

U. S. Government

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October 21, 1955

Vol. 24, No. 4

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Abstracts of Technical Papers From
the Government Synthetic Rubber
Program

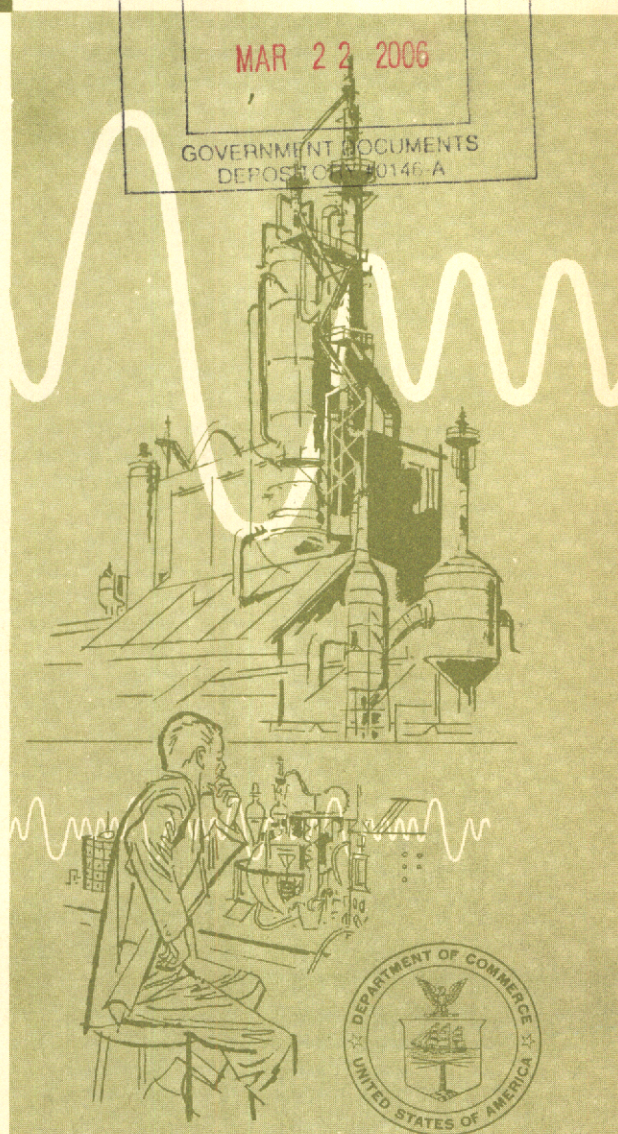
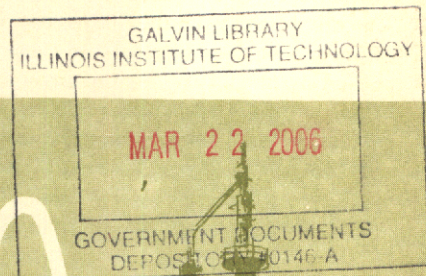
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Investigation of Permanent Magnet
Alloys

New Shop Techniques and
Developments

Scaling of Titanium and Titanium
Alloys



U. S. DEPARTMENT OF COMMERCE

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



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APPAREL

Effects of clothing on gross motor performance, by Ezra V. Saul and Jack Jaffe. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jun 1955. 37p photos, tables. Order from LC. Mi \$3, ph \$6.30. PB 118138

An investigation was carried out to determine the usefulness of 28 performance tests and devices which might reliably reflect the restriction effects of Quartermaster clothing and personal equipment. In general, these were tests of flexibility, steadiness and coordination of gross motor movement. The data obtained were analyzed with respect to reliability, sensitivity and interrelations of the tests with each other. A majority of the tests indicated that performance is impaired as amount of clothing is increased. Certain of these tests showed considerable promise as useful methods for evaluating clothing restriction. Contract no. DA 44-109-qm-1124, Project reference 7-95-20-003B. QMC EP TR 12.

Spatial requirements of the neck-shoulder region, by Russell W. Newman and Paul T. Baker. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jul 1955. 16p diags, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118196

Dimensional analyses were performed on the neck-shoulder region of a sample of U. S. Army soldiers selected on the basis of body build. Measurements of neck-height, neck-shoulder angle, acromial width, shoulder width, and a calculation of the square inches involved in two triangles, the shoulder and acromial triangles, are computed from photographs. Statistical tables of the four measured dimensions and two calculated areas are here presented in the form of reference data. Cut-out models of the averages and statistical extremes are provided for graphic visualization. Project reference 7-79-10-001 G. QMC EP TR 15.

CARTOGRAPHY

Etching or engraving on vinylite, by Charles C. Foster. Revised edition. U. S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. May 1955. 24p photos. Order from The Commander, USAF Aeronautical Chart and Information Center, 2d and Arsenal Sts., St. Louis 18, Mo. PB 118033

Final report, superseding Interim report 27 of 27 June 1951. Sample of coated vinylite attached.
1. Vinylite - Engraving 2. Vinylite - Coatings
3. Engraving - Methods 4. Machines, Engraving
5. Mapping - Technique 6. Foster-cote (Trade name) 7. AAF ACIC TR 3.

Machine map duplicating, size 22 inches x 29 inches ditto model D22. U. S. Army. Jun 1952. 36p photos, drawings, diags. Order from LC. Mi \$2.50, ph \$5.25. PB 117960

1. Maps - Reproduction equipment 2. D22 (Duplicating machine) 3. Duplicating processes 4. WD TM 5-6121.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

n-Alkylation of amines with alcohols catalyzed by Raney nickel, by Rip G. Rice and Earl J. Kohn. U. S. Naval Research Laboratory. Apr 1955. 17p photos, drawings, diagr, graphs, tables. Order from OTS. 50 cents. PB 111686

A one-step synthesis which appears to be general for the preparation of n-alkylarylamines has been developed. n-Alkylanilines were prepared in 80-85% yield and n,n'-dialkylbenzidines in 50-65% yield. Attempts to extend the synthesis to aliphatic

amines as well as aliphatic diamines and diols resulted in the formation of considerable amounts of tertiary products, with the resultant decrease in the yields of desired secondary amines. NRL R 4517.

Biochemistry of the utilization of certain carbohydrates, particularly the disaccharides by microorganisms (research on enzymes, hormones, and intermediary metabolism). Final report under Contract no. Nonr 637(00), by Michael Doudoroff, California. University. Biological Sciences Division, Sep 1954. 41p diagr, tables. Order from LC. Mi \$3.30, ph \$7.30. PB 118143

Considers the metabolism of: glucose, fructose by P. Saccharophila, maltose, L-arabinose by P. Saccharophila. Bibliography attached. Summarizes technical reports already published and experiments of a preliminary nature.

Effects of methylene blue on mammalian erythrocytes. Final report under Contract Nonr 067(00), by C. M. Wilhelmj and A. B. Vialpando. Creighton University, Omaha, Nebraska. Sep 1954. 12p. Order from LC. Mi \$2.40, ph \$3.30 PB 118144

This report considers: (1) The effect of methylene blue in normal laboratory animals, (2) effect of methylene blue on the metabolism of mammalian erythrocytes, (3) production of polycythemia in dogs, and (4) methylene blue treatment of human polycythemia. Bibliography attached.

Fungistatic capacities of aromatic fluorine compounds in relation to cloth-rotting fungi. Part 1: Fluorinated quinones and phenols, by Leo R. Tebon and Sylvia Wolcyrz. Illinois. State Natural History Survey. Section of Applied Botany and Plant Pathology. Aug 1952. 70p photos, drawings, diagrs, graphs, tables. Order from CTS. \$1.75. PB 111590

Examination of aromatic fluorine compounds--six quinones and three phenol isomers--by dilution plate and cloth square methods with respect to four cloth-deteriorating fungi showed general possession of fungistatic properties. All the quinones and two of the phenol isomers exhibited appreciable fungistatic capacities. The compound 2,5-difluoro-1,4-benzoquinone was most potent. Among the quinones fungistatic potency appeared to vary both with fluorine content--the higher the content, the more potent the compound--and, independently of fluorine content, with molecular structure. With phenol isomers, the position of the fluorine atom strongly influenced potency. For Parts 2-4 see PB 111591, 111487, 111488. AAF TR 6518, Part 1.

Pilot-plant production of clinical-sized dextran by acid hydrolysis of the enzymatically synthesized high polymer, by V. E. Sohns, S. P. Rogovin, H. F. Conway and C. T. Langford. U. S. Dept. of Agriculture. Agricultural Research Service. Northern

Utilization Research Branch, Peoria, Ill. Jun 1954. 31p diagrs, tables. Order from Agricultural Research Service, U. S. Dept. of Agriculture, Washington 25, D. C. PB 118098

Describes the pilot-plant methods developed for the production of clinical-sized dextran by a combined enzymatic and hydrolytic process, and presents estimates for the investment and operating costs in conducting it on a plant scale. AIC-372.

Preparation of cellulose and acetyl derivatives for microbiological investigations, by E. Heuser. Institute of Paper Chemistry, Appleton, Wis. Jun 1946. 27p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118069

The report is divided into 6 sections: I. Introduction, II. Analytical methods, III. Preparation of polyhomologous series of cellulose preparations of varying degree of polymerization, IV. Preparation of polyhomologous series of cellulose triacetates with varying degrees of polymerization, V. Preparation of cellulose acetates with varying degrees of polymerization and acetylation, and VI. Summary. Contract W 44-109-qm-907. QMC MSR 7.

Protein complexes, by I. M. Klotz. Northwestern University. Dept. of Chemistry, Evanston, Ill. Sep 1954. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 118127

Considers complexes with neutral organic molecules, complexes with anions, and metal complexes. Contract Nonr 245(00) Project NR 124-054.

Paints, Varnishes and Lacquers

Behavior of petroleum type preservative compounds under service conditions, by Linden H. Wagner. U. S. Arsenal, Rock Island, Ill. Apr 1955. 61p photos, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB118045

The behavior of petroleum type corrosion preventive compounds described in specification MIL-C-11796A, was investigated in outdoor, shed, and indoor storage. Ordnance project no. TB 5-6010A, Report no. 27. Dept. of the Army project no. 593-21-055. RIAL R 55-1292.

Development of electrically conductive transparent coatings for acrylic plastic, by John Bjorksten, Harry L. Hamilton, Evelyn E. Smith, and Robert J. Roth. Bjorksten Research Laboratories, Inc., Madison, Wis. Dec 1952. 72p photos, diagr, graph, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 118034

In order to dissipate precipitation electrostatic charge built up on transparent plastic aircraft canopies during flight an electrically conductive transparent coating, easily applied to formed air-

craft canopies made from acrylic sheet conforming to Specification MIL-P-5425, has been developed. The coating is applied by abrading or scratching the acrylic surface slightly with a suede brush, rubbing in finely divided graphite, and spraying the surface with a protective film of a 1:5 methacrylic acid-methyl methacrylate copolymer resin. Contract no. AF 33(038)-23319. AAF WADC TR 52-48.

Tropical performances of fungicidal coatings, Part II, by J. M. Leonard and J. D. Bultman. U. S. Naval Research Laboratory. Jul 1955. 9p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118258

Under the natural conditions of a Panama jungle the abilities of six different fungicides to suppress fungus growth on varnish films have been examined. The toxicants were studied singly and in binary mixtures. The results confirm an earlier experiment which shows p-toluene sulfonamide to be of superior merit. For Part I see PB 103381. NRL R 4563.

Inorganic Chemicals

Catalytic oxidation of ammonia, an experimental study, by Hyman Marcus. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1953. 21p photo, diagr, graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 118228

An investigation was conducted to determine the feasibility of removing ammonia gas (injected by necessity) from an air conditioning system by the catalytic action of promoted and unpromoted cupric oxide and a cobalt-bismuth oxide mixture. A system was designed to deliver 0.378 pounds per minute of a 5% ammonia-enriched air mixture to the catalyst for conversion. The materials used to promote the action of the cupric oxide included red iron oxide, green nickel oxide, and a mixture of the two. The conversion reaction proceeded when the temperature of the preheated gas mixture passing over the catalyst bed had reached approximately 800°F. The reaction products consisted of a mixture of nitric oxide, nitrogen dioxide, nitrogen, water vapor, and the ammonium salts of nitrous and nitric acids. AAF WADC TR 53-32.

Crystal and molecular structure of orthorhombic sulfur, by S. C. Abrahams. Massachusetts Institute of Technology. Laboratory for Insulation Research. Sep 1954. 29p diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB118157

Contract N5ori-07801, NR 017-421.

1. Sulfur - Crystal structure 2. Sulfur - Molecular structure 3. MIT LIR TR 83.

Some factors affecting the decomposition of hydrazine in liquid ammonia, by J. P. Redmond and J. A.

Krynitsky. U. S. Naval Research Laboratory. Jun 1955. 22p diagrs, graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 118215

The influences of soluble potassium amide and insoluble potassium sulfate on the stability of hydrazine in liquid ammonia were studied. The alkalinity of the solution was significant in the results. Hydrazine was found to be stable in acidic or essentially neutral liquid ammonia solutions with or without the presence of such catalysts as potassium sulfate or graphite. NRL R 4536.

Miscellaneous Chemicals

Chemistry of light production in living organisms, by E. Newton Harvey and F. I. Tsuji. Princeton University, Princeton, N. J. Contract Nonr 1006(600), NR 165-167. Order separate parts described below from LC, giving PB number of each part ordered.

Annual progress report for period Sep 20, 1953 to Aug 31, 1954. Aug 1954. 5p. Mi \$1.50, ph \$1.50. PB 117764

1. Luciferin - Production 2. Light - Sources
3. Luminescence, Biological.

Final report for period Sep 1, 1952 to Aug 31, 1954. Aug 1954. 4p. Mi \$1.50, ph \$1.50.

PB 117765

1. Luciferin - Production 2. Light - Sources
3. Luminescence, Biological.

ELECTRICAL MACHINERY

Communication Equipment

Effets transitoires dans un systeme de reception CISPR (Transitory effects in a C.I.S.P.R. system reception), by J. Pfister. Translated and edited by F. A. Raven. May 1955. 21p diagr, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118166

Translated from R. I. (Suisse) 25, Jan 1953. Published by Commission Electrotechnique Internationale, Comité International Spécial des Perturbations Radioelectriques. R.I. (Suisse) 25 is a translation of the article entitled Zur messtechnik von störspannungen (On the technical measurement of interference potentials) published in the Bulletin techniques des PTT Suisse, vol. XXIX, no. 9, 1 Sep 1951, p. 321.
1. Radio interference - Measurement - Germany
2. Filters, Band-pass - Impedance - Theory - Germany
3. Radio receivers - Interception - Germany
4. International Special Committee on Radioelectric Disturbances 5. NAVSHIPS T 589-B 6. STS 216B.

Introduction aux rapports RI (Suisse) 25 et 26 concernant le calcul de la sensibilité des récepteurs de mesure C.I.S.P.R. aux impulsions brèves régulièrement répétées, et Résumé des propositions suisses à l'égard de la normalisation de ces récepteurs (Introduction to reports R.I. (Suisse) 25 and 26 concerning the calculation of the sensitivity of CISPR measuring receivers with respect to short regularly repeated pulses and summary of Swiss proposals relative to standardization of these receivers). Translated and edited by F. A. Raven. International Special Committee on Radioelectric Disturbances. May 1955. 7p graph. Order from LC. Mi \$1.80, ph \$1.80. PB 118165

1. Radio receivers - Sensitivity - Switzerland
2. Generators, Pulse - Switzerland
3. Generators, Radio frequency - Specifications - Switzerland
4. NAVSHIPS T 589-A
5. STS 216A.

Progrès techniques concernant la mesure des perturbations radioélectriques (Technical progress concerning the measurement of radioelectric interference), by J. Pfister and J. P. Buclin. Translated and edited by F. A. Raven. May 1955. 38p drawings, diagrs, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118167

Translated from R. I. (Suisse) 26, Jan 1953. Published by Commission Electrotechnique Internationale, Comité International Spécial des Perturbations Radioélectriques.

1. Radio waves - Interference - Switzerland
2. Radio interference - Measuring equipment - Switzerland
3. Generators, Pulse - Spectrographic analysis
4. International Special Committee on Radioelectric Disturbances
5. NAVSHIPS T 589-C
6. STS 216C.

Sondages statistiques concernant l'auditoire radio-phonique et sa consommation d'électricité (Statistical sampling concerned with the radio-listening public and the electrical consumption involved), by J. Meyer de Stadelhofen. Translated and edited by F. A. Raven. May 1955. 19p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118164

Translated from Bulletin technique de l'Administration des Télégraphes et des Téléphones Suisse, no. 4, 1946, p. 163-176.

1. Sampling (Statistics) - Switzerland
2. Radio operation - Consumption of electricity - Switzerland
3. Electricity - Use in radio operation - Switzerland
4. NAVSHIPS T 591
5. STS 218.

Electronics

Anti-aircraft target designation equipment for ships, by R. W. Blue and C. E. Moore. Massachusetts Institute of Technology. Radiation Laboratory. Nov 1944. 31p photos, diagrs, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118072

A complete system has been set up for coaching a fire-control radar on an aircraft target. This system consists of a search radar, a simulated fire-control radar, a precision PPI, an ordinary remote PPI, matching dials for data presentation, an electronic repeat-back indicator showing the range and bearing settings of the fire-control radar, and facilities for plotting and recording data. A projection PPI has been used interchangeably with the plotting table. Contract OEMsr-262. MIT Rad Lab 640. NDRC Div 14.

Behavior of piezo-electric transducer systems, by J. Hugh Hamilton, P. J. Elsey, L. Dale Harris, John T. Doherty, Frank W. Neilson, Howard T. Ozaki. Utah. Engineering Experiment Station, Salt Lake City, Utah. Nov 1951. 57p photos, diagrs, graphs, tables. Order from LC. Mi \$3, ph \$7.75. PB 117875

The study of the behavior of piezoelectric transducers at their solid-liquid interfaces is the purpose of this project. This report is a description of the apparatus and instrumentation developed, the preparation of materials, the methods of test, and the results obtained to date. Technical report I. Contract N7onr-45104, Project no. NR 014 403.

Continuation of index of regular reports, special reports, manuals, and texts. Massachusetts Institute of Technology. Radiation Laboratory. Mar 1946. 60p. Order from LC. Mi \$3, ph \$7.75. PB 117876

Contract OEMsr-262. For earlier indexes see Report 400 (PB 117131) and Report 800 (PB 117132). These three volumes index the complete set of reports. NDRC Div 14. MIT Rad Lab 1083.

Critique of the variational method in scattering problems, by D. S. Jones. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. May 1955. 20p. Order from LC. Mi \$2.40, ph \$3.30. PB 118160

It is shown that the variational method of dealing with the integral equations of scattering problems is equivalent to solving the integral equation directly by Galerkin's method and using the standard formula for the amplitude of the scattered wave. The second method also satisfies the reciprocity theorem. It is therefore suggested that the reciprocity theorem be used as the basis of approximation without the introduction of variational formulas. The error involved in using an approximate solution is discussed and it is shown that only a special set of approximations can lead to accuracy at low frequencies. Some ways in which bounds for the error may be obtained in special problems are also given. Contract no. AF 19(122)-42. NYU RR EM-78. AAF CRC TN 55-389.

D-C current transformers and magnetic frequency doublers, by Theodor Buchhold. U. S. Ordnance Dept. Research and Development Division. Sub-office (Rocket), Fort Bliss, Texas. Apr 1950. 30p diags. Order from LC. Mi \$2.70, ph \$4.80.
PB 118094

1. Transformers, Current - Theory 2. Frequency changers - Theory 3. ORDD R TR 63.

Deflections of a gear drive used for a radar antenna mount, by James W. Titus. U. S. Naval Research Laboratory. Jun 1955. 15p photos, drawings, diags. Order from LC. Mi \$2.40, ph \$3.30.
PB 118217

The new elevation drive of the antenna for the radar equipment Mark 50 is believed to be of interest as an example of an extremely "stiff" drive achieved by a straightforward approach. A lengthy design study with conservative assumptions predicted a spring constant between the motor and the output of this gear drive of 13.4×10^6 ft lb per radian. Measurements made upon the completed equipment show that this value for the spring constant, calculated before construction, was 33 percent low. NRL R 4518.

