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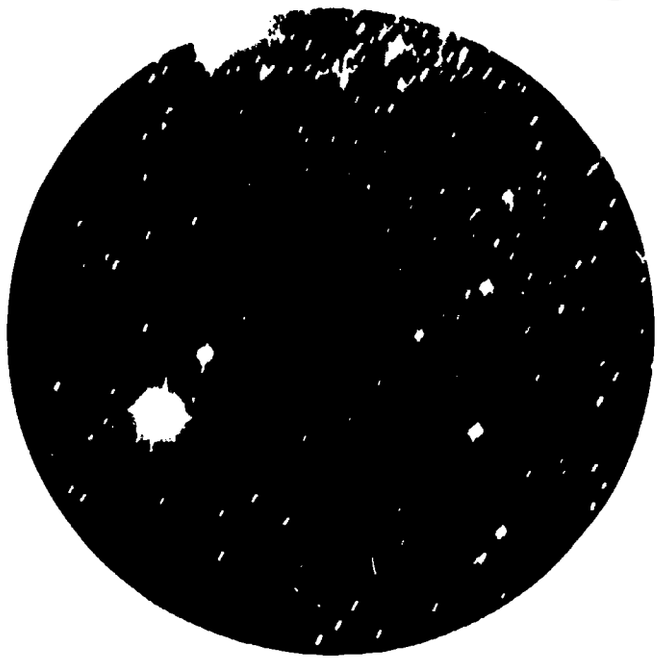
ABSTRACT

This sixth edition of the National Aeronautics and Space Administration's (NASA) bibliography presents an updated list of books, references, periodicals, and other educational materials related to space flight and space science. To find materials on a particular subject and for a specific reading level, users are advised to refer first to Part 1-Subject Index. Details are found in Part 2. Part 3 includes listings of reference materials related to space flight and space science, while Part 4 provides a list of related periodicals. Elementary and secondary teachers and adult readers will find this bibliography useful. There is an index to titles, a description of NASA services, and a list of addresses of sources of books and other materials. For the most part, books listed in this bibliography bear copyright dates beginning with 1969 through fall 1971. (EB)

sixth edition
aerospace bibliography



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Preface

With the publication of the Sixth Edition of the AEROSPACE BIBLIOGRAPHY, the National Aeronautics and Space Administration presents to elementary and secondary school teachers, and to general adult readers an updated list of books, references, periodicals, and other educational materials related to space flight and space science. To find books and other materials on a particular subject and for a specific reading level, users of the bibliography are advised to refer *first* to Part I—Subject Index. Details about each item listed in the Subject Index may then be found in Part II—Annotated Bibliography—where all items are listed alphabetically by author or source. Part III includes listings of reference materials related to space flight and space science, while Part IV provides a list of related periodicals.

The suggested reading or usage level of each item is designated by code letters as follows: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; and (A) adult or college level. Prices quoted are list prices at the time of publication of this bibliography.

For the most part, books listed in this bibliography bear copyright dates beginning with 1969 through fall 1971. A few semi-technical books have been included for those readers who wish to pursue a subject in depth. Also, a few out-of-print materials are listed, as they are considered still relevant and may be located in libraries. Aeronautical titles are limited to those dealing with aeronautical research subjects such as jet engine noise, V/STOL aircraft, the supersonic transport, sonic boom, etc. For a broader coverage of aeronautical titles and materials, the reader is referred to the *Aviation Education Bibliography* published by the National Aerospace Education Association (See page 60). Users of the *Aerospace Bibliography, Sixth Edition*, are urged to consult the *Readers' Guide to Periodical Literature* to locate additional sources of information on space subjects.

Orders for books and sale items, and requests for free materials should be sent to the appropriate publisher or supplier, whose addresses are listed beginning on page 111.

The books and teaching aids appearing in this bibliography comprise only a partial listing; therefore, this bibliography should not be considered as complete or exhaustive. The listing of any item should not be construed as an endorsement either by the National Aeronautics and Space Administration or by the National Aerospace Education Association, compiler.

Users of this bibliography are invited to send to NASA their suggestions for improvement in format, arrangement, or content for consideration in compiling future editions. Suggestions may be sent to the Director of Educational Programs, Office of Public Affairs, Code FE, NASA, Washington, D.C. 20546.

The National Aerospace Education Association acknowledges with thanks the assistance of representatives of the many publishers, organizations, government agencies, and private firms whose cooperation in compiling this bibliography was solicited and most courteously extended.

part i
subject index

part I - subject index

Items listed in Part I below are arranged according to subject matter. Annotations for these items appear in Part II—ANNOTATED BIBLIOGRAPHY, beginning on page 33, where they are listed alphabetically by author or source.

1. General Overview of Space Exploration

Books and materials in this section are introductory in nature and present a comprehensive survey of the environment of space, space technology, and accomplishments in the exploration of space. For items that provide more detailed and specific information on a particular space-related subject, consult Part I of the Table of Contents.

