U. S. Government

RESEARCH REPORTS

November 16, 1956
Vol. 26, No. 5

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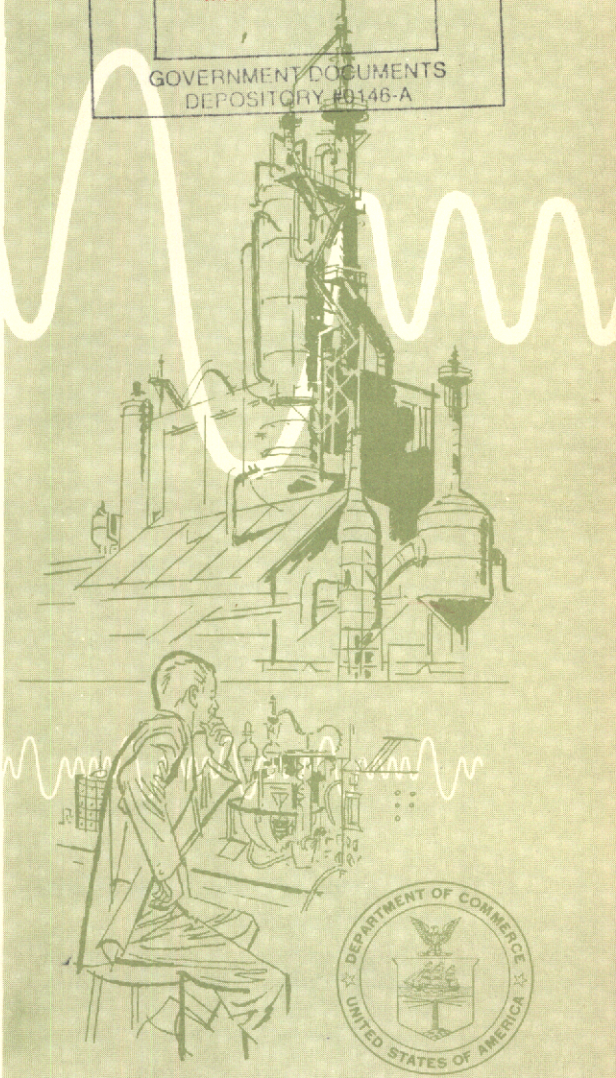
In this issue:

63 printed reports listed on pages 229–231



U. S. DEPARTMENT OF COMMERCE
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OFFICE OF TECHNICAL SERVICES
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Use of funds for printing this publication approved by the Director of the Bureau of the Budget, August 22, 1955.

U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 26, No. 5 November 16, 1956

Contents

Printed Reports Available from OTS Announced in This Issue

APPAREL

Test of heat load imposed by protective clothing, subject: Ventilation requirements of a ventilated suit, by Theodore F. Hatch and others. U. S. Army Medical Research Laboratory, Ft. Knox, Ky. Sep 1945. 8p drawing, tables. Order from LC. Mi $1.80, ph $1.80. PB 120358

A positive pressure impervious ventilated suit, made of nylon fabric impregnated with neoprene, was ventilated by positive distribution of air. This study was undertaken to determine the volume, the temperature, and the water content of the ventilating air that would permit men to work in the suit with comfort in environments with dry bulb temperatures up to 120°F. Final report on project no. T-2.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Decomposition of diethyl peroxide in the presence of nitric oxide and ethyl nitrite, by Joseph B. Levy. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1952. 13p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122019

The reaction of ethoxyl radicals with ethyl nitrite, nitric oxide and a mixture of these, all in the vapor phase, has been studied. The radicals were produced by the decomposition of diethyl peroxide at 181°C. The impact of the results of these studies on the mechanisms for the thermal decomposition of both nitrate and nitrite esters is discussed and revised mechanisms suggested. NAVORD 2696.

Effect of pressure on the U. V. spectra of benzene and its derivatives, by W. W. Robertson, S. E. Babb, Jr., and F. A. Matsen. Texas. University. Department of Chemistry, Austin, Texas. Mar 1956. 17p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122196

AD 82516. AF OSR Chem 50-1. Technical note 25. 1. Benzene - Solvent properties 2. Spectra, Ultraviolet - Absorption 3. AF 18(600)-430 4. AF OSR TN 56-120.

Molecular rotation and translation in crystals. Nuclear magnetic resonance absorption, heat capacity and entropy of crystalline solid solution of 2,2-dimethylbutane in 2,3-dimethylbutane from 10°K to 273°K, by John G. Aston, H. Segall, and N. Fuschillo. Pennsylvania State University. Cryogenic Laboratory, University Park, Pa. Jul 1955. 17p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122239

The nuclear magnetic resonance absorption of solid solutions of 2,2-dimethylbutane (A) and 2,3-dimethylbutane (B) has been studied as a function of composition. The melting range is clearly marked but the rotational transition is absent. There is a maximum in the melting point diagram at the composition B_2A_3. Thermal data have been determined on this complex from 10°K. to 265°K. from which the zero point entropy has been deduced. The heat capacity curve and zero point entropy of the crystals are those of a glass which indicates translational freedom in the rotating crystals. Pennsylvania State University. College of Chemistry and Physics. Cryogenic Laboratory. Contribution 82. Contract N6 onr-269, T. O. 3 and 10.

Preparation and properties of some new fluorine-containing 1,2-epoxides, by D. A. Rausch and A. M. Lovelace. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1956. 11p table. Order from OTS. 50 cents. PB 121529

The interest in fluorine-containing polyethers for possible application as thermally stable elastomers prompted research on the preparation of new epoxide monomers. Six new epoxides were prepared and characterized. The utilization of these monomers in new polymer systems is being investigated. Project no. 7340. Covers period of work from Apr to Sep 1955. AF WADC TR 56-94.

Report on submarine air purification, no. 3, by P. Borgstrom. U. S. Naval Research Laboratory. Oct 1934. 16p. Order from LC. Mi $2.40, ph $3.30. PB 120467

The absorption of carbon dioxide from the air of submarines by means of soda lime and lithium hydroxide has been reinvestigated. In order to evaluate the effects of aging on the chemicals used, the supplies of soda lime and lithium hydroxide were drawn from stocks from two to four years old that had been stored in the usual commercial containers. As a result of these tests, it is concluded (1) that the lithium hydroxide had not deteriorated and therefore its use in submarines should be continued according to the present practices; and (2) that soda lime, even if old, can be used where the temperature is above 80°F. and a relative humidity above 75%. NRL P-1080.

Detergents

Evaluation of waterless hand cleaners, by Donald J. Birmingham and Vernon B. Perone. U. S. Public Health Service. Jan 1956. 62p tables. Order from OTS. $1.75. PB 121389

Fifteen waterless hand cleaners and four conventional type cleaners were evaluated in laboratory and field studies. The primary purpose was to de-

termine the cutaneous irritant or sensitization reactions associated with these compounds, and to study physiological factors which are influenced by their usage. Laboratory tests included determination of free alkalinity or acidity, stability, relative cleansing efficiency, solvent content, residual effects on metals, mildness tests, defatting capacity, effects on the pH of the skin, and eye toxicity studies. Project no. 7159. AF WADC TR 55-467. Contract AF 33(616)-54-13.

Agricultural Chemicals

Development of improved petroleum larvacides for mosquito control, by W. A. Zisman. U. S. Naval Research Laboratory. May 1943. 35p graph, tables. Order from LC. Mi $3, ph $6.30. PB 120540

The physical chemistry of the spreading of these oils on water is discussed in some detail. In addition, an analysis is presented of the causes of the instability manifested by oil films after having been spread. Some practical considerations in connection with the preparation of improved larvacide oils are discussed. Finally, an outline is given of the research work yet necessary to develop the most effective petroleum oils for mosquito control. NRL P-2072.

Plastics and Plasticizers

Castor oil-m-tolylene diisocyanate polyurethane resins and related modifications as potting compounds, by Gregers Cassias, Ralph E. Christensen, and Daniel S. Trifan. Princeton University. Plastics Laboratory, Princeton, N. J. Jul 1952. 61p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 122974

An evaluation of some m-tolylene diisocyanate polyurethane resins prepared from two commercial grades of castor oil, ca. 100% glyceryl triricinoleate, and castor oil modified with various commercially available glycols and plasticizer, have been carried out to determine the effect of these composition variables on electrical, physical, and chemical properties. Time-temperature relationships for optimum cure have also been determined and some further data obtained on the factors involved in bubble formation in castor oil-m-tolylene diisocyanate polymerizations. Some factors involved in heat resistance of these resins have been identified. High-temperature transformers potted in castor oil-m-tolylene diisocyanate polyurethane resins have been successfully immersion tested following 1000 hours at 125°C. Dept. of the Army project 3-99-15-022. Signal Corps project 32-152B. PU PL TR 26C. Contract DA 36-039-sc-133, Report no. 8C.

Development of low temperature fungus resistant vinyl compounds, by Wallace W. Jackson, Jr. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1954. 18p photos, tables. Order from OTS. 50 cents. PB 111929

A series of tests were conducted with fungicidal compounds of several different classes in an attempt to impart the necessary characteristics to the vinyls. The compounds tested are tabulated. An important consideration was the desire not to affect the other properties expected of a properly compounded vinyl formulation, such as fungus resistance, dielectric strength, low temperature flexibility and color identification requirements. AF WADC TR 53-223.

Effect of molecular structure on the properties of polyurethanes, by George R. Smoluk. Princeton University. Plastics Laboratory, Princeton, N. J. Jul 1951. 40p graphs. Order from LC. Mi $3, ph $6.30. PB 122973

An homologous series of wood flour filled (60% filler), polyurethane resins were prepared using m-tolylene diisocyanate and linear glycols containing 2, 3, 4, 5, 6, 8, 9, and 10 methylene groups. Using a constant filler content and molding cycle, test samples were molded and tested. PU PL TR 21C. Contract DA 36-039-sc-133.

Effects of fungus growth and moisture upon the strength properties of reinforced plastics, by R. C. Tomashot and E. L. Hamilton. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1956. 13p tables. Order from OTS. 50 cents. PB 121513

The effects of fungus growth and moisture upon the strength properties of several reinforced plastic laminates were investigated. Material variations included the type of reinforcement, the chemical type of resin, and the finish on the glass fabric reinforcement. Of the material variations, the type of reinforcement and finish on the glass fabric were significant in regard to both the amount of fungus growth and the reduction of the strength properties. The effect of fungus growth upon the strength properties was not considered significant as compared to the effect caused by the presence of moisture. AD 97183. Projects no. 7340 and 7312. Covers period of work from Jan 1955 to Feb 1956. AF WADC TR 56-208.

Fatigue properties of various glass-fiber-reinforced plastic laminates, by K. H. Boller. U. S. Forest Products Laboratory, Madison, Wis. May 1956. 96p photos, drawing, graphs, tables. Order from OTS. $2.50. PB 121500

Fatigue strength values are presented for 6 standard and 4 heat-resistant resin laminates reinforced with glass fibers. Fifty-three S-N curves, repre-

senting fatigue data between 1 thousand and 10 million cycles, show the effect on fatigue strength of a notch, moisture, fabrics, resins, mean stress levels, angles to warp, and temperatures up to 500°F. Project no. 7360. Covers work conducted from May 1954 to Oct 1955. AF WADC TR 55-389. Contract DO 33(616)-54-14.

Paints, Varnishes and Lacquers

Characteristic of petroleum thinners available commercially for organic protective coatings, by A. L. Alexander. U. S. Naval Research Laboratory. May 1939. 23p graph, table. Order from LC. Mi $2.70, ph $4.80. PB 120437

This report describes the studies made on the constitution of ten different solvents designed for use in protective coating formulations. In the appendix the methods employed are described, along with numerous experiments designed to establish the validity of these methods. These methods applied to solutions of known composition give results quite acceptable when compared to the calculated value for these solutions. At the end of the appendix the commercial source of each product studied is designated. NRL P-1532.

Development of a protective coating resistant to nitric acid and hydrocarbons, by D. F. Siddall, E. Hillier, R. Garling, and M. Gunther. United States Stoneware Co., Akron, Ohio. Jun 1956. 116p photos, tables. Order from OTS. $3. PB 121217s

X-200 (Kel-F 800) resin, a new fluorinated fuming nitric acid resistant material, was formulated as a lacquer and a filleting putty. Application procedures were developed, and resistance of the lacquer coating, the filleting putty, and the complete system in FNA and JP-4 fuel were determined. Results indicate that the X-200 system is suitable for application on aircraft metals. When force dried at 300°F, FNA resistance approaches that of fused Kel-F. Resistance of the system when air dried is considerably lower but improves slowly over a long period of time as residual solvent evaporates. The coating system softens in JP-4 fuel after 3 days at 125°F. Project 7312. Work covers period of two contract extensions, May 15, 1954 through Jul 15, 1955. Supplement to PB 121217. AF WADC TR 54-527, Suppl. 1. Contract AF 33(616)-150.

Effect of phosphate coatings on temperature of metal parts exposed to flame environments, by George C. Fryburg, Norman H. Katz, and Sidney L. Simon. U. S. National Advisory Committee for Aeronautics. Jul 1956. 20p photo, diagr, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123479

The effect of phosphate coatings on the temperature of metal specimens placed in a flame environment was investigated. Since flames contain large numbers of atoms and radicals that react on metal surfaces liberating heat, it was thought that a phosphate coating might decrease the temperature of the metal by poisoning the surface to these reactions. Temperature lowerings of about 100° to 200°F were obtained. These are shown to arise mainly from the high emittance (about 1) of the phosphate coating rather than from a poisoning action. NACA TN 3279.

Evaluation of thin iron films as corrosion indicators, by David Roller. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1956. 38p photos, diagrs, graph, tables. Order from OTS. $1. PB 121536

A requirement exists for a sensitive, easily used, inexpensive, replaceable, and conveniently fabricated direct reading corrosion indicator. Particularly in the field of packaging, a direct reading visual or electrical specimen which could nondestructively determine environmental conditions within all types of containers would be very useful. A preliminary evaluation of the corrosion rates of thin, continuous, adherent vacuum deposited iron films in various humidities to determine their suitability as corrosion indicators is described. Variables investigated included film thickness and film substrate as it affected the corrosion rates in various humidities. It was evident from this work that thin pure iron films corrode readily in high static humidities. Recommendations for further investigations needed to develop a suitable visual or electrical indicator for use in packages are made. Project no. 7312. Covers work conducted from Jan 1955 to Apr 1956. AF WADC TR 56-237.

Moravian green anti-fouling paint: The inorganic components. First report, by Henry O. Farr, Jr. U. S. Naval Research Laboratory. Aug 1936. 10p. Order from LC. Mi $1.80, ph $1.80. PB 120652

Declassified Dec 15, 1953.
1. Paints, Anti-fouling - Analysis 2. NRL P 1299.

Test of insulating varnishes for radio frequency uses, by R. B. Owens and R. W. Armstrong. U. S. Naval Research Laboratory. Mar 1937. 19p photo, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 120648

1. Insulating varnishes - Tests 2. NRL R 1345.

Inorganic Chemicals

Chemical oxygen sources for submarine air purification. Fifth partial report, by R. R. Miller and W. C. Lanning. U. S. Naval Research Laboratory. May 1940. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 120422

The development of a process for the production of mixed potassium tetroxide and sodium peroxide is described in this report. The mixed oxide is obtained by the reaction of metallic sodium with potassium chloride at high temperature, followed by evaporation and combustion of the resultant mixture of potassium and sodium metal. The oxide contains available oxygen equivalent to 83 per cent potassium tetroxide, and is an efficient carbon dioxide absorbent. The process was carried out successfully in a pilot plant and material requirements were determined. NRL P-1619.

Influence of electric fields on zinc sulfide phosphors, by Sol Nudelman. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1955. 114p photos, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 120875

A variety of ZnS phosphor powders (electroluminescent and non-electroluminescent, fluxed and non-fluxed, hexagonal and cubic) were subjected to electric fields. The influence of the electric fields on the luminescence of the phosphors was investigated by using square, sinusoidal, exponential, and sawtooth wave shapes, and pulses of variable duration, for frequencies ranging from 60-100,000 cps and for signal voltages up to 600 V9rms). Thesis - University of Maryland. NAVORD 3850.

Analytical Chemistry

Kinetics of fast reactions. Second technical report covering the period Nov 1, 1952-Jul 1, 1955 under Contract No. N6 onr-264 (17), project NR 051-242, by S. H. Bauer. Cornell University. Dept. of Chemistry, Ithaca, N. Y. Jul 1955. 212p drawings, diagrs, graphs, tables. Order from LC. Mi $9.60, ph $33.30. PB 122240

Contents: Sec. A. Report on the continuation of work on the relative rates of the gas phase reactions between boron-trifluoride and amines, by Milton Blander and S. H. Bauer. - Sec. B. Summary of spectroscopic data: Partial analysis of the spectra of compounds which appear in the above kinetic studies. Part 1. High resolution spectra of gaseous trimethylamine, by S. H. Bauer and Milton Blander. - Part 2. Infrared spectra of Lewis salts, by C. C. Peterson and S. H. Bauer. - Sec. C. Diffusion controlled gas phase reactions (binary associations). Part 1. Theoretical treatment of a proposed experiment to determine the rate constant or reaction, by James J. Klein. - Part 2. Note on experiments by A. Shepp utilizing a linear arrangement for diffusion controlled gas phase reactions: Mechanism for heat transfer, by S. H. Bauer. - Sec. D. Analysis of the kinetics of decomposition of molecular oxygen, the formation of ozone, and the isotopic exchange in gaseous oxygen, as these occur in a single pulse shock tube, by Eliza Pollard. - Sec. E. Relaxation times for fast reactions from phase lag measurements: Phase lag as a measure of entropy gain, by S. H. Bauer.

Kinetics of the dissociation of weak acids and bases: Application of polarography and voltammetry at constant current, by Paul Delahay and Wolf Vielstich. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Mar 1955. 16p. Order from LC. Mi $2.40, ph $3.30. PB 120020

The kinetics of dissociation of weak acids and bases can be studied quantitatively from current-potential or potential-time curves for electrode reactions in poorly buffered solution. The nature of the substance being reduced or oxidized is rather immaterial, but the electrode reaction must involve hydrogen or hydroxyl ions. The weak electrolyte whose kinetics of dissociation is studied need not be reducible or oxidizable in this method. A quantitative treatment is given for polarography and voltammetry at constant current, and the two methods are compared. Application is made to formic and acetic acids, and rate constants for dissociation and ionic recombination in 50-50 water-ethanol mixture are shown graphically. Project NR 051-258, Report no. 22.

Mechanism of linseed oil film degradation under ultraviolet irradiation, by S. B. Crecelius, R. E. Kagarise, and A. L. Alexander. U. S. Naval Research Laboratory. Jul 1956. 15p photo, graphs, tables. Order from OTS. 50 cents. PB 121330

Two films of linseed oil, one thick and the other relatively thin were irradiated with ultraviolet light in a closed cell filled with oxygen. Periodically infrared spectra of gaseous content were obtained through the films during irradiation. The data indicate that the films break down into carbon dioxide, carbon monoxide, and low molecular weight aldehydes and ketones. The spectra showed that the rate of formation of carbonyl and OH and/or OOH groups for the thick film differed from that of the thin film. Methyl alcohol was identified in the gaseous phase of the decomposition of the thick film. NRL R 4803.

Procedure for the chemical analysis of composition A-3, by K. Van Keuren. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1951. 6p. Order from LC. Mi $1.80, ph $1.80. PB 122068

1. A-3 (Wax) 2. Waxes - Analysis 3. NAVORD 1781.

ELECTRICAL MACHINERY

Communication Equipment

Error-free coding, by Peter Elias. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Sep 1954. 14p diagr. Order from LC. Mi $2.40, ph $3.30. PB 122975

Some simple constructive procedures are given for coding sequences of symbols to be transmitted over noisy channels. A message encoded by such a process transmits a positive amount of information over the channel, with an error probability which the receiver may set to be as small as it pleases, without consulting the transmitter. The amount of information transmitted is less than the channel capacity, so the procedures are not ideal, but they are quite efficient for small error probabilities. It is shown that there exist codes of the same error-free character which transmit information at rates arbitrarily near the channel capacity. MIT RLE TR 285.

Location of underground cable failures, by M. S. Gilbert. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1946. 8p photo, diagrs. Order from LC. Mi $1.80, ph $1.80. PB 122259

1. Cables, Electric - Underground - Maintenance and repair 2. Cables, Electric - Underground - Failure - Causes 3. CAA TDN 41.

Test of model CXCK pulse communication equipment, contractor Federal Telephone and Radio Laboratory, by C. E. Cleeton, R. B. Meyers, and T. McL. Davis. U. S. Naval Research Laboratory. Jul 1943. 67p photos, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 120692

1. CXCK (Radio Link P-1 equipment) 2. Pulse communication equipment - Tests 3. NRL R-2115.

Electronics

Acceptance test of the aerosol sampler controlling radio transmitter, by Douglas M. Dechert. U. S. Air Force. Air Research and Development Command. Air Force Armament Center. Eglin Air Force Base, Fla. Jul 1955. 15p photos, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 120012

This transmitter is the frequency-modulated type and operates on a frequency of 39.3 mc with a one-kilowatt power output. The transmitter is designed so that one or all of six control tones may be imposed upon the carrier at one time without any interaction. The preliminary testing was done in the Armament Center's Heavy Systems Building. The final test was accomplished in the field under simulated operating conditions. AD 72974. AF AC TN 55-6.

Antenna studies for radio astronomy. Scientific report no. 1 for the period 15 Jun-15 Sep 1955 under Contract no. AF 19(604)-1503, by James W. Warwick and Palmer W. Carlin. Colorado. University. Research Service Laboratories, Boulder, Colo. Jan 1956. 18p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 123219

This report discusses the progress of antenna designs for measurements of ionospheric absorption and refraction of discrete radio noise sources at low frequencies in the range 15 to 80 Mc/s. The requirements of the antenna are: (a) forward gain 10 db over a dipole; (b) sufficiently broad-band characteristics to permit operation without essential change in pattern (but not necessarily impedance) over the range from 16 to 20 Mc/s; and (c) compactness, so as to allow alt-azimuth mounting. AF CRC TN 56-162.

Development of an improved crystal exciter unit, by C. H. Jackson. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1940. 17p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122294

Reprinted 1941.
1. Circuits, Oscillator - Design 2. Exciters - Design 3. CAA TDR 26.

Development of the high-frequency radio range. Part II: Testing of the ultra-high-frequency radio ranges on towers, by P. B. King and T. A. Kouchnerkavich. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1944. 41p photos, map, drawings, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122281

For Part I see PB 123549.
1. Radio range (UHF) - Tests 2. CAA TDR 43.

Effect of parasitic currents in antennas of the UHF radio ranges on horizontal field pattern, by H. W. Kohler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1945. 10p diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 122256

1. Antennas - Radiation patterns 2. Radio range (UHF) 3. CAA TDN 38.

Four course ultra-high-frequency radio range. Preliminary report, by J. C. Hromada. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1938. 9p photos, map, diagrs, graph. Order from LC. Mi $1.80, ph $1.80. PB 122286

Formerly Report no. 3, Jan 1938, issued by the Safety and Planning Division, Bureau of Air Commerce. Reprinted, 1940.
1. Radio range (UHF) - Tests 2. Antennas, Ultra high frequency 3. CAA TDR 3.

Horizontal field patterns of very-high-frequency unsymmetrical localizer antenna arrays, by H. W. Kohler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center,

Indianapolis, Ind. Jan 1945. 17p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122254

1. Antennas - Radiation patterns 2. CAA TDN 36.

Industrial preparedness study of transistors and diodes. Final report for period 31 Mar 1952 to 30 Sep 1954 under Contract DA 36-039-sc-30181, by G. F. Platts, L. M. Downes and others. General Electric Co. Electronics Division, Syracuse, N. Y. Jul 1955. 402p photos, drawings, diagrs, graphs, tables. Order from OTS. $8. PB 121291

The continuous reduction furnace has been proven an efficient equipment for the production of germanium metal for semiconductor devices. Over a similar period of operation, its output is equivalent to that of nine batch-type furnaces. A six-zone metal refining process was developed and has shown itself to be a valuable processing tool. It can handle metal too impure to be used in a progressive crystallization furnace, and can produce germanium in excess of 20 ohm-cm in a single run. Investigations of single crystal pulling techniques led to the design of a resistance-type pulling furnace easily adaptable to quasi-automation. Experience with this equipment has proved its ease of operation, less initial cost, lower maintenance, and better automation possibilities. Equipment and methods have been developed to measure bulk parameters for quick reliable evaluation of metals. A reliable method of measuring resistivity, utilizing a four-point probe, was established. A separate conductivity test determined n- or p-type metal. Equipment to measure lifetime by the spark method was developed and tests were reduced to routine level. A diffused junction rectifier package was designed for automatic machine production with an all-welded construction. Reliability of product was shown to be intimately related to metal contamination. A process of manufacture was developed to reduce the introduction of foreign materials to a minimum. A tunnel oven diffusion process produced excellent control and a more favorable percentage of high voltage junction rectifiers. An automatic, conveyor-type classifier unit for the junction rectifier was built to remove operator discretion and increase the test station output, consistent with increased production. In order to control the electrolytic etching process, an automatic etching machine was designed and built for use with junction rectifiers. A point contact transistor package was developed to utilize all-welded, hermetic sealed construction. Experience indicated that the point contact device had two inherent disadvantages. The first was that fabrication could not be made completely non-discretionary. Secondly, parameters tended toward instability under varying operating conditions. It was proved that the germanium high current rectifier could be manufactured without undue difficulty with a minimum of non-discretionary tooling. Failures of units were reduced from 25% to 100% by removal of operator error. Greatest gains were in improvements in tinning, mounting methods, and welding techniques. Accurate control of time and temperature in the hydrogen diffusion furnace has proved of great importance in formation of high quality devices.