Detection of moving targets among ground clutter by coherent pulse methods, by Robert A. McConnell. Massachusetts Institute of Technology. Radiation Laboratory. Dec 1943. 19p diagr, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118071

1. Targets - Detection 2. Radar - Noise elimination 3. Radar - Echo lines 4. MIT Rad Lab 480.

Determination of the scattering potential from the spectral measure function. Part II: Point eigenvalues and proper eigenfunctions, by Irvin Kay and Harry E. Moses. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jun 1955. 24p. Order from LC. Mi \$2.70, ph \$4.80. PB 118162

This part of the paper shows how one may choose weight operators which lead to Hamiltonians H having spectra different from that of H_0 . To make the discussion more concrete the case is considered where H_0 has a purely continuous spectrum extending from 0 to ∞ and where H has a spectrum which has a continuous part which coincides with the spectrum of H_0 and, in addition, has negative point eigenvalues. Contract AF 19(122)-463. For Part I see PB 117016. NYU RR CX-19. AAF CRC TN 55-40.

Electric line construction. U. S. War Department. Jun 1945. 29p drawings, diags. Order from LC. Mi \$2.25, ph \$4. PB 117959

1. Electrical equipment - Maintenance 2. Electric lines - Construction 3. WD TB 5-283-3.

Electromagnetic propagation characteristics of space arrays of aperture-in-metal discontinuities and complementary structures, by J. Munushian. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Sep 1954. 73p photos, diags, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 118153

Report 36 on Contract N7onr 29529.

1. Waves, Electromagnetic - Propagation - Theory 2. Wave guides - Propagation constant 3. Circuits, Amplifier 4. UC IER Series no. 60, Issue no. 126.

Electromagnetic wave propagation on helical conductors embedded in dielectric medium, by Sven Olving. Chalmers University of Technology. Research Laboratory of Electronics, Gothenburg, Sweden. 1955. 16p diags, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118032

The problem is to construct helices allowing interaction with an electron beam of very low velocity. Owing to mechanical difficulties the helical pitch angle cannot always be made small enough. It has been shown that the phase velocity along the helical wire, when the hole radius is equal to the helix radius, takes approximately $\sqrt{2}$ times the value this velocity would have if all the helix were filled up by the dielectric medium. Thus it is sufficient to surround the helix only externally by a dielectric. Electrical Engineering Series vol. 6, no. 3. Chalmers University of Technology. Handlingar 156. Acta polytechnica 165.

Experimental MTI system, by R. A. McConnell. Massachusetts Institute of Technology. Radiation Laboratory. Apr 1946. 42p photos, diags. Order from LC. Mi \$3.30, ph \$7.80. PB 118074

Describes a prototype MTI system and its components. Switching, testing, and multi-indicator circuits were arranged for maximum flexibility. The results of some of the operational tests are given. A glossary and a complete bibliography of Radiation Laboratory publications on MTI are appended. Contract OFMSr-262. NDRC Div 14. MIT Rad Lab 744.

High precision primary frequency standard oscillator. Interim and final engineering report (interim, 20 Jul-1 Oct 1951; final, 1 May 1950-1 Oct 1951). Bell Telephone Laboratories, Inc., Murray Hill, N. J. Nov 1951. 164p photos, drawings, diags (part fold), graphs. Order from LC. Mi \$6.50, ph \$21.50. PB 117861

Major objective in the final period was construction of a breadboard model of the oscillator and to improve the instrumentation for processing the crystal unit. Gives details of overall oscillator design, revisions in the circuit and new parts; new design of the crystal unit, including gold loaded filament and revised electrode design; and describes rearranged experimental oven for testing the breadboard model,

including control circuits and performance data.
Contract no. AF 28(099)-204.

High resolution set. Massachusetts Institute of
Technology. Radiation Laboratory. n.d. 8p
drawings. Order from LC. Mi \$1.80, ph \$1.80.
PB 118078

1. Radar, Marine - Uses 2. MIT Rad Lab S-5.

High voltage extraction of electrons from a plasma,
by C.A.B. Coelho. California. University. Divi-
sion of Electrical Engineering. Electronics Re-
search Laboratory, Berkeley, Calif. Feb 1955.
42p drawings, diags, graphs. Order from OTS.
\$1.25. PB 111698

This report describes the series of experiments
made during the early part of 1954 to extract elec-
trons from the plasma of an arc discharge by a
strong electric field in a high-vacuum region close
to the plasma. The ultimate goal is to obtain a
high-density electron beam suitable for use in a high-
power traveling-wave amplifier or backward-wave
oscillator, but the experiments reported here were
preliminary, yielding information which has affect-
ed the design of later arc cathodes suitable for the
beam-type tubes. UC IER Series 60, Issue no. 133.
Contract AF 33(616)-495.

Interaction between an obliquely incident plane elec-
tromagnetic wave and an electron beam. Part I,
by Hans Wilhelmsson. Chalmers University of
Technology. Research Laboratory of Electronics,
Gothenburg, Sweden. 1954. 32p diags, graphs.
Order from LC. Mi \$3, ph \$6.30. PB 118031

Electrical Engineering Series vol. 6, no. 2.
1. Waves, Electromagnetic - Propagation - Theory -
Sweden 2. Electron beams - Electromagnetic ef-
fects - Sweden 3. Chalmers University of Techno-
logy. Handlingar 155 4. Acta polytechnica 164.

Microwave radiation from large finite bodies, by
Seymour B. Cohn and Tetsu Morita. Stanford Re-
search Institute, Stanford, Calif. Jan 1955. 44p
diags, graphs. Order from LC. Mi \$2.75, ph
\$6.50. PB 117735

This report is concerned with the effect of the sur-
face shape of an aircraft on the radiation pattern of
a flush-mounted microwave antenna. A procedure
is proposed for determining the effect of the large
finite body on which an antenna is mounted. This
procedure involves the "pattern multiplication" of
the theoretically determined pattern of the antenna
on a hypothetical infinite ground plane by the pattern
of a single slot element at a mean location in the
region to be occupied by the antenna. The radiation
patterns of slot elements on various bodies of simple
shape and the applicability of these data to flush-
mounted antennas on an actual aircraft are discussed.
Contract AF 19(604)-1296. SRI TR 48. SRI Proj 1197.
AAF CRC TN 55-186.

Mode selective directional couplers, by H. A. Judy
and D. J. Angelakos. California. University.
Division of Electrical Engineering. Electronics
Research Laboratory. Antenna Group, Berkeley,
Calif. Sep 1954. 52p photos, diags, graphs, tables.
Order from LC. Mi \$3.60, ph \$9.30. PB 118152

This is a theoretical and experimental study of di-
rectional couplers which have both the TE₁₀ and
TE₂₀ modes propagating in the rectangular primary
wave guide. Results are shown of a practical -20 db
directional coupler for each mode, with a coupling of
-50 db for the undesired mode. Three types of mode
selective directional couplers were studied. A re-
verse type directional coupler was designed which is
similar to the cross guide coupler. This design is
applicable to mode selection although its practical
application is limited. Report no. 31 under Contract
N7onr 29529. UC IER Series 60, Issue 119.

Modulation and demodulation of an electron stream
by backward-wave interaction, by M. R. Currie.
California. University. Division of Electrical En-
gineering. Electronics Research Laboratory.
Microwave Tube Group, Berkeley, Calif. Oct 1954.
146p photos, drawings, diags, graphs. Order from
LC. Mi \$7.20, ph \$22.80. PB 118151

This investigation is primarily concerned with
backward-wave interaction in the presence of various
boundary conditions which are imposed on the elec-
tron stream and the wave-propagating structure.
Throughout, the tape helix is used both conceptually
and physically as a backward-wave interaction cir-
cuit. The nature of the current and velocity modula-
tion which is induced on an electron beam as a re-
sult of backward-wave interaction is investigated.
The circuit field which is induced when a beam is
injected into the interaction space with arbitrary
current and velocity modulation is then studied. A
comparison of a backward-wave beam-demodulator
with a klystron cavity shows that the former has
significant advantages and leads to the concept of the
severed-helix backward-wave amplifier. An experi-
mental two-helix backward-wave amplifier which
uses a drift-tube as the transducer section is de-
scribed. Finally, an experiment is described which
illustrates the existence of orthogonal patterns of
density modulation on a broad beam. Contract no.
AF 33(616)-495. Essentially the same as the second
half of a dissertation. The first part is summariz-
ed in Series 60, Issue no. 111. UC IER Series 60,
Issue no. 129.

MTI for MEW, by George Nonemaker. Massachu-
setts Institute of Technology. Radiation Labora-
tory. May 1945. 13p photos, drawings. Order
from LC. Mi \$2.40, ph \$3.30. PB 118075

MTI is a modification kit for removing ground
echoes from the MEW scopes while retaining those
from aircraft. This is done by subtraction of alter-
nate echoes leaving nothing for a fixed target but
showing a net voltage for a moving aircraft. MTI
thereby facilitates plotting aircraft into areas where

ground signals are strong enough to mask aircraft echoes or where confusion is too great to follow a target. Contract OEMsr-262. SC-73. MIT Rad Lab 752.

Observation of R.F. phase in pulse radar, by R. A. McConnell and A. G. Emslie. Massachusetts Institute of Technology. Radiation Laboratory. Dec 1943. 22p diags. Order from LC. Mi \$2.70, ph \$4.80. PB 118073

Echo fluctuation frequency obtained by comparing the echo phase from a moving target with a reference CW is equal to the Doppler shift frequency if the reference frequency equals the echo carrier frequency. Methods for making such a comparison and equipment stability requirements are discussed. Representative circuits are described. MIT Rad Lab 481.

On the time dependent reliability of networks, by George H. Weiss. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Mar 1955. 18p. Order from LC. Mi \$2.40, ph \$3.30. PB 118212

Many researchers in reliability theory compute such quantities as the survival curve, or replacement rate, as a function of time. This paper assumes as known the survival curve of a network and a probability distribution for repair and replacement times. In terms of these distributions, it derives formulae for the mean time of survival for a network, the expected number of breakdowns as a function of time, and the probability for being under repair at a given time. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007. APG BRL R 929.

Oscillating circuit incorporating a choke with rectangular magnetization curve, by Theodor Buchhold and Ernst Stuhlinger. U. S. Redstone Arsenal, Huntsville, Ala. Apr 1952. 50p diags. Order from LC. Mi \$3.30, ph \$7.80. PB 118092

Compiled, edited, and published by the Guided Missile Development Group, Technical and Engineering Division.

1. Circuits, Oscillator - Theory 2. Circuits, Oscillator - Design 3. RSA TR 70.

Phase difference variations in 9350 megacycle radio signals arriving at spaced antennas, by A. P. Dean and B. M. Fannin. Texas. University. Electrical Engineering Research Laboratory. May 1955. 36p photo, diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118163

Contract AF 19(604)-494. Report no. 6-08.

1. Radio waves - Frequency measurement 2. Antennas - Mounts 3. AAF CRC TN 55-364.

Potential at zero charge for reversible and ideal polarized electrodes, by Paul Ruetschi and Paul

Delahay. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Aug 1954. 18p graphs. Order from LC. Mi \$2, ph \$2.75.

PB 117821

The potential at zero charge for an ideal polarized electrode, as measured with respect to some reference electrode, varies linearly with the work function of the metal, while this potential for a reversible electrode is independent of the nature of the electrode. This observation is verified experimentally for Ag, Cd, Cu, Ga, Hg, Ni, Pb, Pt, and TI in the case of ideal polarized electrodes and for Ag, Au, Bi, Cu, Hg, and Pt for reversible electrodes. The difference of Volta potentials for a reversible electrode at zero charge varies linearly with the electronic work function of the metal. Project NR 051-258, Report 19. ONR TR 19.

Proceedings of the Department of Defense symposium on magnetic recording, fifth symposium on acoustics-in-air research and development. U. S. Bureau of Ships. Mar 1954. 270p photos, diags, graphs, tables. Order from LC. Mi \$11.10, ph \$40.85. PB 118037

Contents: 1. Ferrite core heads for magnetic recording, by R. J. Youngquist and W. W. Wetzel. - 2. A vacuum tube for an electron beam magnetic reproducing head, by L. E. Loveridge. - 3. Core structures for the electron-beam magnetic reproducing head, by J. W. Gratian. - 4. A magneto-static reading head, by S. M. Rubens and A. B. Bergh. - 5. Performance characteristics of magneto-static reproducing equipment, by W. R. Boenning. - 6. Playback of magnetic recordings through transistor amplifiers, by C. E. Williams. - 7. Components and mechanical considerations for magnetic sound on 35MM film, by John G. Frayne. - 8. Basic mechanical considerations for tape transport systems, by O. C. Bixler. - 9. Mechanical factors governing tape coatings, backings, and reel design, by J. E. Johnston. - 10. Magnetic recorders for data recording under adverse environments, by G. L. Davies. - 11. Improved performance of magnetic recording system for precision data, by Walter T. Selsted. - 12. Present status of a 16MM standardized reproduction characteristic, by E. W. D'Arcy. - 13. Magnetic tape testing on a comparison basis, by Walter H. Erikson. - 14. Characteristics of recent commercial 1/4-inch magnetic tapes-- Effects of trends on Navy Tape Standardization, by F. Comerci, S. Wilpon, and R. Schwartz. - 15. Some notes on problems encountered in the use of the standard reference tape, by Frank Radocy. - 16. A standard magnetic tape recording for standardizing the characteristics of Navy recorder-reproducers, by F. Comerci, S. Wilpon, and R. Schwartz. - 17. Equalization of magnetic tape recorders and general recorder performance tests, by Frank G. Lennert. - 18. Methods of measuring surface induction of magnetic tape, by J. D. Bick.

Progress report for Jan-Mar 1955. National Research Council of Canada. Radio and Electrical Engineering Division. Apr 1955. 23p photos,

diagr. Order from National Research Council,
Ottawa, Canada. PB 117999

1. Dielectric research - Canada
2. Antennas - Research - Canada
3. Navigational aids - Canada
4. Engineering, Electric - Canada
5. Electro-medical research - Canada
6. Tubes, Electron - Research - Canada
7. Noise, Solar - Research - Canada
8. Wave propagation - Research - Canada
9. NRRC ERA 283.

Propagation in the 960 to 1215 mc range, report no. 2, and Propagation in the 2000 mc frequency band, report no. 1, combined final report, by C. H. Duerfeldt and L. F. Dodson. U. S. Naval Air Test Center. Electronics Test Division, Patuxent River, Md. Oct 1954. 41p diags, graphs. Order from LC. Mi \$3.30, ph \$7.80. PB 118082

Simultaneous ground-to-air radio wave propagation measurements were obtained for over land and over water conditions on 328.2, 1186, and 2300 mc. Concurrent measurements of atmospheric refractive index and water surface roughness were also obtained. Small atmospheric refractive index variations and elevated ducts produce deviations from standard two-path theory. NATC Proj EL 44012, 3-4. NATC ET 312-412.

Propagation of 4.3-millimeter radio waves on 3.5 and 7.0 mile paths, by C. W. Tolbert, C. O. Britf, C. D. Tipton and A. W. Straiton. Texas. University. Electrical Engineering Research Laboratory. Aug 1954. 18p photos, graphs, table. Order from LC. Mi \$2, ph \$2.75. PB 117819

Propagation measurements are reported for frequencies of 69.5 and 70.1 kilomegacycles per second over 3.5- and 7.0-mile paths in the vicinity of Austin, Texas. The magnetron transmitter, the crystal video receiver, and the associated equipment used for the tests are described in the report. Contract N-onr-375(01), NR 071 032. TU EERL 73.

Quarterly report under Contract AF 189(600)-689, Dec I, 1954 to Feb 28, 1955, Mar I, 1955, to May 31, 1955, by Frederick Seitz. Illinois. University, Urbana, Ill. Jun 1955. 6p. Order from LC. Mi \$1.50, ph \$1.50. PB 117772

1. Atomic power - Research
2. Crystals, Sodium chloride - Electromagnetic properties.

Radar beacon Mark I, mod. 1, by Donald R. Young. Massachusetts Institute of Technology. Radiation Laboratory. May 1944. 37p photos, drawings (1 fold), diags (1 fold). Order from LC. Mi \$3, ph \$6.30. PB 118076

This beacon contains a receiver and transmitter that may be tuned to any frequency in the band of the Mark III or Mark IV fire control radars and is designed to provide a reference point, on a coast line,

for controlling shore bombardment by a ship. A cavity oscillator is used as a superregenerative detector for the receiver and as a transmitter. The beacon consists of two rectangular boxes and requires two men to carry it. Contract OEMsr-262. NDRC Div 14. MIT Rad Lab M-167.

Reflection and transmission of plane electromagnetic waves by ferrite sheets, by George Jeromson. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Sep 1954. 24p diags. Order from LC. Mi \$2.70, ph \$4.80. PB 118154

The purpose of this report is to investigate the nature of transmission of plane electromagnetic waves through sheets of anisotropic material. The propagation constants for plane waves in ferrites, with excitation H_a taken along each of the axes in turn, are computed for transmission in the z direction. Then, these results are applied to situations involving reflections from a surface of a semi-infinite ferrite occupying the half-space $z \geq 0$, and for transmission through single ferrite sheets. The latter case is extended to include metal plane terminations, and "open circuit" terminations (metal plane one-quarter wavelength behind the ferrite). An appendix listing all symbols used has been included at the end of the report, in addition to a short bibliography containing references which have been of assistance to the author. Report no. 32 on Contract N7onr-29529. UC IER Series 60, Issue 120.

Some results in the large-signal analysis of traveling-wave tubes, by R. L. Hess. California. University. Div. of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Dec 1954. 54p graphs, table. Order from LC. Mi \$3, ph \$7.75. PB 117927

Part I of the present report is an attempt to simplify the numerical analysis of Nordsieck using the physical concepts of Slater. A theory is developed which describes the interaction of a tightly-bunched electron beam with a traveling circuit wave. Contract no. AF 33(616)-495. UC IER Series 60, Issue 131.

Spot-width variation in Weissenberg X-ray diffraction patterns from single crystals, by A. B. Wing. U. S. Naval Research Laboratory. Jul 1955. 7p diags, graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118199

The variation in the base widths of single-crystal reflections in Weissenberg photographs is analyzed in terms of geometric, chromatic, and crystal lattice factors. It is shown to be feasible to construct curves for this variation which can be used for correcting visual estimates of the reflection intensities. This has been found essential for bringing the estimates into their proper relationship with the true intensity values. NRL R 4553.

Systematic trouble shooting and the half-split technique, by Robert B. Miller, John D. Folley, Jr., and Philip R. Smith. American Institute for Research, Inc., Pittsburgh, Pa. Jul 1953. 21p diags, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118038

Trouble-shooting procedures have been broken down into two phases: (a) isolating the data chain in which the malfunction is located, and (b) identifying the particular component or components in the data chain which represent the cause of the malfunction. Conclusions and summary are given. Contract no. AF 33(038)-12921, Project no. 507-008-0001. AAF HRRC TR 53-21.

Theory of the radiofrequency Stark effects, by D. T. F. Marple. Syracuse University. Institute of Industrial Research. Dept. of Physics. Aug 1954. 30p. Order from LC. Mi \$2.25, ph \$4. PB 117917

The theory presented explains both microwave absorption experiments and electric resonance experiments, and also predicts the two quantum transitions originally observed and explained by Hughes and Grabner. Contract 6N-onr-248, Task order 11.