Aerospace Corporation. SPACE PRIMER. (U-S)

Anderson, Poul. THE INFINITE VOYAGE. 1969. (U-S-A)

Asimov, Isaac. THE ABC's OF SPACE. 1969. (P)

Barbour, John. FOOTPRINTS ON THE MOON. 1969. (U-S-A)

Bendick, Jeanne. SPACE TRAVEL. 1969. (I)

Bergaust, Erik. THE RUSSIANS IN SPACE. 1969. (U-S)

Bernardo, James V. AVIATION AND SPACE IN THE MODERN WORLD. 1968. (S-A)

Civil Air Patrol. THE DAWNING SPACE AGE. 1971. (S-A)

Clarke, Arthur C. and The Editors of Life. MAN AND SPACE. 1969. (U-S-A)

Clarke, Arthur C. and Robert Silverberg. INTO SPACE. 1971. (I-U-S)

Cortright, Edgar M. EXPLORING SPACE WITH A CAMERA. 1968. (U-S-A)

Dempsey, Michael W. and Angela Sheehan. INTO SPACE. 1970. (P)

Desoutter, Denis M. YOUR BOOK OF SPACE TRAVEL. 1970. (I-U)

Dolezal, Erich. CONQUEST OF SPACE. 1969. (U-S)

Editors of Hammond, Inc. EARTH AND SPACE. 1970. (I-U-S)

George, Frances. YOU AND SPACE. 1964. (P)

Hammond-Newsweek. CONQUEST OF SPACE. 1969. (U-S)

Highland, Harold. HOW AND WHY WONDER BOOK OF PLANETS AND INTERPLANETARY TRAVEL. 1970. (I-U)

Hyde, Margaret. EXPLORING EARTH AND SPACE. 1970. (I-U)

————OFF INTO SPACE! 1969. (I)

Kennan, Erlend A. and Edmond H. Harvey, Jr. MISSION TO THE MOON. 1969. (A)

Lewis, Richard S. APPOINTMENT ON THE MOON: The Inside Story of America's Space Program. 1969. (S-A)

Logsdon, Thomas S. THE RUSH TOWARD THE STARS. 1970. (S)

Mailer, Norman. OF A FIRE ON THE MOON. 1970. (S-A)

National Geographic Society. A LIST OF SPACE TRAVEL ARTICLES appearing in issues of the *National Geographic Magazine* from Dec. 1926 through August 1970. (U-S-A)

Newell, Homer E., Jr. SPACE BOOK FOR YOUNG PEOPLE. 1968. (I-U)

Newlon, Clarke. 1001 QUESTIONS ANSWERED ABOUT SPACE. 1971. (U-S-A)

RCA. MAN AND SPACE. (I-U-S-A)

Rosenfeld, Sam. ASK ME A QUESTION ABOUT ROCKETS, SATELLITES AND SPACE STATIONS. 1971. (I-U)

Shapp, Martha and Charles Shapp. LET'S FIND OUT ABOUT SPACE TRAVEL. 1971. (P)

Silverberg, Robert. THE WORLD OF SPACE. 1969. (S-A)

Smith, Kevin R. SPACE ADVENTURE. 1969. (U-S-A)

U. S. National Aeronautics and Space Administration. AMERICA IN SPACE: THE FIRST DECADE. 1969. (S-A)

————"IN THIS DECADE . . ." MISSION TO THE MOON. 1969. (S-A)

————PICTURE SET 3. "EYEWITNESS TO SPACE". (P-I-U-S-A)

von Braun, Wernher. SPACE FRONTIER. 1971. (S-A)

Young, Hugo, Bryan Silcock and Peter Dunn. JOURNEY TO TRANQUILITY. 1969. (S-A)

Zaffo, George J. THE GIANT BOOK OF THINGS IN SPACE. 1969. (P)

CODE: (P) primary—grades 1-3; (I) intermediate—grades 4-6; (U) upper elementary—grades 7-8; (S) secondary—grades 9-12; (A) college and adult.

2. Research, Development, and Manufacturing of Space Hardware

Books and materials under this heading are concerned with the research, development, and manufacturing of the unique and complex equipment and materials required by the demands of space flight. The roles of industry and NASA laboratories are discussed, and materials useful in college-level courses in space systems design are included.

Abraham, L. H. SPACE TECHNOLOGY. Volume I. Spacecraft Systems. 1965 (A)

Adams, James L. SPACE TECHNOLOGY. Volume II. Spacecraft Mechanical Engineering. 1965. (A)

Bell Aerospace Company.
APOLLO COMMAND & SERVICE MODULES—Reaction Control Tanks. (S-A)
APOLLO LUNAR MODULE PROPELLANT TANKS. (S-A)
APOLLO LUNAR MODULE WATER TANKS. (S-A)
POSITIVE EXPULSION BELLOWS. (S-A)
POSITIVE EXPULSION TANKS. (S-A)

Bell System. SIGNALS IN SPACE. (S-A)

Bergaust, Erik. THE RUSSIANS IN SPACE. 1969. (U-S)

Hartman, Edwin P. ADVENTURES IN RESEARCH. 1970. (S-A)

Holder, William G. SATURN V. THE MOON ROCKET. 1970. (U-S-A)

Hoyt, Edwin P. THE SPACE DEALERS: A Hard Look at the Role of American Business in Our Space Effort. 1970. (S-A)

International Business Machines. SUDDENLY, TOMORROW CAME. (S-A)

Jet Propulsion Laboratory. THE JET PROPULSION LABORATORY TODAY. 1970. (S-A)

Layton, J. Preston. PROCEEDINGS OF THE PRINCETON UNIVERSITY CONFERENCE ON AEROSPACE METHODS FOR REVEALING AND EVALUATING EARTH'S RESOURCES. 1970. (S-A)