Interference between radio aids to air navigation and maritime radio beacons, by H. W. Kohler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1942. 31p diagr, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122252

1. Radio interference - Elimination 2. CAA TDN 30.

Investigation of self-supporting telescopic vertical antenna for use on battleships 55 and 56, by Carl Christenson and Oscar Norgorden. U. S. Naval Research Laboratory. Mar 1941. 35p photos, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120420

1. Antennas, Telescopic - Tests 2. NRL R 1707.

Investigation of site requirements for very-high-frequency radio ranges, by J. M. Lee, B. M. Lahr and R. G. Pamler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1947. 65p photos, maps, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 122263

1. Radio range (VHF) - Location 2. CAA TDN 45.

Investigations of scattering and multipath properties of ionospheric propagation at radio frequencies exceeding the MUF, by W. G. Abel, J. T. DeBettencourt, J. F. Roche, and J. H. Chisholm. Massachusetts Institute of Technology. Research Laboratory of Electronics and Lincoln Laboratory, Lexington, Mass. Jun 1955. 166p photos, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 123211

This report presents some results of studies of ionospheric forward-scatter propagation at frequencies exceeding normal MUF in the high HF and low VHF range for the purpose of investigating potential point-to-point communications. Data from approximately 13,000 hours of operation were analyzed from measurements conducted since late 1951 on several frequencies and paths, predominantly 1000 to 1100 miles in length, in mid-latitudes. Signal levels and signal-level characteristics are presented and discussed. Studies made in 1952 of off-path signal levels and measurements of cosmic noise are described. The level and characteristics of 27.8-Mcps signals (Cedar Rapids—Round Hill) are presented and discussed. Additional measurements at 22.9 Mcps are described for the 1059-mile Alpine (New Jersey) — Goose Bay (Labrador) path on transmissions during part of 1953. Lincoln Laboratory - Technical report no. 81. MIT RLE TR 262.

Mathematical analysis of the radiation characteristics of partially shielded antennas, by Oscar Norgorden. U. S. Naval Research Laboratory. Jun 1938. 12p drawings. Order from LC. Mi $2.40, ph $3.30. PB 120425

1. Antennas - Radiation patterns - Mathematical analysis 2. NRL R 1446.

Mathematical analysis of the ring modulator circuit, by L. P. Gieseler. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1954. 18p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 120866

A solution is obtained for the output current of a ring modulator circuit with arbitrary inputs and arbitrary load resistance. The operation of the circuit for various operating conditions is considered. The effect of random noise in one input channel is also discussed. A comparison is made with the corresponding operation of an ideal product modulator. NAVORD 3673. NOL ARR 229.

Measurements of noise radiation from high-voltage transmission lines, by J. M. Lee. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1947. 33p maps, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122264

1. Transmission lines, High-voltage - Noise radiation - Measurements 2. CAA TDN 46.

Microwave propagation and absorption in material media, by Robert Beringer. Yale University. Sloane Physics Laboratory, New Haven, Conn. Jun 1955. 6p. Order from LC. Mi $1.80, ph $1.80. PB 122313

A brief review of work performed under the Contract followed by a bibliography on microwave magnetic resonance and microwave spectroscopy. Final report under Contract no. N7onr 288, Task Order I, NR 072-135, Final report.

NOL 8 x 8 inch shock tube: Instrumentation and operation, by George A. Lundquist. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 31p photos, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 122012

An 8 x 8 inch shock tube was constructed in support of the research and development program carried out in the hypersonic wind tunnel. A detailed description of the instruments and operation of the shock tube is given. Schlieren photographs of wedge and cone were taken throughout the flow system, in particular in the cold high Mach number flow behind the contact surface. Equipment to study water vapor and/or nitrogen condensation by light scattering is described. NAVORD 2449. NOL ARR 100.

Pulse synchronization equipment and wide-band 75 Kc/s T.R.F. receiver, by S. A. Bowhill. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Feb 1956. 26p photos, drawings, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 122188

Two newly developed pieces of instrumentation are described. They are intended to replace some existing equipment for receiving 75 kc/s pulse signals. The pulse synchronization equipment uses the phase coherence of the line voltage at the transmitter and the receiver as a time reference. The T.R.F. receiver achieves a wide bandwidth and high gain by using preset stagger-tuned circuits. Detailed circuit descriptions and adjustment procedures are given. AF CRC TN 56-268. PSC IRL SR 82. Contract AF 19(604)-1304.

Quarterly progress report, by J. B. Wiesner, G. G. Harvey, and H. J. Zimmermann. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Dept. of the Army project 3-99-12-022. Signal Corps project 132B. Contract DA 36-039-sc-42607. Order separate parts described below from LC, giving PB number of each part ordered.

37th, for the period ending Feb 28, 1955. Apr 1955. 110p diagrs, graphs, tables. Mi $5.70, ph $16.80. PB 122979

1. Communications - Theory 2. Electronic research 3. Electrons - Emission 4. Spectroscopy, Molecular 5. Information - Coding 6. Speech - Analysis 7. Transistors - Circuits 8. Circuits, Nonlinear - Mathematical analysis.

38th, for the period ending May 31, 1955. Jul 1955. 128p photos, diagrs, graphs, tables. Mi $6.30, ph $19.80. PB 122978

1. Communications - Theory 2. Electronic research 3. Speech - Analysis 4. Circuits, Nonlinear - Mathematical analysis 5. Networks, Electrical - Synthesis 6. Information - Coding.

Radiotelemeter and its importance to aviation, by R. W. Knight. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1938. 19p photos, table. Order from LC. Mi $2.40, ph $3.30. PB 122291

Originally printed in Sep 1938 as Report no. 1, Planning and Development Division, Civil Aeronautics Authority. Reprinted 1941.
1. Telemeters, Radio - Design 2. Radio aids to aviation 3. CAA TDR 16.

Relaxation oscillations in voltage-regulator tubes, by P. L. Edwards. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1952. 20p photos, diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122020

Gas-filled voltage-regulator tubes are subject to relaxation oscillations when operated in parallel with a condenser. These oscillations have been investigated and a qualitative description of their mechanism is presented. NAVORD 2698.

Research and development study of gold bonded transistors, by Peter Toong and Roy Yee. Final report under Contract AF 19(604)-1007. Transistor Products, Inc., Waltham, Mass. Aug 1954. 44p photos, fold diagrs, tables. Order from OTS. $1. PB 111669

Stable, junction-like transistors with alpha cut-off frequencies up to ten megacycles and values of alpha up to 0.95 have been produced by electrically bonding gallium doped gold wire to the opposite faces of a thin germanium crystal. For report on earlier contract see PB 113297.

RMS value of horizontal field patterns of UHF two-course radio range, by H. W. Kohler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1945. 8p graphs. Order from LC. Mi $1.80, ph $1.80. PB 122255

1. Antennas - Radiation patterns 2. CAA TDN 37.

Starting-current analysis of monotrons with a cylindrical TM_{01n} resonator, by H. D. Arnett and A. J. Ruhlig. U. S. Naval Research Laboratory. Sep 1956. 20p diagrs, graphs, table. Order from OTS. 50 cents. PB 121402

An electron beam, unmodulated in velocity, can excite cavity oscillations in a single-cavity resonator by converting some of its kinetic energy into electromagnetic energy. For interaction between electron beam and cavity fields, there must be an electric field component in the direction of motion of the electrons. The simplest such modes are the cylindrical TM_{01n} modes. A calculation has been made of the minimum current required for the start of oscillations in the four lowest modes of this type. This type of oscillator is especially suited to millimeter wavelengths because of the relative ease of cavity fabrication, provided currents of about an ampere can be provided. NRL R 4819.

Study of the memory requirements of sequential switching circuits, by David A. Huffman. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Mar 1955. 30p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123217

The number of elementary binary memory devices necessary for the realization of an arbitrary asynchronous sequential switching circuit is considered. The least upper bound is discovered to be approximately equal to twice the greatest lower bound. The minimum conceivable interstate transition time for a sequential circuit is the reaction time of a single memory element. A solution which achieves this minimum time is derived and its relationship to the Hamming single-error correcting code is shown. The fundamental limitations of error correction schemes which compensate for malfunctioning of memory elements are discussed. MIT RLE TR 293.

Study of the problem of detection, by K. M. Soukaras. U. S. Naval Research Laboratory. Feb 1939. 51p drawings, diagrs (part fold), graphs (part fold), table. Order from LC. Mi $3.60, ph $9.30. PB 120429

1. Vacuum tubes - Grids 2. Vacuum tubes, Detector 3. Vacuum tubes, Rectifier 4. Vacuum tubes, Transmitting 5. NRL R-1517.

Study of the radiation characteristics of shipboard antenna systems, by Oscar Norgorden and R. B. Meyer. U. S. Naval Research Laboratory. Jun 1938. 47p drawings, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120427

1. Antennas, Shipborne - Radiation patterns - Measurement 2. NRL R 1448.

Telemetering notch antenna 225.0 Mc/Sec Aerobee Hi rocket, by Herbert W. Haas. New Mexico College of Agriculture and Mechanic Arts, Physical Science Laboratory, State College, N. Mex. Feb 1956. 39p photos, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 122373

The design and development of a 225.0 Mc/Sec notch antenna for the Aerobee Hi rocket is presented. A detailed radiation pattern study has been made of the antenna installed in a full scale size rocket mockup. The radiation patterns have been measured for linear, right circular and left circular polarization. Measured power contour plots are presented to show the distribution of power in the aft region of the missile. A number of photographs of the antenna, rocket mockup and antenna range facilities are included in this report. Electrical and mechanical details of the antenna are shown by the drawings. AF CRC TN 56-450. Contract AF 19(604)-409, Scientific report no. 2.

Test of models RAA and RAB receiving equipments. Report, by Edward N. Dingley. U. S. Naval Research Laboratory. Feb 1934. 61p diagr, graphs. Order from LC. Mi $3.90, ph $10.80. PB 120651

1. RAA (Radio receiver) 2. RAB (Radio receiver) 3. Circuits, Amplifier - Tests 4. Radio receivers - Tests 5. NRL R 1028.

Test of models RAA and RAB receiving equipments. Report, by John H. Gough. U. S. Naval Research Laboratory. Feb 1934. 35p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120650

1. RAA (Radio receiver) 2. RAB (Radio receiver) 3. Radio receivers - Tests 4. NRL R 1027.

Tests of the Mark 8 radar equipment, by John P. Hagen, R. B. Meyer and Thomas McL. Davis.

Western Electric Co., New York, N. Y. Mar 1943. 195p photos, graphs, tables. Order from LC. Mi $8.70, ph $30.30. PB 120739

1. Mark 8 (Radar) 2. Radar - Tests 3. NRL R 2224.

Theoretical considerations of ultra-high-frequency two-course simultaneous radio ranges, by H. W. Kohler. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1947. 36p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122262

1. Radio range (UHF) - Theory 2. CAA TDN 44.

Triangulation tests at the New York, Pittsburgh, and Washington direction finder stations. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1945. 42p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122257

1. Radio direction finders - Tests 2. CAA TDN 39.

Ultra-high-frequency aircraft receiver, by P. D. McKeel. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1938. 28p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122278

An ultra-high-frequency aircraft receiver, which covers the band from 60 to 132 megacycles, is described. Sections of coaxial lines are used for the radio-frequency and oscillator tuned circuits in this receiver, and the essential factors involved in their design are discussed. The frequency stability of the coaxial line controlled oscillator was studied, and methods were devised to reduce the variations in frequency. Originally printed in Sep 1938 as Report no. 2, Planning and Development Division, Civil Aeronautics Authority. Reprinted 1941. CAA TDR 17.

Ultra-high-frequency airport traffic control, by H. C. Hurley. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Aug 1944. 53p graphs. Order from LC. Mi $3.60, ph $9.30. PB 122282

1. Airports - Air traffic control 2. Radio transmitters (UHF) 3. CAA TDR 44.

Generators, Motors, Transmission

Design and performance of voltage and frequency regulators XM-1A and XM-2A, by E. T. Hooper and H. H. Woodson. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1953. 18p photo, diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122042

1. XM-1A (Voltage and frequency regulator) 2. XM-2A (Voltage and frequency regulator) 3. Voltage regulators - Design 4. Voltage regulators - Performance 5. Frequency changers - Design 6. Frequency changers - Performance 7. NAVORD 2976.

Design considerations of the half-wave bridge magnetic amplifier, by C. W. Lufcy and H. H. Woodson. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1953. 22p diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 122043

The operation of the half-wave bridge magnetic amplifier is described in such a manner that conditions for optimum performance are easily derived. The assumption of rectangular hysteresis loop core material along with Faraday's Law and linear circuit theory are used to simply but rigorously describe the operation of the circuit. The step-by-step design procedure based on this derivation is given. NAVORD 2979.

Generation of fast video pulses, by Solomon Krasnick. U. S. Camp Evans Signal Laboratory, Belmar, N. J. Dec 1955. 22p photo, diagrs. Order from OTS. 75 cents. PB 121404

Advances in the electronic arts are repeatedly creating more stringent requirements for prime and test devices. Among the new problems being encountered are those of video pulse generation and carrier modulation over wider ranges of frequency, pulse repetition rate, and pulse width than hitherto common. This report reviews some of the work at SCEL on the video portions of the problems. Signal corps project no. 122A. Dept. of the Army project no. 3-99-05-000. SCEL TM 1724.

Investigation of the mechanical characteristics of a friction-type electrical connector including comparisons with screw-type connectors, by F. L. Goodwin. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1953. 13p photos, graph. Order from LC. Mi $2.40, ph $3.30. PB 120998

1. Connectors, Electric - Tests 2. NAVORD 3576.

Magnetic-amplifier potentiometer servo system with vacuum-tube or transistor preamplifier, by Donald D. Wright and Walter H. Raskin. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1955. 12p drawings, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120822

The use of magnetic amplifiers in a potentiometer-type computer servo is described. Both vacuum tubes and transistors are considered for input stages, to obtain the necessary high input impedance. Magnetic amplifiers are used in the latter stages to take advantage of their ruggedness and ease of compensation. No complex circuitry is required to couple the vacuum tubes or the transistors to the magnetic amplifier. NAVORD 4024.

Magnetic-amplifier two-speed servo system, by J. J. Suozzi. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1955. 25p drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120818

This report describes a half-wave magnetic amplifier utilizing a full-wave slave output stage to replace a vacuum tube amplifier in a two-speed servo system. The design of the magnetic amplifier and compensating networks is outlined, together with a discussion of stickoff voltage and synchronizing networks. Complete system performance of the magnetic-amplifier servo system is given and a comparison between vacuum tube and magnetic amplifier systems is made. An appendix is included giving complete design information on a number of magnetic amplifier servo systems. NAVORD 3973.

Magnetic servo amplifiers employing tripled-frequency carriers, by George Schohan and Robert W. Reichard. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1955. 15p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120889

1. Servo systems - Theory 2. Amplifiers, Servo - Design 3. Amplifiers, Magnetic - Design 4. NAVORD 3856.

Miniature variable air capacitors. Final report for the period Jul 1, 1954-Sep 30, 1955 under Contract no. DA 36-039-sc-64430, by Edward T. Machuga. Hammarlund Manufacturing Co., New York, N. Y. Jan 1954. 63p fold drawings, fold tables. Order from OTS. $1.75. PB 121239

The purpose of this development is to establish designs for a series of miniature variable air capacitors having long rotational life and capable of satisfactory operation over a temperature range of -55°C to +85°C. Dept. of the Army project no. 3-26-00-600. Signal Corps project no. 2006A.

Naval Ordnance Laboratory pulse generator, type 1A, by C. R. Wood, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1952. 15p photos, drawing, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120842

A versatile, wide range pulse generator is described which covers the range of 10 microseconds to 0.1 seconds in pulse width and 1 cps to 10 kc in repetition rates. Provision is made for synchronization of repetition rate, for external trigger, and for single pulse operation. NAVORD 2635.

Survey of low level modulators, by John H. Searcy. Radiation, Inc., Melbourne, Fla. Feb 1956. 87p diagrs, graphs, tables. Order from OTS. $2.25. PB 121385

A survey of commercially available and developmental low-level modulators is made. Fundamental limitations which restrict the minimal signal are the prime requisites for evaluation. Consideration is also given to transfer linearity, complexity, size, weight and power requirements. Project no. 7218. AF WADC TR 56-178. Contract AF 33(616)-2985.

Test of 5 kilovolt multiplier resistors, by H. A. Brinkman. (Sprague Specialties Co.). U. S. Naval Research Laboratory. Apr 1942. 13p photo, table. Order from LC. Mi $2.40, ph $3.30. PB 120556

1. Resistors, Multiplier - Tests 2. NRL R 1859.

Test of six wire wound fixed resistors, by H. A. Brinkman. (Hardwick, Hindle, Inc.). U. S. Naval Research Laboratory. Apr 1942. 10p photo, table. Order from LC. Mi $1.80, ph $1.80. PB 120555

For later report see PB 120565.
1. Resistors, Wire-wound - Tests 2. NRL R 1858.

Test of six wire wound fixed resistors, by H. A. Brinkman. (Sprague Specialties Co.). U. S. Naval Research Laboratory. May 1942. 13p photos, table. Order from LC. Mi $2.40, ph $3.30. PB 120565

See also PB 120555 and PB 120542.
1. Resistors, Wire-wound - Tests 2. NRL R 1873.

Test of six wire wound style A grade 1 Class II fixed resistors, by Harold A. Brinkman. (Ward Leonard Electric Co.) U. S. Naval Research Laboratory. May 1943. 9p photo, table. Order from LC. Mi $1.80, ph $1.80. PB 120542

For earlier reports see PB 120555 and PB 120565.
1. Resistors, Wire-wound - Tests 2. NRL R 2071.

Miscellaneous

Studies of grid alloys for submarine storage batteries. Partial report, by Howard F. Taylor. U. S. Naval Research Laboratory. Feb 1941. 24p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120419

1. Batteries, Storage - Tests 2. NRL M 1698.

FUELS AND LUBRICANTS

Antiwear and extreme pressure additives for greases, by S. Fred Calhoun and G. P. Murphy. U. S. Arsenal, Rock Island, Ill. Mar 1955. 27p photos, graph, tables. Order from OTS. 75 cents. PB 111919

Twenty-seven different compounds or formulations have been incorporated in amounts up to ten percent in lithium soap mineral oil greases. The results of these tests are tabulated according to type of additive used. The additives used were made up of commercial gear lubricant additives, oiliness improvers, a recognized antiwear agent and compounds which from their composition looked promising. The active elements present were lead, sulfur, phosphorous or chlorine and were evaluated alone and in various combinations. Dept. of the Army project no. 593-21-053. Ordnance project no. TB 5-4010E, Report no. 12. RIAL R 55-945.

Behavior of water in jet fuels and the clogging of micronic filters at low temperatures, by John A. Krynitsky, John W. Crellin and Homer W. Carhart. U. S. Naval Research Laboratory. Jan 1950. 44p drawing, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122129

A method for the determination of water in fuels using the Karl Fischer reagent has been developed and used in the determination of the solubility of water in several fuels and pure hydrocarbons from 32°F to 120°F. The effect of aromatic content, rates of saturation and disappearance of suspended water from fuels have been investigated. A small scale apparatus was devised for the study of the clogging of micronic filters at low temperatures. The variables temperature, water content of the fuel, fuel pressure, porosity and type of paper were studied for their effects on filter clogging. Mechanisms of clogging as a function of temperature are proposed. A number of representative substances were tested as potential freezing point depressants for the prevention of clogging. Unclassified 10 Jan 1952. NRL 3604.

Diesel oils in storage at the Naval Research Laboratory, by P. Borgstrom. U. S. Naval Research Laboratory. Oct 1935. 24p. Order from LC. Mi $2.70, ph $4.80. PB 120659

1. Oils, Diesel - Storage 2. NRL C 1208.

Evaluation of chlorophenyl phosphates as potential base stocks for high temperature hydraulic fluids, by J. C. Dacons and H. M. Schiefer. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1956. 22p graph, tables. Order from OTS. 75 cents. PB 121446

Three phosphate ester fluids, all containing phenyl and/or chlorophenyl groups have been evaluated for potential high temperature hydraulic fluid application. These fluids are so chosen that they represent three different classes of chlorophenyl phosphate fluids and results obtained form a basis for predicting the success or failure of the chlorophenyl phosphates in general for this application. The fluids were tested extensively for thermal and oxidative stability since these are the areas in which they were particularly controversial. Other tests include viscosity, pour point, flash point, fire point, and foaming tendency determinations. This report covers work done at WADC and Pennsylvania State University, under contract AF 33(038)-18193, and at the University of Virginia under contract AF 33-(038)-22947. The fluids tested were prepared by Southwest Research Institute under Contract AF 33-(616)-276. Project no. 7331, Task no. 73313. Covers period of work from Oct 1955 to Dec 1955. AF WADC TR 56-25.

Foaming characteristics of aircraft oils, by George Baum. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1956. 16p graph, tables. Order from OTS. 50 cents. PB 121445

The foaming characteristics of several lubricating oils were studied in connection with power plant and propeller installation difficulties ascribed to oil foaming. Wide variations in quantity and collapse time of foam formed during aeration were observed in laboratory tests. Chemical additives of silicone and sorbitan type proved effective as heavy petroleum oil defoamers. No really effective defoamers for light oils were noted. A laboratory test which gives a sharper delineation between a group of light oils than the present ASTM test has been studied and may with sufficient refinement provide a better index of foaming tendency of oils than the present test. Project no. 3044. Covers work conducted from 1949 to 1956. AF WADC TR 55-475.

Micro lubricant test methods. Part 3: Corrosion and oxidation-separation of oil from lubricating greases, corrosiveness of greases and oils, by John B. Christian. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1956. 26p diagrs, tables. Order from OTS. 75 cents. PB 121443

This report contains the following test methods: Corrosion and Oxidation, Separation of Oil from Lubricating Greases, and Corrosiveness of Greases and Oils. These test methods are designed for the micro analysis of petroleum, petroleum products, and related materials. They were arrived at through the modification of existing test procedures which require greater quantities of test samples. Project no. 3044. Covers period of work from Sep 1955 to Jan 1956. AF WADC TR 55-449, Part 3. For Parts 1-2 see PB 121355 and 121386.

Polyarylurea greases, by D. T. Kjerland. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1956. 19p tables. Order from OTS. 50 cents. PB 121531

Arylurea compounds prepared from aromatic isocyanates or aromatic diisocyanates and an aromatic amine or combination of aromatic amines have in the last three years been shown to be good grease thickening agents having high temperature (500°F) stability. In this report, preliminary data are presented on polyarylurea thickening agents prepared from aromatic diisocyanates and aromatic diamines. Initial data show that polyarylureas have much better thickening ability than the simple arylureas with equivalent heat stability. AD 97138. Project no. 3044, Task no. 73310. AF WADC TR 56-177.

Properties of aircraft fuels, by Henry C. Barnett and Robert R. Hibbard. U. S. National Advisory Committee for Aeronautics. Aug 1956. 156p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123476

The primary objective of this report is to collect fuel data that should aid in the design of aircraft fuel systems. It includes a survey of recent production jet fuels and shows the ranges of fuel properties which can be encountered for each grade of fuel. The effect of temperature and pressure on many of these properties is given. In the future fuel oils may be used in jet aircraft; and, therefore, these fuels have also been treated. In addition there are discussions on the development of jet fuel specifications and the pertinence of fuel properties to fuel-system design. The practical problems associated with the use of aircraft fuels are also discussed. Supersedes RM E53A21 and RM E53I16. NACA TN 3276.

Space heating rates for some premixed turbulence propane-air flames, by Burton D. Fine and Paul Wagner. U. S. National Advisory Committee for Aeronautics. Jun 1956. 26p graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123477

Space heating rate measurements can yield information that is useful in characterizing turbulent combustion. For Bunsen burner flames stabilized over a field of pipe-induced turbulence, the space heating rate decreased with increasing linear flow and burner diameter, and was independent of pilot conditions. Calculated space heating rates, at 1-atmosphere pressure, were in the range of 2×10^7 to 6×10^7 Btu per cubic foot per hour. Turbulent burning velocities over the same flow range were correlated by linear velocity at constant burner diameter, but the variation with burner diameter could not be expressed by a simple correlation. NACA TN 3277.

Specific gravity-temperature relationships of the NRL and "A" series of fuel oils. Report, by L. Singer. U. S. Naval Research Laboratory. Nov 1935. 34p drawing, graph, tables. Order from LC. Mi $3, ph $6.30. PB 120658

1. Oil fuel - Specific gravity 2. NRL C 1210.

Storage stability of high-test leaded aviation gasolines in commercial metal drums and tinned containers, by Dan Fore, Jr. U. S. Naval Research Laboratory. Jun 1940. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120423

1. Fuels, Aviation - Stability 2. Fuels, Aviation - Storage 3. NRL P 1624.

Study of explosive vapor detection, by Thomas M. Shaw, Frank K. Truby and Wilbur R. Wood. Southwest Research Institute, San Antonio, Texas. Jun 1956. 277p diagrs, graphs, tables. Order from OTS. $6. PB 121517

This report contains the results of a survey and analysis of vapor detection methods and instrumentation. The work was undertaken to establish a basis for a program for the development of instruments for the detection of rocket propellant vapors in operational, piloted, rocket-powered aircraft. The results of the study show that no completely satisfactory principle of operation or sufficiently compact instrumentation capable of meeting these specifications exists. The results indicate that any immediate need for vapor detection instruments can be met by the development of a compact type of nondispersive infrared analyzer. The radio frequency-type mass spectrometer may also be developed to serve on an interim basis as a satisfactory vapor detection device. The results of the study also show that a research and development program in a number of possible areas may result in a more satisfactory vapor detection device. These areas include contact potentials, gas phase chromatography, glow discharge phenomena, ionization phenomena, microwave spectroscopy, and semi-conduction phenomena. Project no. 6075. Appendix I. Physical and chemical properties of various rocket-propellant fuels and oxidizers. - Appendix II. Bibliography. - Appendix III. Index to bibliography. - Appendix IV. Limits of inflammability for certain fuels as a function of altitude. Contract AF 33(616)-2802. AF WADC TR 56-293.

Tests conducted to determine safe methods of dumping fuel from airplanes in flight, by Allen W. Dallas. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1938. 25p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122277

Originally printed in July 1938 as Report No. 15, Safety and Planning Division, Bureau of Air Commerce. Reprinted 1941.
1. Fuels, Aviation - Ignition 2. Fuels, Aviation - Dumping 3. CAA TDR 13.

Use of hydrophobic rings for the measurement of interfacial tensions. The relation between the interfacial tensions of fuels and their water-tolerance characteristics, by J. A. Krynitsky and W. D. Garrett. U. S. Naval Research Laboratory. Sep 1956. 22p diagrs, graphs, tables. Order from OTS. 75 cents. PB 121397

A method has been developed whereby platinum rings coated with hydrophobic materials can be used with the conventional du Nouy interfacial tensiometer to determine the interfacial tensions of a variety of organic-liquid/water systems. This method is adaptable to time studies on interfacial tensions of certain fuel/water combinations that do not lend themselves to appropriate treatment by other more common techniques. In addition, the use of hydrophobic rings for determining surface tensions of liquids was investigated. It was found that the wettability of the ring surface material by the liquid is an important factor in such measurements. NRL R 4816.