2500-watt wideband sonar frequency amplifier, by Thomas C. Dixon. U. S. Naval Research Laboratory. Jun 1955. 18p photo, diags. Order from LC. Mi \$2.40, ph \$3.30. PB 118218

This report discusses the design, construction, and operation of a 2500-watt amplifier covering most of the sonar frequency and impedance ranges. Because of the very small commercial interest in such an amplifier, nothing similar has been found in the literature. This lack of a suitable amplifier has retarded certain sonar transducer research and development work. NRL R 4529.

U-H-F tailcap antenna pattern characteristics and their control, by A. R. Ellis. Stanford Research Institute, Stanford, Calif. Feb 1955. 88p diags. Order from LC. Mi \$4, ph \$11.50. PB 117734

Radiation patterns of airborne tail-cap antennas for uhf (225-400Mc) are presented, with special attention given to the effect of such parts of the airframe as stabilizers, wings, and fuselage. An experimental investigation has shown that the typical highly lobed pattern characteristics are caused by a high radiation-current density on the entire vertical stabilizer and adjacent surfaces. A modification to the vertical fin is suggested which improves the pattern characteristics and is applicable to most airframe designs. Contract AF 19(604)-1296. SRI TR 35. SRI Proj 1197. AAF CRC TN 55-350.

Window tests on AN/CPS-6, Leesburg, Florida, June 7 and 9, 1944, by L. B. Linford and J. Millman. Massachusetts Institute of Technology. Radiation Laboratory. Jul 1944. 18p photos. Order from LC. Mi \$2.40, ph \$3.30. PB 118077

Contract OEMsr-262. SC-74.
1. AN/CPS-6 (Radar) 2. Radar - Tests 3. NDRC Div 14 SC-74 4. MIT Rad Lab S-20.

Generators, Motors, Transmission

Evaluation of dynamotors, by John F. McNaughton. Cook Electric Co., Chicago, Ill. Jan 1955. 90p photos, diags, graphs, tables. Order from OTS. \$2.25. PB 111733

Research and testing were performed to develop a brush life test and a corona test for inclusion in Specification MIL-D-24. The new brush life test encompasses all of the environmental factors pertinent to brush life. The corona test was developed to utilize the lower frequencies of the corona spectrum, resulting in measurements which are reproducible to a greater degree than previously. Contract AF 33(616)-2192, Project no. 4155. AAF WADC TR 55-32.

Investigation and improvement of fixed ceramic capacitors for wide temperature range operations, by J. W. Schell and J. D. Heibell. Erie Resistor Corporation, Erie, Pa. Contract W36-039-sc-44575. Order separate parts described below from LC, giving PB number of each part ordered.

Final report. Jun 1951. 662p graphs (part fold), tables (part fold). Mi \$11.10, ph \$101.15. PB 118259

Data and curves are presented for both temperature compensating and high dielectric constant capacitors which will enable the design engineer, armed with specification data, to design a ceramic dielectric capacitor for a definite application. Data are presented for the maximum elevated temperature operation of presently commercially available ceramic capacitors. Procedures for the application of both dip and molded type elevated temperature cover coats are shown.

Supplementary report. Feb 1952. 109p tables (part fold). Mi \$5.70, ph \$16.80. PB 118259s

Final results based on one year storage testing are presented. Degredation of the silver electrodes is discussed.

Supplementary report. Jul 1953. 244p graphs, fold tables. Mi \$11.10, ph \$37.80. PB 118259s2

Issued as a supplement to that portion of the final report concerning extended life test results. Data are derived from the 10,000 hour life testing of Kel-T molded units.

FUELS AND LUBRICANTS

Development of qualification test methods for gear lubricants, for the period May 15, 1955 to June 15, 1955, by J. N. Foster and H. Ruwe Barton. Armour Research Foundation, Chicago, Ill. Jul 1955. 12p photos, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118132

Contract no. DA-11-022-ORD-905, Project no. TB 5-3010.

1. Lubricants, Gear - Qualification tests 2. ARF Project L030, Progress report no. 31.

Effect of burner-tip temperature on flash-back of hydrogen-oxygen flames, by Loren E. Bollinger and Rudolph Edse. Ohio State University Research Foundation, Columbus, Ohio. Oct 1953. 102p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 118046

In earlier experiments, it had been found that the flash-back tendency of hydrogen-oxygen flames is greatly reduced when the burner is water-cooled. The present work was undertaken to obtain more information about this fact by studying the relationship in turbulent flow between burner tip temperature and velocity gradient at flash-back, and to obtain data on the effects of the material, inside diameter, wall thickness and convergence of the burner tip. Contract no. AF 33(616)-44. AAF WADC TR 53-325.

Effect of hydrocarbon structure on reaction processes leading to spontaneous ignition, by Donald E. Swarts and Charles E. Frank. U. S. National Advisory Committee for Aeronautics. Jul 1955. 23p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118005

The present study compares the reaction processes of other aliphatic hydrocarbons with those of the heptane and isooctane previously studied. A study of the behavior of olefins and some exploratory work on the effect of the ratio of surface to volume on the extent of oxidation in the early stages was also included. NACA TN 3384.

Friction and wear studies of chlorinated methylphenyl silicones, by R. C. Bowers, R. L. Cottingham, T. M. Thomas, and W. A. Zisman. U. S. Naval Research Laboratory. Jun 1955. 27p photos, drawing, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118216

Friction and wear experiments have been conducted with a Bowden-Leben friction apparatus and a four-ball wear machine on a methylphenyl silicone and

three different chlorinated methylphenyl silicones. The kinetic coefficients of friction have been measured when these liquids were used to lubricate hard steel, soft steel, and copper. The effects of the degree of chlorination of the silicone, of applied load, and of temperature on wear rates have been investigated for hard steel. Data are also presented on comparative wear rates in the presence of several familiar synthetic and petroleum oils. The wear rates measured with the four-ball machine were found to correlate well with the friction measured with the Bowden-Leben apparatus. NRL R 4539.

Propagation of a free flame in a turbulent gas stream, by William R. Mickelsen and Norman E. Ernstein. U. S. National Advisory Committee for Aeronautics. Jul 1955. 89p photos, diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118023

Effective turbulent free-flame speeds measured in turbulent, flowing propane-air mixtures were found to have statistical distributions about mean values. The statistical spread was greater for rich and lean fuel-air ratios and at high turbulence intensities. The measured flame speeds, together with hot-wire-anemometer measurements, formed a basis for comparison with three theories and other types of flames. Although the free-flame speeds are lower than those for turbulent Bunsen and stabilized flames, values calculated from the Tucker analysis and a modified Scurlock-Grover analysis seem to form an upper limit to the turbulent free-flame-speed data. NACA TN 3456.

HIGHWAYS AND BRIDGES

Bituminous paving mixtures: Fundamentals for design. Highway Research Board. 1955. 52p photos, drawings, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. 75 cents. PB 118156

This bulletin discusses fundamentals governing the design of bituminous paving mixtures. Information concerning bituminous-paving-mixture design is assembled in one publication for the benefit of those engineers who need to have comprehensive, up-to-date material readily available. HRB Bul 105.

Manpower needs in highway engineering. Presented at the thirty-fourth annual meeting, Jan 11-14, 1955. Highway Research Board. 1955. 34p graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. 60 cents. PB 118059

Contents: Engineering-personnel needs for highway departments, by M. Earl Campbell and L. R. Schureman. - Use of private firms for highway-

engineering functions, by Harmer E. Davis, Donald S. Berry and Wayne H. Snowden. NRC 357. HRB Bul 106.

Shopper attitudes. Highway Research Board. 1955. 77p maps, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$2.25. PB 118170

Additional studies have been made on the habits and attitudes of shoppers, the travel pattern to shopping areas, and the effect of customer parking facilities on shopping habits. The present report includes findings of research on the attitudes of shoppers in Columbus, Ohio; Houston, Texas; and Seattle, Washington. Supplement to Special report 11 (PB 113730) Pt. I also issued as PB 112217. HRB SR 11-A.

Vehicle operation as affected by traffic control and highway type. Presented at the thirty-fourth annual meeting, Jan 11-14, 1955. Highway Research Board. 1955. 68p photos, diagsr, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. 90 cents. PB 118180

Contents: Operating characteristics of a passenger car on selected routes, by Carl C. Saal. - Analysis of flow on an urban thoroughfare, by Roy H. Fielding and Thomas E. Young. - Economics of operation on limited-access highways, by A. D. May, Jr. HRB Bul 107. NRC 358.

INSTRUMENTS

Acoustical properties of the C&N Laboratory anechoic chamber. Final engineering report on Task 6 under Contract no. AF 33(038)-23313. Baldwin Co. Engineering and Research Dept., Cincinnati, Ohio. Nov 1953. 58p drawing, graphs. Order from LC. Mi \$3, ph \$7.75. PB 117878

Anechoic properties were checked by the contractor by inverse-square law measurements along the length and along one diagonal in the horizontal plane, and were found to be very good. Particular attention was given to measuring the ambient noise spectrum, as a guide to future experimenters. Details of a special low level acoustic noise-measuring system are included. Report no. AFAC-6.

Apparatus for semi-automatic transfer of length-represented data to punched cards and charts, by Lars-Eric Ericsson, Josef Käufel, and Carl Olof Olsson. Flygtekniska Försöksanstalten (FFA), Stockholm. 1955. 12p photos, diagsr. Order from LC. Mi \$2.40, ph \$3.30. PB 118028

An apparatus for semi-automatic evaluation of length-represented data has been designed. The data

are projected to suitable scale on a horizontal movable plate, covered by a chart sheet. A pointer is carried over the plate and, when it is aligned with the measuring point, a switch on the pointer is actuated causing the measurement to be registered simultaneously in a punched card and on the chart. The apparatus has been in use since the end of 1952 and has proved satisfactory. FFA 56.

Datac Mark II computation circuit analysis, by R. O. McManus. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate, Cambridge, Mass. Dec 1954. 34p diagsr, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118161

The purpose of this report is to determine the reference voltage settings in the computation circuits of the Datac computer. A secondary purpose is to indicate the manner in which the potentiometer functions are determined. The basic report on this computer described the functions and the computations but did not include the calculation details. This information is necessary for complete understanding of the computer. Volscan Project. AAF CRC TN 54-103.

Engineering report on type II (Light weight, battery operable) refractometer. Supplement, by De Forrest Metcalf. Texas. University. Electrical Engineering Research Laboratory. Dec 1954. 19p photos, diagsr, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118169

Contract AF 19(604)-494. Report no. 5-03A. Supplement to Report 5-03.
1. Refractometers - Design 2. AAF CRC TN 55-378.

General description of the NAREC, by D. H. Gridley and J. S. Seward. U. S. Naval Research Laboratory. Jul 1955. 19p photos, diagsr. Order from LC. Mi \$2.40, ph \$3.30. PB 118197

The NAREC is a general-purpose digital computer capable of performing high-speed computations with numbers expressed to a precision of forty-four binary digits (equivalent to approximately thirteen decimal digits). Two types of storage are currently used to retain information in the computer: a high-speed electrostatic storage system which can store 1024 forty-four binary digit quantities, and a magnetic-drum storage which can store 1536 quantities. Numbers or operational instructions may be stored in either of the two storage systems. NRL R 4551.

Networks of association. Documentation, Inc., Washington, D. C. Oct 1954. 13p diagsr. Order from LC. Mi \$2.40, ph \$3.30. PB 118190

Contract Nonr 1305(00). Technical report no. 7.
1. Correlation 2. Indexing (Machine work).

Rotating arm resolving anemometer, by Arnold H. Glaser. Texas. Agricultural and Mechanical College, Dept. of Oceanography, College Station, Texas. Aug 1954. 22p graphs. Order from LC. Mi \$2.25, ph \$4. PB 117820

The rotating arm anemometer as presented here, while not a finished instrument, shows enough promise of becoming a useful addition to the instrumentation of micrometeorology to justify further development. Technical report no. 2, A & M project 59, Reference 54-56T. Contract N7-onr-48705, Project NR 082-111.

Speed and accuracy of response to five different attitude indicators, by John F. Gardner. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1954. 27p photos, diags, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118182

This study was conducted in order to (1) determine the optimal attitude indicator design from a field of five designs and (2) compare two methods of obtaining data which could be used to determine optimal attitude indicator designs. Five attitude indicators were used in the study. The design situation tested subject response time and accuracy under two conditions. Condition one required the subject to make a corrective manual response with a simulated control stick, to deviations as presented on the instruments. Condition two required the subject to make a corrective verbal response to deviations as presented on the instruments. The data gathered was not critical to a point which would permit an accurate statement relative to the optimal instrument design. However, this study does indicate that the present standard attitude instrument is not the optimum design. Project no. 7189. AAF WADC TR 54-236.

Waterman type I hydraulic quantity measuring fuse, by Howard R. Davies. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1952. 59p photos, drawings, graphs. Order from LC. Mi \$3, ph \$7.75. PB 117880

Tests were conducted at temperatures of -65° to $+160^{\circ}$ F and at flow rates of 0.1 to 12 gpm with rated flow being 6 gpm, in accordance with MIL-F-5508. The fluid used was in accordance with MIL-O-5606. Final report. AAF WADC TR 52-52.

MACHINERY

K diskussii o metodah rascheta zubchateeh peredach: o metodah rascheta zubchateeh no prochnost, raz-rabotanneeh A.I. Petrusевичem (Contribution to a

discussion of methods of computation of toothed gears: specifically a critique of the method developed by A. I. Petrusевич for the calculation of stability of toothed gears), by Y. G. Kistyan. Translated by L. C. Lecompte, edited by F. A. Raven. May 1955. 40p. Order from LC. Mi \$3.30, ph \$7.80. PB 118219

Translated from Izvestia Akademii Nauk SSR, Otdelenie Tekhnicheskikh Nauk, no. 8, 1952, p. 1226-1244. 1. Gears, Toothed - Stability - Calculation - Russia 2. Gears, Toothed - Theory - Russia 3. NAVSHIPS T 585 4. STS 212.

Light aerial tramway M2. U. S. War Department. Apr 1944. 65p photos, diags, graph, tables. Order from LC. Mi \$3.25, ph \$9. PB 117554

1. Tramways, Aerial 2. M2 (Aerial tramway) 3. WD TB ENG 16 4. AAF TO 19-15BF-1.

New shop techniques and developments. Second annual report, by Ivar C. Akerblom. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Research Services Division, Cambridge, Mass. Dec 1954. 23p photos, graphs. Order from LC. 75 cents. PB 111668

New techniques, originated and developed by personnel of the Research Services Division prior to June 1954, are outlined briefly on the basis of their particular application in the Cambridge Research Center and their possible utilization elsewhere. These include design of return motion for cylindrical cams, formation of plastic funnels, uses for printed circuits, a cable cutting and stripping tool, a method for cutting fine pitch worm gears, a slot-measuring gage, and a Collet stop for duplicating parts. For first annual report see PB 111338.

Technical data for hoisting equipment. U. S. War Department. Oct 1944. 41p photos, diags. Order from LC. Mi \$2.75, ph \$6.50. PB 117555

1. Cranes 2. Derricks 3. Hoisting equipment 4. WD TB 5-9720-16.

MEDICAL RESEARCH AND PRACTICE

Analysis of temporal lobe function in man. Progress report for Contract no. N6ori 02044, ONR project NR 146-079, by Ward C. Halstead. Chicago. University. Dept. of Medicine and Psychology. Division of Biological Sciences. Sep 1954. 4p. Order from LC. Mi \$1.80, ph \$1.80. PB 118140

1. Brain - Localization of function 2. Brain - Testing equipment 3. Indicators, Physiological - Design 4. Contract N6ori 02044, Project NR 146-079.

Bacteriological studies of otitis externa (1951, 1952, and 1953), by Albert V. Hardy, Roland B. Mitchell, Minnie Schreiber, Warren R. Hoffert, Elizabeth Yawn, and Florence Young. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1955. 4p table. Order from LC. Mi \$1.80, ph \$1.80. PB 118054

A study was made of 1,601 diseased ears and 3,577 normal ears among young adult males serving at MacDill Air Force Base, Florida, and at the Naval Air Station, Jacksonville, Florida. The bacteriological findings in cases of acute external otitis and in comparable cultures taken from the normal ears are presented. AAF SAM R 55-26.

Biochemistry of tissue trauma. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Order separate parts described below from LC, giving PB number of each part ordered.

The time course of the change in adenine nucleotide content of rabbit muscle following acute cold injury, by Harry G. Albaum. Apr 1955. 4p graph, tables. Mi \$1.80, ph \$1.80. PB 118053

Tibialis anticus and extensor digitorum longus removed at time intervals ranging between 12 and 128 minutes after exposure show significant decreases in the adenosine triphosphate level. At 120 minutes post-exposure, ATP levels have already reached the minimal values previously observed at 18 hours after similar cold injury. The decrease in adenosine triphosphate level is paralleled by a decrease in dry weight of the tissue. The decrease in total purine shows a slight lag after which it also parallels the decrease both in dry weight and adenosine triphosphate level. Therapy, if it is to be employed, must be carried out almost immediately after exposure since the changes occur very rapidly. AAF SAM R 55-28.

The relationship between blood lipids and radiation injury in rabbits, by Lawrence J. Milch, Richard A. Yarnell, James V. Stinson. Mar 1955. 4p photos, table. Mi \$1.80, ph \$1.80. PB 118052

A direct function between x-irradiation dose and plasma S_f 0-20 lipoproteins, cholesterol, and lipid phosphorus was found, while the lipid phosphorus-cholesterol ratio was determined to be a negative function of radiation dose. Pathologically, the increasing radiation exposure was reflected in increasing muscle tissue injury. AAF SAM R 55-30.

Biological and medical aspects of ionizing radiation: Protective action of carbon monoxide in mammalian whole-body X-irradiation, by Eugene B. Konecni, William F. Taylor, and Syreel S. Wilks. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Mar 1955. 9p diagr, graphs, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118056

The present study was designed to test the possible prophylactic and therapeutic usefulness of carbon monoxide in mammalian whole-body x-irradiation. CO was administered either by inhalation (0.10 percent CO) or intraperitoneal injection (100 percent CO). Whole-body x-irradiation was performed with a Picker x-ray unit (260 KVP, 18 ma.), and all of the statistically treated animals were exposed to lethal doses of x-rays. Experiments indicate that CO protection depends on (1) optimal amounts of CO inhaled or injected, (2) critical times of CO administration pre-and/or post-irradiation, and (3) dose of whole-body x-irradiation. Possible modes of protection afforded by carbon monoxide are discussed. AAF SAM R 55-8.

Conditioned heart rate as a function of anxiety and CS-UCS interval, by W. R. McAllister, I. E. Farber, and J. E. Taylor. Iowa State University. Dept. of Psychology, Iowa City, Iowa. Aug 1954. 23p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118095

Contract N9onr-93802, Project NR 154-107. Technical report 1, Studies of influence of motivation on performance in learning.

1. Heart - Effect of anxiety 2. Neuroses, Anxiety - Effect on heart.

Education in aviation medicine, a survey of graduate opinions pertaining to the primary course at the School of Aviation Medicine, by Donald J. Malcolm in cooperation with the Psychological Center, Syracuse University. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jan 1954. 192p graphs, tables. Order from LC. Mi \$7.25, ph \$25.25. PB 117987

1. Medicine, Aviation - Surveys 2. Medicine, Aviation - Training 3. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas 4. Syracuse University. Psychological Research Center 5. AAF HRRI TRR 27.