Lieberman, Alvin and Peter Schipma. AIR-POLLUTION-MONITORING INSTRUMENTATION. 1969. (A)

Rittenhouse, John B. and John B. Singletary. SPACE MATERIALS HANDBOOK. 3rd ed. 1970. (A)

Scull, J. R. SPACE TECHNOLOGY. Volume IV. Spacecraft Guidance. 1967. (A)

Seamans, Robert C., Jr. ACTION AND REACTION. 1969. (A)

Seiden, Jacob. OAR 1968 PROGRESS. 1969. (A)

Society for Visual Education. BUILDING TOWARD THE MOON. (I-U-S)

Space Age Technology Series. Bobbs-Merrill. 5 volumes, 1969.
Hellman, Hal. CONTROLLED GUIDANCE SYSTEMS. (A)
Gates, Robt. INERTIAL GUIDANCE SYSTEMS. (A)
Pike, Chas. LASERS AND MASERS. (A)
Kalish, Israel. MICROMINIATURE ELECTRONICS. (A)
Brite, Robt. and C. H. Fiorenelli. SYNCHROS AND SERVOS. (A)

Space General Company. Illustrated booklets on the various sounding rockets produced. (S-A)

Steinhoff, Ernst A. AEROSPACE RESEARCH AND DEVELOPMENT. Volume 24. 1970. (A)

Stiffler, J. J. SPACE TECHNOLOGY. Volume V. Telecommunications. 1967. (A)

U. S. National Aeronautics and Space Administration. "IN THIS DECADE . . ." MISSION TO THE MOON. 1969. (S-A)

————NASA FACTS ORGANIZATION SERIES. (S-A)

————THIS IS NASA. 1971. (S-A)

Useller, James W. CLEAN ROOM TECHNOLOGY. 1969. (S-A)

von Braun, Wernher. SPACE FRONTIER 1971. (S-A)

Webb, James E. SPACE AGE MANAGEMENT. 1969. (A)

Weitman, Gershon and others. NASA CONTRIBUTIONS TO BIOINSTRUMENTATION SYSTEMS. 1969. (A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

3. Space Flight Facilities

The books and materials in this section describe the facilities which play major roles in all space missions—U.S. and Soviet launch sites, tracking networks, astronaut training simulators, NASA centers, and the relatively new Lunar Receiving Laboratory.

Bell Aerospace Company. LUNAR LANDING TRAINING VEHICLE. (S-A)

Bergaust, Erik. THE RUSSIANS IN SPACE. 1969. (U-S)

Colby, C. B. ASTRONAUTS IN TRAINING. 1969. (P-I)

Coombs, Charles. SPACETRACK. Watchdog of the Skies. 1969. (I-U-S)

Cooper, Henry S. F., Jr. MOON ROCKS. 1970. (S-A)

Dreyer-Geppert Co. ASTRONOMERS AT WORK. (U)

Hartman, Edwin P. ADVENTURES IN RESEARCH. A History of Ames Research Center, 1940–1965. 1970. (S-A)

Holder, William G. SATURN V. THE MOON ROCKET. 1970. (U-S-A)

Hyde, Margaret. EXPLORING EARTH AND SPACE. 1970. (I-U)

Hynek, Allen. EXPLORING THE UNIVERSE. 1970. (U-S)

National Geographic Society. RADIO TELESCOPES HELP BOY EAVESDROP ON THE STARS. *National Geographic School Bulletin,* Feb. 10, 1969. (I-U)

Parrish, Lex. SPACE FLIGHT SIMULATION TECHNOLOGY. 1969. (S-A)

Pope, Billy N. and Ramona W. Emmons. LET'S VISIT A SPACESHIP. 1971. (P)

Ronan, Colin. INVISIBLE ASTRONOMY. 1971. (S-A)

Sharpe, Mitchell R. SATELLITES AND PROBES. 1970. (U-S)

Smith, Kevin R. SPACE ADVENTURE. 1969. (U-S-A)

Smithsonian Astrophysical Observatory. SPACE SCIENCES AND SATELLITE TRACKING AT THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY. (S-A)

Smithsonian Institution. TRAINING BY SIMULATION. (S-A)

Society for Visual Education. ASTRONAUT—TRAINING AND EQUIPMENT. (I-U-S)

————BUILDING TOWARD THE MOON. (I-U-S)

Stoiko, Michael. SOVIET ROCKETRY: PAST, PRESENT AND FUTURE. 1970. (S-A)

U. S. National Aeronautics and Space Administration. APOLLO PROGRAM WALL POSTERS. (P-I-U-S-A)

————COUNTDOWN. NASA FACTS Science Series. 1967. (I-U)

————"IN THIS DECADE . . ." MISSION TO THE MOON. 1969. (S-A)

————NASA FACTS ORGANIZATION SERIES. (S-A)

————THIS IS NASA. 1971. (S-A)

von Braun, Wernher. SPACE FRONTIER. 1971. (S-A)

4. Propulsion and Power Systems for Spacecraft

Books and materials listed in this section furnish information about the principles of rocketry, types of rockets and launch vehicles, rocket fuels, thrust, and the history of rocketry. They also give information about power systems aboard spacecraft such as solar cells and fuel cells. Materials on model rocketry may be found in Section 15—Curriculum Resource Materials and Aids to Teachers. *See page 27.*

Aerospace Corporation. SPACE PRIMER. (U-S)

Ahnstrom, D. N. THE COMPLETE BOOK OF JETS AND ROCKETS. 1970. (U-S)