HIGHWAYS AND BRIDGES

Effect of vibratory and slow repetitional forces on the bearing properties of soils, by Gregory P. Tschebotarioff and George W. McAlpin. Princeton University. School of Engineering. Soil Mechanics Laboratory. Oct 1947. 76p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 122833

A brief summary is given of the limited amount of published work previously performed elsewhere concerning the effect of sustained vibrations on soils. Special features presented by the vibrating system plane-tire-payment are briefly discussed. The vibration studies at Princeton are outlined. The findings are explained by which it was demonstrated that controlled strain load tests or CBR tests cannot be applied to the study of vibration effects. The results of a series of small-scale controlled stress 2-in. and 5-in. diameter plunger tests on two types of sand are reported. Vibratory plunger tests on two types of clay were performed and showed that on cohesive soils the deformation producing capacity of a vibratory force is no greater than that of an equivalent static force. This finding was confirmed by comparisons of static and vibratory unconfined compressive strength tests and consolidation tests. Actual measurements of vibratory forces transmitted to pavements by the wheels of an airplane during engine warm-up permitted the adaptation of laboratory tests to field conditions. An outline is given of the manner in which the findings of this investigation can be applied to field problems of airport pavement design. CAA TDR 57.

Laboratory study of the soil stabilizing effectiveness of artificial resins with special emphasis on the aniline-furfural resins, by Hans F. Winterkorn. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1947. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122261

1. Soil stabilization 2. Resins, Aniline-furfural - Use in soil stabilization 3. Stabilizing agents - Tests 4. CAA TDN 43.

Laboratory study of the soil stabilizing effectiveness of a complex salt of abietic acid, by George W. McAlpin, Robert C. Mainfort and Hans F. Winterkorn. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1944. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122272

1. Soil stabilization 2. Abietic acid - Use as stabilizing agent 3. Stabilizing agents - Tests 4. CAA TDN 35.

Soil stabilization by the use of rosin, by Hans F. Winterkorn and George W. McAlpin. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1946. 26p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122271

1. Soil stabilization 2. Rosin - Uses 3. Stabilizing agents - Tests 4. CAA TDN 34.

Traffic accidents and violations, presented at the thirty-fourth annual meeting, Jan 11-14, 1955. Highway Research Board. 1956. 60p photos, drawings, diagrs, graphs, tables, map. Order from NAS-NRC Publications Office, 2101 Constitution Avenue, N. W., Washington 25, D. C. 90 cents. PB 122543

Contents: Role of roadway elements in Pennsylvania turnpike accidents, by Paul K. Eckhardt and John C. Flanagan. - Relation of accidents to speed habits and other driver characteristics, by B. A. Lefeve. - Habitual traffic violator, by Harry W. Case, Ismar Reiter, Ernst A. Feblowicz and Roger G. Stewart. - Comparison of types of traffic violations for different years, by A. R. Lauer and Elmer B. Siebrecht. - Automobile-crash injuries, by Charles A. Goodwin. HRB Bul 120, NRC 407.

INSTRUMENTS

Appraisal of the consolidated night vision tester, by Paul H. Ripple. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1949. 8p photos, tables. Order from LC. Mi $1.80, ph $1.80. PB 122392

This report is an appraisal of the Consolidated Night Vision Tester to measure its ability to meet present night vision testing criteria and a correlation of its performance by actual testing with the AF Eastman and the Hecht-Shlaer Night Vision Testers. AF SAM Proj 21-02-088.

Automatic data reduction, Part II: Catalog of devices useful in automatic data reduction, by Robert S. Hollitch and Albert K. Hawkes.

Armour Research Foundation, Chicago, Ill. Nov 1954. 80p. Order from OTS. $2. PB 111928

The catalog prepared in this report serves the purpose of summarizing the characteristics of devices useful in automatic data recording and reduction systems which are commercially available or under development. Included are analog voltage to digital converters, shaft position digitizers, digital plotters, digital to analog converters, digital voltmeters, and special tape recorders. For Part I see PB 111927. Project no. 7060. AF WADC TR 54-519, Part II. Contract AF 33(616)-2573.

Development of a fine-focus flash X-ray tube, by E. L. Criscuolo and D. T. O'Connor. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1952. 23p photos, drawings. Order from LC. Mi $2.70, ph $4.80. PB 120955

1. Radiography - Apparatus 2. X-ray tubes - Flash - Design 3. NAVORD 2338.

Discussion of some meters and test sets for the resistance measurement of electric primers and detonators, by A. M. Corbin. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1952. 22p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122077

The problem of measuring the resistance of a sensitive initiator such as a primer or detonator has resulted in the development of a number of special meters. This report presents a brief description of several special purpose meters and analyzes briefly the suitability of some common general purpose meters. All except the multimeters were designed for use with primers or detonators and had good low current characteristics. NAVORD 2288.

Electric log equipment of USS SEMMES, by W. B. Roberts. (Julian P. Friez & Sons). U. S. Naval Research Laboratory. Jul 1938. 17p photos, table. Order from LC. Mi $2.40, ph $3.30. PB 120428

1. Logs, Marine - Electrical equipment 2. Instruments, Electric - Tests 3. Contract NOs 59005 4. NRL B 1455.

Electrostatic method for controlling the parameters of a low frequency vibration pickup, by Ernest R. Kolsrud. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1951. 40p photos, drawings (1 fold), diagr, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120860

Displacements smaller than one micro-inch in the frequency range from 0.1 to 10 cycles per second may be measured and recorded with an inertia type pickup which consists basically of a mass suspended on springs and ligaments in the form of an inverted pendulum. Such a device is particularly useful in measuring seismic disturbances. NAVORD 2202.

Equipment and techniques for making pressure measurements in supersonic wind tunnels at Mach numbers up to 5, by J. M. Kendall. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 49p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122009

The equipment and techniques described in detail in this report were developed especially for use in the Intermittent Supersonic Wind Tunnel for measuring pressures where the stabilization time is very important. The techniques described give procedures for determining the dimensions of tubes running from the model to the pressure measuring equipment so that stabilization times will be equal to or shorter than the allowable blowing times. An actual example of determining tube dimensions is worked out to illustrate the use of the procedure. This procedure, in effect, puts tubing system design on an engineering basis. NAVORD 2580. NOL ARR 119.

Gas gain in the proportional counter, by T. A. Chubb. U. S. Naval Research Laboratory. Sep 1956. 21p drawing, graphs. Order from OTS. 75 cents. PB 121371

A study of gas gain characteristics in the proportional counter at gains of 10^2 and above has been made with about 29 low-pressure gas fillings, representative of a wide selection of chemical structures. Gas gains of 10^7 to 10^8 have been achieved for single electrons with certain of the organic molecules. The data, plotted on log gain vs voltage curves, show several facts. Excessive vapor pressure reduces the maximum gas gain which can be achieved with organic compounds without sparking. Increasing the component pressure of simple molecules, or adding a polyatomic component, permits operation at increased gain. The characteristic curves are essentially in agreement with current gas discharge theory. NRL R 4814.

Instruments for the measurement of local flame temperatures in high-velocity streams, by Conrad Grunfelder, Jr. Johns Hopkins University. Applied Physics Laboratory. Jan 1953. 32p diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 122972

The need for a method of accurately measuring point temperatures in a high-velocity burning gas stream has long been recognized. Such a method would be of great value in the determination of local combustion efficiency and flame-spreading characteristics. The current program, therefore, has been undertaken to develop a radiation-shielded thermocouple assembly and to investigate the pneumatic method of temperature measurement. CM-768. Contract NOrd-7386.

Kinetic and static friction of the "O" ring type gasket, by L. E. Hoblin, S. A. Humphrey and

T. E. Dinsmoor. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1952. 29p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120850

This survey was undertaken to provide supplementary data on the character of the frictional forces to expect when employing "O" ring type gaskets, and the results are presented in the form of design work sheets. NAVORD 2281.

Linear lumped parameter analysis of synchros. Part VII: Simple torque systems, by B. D. Fried and G. H. Rosenbloom. U. S. Naval Ordnance Laboratory. Jul 1953. 56p diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 120884

The main results of this report are the formulae for torque gradient and electrical error of a simple torque system, in terms of the basic building blocks - the impedances. The general methodology is similar to the one we have used in previous reports for control systems - transformation to the d,q coordinate system and the perturbation technique. However, the calculations are quite different for the two systems, since the analogs for the two systems - torque and voltage - are formally quite different. For Parts 1-3 and 5 see PB 120921, 120852, 120947 and 120836. NAVORD 2829.

Measurement of magnetic characteristics of "non-magnetic" materials, by M. Pasnak and D. I. Gordon. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1952. 40p drawing, diagrs, graphs, tables (6 fold). Order from LC. Mi $3, ph $6.30. PB 122080

The problem of measuring the magnetic properties of feebly magnetic materials in weak fields was investigated. Apparatus and techniques were developed for executing this study. These techniques and apparatus were utilized in the selection of materials for use in "non-magnetic" minesweepers. Special effects, such as "idealization" and "shaking" were also investigated. This report gives the details and results of this program. NAVORD 2415.

Needle static-pressure probes insensitive to flow inclination in supersonic air streams, by L. W. Walter and E. J. Redman. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1954. 26p drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120848

Tests were made to develop small static pressure needle-probes insensitive to flow inclination in a two-dimensional supersonic flow. A probe configuration was obtained which could be used to measure static pressure within $\pm 2\%$ at angles of attack from -8° to $+16^{\circ}$ at Mach number 1.5 and from -4° to $+12^{\circ}$ at Mach number 2.5. Assuming that the flow can be resolved into independent axial and transverse components, agreement between the pressure variation predicted using data taken with cylinders transverse to the flow and the pressure variation versus angle of attack measured with the probes was obtained. NAVORD 3694. NOL ARR 231.

NOL interferometer fringe pattern analyzer, by J. M. Kendall. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 22p photos, drawings, diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122065

The interferometer fringe pattern analyzer described here is a type of comparator which, with its associated mechanism, directly determines S(y), the fringe shift (not fringe position) occurring in interferograms of gas density variations in gas flows, and automatically plots this information on a sheet of coordinate paper 10" x 15" as a series of dots which when joined together become a curve of the fringe shift vs. units of distance of traverse. The analysis of the fringe pattern due to a cone in the supersonic wind tunnel at Mach 2.48 is given as an example of the use of the machine. NAVORD 1596.

NOL 100,000 psi adiabatic compressor. Third operation report, by George T. Lalos. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1954. 23p photo, drawings, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120888

1. Compressors, Adiabatic - Design 2. Plugs, Gas inlet - Design 3. NAVORD 3881.

Partial report on gas pulsator, by L. F. Campbell and T. O. Meyer. U. S. Naval Research Laboratory. Jan 1946. 33p photos, tables. Order from LC. Mi $3, ph $6.30. PB 123349

This work found that 48 special "sandwich" valves of plastic-impregnated glass-cloth between spring steel lasted for a total running time of 6 hours and 25 minutes. This laminated valve consisted of an 0.008-inch spring-steel vane on the striking side, a 0.006-inch spring-steel vane on the combustion side, and an insert of ethyl-cellulose-coated glass-cloth between the two steel vanes. This insert cushioned impact shock and insulated the striking vane from the heat of the combustion chamber. Other methods of extending vane life are discussed. NRL O-2730.

Principles of laboratory temperature control. Electronic relays. Thermistor operated temperature control, by Charles M. Proctor. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Tex. Mar 1955. 55p photos, drawings, diagrs, graphs, tables. Order from OTS. $1.50. PB 121120

Temperature sensing elements and regulated temperature bath design are discussed in Part 1. Two circuits for electronic relays and a mercury regulator to use with them are described in Part 2, one circuit using a low power pentode or dual triode, the other with a small thyratron. A ther-

mistor operated controller, described in Part 3, allows temperature to be set by a dial and controlled to +0.01°C or better. A protective mount is described for use with a thermistor in a water bath. A & M project 24, Reference 55-15T. Contract N7onr-48702, Project NR 083-036.

Report on test of RCA type TMV-75B field intensity meter, by Harold Granger. U. S Naval Research Laboratory. Mar 1939. 26p photos, drawing, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120432

1. TMV-75B (Meters, Field strength) 2. Meters, Field strength - Tests 3. NRL R-1520.

Superimposed coding for data storage, with an appendix of dropping fraction tables, by Mortimer Taube. Documentation, Inc., Washington, D. C. Sep 1956. 27p tables. Order from OTS. 75 cents. PB 121345

1. Coding devices 2. Data storage systems 3. Tables, Mathematical 4. Contract N onr-1305(00) technical report no. 15.

Speech compression research. Massachusetts Institute of Technology. Acoustics Laboratory. Nov 1955. 10p. Order from LC. Mi $1.80, ph $1.80. PB 120277

The speech compression system is based on the principle of coding and transmitting formant or articulatory information. The system consists of a speech analyzer at the transmitting end and a speech synthesizer at the receiver. The analyzer extracts from the speech wave signals that provide a simple description of the speech events; these signals are transmitted through a narrow-band channel and are used to control the speech synthesizer at the receiver. Status report under Contract AF 19(604)-626. AF CRC TN 55-983.

Very low frequency recording and analyzing instrument, by W. E. Austin. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1954. 25p drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120991

A frequency modulation system of magnetic tape recording for signals from d.c. to 15 cycles per second has been developed along with playback apparatus permitting wide band frequency analysis from .016 cycles per second to 4.2 cps. The recorder will operate over 24 hours unattended. The recordings are played back either 30 or 60 times faster than when recorded, producing frequencies great enough to be separated by special octave band pass filters which were developed. This equipment has been used for recording and analyzing low-frequency geomagnetic data and can be readily adapted for other applications. NAVORD 3615.

Marine borer control. U. S. Naval Research Laboratory. Order separate parts described below from OTS, giving PB number of each part ordered.

Part V: Studies on the leaching of cresote from wood, by T. R. Sweeney, T. R. Price, and R. A. Saunders. Aug 1956. 18p graphs, tables. 50 cents. PB 121410

The differential diffusion of creosote constituents from creosoted wooden panels was studied under conditions of accelerated and normal leaching with water. The standard accelerated leaching of 16 days at 80°C in flowing water brought about a total loss of material of nearly 70%. Distillation studies showed a loss of about one half of the material boiling over 360°C, two thirds of the 320°C to 360°C fraction, and all of the 0° to 270°C fraction. Tar acids were also rapidly lost from the wood. For Parts I-IV see PB 106763, 115476-115477, 111866. NRL R 4822.

Part VI: Evaluation of cresote after the removal of various distillation fractions, by T. R. Sweeney and T. R. Price. Aug 1956. 10p tables. 50 cents. PB 121433

Fractions of high-temperature coal tar creosote consisting of whole creosote from which cuts of various boiling ranges had been removed by fractional distillation were evaluated for their ability to protect wood against attack by marine borers. Two other fractions, the distillation residue and the petroleum-ether-soluble fraction freed of tar acids, were also tested. A linear relationship between attack and concentration of preservative was derived for each fraction. From this an estimate of the performance of each fraction relative to whole creosote was established. NRL R 4829.

Report of test on plywood pedestal, by P. J. Loatman and C. H. Grogan. (Frank Snedaker & Co.) U. S. Naval Research Laboratory. Jul 1943. 24p photos, diagr, graphs (part fold). Order from LC. Mi $2.70, ph $4.80. PB 120528

1. Plywood - Tests 2. NRL B 2117.

MACHINERY

Development of a mechanical cement spreader and accessories for use in soil cement construction, by R. C. Mainfort. U. S. Civil Aeronautics Administration. Technical Development and Evalu-

ation Center, Indianapolis, Ind. May 1944. 33p photos, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122280

1. Cements, Soil - Construction equipment
2. Cement spreaders - Design 3. Soil stabilization
4. CAA TDR 41.

Gas turbine drive system for wind tunnels requiring extremely high power, by Hans von Ohain. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1956. 14p diagrs. Order from OTS. 50 cents. PB 121488

The feasibility of a gas turbine drive system for extremely high power output (of the order of one million HP), and variable speed has been studied. It has been found that the development risk, time, and cost of such a drive system can be substantially reduced by applying a multiplicity of standard turbo jet engines as gas generator. A method of manifolding the individual exhaust jets into a common duct which assures the stability of the system has been given. It further has been shown that an impulse turbine can be designed which will satisfy the power speed requirements for driving large transonic or supersonic wind tunnel compressors; the dimensions of the machine components will be such as to permit their transportation by railroad. Also, the condition for easy accessability, and simple exchangeability of the individual turbo jets for preventive maintenance have been given. Project 1363, Task 70133. AF WADC TN 55-319.

Modifications of the A. E. compressor, by Donna Price and Julian B. Lewis. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 15p drawing, tables. Order from LC. Mi $2.40, ph $3.30. PB 120839

These parts which are described include an end plug cover, a side window assembly, and a new piston face. Their installation reduced dead space to 16 - 30% of the volume of the gas at maximum compressions, V_r, and thus operation of this compressor at pressures for which it was designed can now be attempted. Measurements reported here suggest two other simple modifications to reduce the dead space to 6 - 20% V_r. Successful replacement of neoprene with aluminum gaskets and correction of the piston release mechanism are also reported. NAVORD 2596.

Three-dimensional flow in axial-flow turbo machinery, Part 3, by Leroy H. Smith, Jr. Johns Hopkins University, Baltimore, Md. Mar 1956. 14p graphs, drawings. Order from OTS. 50 cents. PB 121489

The blade design method used to determine the shapes of the blades in the test stage reported in Volume I of WADC TR 55-348 (PB 121052) is given. Drawings of the resulting blade element profiles are also presented. Project 3066, Task 70153. For Vol. I see PB 121052. AF WADC TR 55-348, vol. II. Contract AF 33(616)-152.

MEDICAL RESEARCH AND PRACTICE

Adaptation to ionizing radiation, by A. T. Krebs and John B. Storer. U. S. Army Medical Research Laboratory, Ft. Knox, Ky. Feb 1955. 19p graphs, table. Order from OTS. 50 cents. PB 121352

The literature on acquired radioresistance (adaptation) has been reviewed briefly. A definition of adaptation and criteria for the evaluation of experiments have been proposed. Theories of mechanism were discussed. Original studies on unsuccessful attempts to adapt mice to total-body radiation were reported. It was concluded that adaptation does occur in certain tissues but that considerably more information is required before the significance and possible importance of the phenomenon can be evaluated. AMRL project no. 6-59-08-014. AMRL R 175.

Analog correlator system for brain potentials, by John S. Barlow and Robert M. Brown. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jul 1955. 43p photos, diagrs, (1 fold) graphs. Order from LC. Mi $3.30, ph $7.80. PB 123216

Brain potentials amplified by standard electroencephalographic equipment are recorded on a multichannel FM magnetic tape recorder. Autocorrelation and cross-correlation functions of the tape-recorded signals are automatically computed as the tapes are played back repeatedly by an electronic analog multiplier and integrator; a magnetic drum introduces the desired interchannel delays. Averaged responses to sensory stimuli are detected by crosscorrelating brain potentials with the stimuli, by means of a gating and storage technique. Examples of correlation functions for brain potentials and for known signals are given. MIT RLE TR 300.

Graphic summary, selected infectious diseases of importance to the public health, by Phebe W. Summers. U. S. Chemical Corps. Army Chemical Center, Frederick, Md. Sep 1954. 59p maps, tables. Order from OTS. $1.50. PB 121449

The charts included in this pamphlet are summaries of available information on diseases of importance to the public health. No attempt has been made to be all-inclusive, only pertinent points being included. An appendix is included which summarizes the diseases included by various groupings; e.g., methods of distribution, mortality rates, etc. A glossary of terms is also included for the benefit of those persons not trained in the field of bacteriology and public health.

Normal human EKG and its common variations in experimental situations, by Terence F. McGuire. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1956. 72p diagrs. Order from OTS. $2. PB 121528

An attempt has been made to define as clearly as possible, within the limits of presently accepted knowledge, the boundaries of normal in electrocardiography. "Normal" having been defined, attention is turned to possible changes during experimental procedures. These changes include the following five basic modes or combinations thereof: positional effect, chemical effect, circulatory effect, nervous system effect, and temperature effect. Varying arrhythmias and conduction defects are discussed, as are cardiac chamber dilitation, cardiac strain, myocardial hypoxia, and various EKG artefacts. Project no. 6333. AF WADC TR 56-309.

Orthostasis and the kidney, by James P. Henry. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1955. 111p diagrs, graphs, table. Order from OTS. $3. PB 121382

A series of localizing experiments is described in which distension of the pulmonary vascular bed and left atrium by a balloon induced a diuresis, whereas distension of the pulmonary bed alone, by snares on the veins, was ineffective. The mechanism of the oliguria, vasoconstriction and proteinuria which often follows orthostasis may be illuminated by these observations. They may apply to the diseased as well as healthy kidney. Preliminary evidence is presented concerning the mechanism of the vasovagal collapse and oliguria which frequently follows prolonged orthostasis. Project 7216, Task 71712. AF WADC TR 55-478.

Ventricular fibrillation in the hypothermic dog, a study of underlying causes and means of control, by Albert H. Hegnauer. Boston University. School of Medicine, Boston, Mass. Feb 1955. 43p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120265

The effectiveness of a number of antifibrillary drugs including Dacorene, procaine amide, and Dilantin is evaluated. By means of a technique permitting direct measurement of ventricular excitability during cold water exposure, the occurrence of ventricular fibrillation is demonstrated to be associated with a significant rise of ventricular excitability during diastole. Experimental evidence shows that both the injury potential and the extremely low excitability thresholds are due to respiratory acidosis. AD 63618. See also PB 110070 for earlier report. AF WADC TN 55-79. Contract AF 18(600)-65.

METALS AND METAL PRODUCTS

Cemented borides. Summary progress report for the period Jun 1, 1954-Jul 31, 1955 under Contract N6 onr-256/1, by Ira Binder and David Moskowitz. American Electro Metal Corp., Yonkers, N. Y. Jul 1955. 140p photos, graphs, tables. Order from OTS. $3.50. PB 121346

A new high temperature material, Borolite IV, has been found. This material, comprising several compositions of the type Cr_2B+Cr-Mo alloy, has outstanding characteristics in heat shock resistance, oxidation resistance and stress-to-rupture strength through 2000°F. Impact strength of Borolite IV as such is not yet good enough for most desired uses, but coating experiments have given promise that this can be improved considerably. AD no. 71936. For earlier reports see PB 118675 and PB 117522.

Collected data on the magnetic properties of non-metallic compounds, by J. Samuel Smart. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1949. 16p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123582

A brief resume is given of the progress made in collecting and analyzing data on the magnetic properties of non-metallic compounds. The greater part of the data collected is on the simple compounds of the iron group, especially the oxides and halides. Particular attention has been given to compounds suspected of being antiferromagnetic and to those with the spinel structure. Several compounds have been identified as probably being antiferromagnetic, including $NiSO_4$, $CoSO_4$, VCl_3, and $FeTiO_3$. Existing data on ferrites is given in a table. NOL M 10496.

Computed spontaneous magnetization curves for ferromagnetic materials, by Alice Warfield, J. Samuel Smart and Roald K. Wangsness. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1954. 50p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122057

Curves of spontaneous magnetization versus temperature have been computed for simple ferrimagnetic materials containing only one kind of magnetic ion. The results for various values of the parameters λ, α, and β are shown in tables and graphs. NAVORD 3815.

Creep properties of metals under intermittent stressing and heating conditions. Part 4: Creep results for Alclad 7075-T6 aluminum alloy and comparison with results for other materials, by

N. H. G. Daniels, H. B. Masuda, and John E. Dorn. California. University. Institute of Engineering Research, Berkeley, Calif. May 1956. 101p diagrs, graphs, tables. Order from OTS. $2.75. PB 121435

A study was made of the creep properties of clad aluminum alloy 75S-T6 under intermittent heating and loading conditions at 300°F and 600°F. A few tests were also conducted at 450°F under intermittent heating conditions. A review of the literature has shown that although in a significant proportion of cases the above analysis can be used successfully, the function f often varies considerably with strain, and in some instances is not independent of the type of intermittent condition. Nevertheless even the approximate prediction of intermittent creep data by flexible use of the method is likely to be of value. The test results were also compared on a basis of net time at temperature under load. AF WADC TR 53-336, Part 4. Contract AF 33-(038)-11502.

Ductile fracture of metals: Diameter gage and dynamometer for true stress-strain tension tests at constant true strain rate, by Gordon W. Powell, Earle R. Marshall, Walter A. Backofen, and John Wulff. Massachusetts Institute of Technology. Dept. of Metallurgy. Metals Processing Division. Feb 1955. 30p photo, drawings, diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120296

A detailed design is presented for a diameter gage and dynamometer that may be used for tension testing to establish true stress-strain curves at constant true strain rate. To illustrate the use of the apparatus and the information that it can provide, typical data are included from tests on type 301 austenitic stainless steel at several strain rates at temperatures of 20°C and -196°C. Technical report no. 6 under Contract no. N5ori-07841, Project no. NR 031-356.

Effect of alloying and cold working on the activation energy for creep of aluminum, by O. D. Sherby and P. W. Flynn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Jun 1955. 19p graphs, tables. Order from OTS. 50 cents. PB 121298

The activation energies for creep of dilute aluminum alloys at elevated temperatures were determined by a technique involving rapid changes in temperature under constant stress. The results revealed that the activation energy for creep is insensitive to dilute solid solution alloying with zinc, cadmium, germanium, magnesium and copper, to dispersion hardening with $CuAl_2$ particles in an Al-Cu alpha solid solution alloy and to cold working. The various activation energies obtained can be contained within the value 34,500 calories per mole plus or minus 3500 calories per mole. UC IER Series 22, Issue no. 42. Contract N7 onr-295, T. O. II, NR 031-048.