Effect of splenectomy on changes in plasma and blood volume produced by inhalation of 30 and 40 percent carbon dioxide in dogs, by Harry H. Billings and E. B. Brown, Jr. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Mar 1955. 5p graph, table. Order from LC. Mi \$1.80, ph \$1.80. PB 118055

Pentothal anesthetized dogs showed a marked rise in hematocrit, hemoglobin, and red cell count within 15 minutes after beginning breathing of 30 percent CO₂. In spite of a slight fall in plasma volume during the CO₂, the circulating blood volume increased. The increase in circulating blood volume was produced largely by contraction of the spleen, as evidenced by the fact that no appreciable elevation of hematocrit or blood volume was produced by high CO₂ in splenectomized dogs. AAF SAM R 55-17.

Effects of ingestion of large doses of radioactive elements on the alimentary canal (including mouth, teeth, and periodontal structures and other vital organs), by Herman Becks and Howard M. Myers. California. University, Los Angeles, Calif. Sep 1954. 9p photos, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118142

The general purpose of this study was to study the effects of ingested radioactive substances on the gastrointestinal tract in general and the oral region in particular. It was desired to determine whether lesions similar to those reported found in the stomach and intestine could be discerned in the mouth. A further purpose was to analyze the effects of local irradiation of the G. I. tract without the presence of an appreciable external irradiating source. In view of the plan to irradiate locally the alimentary canal it was also deemed worthwhile to analyze the effects of such irradiation on the thymus, spleen and adrenals which are so intimately concerned with stress. Photomicrographs included. Contract ONR 29539, NR-182-008.

Evaluation of certain therapeutic agents and procedures in the treatment of acute diffuse external otitis, by Ben H. Senturia, Richard J. Cross, James E. Lett, and A. V. Hardy. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Mar 1955. 9p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118051

Five therapeutic preparations and two control agents were evaluated in the treatment of 493 ears with acute diffuse external otitis. When compared as to cure rate after five days there is little difference in the effectiveness of the antimicrobial agents. When measured by certain symptoms and findings, oxytetracycline, or a combination of oxytetracycline and polymyxin, seemed to offer slightly better results than other preparations. Bacteriologic observations confirm the high incidence of *Pseudomonas*. In vitro tests revealed that the fewer strains were resistant to sulfadiazine and oxytetracycline. AAF SAM R 55-38.

Investigation of the effects of chemical compounds on the tubercle bacillus. Final report under Contract Nonr 1063(00) for period Oct 1, 1952 to Sep 30, 1954, by J. Carroll Bell, J. W. Berry, and H. D. Olson. Colorado. University. Biological Science Division. Sep 1954. 12p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118139

A study of bacterial resistance to isomonic acid hydrazide and of the effects of bostrycoidin upon the tubercle bacillus.

Military biology and biological warfare agents. U. S. Army. Oct 1952. 136p. Order from LC. Mi \$3.25, ph \$9. PB 117673

Supersedes tentative TM 3-216, Apr 1947.
1. Biological warfare 2. Biology, Military 3. WD TM 3-216.

Reaction of infected respiratory cells to influenza virus infection. Final report under Contract Nonr 1304(01) for period Oct 1, 1953 to Sep 1, 1954, by Thomas E. Van Metre, Jr. Saint Louis University, St. Louis, Mo. Sep 1954. 7p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118141

1. Influenza - Virus 2. Respiratory tract - Diseases.

Studies in resuscitation, by Howard G. Swann. Texas. University. Dept. of Physiology, Galveston, Texas. Sep 1951. 40p diags, tables. Order from LC. Mi \$3, ph \$6.30. PB 118181

Resuscitation of dogs in nearly fatal acute anoxia is effected by 4% O₂ (96% N₂). The cause of ventricular fibrillation during fresh water drowning has been ascertained to be a low O₂ tension and low plasma sodium, with plasma potassiums constant. The limits of resuscitability in drowning are described, with the conclusion that aspirated water, either fresh or sea, is not dangerous to the organism *per se*. Rather, it is the blockage of the respiratory passages, the anoxia and the ventricular fibrillation that are dangerous. The processes of death and resuscitation in man are summarized. Contract no. W 33-038-ac-14379, Report no. 5. AAF TR 6696.

Studies of motion sickness, vestibular function and of psychological and physiological effects of drugs. Final report, 1946 - 1954, by G. R. Wendt. Rochester. University. Psychology Dept., Rochester, N. Y. Jun 1954. 39p diagr, table. Order from LC. Mi \$3, ph \$6.30. PB 118109

This is the final report on a research program of 25 years duration. The items are listed under three categories: Studies of (1) motion sickness, (2) vestibular function, and (3) effects of drugs and related physiological states on physiological, emotional, motivational and other psychological states along with correlated studies. Contract N6ori-126, T. O. I., Project NR 143-060.

Studies of the mechanism of shock. Final report under Contract no. Nonr 266-05, by Dan H. Moore. Columbia University, New York, N. Y. n.d. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 118128

This work included a study of the amino acids of the blood, brain, lung, liver, spleen, kidney, and legs of normal mice and mice which had been shocked by scalding their hind legs in 70° water for 10 seconds. The amino acids were identified on two-dimensional chromatograms. Published in 1953 or later.

Studies on the protective action of sulfhydryl compounds against X-irradiation, by W. Parr, N. Puckett, R. Ransom, S. Spradling, A. Krebs. U. S. Army. Medical Dept. Field Research Laboratory, Fort Knox, Ky. Nov 1952. 18p tables. Order from LC. Mi \$2, ph \$2.75. PB 117862

AMRL project no. 6-59-08-013, Subtask, Early effects of ionizing radiation. Subtask AMRL S-1. 1. Cysteine - Biological effects 2. Glutathione - Biological effects 3. Cysteine - Uses 4. Glutathione - Uses 5. Nucleic acids - Biosynthesis 6. X-rays - Protection 7. Mercapto compounds - Biological effects 8. MD FRL 102.

METALS AND METAL PRODUCTS

Characteristics of the bainite transformation in Ni-Cr steel, by L. S. Birks. U. S. Naval Research Laboratory. Jun 1955. 10p diagr, graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118130

The bainite transformation in a 3.5% Ni, 1.25% Cr steel was studied under various conditions of cooling and stress. Several characteristics may be specified: (1) Transformation in the bainite region (920° to 575° F) is very little affected by the manner of cooling from the austenitizing temperature, 1600°F, to the upper limit of bainite transformation, 925°F. (2) Starting time for the bainite transformation is the same order of magnitude for either isothermal conditions or continuous cooling, but the rate of transformation is somewhat greater for isothermal transformation. (3) Tensile stress accelerates both isothermal and continuous-cooling transformation, and 32,000-psi stress changes the form of the isothermal transformation diagram to correspond in appearance to the continuous-cooling diagram. (4) Transformation for nonlinear continuous cooling may not be determined directly from the linear continuous transformation diagram. NRL R 4564.

Crystal structure of Δ -potassium superoxide, by S. C. Abrahams and J. Kalnajs. Massachusetts Institute of Technology. Laboratory for Insulation Research. Sep 1954. 11p diagr, graph, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118158

Contract N5ori-07801.

1. Δ -Potassium oxide - Crystal structure 2. MIT LIR TR 84.

Development of sand-cast, aluminum-base alloys having improved properties. Final report, Jul 1, 1953 to Apr 30, 1954 under Contract no. DA 33-019-ORD-937, by L. L. Hirsch, M. W. Mote, and D. P. Frost. Battelle Memorial Institute, Columbus, Ohio. Jul 1954. 74p photos, graphs, tables. Order from OTS. \$2. PB 111699

An aluminum alloy containing 7% magnesium and 3% zinc, as sand-cast, can develop mechanical properties, when properly heat treated as follows: 8% elongation, 35000 psi yield strength, and 48000 psi tensile strength. These properties are reasonably stable with time at normal operating temperatures to 250°F. Project no. TB 4-15F.

Effect of microstructure on the mechanical properties of titanium alloys. Summary report covering the period from Jun 18, 1951 through Dec 31, 1953, under Contract no. DA 33-019-ORD-280, Project TB 4-15, by F. C. Holden, H. R. Ogden, and R. I. Jaffee. Battelle Memorial Institute, Columbus, Ohio. Dec 1953. 41p photos, graphs. Order from OTS. \$1.25. PB 111681

Brief summaries are presented of various phases of work conducted in a systematic investigation of the microstructure, heat treatment, and mechanical properties of titanium alloys prepared with high-purity iodide titanium. The Ti-Cu alloys are quench hardenable and have been found to be similar to steels in their response to heat treatment and microstructure variations.

French research institutes in metallurgical fields; statements presented at the joint meetings in France from June 14-18, 1955 of American and European metallurgical societies. U. S. Embassy, Paris, France. Jun 1955. 20p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118001

The organization, operation methods, and objectives of each of the various French research organizations and institutions for graduate study in metallurgy are described.

Investigations of permanent magnet alloys. Final report on Contract no. W 36-039-sc-32117, by H. F. Graff. Arnold Engineering Co., Chicago, Ill. May 1948. 51p diagrs, tables. Order from OTS. \$1.50. PB 111664

A study of the magnetic properties of 140 alloy compositions varying in composition from Alnico V as a standard. SIG Contract W36-039-sc-32117, Final report.

Preliminary tests of aluminum specimens with birefringent coating permanently deformed by impact, by J. Duffy and C. Mylonas. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jul 1955. 11p photos, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118214

The ability of birefringent coatings made of epoxy resins to follow the deformation of metals under impact loads was tested with coated aluminum beams subjected to the moderate impact of the Charpy hammer, and with aluminum plates subjected to the severe impact of .38 and .45 caliber pistol bullets. In all but one case of very severe impact indentation the coatings followed the deformations without cracking or breaking off, and were used as indicators of the permanent strains of the metal specimens. Contract DA 19-020-ORD-798. Ordnance project TB 3-0122. Dept. of the Army project 503-06-005. GDAM DA-798/22. GDAM TR 22.

Scaling of titanium and titanium alloys, by H. W. Maynor, Jr., B. R. Barrett, and R. E. Swift. Kentucky. University. Dept. of Mining and Metallurgical Engineering. Mar 1955. 137p photos, drawing, graphs, tables. Order from OTS. \$3.50. PB 111731

A preliminary study of the scaling characteristics in air of experimentally produced titanium and titanium-base alloys, and commercially-produced titanium and titanium-base alloys was conducted at temperatures of 1200^o, 1400^o, 1600^o, and 1800^o F. (650^o, 760^o, 870^o, and 980^o C.) in the time range of approximately four to three hundred hours. A total of forty-three titanium-base alloys, one commercial grade of titanium (RS-70), and type 302 stainless steel were scaled at each of these temperatures; two additional alloys were employed at temperatures of 1200^o and 1600^o F. Scales formed on a 4.02% Al-Ti alloy were studied in detail and a scaling mechanism was suggested; scales formed on a 4.03% Cr-Ti alloy and a 2.95% W - Ti alloy were studied in less detail. Scaling propensity of titanium-base alloys, relative to titanium and stainless steel, was evaluated on the basis of weight gain with time. Contract no. AF 18(600)-60. AAF WADC TR 54-109.

Structural changes of commercial titanium and titanium-base alloys on heat treatment, by William Rostoker, Donald J. McPherson, and Max Hansen. Armour Research Foundation, Chicago, Ill. Feb 1953. 102p photos, graphs, tables. Order from LC. Mi \$4.75, ph \$14. PB 117938

Work primarily directed toward the establishment of correlations between heat treatment, microstructure, and mechanical properties is summarized for two types of potentially heat-treatable alloys characterized by the Mo-Ti and Ti-Cr phase diagrams. Limited studies have been devoted to the effects of O₂ on transformation rates and microstructural characteristics, on the conditions for developing anomalously hard β in Ti-Mo alloys, and on correlations of forming end-quench hardenability curves for alloys of Ti-Mo. Contract no. AF 33-(038)-16347, RDO no. 463-6. AAF WADC TR 53-62.

Synthesis of ferrites and preparation of cobalt ferrite single crystals, by D. G. Wickham. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Oct 1954. 53p diagrs, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118131

A new method is developed for the preparation of magnesium, manganese, cobalt, nickel, and zinc ferrites, based on the thermal decomposition of the mixed precipitates of ferrous oxalate dihydrate with the analogous compounds of magnesium, manganese, cobalt, nickel, and zinc. Evidence is presented to show that ferrous oxalate dihydrate forms mixed crystals (solid solutions) with the other oxalates of the series. The purity of the ferrite products is established by X-ray and chemical analysis. Lattice

parameters for ferrous oxalate are directly measured, those for the other oxalates and mixed crystals are computed. A high temperature furnace, utilizing a molybdenum wire heating element, is designed and constructed for the purpose of growing single crystals of the ferrites from the melt by the Bridgman method. The operation of the furnace is tested in attempts to prepare single crystals of cobalt ferrite. Appendices: I. Preparation of materials. - II. Analytical procedures. - III. Interplanar spacings and their relative intensities for oxalate dihydrates of magnesium, manganese, iron, cobalt, nickel and zinc. - IV. Comparison of interplanar spacings in the oxalates found by several investigators. - V. Comparison of observed and calculated values for spacings (d) in oxalates and mixed crystal oxalates. - VI. Power controller for high-temperature electric furnaces. MIT LIR TR 89.

Tensile properties of 7075-T6 and 2024-T3 aluminum alloy sheet heated at uniform temperature rates under constant load, by George J. Heimerl and John E. Inge. U. S. National Advisory Committee for Aeronautics. Jul 1955. 46p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118021

Results are presented of tests to determine the effect of heating at uniform temperature rates from 0.2^o to 100^o F per second on the tensile properties of 7075-T6 (75S-T6) and 2024-T3 (24S-T3) aluminum-alloy sheet under constant-load conditions. Yield and rupture stresses, obtained under rapid-heating conditions, are compared with results of elevated-temperature stress-strain tests for 1/2-hour exposure. NACA TN 3462.

METEOROLOGY AND CLIMATOLOGY

Fjörtoft's graphical methods for preparing 24 hour 500 mb prognostic charts. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Apr 1955. 13p diagrs, graph, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118042

1. Weather forecasting - Methods 2. Winds - Forecasting 3. Graphic methods 3. AAF AWS TR 105-131.

Frost investigations, fiscal year 1954: An analysis of errors in ground and air temperature measurement, by Warren M. Rohsenow, John A. Clark, and Paul Van Alstyne. U. S. Army. Corps of Engineers. New England Division, Arctic Construction and Frost Effects Laboratory, Boston, Mass. Oct 1954. 92p diagr, graphs, tables. Order from LC. Mi \$4.50, ph \$12.75. PB 117594

This report presents the results of theoretical studies to determine the minimum requirements

that must be met in temperature measuring installations in order to obtain results within specified limits of error. The studies consider the effects of the design and the thermal properties of the temperature sensitive element, together with the method of placement in media.

Ice crossings, by G. R. Bergman and B. V.

Proskurlanov. Selected excerpts translated by SIPRE Bibliography Project, Library of Congress. Oct 1954. 76p drawings, diags, tables. Order from OTS. \$2. PB 111688

The translated material consists of selected portions of the complete book, "Ice Crossings", (Moscow, 1943) covering the following: (1) Problem of determining safe loads on an ice cover and construction of ice crossings, (2) brief characteristics of the conditions on bodies of water and the physico-mechanical properties of ice and snow, (3) natural ice bridges, reinforcement of the ice cover, and appendices giving values of various functions and tables for calculating the supporting power of an ice cover. Investigation of construction and maintenance of airdromes on ice, 1953-1954. Translated from Trudy Nauchno-issledovatel'skikh uchreshdenii, seriia IV Gidrometeorizdat, 1943, for Arctic Construction and Frost Effects Laboratory, Boston, Mass., by Nikolay T. Sikejew.

Infrared studies of the atmosphere. Final report for the period May 16, 1949 to Dec 31, 1954, under Contract AF 19(122)-65, by Harald H. Nielsen and John H. Shaw. Ohio State University. Dept. of Physics and Astronomy, Columbus, Ohio. Dec 1954. 81p graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 118126

This report summarizes the results of an investigation of the infrared solar spectrum between 3 and 13 μ and the analyses of bands of several atmospheric gases including N_2O , O_3 and H_2O . Measurements of the variation in abundance of atmospheric CO and the curves of growth of single rotation-vibration lines of CO are discussed. Apparatus for determining the spectral distribution of the thermal radiation emitted by the atmosphere and the solar radiation scattered by the atmosphere is described. Appendix I: List of publications under this contract. AAF CRC TR 55-268. OSURF Proj 381, Report no. 23.

Interrelations of Arctic ice with the ocean and the atmosphere in the North Atlantic - Arctic and adjacent areas, by I. I. Scheil. Woods Hole Oceanographic Institution, Woods Hole, Mass. Sep 1954. 31p map, tables. Order from LC. Mi \$3, ph \$6.30. PB 118172

The aim of this study is to outline, with the aid of the growing body of Arctic ice and oceanographic and meteorological data, the nature and degree of interrelation between the severity of the Arctic ice in the northern North Atlantic and the seasonal,

annual, and longer-period variations in ocean and air temperatures, precipitation, and storm frequencies and mean storm tracks in that general area. Contract N6onr 27701 (NR 083-004). Unpublished manuscript. WHOI Ref 54-72.

Investigations of the general circulation of the atmosphere. Final report, under Contract AF 19(122)-48, by Jacob Bjerknes and Yale Mintz. California University. Dept. of Meteorology, Los Angeles, Calif. Mar 1955. 430p diags, maps (fold), graphs (fold), tables. Order from LC. Mi \$11.10, ph \$64.85. PB 118145

For progress reports on this contract see PB 112479, 113236-113239, 113248, 113421-113423. Contents: 1. Observed mean field of motion of the atmosphere, by Y. Mintz and G. Dean. - II. Observed zonal circulation of the atmosphere, by Y. Mintz. - III. Zonal-index tendency equation, by Y. Mintz. - IV. Geostrophic poleward flux of angular momentum in the month of January 1949, by Y. Mintz. - V. Final computation of the mean geostrophic poleward flux of angular momentum and of sensible heat in the winter and summer of 1949, by Y. Mintz. - VI. Model of the mean meridional circulation, by Y. Mintz and J. Lang. - VII. On the mean meridional circulation in low latitudes of the northern hemisphere in winter and the associated meridional and vertical flux of angular momentum, by E. Palmer. - VIII. Effect of winds and bodily tides on the annual variation in the length of day, by Y. Mintz and W. Munk. - IX. Zonal-index tendency equation and its application to forecasts of the zonal index, by Y. Mintz and S. Kao. - X. Geostrophic and ageostrophic poleward flux of angular momentum, by E. Lorenz. - XI. Preliminary study of the day to day changes of angular momentum during January-February and July-August 1949, by J. B. Bjerknes. - XII. On the total momentum vorticity with application to the study of the general circulation of the atmosphere, by S. Kao. - XIII. Total energy budget of the atmosphere, by Y. Mintz. - XIV. Kinetic energy of the atmosphere, by P. Pisharoty. - XV. Some aspects of the geostrophic poleward flux of sensible heat, by P. Pisharoty. - XVI. Contour-channel method of computing the geostrophic poleward flux of atmospheric properties, by Y. Mintz and S. Kao. AAF CRC TR 55-266.

Measurement of drop size distribution and liquid water content in natural clouds. Final report under Contract no. AF 19(122)-245, by D. P. Keilly. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Sep 1954. 16p. Order from LC. Mi \$2.40, ph \$3.30. PB 118200

An infrared transmissometer has been developed which successfully measures the size distribution and total number of water droplets in natural cloud. The size range accommodated is 1 to 32-microns diameter. This instrument also functions as a liquid content meter. Improvements have been made to a glass slide cloud camera, but they have not been proven by field tests. An electronic probe type instrument for sizing and counting cloud drops has

been developed and calibrated in the laboratory in the size range 4 to 50-microns. AAF CRC TR 55-260.