Anderson, Poul. THE INFINITE VOYAGE. 1969. (U-S-A)

Bergaust, Erik. THE RUSSIANS IN SPACE. 1969. (U-S)

Branley, Franklyn M. A BOOK OF OUTER SPACE FOR YOU. 1970. (P-I)

————ROCKETS AND SATELLITES. 1970. (P)

Civil Air Patrol. THE DAWNING SPACE AGE. 1971. (S-A)

Clarke, Arthur C. and Robert Silverberg. INTO SPACE. A Young Person's Guide to Space. 1971. (I-U-S)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

Denoyer-Geppert Co. ROCKET chart. (U)

————ROCKETS AND SATELLITES. (U)

Edmund Scientific Company. SOLAR CELL EXPERIMENT SET. (S)

Ehricke, Krafft and Betty A. Miller. EXPLORING THE PLANETS. 1969. (I-U-S)

Goodrum, John. WERNHER VON BRAUN. Space Pioneer. 1969. (U-S)

Highland, Harold. HOW AND WHY WONDER BOOK OF PLANETS AND INTERPLANETARY TRAVEL. 1970. (I-U)

Holder, William G. SATURN V. THE MOON ROCKET. 1970. (U-S-A)

Hunter, Maxwell, W., II. THRUST INTO SPACE. 1966. (S)

Larmore, Lewis and Robert L. Gervais. SPACE SHUTTLES AND INTERPLANETARY MISSIONS. Volume 28 of the Advances in the Astronautical Sciences series. 1970. (A)

Lewis, Richard S. APPOINTMENT ON THE MOON: The Inside Story of America's Space Program. 1969. (S-A)

Malina, Frank J. THE ROCKET PIONEERS. Memoirs of the infant days of rocketry at Caltech. 1968. (S-A)

Model rocketry. See Section 15—Curriculum Resource Materials and Aids to Teachers, p. 27 (U-S-A)

National Aerospace Education Association. ROBERT GODDARD: "FATHER" OF MODERN ROCKETRY. (U-S-A)

National Research Council. Space Committee on Rocket Research. SOUNDING ROCKETS: THEIR ROLE IN SPACE RESEARCH. 1969. (A)

Rosenfeld, Sam. ASK ME A QUESTION ABOUT ROCKETS, SATELLITES AND SPACE STATIONS. 1971. (I-U)

Sandford, J. W. and J. E. Martin, Jr. THE SATURN V FOR THE '70'S. 1969. (A)

Smithsonian Institution. MASTERS OF SPACE. (I-U-S)

Space General Company. Illustrated booklets on the various sounding rockets produced. (S-A)

————PERFORMANCE CAPABILITIES OF SPACE GENERAL COMPANY SOUNDING ROCKETS. (S-A)

Stoiko, Michael. SOVIET ROCKETRY: PAST, PRESENT AND FUTURE. 1970. (S-A)

U. S. National Aeronautics and Space Administration. ELECTRIC POWER GENERATION IN SPACE. NASA FACTS. 1968. (S-A)

————EXPLORING IN AEROSPACE ROCKETRY. 1971. (S-A)

————SATURN V. NASA FACTS. 1967. (P-I-U-S-A)

————SOLAR CELLS. NASA FACTS Science Series. 1968. (S)

————SPACECRAFT POWER. 1970. (S-A)

————U.S. LAUNCH VEHICLES FOR PEACEFUL EXPLORATION OF SPACE. NASA FACTS. 1969. (P-I-U-S-A)

————VANGUARD—A HISTORY. 1970. (S-A)

von Braun, Wernher. SPACE FRONTIER. 1971 (S-A)

————*and Frederick Ordway.* HISTORY OF ROCKETRY AND SPACE TRAVEL. 1969. (S-A)

Warshofsky, Fred. THE 21st CENTURY: The New Age of Exploration. 1969. (S-A)

5. Spacecraft Communications, Guidance and Control

Books and materials listed in this section explain the various ground-based and spaceborne systems that provide communications and transmission of data, guidance, and control for spacecraft. Topics include inertial guidance systems, radar, communications and navigation equipment, telemetry, tracking, and the use of lasers and computers.

Abraham, L. H. SPACE TECHNOLOGY. Volume I. Spacecraft Systems. 1965. (A)

Adams, James L. SPACE TECHNOLOGY. Volume II. Spacecraft Mechanical Engineering. 1965. (A)

Bell System. SIGNALS IN SPACE. (S-A)

Brown, Robert G. INERTIAL GUIDANCE IN THE SPACE AGE. (S-A)

Dunlap, Orrin E., Jr. COMMUNICATIONS IN SPACE. 1970. (S-A)

Gates, Robert L. INERTIAL GUIDANCE SYSTEMS. 1968. (S-A)

Hellman, Hal. CONTROLLED GUIDANCE SYSTEMS. 1967. (S-A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

Hymoff, Edward. GUIDANCE AND CONTROL OF SPACECRAFT. 1966. (S)

Independent Tracking Coordination Program. Society of Photographic Scientists and Engineers.
SATELLITE PREDICTION SERVICES. (S-A)
PATHFINDER STAR ATLAS. (S-A)
RATIONALIZED GENERAL CATALOG OF 33,342 STARS. (S-A)
ORBITAL ELEMENT ANNOUNCEMENT SERVICE. (A)