Effect of stress on microhardness, by F. H. Vitovec. Minnesota. University. Dept. of Mechanics and Materials, Minneapolis, Minn. Aug 1956. 28p photo, diagr, graphs. Order from OTS. 75 cents. PB 121534

Microhardness is investigated as a function of test load for mild steel, Armco iron, copper, brass, zinc and cadmium. At light loads a discontinuity of slope in the hardness-load curve is observed which can be attributed to subgrain structure. A tension-compression fixture was developed and used to study the effect of stress on the microhardness of mild steel, brass, and copper specimens. For initially stress free specimens, tensile stress causes a decrease in microhardness over a certain range of test load, and compressive stress results in a slight increase. The effect of stress on microhardness is complicated by the discontinuous slope in the hardness-load curve introduced by subgrain structure effects. Project no. 7360. AD 97201. AF WADC TR 56-282.

Effect of transverse compressional stress on magnetic properties, by R. E. Fischell. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1954. 36p photos, drawing, graphs, table. Order from LC. Mi $3, ph $6.30. PB 122056

Toroidal, laminated cores of several important magnetic materials were tested for their magnetic properties at compressional stresses ranging from 0 to 500 pounds per square inch. The compressional stress was applied in a direction perpendicular to the plane of the laminations and perpendicular to the direction of the magnetic field. The materials tested were 3.5% and 6.4% silicon-iron, 81% and 90% nickel-iron, and both hydrogen- and air-annealed samples of AEM 4750, 12 Alfenol and 16 Alfenol. Tests were run at frequencies of zero, 60, and 400 cycles per second. The experimental results indicate that magnetic effects of transverse compressional stress are dependent on the magnitude and independent of the sign of the magnetostriction. NAVORD 3796.

Effect of type of cold-deformation on the recrystallization properties of Armco iron, by Herman F. Kaiser and Howard F. Taylor. U. S. Naval Research Laboratory. Jul 1938. 40p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120434

1. Iron - Recrystallization 2. Iron - Deformation - Effects 3. NRL M-1456.

Electron microscopy of aluminum crystals deformed at various temperatures, by Thomas Sherman Noggle. Illinois. University, Urbana, Ill. Jul 1955. 96p photos, drawing, graphs, tables (part fold). Order from LC. Mi $5.40, ph $15.30. PB 123164

The present program was initiated with the objective of examining the surface structures of aluminum

deformed at low temperatures. In view of the differences in the structures reported by different investigators (who also used different replica methods), some preliminary work on aluminum deformed at room temperature was carried out. Using both the aluminum oxide and silicon monoxide replica methods, it was established that the results obtained by both methods were in general agreement with each other and with the results published by Kuhlman and Wilsdorf. Supplementary data on stress-strain behavior and from X-ray examination were also obtained. Report was submitted as thesis to University of Illinois. Contract N6 ori-071(54), Technical report no. 2.

Evaluation of forgings of 4330 modified, 4340, and 98B40 steels at high-strength and levels, by F. J. Ragland, Jr. and G. N. Barrett, Jr. Cleveland Pneumatic Tool Co., Cleveland, Ohio. Mar 1954. 101p photos, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 122590

A study was made of the high strength characteristics of large steel landing gear forgings. Mean ultimate strengths ranging from 200,000 psi to 270,000 psi were investigated for forgings made from 4330 modified, 4340 and 98B40 steels. The physical properties in directions parallel to the axis, transverse to the axis clear of the flash line and transverse to the axis across the flash line of the forgings were determined in heat treated sections approximating an actual part made from these forgings. AF WADC TR 54-89. Contract AF 33-(616)-376.

Influence of hot-working conditions on high-temperature properties of a heat-resistant alloy, by John F. Ewing and J. W. Freeman. U. S. National Advisory Committee for Aeronautics. Aug 1956. 135p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123499

A study was made to determine the influence of various hot-working conditions on the high-temperature properties of a heat-resistant alloy. The effects of hot-working on response to subsequent heat treatment were also studied. The working conditions varied were temperature, amount of reduction, and a combination of both. The evaluation of the effects of rolling was based on rupture and creep tests, hardness measurements, microstructural examination, and lattice-parameter measurements. NACA TN 3727.

Investigation of the compressive, bearing and shear creep-rupture properties of aircraft structural metals and joints at elevated temperatures, by F. J. Vawter, G. J. Guarnieri, L. A. Yerkovich, and G. Derrick. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Jun 1956. 194p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.50. PB 121436

The intent of this investigation is to supplement conventional tensile creep data of several aircraft structural alloys with compression, bearing, and shear properties as well. While these data alone are of interest, a correlation is being attempted between tensile creep and compression, bearing, and shear creep properties so that the latter type of data may be predicted from tensile creep properties alone. This report includes descriptions of equipment and fixtures for conducting tensile, compression, bearing, and shear creep tests. Tensile creep properties are reported at several test temperatures for the following alloys: (1) 2024-T3 aluminum sheet, 0.064 and 3/16 inch thick; (2) C-110M titanium sheet; (3) type 321 stainless steel sheet; (4) 2117-T4 aluminum rivet wire; (5) Monel rivet wire; and (6) type 301 stainless steel rivet wire. Bearing and shear creep characteristics are included for the 2024-T3 aluminum alloy. Project no. 7360, Task no. 73605. Covers period of work from Jun 1952 to Dec 1953. AF WADC TR 54-270, Part 1.

Investigation of compressive-creep properties of aluminum columns at elevated temperatures. Battelle Memorial Institute, Columbus, Ohio. Contract AF 33(038)-9542. Project no. 7360. Order separate parts described below as indicated, giving PB number of each part ordered.

Part II: Stability problems, by R. L. Carlson and G. K. Manning. May 1954. 83p photos, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 120298

A method for estimating allowable load capacities of columns subject to creep is presented. The method, which utilizes approximate stress distributions derived from isochronous-stress-strain curves to estimate column load capacities, is shown to be conservative for the time for which the estimate is made. An application of the method is made to test data on as-received and on stabilized 24S-T4 aluminum alloy. A comparison of the computed column capacities with experimental capacities indicates that the method is satisfactory for estimating the decrease in capacity with increasing time. AD 43524. Covers work from 1 Nov 1952 to 31 Jan 1954. For Parts I and III see PB 122099, 111896. AF WADC TR 52-251, Part 2.

Part IV: Additional studies, by R. L. Carlson, E. G. Bodine and G. K. Manning. Apr 1956. 80p photo, graphs, tables. Order from OTS. $2. PB 121465

A summary and an analysis of the results of an experimental study of the creep buckling of columns is presented. The results include investigations of the behavior of short, inelastic columns of the aluminum alloy 2024-T4, of square tubing columns of aluminum alloy 2024-T3, and columns of the stainless steel 17-7PH (THD 1050). Shanley's time-dependent tangent modulus is applied to the test data, and it is

found to be fairly successful in providing an estimate of the possible loss in load capacity with time. It is observed, however, that the agreement with test data can be expected to vary significantly with column imperfection. The possible existence of a lower load limit below which collapse will never occur is discussed. Covers work from 1 Dec 1954 to 1 Dec 1955. AF WADC TR 52-251, Part 4.

Investigation of the sensitivity limits of fluoroscopy for light alloy casting inspection, by D. T. O'Connor and D. Polansky. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1951. 101p graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 122076

Expressions have been developed which describe the sensitivity or quality of fluoroscopic images in terms of measurable characteristics of x-ray tubes and fluoroscopic screens. Experimental data are presented in support of these expressions. The requirements imposed by adequate fluoroscopic viewing are used to specify the design features of a proposed fluoroscopic x-ray tube. A fourfold improvement in fluoroscopic sensitivity in the inspection of aluminum and magnesium alloys is demonstrated. Full utilization of the principles developed permit such inspection at a sensitivity of two percent, meeting the present requirement of federal specifications for the radiographic inspection of materials. TED NOL AE 411001. NAVORD 2168.

Light armor investigation. Fourth partial report: Laminated, spaced, and compound plates, by George R. Irwin. U. S. Naval Research Laboratory. Apr 1938. 13p table. Order from LC. Mi $2.40, ph $3.30. PB 120424

For Part I see PB 122667.
1. Steel plates - Impact tests 2. Armor plate - Impact tests 3. NRL O-1440.

Magnetic effects of compressional stress at low field intensities, by R. E. Fischell. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1955. 20p photos, drawing, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120824

Toroidal, laminated cores of several important magnetic materials were tested for the low field intensity magnetic properties at compressional stresses ranging from 0 to 500 pounds per square inch. The materials tested were hydrogen-annealed specimens of 3.5% and 6.4% silicon-iron, 81% and 90% nickel-iron, 4-79 and 5-79 moly-permalloy, and hydrogen- and air-annealed specimens of AEM-4750, 12 Alfenol and 16 Alfenol. NAVORD 4050.

Mechanical tests on specimens from large aluminum-alloy forgings, by James A. Miller and Alfred L. Albert. U. S. National Advisory Committee for Aeronautics. Aug 1956. 25p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123501

Results of tensile and bend tests on specimens in the T6 condition from 12- by 24-inch hand forgings of 7075 (75S) and 2014 (14S) aluminum alloy are presented. Properties are given for specimens from various locations within the forgings as well as for specimens oriented in both the longitudinal and transverse directions. NACA TN 3729.

Method of determining laminations in steel plates. First partial report: The relation of mill practice to laminations in steel plates, by R. H. Canfield. U. S. Naval Research Laboratory. Nov 1935. 14p photos, drawings. Order from LC. Mi $2.40, ph $3.30. PB 120657

1. Steel plates - Defects - Determination 2. NRL M 1211.

Poisson's ratios and volume changes for plastically orthotropic material, by Elbridge Z. Stowell and Richard A. Pride. U. S. National Advisory Committee for Aeronautics. Aug 1956. 28p photos, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123504

Measurements of Poisson's ratios have been made in three orthogonal directions on aluminum-alloy blocks in compression and on stainless-steel sheet in both tension and compression. These measurements, as well as those obtained by density determinations, show that there is no permanent plastic change in volume within the accuracy of observation. A method is suggested whereby a correlation may be effected between the measured individual values of the Poisson's ratios and the stress-strain curves for the material. Allowance must be made for the difference in the stress-strain curves in tension and compression; this difference, wherever it appears, is accompanied by significant changes in the Poisson's ratios. NACA TN 3736.

Properties of bolts under shock loading, by E. W. Clements. U. S. Naval Research Laboratory. Sep 1956. 40p photos, drawings, graphs (part fold.), tables. Order from OTS. $1.25. PB 121372

Four designs of bolts have been prepared from SAE 4140, SAE 1020 hot-rolled, and SAE 1020 cold-rolled steels, and subjected to typical shipboard shock motions while restraining loads of various magnitudes. Such quantities as the velocity and acceleration of the restrained load, the velocity of the shock machine anvil table, and the dynamic strain and plastic elongation of the specimen bolt have been measured. Comparisons of static and dynamic stresses and elongations have been made to reveal how their relationship is affected by variation of bolt geometry and material. Bolts of SAE 4140 steel have been found usually to possess a more desirable combination of properties than those of the other steels tested. NRL R 4817.

Research on the weldability of iron alloys, by Clarence E. Jackson, George C. Luther, and Myron A. Pugacz. U. S. Naval Research Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

A correlation of tests for weldability and calculated hardenability for carbon-manganese steels. Apr 1942. 43p photos, graphs, tables. Mi $3.30, ph $7.80. PB 120562

1. Steel - Hardenability - Tests 2. Steel - Weldability - Tests 3. Steel, Carbon-manganese - Weldability 4. Iron alloys - Weldability - Tests 5. NRL M 1870.

Weldability tests and calculated hardenability for 42 carbon-manganese steels. Aug 1942. 30p photos, graphs, tables. Mi $2.70, ph $4.80. PB 120538

1. Steel - Hardenability - Tests 2. Steel - Weldability - Tests 3. Steel, Carbon-manganese - Weldability 4. Iron alloys - Weldability - Tests 5. NRL M 1925.

Resume of the experience of the U. S. Naval Torpedo Station with welding in the fabrication or repair of pure aluminum navol tanks for hydrogen peroxide service, by C. B. Rex. U. S. Naval Torpedo Station, Newport, R. I. Aug 1950. 19p. Order from LC. Mi $2.40, ph $3.30. PB 123214

1. Aluminum - Welding 2. Welding - Methods.

Roll cladding of base metals with titanium, by Peter F. Mataich and F. Clifton Wagner. Horizons, Inc., Cleveland, Ohio. Dec 1953. 36p photos, drawings, diagrs, graphs, tables. Order from OTS. $1. PB 121479

A study of the roll cladding of titanium to steel was conducted using intermediate layers of a number of different metals as bonding agents. It was found that (1) the metals, iron, nickel, cobalt, and copper were not suitable because of the presence of a weakening intermetallic layer in the bond zone; (2) chromium, when plated on the titanium bonding surface, did not bond well to steel during the roll cladding operation. However, one experiment was conducted with the chromium layer plated on the steel bonding surface and a high strength bond was obtained; (3) silver bonded to titanium gave a fairly strong bond, 24,000 psi, but a layer of nickel was required between the silver and the steel to bond them together; (4) experiments with electroplated manganese as an intermediate bonding layer between titanium and steel were inconclusive because of difficulty in obtaining a γ manganese layer on the surface of titanium; (5) molybdenum formed a strong bond with titanium but could not be bonded firmly to the steel; (6) a type 410 stainless steel gave a stronger bond than most of the pure metals individually, but not as strong as the bond obtained using a nickel plus silver intermediate layer, or as that obtained using chromium electroplated on the steel. AD 29400. AF WADC TR 53-502. Contract AF 33(616)-393.

Soldering of aluminum and its alloys. Comprehensive review of the literature, by J. Byron Jones, F. R. Meyer, and C. D. Twardowski. Aeroprojects, Inc., West Chester, Pa. Jan 1954. 214p tables (part fold.) Order from LC. Mi $9.60, ph $33.30. PB 123215

Section I summarizes development and current practices of the art of aluminum soldering. Section II reviews developments in ultrasonic soldering from 1936. Section III is a concise statement of conclusions and recommendations for future lines of research. The bibliography includes 898 numbered references, most of which have abstracts or annotations. All but 60 of these references were checked. U. S. patents were individually checked and errors in previous listings were corrected to conform with Patent Office records. Ordnance Corps project no. TB4-31G-4. Research report no. 54-8. Contract DA 36-034-ORD-1401.

Solidification studies (Part of steel casting research problem), by C. W. Briggs. U. S. Naval Research Laboratory. Feb 1934. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120649

1. Steel castings - Solidification - Research 2. NRL M 1026.

Spectrographic method for analyzing zirconium hydride, zirconium metal, and zirconium-nickel alloys, by Sol Weisberger. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Jul 1955. 26p tables. Order from OTS. 75 cents. PB 111842

It is concluded that the developed method is satisfactory and has a useful range from 0.5% to 1.0% for the determination of iron, aluminum, titanium, magnesium, silicon, and calcium in alloys. This same range applies to the chromium contents of the zirconium-nickel alloys. For the hafnium contents of zirconium and zirconium hydride, the range extends from approximately 0.5 to 10.0%. PA TR 2206.

Study of aluminum deformation by electron microscopy, by A. P. Young, C. W. Melton, and C. M. Schwartz. U. S. National Advisory Committee for Aeronautics. Aug 1956. 39p photos, diagrs, graph. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123500

The slip-line structure in a series of aluminum single crystals at various stages during deformation was examined in an electron microscope. The slip-line structure was also investigated in crystals strained after various degrees of prestraining. On the basis of the data from this study and from other investigations a theory is proposed for the deformation mechanism in aluminum crystals. The possible effects of short-range ordering on deformation modes are discussed. NACA TN 3728.

Study of the efficiency of high-strength, steel, cellular-core sandwich plates in compression, by Aldie E. Johnson, Jr., and Joseph W. Semonian. U. S. National Advisory Committee for Aeronautics. Sep 1956. 26p drawing, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123512

Structural efficiency curves are presented for high-strength, stainless-steel, cellular-core sandwich plates of various proportions subjected to compressive end loads for temperatures of 80°F and 600°F. Optimum proportions of sandwich plates for any value of the compressive loading intensity can be determined from the curves. The efficiency of steel sandwich plates of optimum proportions is compared with the efficiency of solid plates of high-strength steel and aluminum and titanium alloys at the two temperatures. NACA TN 3751.

Survey of available literature on the rapid combustion of metals in air, by Saul Haffner. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Sep 1954. 19p tables. Order from OTS. 50 cents. PB 121347

A literature survey made to determine what metal or combination of metals would be the most suitable constituent for photoflash bombs indicates the best combination as a mixture of 91% aluminum, 7% magnesium, and 2% zirconium. Ordnance project TA2-9201. Dept. of the Army project 504-01-027. PA TR 2061.

Testing methods for soldering fluxes, by Frederick Hockberg. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Nov 1954. 75p photos, drawings, tables (1 fold). Order from OTS. $2. PB 111843

This report contains a discussion of soldering fluxes with particular emphasis on rosin-based fluxes. Several test methods are presented which were developed to measure the degree of corrosion and electrical leakage attributable to the use of various commercially available rosin-based fluxes in the assembly of electrical and electronic equipment. These tests include the effect of flux on: a) thin copper films; b) the strength of fine copper wire; c) electrically polarized wire; d) the electrical resistivity between terminals mounted on PBE-P terminal strips; and e) the measurement of the amount of water-soluble ionizable materials in soldering fluxes. Signal Corps project nr. 0152A. Dept. of the Army project nr. 3-99-15-021. SCEL TM 1436.

X-ray lattice strains in plastically deformed metals, by D. Rosenthal, M. Kaufman, R. Asimow and D. Hasanovitsh. California. University. Dept. of Engineering, Los Angeles, Calif. Aug 1955. 92p photos, drawings, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 122402

Lattice strain is defined as the relative change, caused by an applied stress, in the spacing of a particular family of crystallographic planes. The trends in the lattice strains provide a useful tool for studying those aspects of plastic deformation which arise from the interaction among the crystals of the aggregate. Project R-355, 20-11. AF OSR TR 55-31. Contract AF 18(600)-1022.

METEOROLOGY AND CLIMATOLOGY

Case study of an easterly jet stream in the tropics, by M. A. Alaka. Chicago. University. Dept. of Meteorology. Mar 1955. 40p maps, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 119922

In the last few years, the account of raob and rawin observations in the region south of the United States has been increased sufficiently so that this region now contains what may be termed the nearest approximation to a network of high-tropospheric reports in lower latitudes. Therefore, in the course of an experiment in tropical analysis and forecasting conducted in Miami during the summer of 1953, close watch was kept for indications of easterly jet occurrence south of latitude 30°. Evidence was soon forthcoming; the present paper deals with the best-documented case encountered. Technical report under Contract N6 ori-02036.

Drag and evaporation of dry ice models in supersonic air flow, by K. H. Gruenewald. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1953. 19p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122041

A theory for determining air densities at high altitudes from meteoric data has been developed. The application of this theory requires the knowledge of the numerical values to two quantities, namely aerodynamic drag and mass loss, of meteors which have to be estimated. In order to substantiate the quantitative aspect of this theory an experimental investigation was undertaken of evaporation rate and drag of vaporizing models in a supersonic wind tunnel. An accuracy of the test results within 30 percent of the actual values was considered sufficient to satisfy the theory. NAVORD 2954. NOL ARR 189.

Effect of a high-frequency disturbance on the direct-current corona from a sharp point, by Marcus O'Day. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Aug 1940. 23p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122295

Reprinted 1941.
1. Corona discharges - Intensity - Measurement
2. Radio interference - Aircraft 3. CAA TDR 27.

Geodetic procedures used by RCA-MTP, by B. U. Glass. U. S. Air Force, Air Research and Development Command, Missile Test Center, Patrick Air Force Base, Fla. Feb 1956. 45p tables. Order from LC. Mi $3.30, ph $7.80. PB 122382

This report presents an outline of the methods used by RCA-MTP for accomplishing the following: 1. Coordinate transformation on the earth's surface. 2. The determination of radial and transverse coordinates from the Laborde projection. 3. The direct and reverse geodetic problems. RCA data reduction technical report, no. 26. AF MTC TN 56-7.

Interpretation of diffusion times, by Phillip W. Mange. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Mar 1956. 40p graphs, tables. Order from OTS. $1. PB 121273

The "time of diffusion" criteria used to describe the rapidity of neutral molecular diffusion in the high atmosphere are compared. It is shown that these are not well defined in terms of absolute or relative concentration changes to be expected. However, it is found that some of these criteria have a relative altitude dependence for which a precise physical meaning can be given. A single relative criterion is then defined which is calibrated, without great difficulty, in the absolute sense, for a given constituent, and which has concrete physical meaning. As a supplement, the use of Lettau's theory for simultaneous diffusion and mixing is shown to support an earlier conclusion with regard to the action of turbulence affecting the distribution of molecular oxygen in the atmosphere above 100 km. AF CRC TN 56-288. PSC IRL SR 83.

Low visibility airport windrose summaries, by Robert W. Knight. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1940. 231p. Order from LC. Mi $10.20, ph $36.30. PB 122267

This report of wind and climatic conditions during periods of restricted visibility, covers the 5-year period from 1934 to 1938, inclusive. A suitable type of windrose chart was developed to portray the results pictorially, and show other important data in convenient reference form. These charts are intended for use in planning airport runways, extensions, and air navigation facilities, including instrument landing systems. CAA TDN 22.

Measurement and analysis of the rotational fine structure of the ν_2 fundamental of ozone, by William E. Nexsen, Jr. Ohio State University. Dept. of Physics and Astronomy, Columbus, Ohio. Jan 1956. 53p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122352

The fundamental of ozone has been investigated with a high resolution vacuum spectrometer. The sample was contained in a multiple traversal cell which gave an absorption path of eight meters. Over 300 absorption maxima were measured in the region from 787 cm^{-1} to 656 cm^{-1}. The band exhibits the properties of a perpendicular band of an almost symmetric rotator. Molecular constants were obtained from analysis of the band. Scientific report no. 1 under contract AF 19(604)-1003. AF CRC TN 56-265. OSURF Proj 587, Scientific report 1.

Measurements of atmospheric turbulence over a wide range of wavelength for one meteorological condition, by Harold L. Crane and Robert G. Chilton. U. S. National Advisory Committee for Aeronautics. Jun 1956. 18p photo, diagr, graphs, map. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123487

A power spectrum of gust vertical velocity over a wide range of wavelengths, 10 feet to 60,000 feet, has been obtained by a simultaneous set of measurements in flight. The method used, which had the advantage of not involving airplane transfer functions, proved to be practicable. The data were obtained on film records and the power spectrum was calculated by digital methods. NACA TN 3702.

Practical aspect of tropical meteorology, by C. E. Palmer, C. W. Wise, L. J. Stempson, and G. H. Duncan. U. S. Air Force, Air Weather Service, Andrews Air Force Base, Washington, D. C. Sep 1955. 199p drawings, diagrs, graphs, tables. Order from LC. Mi $8.70, ph $30.30. PB 122153

The report is in seven parts. After a short introduction, the manner in which the tropical forecaster may utilize climatological information is discussed. The next section emphasizes that the approach to the evaluation of tropical data is different from that which is standard in high latitude meteorology. Then follows a long discussion of wind analysis, using streamlines and isotachs. The fifth section covers methods of analyzing cloud and weather distribution; the methods outlined here are designed specifically for use in tropical regions. The sixth section deals with problems of correlation of wind and weather patterns, of continuity and with related topics; the material is presented chiefly in the form of practical examples. Finally, the structure, genesis and movement of tropical cyclones are briefly discussed. AF AWS M 105-48.

Preliminary results of project Cloud Trail. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Feb 1956. 27p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122152

This report presents findings based on winter and spring data collected in Project CLOUD TRAIL. The Project has provided accurate observations of the occurrence or non-occurrence of contrails, cirrus clouds, and high-level turbulence. The data

have been used as a basis for improved methods of forecasting contrails, cirrus clouds, haze, and turbulence at the heights of operation of jet aircraft as well as for constructing contrail probability curves which do not require the specification of relative humidity. Section IV of this Report presents a test (based on CLOUD TRAIL data) of the accuracy of the method in AWS TR 105-110, June 1953, for estimating the height of cirrostratus clouds. AF AWS TR 105-132.

Report on the off-season operation of the Air Force Hurricane Office, 1947-1948. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Jul 1948. 48p map, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120356

1. Hurricanes - Forecasting 2. AF AWS TR 105-37.

Some observations of atmospheric noise and propagation factors in the Arctic. Report on project "Nanook", by Warren M. Rieth. U. S. Naval Research Laboratory. Dec 1946. 22p photos, graph, map. Order from LC. Mi $2.70, ph $4.80. PB 122128

1. Noise, Atmospheric - Arctic 2. Project "Nanook" 3. NRL R 3023.

Static direction finder research. Report, by W. M. Lockhart. U. S. Naval Research Laboratory. May 1937. 29p photo, drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120653

1. Static tests 2. Cyclones - Forecasting - Methods 3. Cyclones, Tropical - Forecasting 4. Hurricanes, Tropical - Forecasting 5. NRL R 1370.

Whistling atmospherics, by Harold E. Dinger. U. S. Naval Research Laboratory. Sep 1956. 40p photos, diagrs, map, graphs. Order from OTS. $1. PB 121408

Since 1953 NRL has been observing and recording audio-frequency atmospherics and their correlation with other geophysical phenomena. Beginning in April 1955, the diurnal variation in both whistler activity and the occurrence of "dawn chorus" has been recorded in an attempt to prove L. R. O. Storey's theory on the mode of propagation of these atmospherics. Many whistlers of unusual character have been spectro-analyzed for the purpose of extending present theory to cover the general case. Plans have been formulated for synoptic observations at a number of selected locations during the International Geophysical Year. NRL R 4825.

MINERALS AND MINERAL PRODUCTS

Analysis of the DC and pulsed thermionic emission from BaO, by George A. Haas. U. S. Naval Research Laboratory. Jul 1956. 17p graphs. Order from OTS. 50 cents. PB 121270

The effects of field penetration and donor mobility on the chemical potential of BaO have been computed by using a nondegenerate single-donor-level semiconductor model. The calculations predict that the pulsed emission starts lower but increases with field more rapidly than given by simple Schottky theory, actually being capable of exceeding the theoretical Schottky emission. The dc emission level is always lower than the pulsed emission, the difference being more pronounced at higher fields and for less active cathodes. NRL R 4780.