Marine meteorology. Cumulus cloud observations; methods, instrumentation, flight procedures, reduction and analysis of data, by Joanne Starr Malkus. Woods Hole Oceanographic Institution, Woods Hole, Mass. Aug 1954. 33p diags (1 fold), graphs. Order from LC. Mi \$3, ph \$6.30.
PB 118050

The use of the PBY-6A aircraft in cumulus cloud observations is discussed in detail. The calibration of the aircraft for vertical draft measurements is reviewed and its applicability to cloud penetrations established. The equation for draft calculation from oscillograph records of accelerations, pitch, air-speed, and altitude is set forth and its use with the actual records outlined. The other measurements made in cloud flights, including temperature, water vapor, liquid water, small-scale turbulence, and those by photography, are described, along with the instrumentation employed. Technical report no. 32 under Contract N6onr-27702 (NR-082-021). Unpublished manuscript. WHOI Ref 54-60.

Measurement of multiply charged cosmic-rays by a new technique, by John Linsley. Minnesota. University. Dept. of Physics. Aug 1954. 44p photos, diags, graphs, tables. Order from LC. Mi \$2.75, ph \$6.50.
PB 117911

The Cerenkov effect has been applied to the problem of determining the charge of cosmic-rays. Cloud chamber photographs have been obtained of the events that caused large signals from a thin Cerenkov counter during a balloon flight which carried the apparatus above most of the atmosphere. Technical report under Contract no. N6onr-246, Cosmic Ray Project.

Multiple layer mountain wave models with constant mobility and shear, by Enok Palm. California. University. Dept. of Meteorology, Los Angeles, Calif. Mar 1955. 34p diags. Order from LC. Mi \$3, ph \$6.30.
PB 118184

In this paper atmospheric waves behind a mountain are discussed. The introduction contains a non-mathematical description of the creation of lee waves. In sections 2, 3 and 4 models with a velocity and stability distribution which approximate the observed data are discussed. It has been possible in two cases to compare the computed wave length with that observed in the Sierra Nevada region and in both cases a good agreement is found. The streamline and pressure field due to the resonance waves have been drawn for one of these. Contract AF 19(604)-728, Autobarotropic flow project, Scientific report no. 3.

On the evolution of symmetric updrafts in a current with constant shear, by Jørgen Holmboe. Califor-

nia. University. Dept. of Meteorology, Los Angeles, Calif. Apr 1955. 54p diags, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 118185

A derivation of the Reynolds criterion as applied to a system which is enclosed within axially symmetric boundaries is given in Appendix B of this report. The main part of the report deals with the much simpler problem to determine the evolution of axially symmetric updrafts superimposed on an unbounded Couette flow. Contract AF 19(604)-728, Autobarotropic flow project, Final report.

Rocket measurement of upper atmosphere density by Paschen's law, by Haldon L. Smith, Harold C. Early, Nelson W. Spencer. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. May 1955. 48p photos, diags, graphs. Order from LC. Mi \$2.75, ph \$6.50.
PB 117928

The original goal of this research was to develop a new method of rocket instrumentation for obtaining a direct measurement of the ambient air density of the upper atmosphere. This objective was modified, however, in favor of a more readily realizable system for determining the surface density existing on the nose cone of a supersonic missile. Contract AF 19(604)-545. Scientific report no. CS-3. MU ERI Proj 2096.

Salt nuclei, wind and daily rainfall in Hawaii, by A. H. Woodcock and W. A. Mordy. Woods Hole Oceanographic Institution, Woods Hole, Mass. Aug 1954. 30p graphs, map, fold table. Order from LC. Mi \$2.70, ph \$4.80.
PB 118047

Technical report no. 9 under Contract Nonr-798(00) (NR-085-001). Unpublished manuscript.
1. Climate - Hawaii 2. Winds - Measurement - Hawaii 3. Rain and rainfall - Hawaii 4. Sea water - Salinity 5. WHOI Ref 54-57.

Studies on the orbit of Pluto, by C. O. Lampland and H. L. Giclas. Yale University. Lowell Observatory, Flagstaff, Ariz. n.d. 3p. Order from LC. Mi \$1.50, ph \$1.50.
PB 117923

Contract no. Nonr-411(00), Final report.
1. Pluto - Orbits 2. Stars - Observations
3. Mechanics, Celestial.

To isolate and examine all significant phenomena associated with the yellow coronal line at 5694A. Final report under Contract Nonr 393, Task order 2, NR 046-721, by Robert L. Low. Harvard University. High Altitude Observatory, Boulder, Colo. Oct 1954. 7p. Order from LC. Mi \$1.80, ph \$1.80.
PB 118192

1. Corona discharges - Measurement 2. Solar phenomena.

MINERALS AND MINERAL PRODUCTS

Clays and clay minerals. Proceedings of the second National Conference on Clays and Clay Minerals, University of Missouri, Columbia, Mo., Oct 15-17, 1953, edited by Ada Swineford and Norma Plummer, sponsored by Committee on Clay Minerals of the National Academy of Sciences - National Research Council, University of Missouri, and State Geological Survey of Kansas. 1954. 411p photos, diags, maps, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$4. PB 118242

1. Clay - Congresses
2. Clay minerals - Congresses
3. Clay minerals - Ion exchange
4. Anorthite - Decomposition
5. Bentonite - Production
6. Chlorites - Analysis
7. Halloysite - Determination
8. Montmorillonite - Analysis
9. Silica - Solubility
10. Soils - Analysis
11. NRC 327.

Crystallography of the tellurium-iodine system, by W. R. Blackmore, S. C. Abrahams, and J. Kalnajs. Massachusetts Institute of Technology. Laboratory for Insulation Research. Sep 1954. 9p photo, diags, table. Order from LC. Mi \$1.80, ph \$1.80. PB 118159

Contract N5ori-07801.

1. Tellurium tetraiodide - Crystal structure
2. MIT LIR TR 85.

PAPER AND ALLIED PRODUCTS

Contribution that sugarcane bagasse can make to the paper and board industries, by Elbert C. Lathrop and Samuel I. Aronovsky. U. S. Bureau of Agricultural and Industrial Chemistry. Regional Research Laboratory, Peoria, Ill. Nov 1954. 60p graph, tables. Order from Agricultural Research Service, Dept. of Agriculture, Washington 25, D. C. PB 118103

1. Bagasse - Uses
2. ARS-71-1.

PERSONNEL APTITUDE TESTING

Comparison of performance of new airmen on the Airman Classification Battery AC-1B by Army enlistment area, by Jane McReynolds and I. A. Nichols. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Aug 1953. 25p graphs,

tables. Order from LC. Mi \$2.70, ph \$4.80.

PB 118039

The purpose of this study was to determine the existence of significant regional differences in new airmen population as measured by the variables of the Airman Classification Battery AC-1B. The tests of this battery are varied enough to provide a better estimate of population aptitudes than any one test can provide. A brief description of the tests included in the Airman Classification Battery AC-1B is given. Project no. 503-001-0009. AAF HRRC RB 53-31.

Generals of the Air Force, Vol. II. Rosters of General Officers of the United States Air Force, permanent and temporary on active duty, 1 Nov 1952, by graduates and nongraduates of the Air Corps Tactical School, the Command and General Staff School, and/or the Air Corps Engineering School, by Stephen W. Fotis and C. A. McMahon. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. May 1953. 44p graph, tables. Order from LC. Mi \$2.75, ph \$6.50. PB 117984

HRRI project "Research on manpower resources."
1. U. S. Army - Rosters- 2. AAF HRRI RM 7.

Performance examinations for the training and selection of scientific personnel. Final report, by Haym Kruglak. Minnesota. University. Physics Dept. Jun 1954. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 118106

Contract N8onr-66213, Project NR 153-148.

1. Scientists - Training
2. Scientists - Selection
3. Performance tests
4. Electromaze.

Screening efficacy of the enlisted personal inventory (Shipley): A study of 2164 Great Lakes recruits, by Arthur L. Benton, Charles D. Windle, and Elizabeth Erdice. Iowa State University. Dept. of Psychology. Oct 1954. 18p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118189

The inventory was given to 2164 naval recruits prior to and independently of psychiatric evaluation at Great Lakes Naval Training Center during November, 1951. A follow-up study of the military suitability of the recruits was made approximately six months later. Successful completion of recruit training was the criterion of "normal" aptitude-for-service. Contract Nonr 311(00). NAVPERS TB 54-16.

Validation and revision of the U. S. Medical Research Laboratory personal history form, by Robert R. Mackie, Donald A. Clegg, and Donald N. Buckner. Management and Marketing Research Corporation, Los Angeles, Calif. Sep 1954. 60p graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118030

Technical report no. 2 (Submarine Personnel Selection) under Contract Nonr 1113(00). ONR Project no. NR-151-141. BuMed Project no. 002-013. 1. Forms, Personal history 2. Personnel, Submarine - Selection and training 3. Questionnaires.

Verbal-numerical test: Development and validation, by Theodore R. Vallance and Albert S. Glickman, American Institute for Research, Inc., Pittsburgh, Pa. Oct 1954. 28p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118187

This test consists of one hundred multiple-choice items presenting numerical problems in verbal form. The mathematical operations are quite simple and item analysis shows the problems to be quite easy. The novelty of the task and the severe time limit are such as to induce stress and to make the test as a whole quite difficult. Contract Nonr 890(01). NAVPERS TB 54-15.

PHOTOGRAPHIC AND OPTICAL GOODS

Reliability and validity of air reconnaissance as a collection method for urban demographic and sociological information, by Norman E. Green and Robert B. Monier. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jan 1953. 19p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118041

HRRRI project "Pop Key".
1. Photography, Aerial - Uses 2. Sociology - Research 3. Demography, Urban - Research 4. AAF HRRRI TRR 11.

PHYSICS

General

Brief guide to noise measurement and analysis, by Robert W. Young. U. S. Navy Electronics Laboratory, San Diego, Calif. May 1955. 24p photo, diagr, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118036

Basic noise-measurement principles and techniques are treated in Part I, by the use of only simple arithmetic. Terms peculiar to noise analysis are explained. Special attention is given to interpreting graphs of noise spectra obtained with analyzers of different bandwidths. Part II describes specific calibration procedures. It also gives the mathematics used in calculating sound-pressure levels, spectrum levels, and combinations of levels. NELS R 609.

Coefficients problem for Schlicht functions in the exterior of the unit circle, by E. Netanyahu, Stanford University. Department of Mathematics, Stanford, Calif. Sep 1954. 22p. Order from LC. Mi \$2.70, ph \$4.80. PB 118155

Technical report no. 39 under Contract N6ori 106, Task order 5 (NR 043-992).
1. Mathematical equations and solutions
2. Schlicht functions 3. Circle coefficients 4. SU AMSL 39.

Confidence limits tables for small samples of binomially distributed data, by John Folger. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. May 1953. 15p tables. Order from LC. Mi \$2, ph \$2.75. PB 117970

HRRRI project "Research planning".
1. Sampling (Statistics) - Theory 2. Tables, Mathematical 3. Data analysis 4. AAF HRRRI RM 6.

Heat transfer at the forward stagnation point of blunt bodies, by Fli Reshotko and Clarence B. Cohen. U. S. National Advisory Committee for Aeronautics. Jul 1955. 17p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118025

The relations for the heat transfer at the forward stagnation point of both two-dimensional and axially symmetric blunt bodies, which were obtained from exact solutions to the equations of the laminar boundary layer, are presented in terms of the local velocity gradient at the stagnation point. These exact solutions include effects of variation of fluid properties, Prandtl number, and transpiration cooling. Examples illustrating the calculation procedure are presented. Appendix A: Symbols - Appendix B: Exact solutions for stagnation-point flow with Prandtl number of 0.7. NACA TN 3513.

Infrared study of the kinetics of homogeneous gas reactions, by George C. Pimental, Richard E. Powell, David A. Dows, and Eric Whittle. California. University. Dept. of Chemistry and Chemical Engineering, Berkeley, Calif. Oct 1954. 21p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 117877

Visible-ultraviolet spectra have been used in studying flames, explosions, and other reacting gas mixtures. Effort was devoted to the detection of unstable intermediate species produced in a catalyzed ammonia-oxygen flame, in an ammonia-oxygen diffusion flame, by pyrolysis, and by a glow discharge. A new technique involving trapping unstable species in an inert solid matrix was originated and tested. Infrared spectra of gaseous and solid hydroxylamine, gaseous and solid hydrazoic

acid, and solid ammonium azide were studied. Final report under Contract no. ONR 222-16, Onr project no. 051-306.

Low-density wind-tunnel study of shock-wave structure and relaxation phenomena in gases, by F. S. Sherman. U. S. National Advisory Committee for Aeronautics. Jul 1955. 83p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118007

The profiles and thicknesses of normal shock waves of moderate strength were determined in terms of the variation of the equilibrium temperature of an insulated transverse cylinder in free-molecule flow. The shock thickness was determined from the maximum slope of the cylinder temperature profile. The experimental shock profiles are compared with various theoretical predictions. NACA TN 3298.

Mathematical tables and other aids to computation, vol. IX, no. 50. National Research Council. Apr 1955. 40p tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$1.50. PB 118102

Quarterly. Subscriptions \$5.00 a year.
1. Tables, Mathematical 2. Mathematical equations and solutions.

Multi-level continuous sampling plans, by Gerald J. Lieberman and Herbert Solomon. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Sep 1954. 24p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118174

The primary purpose of this paper is to consider an extension of Dodge's first plan which (a) allows for smoother transition between sampling inspection and 100 percent inspection, (b) requires 100% inspection only when the quality submitted is quite inferior, and (c) allows for a minimum amount of inspection when quality is definitely good. This aim is accomplished by the introduction of a multi-level sampling plan which specifically allows for any number of sampling levels subject to the provision that transitions can only occur between adjacent levels. This inspection plan will be recognized as a random walk model with reflecting barriers. Contract N6onr 25126 (NR 042-002). SU AMSL TR 17.

On the synthesis of a minimal representation of a logic function, by Rolf Mueller. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Communications Laboratory, Cambridge, Mass. Apr 1955. 18p diagr. Order from LC. Mi \$2.40, ph \$3.30. PB 118125

A method is shown of synthesizing a minimal sum-of-terms representation of a logic function given as a

truth-table or in one of its canonical forms. The method consists essentially of performing simple arithmetic operations with numbers correlated with the terms in the canonical form, and checking whether those numbers are present in a given list of less than 2^{n-1} numbers for n variables. The process is based on elementary concepts of the theory of cell complexes, using the homomorphism between all possible terms in a logic function of n variables with a cell complex in the unit n -dimensional cube. AAF CRC TR 55-104.

Optimum free volume theory of liquids, by John S. Dahler and Joseph O. Hirschfelder. Wisconsin University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Oct 1954. 12p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 117989

An iterative method for solving Kirkwood's integral equation for the free-volume of a liquid is described. This procedure uses the results of the well-known Lennard-Jones and Devonshire theory of liquids as its starting point. The results of the calculations suggested would provide a good test of the validity of the cell theory of liquids. It is believed that this "optimum free-volume theory" will remove several of the undesirable characteristics of the Lennard-Jones and Devonshire liquid. Technical report WIS-ONR-12 under Contract N7onr-28511. WIS ONR-12.

Structure of turbulence in fully developed pipe flow, by John Laufer, National Bureau of Standards. 1954. 20p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118057

Measurements, principally with a hot-wire anemometer, were made in fully developed turbulent flow in a 10-inch pipe at speeds of 10 and 100 feet per second. It is shown that rates of turbulent-energy production, dissipation, and diffusion have sharp maximums near the edge of the laminar sublayer and that there exist a strong movement of kinetic energy away from this point and an equally strong movement of pressure energy toward it. Supersedes NACA TN 2954. NACA 1174.

Nuclear

Cerenkov counter measurement of cosmic ray alpha particles at 41°, by Nahmin Horwitz. Minnesota University. Dept. of Physics. Aug 1954. 78p photos, diagrs, graphs. Order from LC. Mi \$3.75, ph \$10.25. PB 117912

Knowledge of the flux and energy spectrum for each charge component of primary cosmic rays will be helpful in solving the fundamental problem of their origin. A Cerenkov counter was flown by balloon to a height of 16 gm/cm² on February 2, 1954, at a geomagnetic latitude of 41° 21'. The purpose of the experiment was to measure the alpha particle

flux and to observe the behavior of a Cerenkov counter in the $3 \leq Z \leq 9$ region. Technical report under Contract N6onr-246, Cosmic ray project. Appendices: A. Determination of the geometry factor. - B. Test to show the Dumont photomultiplier would be insensitive to the earth's magnetic field. - C. Calibration of amplifiers and oscilloscopes. - D. Crude prediction of the shape of the alpha peak. - E. Estimate of the fraction of alphas which will cause more than one Geiger counter to be discharged. - Bibliography.

Experimental gamma radiac calibrator, by J. D. Graves. U. S. Naval Research Laboratory. Jul 1955. 12p photos, diagrs, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118210

A semiportable gamma radiac calibrator has been constructed for use with portable survey radiac instruments. The calibrator is completely self-contained and requires no further installation of shielding, electricity, or facilities; it is believed to be capable of calibration accuracies to within four percent of a standard. NRL R 4566.

Extrapolation techniques applied to matrix methods in neutron diffusion problems, by Robert R. McCready. U. S. National Advisory Committee for Aeronautics. Jul 1955. 32p diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118022

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

Ion exchange of zirconium and hafnium in perchloric acid with Amberlite IR-120, by Edwin M. Larsen and Pei Wang. Wisconsin University. Dept. of Chemistry, Madison, Wis. Aug 1954. 25p graphs, tables. Order from LC. Mi \$2.25, ph \$4. PB 117919

The distribution data show that zirconium is favored over hafnium in the resin phase, with the ratio of the distribution coefficients, D_{Zr}/D_{Hf} , increasing in favor of zirconium at the lower aqueous hydrogen ion concentration. Contract N7onr-28540, Task order 4. Technical report VI. Based on thesis submitted by Pei Wang.

Quarterly progress report no. 14 under ONR contract N5-07856. Massachusetts Institute of Technology. Solid-State and Molecular Theory Group. Oct 1954. 52p. Order from LC. Mi \$3.60, ph \$9.30. PB 118133

Contract N5ori-07856. Contents: 1. Calculation of a density of states curve for nickel, by G. F. Koster. - 2. Energy bands in copper, by D. J. Howarth. - 3. Augmented plane wave method as applied to sodium, by M. M. Saffren. - 4. Energy bands in potassium chloride, by L. P. Howland. - 5. Energy bands in graphite, by F. J. Corbato. - 6. Review of the use of Whirlwind by the Solid-State and Molecular Theory Group. - 7. Applications of Whirlwind to problems of molecular and solid-state physics, by F. J. Corbato. - 8. Limited configuration interaction treatment of the NH_3 molecule, by H. Kaplan. - 9. Valence bond theory. Simple saturated molecules, by R. McWeeny. - 10. Natural orbitals for the helium atom, by G. F. Koster. - 11. Hartree-Fock-Slater self-consistent field for $Fe(3d)^6(4s)^2$, by J. H. Wood. - 12. Nuclear electric quadrupole interaction in the KCl molecule, by L. C. Allen. - 13. Electron-lattice interactions, by T. D. Schultz. - 14. Thermal vibrations in the Cu-Zn system crystals, by H. C. White.

Razrushenie otritsatel'nykh ionov pri stolkoveni-
iakh s atomami (Destruction of negative ions in
collisions with atoms), by V. M. Duke'skii and
E. Ia. Zandberg. Translated by David Kraus.
May 1955. 28p diagrs, graphs. Order from LC.
Mi \$2.70, ph \$4.80. PB 118223

Translated for Geophysics Research Center, AF Cambridge Research Center, by American Meteorological Society under Contract no. AF 19(604)-1364, from Zhurnal eksperimental'noi i teoreticheskoi fiziki vol. 21, no. 11, p. 1270-1283, 1951.

1. Atomic power - Research - Russia 2. Ions, Negative - Decay - Measurement - Russia
3. Molecular interactions - Russia 4. Electrons - Collisions - Russia.