International Business Machines. SUDDENLY, TOMORROW CAME. (S-A)

Rittenhouse, John B and John B. Singletary. SPACE MATERIALS HANDBOOK, 3rd ed. 1970. (A)

Scull, J. R. SPACE TECHNOLOGY. Volume IV. Spacecraft Guidance. 1967. (A)

Smithsonian Astrophysical Observatory. SPACE TRACKING WITH LASERS. (S-A)

Space Age Technology Series. Bobbs-Merrill. 5 volumes. 1969.
Hellman, Hal. CONTROLLED GUIDANCE SYSTEMS. (A)
Gates, Robt. INERTIAL GUIDANCE SYSTEMS. (A)
Pike, Chas. LASERS AND MASERS. (A)
Kalish, Israel. MICROMINIATURE ELECTRONICS. (A)
Brite, Robt. and C. H. Fiorenelli. SYNCHROS AND SERVOS. (A)

Stiffler, J. J. SPACE TECHNOLOGY. Volume V. Telecommunications. 1967. (A)

U. S. National Aeronautics and Space Administration. "IN THIS DECADE . . ." MISSION TO THE MOON. 1969. (S-A)

————ITOS, NIGHT-DAY METEOROLOGICAL SATELLITE. 1970. (A)

————LINKING MAN AND SPACECRAFT. 1969. (S-A)

————SPACECRAFT TRACKING. 1969. (S-A)

————SPACECRAFT TRACKING AND COMMUNICATION. 1967. (U-S)

————SPACE NAVIGATION. 1968. (U-S-A)

Vermillion, Charles H. WEATHER SATELLITE PICTURE RECEIVING STATIONS. 1969. (S-A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

6. Unmanned Exploration of Space by Satellites and Space Probes

Books and materials in this section provide, first, general information about unmanned spacecraft—their purposes, operation, and accomplishments. Subsections list items that give details about communications satellites, meteorological satellites, lunar and planetary probes, spacecraft for investigating scientific phenomena in space, and future Earth-oriented satellites designed to monitor Earth resources from space.

A. General Information

Branley, Franklyn M. A BOOK OF SATELLITES FOR YOU. 1971. (I)

————ROCKETS AND SATELLITES. 1970. (P)

Cortright, Edgar M. EXPLORING SPACE WITH A CAMERA, 1968. (U-S-A)

Denoyer-Geppert Co. ROCKETS AND SATELLITES. (U)

Green, Jack. GEOLOGICAL PROBLEMS IN LUNAR AND PLANETARY RESEARCH. Volume 25, Science and Technology Series. 1971. (A)

Hynek, Allen. EXPLORING THE UNIVERSE. 1970. (U-S)

Naugle, John E. UNMANNED SPACE FLIGHT. 1965. (S)

Ronan, Colin A. DISCOVERING THE UNIVERSE. 1971. (S-A)

Ross, Frank, Jr. MODEL SATELLITES AND SPACECRAFT. 1969. (U-S)

Sharpe, Mitchell R. SATELLITES AND PROBES. 1970. (U-S)

U. S. National Aeronautics and Space Administration. Office of International Affairs. INTERNATIONAL PROGRAMS. (S-A)

————"IN THIS DECADE . . ." MISSION TO THE MOON. 1969. (S-A)

————NASA FACTS ORGANIZATION SERIES. (S-A)

————NASA SPACECRAFT. 1969. (S-A)

————PUTTING SATELLITES TO WORK. 1969. (S-A)

————SATELLITES AT WORK. 1971. (S-A)

B. Communications Satellites

Bell System. SIGNALS IN SPACE. (S-A)

Dunlap, Orrin E., Jr. COMMUNICATIONS IN SPACE. 1970. (S-A)

Dwiggins, Don. VOICES IN THE SKY. The Story of Communications Satellites. 1960. (U-S)

Hickman, William D. TALKING MOONS: THE STORY OF COMMUNICATIONS SATELLITES. 1970. S-A)

Jaffe, Leonard. COMMUNICATIONS IN SPACE. 1966. (S)

McWinney, Edward. THE INTERNATIONAL LAW OF COMMUNICATIONS. 1971 (A)

Smithsonian Institution. COMMUNICATIONS IN SPACE. (U-S-A)

Twentieth Century Fund Task Force on International Satellite Communications. THE FUTURE OF SATELLITE COMMUNICATIONS: RESOURCE MANAGEMENT AND THE NEEDS OF NATIONS. 1970. (S-A)

————PLANNING FOR A PLANET: AN INTERNATIONAL DISCUSSION ON THE STRUCTURE OF SATELLITE COMMUNICATIONS. 1971. (A)

C. Meteorological Satellites

U. S. National Aeronautics and Space Administration. ITOS, NIGHT-DAY METEOROLOGICAL SATELLITE. 1970. (A)

————WEATHER IN MOTION. 1970. (S-A)

Widger, William K., Jr. METEOROLOGICAL SATELLITES. 1966. (S)

World Meteorological Organization. AN INTRODUCTION TO GARP. 1970. (S-A)

————SCOPE OF THE 1972–1975 PLAN WITH PARTICULAR REFERENCE TO THE METEOROLOGICAL SATELLITE SUBSYSTEM. 1970. (A)

D. Lunar Probes

Branley, Franklyn M. A BOOK OF MOON ROCKETS FOR YOU. 1970. (P)