Drop test for the evaluation of the impact strength of cermets, by B. Pinkel, G. C. Deutsch and N. H. Katz. U. S. National Advisory Committee for Aeronautics. Mar 1955. 8p photo, drawings, diagr. Order from LC. Mi $1.80, ph $1.80. PB 123540

The development of brittle high-temperature materials has focused attention on the impact resistance of these materials. This report describes a device for measuring very small values of impact resistance both at norm and elevated temperatures. The device is believed to eliminate extraneous energies, such as the "toss energy" from the impact strength. The method of testing consists of dropping a hammer from increasing heights so that it strikes near the free end of a cantilever beam specimen. The energy of the hammer when the specimen fractures is the impact strength. Representative values of the impact strengths of several high-temperature materials are given. NACA RM E54D13.

Proceedings of the WADC Ceramic Conference on Cermets, 6-8 October 1952. Edited by Murray A. Schwartz. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Flight Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1952. 361p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $40.85. PB 123207

AD 1183. Contents: Paper no. 1: Development of TiC-base cermets, by J. C. Redmond. - Paper no. 2: Development of TiC-base cermets, by W. L. Havekotte. - Paper no. 3: Factors in TiC-base cermets, by M. Basche. - Paper no. 4: The system TiC-SiC-B_4C plus Co, by T. S. Shevlin. - Paper no. 5: Comments on brittle fracture as applied to TiC-base cermets, by W. H. Duckworth. - Paper no. 6: Physical characteristics of TiC-base cermets at elevated temperatures, by F. P. Knudsen and R. F. Geller. - Paper no. 7: Effect of variables in producing carbides, nitrides, borides, etc., by H. Blumenthal. - Paper no. 8: Cermet raw materials, by K. C. Nicholson. - Paper no. 9: Diffusion of Fe, Ni and Co into TiC, by R. C. Turnbull. - Paper no. 10: Cast TiC-Ni alloys, by R. B. Fischer. - Paper no. 11: Extrusion of metal-bonded cermets, by W. W. Wellborn. - Paper no. 12: Forming refractory shapes by vibratory compaction under low pressure, by W. C. Bell. - Paper

no. 13: Infiltrated TiC bodies, by C. G. Goetzel. - Paper no. 14: Cermets containing $MoSi_2$ and Al_2O_3, by J. D. Burney. - Paper no. 15: Hot pressing and casting of cermets, by J. R. Tinklepaugh. - Paper no. 16: Experimental hot-pressed ceramics for turbine blade application, by Lowell H. Milligan. - Paper no. 17: Sintering cermets by electrical resistance, by F. V. Lenel. - Paper no. 18: Flash sintering of cermets, by E. G. Touceda. - Paper no. 19: Al_2O_3-Cr cermets vs. TiC-base cermets, by E. T. Montgomery. - Paper no. 20: Phase diagrams of carbide ternary systems, by J. T. Norton. Paper no. 21: Research in the system TiC-TaC-NbC, by N. R. Thielke. - Paper no. 22: Aluminide intermetallic compounds, by R. L. Wachtell. - Paper no. 23: Bonding of silicon carbide, by J. R. Tinklepaugh. - Paper no. 24: TiN-base cermets, by F. K. Davey. - Paper no. 25: Boride bodies, by F. W. Glaser. - Paper no. 26: Boride cermets, by T. A. Willmore. - Paper no. 27: Application of fundamental concepts to bonding of ceramics and metals, by J. A. Stavrolakis and L. E. Marchi. - Paper no. 28: New high temperature materials, by W. Arbiter. - Paper no. 29: Metal-ceramic interactions at elevated temperatures, by W. D. Kingery. - Paper no. 30: Evaluation techniques for high temperature metal-ceramic materials, by W. B. Crandall. - Paper no. 31: Appraisal of evaluation tests for cermets, by G. B. Massengale. - Paper no. 32: Properties of Be-BeO cermets, by J. Greenspan. - Paper no. 33: Transition metal silicides and germanides, by A. W. Searcy. - Paper no. 34: Studies on glass-metal bonding, by J. A. Pask. - Paper no. 35: Experiences with cermet jet turbine blades, by Owen W. Welles. - Paper no. 36: Cermet turbine stator blades, by L. Glasier. - Paper no. 37: U. S. N. Boiler & Turbine Lab. cermet program, by A. M. Suga. - Paper no. 38: N.A.C.A. cermet research, by George C. Deutsch. - Paper no. 39: Flight Research Lab. cermet research, by B. Weber and M. A. Schwartz. - Paper no. 40: Materials Lab. cermet program, by W. E. Winters and L. D. Richardson. - Paper no. 41: Power Plant Lab. cermet program, by L. T. Fuszara and B. L. Paris. AF WADC TR 52-327.

Review of the properties of barium titanate ceramic, by Samuel Globe. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 9p. Order from LC. Mi $1.80, ph $1.80. PB 122066

The symmetry properties of barium titanate ceramic are listed, and the values of the elastic, dielectric, and piezoelectric constants are given for the different forms of the piezoelectric equations of state. The information given herein is intended for use by those concerned with the design of electro-acoustic or other transducers of barium titanate ceramic. NAVORD 1751.

ORDNANCE AND ACCESSORIES

Additional report on vibration tests of AN/ASG-10 toss-bombing device, by I. W. Fuller and M. L. Burnett. U. S. Naval Research Laboratory. May 1946. 8p graph. Order from LC. Mi $1.80, ph $1.80. PB 120768

1. AN/ASG-10 (Bombing device) 2. Bombing equipment - Vibration 3. NRL R 2837.

Aeroballistic research investigation of the Specialties Incorporated airborne fire-control component, by H. J. Gauzza and W. H. Dunham. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 26p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120837

The purpose of this test was to determine the pressure distribution that occurs around a cylindrical probe at various Mach numbers in order to establish optimum locations for pressure orifices. An optimum location of a pressure orifice is one which will give the most linear variation in pressure coefficient with change in Mach number, and a large change in pressure coefficient with change in angle of attack. NAVORD 2572.

Application of the "detonation head model" to the mass loading by explosives, by A. S. Filler. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Jul 1955. 24p drawings, table. Order from LC. Mi $2.70, ph $4.80. PB 122236

Since this model is based upon simple geometrical considerations, it may be readily applied to rather complicated charge configurations. This article was prepared to illustrate application of the calculations of optimum loading of solids by explosives as well as the relative efficiency of utilization of the explosive in each case. Examples as well as a brief description of the model are presented to provide sufficient information and background to permit one to make similar calculations on the basis of this model for any charge configuration desired. UU ISRP TR 46. Contract N7 onr-45107, NR 357-239.

Development of streamline fairing for the mine Mark 50, by J. R. Whittaker. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1953. 28p photos, drawings, tables. Order from LC. Mi $2.70, ph $4.80. PB 120786

A program to develop a relatively low drag fairing for the mine Mk 50 has been conducted at the U. S. Naval Ordnance Laboratory. The final configuration herein described reduces the drag force of the basic mine shape to approximately one-half. NAVORD 2788.

Effect of jolt on primers MK 106, MOD 0 and MOD 1 in the delay element Mk 7 in the fuze MK 164, by J. H. Herd. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1953. 17p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122040

1. MK 164 (Fuze) 2. MK 106 (Primer) 3. Primers - Sensitivity 4. Fuzes, Delay - Tests 5. NAVORD 2996.

Fatigue life of six propulsion type torpedo air flasks, by F. E. Butler. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1954. 33p photos, drawing, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120901

1. Flasks, Air - Life expectancy 2. Fatigue, Structural - Tests 3. NAVORD 2963.

Investigation of explosive phenomena through ionization measurements, by Jacob Savitt and Richard H. F. Stresau. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1951. 13p graphs. Order from LC. Mi $2.40, ph $3.30. PB 120849

Recent results of ionization measurements in the immediate neighborhood of detonating explosives are described. This ionization is found to depend upon the explosive used, the weight of the explosive, the confinement conditions, and the method of initiation. Some evidence is presented which suggests that these ionization measurements may eventually be found useful as a means of evaluating explosives. NAVORD 2283.

Reduction of data obtained in a spark range for free-flight motion of a finned projectile, by Raymond A. Turetsky. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1951. 11p. Order from LC. Mi $2.40, ph $3.30. PB 122071

A presentation is given of the theory of the angular motion of a finned projectile without roll. A modification is made of existing techniques for reduction of related spark range data, leading to considerable improvement in the accuracy of the determination of the aerodynamic coefficients. NAVORD 2126. NOL ARR 41.

Statistical methods appropriate for evaluation of fuze explosive-train safety and reliability, by H. P. Culling. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1953. 77p graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 122070

The statistical problems of evaluating fuze explosive trains for safety and reliability are presented. The Bruceton and Probit procedures of testing are illustrated by examples of actual tests and the interpretation of the results is discussed. Appendix A presents a step-by-step description of the calculations necessary to determine the "50% reliable distance", the standard deviation, errors of estimate, and "degree of reliability" by the Bruceton method of analysis. Tables and graphs necessary for the calculations are appended. Appendix B presents the Probit method calculations necessary to determine the Probit line equation from which estimates of the "50% unsafe distance", standard deviation, errors of estimate, and "degree of safety" may be obtained. A test for "goodness of fit" of the Probit line is presented. Tables necessary for the analysis are appended. Change no. 1 (20 Sep 1954) included. NAVORD 2101.

PACKING AND PACKAGING

Development of a case liner for long-term outdoor storage, by C. E. Hrubesky, R. A. Aubey and A. Hyttinen. U. S. Forest Products Laboratory, Madison, Wis. May 1955. 33p photos, tables. Order from OTS. $1. PB 111916

Various materials were tested in the laboratory for requirements believed necessary for a case liner that would protect the contents of a box for a period of five years in outdoor storage. The tests made were of two kinds, accelerated laboratory tests and actual service tests. Results of accelerated tests are reported under Phase I and Part A of Phase II in this report. In Phase II, Part B, is described the preparation of case liners in loaded boxes for long-term outdoor storage tests. Of about fifty materials tested, three appeared to be promising for this purpose. These three consisted of: (1) 2-mil polyethylene sandwiched between two sheets of 60-pound creped kraft and coated on one surface with a 2-mil polyethylene film; (2) 3-mil polyethylene on 60-pound kraft; and (3) 1-mil aluminum foil laminated between a 3-mil film of polyethylene and 44/40 cotton scrim. Ordnance project no.: TB 5-1101G. Army project no.: 591-07-001. Preliminary report. FPL R 55-2.

PHOTOGRAPHIC AND OPTICAL GOODS

Aeronautical light nomenclature, by H. J. Cory Pearson. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Aug 1942. 9p. Order from LC. Mi $1.80, ph $1.80. PB 122292

Supersedes Planning and Development report no. 3. 1. Lighting, Aeronautical - Terminology 2. CAA TDR 18.

Application of scattering theory to the measurement of turbulent density fluctuations by an optical method, by Howard A. Stine and Warren Winovich. U. S. National Advisory Committee for Aeronautics. Jun 1956. 21p drawings, diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123493

It is shown that photometric measurements in the scattered field produced by passing an unpolarized

plane light wave through a nonabsorbing turbulent fluid can be used to define an average integral scale and average intensity of density fluctuations. The analysis is based upon the scattering coefficient deduced by Booker and Gordon for a turbulence model possessing isotropic fluctuations and an exponentially decaying correlation function. A limited number of experimental results are presented which demonstrate the functional adequacy of the derivation. NACA TN 3719.

Coagulation of aerosols. Final report for the period 1 Nov 1950-31 Oct 1954, under Contract no. AF 19(122)-375, by Frank T. Gucker, Jr. Indiana. University. Dept. of Chemistry, Bloomington, Ind. Jun 1955. 68p drawings, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 123317

This report deals with experimental and theoretical studies of the light-scattering properties of aerosols and their application in determining particle size and thus studying the process of coagulation in aerosols. It contains a bibliography of work on coagulation of aerosols, describes a new forward scattering aerosol particle counter and an apparatus for measuring light scattering from single aerosol particles, and calculates scattering according to the Mie theory. For Scientific reports no. 2 and 3 under this contract see PB 113001 and PB 112164. Scientific report no. 1 issued in J. Coll. Sci. vol. 8, p. 555-574 (1953). AF CRC TR 55-274.

Current improvements in the HADC SLERAN space-time system, by Max I. Rothman. U. S. Air Force. Air Research and Development Command. Holloman Air Development Center. Holloman Air Force Base, N. Mex. Jun 1955. 22p photos, drawings, diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 120216

The SLERAN system is an automatic, digitized electronic installation for the collection of space-time data on track runs. Initial operational experience revealed some system susceptibility to moisture and vibration-generated noise. Development work was started in October 1954 and consummated by May 1955 in the successful design and application of an improved type SLERAN RF projector oscillator and lens, an improved type SLERAN track station and a pulse-selective SLERAN signal gate which overcame all of the above difficulties. The purpose of this paper is to report on improvements developed for the HADC SLERAN space-time system in the period October 1954 to May 1955. A detailed treatment of operational SLERAN data for the current period will be made in a later report devoted entirely to this purpose. AD 72587. AF HADC TN 55-7.

Path of a ray of light tangent to the surface of the earth, by John Sweer. U. S. Naval Research Laboratory. Jun 1938. 13p graph, table. Order from LC. Mi $2.40, ph $3.30. PB 120426

1. Light - Refraction - Measurement 2. NRL H 1447.

Photoluminescence and associated processes of complex organic molecules in the vapor phase, by Brian Stevens. Princeton University. James Forrestal Research Center. Feb 1956. 65p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 123541

A general photokinetic scheme is constructed for a complex fluorescent molecule in the vapor phase. The 12 processes considered most probable following excitation by ultra-violet absorption are discussed with reference to the behavior of those molecules of this class which have been investigated photometrically. The relationship between the intensity of fluorescence emitted by a certain volume of vapor and the measured quantity is treated in some detail. Technical note no. 26 under Contract no. AF 33(038)-23976. AD 82019. Project OSR Chem. 50-4. AF OSR TN 56-105.

Relative effectiveness of differing commentaries in an animated film on elementary meteorology, by H. E. Nelson and A. W. VanderMeer. Pennsylvania State University, State College, Pa. Jun 1955. 21p tables. Order from LC. Mi $2.70, ph $4.80. PB 122391

Only small changes in over-all learning resulted from rearranging the wording and reorganizing the commentary while keeping the same visual content. This study confirmed the results obtained previously that the sound track contributes a much larger share to learning than does the visual element. SPECDEVCEN project 20-E-4: Instructional film research. SDC TR 269-7-43. Contract N6 onr-269.

Report of tests made with optical stethoscope developed by Professor J. E. Shrader, Drexel Institute of Technology, Philadelphia, Pa., by Kenneth C. Ripley. U. S. Naval Research Laboratory. Sep 1937. 11p photos. Order from LC. Mi $2.40, ph $3.30. PB 120435

1. Stethoscopes, Optical - Tests 2. Instruments, Optical - Tests 3. Steel plates - Defects - Determination 4. NRL M-1400.

Service tests on seadrome lights, by Fred H. Grieme. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Nov 1940. 21p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 122269

1. Seadromes - Lighting 2. CAA TDN 24.

Tests to determine intensity of illumination required on a night photogrammetric range located at Eglin AFB, Fla., by Ben F. Chartier. U. S. Air Force. Air Research and Development Command. Air Force Armament Center, Eglin Air Force Base, Fla. Sep 1955. 12p photos, diagrs, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 120202

Night photographic missions were flown at 15,000 ft using a T-11 camera installed in a B-26 aircraft to photograph the lights. The camera was equipped with a 150mm focal length lens. A camera shutter speed of 0.3 sec was used with an aperture of F 5.6. Super-XX and Tri-X film was used. The lights consisted of two bulbs in reflectors mounted 20^{0} either side of the vertical. Light intensities of 50 to 1000 watts were tested. Project 5080/A-1, Task 50253. AD no. 72198. AF AC TR 55-29.

Techniques for pressure pulse measurement and high-speed photography in ultrasonic cavitation, by Albert T. Ellis. California Institute of Technology. Hydrodynamics Laboratory, Pasadena, Calif. Jul 1955. 41p photos, diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 122237

A photographic system has been developed and applied to the study of cavitation bubble collapse. Sequences of 700 pictures at a rate of one million pictures per second, and less than 10^{-7} second exposure time have been obtained. Resolution is estimated to be better than 10^{-3} cm. Photoelastic photographs have also been taken under the above conditions. CIT HL 21-20. Contract N6onr-24420, NR 062-059.

PHYSIOLOGY

High temperatures in tanks. Determination of water and salt requirements for desert operations. U. S. Army Medical Research Laboratory, Ft. Knox, Ky. May 1943. 21p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 120359

Four studies were carried out on a total of fifty-six enlisted men living in the hot room of the Laboratory. The periods of study ranged from one week to two months for the various groups. Dry bulb temperature was maintained at 120^{0}F from 0800 to 1700 hours and at 90^{0}F during the remainder of each 24 hours. Details of the procedures and results are given. Final report on sub-project 2-6. See also PB 120360.

Operations high temperatures. Water and salt requirements for desert operations. U. S. Army Medical Research Laboratory, Ft. Knox, Ky. Nov 1942. 9p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 120360

Water balance studies and chloride excretions were followed on 52 subjects; 37 men from a light-tank company during maneuvers, 10 medium-tank crewmen during instructional periods and 4 members of the laboratory staff. All liquid intake and urinary output was measured and recorded - evaporative water loss determined by weighing. Details of procedure and analysis of results are given. Partial report on subproject no. 2: Operations high temperatures. See also PB 120359.

Studies in respiratory physiology. Second series: Chemistry, mechanics, and circulation of the lung, by Hermann Rahn and Wallace O. Fenn. Rochester. University. School of Medicine and Dentistry. Dept. of Physiology, Rochester, N. Y. Nov 1955. 460p photos, drawings, diagrs, graphs, tables. Order from OTS. $7.50. PB 121381

Project no. 7160. For previous report see PB 106704. Contents: A. Pressure breathing. - B. Mechanics of breathing. - C. Pulmonary circulation. - D. Changes with acclimatization. - E. Gas stores of the body. - F. Alveolar gas. - G. Alveolar-arterial O_2 difference. - H. Ventilation. - I. Behavior of gas in closed body cavities. Contract AF 18(600)-17. AF WADC TR 55-357.

Studies of men in simulated jungle (humid) heat. U. S. Army Medical Research Laboratory, Ft. Knox, Ky. Oct 1943. 43p graphs. Order from LC. Mi $3.30, ph $7.80. PB 120361

The purpose of these experiments was to study the behavior and performance of military personnel when exposed to the high temperature and high humidity of a simulated jungle climate. Tests were carried out under controlled conditions in the Laboratory hot room.

PHYSICS

General

Asymptotic minimax character of the sample distribution function and of the classical multinomial estimator, by A. Dvoretzky, J. Kiefer, and J. Wolfowitz. Cornell University. Dept. of Mathematics, Ithaca, N. Y. May 1955. 55p. Order from LC. Mi $3.60, ph $9.30. PB 122312

This paper is devoted, in the main, to proving the asymptotic minimax character of the sample distribution function (d.f.) for estimating an unknown d.f. in $\mathcal{F}$ or $\mathcal{F}_c$ for a wide variety of weight functions. Section 1 contains definitions and discussion of measurability considerations. Section 2 contains a statement of two lemmas (and a corollary of the second) which are important tools in the proofs and are of interest per se. Contract AF-18(600)-685.

Attenuation in a shock tube due to unsteady-boundary-layer action, by Harold Mirels. U. S. National Advisory Committee for Aeronautics. Aug 1956. 61p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123478

A method is presented for obtaining the attenuation of a shock wave in a shock tube due to the unsteady

boundary layer along the shock-tube walls. It is assumed that the boundary layer is thin relative to the tube diameter and induces one-dimensional longitudinal pressure waves whose strength is proportional to the vertical velocity at the edge of the boundary layer. The method is shown to be in reasonably good agreement with existing experimental data. NACA TN 3278.

Boundary layer behind shock or thin expansion wave moving into stationary fluid, by Harold Mirels. U. S. National Advisory Committee for Aeronautics. May 1956. 54p diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122534

The boundary layer behind a shock or thin expansion wave moving into a stationary fluid has been studied. Both laminar and turbulent boundary layers were considered. The wall surface temperature behind the waves was also investigated. Numerical and analytical results are presented for the various boundary-layer parameters of interest. It was found that the wall surface temperature was uniform (as a function of distance behind the wave) for the laminar-boundary-layer case but varies with distance for the turbulent-boundary-layer case. NACA TN 3712.

Compressibility factor, density, specific heat, enthalpy, entropy, free-energy function, viscosity, and thermal conductivity of steam, by Lilla Fano, John H. Hubbell, and Charles W. Beckett. U. S. National Advisory Committee for Aeronautics. Aug 1956. 61p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123475

The NBS-NACA tables of thermal properties of steam are grouped together for convenient use. They include the compressibility factor, density, specific heat at constant pressure, enthalpy, entropy, free-energy function, viscosity, and thermal conductivity for the real gas and the specific heat, enthalpy, entropy, and free-energy function for the ideal gas. Conversion factors to frequently used units are given to facilitate use of the tables in dimensionless form. NACA TN 3273.

Compressive and torsional buckling of thin-wall cylinders in yield region, by George Gerard. U.S. National Advisory Committee for Aeronautics. Aug 1956. 42p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123498

Based on assumptions which have led to the best agreement between theory and test data on inelastic buckling of flat plates, a general set of equilibrium differential equations for the plastic buckling of cylinders has been derived. These equations have been used to obtain solutions for the compressive and torsional buckling of long cylinders in the yield region. Test data are presented which indicate satisfactory agreement with the theoretical plasticity-reduction factors in most cases. NACA TN 3726.

Convenient and accurate semi-empirical entropic equation for use in internal ballistic calculations, by A. E. Seigel. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1953. 15p graphs. Order from LC. Mi $2.40, ph $3.30. PB 122018

A semi-empirical equation of state has been developed which permits the solution of the internal ballistics problem and represents accurately the effects of the intermolecular forces over a wide range of pressures and densities. Since the semi-empirical equation is similar in form to the perfect gas equation, it is as convenient in application to interior ballistic calculations. Includes list of symbols used and their meanings. NAVORD 2695. NOL ARR 82.

Effect of specimen surface as a discontinuity in fatigue phenomena, by F. H. Vitovec. Minnesota. University, Minneapolis, Minn. Sep 1953. 63p graphs. Order from LC. Mi $3.90, ph $10.80. PB 120309

Experimental observations relating to the fatigue process and theories of fatigue are discussed. A picture of the mechanism of fatigue considering all experimental observations is developed. The influence of the free surface of the specimen on the strength of surface grains is discussed. Considering the effect of the free specimen surface, the influence of size of specimen, shape of cross section, and the effect of notches on fatigue strength are explained. The effect of sharp notches in a material is shown in relationship to the propagation of fatigue cracks. AD 39662. AF WADC TR 53-167. Contract AF 33(038)-20840.

Elementary approach to the analysis of variance, by Paul R. Rider, N. Leon Harter and Mary D. Lum. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1956. 70p tables. Order from OTS. $1.75. PB 121249

An introduction to the analysis of variance is given. Several important experimental designs to which this statistical technique is applicable are discussed, as are multiple comparison tests which can be used after the analysis of variance has been made. Transformations employed prior to analysis are also treated. An extensive bibliography is to be found at the end of the report. Project 7060, Task 70418. For earlier reports in this series see PB 112386 and PB 111878. AF WADC TR 56-20.

Equation of state for water at extreme pressures, by J. H. Rosenbaum. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1954. 17p graphs tables. Order from LC. Mi $2.40, ph $3.30. PB 120876

A new equation of state for water is derived from theoretical considerations. This is used to obtain a smoothed extrapolation of Bridgman's P-V data to extremely high pressures. NAVORD 3847.

Evaluation of four experimental methods for measuring mean properties of a supersonic turbulent boundary layer, by George J. Nothwang. U. S. National Advisory Committee for Aeronautics. Jun 1956. 34p photos, drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123494

Surveys were made through the flat plate turbulent boundary layer at a Mach number of 3 using a pitot proble, an X-ray densitometer, and cold-wire and hot-wire probes. The first three methods indicated consistent mean values of pitot pressure, density, and total temperature; the hot-wire proble, however, indicated larger values of mean mass flow. The assumption of constant total temperature through the boundary layer yielded negligible errors in velocity distribution, and displacement and momentum thicknesses. NACA TN 3721.

Evaluation of inertia sensitivity, by Murray Kornhauser. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1953. 33p diagrs, graphs, table. Order from LC. Mi $3, ph $6.30. PB 120999

The main objective of this report is to discuss the determination, presentation and interpretation of inertia sensitivity data. Theoretical analysis of the mass-spring system for response to acceleration-time pulses, amplification factors, characteristic delay times, and inertia sensitivity are used as a basis for discussion of actual devices. Effects of deviations from the ideal mass-spring system are considered. Practical use of sensitivity data is discussed with regard to the reliability of laboratory methods, the accuracy of field measurements and variability of service conditions. NAVORD 3577.

Experimental solution to the Lagrange ballistic problem, by A. E. Seigel. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1953. 12p drawing, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 122016

An experimental gun was employed to check experimentally the theoretical solutions to the Lagrange ballistic problem. This constant cross-sectional area gun was previously developed so that an accurate study of the rapid expansion of a compressed gas for well-determined initial conditions could be made. NAVORD 2693. NOL ARR 80.

Final report under Contract no. Nonr-218(00), by Irving Kaplansky. Chicago. University, Chicago, Ill. Feb 1955. 9p. Order from LC. Mi $1.80, ph $1.80. PB 120159

Period of Contract 1 Oct 1950-28 Feb 1955. Lists articles published in various publications as a result of this contract.
1. Mathematical research.

Flow of a Beattie-Bridgeman gas with variable specific heats, by J. C. Crown. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1951. 47p graphs (8 fold), tables. Order from LC. Mi $3.30, ph $7.80. PB 122072

In Part I of this report the usual aerothermodynamic relations for isentropic flow in a quasi-unidimensional channel were rederived using the Beattie-Bridgeman equation of state in place of the perfect-gas law and allowing for the component of specific heat due to the vibrational mode of freedom (for polyatomic gases). In Part II of this report the analysis has similarly been extended to consider normal and oblique shock waves. Graphs permitting rapid numerical evaluation of the resulting formulas are presented. NAVORD 2148. NOL ARR 35.