PRINTING, PUBLISHING

Newspaper images in communist East Germany and in democratic West Germany; a comparative study of social images, by Richard Conrad. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Sep 1953. 18p graphs, tables. Order from LC. Mi \$2, ph \$2.75. PB 117979

HRRI project "Communist Controls in East Germany".

1. Communications - Germany 2. Newspapers - Germany 3. Sociology - Research - Germany
4. AAF HRRI RM 16.

Physical characteristics of leaflets: a survey of the literature, by Sidney Culbert. Washington University. Public Opinion Laboratory, St. Louis, Mo. Jan 1954. 20p. Order from LC. Mi \$2, ph \$2.75. PB 117976

This memorandum reports a systematic survey of the literature relevant to the problem of designing leaflets that will achieve maximum perception in various target populations. Findings on the optimal physical characteristics of leaflets are presented from a content analysis of 15 psychological and language journals dating from their first publication to the present time. Contract AF 33(038)-27522. HRRRI Project "Revere". Appendices - A. Languages using the Latin alphabet. - B. Relative visibilities of some 8-point types. - C. Legibility of color combinations. - D. Bibliography. AAF HRRRI RM 21.

PSYCHOLOGY

Attitudes and judgements of some lieutenants related to present active duty intentions, by George W. Baker. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. May 1953. 77p graphs, fold table Order from LC. Mi \$3.75, ph \$10.25. PB 117990

HRRRI project: Motivation and integration of new officers.

1. Personnel, Flying - Psychological records
2. Personnel, Flying - Training 3. AAF HRRRI TRR 14.

Technical appendices. May 1953. 166p tables. Order from LC. MI \$6.50, ph \$21.50. AAF HRRRI TRR 14 Appendix. PB 117990s

Behavioral correlates of directly and indirectly measured achievement motivation, by Richard de Charms, H. William Morrison, Walter Reitman, David C. McClelland. Wesleyan University, Middletown, Conn. Oct 1954. 17p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118191

Contract N7onr 463. Need analysis research project no. NR 172-363.

1. Psychological tests 2. Performance tests.

Bibliography on military leadership; annotations of selected studies from scientific, technical, and related publications, by Floyd L. Ruch. Psychological Services, Inc., Los Angeles, Calif. Jun 1953. 88p. Order from LC. Mi \$4, ph \$11.50. PB 117995

AF contract 505-039-0001. HRRRI project Research on leadership in combat.

1. Military training - Research - Bibliography
2. Leadership, Military - Bibliography 3. AAF HRRRI TRR 18.

Delinquency integrations. Second technical report, by Clyde E. Sullivan, Marguerite Q. Grant, and J. Douglas Grant. U. S. Naval Retraining Command, Camp Elliot, San Diego, Calif. Oct 1954. 31p. Order from LC. Mi \$3, ph \$6.30. PB 118193

Seven developmental modes of perceiving interpersonal relationships were discussed as phases of experience to which all humans are exposed. ONR Contract Nonr 825(00) and Nonr 1535(00).

Effects of sound on autokinetic movement, by George Soloyanis and John F. Corso. Pennsylvania State College. Dept. of Psychology, State College, Pa. Jun 1953. 22p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118183

Twenty-one subjects were tested in a study to determine the effects of monaural and binaural pure tone stimulation (1000 cps) on the total magnitude and horizontal directional displacement of autokinetic movement. Analysis of the data through rank order and analysis-of-variance techniques showed that (a) the total magnitude of autokinetic movement is directly related to the intensity difference of the bilateral stimuli and that (b) the relative magnitude and horizontal directional displacement of autokinetic movement is predictable from the auditory stimulus conditions, with the extent of movement dependent upon the bilateral intensity difference and the direction of movement dependent upon the side of greater stimulation. In addition, it was found that (c) repeated light exposures tend to decrease the total magnitude of apparent movement. Contract no. AF 33(038)-786. AAF WADC TR 53-447.

Exploratory study of attitudes toward flying, by Keith P. Kelley. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Officer Education Research Laboratory, Maxwell Air Force Base, Ala. Dec 1954. 35p tables. Order from LC. Mi \$3, ph \$6.30. PB 118229

The specific research objective was to isolate and identify factors which affected the decisions of junior and senior AFROTC students to volunteer or not to volunteer for USAF flying training. As a secondary objective, it was hoped that some useful information might be obtained concerning differences in attitudes between volunteers and non-volunteers, and between juniors and seniors. Project no. 7730, Task no. 77506. AAF PTRC TR 54-100.

Guide for interviewing Soviet escapees, by Alice H. Bauer. Harvard University. Russian Research Center. Aug 1953. 40p. Order from LC. Mi \$3, ph \$6.30. PB 118040

Contract AF 33(038)-12909.

1. Sociology - Research - Russia 2. Russia - Social life and customs 3. Interviewing 4. AAF HRRRI RM 3.

Incidents of leadership in combat, by Floyd L. Ruch. Psychological Services, Inc., Los Angeles, Calif. Contract no. AF 33(038)-23295. Order separate parts described below from LC, giving PB number of each part ordered.

Vol. I: Human relations. Jan 1953. 37p.
Mi \$2.50, ph \$5.25. PB 117964

1. AAF HRRI RM 3, vol. I.

Vol. II: Communications. Feb 1953. 38p.
Mi \$2.50, ph \$5.25. PB 117965

1. AAF HRRI RM 3, vol. II.

Vol. III: Personal conduct. Feb 1953. 28p.
Mi \$2.25, ph \$4. PB 117966

1. AAF HRRI RM 3, vol. III.

Vol. IV: Organization and planning of duties.
Mar 1953. 45p. Mi \$2.75, ph \$6.50. PB 117967

1. AAF HRRI RM 3, vol. IV.

Vol. V: Administration and supervision of duties.
Apr 1953. 53p. Mi \$3, ph \$7.75. PB 117968

1. AAF HRRI RM 3, vol. V.

Vol. VI: Execution of duties. Apr 1953. 58p.
Mi \$3, ph \$7.75. PB 117969

1. Leadership 2. Psychology, Applied 3. AAF
HRRI RM 3, vol. VI.

Index to HRRI 1953 publications, by Sophia S.

Cowden and Sanford S. Neal, Jr. U. S. Air Force.
Air Research and Development Command. Human
Resources Research Institute, Maxwell Air Force
Base, Ala. Jan 1954. 38p. Order from LC.
Mi \$2.50, ph \$5.25. PB 117982

1. AAF HRRI RM 9.

Influence of an indoctrination course on active duty
attitudes, by Harry M. Henkin and George W. Baker.
U. S. Air Force. Air Research and Development
Command. Human Resources Research Institute,
Maxwell Air Force Base, Ala. Jul 1953. 37p tables.
Order from LC. Mi \$2.50, ph \$5.25. PB 117980

HRRI project: Motivation and integration of new
officers. AF Project 505-036-0011. Contents. Ap-
pendix Tables: - I. Comparison of some characteris-
tics of the experimental group (N-236) and Control
group (N-26). - II. Percentage distribution of control
and experimental group responses to indoctrination
course-related questions, with significant differences
indicated. - III. Comparison of the percentage of posi-
tive responses to fifteen active duty components, by a
control and an experimental group of officers for two
periods, and the direction and amount of change in
each group's response. AAF HRRI RM 13.

Memo on the experimental determination of transfer
functions for human operators and machines, by
W. H. Huggins. Massachusetts Institute of Techno-
logy. Research Laboratory of Electronics. Oct 1949.

10p diags, graphs. Order from LC. Mi \$1.80,
ph \$1.80. PB 118035

Theory of human beings as servo-mechanisms is
outlined and discussed. Includes summary of dis-
cussions at American Psychological Association's
symposium of Sept. 7, 1948.

Organization and information processing, by Lee S.
Christie. Tufts College, Medford, Mass. Aug
1954. 30p graphs. Order from LC. Mi \$2.70,
ph \$4.80. PB 118137

A theoretical analysis of systems organization as
the management of information flow has been
made. This analysis indicates that the action ef-
fectiveness of a system depends upon the efficiency
of internal communication. Internal information
handling necessitates decisions of four kinds:
routing, filtering, coding, and scheduling. The or-
ganization of these four functions is effected by
these factors: imposition of rules by outside
authority, the rational pre-existing behavioral
tendencies of the human components, learning, the
exertion of control by authority within the group.
Data from an experimental program designed to
study the organization of routing, particularly with
respect to the effect of rules for routing expressed
as communication networks, was analyzed. This
empirical analysis demonstrated the vital import-
ance of so designing the system by the rules im-
posed that a basis for rational behavior is pro-
vided for the men in the system and so designing
it that behavior optimized with respect to that basis
will be optimum for total system performance. Re-
port no. 1954-494-03-25 under Contract no. Nonr
494(03).

Paper-pencil analogs of laboratory performance
tests, by Haym Kruglak. Minnesota. University.
Dept. of Physics. Jun 1954. 14p tables. Order
from LC. Mi \$2.40, ph \$3.30. PB 118105

An attempt has been made to convert laboratory
performance tests into essay and multiple choice
items. Preliminary forms of the tests were ad-
ministered to about 160 elementary physics students.
Technical report no. 9 under Contract N8onr-66213,
Project NR 153-148.

Pitch of side-tone, by John W. Black and Scott N.
Morrill. U. S. Naval School of Aviation Medicine,
Pensacola, Fla. and Ohio State University Re-
search Foundation, Columbus, Ohio. Oct 1954.
12p diagr, tables. Order from LC. Mi \$2, ph
\$2.75. PB 116530

Thirty-two experimental subjects recorded the vowel
(a) at four sound pressure levels, then heard their
recordings played back at a different fundamental
frequency. Through control of the play-back tape
speed the subjects attempted to make the reproduced
vowels agree in pitch with simultaneous revocaliza-
tions of the original recordings. The majority of the

readjusted frequencies were higher than the frequencies of the simultaneous revocalizations. The subjects were sustaining vowels at lower vocal frequencies than they suspected. Joint project report no. 31 under Contract N6ONR 22525, Project no. NR 145-993. NMRI Proj NM 001 064.01, Report no. 31.

Predicting the accuracy of oral reporting in group situations, by Joseph H. McPherson. Chicago. University. Human Dynamics Laboratory. Dec 1954. 90p tables. Order from LC. Mi \$4.80, ph \$13.80. PB 118146

This bulletin describes a study of the accuracy of reporting on assigned materials in a course at the Air University. A Reading Distortion Test and a Reactions to Group Situations Test were used to predict which men would be most likely to distort the content of assignments in making oral reports to groups. The tests were given to 100 men. Eight men predicted to be high in distortion and eight predicted to be low on the basis of these tests were then observed as they discussed specially selected readings in class. Different patterns of behavior tending to bear out the predictions are discussed. Contract no. AF 18(600)-5, Project no. 505-040-0004. AAF PTRC TR 54-130.

Predictive value of a revised forced choice form of the manifest anxiety scale, by Rodman P. Kabrick. Iowa State University. Dept. of Psychology, Iowa City, Iowa. Aug 1954. 24p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118096

Results indicated that, although the forced-choice form of the manifest anxiety test may be less influenced by favorability factors than the conventional A-scale, there is no reason to suppose that the two forms differ in their ability to predict performance in eyelid conditioning or simple verbal learning. Contract N9onr-93802, Project NR 154-107. Technical report 2, Studies of influence of motivation on performance in learning.

Preliminary note on psychiatric evaluation of students in ONI school, by John H. Rohrer. Tulane University, New Orleans, La. Jun 1954. 4p diagr, table. Order from LC. Mi \$1.80, ph \$1.80. PB 118110

A brief summary of the predicted relationship between officer effectiveness ratings and personality types has been prepared from the information supplied by participating psychiatrists. Contract NR 151-152.

Rehabilitation research: Inventory of personal opinions, by Charles Hanley. U. S. Navy. Naval Retraining Command, Camp Elliott, San Diego, Calif. Aug 1954. 66p tables. Order from LC. Mi \$3.25, ph \$9. PB 117884

Contract ONR 174-177, first technical report.
1. Personality - Research 2. Psychological research

3. Military discipline 4. Personnel, Military - Psychiatric records 5. Questionnaires.

Religious and other sources of parental attitudes toward independence training, by D. C. McClelland, A. Rindlisbacher, and R. de Charms. Wesleyan University, Middletown, Conn. Oct 1954. 13p table. Order from LC. Mi \$2.40, ph \$3.30. PB 118211

Contract N7onr 463. Need analysis research project NR 172-363.
1. Psychological research 2. Religion - Effect child training 3. Children - Training - Effect of religion.

Report on attitudes towards desertion of Air Force personnel, by Andrew F. Henry and Edgar F. Borgatta. Harvard University. Laboratory of Social Relations. May 1953. 13p graphs, tables. Order from LC. Mi \$2, ph \$2.75. PB 117983

Contract AF 33(038)-12782. HRRRI project "Studies of informal social control, effective leadership and officer career."
1. U. S. Air Force - Desertion - Research 2. Personnel, Flying - Psychological records 3. AAF HRRRI RM 8.

Rumors in a disaster; observation of the rumors and concomitant factors in a disaster situation, by Otto N. Larsen. Washington University. Public Opinion Laboratory, St. Louis, Mo. Jan 1954. 24p. Order from LC. Mi \$2, ph \$4. PB 117972

In disaster situations within the United States, as well as tactical situations in combat, the Air Force is frequently called upon to communicate with harassed groups to assist in re-establishing effective control or in exploiting the disorganization for tactical gains. Knowledge of how and when the rumor may be used to further communication is necessary to the success of the mission. Contract AF 33(038)-27522. HRRRI Project "Revere". AAF HRRRI RM 29.

Situational factors and attitudes expressed toward duty with ARDC, by Fred R. Crawford and Frederick H. Esch. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Sep 1953. 35p graphs. Order from LC. Mi \$2.50, ph \$5.25. PB 117994

AF 505-036-0011. HRRRI Project: Motivation and integration of new officers.
1. Personnel, Flying - Training 2. Personnel, Flying - Psychological records 3. AAF HRRRI TRR 19.

Some consequences of power differences on decisions in B-26 crews, by E. Paul Torrance. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 33p graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118147

The present study deals with decision-making in small permanent groups with uniform, well-established, and clear-cut power structures. For the purposes of this study, power or the influence exerted by one person over another has been operationally defined here in terms of crew position. A second aspect of the present study compares the decision-making behavior of permanent groups with that of similarly constituted temporary groups. Project no. 7713, Task no. 57157. AAF PTRC TR 54-128.

Stability of autokinetic judgments, by J. H. Rohrer, S. H. Baron, E. L. Hoffman, D. V. Swander. Tulane University. Urban Life Research Institute, New Orleans, La. Jun 1954. 12p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118107

Contract Nonr-475(01).
1. Psychology, Social 2. Perception, Social - Research.

Studies in extra-messages: Listener identification of speaker's voice under conditions of certain restrictions imposed upon the voice signal, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio. Oct 1954. 24p graphs, tables. Order from LC. Mi \$2.25, ph \$4. PB 116529

The ability of listeners to identify a speaker by voice was studied relative to certain restrictions imposed upon the voice signal. These restrictions included: (a) high-pass, low-pass and octave-band pass filtering of the voice signal, (b) the altering of the relative sound pressure level of the voice signal, and (c) the masking of the voice signal by noise. For the octave bands considered, maximum correct identification of voices occurred for the octave band of 1200 to 2400 cps. A decrease in listener identification occurred when the voice signal was presented at a relatively low signal level. Listener identification of voices decreased directly as the signal-to-noise-ratio of the masking noise was decreased in the range from a plus to a minus eight signal-to-noise-ratio. Joint project report no. 30 under Contract N6ONR 22525, Project no. 145-993. NMRI Proj NM 001 064.01, Report no. 30.

What non-commissioned officers think of promotion and reward practices in the U. S. Air Force, by Edgar F. Borgatta. Harvard University. Laboratory of Social Relations. Dec 1952. 17p. Order from LC. Mi \$2, ph \$2.75. PB 117985

Preliminary report. Contract AF 33(038)-12782. HRRRI project "Studies of informal social control, effective leadership and officer career".

1. Personnel, Flying - Psychological records
2. AAF HRRRI RM 4.

RUBBER AND RUBBER PRODUCTS

Abstracts of technical papers from the government synthetic rubber program, in 4 volumes, 1942-1953. Reconstruction Finance Corporation. Office of Synthetic Rubber. Dec 1953. 1083p. Order from OTS. \$5 a set. PB 111736

Summaries of published technical papers submitted by cooperating universities, institutes, companies, and government agencies from 1942 through 1953. Vol. 4 is author and subject index.

Accelerated heat and oxygen aging of rubber, by Z. T. Ossefort. U. S. Arsenal, Rock Island, Ill. May 1955. 31p photos, tables. Order from LC. Mi \$3, ph \$6.30. PB 118134

A discussion is presented covering the following principal points in the aging of rubber: 1. Chief causes and effects of heat and oxygen aging of vulcanizates. 2. Uses of oven aging tests. 3. Some of the goals of the Ordnance aging program. 4. Test methods and apparatus used in studying aging of vulcanizates. Procedures used and results of several studies on some of the factors responsible for heat and oxygen aging of vulcanizates are reported. Ordnance project TB 4-521A, Report no. 19. Dept. of the Army project 593-15-008. RIAL R 55-1993.

Coefficient of friction of aircraft tires on concrete runways, by Robert R. Luthman. Dayton. University. Division of Research, Dayton, Ohio. Mar 1955. 54p photos, drawing, diags, graphs, tables. Order from OTS. \$1.50. PB 111732

The principal objective of the project was the determination of the maximum attainable coefficient of friction under various conditions of velocity and vertical loading. The variation in the coefficient of friction with velocity up to 140 mph was established and is presented here in graphical form. The results indicate that the coefficient of friction is actually somewhat higher than the value currently used in calculations. Contract no. AF 33(616)-2251. AAF WADC TR 55-179.

Copolymer research reports, no. 1-3570, Feb 1, 1943-Jun 30, 1954. Federal Facilities Corporation. 1943-1954.

PB 118310

These reports cover research that was carried on by the Federal Facilities Corporation and its predecessor agencies. 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.

Treatment of viscosity data on polymer solutions.

I. Intrinsic viscosity and slope constants, by W. Heller. Wayne University. Dept. of Chemistry, Detroit, Mich. Aug 1954. 48p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118100

Existing equations and conventional procedures for the graphical determination of intrinsic viscosity and slope constants are analyzed. It is shown that slope constants obtained by conventional procedures contain a systematic error which varies with the intrinsic viscosity. Several new equations and procedures are proposed and their accuracy and precision are checked. Attention is drawn to the possible application to the evaluation of measurements of osmotic pressure and of light scattering. Special report no. I, under Contract Nonr 736(00) Project NR 330-027. Material in this report was presented at a meeting of the American Physical Society, March 1954, at Detroit.

STRUCTURAL ENGINEERING

Creep and creep-rupture characteristics of some riveted and spot-welded lap joints of aircraft materials, by Leonard Mordfin. U. S. National Advisory Committee for Aeronautics. Jun 1955.

53p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 118017

Equipment, test techniques, and results are presented for an experimental investigation of the creep of lap joints. Riveted aluminum-alloy joints fabricated from 75S-T6 and 24S-T3 sheet with 24S and 24S-T31 rivets were tested at 300^o, 400^o, and 500^o F. Spot-welded joints of 1/4-hard, type 301 stainless steel were tested at 800^o F. Each type of joint was also tested in tension at room temperature. NACA TN 3412.