Firsoff, V. A. THE OLD MOON AND THE NEW. 1970. (S-A)

Jet Propulsion Laboratory. SURVEYOR. Soft-Landing Lunar Spacecraft. (S-A)

Kosofsky, L. J. and Farouk El-Baz. THE MOON AS VIEWED BY LUNAR ORBITER. 1970. (S-A)

Mathews, William, III. SCIENCE PROBES THE EARTH. New Frontiers of Geology. 1969. (S-A)

Nourse, Alan E. NINE PLANETS. Astronomy for the Space Age. 1970. (S-A)

Scott, Ronald F. ON MEETING AN OLD FRIEND, SLIGHTLY THE WORSE FOR WEAR, AFTER A LAPSE OF TWO AND A HALF YEARS. 1970. (S-A)

U.S. National Aeronautics and Space Administration. EXPLORING THE MOON AND PLANETS. 1969. (S-A)

————LUNAR ORBITER. NASA FACTS. 1967. (I-U-S-A)

E. Planetary Probes

American Philosophical Society. PLANET VENUS: PAST, PRESENT & FUTURE. 1969. (A)

Becker, Bill. MARS—A NEW MYSTERY. (S-A)

Branley, Franklyn M. A BOOK OF VENUS FOR YOU. 1969. (I)

Glasstone, Samuel. THE BOOK OF MARS. 1968. (S-A)

Jet Propulsion Laboratory. THE JET PROPULSION LABORATORY TODAY. 1970. (S-A)

————MARINER MARS 1969. PICTURES AND RESULTS FROM MARINER VI AND VII. (S-A)

————MARINER MARS 1971 MISSIONS. (S-A)

Moore, Patrick. MOON FLIGHT ATLAS. 1970. (I-U-S-A)

Space Science Board, National Academy of Sciences. VENUS. STRATEGY FOR EXPLORATION. 1970. (S-A)

Stambler, Irwin. PROJECT VIKING: Space Conquest Beyond the Moon. 1970. (U-S)

U.S. National Aeronautics and Space Administration. PLANETARY EXPLORATION. A booklet in the "Space in the Seventies" series. 1971. (S-A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

———REPORT FROM MARS. 1966. (U-S-A)

———TWO OVER MARS. Mariner VI and Mariner VII. 1971. (S-A)

Worsnop, Richard L. MISSION TO MARS: BENEFITS VS. COSTS. 1969. (S-A)

F. Scientific Satellites

Kopal, Zdenek. TELESCOPES IN SPACE. 1970. (S-A)

Society for Visual Education. GEOGRAPHY FROM SPACE. (I-U-S)

Space Science Board, National Academy of Sciences. PRIORITIES FOR SPACE RESEARCH 1971–1980. 1971. (S-A)

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G. Earth Resources Monitoring Satellites

(See also Section 10—Space Exploration in the Future, p. 22)

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Report of the Central Review Committee (A)
Summaries of Panel Reports (A)
Panel #1-Forestry, Agriculture and Geography (A)
Panel # 2-Geology (A)
Pane # 3-Hydrology (A)
Panel # 4-Meteorology (A)
Panel # 5-Oceanography (A)
Panel # 6-Sensors and Data Systems (A)
Panel # 7-Point-to-Point Communication (A)
Panel # 8-Systems for Remote Sensing (A) *Out of print.*
Panel # 9-Point-to-Point Communication (A)
Panel #10-Broadcasting (A)
Panel #11-Navigation and Traffic Control (A)
Panel #13-Geodesy-Cartography *Out of print. print.*

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———EARTH PHOTOGRAPHS FROM GEMINI III, IV, AND V. (I-U-S-A)

———EARTH PHOTOGRAPHS FROM GEMINI VI THROUGH XII. 1968. (I-U-S-A)

CODE: (P) primary—grades 1-3; (I) intermediate—grades 4-6; (U) upper elementary—grades 7-8; (S) secondary—grades 9-12; (A) college and adult.

7. Manned Exploration of Space

Books and materials in this section deal with man in space. They provide, first, general information about manned space flight. Other subsections give more specific information about Project Apollo, the physical and psychological hazards of space travel and how they are being overcome, and future directions of manned spaceflight such as manned orbiting space stations, the use of space shuttles, and possibilities for manned missions to the planets.

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Sharpe, Mitchell R. YURI GAGARIN. First Man In Space. 1969. (U-S)

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————MAN IN SPACE. 1969. (U-S-A)

———— NASA FACTS ORGANIZATION SERIES. #0-9. NASA Manned Spacecraft Center. (S-A)

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Booker, Peter, Gerald Frewer and Geoffrey Pardoe. PROJECT APOLLO: THE WAY TO THE MOON. 1970. (S-A)

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CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

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————WEIGHTLESSNESS. 1967. (U-S)

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8. Space Science

Books and materials in this section deal with those scientific disciplines that are most closely related to space flight such as astronomy, biology, chemistry, and physics. They provide surveys of the planets, Moon, and Sun and astronomical tools such as radioastronomy and optical telescopes. They discuss the effects of the space environment on man's body and mind; provisions for sustaining man in space, and weightlessness. The possibility of life beyond Earth, and the physical properties of the space environment are examined.