Free-flight determinations of the drag coefficient of spheres, by Albert May and W. R. Witt, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 16p photos, map, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120956

1. Mach number - Effect 2. Reynolds number - Effect 3. Spheres - Drag coefficient 4. NAVORD 2352 5. NOL ARR 80.

Gas flow past slender bodies, by Max M. Munk. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 14p. Order from LC. Mi $2.40, ph $3.30. PB 120831

Each subsonic flow of gas past an obstacle requires a definite momentum for its creation. This new theorem is explained, demonstrated, and applied to the computation of airforces on a missile body. NAVORD 2490.

General approximation theory for compressible laminar and turbulent boundary-layers with respectation of flow-effects normal to the wall across the boundary layer (investigations on an improvement of known approximation-methods of boundary-layer calculation), by A. Walz. Nov 1955. 143p graphs, (part fold.) tables. Order from LC. Mi $7.20, ph $22.80. PB 122189

An approximate solution of the general equations of Navier and Stokes for a viscous flow is tried in such a manner that these partial differential-equations are transformed without neglecting any terms into an infinite system of ordinary differential-equations by partial integrations in y-direction. AD 86312. Covers work from 1 Aug 1954 to 30 Nov 1955. Contract no. 61(514)-739-C. AF OSR TR 56-13.

Glancing reflection of shock, by George Rawling and James Riley. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1952. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122075

The pressure distribution behind a glancing shock reflection similar to a Mach configuration as predicted by the Lighthill theory has been computed by a card-programmed calculator and resulting isobars drawn. For weak shocks agreement is found with the Bargmann theory and for strong shocks a graph from the Ting-Ludloff version is consistent with these results. NAVORD 2165. NOL ARR 44.

Gradient methods of solving systems of linear algebraic equations, by R. P. Eddy. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 24p. Order from LC. Mi $2.70, ph $4.80. PB 122008

1. Equations, Linear 2. NAVORD 2582 3. NOL ARR 121.

Guide to the use of the M.I.T. cone tables, by Richard C. Roberts and James D. Riley. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1953. 18p. Order from LC. Mi $2.40, ph $3.30. PB 122007

This report contains information which is necessary for the proper use of the M.I.T. cone tables. Specific directions and formulas are given which enable the velocity, pressure, etc. to be computed directly from the information in the cone tables. NAVORD 2606.

High-frequency gas-discharge breakdown, by Sanborn C. Brown. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jul 1955. 66p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 123212

In this report an attempt is made to summarize knowledge of high-frequency gas-discharge breakdown. The types of processes discussed include diffusion-controlled, mobility-controlled, and electron-resonance breakdown, as well as breakdown phenomena in the presence of magnetic and dc electric field superimposed on the high-frequency electric field. Material prepared for Handbuch der Physik, vol. 22, 1955. MIT RLE TR 301.

Inequalities for complex linear differential systems of the second order, by Daniel C. Lewis. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1952. 7p. Order from LC. Mi $1.80, ph $1.80. PB 120943

1. Ballistics, Exterior - Theory 2. Equations, Differential 3. NAVORD 1864 4. NOL ARR 31.

Interaction of grids with traveling shock waves, by Darshan Singh Dosanjh. U. S. National Advisory Committee for Aeronautics. Sep 1956. 81p photos, drawings, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H", St., N. W., Washington 25, D. C. PB 123483

Grids were mounted in the path of traveling shock waves in a shock tube. The incident shock wave after its collision with the grid split into transmitted and reflected waves. The emergence, growth, and speeds of these shock fronts were recorded with shadowgraphic and hot-wire techniques. The oscillograms of the hot-wire response of various transient flow regions are examined and some preliminary conclusions regarding the state of the flow down-stream of the grid are reached. NACA TN 3680.

Iteration procedures for the Dirichlet difference problem, by James D. Riley. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1953. 15p graph. Order from LC. Mi $2.40, ph $3.30. PB 120879

This report further analyses the common iteration procedures for solving the Dirichlet difference problem. One such method is revised and made in some ways superior to the method which is generally considered the best. NAVORD 2848. NOL ARR 171.

Laminar boundary layer at hypersonic speeds, by J. C. Crown. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1952. 32p graphs. Order from LC. Mi $3, ph $6.30. PB 120951

A theoretical study was made of the laminar boundary at hypersonic speeds using a modification of the Crocco method of solution. A solution to the flow equations was obtained independent of any particular viscosity law by an artifice which, although approximate, is of engineering accuracy. A simple formula was obtained for the friction drag coefficient. Likewise a simple formula for heat transfer was obtained. The need for reliable data on viscosity and Prandtl number at high temperatures is stressed. NAVORD 2299.

Least squares over the complex field, by Calvin C. Elgot. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1954. 23p. Order from LC. Mi $2.70, ph $4.80. PB 120898

The least square solution of a set of linear equations with complex coefficients and its relation to the equivalent real equations is discussed. In particular it is shown that the square root method of solving the normal equations is extendible to the complex field and that fewer operations are required to effect this solution by computing with complex numbers rather than with real numbers. NAVORD 3797. NOL ARR 250.

Mathematical methods in the solution of aeroballistic problems, by G. Temple. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1951.

32p. Order from LC. Mi $3, ph $6.30.
PB 120941

The methods described in this report are applicable to the calculations of lift and moment of shells, finned missiles and fuselages, including the effects of yaw and body-fin interference. The report is written in three sections: 1. The Zone Method in Aeroballistic Problems. 2. Fourier Transformation Methods in Aeroballistics. 3. The Accuracy of Rayleigh's Method for the Estimation of Eigenvectors and Eigenvalues. NAVORD 1843. NOL ARR 30.

Mixed variables and attributes plans: Exponential case, by I. Richard Savage. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jun 1955. 37p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122318

The following criteria are used in arriving at a compact description of the plans: type of sampling - single, multiple, and sequential sampling, and type of data - variables and attributes. Contract N6 onr-25126, NR 042-002. SU AMSL TR 23.

Note on a modification of a method of Kampé de Fériet for estimating the critical Reynolds number of turbulence, by C. C. Lin. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1952. 6p graph. Order from LC. Mi $1.80, ph $1.80.
PB 120853

1. Reynolds number - Effect 2. Flow, Turbulent - Theory 3. Pipe lines - Flow - Calculation 4. NAVORD 2243.

Radiation measurement of high transient temperatures, by Donna Price. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 46p graphs, tables. Order from LC. Mi $3.30, ph $7.80.
PB 122011

This report discusses the measurement of high transient temperatures of a gas about 116,000 p.s.i. and 3870°K. These are the extreme experimental conditions expected in the adiabatic compressor to be used by the Thermodynamics group for P-V-T determinations on various gases. This study concerns the measurement of the expected temperatures at the expected duration of 80 microseconds or less. A review of experimental and theoretical work which has been done on gas emissivities is made. NAVORD 2445.

Study of functional analysis in topological algebras, Final report, by William L. Duren, Jr. Tulane University. Dept. of Mathematics, New Orleans, La. Aug 1955. 36p. Order from LC. Mi $3, ph $6.30. PB 122947

1. Mathematical research 2. Contract N7 onr-434, T. O. III, Final report.

Study of the applicability of the unsteady one-dimensional isentropic theory to an experimental gun, by A. E. Seigel. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 38p drawings, graphs, tables. Order from LC. Mi $3, ph $6.30.
PB 122015

Contents: Appendixes: I. One-dimensional unsteady flow with gas-wall friction and heat transfer. - II. Method of obtaining the air pressure in front of the piston. - III. Method of approximately calculating the effects of turbulent heat transfer and gas-wall friction. NAVORD 2692. NOL ARR 79.

Survey on heat transfer at high speeds, by Ernst R. G. Eckert. Minnesota. University, Minneapolis, Minn. Apr 1954. 101p graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 123208

A survey has been made of the literature on heat transfer at high supersonic velocities published in the last three years. Relations for friction, recovery, and heat transfer have also been recommended for turbulent boundary layers. A method has been described by which the effect of an arbitrarily varying temperature along the surface can be established. The influence of the molecular structure of air appearing at flight at high altitude and of dissociation occuring at high flight velocities has been discussed. AD 38093. AF WADC TR 54-70. Contract AF 33(616)-2214.

Thermodynamic properties of argon at temperatures below room temperature as obtained from an experimental gun, by A. E. Seigel. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1952. 14p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122017

The position-time relation of the moving piston in the experimental gun (named ERMA) can be calculated from the unsteady one dimensional isentropic theory with the use of the entropic equation of state of the gas. The reverse procedure is also possible, that is, the obtaining of the gas entropic relationship from the experimental travel-time data. The ERMA experimental position-time data of a few argon runs were analyzed to obtain the pressure-density isentropes of argon. These results demonstrated the feasibility of employing ERMA to obtain previously unknown gas data. NAVORD 2694. NOL ARR 81.

On sufficient statistics when the range depends upon the parameter, by Walter L. Smith. North Carolina State College, Institute of Statistics, Raleigh, N. C. Nov 1955. 23p. Order from LC. Mi $2.70, ph $4.80. PB 122404

This note strengthens a theorem concerning the factorability of the probability density function by removing the restrictive assumptions concerning the analytic form of the relevant density functions and by making the theorem valid for abstract

spaces instead of the real line. Institute of Statistics Mimeograph Series no. 141. AD 80548. CIT Report no. 18. Contract AF 18(600)-458. AF OSR TN 56-37.

On the attenuation of the shock wave about an axially-symmetric body, by J. C. Crown. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 17p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120829

1. Shock waves - Attenuation 2. Bodies of revolution - Angle calculation 3. Bodies of revolution - Pressure distribution - Theory 4. NAVORD 2475 5. NOL ARR 104.

On the computation of spherical blast waves, by Feodor Theilheimer and Martin L. Storm. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1951. 20p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120859

1. Lagrange equations 2. Blast, Air - Shock waves - Transmission - Theory 3. Shock waves - Gases 4. NAVORD 2221.

On the mechanism of turbulent fluid motion, by Max M. Munk. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1952. 15p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120950

The discussion of NAVORD Report 1572 (PB 122060) is brought to conclusion. A system of interacting fluid motions and motion effects is described whereby the occurrence and maintenance of turbulent fluid motion is qualitatively explained on the basis of the Navier-Stokes equation. NAVORD 2298. NOL ARR 62.

On the problem of heat conduction in certain quasi-infinite two- and three-dimensional domains, by Arnold N. Lowan. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1952. 70p. Order from LC. Mi $4.50, ph $10.80. PB 122074

1. Thermal conductivity - Theory 2. Flow, Two-dimensional - Heat transference - Theory 3. Flow, Three-dimensional - Heat transference - Theory 4. NAVORD 2159 5. NOL ARR 39.

On the problem of heat conduction in the finite wedge of an angle, in the case of radiation at the bounding planes, by Arnold N. Lowan. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1951. 9p. Order from LC. Mi $1.80, ph $1.80. PB 122069

1. Thermal conductivity - Theory 2. NAVORD 1822 3. NOL ARR 28.

Field ion emission. Pennsylvania State University. Dept. of Physics, University Park, Pa. Mar 1956. 44p photos, drawings, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122197

AD 82514. Technical report no. 2 under Contract no. AF 18(600)-673. For Technical report no. 1 see PB 119020. Contents: Part I: Experimental investigation of field ion emission, by Kanwar Bahadur. - Part II: Resolution of the atomic structure of a metal surface by the field emission microscope, by E. W. Müller. AF OSR TN 56-118.

Optical properties of atomic vapors near resonance, by Francis Bitter. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Mar 1955. 22p diagr, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 122977

This paper summarizes and amplifies well-known results in order to facilitate the design of magnetic scanning experiments and to lay the ground for a further analysis of double-resonance phenomena produced by simultaneous rf and optical resonance. The reflection, refraction, and attenuation of light incident on the plane face of a cell containing an atomic vapor are calculated for frequencies in the vicinity of an absorption frequency. The significance of the results obtained is discussed and a few numerical examples are considered. It is found that observation of the attenuation of a transmitted beam offers certain advantages over observation of scattered light in scanning experiments. MIT RLE TR 292.

Photoelectric emission for film dosimetry, by N. Modine and D. T. O'Connor. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1953. 28p photos, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122044

A survey of film dosimetry methods reported in the literature to date, experimental results of work on the secondary electronic emission of lead foils as applied to film dosimetry, and a proposed method of using photoelectric emission for the more accurate measurement of penetrating photon exposures and qualities such as occur near an atomic explosion. NAVORD 2990.

Structure and activity of catalytically active solids, by T. W. Hickmott and P. W. Selwood. Northwestern University. Dept. of Chemistry, Evanston, Ill. Mar 1955. 45p graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 119931

Proton relaxation time measurements by means of the spin-echo method have been made for liquids absorbed on high-area, diamagnetic catalyst supports and on paramagnetic supported oxide systems.

Associated liquids such as methanol, ethanol, and water, and the hydrocarbon n-hexane were absorbed on γ Al_2O_3 and the relaxation time plotted as a function of the weight of liquid. Supported oxides were MnO_2/Al_2O_3 and CuO/Al_2O_3. Seventh technical report under Contract no. N7 onr-45003, project NR 051-143. Contents: Part I. Proton relaxation on diamagnetic catalytic solids - Part II. Proton relaxation on paramagnetic supported catalytic solid. Contract N7 onr-45003, NR 051-143.

PSYCHOLOGY

Behavior in groups: Increased attraction to the group as a function of individual and group goal attainment, by Bernard Bass. Louisiana State University, Baton Rouge, La. May 1955. 10p. Order from LC. Mi $1.80, ph $1.80. PB 122311

Technical report no. 2.
1. Group behavior - Tests 2. Psychological tests 3. Psychology, Social - Tests 4. Contract N7 onr-35609.

Effect of a dividing network on speech reception, by Robert T. Camp, Jr. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. May 1955. 16p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122397

The effect on speech reception of listeners receiving the identical full speech spectrum in both ears (diotic listening) was compared to the effect on speech reception of listeners receiving the high-frequency components above 1650 cps in one ear and the low-frequency components below 1650 cps in the other (dichotic listening) in the presence of 114 db of simulated aircraft noise. A comparison was also made of three headphone arrangements or speech spectra under the dichotic condition. In general, those listeners who listened dichotically earned better reception scores than those who listened diotically. Two of the three speech spectra under the dichotic condition yielded scores significantly different from each other. Joint project report no. 52. Contract N6 onr-22525, NR 145-993. NMRI Proj NM 001-104-500.52.

Listener performance as a function of listening time for various signal-to-noise conditions, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jun 1955. 10p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 122398

Listener reception was evaluated, with respect to values earned at the end of eight cumulative time intervals during an hour of continuous testing, for several signal-to-noise conditions. The noise was babel, prepared by superimposing two voices on a single recording. Mean values of listener reception did not follow the same trend for each listening condition. As the signal-to-noise ratio was decreased, a temporary decrement in listener reception followed after approximately one-half hour of listening. This decrement became more pronounced and more lasting as the signal-to-noise ratio was decreased. Joint project report no. 53. Contract N6 onr-22525, NR 145-993. NMRI Proj. 001-104-500.53.

Need analysis research project. Wesleyan University, Middletown, Conn. Contract N7 onr-463, NR 172-363. Order separate parts described below from LC, giving PB number of each part ordered.

Some social consequences of achievement motivation, by David C. McClelland. 1955. 27p tables. Mi $2.70, ph $4.80. PB 122315

Author shows how he developed a renewed interest in "content" psychology by following through on some of the social implications of research on the achievement motive. Paper presented at the University of Nebraska Symposium on Motivation, 1955.

Annual technical report under Contract no. N7 onr 463, NR 172-363, by D. C. McClelland. Feb 1955. 4p. Mi $1.80, ph $1.80. PB 122316

1. Performance tests 2. Psychiatric tests 3. Contract N7 onr 463, NR 172 363.

Interim report concerning the hope-of-success and fear-of-failure aspects of need for achievement, by Russell A. Clark, Henry N. Ricciuti, and Richard Teevan. Jun 1955. 25p graphs, tables. Mi $2.70, ph $4.80. PB 122314

On a priori grounds it seems highly plausible that a fear-of-failure individual could have low, moderate, or high n Achievement and similarly for a hope-of-success individual. For a number of reasons it was felt that it would be very fruitful to have a measure of these two aspects of n Achievement that was independent of the level of the n Achievement score. The present study represents in part an initial attempt to establish such a measure.

Prediction of the words of varied materials, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jul 1955. 47p graph, tables. Order from LC. Mi $3.30, ph $7.80. PB 122396

Samples of five-syllable phrases of similar length extracted from the language of flight instruction and newspapers were presented to experimental subjects who were asked to predict the successive letters and then progress to a succeeding letter with knowledge of the preceding ones. Phrases of flight instruction were more readily predicted than newspaper ones. Advantages also accompanied

more words, more letters to judge, and longer words in the sample. Anomalous deviations, present in judged samples and from other studies are noted. Joint project report no. 57. Contract N6 onr-22525, NR 145-993. NMRI Proj NM 001-104-500.57.

Quality control procedures for monitoring psychological testing, by Robert G. Smith, Jr. and Donald B. Gragg. U. S. Air Force. Air Research and Development Command. Personnel and Training Research Center. Personnel Research Laboratory. Lackland Air Force Base, San Antonio, Texas. Aug 1955. 20p tables. Order from OTS. 50 cents. PB 121271

The purpose of this report is to describe procedures for rapid identification of unstandardized testing conditions. These procedures are applicable to the test-monitoring problem of industrial quality control methods. Project no. 7700, Task no. 77005, and Project no. 7701, Task no. 77032. AF PTRC TN 55-21.

Relationship between speaking and listening, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jun 1955. 10p tables. Order from LC. Mi $1.80, ph $1.80. PB 122399

One hundred eighty panels of 12 members each responded to Forms C and D of the multiple-choice intelligibility tests in round-robin administrations. Rank order correlations between the listening and speaking scores of members of the 180 panels ranged from .02 to .87. Low positive correlations of this magnitude are common in applications of these tests and suggest that intelligibility in speaking and listening are not independent skills. Joint project memorandum report no. 54. Contract N6 onr-22525, NR 145-993. NMRI Proj NM 001-104-500.54.

Relative intelligibility of single-voice and multiple-voice messages under various conditions of noise, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jul 1955. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122401

Evaluations were made of the relative intelligibility of single-voice and multiple-voice transmissions under various conditions of noise. The hypothesis under test was that continuity of voice during a transmission contributes to the efficiency of listener reception. The results supported the hypothesis in that single-voice transmissions were consistently more intelligible than were multiple-voice transmissions. Mean values of intelligibility, under increasing levels of noise, did not follow the same trend for the two kinds of transmissions. The multiple-voice transmissions became relatively less intelligible under increasing levels of noise than did the single-voice transmissions. Joint project report no. 56. Contract N6 onr-22525, NR 145-993. NMRI Proj 001 104-500.56.

Studies in listener reception of voice messages: The persistence of the effects of listening conditions, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jun 1955. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 122400

An evaluation was made, with respect to mean values of listener reception, among three listener groups who immediately prior to responding to test materials responded to similar materials under one of three signal-to-noise ratio conditions. The three signal-to-noise ratio conditions were +8 db, 0 db, and -8db. Test materials were presented to all listeners at a 0 db signal-to-noise ratio. Joint project report no. 55. NMRI Proj 001-104-500.55. Contract N6 onr-22525, NR 145-993.

RUBBER AND RUBBER PRODUCTS

Copolymer research reports, no. 3571-3934, Jul 1, 1954-Jun 30, 1955. Federal Facilities Corporation. 1954-1955. Mi $35.00 a set. Prices for individual reports in microfilm or photocopy will be furnished upon request by the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C. Supplements PB 118310. List of copolymer reports is available from OTS at 25 cents. PB 118310s

Elastomeric polyphosphates, by R. A. Hubbard, II and U. P. Strauss. Rutgers University, New Brunswick, N. J. Aug 1955. 49p graph, tables. Order from OTS. $1.25. PB 121516

The problem is the preparation of an elastomer based on the high molecular weight polyphosphate chain. Since the known polyphosphates are essentially linear polyelectrolytes occurring in the glassy or crystalline form, the problem consists of two parts. First, the strong interionic forces which cause stiffness of the materials must be overcome; second, the chains must be cross-linked. The first of these problems is attacked by the use of large cations and plasticizers, the second by the use of polyvalent cations; possible chemical methods of tying the chains together are discussed. Some elastomeric products have been obtained, showing the essential soundness of this approach. However, none of the products prepared so far have the required thermal stability, even though the polymeric chain is stable. AD 76871. Project no. 7340. Covers work conducted from July 1953 to Dec 1954. AF WADC TR 54-599. Contract AF 33(616)-2059.

Research on the synthesis of polar silane monomers, by Robert M. Silverstein, Leon Goodman, and Allen Benitez. Stanford Research Institute, Stanford, Calif. May 1956. 30p tables. Order from OTS. 75 cents. PB 121498

The principal method used for the monomer synthesis was the addition of the Si-H linkage to vinyl and allyl monomers. Monomers containing halogens were prepared by the Grignard reaction, by Diels-Alder addition of hexachlorocyclopentadiene to unsaturated silanes, and by the addition of polyhalogenated molecules to unsaturated silanes. Hydrolysates of certain of the polarsilane monomers strongly inhibited polymerization when mixed in 5 mole percent amounts with the hydrolysate of dimethyldichlorosilane. The polymerization could be forced but the products were then insoluble in benzene. Project no. 7340. Covers period of work from May 1955 to May 1956. AF WADC TR 56-201. Contract AF 33(616)-2998.

STRUCTURAL ENGINEERING

Development of non-destructive tests for structural adhesive bonds, by J. S. Arnold. Stanford Research Institute, Stanford, Calif. Jun 1956. 45p diagrs, graphs. Order from OTS. $1.25. PB 121495

An ultrasonic technique for the evaluation of structural adhesive bonds (the STUB-meter) is being developed. The behavior of a ferroelectric transducer, when mechanically coupled to a test specimen, is affected by the structural properties of the test specimen. The design and construction of a portable laboratory model of the STUB-meter are described, and a plausibility argument for the existence of a relationship between bond strength and the STUB-meter behavior is presented. An evaluation program that will be carried out in cooperation with organizations in the aircraft industry is described. Project no. 7340. Covers work from 1 Jan 1955 through 31 Dec 1955. For Part 3 see PB 111678. AF WADC TR 54-231, Part 4. Contract AF 33(616)-2035.

Effect of fatigue stress history on elasticity properties and stress distribution under rotating bending, by Leonard C. Lidstrom and Benjamin J. Lazan. Minnesota. University, Minneapolis, Minn. Aug 1956. 55p photos, drawings, graphs. Order from OTS. $1.50. PB 121523

An analytical method is presented for determining the actual or specific stress-strain relationships from the moment-strain data of rotating beam fatigue specimens. This method is used to calculate the specific stress-strain relationships for mild steel, and these are compared with experimentally determined axial stress-strain data. The agreement is found to be good. The actual stress distributions in rotating cantilever-beam fatigue specimens are determined from the specific stress-strain relationships. The errors associated with nominal stress based on the accepted linear stress-strain relationship are analyzed. The effects of magnitude of stress and number of stress cycles on stress distribution are discussed. Fatigue data are presented on solid and hollow rotating beams and under axial stress. AD 97186. Project no. 7360, Task no. 73604. Covers work during 1954 and 1955. AF WADC TR 56-122. Contract AF 33(616)-2803.

Effect of static mean stress on the damping properties of materials, by Neal L. Person and Benjamin J. Lazan. Minnesota. University, Minneapolis, Minn. Jul 1956. 34p photos, diagrs, graphs, tables. Order from OTS. $1. PB 121522

New bending vibration decay equipment was developed to determine the effect of static mean stress on the damping associated with a given alternating stress. Tests were performed on SAE 1020 steel, 2024-T aluminum, J-1 magnesium, annealed RC-55 titanium, S-816 alloy, glass laminate plastic, and 403 stainless steel. In all cases the maximum stress on the test specimens was kept below the cyclic stress sensitivity limit, below which damping is unchanged by stress history. AD 97123. Project no. 7360, Task no. 73604. Covers work from Jul 1954 to Aug 1955. AF WADC TR 55-497. Contract AF 33(616)-2803.

TEXTILES AND TEXTILE PRODUCTS

Apparatus for determining biaxial strength properties of cloth and supporting test data, by Winston C. Boteler. Georgia Institute of Technology. Engineering Experiment Station, Atlanta, Ga. May 1956. 42p photos, graphs, tables. Order from OTS. $1.25. PB 121475

The Georgia Tech biaxial fabric tension testing machine was modified to permit the simultaneous recording of warp and filling load-elongation curves. It was the purpose of these studies to determine the elastic properties of selected nylon, Orlon, and Dacron parachute-type cloth under various conditions of biaxial loading. Tests conducted at various speeds to determine the effect of testing speed on elastic properties indicated that the testing speed has no apparent effect on the elastic properties. A comparison of elongation measurements by extensometer and jaw separation indicates that jaw separation measurements are satisfactory for light loads, but the difficulty of securely clamping the sample introduces serious discrepancies at high loads. The measurement of elongation at various locations in the sample shows a slight increase in elongation as the extensometer is moved towards the clamping jaws. Project no. 7320. Covers period of work from Mar 1955 to Dec 1955. AF WADC TR 55-485. Contract AF 33-(616)-2857.

Development of current nylon webbings utilizing 840 denier yarns in lieu of new specified 210 denier yarns, by Russell J. Neff. Phoenix Trimming Co., Chicago, Ill. May 1956.

68p diagrs, graphs, tables. Order from OTS. $1.75. PB 121463

This investigation has shown that 840 denier yarn appears as good and sometimes better than 210 denier yarn. Also, results have indicated that piece dyeing of the webbing is not only feasible, but desirable from the standpoints of giving better original tensile strength and abrasion resistance. Project no. 7320. Covers period of work from Dec 1954 to Dec 1955. AF WADC TR 55-494. Contract AF 33-(600)-29034.

Improved utilization of wool in Navy fabrics, by Myron J. Coplan. Fabric Research Laboratories, Inc., Dedham, Mass. Aug 1955. 8p. Order from LC. 50 cents. PB 121472

Summarizes work under this contract concerning the performance of spun staple blends containing wool with nylon or viscose, and lists technical reports on this project. Contract Nonr-478(00), Final report.