Elastic-plastic theory of the response of cantilevers to air blast loading, by F. J. Allen. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Apr 1955. 25p graph, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118213

An elastic-plastic theory of the response of cantilevers loaded by air blast waves is proposed and the predictions obtained from it are compared to experimental results. The theory is capable of providing estimates for the types of beams considered; it is expected to furnish more precise estimates for certain other beams of practical interest. A method is developed by means of which a high speed digital computing machine can rapidly and accurately pre-

dict dynamic elastic strains, moments, and deflections in certain structures. Dept. of the Army project no. TB 3-0112. ORD project 5B03-04-002. APG BRL M 886.

Fatigue life of airplane structures, by Bo Lundberg.

Flygtekniska Försöksanstalten (FFA), Stockholm. May 1955. 150p diagrs, graphs, tables. Order from LC. Mi \$7.20, ph \$22.80. PB 118029

This paper presents a survey of the various aspects of the fatigue of complete airplane structures, together with numerical applications. The survey is to some extent supported by test results obtained in Sweden. A general formula has been developed for the calculation of the cumulative damage. This formula has been used for the preparation of some charts for the calculation of the fatigue life as a function of the most important design and fatigue parameters. A new method by WEIBULL for the determination of S-N curves at various probability levels is discussed and applied. The paper deals mainly with fixed-wing transport aircraft, although the general views and methods can be applied to all types of airplanes. FFA 60.

Klei i deriviannye kleenye konstruksii v rechnem sudostrenii, glava VIII (Glued wooden structures and glues used in river-boat construction and in other shipbuilding for navigation on inland waterways in Soviet Russia. Chapter VIII: Fundamentals for calculation and design of glued ship and marine structures). Translated by Irville C. Lecompte, edited by F. A. Raven. Union of Socialist Soviet Republics. Izdatel'stvo Ministerstva Rechnogo Flota. Jun 1955. 31p photos, drawings, diagrs, graphs. Order from LC.

Mi \$3, ph \$6.30. PB 118220

1. Joints, Glued - Strength - Tests - Russia
2. Glue - Mechanical properties - Russia
3. Ships, Glued - Design - Russia
4. Structures, Marine - Glued - Russia
5. NAVSHIPS T 587
6. STS 214.

On the mechanism of buckling of a circular cylindrical shell under axial compression, by Y.

Yoshimura. U. S. National Advisory Committee for Aeronautics. Jul 1955. 46p diagr, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118027

The present paper deals with the buckling of a circular cylindrical shell under axial compression from the viewpoint of energy and the characteristics of deformation. The occurrence of local buckling is affirmed from the viewpoint of the energy barrier to be jumped over during buckling, and from a comparison of the theoretical post-buckling state with the experimental results. Finally, the local buckling with the load applied by a spring is analyzed, and it is proved that the minimum buckling load increases with an increase of rigidity of the spring. NACA TM 1390.

Residential architectural features in Eastern European countries. U. S. Library of Congress. Air Information Division. HRRRI Project "Pop Key". Order separate parts described below from LC, giving PB number of each part ordered.

Vol. 1. Jan 1954. 207p photos, maps, drawings, tables. Mi \$7.75, ph \$26.50. PB 117998

1. Housing - Russia 2. Architecture - Designs and plans - Russia 3. Photography, Aerial - Interpretation 4. AAF HRRRI TRR 25, vol. 1.

Vol. 2. Jan 1954. 174p photos, drawings, tables. Mi \$6.75, ph \$22.75. PB 117997

AAF HRRRI TRR 25, vol. II.

Tables of coefficients for the analysis of stresses about cutouts in circular semimonocoque cylinders with flexible rings, by Harvey G. McComb, Jr. and Emmet F. Low, Jr. U. S. National Advisory Committee for Aeronautics. Jul 1955. 98p diags, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118019

Tables of coefficients are presented which facilitate the stress analysis of circular semimonocoque cylinders with cutouts by the method published in NACA TN 3200. When the values of two simple structural parameters are known, use of these coefficients enables shear flows and stringer loads in the neighborhood of a cutout to be calculated. NACA TN 3460.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Snow, frost and ice elimination from parked aircraft. Part 2: Effect of frozen deposits and survey of means for elimination, by R. H. Upson. Minnesota. University. Institute of Technology. Dept. of Aeronautical Engineering, Minneapolis, Minn. Apr 1954. 109p graphs. Order from LC. Mi \$4.75, ph \$14. PB 117953

This report, the second interim report of the present study, establishes the serious consequences of frozen deposits, particularly on the upper wing surface near the leading edge, but also shows that such deposits, in sufficient magnitude, can be dangerous elsewhere, the principal harm being the loss of maximum lift during take-off. Several main classes of prevention and removal means are discussed. Contract no. AF 33(616)-413, RDC no. 657-221. For Parts 1 and 3 see PB 117952 and 111671. AAF WADC TR 53-217, Part 2.

Use of aircraft as a counter-riot measure, by Albert D. Biderman and Fred Davis. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Sep 1953. 47p tables. Order from LC. Mi \$2.75, ph \$6.50. PB 117978

Study of the use and effectiveness of aircraft employed by the Pennsylvania authorities to quell a four-day riot of prison inmates. Credit was given to the planes as the major factor in causing the inmates to seek a truce. Special project on Rockview Prison Riot. AAF HRRRI RM 17.

Instruments

Cabin-air-conditioning and wing anti-icing temperature control, by Donald K. Schaeve. Barber-Colman Co., Rockford, Ill. Jul 1954. 470p photos, drawing, diagr, graphs (part fold), tables (1 fold). Order from OTS. \$7. PB 111734

Automatic temperature control systems and components which can be used for control of the temperature in either cabin or wing anti-icing systems on gas turbine powered aircraft, were investigated. A survey of the thinking of known experts in the field was conducted and the information correlated and tabulated. A survey of pertinent literature is presented. Analytical studies were conducted so that design criteria could be established, and performance predicted in advance of the construction of models. Tests of circuits, circuit features and system components were conducted together with performance tests of control systems in realistic mockups. An automatic cabin temperature control system was developed. Pertinent information, with regard to several new developments which hold promise of achieving significant improvements in the future, is presented. Contract AF 33(038)-27968. AAF WADC TR 54-410.

Interpolation and reference marks in reading a linear scale at brief exposures, by T. J. Coonan and E. T. Klemmer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C. Mar 1955. 11p. Order from LC. Mi \$2.40, ph \$3.30. PB 118226

The study was designed to investigate the rotation between reading accuracy and the number of reference marks under conditions of brief exposure. Experiments are described and results are given. AAF CRC TR 55-3.

New Army Air Forces universal shutter tester, by Amrom H. Katz. U. S. Air Materiel Command. Engineering Division. Photographic Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1945. 13p photos, diags, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118060

1. Shutters, Camera - Testing equipment
2. Testers, Optical 3. AAF TSEPL 4-680-70-2.

Vapor-cycle cooling for aircraft, by J. L. Mason, W. L. Burriss, T. J. Connolly. Airesearch Manufacturing Co., Los Angeles, Calif. Oct 1953. 379p diagrs, graphs, tables. Order from LC. Mi \$11.10, ph \$57.35. PB 118225

The design problems anticipated in the adaptation of vapor cycle cooling to aircraft have been studied. The study has been divided into three major areas: components, cycles, and systems. Component evaluation has been directed primarily to size and weight reduction relative to commercially available equipment. Cycle studies indicate the general desirability of a superheater. Other additions to the basic vapor cycle are recommended for specific applications. System evaluation presents possible methods of adapting a vapor cycle system to various cooling problems, considering different heat sources and sinks and the factors controlling their choice. Contract no. AF 33(616)-2016. AAF WADC TR 53-338.

Engines and Propellers

Analysis of two-dimensional compressible-flow loss characteristics downstream of turbomachine blade rows in terms of basic boundary-layer characteristics, by Warner L. Stewart. U. S. National Advisory Committee for Aeronautics. Jul 1955. 48p diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118009

Appendices: - A. Symbols. - B. Development of equations for form, energy, and pressure factors in terms of compressible flow. - C. Derivation of equations used to obtain over-all loss coefficients in terms of basic boundary-layer characteristics. 1. Mathematical equations and solutions 2. Boundary layer - Flow 3. Boundary layer - Mathematical analysis 4. Jet engines, Turbo jet - Blades 5. Flow, Axial - Mathematical analysis 6. NACA TN 3515.

Approximate method for determining equilibrium operation of compressor component of turbojet engine, by Merle C. Huppert. U. S. National Advisory Committee for Aeronautics. Jul 1955. 22p diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118026

1. Compressors - Research 2. Compressors - Flow - Theory 3. Compressors, Turbo - Tests 4. Jet engines, Turbo-jet 5. Compressors, Axial - Performance 6. NACA TN 3517.

Carbon remover for field level cleaning of aircraft engine parts. U. S. Air Force. Aug 1954. 4p. Order from LC. Mi \$1.50, ph \$1.50. PB 117903

1. Engines, Aircraft - Cleaning 2. Carbon - Removal 3. AAF TO 42A1-1-2.

Effect of some selected heat treatments on the operating life of cast HS-21 turbine blades, by Francis J. Clauss, Floyd B. Garrett and John W. Weeton. U. S. National Advisory Committee for Aeronautics. Jul 1955. 39p photos, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118020

1. Jet engines, Turbo-jet - Aerothermodynamics 2. Turbines - Blades - Heat treatment 3. NACA TN 3512.

Effect of turbine blade cooling on efficiency of a simple gas turbine power plant, by W. M. Rohsenow. Massachusetts Institute of Technology. Division of Industrial Cooperation. Jan 1953. 29p diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118070

Contract N5ori-7862, NR-091-158. D.I.C. project no. 6888. Technical report no. 4.

1. Turbines, Gas - Blades - Cooling 2. Turbines, Gas - Thermodynamics 3. MIT DIC R 4.

Noise survey of a 10-foot four-blade turbine-driven propeller under static conditions, by Max C. Kurbjun. U. S. National Advisory Committee for Aeronautics. Jul 1955. 25p photo, diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118003

1. Noise - Distribution - Measurements 2. Noise, Propeller - Measurement 3. Jet engines, Turbo-jet - Noise - Measurement 4. NACA TN 3422.

Training and Training Devices

Conversion tables for airman qualifying examination scores and comparable scores on other selected Air Force and Army tests, by Donald B. Gragg. U. S. Air Force. Air Training Command. Human Resources Research Center, Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Dec 1952. 33p tables. Order from LC. Mi \$2.50, ph \$5.25. PB 117879

The purpose of this study is to derive three empirical conversion tables for realistic evaluation of the scores of the Airman Qualifying Examination and other selected Air Force and Army tests, the scores of each test or composite being convertible to the scores of each other comparable test or composite. The three types of scores which comprise the three conversion tables are the general, the mechanical, and the clerical scores. Project no. 503-002-0002. AAF HRRC TR 52-13.

Evaluations of psychomotor tests for pilot selection:

The direction control and compensatory balance tests, by Edwin A. Fleishman. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 34p photos, diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118171

Each test is discussed in terms of factorial composition, practice effects, and other internal consistency data. Complete test descriptions, wiring diagrams, instructions, and stanine conversion tables are also presented. Project no. 7701. AAF PTRC TR 54-131.

Graduates of the Air Corps Tactical School, 1921-40, a demographic analysis of the population of graduates and an inquiry into the relationship between academic performance and career development, by C. A. McMahan, John Folger and Stephen W. Fotis. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Apr 1953. 63p graphs, tables. Order from LC. Mi \$3.25, ph \$9. PB 117991

This study attempts to answer the following questions concerning officer graduates of the Air Corps Tactical School of the classes 1921 through 1940: What were their background characteristics? What were the differences between the characteristics of those officers who made high grades at the Tactical School and those who made low grades? What is the relation between grades made at the Tactical School and the later career development of the officer graduates? HRR I project "Man-power resources research." AAF HRR I TR R 15.

Identifying the effective instructor: A review of the quantitative studies, 1900-1952, by Joseph A. Morsh and Eleanor W. Wilder. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Training Aids Research Laboratory, Chanute Air Force Base, Ill. Oct 1954. 158p tables. Order from LC. Mi \$7.50, ph \$24.30. PB 118150

In this Research Bulletin over three hundred sixty civilian studies which relate to the evaluation and prediction of instructor proficiency are reviewed and interpreted. Bibliography included. Project no. 7714, Task no. 77243. AAF PTRC TR 54-44.

Performance of student pilots flying the T-6 aircraft in primary pilot training, by Robert C. Houston, James F. Smith, and Ralph E. Flexman. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Basic Pilot Research Laboratory, Goodfellow Air Force Base, Texas. Dec 1954. 102p tables. Order from LC. Mi \$5.70, ph \$16.80. PB 118148

The purpose of this study was to obtain data that could be used to determine reasonable standards of performance for training and to provide information required for the development of an objective measure of student pilot performance. Specifically, this report will be concerned with describing the performance of "satisfactory" student pilots at five levels of primary pilot training. Project no. 508-016-0002. AAF PTRC TR 54-109.

Problems in twelve air force reserve installations; a preliminary report, by Stuart Adams. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jan 1954. 23p tables. Order from LC. Mi \$2.25, ph \$4. PB 117973

HRR I project: Motivation and integration of new officers.

1. Personnel, Flying - Training 2. Personnel, Flying - Psychological records 3. AAF HRR I RM 27.

Procedure for measuring the supervisory responsibilities of Air Force noncommissioned officers, by Stuart Adams, Alfred S. Moore and William A. Glenn. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Oct 1953. 64p tables. Order from LC. Mi \$3.25, ph \$9. PB 117977

Contract no. AF 505-036-0009. HRR I project "Non-commissioned officer responsibilities."
1. Supervisors - Performance 2. AAF HRR I RM 18.

Suggested ways of improving instruction in the primary pilot training program, by John C. Townsend and Ralph E. Flexman. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Research Center. Basic Pilot Research Laboratory, Goodfellow Air Force Base, Texas. Dec 1954. 26p drawings, diags, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118149

Project no. 7710, Task no. 77169. Appendices: A. Table of contents of the supplementary student handbook. - B. Table of contents of the "Quicky." - C. Principles of learning used in the indoctrination period of the project flight instructors.
1. Pilots, Air - Training 2. AAF PTRC TR 54-126.

Airports and Airways

On spectral analysis of runway roughness and loads developed during taxiing, by John C. Houbolt, James H. Walls and Robert F. Smiley. U. S. National Advisory Committee for Aeronautics. Jul 1955. 9p diags. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118006

1. Runways - Roughness - Power spectra 2. Aircraft - Taxiing 3. Loads, Landing - Mathematical analysis 4. NACA TN 3484.

Aerodynamics

Calculation of the supersonic pressure distribution on a single-curved tapered wing in regions not influenced by the root or tip, by Walter G. Vincenti and Newman H. Fisher, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1955. 32p diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118016

1. Flow, Supersonic 2. Flow, Supersonic - Pressure distribution 3. Wings, Tapered - Velocity distribution 4. Wings - Pressure distribution - Theory 5. Wings, Triangular - Pressure distribution 6. NACA TN 3499.

Correction of additional span loadings computed by the Weissinger seven-point method for moderately tapered wings of high aspect ratio, by John DeYoung and Walter H. Barling, Jr. U. S. National Advisory Committee for Aeronautics. Jul 1955. 31p diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118024

1. Loads, Aerodynamic - Theory 2. Wings - Span load distribution 3. Wings, Swept - Loading - Calculations 4. Wings, Tapered - Loading - Calculations 5. NACA TN 3500.

Effects of sweep on the maximum-lift characteristics of four aspect-ratio-4 wings at transonic speeds, by Thomas R. Turner. U. S. National Advisory Committee for Aeronautics. Jul 1955. 25p diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118013

1. Angle of attack - Effect on lift coefficients 2. Wind tunnels, Supersonic - Flow 3. Wings, Swept - Stability 4. Mach number - Effect 5. NACA TN 3468.

Estimation of inlet lip forces at subsonic and supersonic speeds, by W. E. Moeckel. U. S. National Advisory Committee for Aeronautics. Jun 1955. 12p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118015

1. Flow, Compressible - Theory 2. Flow, Subsonic - Theory 3. Flow, Supersonic - Theory 4. Bodies of revolution - Drag - Effect of inlet design 5. NACA TN 3457.

Experimental investigation of the shock wave pressure characteristics related to the sonic boom, by

Fred L. Daum and Norman Smith. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1955. 19p diags, graphs. Order from OTS. 50 cents. PB 111735

Theoretical and experimental investigations were made of the "sonic boom" created during supersonic flight. Static pressure changes at the ground caused by an airplane in level supersonic flight at various altitudes and during dives were recorded. A comparison between the experimental results and the available theory is presented. The effects of wind and temperature gradients are elucidated. The approximate area covered by a sonic boom for particular flight conditions is presented. Comments are made on the rate of decay of the shock wave pressure jump. Project no. 1366, Task no. 70109. AAF WADC TN 55-203.

Flight determination of the drag and pressure recovery of an NACA 1-40-250 nose inlet at Mach numbers from 0.9 to 1.8, by R. I. Sears and C. F. Merlet. U. S. National Advisory Committee for Aeronautics. Jul 1955. 30p photos, drawings, diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118002

Supersedes NACA RML50L18.

1. Mach number - Effect 2. Bodies of revolution - Pressure distribution - Effect of inlet design 3. Bodies of revolution - Drag - Effect of inlet design 4. Reynolds number - Effect 5. Noses (Aircraft) - Air inlets 6. NACA TN 3218.

Flow studies on flat-plate delta wings at supersonic speed, by William H. Michael, Jr. U. S. National Advisory Committee for Aeronautics. Jul 1955. 40p photos, drawings, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118014

1. Flow, Supersonic - Theory 2. Loads, Aerodynamic - Theory 3. Wings, Triangular - Velocity distribution - Theory 4. NACA TN 3472.

Investigation of the discharge and drag characteristics of auxiliary-air outlets discharging into a transonic stream, by Paul E. Dewey and Allen R. Vick. U. S. National Advisory Committee for Aeronautics. Jul 1955. 38p photos, drawings, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118004

1. Bodies of revolution - Drag - Effect of duct design 2. Ducts, Air - Discharge coefficients 3. Ducts, Rectangular - Velocity profiles 4. NACA TN 3466.

Structural response to discrete and continuous gusts of an airplane having wing-bending flexibility and a

correlation of calculated and flight results, by John C. Houbolt and Eldon E. Kordes. U. S. National Advisory Committee for Aeronautics. 1954. 24p diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118058

Supersedes NACA TN 3006 (PB 110904).

1. Gust loads
2. Loads, Dynamic
3. Stability, Structural - Analysis
4. Flight measurements
5. NACA 1181
6. NACA TN 3006 Revised.

A study of boundary-layer transition and surface temperature distributions at Mach 3.12, by Paul F. Brinich. U. S. National Advisory Committee for Aeronautics. Jul 1955. 39p photo, drawings, diags, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118010

1. Mach number - Effect
2. Reynolds number - Effect
3. Schlieren effect
4. Flow, Laminar - Heat transfer
5. Flow, Supersonic - Measuring equipment
6. Flow, Turbulent - Measuring equipment
7. Bodies of revolution - Surface roughness
8. NACA TN 3509.

Summary of results of a wind-tunnel investigation of nine related horizontal tails, by Jules B. Dods, Jr. and Bruce E. Tinling. U. S. National Advisory Committee for Aeronautics. Jul 1955. 105p photos, diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118008

Supersedes RMA51C31A.

1. Mach number - Effect
2. Reynolds number - Effect
3. Tail design - Aircraft
4. Tail surfaces - Aerodynamics
5. Tail surfaces - Tests
6. NACA TN 3497.

Theoretical and experimental investigation of the effect of tunnel walls on the forces of an oscillating airfoil in two-dimensional subsonic compressible flow, by Harry L. Runyan, Donald S. Woolston and A. Gerald Rainey. U. S. National Advisory Committee for Aeronautics. Jun 1955. 41p photo, diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118018

1. Mathematical equations and solutions
2. Mach number - Effect
3. Wind tunnels, Subsonic - Walls - Effects
4. Wings - Vibrations - Calculations
5. NACA TN 3416.