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CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

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Smith, S. W., editor. HANDBOOK OF ASTRONAUTICS. 1969. (S)

U.S. Department of Commerce. MODERNIZED METRIC SYSTEM. (S-A)

U.S. National Aeronautics and Space Administration. ORBITS AND REVOLUTIONS. 1968. (S)

————SHAPES OF TOMORROW. 1967. (S-A)

————SPACE MATHEMATICS: A RESOURCE FOR TEACHERS. 1972. (S-A)

E. Physical Science

Clotfelter, Beryl E. REFERENCE SYSTEMS AND INERTIA (THE NATURE OF SPACE). 1970. (A)

Denoyer-Geppert Co. LAWS OF MOTION OF PLANETS AND SATELLITES. (U)

Editors of Science Experimenter. JUNIOR SCIENCE PROJECTS. 1967. (U-S)

Farley, T. A. SPACE TECHNOLOGY. 1967. (A)

Green, Jack, editor. GEOLOGICAL PROBLEMS IN LUNAR AND PLANETARY RESEARCH. 1971. (A)

Institute of Electrical and Electronic Engineers. FREQUENCY SPECTRUM CHART. (S-A)

Jammer, Max. CONCEPTS OF SPACE: The History of Theories of Space in Physics. 1969. (A)

Moulton, Forest R. INTRODUCTION TO CELESTIAL MECHANICS. 1970. (A)

National Research Council. Space Committee on Rocket Research. SOUNDING ROCKETS: THEIR ROLE IN SPACE RESEARCH. 1969. (A)

Rittenhouse, John B. and John B. Singletary. SPACE MATERIALS HANDBOOK. 1970. (A)

Sutton, Richard M. THE PHYSICS OF SPACE. 1965. (S)

U.S. National Aeronautics and Space Administration. EARTH ORBITAL SCIENCE. 1971. (S-A)

————EXPLORER XXIX (THE GEODETIC EXPLORER). 1968. (S-A)

————SPACE PHYSICS AND ASTRONOMY. 1969. (S-A)

————SPACE RESOURCES FOR TEACHERS: CHEMISTRY. 1971. (S-A)

————SPACE RESOURCES FOR TEACHERS: SPACE SCIENCE, 1969. (U-S-A)

Valens, E. G. THE ATTRACTIVE UNIVERSE. 1970. (S-A)

9. Benefits and Impacts Resulting from the Space Program

The books and materials in this section survey the many benefits already derived and also expected from the nation's space program. They also discuss the impacts, both current and future, resulting from space exploration. The final subsection lists books dealing with the relatively new subject of space law.

A. Benefits

Black, R. P. and C. W. Foreman. CIVILIAN PUBLIC PROBLEMS AND THE AEROSPACE INDUSTRY. 1967. (A)

Burnsall, William and others, editors. PLANNING CHALLENGES OF THE 70'S IN THE PUBLIC DOMAIN. 1970. (A)

Forbes, Fred W. and Paul Dergarabedian, editors. TECHNOLOGY UTILIZATION IDEAS FOR THE 70'S AND BEYOND. 1971. (S-A)

Lieberman, Alvin and Peter Schipma. AIR-POLLUTION-MONITORING INSTRUMENTATION. 1969. (A)

Nicks, Oran W., editor. THIS ISLAND EARTH. 1970. (U-S-A)

Ross, Frank, Jr. SPACE SCIENCE AND YOU. 1970. (U-S)

Space Science Board, National Academy of Sciences. USEFUL APPLICATIONS OF EARTH-ORIENTED SATELLITES. 1969. (A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

United Nations Educational, Scientific, and Cultural Organization. BROADCASTING FROM SPACE. (A)

————COMMUNICATION SATELLITES FOR EDUCATION, SCIENCE, AND CULTURE. (A)

U.S. House of Representatives. Committee on Science and Astronautics. FOR THE BENEFIT OF ALL MANKIND. 1970. (S-A)

U.S. National Aeronautics and Space Administration. MEDICAL BENEFITS FROM SPACE RESEARCH. 1968. (U-S-A)

————SPACE PROGRAM BENEFITS. 1971. (S-A)

Useller, James W. CLEAN ROOM TECHNOLOGY. 1969. (S-A)

Weltman, Gershon and others. NASA CONTRIBUTIONS TO BIOINSTRUMENTATION SYSTEMS. 1969. (A)

Worsnop, Richard L. MISSION TO MARS: BENEFITS VS. COSTS. 1969. (S-A)

B. Impacts

Bauer, Raymond A., Richard S. Rosenbloom and Laure Sharpe. SECOND ORDER CONSEQUENCES. 1969. (S-A)

Bernardo, James V. AVIATION AND SPACE IN THE MODERN WORLD. 1968. (S-A)

Clarke, Arthur C. Reprint from *Engineering and Science.* Jet Propulsion Laboratory. (S-A)

Eckman, Philip K., editor. TECHNOLOGY AND SOCIAL PROGRESS—SYNERGISM OR CONFLICT? 1969. (S-A)

Goodwin, Harold L. THE IMAGES OF SPACE. 1965. (S)

Hough, Roger W. and others. SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #1: Occupations. 1968. (A)

————SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #4: Economic Impacts. 1968. (A)

Hoyt, Edwin P. THE SPACE DEALERS: A Hard Look at the Role of American Business in Our Space Effort. 1970. (S-A)

Hubbard, Earl. THE SEARCH IS ON. 1969. (U-S)

Kash, Don E. THE POLITICS OF SPACE COOPERATION. 1967. (S-A)

Kennan, Erlend A. and Edmund H. Harvey, Jr. MISSION TO THE MOON. 1969. (A)