Research and development of abrasion resistant treatments for Dacron webbings, by George Thomson, Joseph S. Panto, and Ernest R. Kaswell. Fabric Research Laboratories, Inc., Dedham, Mass. Jul 1956. 61p diagr, graphs, tables (part fold.) Order from OTS. $1.75. PB 121496

The purpose of the work reported was the development of finishes which could be applied to Dacron webbing with resulting increase in abrasion resistance. The finish was to remain flexible at -65°F. and be stable to artificial sunlight for 100 hours and to a temperature of 350°F. for 16 hours. A satisfactory method for determining flexibility of webbings at standard conditions and at -65°F. has been developed. Webbings treated with one particular silicone and catalyst emulsion were superior to all other treated samples from the point of view of abrasion resistance, low temperature flexibility and resistance to heat ageing. However, the resistance to artificial sunlight for 100 hours was lowered so that the webbing retained only 60 to 70% of the strength of a similarly exposed untreated sample, whereas a 90% retention was specified. Project no. 7320. Covers period of work from Jun 1954 to Aug 1955. For similar report on nylon see PB 121494. AF WADC TR 55-313. AD 97103. Contract AF 33-(616)-2563.

Study of the distribution of fibers in some blended woolen yarns, by Myron J. Coplan. Fabric Research Laboratories, Inc., Dedham, Mass. Dec 1954. 129p photos, diagrs (part fold), graphs, tables. Order from OTS. $3.25. PB 121471

Basic investigations were made for purpose of improving utilization of wool in Navy fabrics but the basic studies have many other interesting facets. Case number C51137. For corrections see PB 121471s. For Technical report no. 2 see PB 121343. Contract Nonr-478(00), Technical report no. 1.

Note in correction of technical report number 1, by Myron J. Coplan. Fabric Research Laboratories, Inc., Dedham, Mass. Aug 1955. 7p table. Order from OTS. 50 cents. PB 121471s

Supplement to PB 121471. Contract Nonr-478(00), Technical report no. 1, Supplement.

TRANSPORTATION EQUIPMENT

Aeronautics

Instruments

Characteristics of four nose inlets as measured at Mach numbers between 1.4 and 2.0, by George B. Branjnikoff and Arthur W. Rogers. U. S. National Advisory Committee for Aeronautics. Aug 1956. 48p photos, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123497

Supersedes RM A51C12.
1. Diffusers, Supersonic - Flow patterns 2. Ducts, Air - Supersonic 3. Ducts, Air - Inlet pressure 4. NACA TN 3724.

Development of a flight level indicator, by Robert W. Knight and George L. Pigman. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1945. 12p photo, diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 122284

1. Indicators, Flight level - Design 2. CAA TDR 46.

Instrument approach performance characteristics on radio instrument landing systems. Part I: UAL-Bendix system, by W. E. Ryburn. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1943. 8p photo, graphs. Order from LC. Mi $1.80, ph $1.80. PB 122297

1. Landing, Instrument 2. Landing approach - Photographic interpretation 3. Instrument landing systems 4. CAA TDR 32.

Investigation of forward-located fixed spoilers and deflectors as gust alleviators on an unswept-wing model, by Delwin R. Croom, C. C. Shufflebarger, and Jarrett K. Huffman. U. S. National Advisory Committee for Aeronautics. Jun 1956. 26p photo, drawing, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123488

1. Stability, Longitudinal - Static tests 2. Spoilers - Controls 3. Wings - Span load distribution 4. Gust loads - Alleviation systems 5. NACA TN 3705.

Modification of CAA-DME transponder model DTB for compatibility with the TACAN airborne equipment AN/ARN-21, by Donald L. Fehr and David B. Youmans. U. S. Air Force. Air Research and Development Command. Rome Air Development Center. Griffiss Air Force Base, Rome, Y. Y. Dec 1955. 41p photos, diagrs, table. Order from LC. Mi $3.30, ph $7.80. PB 120006

Conversion of the CAA-DME transponder, model DTB, for complete compatibility with airborne radio set AN/ARN-21 of the TACAN system for twenty-five channel operation is described. The required modifications and the addition of new units and sub-units to effect the conversion to a low power ground beacon is detailed. The performance characteristics of the converted unit are given. AF RADC TR 55-47.

Optimum switching criterion for a third-order contractor acceleration control system, by Anthony L. Passera and Ross G. Willoh, Jr. U. S. National Advisory Committee for Aeronautics. Aug 1956. 46p drawing, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123508

1. Airplanes - Controls, Automatic 2. Controls, Longitudinal - Operation 3. Controls, Automatic - Operation - Theory 4. Stability, Automatic 5. NACA TN 3743.

Status of instrument landing systems, by W. E. Jackson. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1937. 17p. Order from LC. Mi $2.40, ph $3.30. PB 122273

Formerly Report no. 1, Safety and Planning Division, Bureau of Air Commerce. Reprinted by the Civil Aeronautics Authority, 1940.
1. Landing, Instrument 2. CAA TDR 1.

Engines and Propellers

Analysis of buzzing in supersonic ram jets by a modified one-dimensional nonstationary wave theory, by Robert L. Trimpi. U. S. National Advisory Committee for Aeronautics. Jul 1956. 72p photos, drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123486

Supersedes RM L52A18.
1. Jet engines, Ram jet - Models - Tests 2. Diffusers, Supersonic - Flow patterns 3. Ducts, Air - Supersonic 4. Ducts, Air - Inlet pressure 5. Flow, Compressible - Heat transfer 6. NACA TN 3695.

Performance analysis of fixed- and free-turbine helicopter engines, by Richard P. Krebs and William S. Miller, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1956. 49p drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123481

1. Engines, Turbine propeller - Performance 2. Engines, Aircraft - Performance 3. NACA TN 3654.

Sonic-flow orifice probe for the inflight measurement of temperature profiles of a jet engine exhaust with afterburning, by C. Dewey Havill and L. Stewart Rolls. U. S. National Advisory Committee for Aeronautics. May 1956. 18p photo, drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122536

1. Airplanes - Performance - Effect of temperature 2. Jet engines, Turbo-jet - Exhaust systems 3. Instruments, Aeronautical - Research 4. Jet propulsion - Research 5. NACA TN 3714.

Airports and Airways

Survey of state airport zoning legislation, by John M. Hunter. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1939. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 122293

Originally published as Report no. 6, issued by Technical Development Division, Civil Aeronautics Authority. Reprinted 1941.
1. Zoning regulations - Airports 2. CAA TDR 21.

Aerodynamics

Aerodynamic investigation of a parabolic body of revolution at Mach number of 1.92 and some effects of an annular supersonic jet exhausting from the base, by Eugene S. Love. U. S. National Advisory Committee for Aeronautics. Sep 1956. 62p photos, drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123490

Supersedes RM L9K09.
1. Flow, Jet mixing - Measurements 2. Flow, Supersonic - Measurements 3. Flow, Supersonic - Pressure distribution 4. Loads, Aerodynamic 5. Interference, Jet - Missiles 6. Nozzles, Jet - Flow - Measurements 7. Bodies of revolution - Aerodynamics - Effect of Mach number 8. NACA TN 3709.

Calculations of the flow over an inclined flat plate at free-stream Mach number 1, by Walter G. Vincenti, Cleo B. Wagoner, and Newman H. Fisher, Jr. U. S. National Advisory Committee for Aeronautics. Aug 1956. 70p drawings, diagrs, graphs, tables, maps. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123496

1. Flow, Mixed 2. Wedges - Pressure distribution 3. Airfoils, Two-dimensional - Flow 4. NACA TN 3723.

Comparison of experimental and theoretical normal-force distributions (including Reynolds number effects) on an ogive-cylinder body at Mach number 1.98, by Edward W. Perkins and Leland H. Jorgensen. U. S. National Advisory Committee for Aeronautics. May 1956. 5p diagr, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122538

Supersedes RM A54H23.
1. Flow, Viscous - Pressure distribution 2. Loads, Aerodynamic - Theory 3. Fuselages - Load distribution 4. Reynolds number - Effect 5. Mach number - Effect 6. NACA TN 3716.

Effects of compressibility on the up-wash at the propeller planes of a four-engine tractor airplane configuration having a wing with 40^{0} of sweepback and an aspect ratio of 10^{1}, by Armando E. Lopez and Jerald K. Dickson. U. S. National Advisory Committee for Aeronautics. Jul 1956. 38p photos, drawings, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123482

Supersedes RM A53A30a.
1. Interference, Propeller - Theory 2. Interference, Nacelle - Theory 3. Wings - Angle of attack 4. Wings - Interference 5. NACA TN 3675.

Experimental measurements of forces and moments on a two-dimensional oscillating wing at subsonic speeds, by Sherman A. Clevenson and Edward Widmayer, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1956. 28p diagr, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122521

Supersedes RM L9K28a.
1. Flow, Subsonic - Measurements 2. Aeroelasticity 3. Vibration - Damping 4. Flutter - Research 5. Stability, Structural - Testing equipment 6. NACA TN 3686.

Flutter on thin propeller blades, including effects of Mach number, structural damping, and vibratory-stress measurements near the flutter boundaries, by Harvey H. Hubbard, Marvin F. Burgess, and Maurice A. Sylvester. U. S. National Advisory Committee for Aeronautics. Jun 1956. 25p drawings, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123489

1. Mach number - Effect 2. Propellers - Flutter - Tests 3. Propellers - Vibration - Tests 4. Vibration - Damping 5. NACA TN 3707.

Free streamline theory for two-dimensional fully cavitated hydrofoils, by T. Yao-tsu Wu. California Institute of Technology. Hydrodynamics Laboratory, Pasadena, Calif. Jul 1955. 46p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122238

The hydrofoils investigated here are those with sharp leading and trailing edges which are assumed to be the separation points. Except for this limitation, the present nonlinear theory is applicable to hydrofoils of any geometric profile, operating at any cavitation number, and for almost all angles of attack as long as the wake has a fully cavitating configuration. As two typical examples, the problem is solved in explicit form for the circular arc and the flat plate for which the various flow quantities are expressed by simple formulas. From the final result the various effects, such as that of cavitation number, camber of the profile and the attack angle, are discussed in detail. It is also shown that the present theory is in good agreement with the experiment. CIT HL 21-17. Contract N6 onr-24420, NR 062-059.

Friction drag and transition Reynolds number on bodies of revolution at supersonic speeds, by J. L. Potter. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1950. 17p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122073

Results of an exploratory investigation to determine the total skin friction coefficient on bodies of revolution are reported. Experimental data for both completely laminar and transitional boundary layer flow at three Mach numbers have been obtained in wind tunnel tests, and free stream Reynolds number of transition is shown. Figures showing total friction drag coefficient as a function of Mach and Reynolds numbers are presented. To summarize available information on transition, a curve of transitional Reynolds number as a function of Mach number for cone-cylinder bodies has been plotted using data on a number of different models regardless of cone angles. NAVORD 2150.

General theory of wave-drag reduction for combinations employing quasi-cylindrical bodies with an application to swept-wing and body combinations, by Jack N. Nielsen and William C. Pitts. U. S. National Advisory Committee for Aeronautics. Sep 1956. 80p drawings, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123495

Supersedes RM A55B07.
1. Wings, Swept - Aerodynamics 2. Fuselages - Drag 3. Fuselages - Shape - Effects 4. NACA TN 3722.

Interference effects of a body on the spanwise load distributions of two 45° sweptback wings of aspect ratio 8.02 from low-speed tests, by Albert P. Martina. U. S. National Advisory Committee for Aeronautics. Aug 1956. 47p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123502

Supersedes RM L51K23.
1. Wings, Sweptback - Aspect ratio 2. Wings, Sweptback - Loading 3. Wings, Sweptback - Span load distribution 4. Loads, Aerodynamic 5. NACA TN 3730.

Investigation at high subsonic speeds of a body-contouring method for alleviating the adverse interference at the root of a sweptback wing, by John B. McDevitt and William M. Haire. U. S. National Advisory Committee for Aeronautics. Apr 1956. 38p photos, drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122512

Supersedes RM A54A22.
1. Mach number - Effect 2. Wings, Sweptback - Aerodynamics 3. Fuselages - Aerodynamics 4. NACA TN 3672.

Investigation at zero forward speed of a leading-edge slat as a longitudinal control device for vertically rising airplanes that utilize the redirected-slipstream principle, by Richard E. Kuhn. U. S. National Advisory Committee for Aeronautics. May 1956. 33p photos, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122526

1. Airplanes - Performance - Tests 2. Controls, Longitudinal - Operation - Tests 3. Stability, Longitudinal - Static tests 4. Propellers - Slipstream - Tests 5. Wings, Slotted - Tests 6. NACA TN 3692.

Investigations at supersonic speeds of 22 triangular wings representing two airfoil sections for each of 11 apex angles, by Eugene S. Love. U. S. National Advisory Committee for Aeronautics. 1955. 62p photos, diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 45 cents. PB 122488

Supersedes RM L9D07.
1. Wings, Triangular - Aerodynamics 2. Mach number - Effect 3. Flow, Supersonic - Wind tunnel tests 4. NACA 1238.

Lift and moment coefficients for an oscillating rectangular wing-aileron configuration in supersonic flow, by Julian H. Berman. U. S. National Advisory Committee for Aeronautics. Jul 1956. 46p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123480

1. Mach number - Effect 2. Vibrations, Forced - Theory 3. Flutter - Surface control 4. Wings - Controls 5. NACA TN 3644.

Low-speed yawed-rolling characteristics and other elastic properties of a pair of 26-inch-diameter, 12-ply-rating, type VII aircraft tires, by Walter B. Horne, Robert F. Smiley and Bertrand H. Stephenson. U. S. National Advisory Committee for Aeronautics. May 1956. 98p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122501

1. Tires, Aircraft - Elastic constants 2. Tires, Aircraft - Load tests 3. Loads, Landing - Impact tests 4. Tires - Testing apparatus 5. NACA TN 3604.

Measurement of aerodynamic forces for various mean angles of attack on an air-foil oscillating in pitch and on two finite-span wings oscillating in bending with emphasis on damping in the stall, by A. Gerald Rainey. U. S. National Advisory Committee for Aeronautics. May 1956. 67p photo, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122506

1. Airfoils, Oscillating - Aerodynamics 2. Wings - Damping 3. Angle of attack 4. NACA TN 3643.

Method for calculating the aerodynamic loading on an oscillating finite wing in subsonic and sonic flow, by Harry L. Runyan. U. S. National Advisory Committee for Aeronautics, Aug 1956. 76p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123485

1. Wings - Flutter - Calculations 2. Wings - Span load distribution 3. Wings - Vibration - Calculations 4. NACA TN 3694.

Method for deflection analysis of thin low-aspect-ratio wings, by Manuel Stein and J. Lyell Sanders, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1956. 65p diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122504

1. Wings, Low aspect ratio - Deflection analysis 2. NACA TN 3640.

NACA transonic wind-tunnel test sections, by Ray H. Wright and Vernon G. Ward. U. S. National Advisory Committee for Aeronautics. 1955. 40p photos, drawings, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 40 cents. PB 122485

Supersedes RM L8J06.
1. Wind tunnels, Transonic - Interference 2. Flow, Subsonic - Theory 3. NACA 1231.

New experimental investigations of friction drag and boundary layer transition on bodies of revolution at supersonic speeds, by J. L. Potter. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1952. 41p photos, drawing, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120958

Total friction drag coefficients for bodies consisting of twenty and twenty-five degree cone forebodies and cylindrical afterbodies have been determined at zero angle of attack by investigations in NOL 40 x 40 cm Aeroballistics Wind Tunnel No. 2. The method was such that laminar and transitional boundary layer data were obtained. However, estimates of the wholly turbulent boundary layer skin friction drag could be made for the case of flow along a cylinder. These results are compared with theoretical calculations and it is shown that existing theories for the flat plate case may be used after slight modification to compute laminar friction drag on bodies of revolution if extremely good accuracy is not necessary. NAVORD 2371.

NOL hypersonic tunnel no. 4 results. U. S. Naval Ordnance Laboratory, White Oak, Md. Order separate parts described below from LC, giving PB number of each part ordered.

I: Air liquefaction, by P. Wegener, E. Stollenwerk, S. Reed and G. Lundquist. Jan 1951. 64p photos, diagr, graphs, tables. Mi $3.90, ph $10.80. PB 120917

Since the presence of condensed air in a hypersonic wind tunnel can make the operation of the tunnel difficult, and since liquefaction can occur when the temperature and pressure in the test section are below the condensation values, an investigation was carried out on the liquefaction of air in a hypersonic wind tunnel. The tunnel used was built to operate at Mach numbers up to 11. The liquefaction was investigated under conditions in which the temperature and pressure of the supply air could be varied. It was found that air, unlike water vapor, does not supersaturate and heating of the supply air is required for satisfactory operation of a hypersonic wind tunnel. NAVORD 1742. NOL ARR 19.

II: Diffuser investigation, by Peter P. Wegener and R. Kenneth Lobb. May 1952. 44p photos, drawing, diagr, graphs. Mi $3.30, ph $7.80. PB 120959

A brief introduction describes previous supersonic diffuser work. The diffuser investigated and the experimental techniques are then discussed. The results show first that air condensation has little or no effect on diffuser performance. Data on diffuser throat areas and overall pressure ratios needed to start and maintain hypersonic flow are given for a Mach number range from 5.9 to 9.6. The effect of two different throat locations and different diffuser configurations on tunnel performance is investigated. A peaked throat diffuser with 3^{o} wall divergence aft of the throat was selected for a more detailed study. NAVORD 2376. NOL ARR 90.

III: Diffuser investigation with models and supports, by R. Kenneth Lobb. Jul 1952. 17p photos, drawings, graphs. Mi $2.40, ph $3.30. PB 122081

The diffuser tested has a single-peaked, variable-area throat followed by a 3^{o} diverging section. A summary of previous tests with this same diffuser (NAVORD 2376, PB 120959) is given in the introduction. The models and testing procedure are then described. The following models are considered: an arbitrary missile model with triangular wings and tails, a cone cylinder, and a sphere. NAVORD 2435.

IV: High supply temperature measurement and control, by Eva M. Winkler. Oct 1952. 42p photos, drawings, diagrs, graphs. Mi $3.30, ph $7.80. PB 120885

The operation of electric heaters (total power of about 200 KW) is discussed and it is found that after a preheating period without tunnel operation, it takes about 5 minutes while the tunnel runs to raise the inlet air temperature to $500^{o}C$. If once attained, the supply temperature can be kept automatically constant for any length of time within $\pm 0.5^{o}C$. The development of subsonic total temperature probes is discussed. The means by which a uniform temperature distribution across the nozzle inlet was achieved is described. Also exterior wall temperatures are given as function of time. For safe operation equipment temperatures limit the duration of the blow to several hours. Finally a description of heaters and their performance is included as appendix. Appendix I: Electric heaters. - Appendix II: List of manufacturers. NAVORD 2574. NOL ARR 117.

V: Experimental and theoretical investigation of a cooled hypersonic wedge nozzle, by P. Wegener, R. K. Lobb, E. M. Winkler, M. Sibulkin and H. Staab. Apr 1953. 82p photos, drawings, diagrs, graphs, tables. Mi $4.80, ph $13.80. PB 122021

This report presents results of theoretical and experimental investigations covering the performance of a new water cooled, wedge-type

nozzle. It was found from measurements of pitot and static pressure that the nozzle produced a shock-free, almost isentropic expansion having a test-section Mach number distribution comparable in quality to that obtained in existing conventional nozzles at lower Mach numbers. The cooling system used was adequate to maintain the nozzle block temperatures at constant low values. The temperature distribution in a nozzle block was also measured and it showed a rise near the throat. This rise agreed qualitatively with theoretical calculations. NAVORD 2701. NOL ARR 83.

VI: Experimental and theoretical investigation of the boundary layer and heat transfer characteristics of a cooled hypersonic wedge nozzle at a Mach number of 5.5, by E. M. Winkler and Jerome Persh. Jul 1954. 30p graphs. Mi $2.70, ph $4.80. PB 122051

Experimental and theoretical investigations were conducted of the nozzle wall heat transfer and boundary layer transition at a Mach number setting of the wedge nozzle of 5.5 and a constant supply temperature of 430°K. The experimental data consists of local heat transfer and surface probe measurements at several axial locations along the nozzle wall, overall heat transfer measurements, and boundary layer surveys at various supply air pressures. These data provide needed information for the design and construction of hypersonic nozzles. The theoretical studies give a method by which the boundary layer development and heat transfer to the nozzle wall can be computed from properly selected (or measured) initial conditions and the measured position of the transition point along the nozzle wall. The agreement between experimental and theoretical data sufficiently supports the usefulness of the analytical method for design applications. NAVORD 3757. NOL ARR 245.

Normal component of induced velocity in the vicinity of a lifting rotor with a non-uniform disk loading, by Harry H. Heyson and S. Katzoff. U. S. National Advisory Committee for Aeronautics. Apr 1956. 46p drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122524

1. Flow, Incompressible - Velocity distribution 2. Helicopters - Rotors - Flow - Induced 3. Wings, Rotating - Theory 4. NACA TN 3690.

On the range of applicability of the transonic area rule, by John R. Spreiter. U. S. National Advisory Committee for Aeronautics. May 1956. 21p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122513

1. Wing theory 2. Flow, Transonic - Theory 3. Wings, Rectangular - Aerodynamics 4. NACA TN 3673.

Preliminary investigation of the effects of external wing fuel tanks on ditching behavior of a swept-back-wing airplane, by Ellis E. McBride. U. S. National Advisory Committee for Aeronautics. Jul 1956. 21p photos, drawings, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123491

1. Hydrodynamics - Research 2. Seaplanes - Hulls - Dead rise 3. Seaplanes - Hydrodynamics 4. NACA TN 3710.

Pressure and temperature measurements of the flow produced by a 12 x 12 cm grating nozzle, by A. H. Lange and L. W. Walter. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1953. 29p photos, drawings, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122013

The characteristics of the flow produced in the test section of a 12 x 12 cm supersonic wind tunnel by a "grating nozzle" have been investigated. The grating nozzle, consisting of five bars which form six "sub-nozzles", has a design Mach number of 3.33. Static and pitot pressure measurements were made in several planes perpendicular to the air flow. These measurements were supplemented by schlieren and shadowgraph pictures and also by measurements of the total temperature distribution across the flow. NAVORD 2678. NOL ARR 166.

Probability and frequency characteristics of some flight buffet loads, by Wilber B. Huston and T. H. Skopinski. U. S. National Advisory Committee for Aeronautics. Aug 1956. 53p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123503

1. Loads, Structural - Dynamic tests 2. Tail surfaces - Loads - Mathematical analysis 3. Gust loads - Mathematical analysis 4. Wings - Span load distribution 5. NACA TN 3733.

Some wind-tunnel experiments on single-degree-of-freedom flutter of ailerons in the high subsonic speed range, by Sherman A. Clevenson. U. S. National Advisory Committee for Aeronautics. Jun 1956. 32p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122522

Supersedes NACA RM L9B08.
1. Ailerons - Flutter - Wind tunnel tests 2. Flow, Subsonic 3. NACA TN 3687.

Static longitudinal and lateral stability characteristics at low speed of unswept-midwing models having wings with an aspect ratio of 2, 4, or 6, by Walter D. Wolhart and David F. Thomas, Jr. U.S. National Advisory Committee for Aeronautics.

May 1956. 41p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122509

1. Wings, Unswept - Wind tunnel tests 2. Stability, Longitudinal - Effect of tail 3. Stability, Directional - Effect of tail 4. Wings - Aspect ratio 5. NACA TN 3649.

Static-thrust measurements of the aerodynamic loading on a helicopter rotor blade, by John P. Rabbott, Jr. U. S. National Advisory Committee for Aeronautics. Jul 1956. 22p photos, diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123484

1. Wings, Rotating - Theory 2. Wings, Rotating - Loads 3. Helicopter blades - Bending moments 4. NACA TN 3688.

Supersonic flow past nonlifting bumped and indented bodies of revolution, by F. Edward McLean and Conrad Rennemann, Jr. U. S. National Advisory Committee for Aeronautics. Sep 1956. 39p drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123509

1. Bodies of revolution - Aerodynamics 2. Bodies of revolution - Design 3. Bodies of revolution - Drag 4. Bodies of revolution - Pressure distribution - Theory 5. Flow, Supersonic - Pressure distribution 6. NACA TN 3744.

Rockets and Jet Propulsion

Power supplies and a remote-control system suitable for Aerobee rocket instrumentation, by H. F. Schulte. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Dec 1955. 18p tables, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 122376

A general discussion of the operating characteristics and experience with the Airpax 400-cycle, d-c to a-c power inverter is presented. Performance curves for the inverter and circuit diagrams of an electronically regulated power supply and a flexible remote-control system suitable for rocket-borne use are included. The important problem of power-supply reliability has also received attention. A simple, yet effective, method of enhancing reliability by automatically switching to auxiliary or standby power is diagrammed. Technical note no. CT-3. Project 2096-12-T. Contract AF 19(604)-545. AF CRC TN 56-284.

Marine Transportation

Damage-distance relations for thin steel diaphragms 20 inches in diameter subjected to noncontact underwater explosions, by Charles T. Johnson. U. S. David W. Taylor Model Basin, Washington, D. C. Apr 1949. 15p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122877

The critical distances for rupture of diaphragms about 0.105 in. thick when attacked by charges of 2 to 60 oz of tetryl have been determined, as has also the curve of deflection versus charge distance for 16-oz charges. Streak pictures of the early stages of the motion of the diaphragms indicate that the initial velocity usually conforms with that predicted by free-plate theory. DWTMB 611.

Establishment of a restricted area for seaplane operation, by F. H. Grieme. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1944. 16p photos, map. Order from LC. Mi $2.40, ph $3.30. PB 122253

1. Seaplanes - Operation - Restricted areas 2. CAA TDN 32.

Exploratory tests on small steel diaphragms subjected to noncontact explosion attack, by Charles T. Johnson. U. S. David W. Taylor Model Basin, Washington, D. C. Apr 1949. 21p tables. Order from LC. Mi $2.70, ph $4.80. PB 122878

Several series of experiments were performed in which circular steel diaphragms, 3 1/4 in. in diameter, were attacked by small explosive charges under a variety of conditions. The tests were of an exploratory nature. Results of the experiments are tabulated. The trends of the data are discussed, but no systematic analysis is attempted. DWTMB 610.