Theoretical investigation of flutter of two-dimensional flat panels with one surface exposed to supersonic potential flow, by Herbert C. Nelson and Herbert J. Cunningham. U. S. National Advisory Committee for Aeronautics. Jul 1955. 60p diagr, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118012

1. Mach number - Effect
2. Flow, Supersonic - Theory
3. Flutter - Theory
4. NACA TN 3465.

Marine Transportation

Atlantis cruise 198 and Caryn cruise 78, a drift study of the Gulf Stream, by W. Malkus and K. Johnson. Woods Hole Oceanographic Institution, Woods Hole, Mass. Aug 1954. 25p graphs, maps (2 fold). Order from LC. Mi \$2.70, ph \$4.80. PB 118048

Describes a method of Gulf Stream observation which can usefully supplement the kind of information obtained in the conventional search pattern. Technical report under Contract Nonr-769(00) (NR-083-069). Unpublished manuscript. WHOI Ref 54-67.

Choptank River summer cruise, 28 Jun - 1 July 1952, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Aug 1954. 41p graphs, map, tables. Order from LC. Mi \$3.30, ph \$7. PB 118099

A tabulated study of the physical and chemical structure of the area in the summer season. Data report 20. Reference 54-7. Contract Nonr 248(20) NR 083-070 and Contract Nonr 248(30) NR 083-070.

Circulation over the continental shelf south of Cape Hatteras, by Dean F. Bumpus. Woods Hole Oceanographic Institution, Woods Hole, Mass. Aug 1954. 35p maps, diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118049

The hydrography of the area is controlled by an environment which produces moderate horizontal gradients and weak to moderate vertical gradients in temperature and salinity. Six reasons why a dynamic coastal current is a transient affair are given. Technical report under Contract N6onr-27701 (NR-084-003). Unpublished manuscript. WHOI Ref 54-58.

NACA model investigations of seaplanes in waves, by John B. Parkinson. U. S. National Advisory Committee for Aeronautics. Jul 1955. 28p photos, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118011

Presented at Conference on Ships and Waves, Stevens Institute of Technology, Oct. 25-27, 1954.

1. Hydrodynamics - Theory
2. Flow, Hydrodynamic - Tests
3. Seaplanes - Hulls - Dead rise
4. Seaplanes - Hulls - Impact pressure
5. NACA TN 3419.

MISCELLANEOUS

Annual report on scientific and industrial research and technological advance in West Berlin, 1954, by Robert M. Brandin. U. S. Mission, Berlin. May 1955. 9p. Order from LC. Mi \$1.50, ph \$1.50. PB 117679

For earlier reports see PB 111165 and 111426.
1. Industrial research - Germany 2. Scientific research - Germany.

Arrest in the Soviet Union, by Raymond A. Bauer. Harvard University. Russian Research Center and Massachusetts Institute of Technology. Center for International Studies. Jan 1954. 49p tables. Order from LC. Mi \$2.75, ph \$6.50. PB 117971

Contract AF 33(038)-12909. HRRI project "An analysis of the Soviet social system".
1. Arrests - Russia 2. Russia - Social life and customs 3. AAF HRRI RM 30.

Biochemical and genetical research on certain mutants of neurospora. Final report under Contract Nonr 859(00) for period Jun 16, 1952 to Jun 15, 1954, by Robert P. Wagner. Texas. University, Austin, Texas. Sep 1954. 16p diagr, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118129

1. Neurospora - Mutations 2. Genetics - Research 3. Contract Nonr 859(00).

Communist control of religion, a sociological case study of the Protestant church in East Germany, by Richard Conrad and William S. Baker. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jan 1954. 31p tables. Order from LC. Mi \$2.50, ph \$5.25. PB 117981

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1. Religion - Germany 2. Religion - State control - Germany 3. AAF HRRI RM 12.

Corncocks - their composition, availability, agricultural and industrial uses, by T. F. Clark and E. C. Lathrop. U. S. Bureau of Agricultural and Industrial Chemistry. Northern Regional Research Laboratory, Peoria, Ill. Apr 1953. 83p maps, graphs, tables. Order from Agricultural Research Service, U. S. Dept. of Agriculture, Washington 25, D. C. PB 118097

Information concerning the physical and chemical properties of corncocks, their availability, their pre-

sent major farm and industrial uses, and some indications of future possibilities of utilization. AIC-177.

Guide to captured German documents, by Gerhard L. Weinberg and others. Columbia University. Bureau of Applied Social Research. Dec 1952. 88p. Order from LC. Mi \$4, ph \$11.50. PB 117988

War documentation project, Study no. 1. Contract AF 18(600-1).

1. Reports, Technical - Bibliography - Germany
2. AAF HRRI RM 2, vol. I.

Information, a valuable substitute for men, material and energy, by C. Tompkins. George Washington University, Logistics Research Project, Washington, D. C. Aug 1954. 9p. Order from LC. Mi \$1.50, ph \$1.50. PB 117885

Contract N7onr 41904.

1. Inventories 2. Naval supplies.

Methods for separating pith-bearing plants into fiber and pith, by E. C. Lathrop, T. R. Naffziger and H. I. Mahon. U. S. Bureau of Agricultural and Industrial Chemistry. Northern Regional Research Laboratory, Peoria, Ill. Mar 1955. 99p photos, diagrs, graphs, tables. Order from Agricultural Research Service, Dept. of Agriculture, Washington 25, D. C. PB 118104

1. Bagasse - Uses 2. Plants, Pith-bearing - Uses
3. Fibers - Uses 4. ARS-71-4.

Relationship between numbers of leaflets disseminated and communication achieved, by Otto N. Larsen, Stuart C. Dodd and Edith Dyer Rainboth. Washington University. Public Opinion Laboratory, St. Louis, Mo. Jan 1954. 12p drawings, graph, tables. Order from LC. Mi \$2, ph \$2.75. PB 117986

Contract AF 33(038)-27522. HRRI Project "Reverse".
1. Communications - Research 2. AAF HRRI RD vol. 1, no. 2.

Report on Contract no. NR 164-823 and no. N8onr-73,100, Sept. 1, 1948 - June 30, 1954, by Karl Sax. Harvard University. Arnold Arboretum. Jun 1954. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 118108

1. Chromosomes - Effects of radiation 2. Seeds - Effects of radiation 3. Contract N8onr 73-100, NR 164-823. To be continued under Contract no. AT (30-1)-1720.

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.

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Biology and Medicine

Studies in methods in instruments to improve the localization of radioactive materials in the body with special reference to the diagnosis of brain tumors, and the use of ultrasonic techniques.

Final progress report July 1, 1952 to June 30, 1953. Univ. of Minnesota, Minneapolis, Minn. Aug 1955. Contract AT(11-1)-41. 67p. Order from OTS. 40 cents. AECU-3012

Operation of the Fission Products Laboratory.

Quarterly progress report no. 1 for the period Jan 1, 1955, to Mar 30, 1955, by L. E. Brownell, J. V. Nehemias, and J. J. Bulmer. Univ. of Mich., Ann Arbor, Mich. May 1955. Contract No. AT(11-1)-162. 26p. Order from LC. Mi \$2.70, ph \$4.80. AECU-3028

Gastro-intestinal absorption of plutonium. III. Comparison between rat and pig, by M. H. Weeks, L. A. George, W. D. Oakley, L. K. Bustad, and R. C. Thompson. Hanford Atomic Products Operation, Richland, Wash. Nov 1954. Contract #W-31-109-Eng-52. 12p. Order from LC. Mi \$2.40, ph \$3.30. HW-33744

The uptake and translocation of cesium by plants, by J. H. Rediske and A. A. Seiders. Hanford Atomic Products Operation, Richland, Wash. Sep 1953. Contract #W-31-109-Eng-52. 18p. Order from LC. Mi \$2.40, ph \$3.30. HW-35174

Food irradiation and associated studies. Progress report no. 3. Columbia Univ., New York, N. Y. Dec 1952. Contract No. AT(30-1)-1186. 69p. Order from OTS. 40 cents. NYO-3319

Teletherapy design problems III, supplement: Proceedings, 3d Industrial Conference on Teletherapy, by Marshall Brucer, J. H. Harmon and Elizabeth B. Anderson. Medical Division, Oak Ridge Inst. of Nuclear Studies, Oak Ridge, Tenn. Jan 1954. 71p. Order from OTS. 35 cents. ORNL-127 (Suppl.)

Chemistry and Chemical Engineering

The distribution of uranyl nitrate from aqueous solutions to diethyl ether, by N. H. Furman, R. J.

Mundy, and G. H. Morrison. Princeton Univ., Princeton, N. J. May 1955. 69p. Order from OTS. 40 cents. AECD-2938

Decay scheme of Y^{92} , by Wayne A. Cassatt, Jr. and W. Wayne Meinke. Univ. of Michigan, Ann Arbor, Mich. Aug 1955. 21p. Order from LC. Mi \$2.70, ph \$4.80. AECU-3004

A continuous flow pilot plant for the separation of bromine-fluorine compounds and light end fission product fluorides from uranium hexafluoride, by W. R. Page, C. J. Raseman, E. I. Goodman, and C. H. Scarlett. Brookhaven National Lab., Upton, N. Y. Mar 1952. 38p. Order from LC. Mi \$3, ph \$6.30. BNL-174

Progress report on waste processing development project. Description of Calciner Pilot Plant, by F. Hittman and B. Manowitz. Brookhaven National Lab., Upton, N. Y. Dec 1954. 12p. Order from OTS. 15 cents. BNL-323

Occurrence of technetium-98 in nature, by Edward A. Alperovitch and J. Malcolm Miller. Columbia Univ., Dept. of Chemistry. Aug 1955. 8p. Order from LC. Mi \$1.80, ph \$1.80. BNL-2113

Manual of preparation of analytical reagents at the Chemical Processing Plant, by M. J. Shepherd, Jr. Gloria J. Harrison and J. E. Rein. Phillips Petroleum Co. Idaho Operations Office. Jul 1955. Contract No. AT(10-1)-205. 88p. Order from LC. Mi \$4.80, ph \$13.80. IDO-14329

Isotopic assay of lithium by means of hydride band emission spectra, by Velmer A. Fassel and Henry J. Hettel. Ames Lab. n.d. 9p. Order from LC. Mi \$1.80, ph \$1.80. ISC-554

The solubility of some metals in their molten halides, J. D. Corbett and S. von Winbush. Ames Lab. Iowa State College. Jan 1955. Contract W 7405-eng-82. 15p. Order from LC. Mi \$2.40, ph \$3.30. ISC-565

The lower oxidation states of gallium I. The Gal₃ - Gal₂ - Gal system, by J. D. Corbett and R. K. McMullan. Ames Lab. Iowa State College. Feb 1955. Contract W-7405-eng-82. 15p. Order from LC. Mi \$2.40, ph \$3.30. ISC-581

Batch countercurrent extraction of radioactive solutions, by Walter O. Haas and Edward L. Zebroski. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1950. Contract No. W-31-109-eng-52. 14p. Order from OTS. 10 cents. KAPL-P-243

The uranyl cupferrates, by W. S. Horton. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1955. Contract No. W-31-109-Eng-52. 13p. Order from LC. Mi \$2.40, ph \$3.30. KAPL-1350

The exchange reaction between substituted benzyl iodides and potassium iodide. III. p-Cyanobenzyl iodide, by Milton Kahn and J. L. Riebsomer. Univ. of New Mexico, Albuquerque, N. M. Aug 1955. 8p. Order from LC. Mi \$1.80, ph \$1.80. LA-1926UNM

Polarography in molten ammonium formate, by E. L. Colichman. Livermore Research Lab., Livermore, Calif. Apr 1954. Contract No. AT(11-1)-74. 19p. Order from OTS. 15 cents. LRL-117

New fluorimeters for the determination of uranium. MTF models I, II, III, and IV, by David Kaufman, Mario Castillo and Urpo Koskela. M.I.T. Mineral Engineering Lab., Watertown, Mass. Jul 1950. Contract No. W-7405-eng-85. 35p. Order from OTS. 25 cents. MITG-A70

Techniques and materials for use at liquid hydrogen temperatures. Information secured at Ohio State University, March 7-9, 1950, by M. Benedict and P. Graff. Hydrocarbon Research, Inc., New York, N. Y. Apr 1950. 50p. Order from LC. Mi \$3.30, ph \$7.80. N-2563d

Removal of deuterated boric acid from deuterium oxide solution by ion exchange resin, by L. Silverman and W. Bradshaw. Atomic Energy Research Dept., North American Aviation, Inc. Jun 1954. 52p. Order from LC. Mi \$3.60, ph \$9.30. NAA-SR-863

Sampling of metallic uranium by electrolytic dissolution, by James R. Foltz, Weldon J. Gardner and Fred D. Rosen. Nuclear Engineering and Manufacturing. North American Aviation, Inc. Apr 1954. Contract AT-11-1-GEN-8. 11p. Order from LC. Mi \$2.40, ph \$3.30. NAA-SR-1239

Termination report relating to the Sheer-Korman process, by Charles Sheer, Samuel Korman, Philip H. Sellev and Willis B. Rice. Burns and Roe, Inc., New York, N. Y. Jul 1950. Contract AT(30-1)-438. 127p. Order from LC. Mi \$6.30, ph \$19.80. NYO-1040

The ion exchange characteristics of phosphorylated fabrics. Progress report, by R. E. Kameros and W. A. Selke. Columbia Univ., New York, N. Y. Apr 1955. Contract AT(30-1)-1108. 41p. Order from LC. Mi \$3.30, ph \$7.80. NYO-8519

Sulfuric acid digestion of leached zone, by J. B. Adams, R. P. Nugent, Robert F. McCullough and Judson G. Brown. Research Division. International Minerals and Chemical Corp., Chicago, Ill. Mar 1952. Contract No. AT(49-1)-545. 39p. Order from LC. Mi \$3, ph \$6.30. RMO-2006

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Fundamental Chemistry for Nuclear Reactor Engineers, by Sigfred Peterson, R. W. Stoughton, William F. Kieffer and S. A. Reynolds. Oak Ridge National Lab. May 1955. 102p. Order from OTS. 50 cents. TID-5260

Comparison of tributyl phosphate and dibutoxytetraethyleneglycol as extractants of uranium, by W. B. Wright, Jr. Analytical Lab. Dept. Carbide and Carbon Chemicals Co., Y-12 Area, Oak Ridge, Tenn. May 1952. Contract No. W-7405-eng-26. 20p. Order from OTS. 15 cents. Y-884

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Summary of airborne radiometric surveying in the Circle Cliffs Upwarp, Garfield County, Utah, by G. E. Klosterman. Exploration Division. Grand Junction Operations Office, Grand Junction, Colo. May 1954. 13p. Order from OTS. 15 cents. RME-72

Examination of copper-uranium occurrences in the Willaha Area, Coconino County, Arizona, by Harry E. Puttuck. Salt Lake Exploration Branch. Division of Raw Materials, Salt Lake City, Utah. Sep 1954. 21p. Order from LC. Mi \$2.70, ph \$4.80. RME-2018

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Effects of X-radiation on influenza virus, by Anne Buzzell, Frank B. Brandon and Max A. Lauffer. Dept. of Biophysics. Univ. of Pittsburgh. Aug 1955. Contract No. AT(30-1)-913. 25p. Order from LC. Mi \$2.70, ph \$4.80. AECU-2985

Cytological analysis of ultraviolet irradiated escherichia coli. I. Cytology of E. coli K12 and a non-lysogenic derivative, by Philip E. Hartman, John I. Payne and Stuart Mudd. Dept. of Microbiology, School of Medicine, Univ. of Penn., Philadelphia 4, Pa. Aug 1955. 23p. Order from LC. Mi \$2.70, ph \$4.80. AECU-2986

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Decontamination of buildings by flame, by R. C. Heatherton. New York Operations Office. Health and Safety Division, New York, N. Y. May 1950. 5p. Order from OTS. 5 cents. NYO-1513

Semiannual report for period ending June 30, 1955, by Robert S. Stone and Gail D. Adams. Radiological Lab. Univ. of Calif. School of Medicine, San Francisco. Jul 1955. Contract No. AT-11-1-GEN-10. 47p. Order from LC. Mi \$3.30, ph \$7.80. UCSF-11

Outline for course in radiological physics, by J. N. Stannard. The Univ. of Rochester. Atomic Energy Project, Rochester, N. Y. Aug 1950. Contract W-7401-eng-49. 31p. Order from OTS. 20 cents.
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Grüneisen's constant for some metals, by J. J. Gilvarry. Univ. of Calif. Radiation Lab. The Rand Corp., Santa Monica, Calif. Jun 1954. 12p. Order from LC. Mi \$2.40, ph \$3.30. AECU-2996

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Pulse amplitude discriminators employed in nuclear research, by Herbert G. Weiss. Los Alamos Scientific Lab., Los Alamos, New Mexico. Sep 1948. 36p. Order from OTS. 25 cents. AECD-3314

Calculations on the lead glass plate spectroscopy, by R. Sternheimer. Brookhaven National Laboratory. Oct 1952. 6p. Order from LC. Mi \$1.80, ph \$1.80. AECU-2983

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Current integrator, by Kenneth D. Jenkins. Information Division. Radiation Lab. Univ. of Calif., Berkeley, Calif. Apr 1950. 9p. Order from LC. Mi \$1.80, ph \$1.80. AECU-3008

Magnet current regulator and metering circuit, by Kenneth D. Jenkins. Crocker Lab., Univ. of Calif., Berkeley, Calif. May 1952. 2p. Order from LC. Mi \$1.80, ph \$1.80. AECU-3009

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A high pressure proportional counter for fast neutron spectroscopy, by S. D. Bloom, E. Reilly and B. J. Toppel. Brookhaven National Lab. Jun 1955. 13p. Order from OTS. 20 cents. BNL-358 (T-66)

Spectrometry of fast neutrons, by C. D. Swartz. The Johns Hopkins Univ., Baltimore, Md. Sep 1954. AEC Contract Nos. AT(30-1)-1251 and AT(30-1)-1452. 57p. Order from LC. Mi \$3.60, ph \$9.30. NYO-3863

The use of a bismuth wire fluxmeter for metering the magnetic field of the consolidated mass spectrometer model 21-103, by Amos S. Newton and Herbert X. DiGrazia. Univ. of Calif. Radiation Lab., Berkeley, Calif. May 1955. Contract No. W-7405-eng-48. 19p. Order from LC. Mi \$2.40, ph \$3.30. UCRL-2994

A kinetic study of the oxidation of sphalerite part II, by John N. Ong, Jr., Milton E. Wadsworth, and W. Martin Fassell, Jr. Technical report no. XVIII. Institute for the Study of Rate Processes. Univ. of Utah, Salt Lake City, Utah. Feb 1955. Contract AT(11-1)-82. 20p. Order from LC. Mi \$2.40, ph \$3.30. AECU-3007

An investigation of scaling of zirconium at elevated temperatures. Quarterly status report no. 8, by W. M. Baldwin, Jr., H. M. Green and H. E. Tuchschnid. Dept. of Metallurgical Engineering. Case Inst. of Technology. Jun 1955. Contract No. AT(11-1)-258. 6p. Order from LC. Mi \$1.80, ph \$1.80. AECU-3032

Anodizing as a means of evaluating the corrosion resistance of zirconium and zirconium alloys, by R. D. Misch. Argonne National Laboratory. Dec 1953. Contract W-31-109-ENG-38. 88p. Order from LC. Mi \$4.80, ph \$13.80. ANL-5229

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Compilation of U. S. and U. K. uranium and thorium constitutional diagrams, by H. A. Saller and F. A. Rough. Battelle Memorial Institute. Jun 1955. Contract No. W-7405-eng-92. 141p. Order from OTS. 90 cents. BMI-1000

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