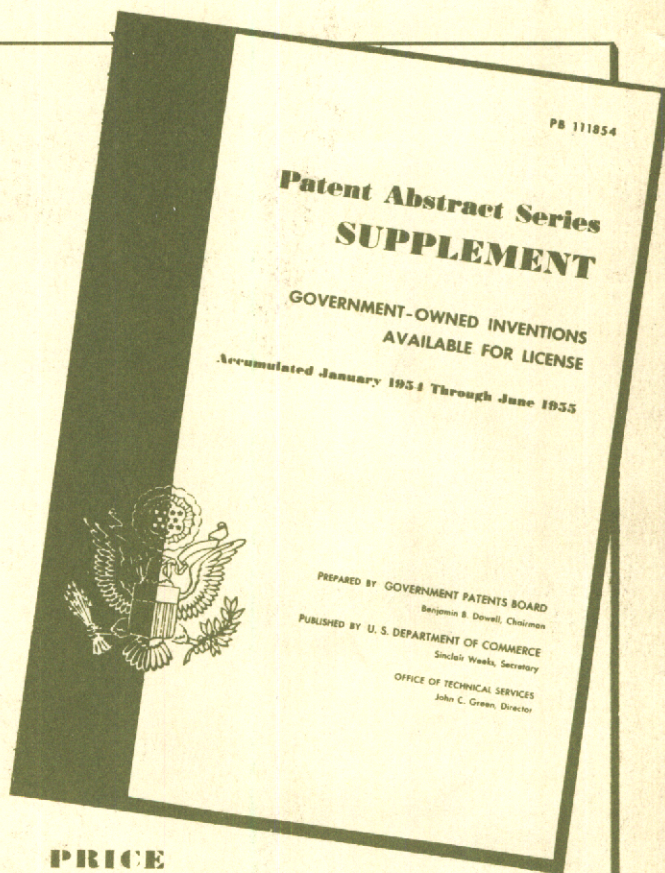
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