Formation of a water column by an explosion in very shallow water, by J. H. Rosenbaum and H. G. Snay. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 29p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122082

A theory is developed which describes the formation of an expanding water column under idealized conditions. It is assumed that the column has vertical walls and consists of a coherent uniform fluid. In the derivation, forces due to the upward acceleration of the water particles are included. The final expressions are solved numerically for a special case. In the Appendix, a less exact theory is derived, which is based on the non-linear shallow water theory and thus ignores forces due to vertical particle acceleration. A numerical solution of this case is compared with the results of the most exact theory. NOL project 152, Interim report no. 4. NAVORD 2436.

Hydrostatic pressure tests on thin rectangular diaphragms 84 inches by 54 inches, by John W. Day. U. S. David W. Taylor Model Basin, Washington, D. C. Sep 1951. 40p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122880

Hydrostatic-pressure tests of thin, clamped, rectangular diaphragms 84 inches by 54 inches were conducted in connection with the general underwater-explosion research program. Data such as profiles of deflected diaphragms, curves of center deflection against pressure, thickness, horizontal displacement, strain, volume of displacement of deflected diaphragms, and energy absorbed were obtained for each of the four diaphragms tested. The results of these tests were compared with results of similar tests on small diaphragms and with a theory for rectangular diaphragms under hydrostatic pressure previously developed at the Taylor Model Basin. Revised edition. DWTMB 636.

Photoelastic study of stress surrounding up-take openings, by H. B. Maris. U. S. Naval Research Laboratory. Mar 1939. 8p. Order from LC. Mi $1.80, ph $1.80. PB 120433

Plates, listed as appendices and described in body of report, are not included.
1. Intakes, Air 2. Deck openings - Stresses 3. NRL H-1522.

Resilient mountings for reciprocating and rotating machinery. Engineering report no. 7: Evaluation of resilient mountings tested aboard a submarine, by Chester A. Arents. Illinois Institute of Technology. Dept. of Mechanical Engineering, Chicago, Ill. Feb 1954. 37f photos, diagrs, graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 123007

The purpose of this study was to attempt to evaluate the importance of wave phenomena in a resilient mounting by conducting a test with a machinery unit aboard a submarine. Overside measurements were made with a hydrophone to determine the effectiveness of a resilient mounting in attenuating structure-borne vibration, i.e., preventing it from exciting the water in the form of sound waves. This study was considered a preliminary one because of limitations of the test results. Anomalies occurred, which were attributed to reinforcement and cancellation in the sound wave patterns, which is part of the phenomena of wave reflection. Also, it was impossible to define accurately or eliminate the effects of air-borne vibrations. AD no. 59704. For 1st-4th reports see PB 120490-120493. Contract N7 onr-32904, NR 264-003, Report no. 7.

MISCELLANEOUS

Proceedings of the fourth annual meeting of the Agricultural Research Institute, Oct 17-18, 1955, Washington, D. C. National Research Council. Division of Biology and Agriculture. Agricultural Research Institute. 1955. 108p graphs, tables. Order free of charge from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. PB 122545

Contents: Cooperation among scientists, by Detlev W. Bronk. - Where is the Agricultural Research Institute going?, by H. E. O. Heineman. - Strategy of research in the plant sciences in relation to agriculture, by A. G. Norman. - Report on the Civil Defense Food Advisory Committee, by R. C. Newton. - Council for agricultural and chemurgic research, by Wheeler McMillen. - Progress report on activities of the Agricultural Board, by W. E. Krauss. - Committee reports. - Corn in the American economy, by Floyd Hosking. - Corn genetics, by G. F. Sprague. - Corn agronomy, by Merle T. Jenkins. - Corn in animal nutrition, by Damon Catron. - Corn in human nutrition, by C. A. Elvhejem. - Corn in nonfood industry, by Robert Ruark. - Role of government and of free enterprise in corn storage and marketing, by Marvin L. McLain.

Report of NRL progress. U. S. Naval Research Laboratory. Oct 1956. 54p. Order from OTS. $1.25. Also available at annual subscription rate of $10 a year in U. S. A., foreign subscription rate $13 a year. PB 121544

Contents: Articles: Role of NRL in the international geophysical year, written by staff. - Portable shipboard deicer, by M. A. Persechino. - Structure of the intermediate state in a superconducting lead alloy. - Scientific program: Problem notes: Astronomy and astrophysics: Power flux of the planets Mars and Venus measured at 3 cm wavelength. - Chemistry: New dielectric liquid for impregnating fixed paper capacitors....Evaluation of petroleum-ether-soluble fractions and distillation fractions of creosote....Self-discharge of the positively charged nickel oxide electrode in alkaline storage batteries ....Sintered-plate nickel-cadmium alkaline secondary cell....Lithium chloride solution for fire extinguishers exposed to low temperatures. - Mathematics: Electronic computer scheme for analysis of shock record data; also, a description of recently obtained analog computer (REAC) solutions to basic problems in metallurgy, nuclear structure, and mechanics. - Mechanics: Relation of heat treatment to the dynamic properties of some carbon steels.... High-velocity gun and measurement techniques for projectile speeds in excess of 15,000 ft/sec. - Metallurgy and ceramics: Aluminum coatings on stainless steel....Effect of baking on delayed fracture of electroplated ultrahigh strength steel.... Automatic control of cathodic protection. - Nuclear and atomic physics: Resonance structures in the gamma-ray yield from proton bombardment of Na^{23}. - Radio: Radar altimeter--ocean wave profile recorder....Twelve-channel FM-FM telemetering system....Ring modulator for comparing and adjusting precision frequency standards used on vacuum tubes....Navy's first atomic frequency standard put in operation at NRL....Microwave stepped-index Luneberg lenses for scanning antennas. - Solid-state physics: Gamma-ray induced colloid band in sodium chloride....Electrical stabilization of conducting neoprene films....Oscillatory galvanomagnetic properties of bismuth single crystals in longitudinal magnetic fields. - Published reports. - Papers by NRL staff members. - Patents.

ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

The following Atomic Energy reports are listed here because of their interest and usefulness to general industry.

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

Reproduction in whole or part of any report listed herein is encouraged by the U. S. Atomic Energy Commission, subject to the approval of authors or originating sites. General inquiries from the industrial press about AEC-developed information should be directed to the Industrial Information Branch, Atomic Energy Commission, Washington 25, D. C.

Biology and Medicine

Safety analysis of the storage and handling of the SRE fuel, by R. O. Williams. North American Aviation, Inc., Downey, Calif. Nov 1954. Decl. Nov 1955. Contract AT(11-1)-gen-8. 8p. Order from LC. Mi $1.80, ph $1.80. AECD-3728

The quantitative determination of plutonium in biological materials. Part II. Analysis of stools, by E. R. Russell and C. Brown. Chicago. Univ., Metallurgical Lab. Jun 1946. Decl. Jan 1956. 10p. Order from LC. Mi $1.80, ph $1.80. AECD-4070

Plutonium hazards created by accidental or experimental detonation of atomic weapons, by R. L. Corsbie. Based on work done by W. H. Langham, P. S. Harris, and T. L. Shipman, Los Alamos Scientific Lab. Division of Biology and Medicine. Civil Defense Liaison Branch, AEC. May 1956. 5p. Order from LC. Mi $1.80, ph $1.80. AECU-3258

The presence of enlarged pituitary glands in rats following administration of I^{131}, by C. J. Shellabarger and J. T. Godwin. Brookhaven National Lab., Upton, N. Y. (1955). 5p. Order from LC. Mi $1.80, ph $1.80. BNL-2450

Studies on the elimination of different classes of radiation-induced mutations from the ovaries of drosophila mellanogaster, by R. C. King, Jean B. Darrow, and Nancy E. Weber. Brookhaven National Lab., Upton, N. Y. (1955)? 16p. Order from LC. Mi $2.40, ph $3.30. BNL-2562

Spectrographic analysis of tissues for trace elements. Progress report for July 1, 1955 through December 31, 1955, by I. H. Tipton, M. J. Cook, R. S. Steiner, W. D. Foland, D. K. Bowman, and K. K. McDaniel. Oak Ridge National Lab., Tenn. Mar 1956. Contract W-7405-eng-26. 47p. Order from LC. Mi $3.30, ph $7.80. CF-56-3-60

Manual of radiation protection standards. Hanford Atomic Products Operation, Richland, Wash. Dec 1954. Changed from Official use only May 10, 1956. Contract W-31-109-eng-52. 77p. Order from LC. Mi $4.50, ph $12.30. HW-25457

Radioactivity levels of the Columbia River below Richland, Washington for the period October, November, December 1955, by R. E. Rostenbach, Radiological Sciences Dept. Hanford Atomic Products Operation, Richland, Wash. May 1956. Contract W-31-109-eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. HW-42946

Radioactive fallout in North America from operation teapot, by Robert J. List. Weather Bureau, Washington, D. C. Feb 1956. Decl. Apr 1956. 128p. Order from OTS. 65 cents. NYO-4696(Del.)

Rare earths in biochemical and medical research: A conference sponsored by the Medical Division, Oak Ridge Institute of Nuclear Studies, October 1955, edited by Granvil C. Kyker and Elizabeth B. Anderson. Oak Ridge Institute of Nuclear Studies, Inc., Oak Ridge, Tenn. Sep 1956. 468p. Order from OTS. $2.20. ORINS-12

Some effects of radiation injury on plants and animals. Final report. Work period from August 19, 1949 to December 31, 1952. Florida. Univ., Gainesville. n.d. Contract AT(40-1)-267. 162p. Order from LC. Mi $7.80, ph $25.80. ORO-153

The plasma lipids following X-irradiation, by Dorothy L. Fillerup, William H. Slaton, Jr., and James F. Mead. Atomic Energy Project. Univ. of Calif., Los Angeles, Calif. Jun 1955. Contract AT-04-1-gen-12. 12p. Order from OTS. 15 cents. UCLA-336

Continuous deuterium analysis. Final report, by Malcolm Dole, R. L. Burwell, Jr., R. J. Voskuyl, and W. E. Roake. Northwestern Univ., Evanston, Ill. Nov 1942. Decl. Jun 1954. Contract OEMsr-482. 35p. Order from LC. Mi $3, ph $6.30. A-359

The preparation of 2,2,2-trifluoroethanol, by Henry Gilman. Iowa State Coll., Ames. Feb 1944. Decl. Feb 1956. 5p. Order from LC. Mi $1.80, ph $1.80. A-1748

Improved directions for the preparation of $U(OC_2H_5)_5$ (to replace the directions submitted April 12, 1943), Iowa State Coll., Ames. Nov 1943. Decl. Jan 1956. 10p. Order from LC. Mi $1.80, ph $1.80. AECD-4039

The coprecipitation of thorium and uranium peroxides, by P. F. Grieger and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1946. Decl. Jan 1956. Contract W-7401-eng-23. 23p. Order from LC. Mi $2.70, ph $4.80. AECD-4110

The methods of preparing anhydrous tuballoy (uranium) tetrachloride, by E. L. Wagner, comp. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1946. Decl. Feb 1956. 77p. Order from LC. Mi $4.50, ph $12.30. AECD-4125

Progress report for the month of December 1947, by E. J. Center, H. A. Pray, A. C. Richardson, and J. D. Sullivan. Battelle Memorial Inst., Columbus, Ohio. Dec 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 12p. Order from LC. Mi $2.40, ph $3.30. AECD-4130

Progress report for the month of November 1947, by E. J. Center, H. A. Pray, A. C. Richardson, and J. D. Sullivan. Battelle Memorial Inst., Columbus, Ohio. Nov 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-4131

Progress report for the month of June 1947, by E. J. Center, H. R. Nelson, H. A. Pray, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. Jun 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 15p. Order from LC. Mi $2.40, ph $3.30. AECD-4133

Progress report for the month of May 1947, by E. J. Center, H. R. Nelson, H. A. Pray, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. May 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 29p. Order from LC. Mi $3, ph $6.30. AECD-4134

Progress report for the month of April 1947, by E. J. Center, H. R. Nelson, H. A. Pray, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. Apr 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 30p. Order from LC. Mi $2.70, ph $4.80. AECD-4135

Separation of tuballoy (uranium) from gunk solutions by sulfite precipitation, by A. D. Ryon and E. C. Armstrong. Tennessee Eastman Corp., Oak Ridge, Tenn. Apr 1945. Decl. Feb 1956. Contract W-7401-eng-23. 10p. Order from LC. Mi $1.80, ph $1.80. AECD-4151

Reclamation of contaminated diffusion pump oil and removal of tuballoy (uranium) therefrom, by J. E. Lee, Jr., K. O. Hambrock, and C. D. Susano. Tennessee Eastman Corp., Oak Ridge, Tenn. Dec 1945. Decl. Feb 1955. Contract W-7401-eng-23. 18p. Order from LC. Mi $2.40, ph $3.30. AECD-4159

Processing leach solutions from pyrosulfate fusions of salvage residues for the recovery of tuballoy (uranium), by A. D. Ryon, L. M. Aikin, and C. D. Susano. Tennessee Eastman Corp., Oak Ridge, Tenn. Jan 1946. Decl. Feb 1956. Contract W-7401-eng-23. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-4160

The determination of tuballoy (uranium) in the presence of thorium in peroxide effluents and cakes, by W. R. Lasko and C. D. Susano. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1946. Decl. Feb 1956. Contract W-7401-eng-23. 9p. Order from LC. Mi $1.80, ph $1.80. AECD-4161

Factors affecting the precipitation of tubanyl peroxide from gunk solutions at reduced temperatures. Part I. Beta, by K. B. Brown, D. H. Swanson, E. L. Wagner, and A. J. Miller. Tennessee Eastman Corp., Oak Ridge, Tenn. Mar 1945. Decl. Feb 1956. 8p. Order from LC. Mi $1.80, ph $1.80. AECD-4165

Division of chemical research and development progress report for period ending June 16, 1945. Tennessee Eastman Corp., Oak Ridge, Tenn. Jun 1945. Decl. Feb 1956. Contract W-7401-eng-23. 53p. Order from LC. Mi $3.60, ph $9.30. AECD-4166

The analysis of impurities in various stages of recycled carbon tetrachloride and correlation with chlorination properties, by R. L. Hudson, L. E.

Burkhart, and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. May 1946. Decl. Feb 1956. Contract W-7401-eng-23. 12p. Order from LC. Mi $2.40, ph $3.30. AECD-4174

Compilation of various fusion methods for the dissolution of insoluble residues, by V. P. Calkins. Tennessee Eastman Corp., Oak Ridge, Tenn. Nov 1946. Decl. Feb 1956. Contract W-7401-eng-23. 18p. Order from LC. Mi $2.40, ph $3.30. AECD-4175

The preparation of tuballoy oxyfluoride (uranyl fluoride) in green salt box-type reactors, by K. O. Johnsson and G. H. Clewett. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1946. Decl. Feb 1956. Contract W-7401-eng-23. 9p. Order from LC. Mi $1.80, ph $1.80. AECD-4178

Preparation of UCl_4 with hexachloropropylene and other chlorinated organic compounds, by A. J. Miller and L. B. Dean. Tennessee Eastman Corp., Oak Ridge, Tenn. Apr 1946. Decl. Feb 1956. Contract W-7401-eng-23. 24p. Order from LC. Mi $2.70, ph $4.80. AECD-4179

Colorimetric analysis for cadmium-diphenylthiocarbazone (dithizone) method, by W. B. Schaap, H. Farber, L. J. Andrews, and J. W. Gates, Jr. Tennessee Eastman Corp., Oak Ridge, Tenn. Aug 1945. Decl. Feb 1956. Contract W-7401-eng-23. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-4180

Spectrographic determination of vanadium in (UF_4)-TF_4, by Alfred B. Chandler, L. F. Burkhart, and J. W. Gates, Jr. Tennessee Eastman Corp., Oak Ridge, Tenn. Sep 1945. Decl. Jan 1956. Contract W-7401-eng-23. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-4186

Determination of the molecular weight of "tuballoy pentachloride" (UCl_5), by H. L. Goren, R. S. Lowrie, and J. V. Hubbard. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1946. Decl. Feb 1956. Contract W-7401-eng-23. 10p. Order from LC. Mi $1.80, ph $1.80. AECD-4187

The detection of uranium by X-ray spectrometry, by B. G. Saunders, L. E. Burkhart, and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Apr 1946. Decl. Feb 1956. Contract W-7401-eng-23. 22p. Order from LC. Mi $2.70, ph $4.80. AECD-4189

Optimum conditions for the "hot zone" volatilization of $TCl_4(UCl_4)$, by C. E. Crompton, V. P. Calkins, and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1946. Decl. Feb 1956. Contract W-7401-eng-23. 6p. Order from LC. Mi $1.80, ph $1.80. AECD-4192

Volatilization of molybdenum during the preparation of $(UF_4$ and U_3O_8 from $UO_3)$, by L. B. Wick, Boyd S. Weaver, and J. W. Gates, Jr. Tennessee Eastman Corp., Oak Ridge, Tenn. Sep 1945. Decl. Feb 1956. Contract W-7401-eng-23. 8p. Order from LC. Mi $1.80, ph $1.80. AECD-4193

Effect of $Cu(NO_3)_2$, $UO_2(NO_3)_2$ and $Fe(NO_3)_3$ on the distribution coefficients of nitrate ion in the system dibutyl carbitol – nitric acid, by Buddy Warren and C. D. Susano. Tennessee Eastman Corp., Oak Ridge, Tenn. Sep 1945. Decl. Feb 1956. Contract W-7401-eng-23. 17p. Order from LC. Mi $2.40, ph $3.30. AECD-4203

A mill for the quantitative grinding of TF_4 (UF_4), by A. D. Webb, W. F. Peed, L. H. Pancoast, and K. O. Johnsson. Tennessee Eastman Corp., Oak Ridge, Tenn. May 1945. Decl. Feb 1956. Contract W-7401-eng-23. 9p. Order from LC. Mi $1.80, ph $1.80. AECD-4205

Literature survey for the fluorine generation program, by Sidney Katz. Carbide and Carbon Chemical Div. K-25 Plant, Oak Ridge, Tenn. Dec 1951. Decl. Feb 1956. Contract W-7405-eng-26. 28p. Order from LC. Mi $2.70, ph $4.80. AECD-4230

Analysis of uranium hexafluoride-hydrogen fluoride solutions by freezing point determination. Errors caused by liquid-vapor equilibrium, by Wallace Davis, Jr. and E. H. Kobisk. Carbide and Carbon Chemicals Co. K-25 Plant, Oak Ridge, Tenn. Apr 1955. Decl. Feb 1956. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. AECD-4234

Hydrolysis of uranium tetra-fluoride, by Harvey A. Bernhardt. Carbide and Carbon Chemicals Co. K-25 Plant, Oak Ridge, Tenn. Jan 1953. Decl. Feb 1956. Contract W-7405-eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. AECD-4235

Intermolecular binding in the solid halogens, by R. Bersohn. Cornell Univ., Ithaca, N. Y. (1955)? Contract AT(30-1)-1662. 11p. Order from LC. Mi $2.40, ph $3.30. AECU-3162

Progress report (No. 39 for the period September 1, 1955 through November 30, 1955). Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science. Nov 1955. Contracts AT(30-1)-905 and N5ori-07806. 83p. Order from LC. Mi $4.80, ph $13.80. AECU-3179

The determination of hydrogen gas in water by the method of thermal conductivity. Research report 60-94602-9-R5, by J. H. Lady and W. B. Brozda.

Westinghouse Electric Corp. Research Labs., East Pittsburgh, Penna. Mar 1956. Order from LC. Mi $2.40, ph $3.30. AECU-3273

The heat capacity and thermodynamic functions of tetrauranium nonoxide from 5 to 310°K, by Darrell W. Osborne, Edgar F. Westrum, Jr., and Harold R. Lohr. Argonne National Lab., Lemont, Ill. Aug 1956. Contract W-31-109-eng-38. 6p. Order from OTS. 15 cents. ANL-5603

Continuous production of trifluorotrichloropropene, by Peter Yankwich. California. Univ., Berkeley. Radiation Lab. Nov 1945. Decl. Jan 1956. Contract W-7405-eng-48B. 12p. Order from LC. Mi $2.40, ph $3.30. CC-3386

Percolation—ion exchange, by S. H. Jury. Oak Ridge National Lab., Tenn. Oct 1951. Contract W-7405-eng-26. 33p. Order from LC. Mi $3, ph $6.30. CF-51-10-149

Remarks on the falling ball viscometer, by R. F. Redmond and S. I. Kaplan. Oak Ridge National Lab., Tenn. Jan 1953. Contract W-7405-eng-26. 20p. Order from LC. Mi $2.40, ph $3.30. CF-53-1-248

Cost estimate check list for a new project, by W. G. Stockdale. Oak Ridge National Lab., Tenn. May 1953. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-53-5-172

Enthalpy and heat capacity of lithium chloride, potassium chloride eutectic, by W. D. Powers and G. C. Blalock. Oak Ridge National Lab., Tenn. Aug 1953. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-53-8-30

Hydrofluoric acid concentration by electrodialysis—life test of unit, by E. J. Parsi. Oak Ridge National Lab., Tenn. Mar 1954. Decl. Feb 1956. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-54-3-22

Radioisotope assay methods at Oak Ridge National Laboratory, by S. A. Reynolds, W. S. Lyon, and E. I. Wyatt. Oak Ridge National Lab., Tenn. Jan 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-56-1-130

The separation and purification of carrier-free fission products, including individual rare earths, by specific elution from amberlite resin, by Waldo E. Cohn. Clinton Labs., Oak Ridge, Tenn. Jun 1945. Decl. Dec 1955. Contract W-7405-eng-39. 66p. Order from LC. Mi $3.90, ph $10.80. CN-2827

Solubility and diffusion constants for gases, by Richard Schlegel. Chicago. Univ. Metallurgical Lab. Apr 1945. Decl. Feb 1956. Contract W-7401-eng-37. 16p. Order from LC. Mi $2.40, ph $3.30. CP-2883

Neutralization of acidic distillates with limestone, by H. L. Brandt and R. E. Burns. Hanford Works, Richland, Wash. Dec 1950. Changed from Official Use Only Feb 20, 1956. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-19852

Densitometric determination of iron in plutonium, by J. L. Daniel. Hanford Works, Richland, Wash. Dec 1951. Decl. Feb 1956. Contract W-31-109-eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. HW-23080

The Hanford remote pipetter, by K. H. Hammill. Hanford Atomic Products Operation, Richland, Wash. Jan 1954. Decl. Apr 1954. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. HW-30556

Corrosion of type 316 stainless steel filter cloth, by R. W. Wirta. Hanford Atomic Products Operation, Richland, Wash. May 1954. Decl. Feb 1956. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. HW-31744

Spectrochemical determination of U-235 in U-238, by J. L. Daniel. Hanford Atomic Products Operation, Richland, Wash. May 1954. Decl. Feb 1956. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-31911

The use of potassium thiocyanate, -citrate, and -oxalate complexing mixture for sodium hydroxide titration of low level nitric acid in uranium solutions: A comparison of sodium hydroxide titration and coulometric titration, by A. C. Leaf and E. W. Christopherson. Hanford Atomic Products Operation, Richland, Wash. Jul 1954. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. HW-32386

An evaluation of monitoring methods for NO and NO_2, by D. R. Kalkwarf. Hanford Atomic Products Operation, Richland, Wash. May 1955. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. HW-37935

Purex cooling water disposal scope study, by J. P. Corley. Hanford Atomic Products Operation, Richland, Wash. Sep 1955. Contract W-31-109-eng-52. 19p. Order from LC. Mi $2.70, ph $4.80. HW-38468

Effect of ultrasonics on dissolution of nickel in nitric acid, by R. W. Wirta and R. C. Smith. Hanford Atomic Products Operation, Richland, Wash. Sep 1955. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. HW-39080

Production of acidity in stored waste, by L. L. Burger. Hanford Atomic Products Operation, Richland, Wash. Oct 1955. Contract W-31-109-eng-52. 3p. Order from LC. Mi $1.80, ph $1.80. HW-39658

NRX graphite, by E. Fast. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Oct 1954. Decl. Jan 1956. Contract AT(10-1)-205. 5p. Order from LC. Mi $1.80, ph $1.80. IDO-16232

Annotated bibliography of 1,2-cyclohexanedionedioxime, by Charles V. Banks, Howard B. Nicholas and James L. Pflasterer. Ames. Lab. Iowa State College, Ames, Iowa. Jun 1956. Contract W-7405-eng-82. 32p. Order from OTS. 25 cents. ISC-738

4-Methyl-2-pentanone (hexone), by Charles A. Burkhard. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1947. Changed from Official Use Only Feb 20, 1956. Contract W-31-109-eng-52. 36p. Order from LC. Mi $3, ph $6.30. KAPL-8

An electrolytic method for separating and determining ruthenium in some redox solutions, by Anita Camilli and John F. Flagg. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1949. Decl. Nov 1955. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. KAPL-200

Thermodynamic calculations on reactions of UO_2 with graphite and silicon carbide, by A. P. Beard. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1950. Decl with deletions Feb 1956. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-APB-1(Del.)

A polarographic determination of iron and chromium, by Harvey A. Mahlman. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-HAM-1

Purification of plutonium hexafluoride, by J. W. Codding, N. J. Hawkins, and W. W. Sabol. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1955. Decl. Feb 1956. Contract W-31-109-eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-PF6-1

Monthly report—extension of OEMsr-290, by Charles A. Kraus. Brown Univ., Providence. Jul 1942. Decl. Jan 1956. 2p. Order from LC. Mi $1.80, ph $1.80. M-884

Investigations on the distribution of $RO_2(NO_3)_2$ ($UO_2(NO_3)_2$) between H_2O and organic solvents. Monthly report no. 8, by Charles A. Kraus. Brown Univ., Providence. May 1944. Decl. Jan 1956. 4p. Order from LC. Mi $1.80, ph $1.80. M-1048

Comparison of low-F starting materials in the (UNH) ether extraction operation, by Alvan Donnan. Du Pont de Nemours (E. I.) & Co. Jackson Lab., Wilmington, Del. Oct 1944. Decl. Feb 1956. Contract W-7412-eng-151. 9p. Order from LC. Mi $1.80, ph $1.80. M-1369

The preparation and reactions of certain compounds of uranium. Monthly technical report for March 1, 1946 to April 1, 1946, by E. T. McBee, D. W. Pearce, and Z. D. Welch. Purdue Univ., Lafayette, Ind. Decl. Jan 1956. Contract W-7405-eng-74. 26p. Order from LC. Mi $2.70, ph $4.80. M-2115

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