Levitt, I. M. and others. SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #7: Final Pilot Study Report. 1968. (A)

Mailer, Norman. OF A FIRE ON THE MOON. 1970. (S-A)

Parrott, Bob. EARTH, MOON & BEYOND. 1969. (A)

Rabinowitch, Eugene and Richard S. Lewis, editors. MAN ON THE MOON. 1969. (A)

Seamans, Robert C., Jr. ACTION AND REACTION. 1969. (A)

C. Space Law

Fawcett, J. E. S. INTERNATIONAL LAW AND THE USES OF OUTER SPACE. 1968. (A)

Gal, Guyala. SPACE LAW. 1969. (A)

Lay, S. Houston and Howard J. Taubenfeld. THE LAW RELATING TO ACTIVITIES OF MAN IN SPACE. 1970. (A)

McWinney, Edward, editor. THE INTERNATIONAL LAW OF COMMUNICATIONS. 1971. (A)

————*and Martin A. Bradley, editors.* NEW FRONTIERS IN SPACE LAW. 1969. (S-A)

United Nations. AGREEMENT ON THE RESCUE AND RETURN OF ASTRONAUTS. 1968. (S-A)

————TREATY ON PRINCIPLES GOVERNING THE ACTIVITIES OF STATES IN THE EXPLORATION AND USE OF OUTER SPACE. 1967. (S-A)

White, Irvin L. DECISION-MAKING FOR SPACE. 1970. (A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

10. Space Exploration in the Future

(See also Section 6G—Earth Resources Monitoring Satellites, p. 13.)

Books and materials in this section deal with the direction space exploration might take in the years ahead and what such exploration might accomplish. They discuss space shuttles, reusable launch vehicles, and space stations; possible findings concerning the history and composition of the universe; lunar exploitation for scientific purposes; Earth-oriented satellites for man's benefit; and the setting of priorities for future space missions.

Chacko, George K., editor. REDUCING THE COST OF SPACE TRANSPORTATION. 1969. (A)

Dole, Stephen H. HABITABLE PLANETS FOR MAN. 1970. (S-A)

Dwiggins, Don. EAGLE HAS LANDED: The Story of Lunar Exploration. 1970. (I-U)

Ehricke, Krafft and Betty A. Miller. EXPLORING THE PLANETS. 1969. (I-U-S)

Executive Office of the President. THE NEXT DECADE IN SPACE. 1970. (S-A)

Halacy, D. S. COLONIZATION OF THE MOON. 1969. (I-U)

Henry, George E. TOMORROW'S MOON. 1969. (I-U-S)

Holmen, R. E. and others. SPACE STATION OPERATIONS AND LOGISTICS. 1970. (S-A)

Huber, W. G. and D. C. Cramblit. THE SPACE STATION: A FUNDAMENTAL ELEMENT OF THE INTEGRATED SPACE PROGRAM. 1970. (S-A)

Larmore, Lewis and R. L. Gervais, editors. SPACE STATIONS. 1970. (S-A)

Morgenthaler, George W. and Robert Morra, editors. PLANNING CHALLENGES OF THE 70'S IN SPACE. 1970. (S-A)

Northrop Corporation. LIFTING BODIES. (S-A)

Rabinowitch, Eugene and Richard S. Lewis, editors. MAN ON THE MOON. 1969. (A)

Ruzic, Neil P. WHERE THE WINDS SLEEP. 1970. (S-A)

Space Science Board. Ad Hoc Committee on the Large Space Telescope. SCIENTIFIC USES OF THE LARGE SPACE TELESCOPE. 1969. (A)

Space Science Board, National Academy of Sciences. LUNAR EXPLORATION. 1969. (S-A)

————PRIORITIES FOR SPACE RESEARCH 1971–1980. 1971. (S-A)

————VENUS. STRATEGY FOR EXPLORATION. 1970. (S-A)

Stambler, Irwin. PROJECT VIKING: Space Conquest Beyond the Moon. 1970. (U-S)

Twentieth Century Fund Task Force on International Satellite Communications. THE FUTURE OF SATELLITE COMMUNICATIONS: RESOURCE MANAGEMENT AND THE NEEDS OF NATIONS. 1970. (S-A)

————PLANNING FOR A PLANET: AN INTERNATIONAL DISCUSSION ON THE STRUCTURE OF SATELLITE COMMUNICATIONS. 1971. (A)

U.S. House of Representatives. Committee on Science and Astronautics. THE NATIONAL SPACE PROGRAM: PRESENT AND FUTURE. 1970. (S-A)

U.S. National Aeronautics and Space Administration. MAN IN SPACE. 1971 (S-A)

————NASA SCIENCE AND TECHNOLOGY ADVISORY COMMITTEE FOR MANNED SPACE FLIGHT. 1968. (A)

————PLANETARY EXPLORATION. 1971. (S-A)

————SPACE IN THE SEVENTIES series. 1971. (S-A)

————SPACE SHUTTLE. 1971. (U-S-A). *Out of print.*

————SPACE STATION: KEY TO THE FUTURE. 1970. (S-A)

U.S. Senate. Committee on Aeronautical and Space Sciences. NASA AUTHORIZATION FOR FISCAL YEAR 1972. Part 1, March 30 and April 1, 1971. 1971. (S-A)

————NASA AUTHORIZATION FOR FISCAL YEAR 1972. Part 2, April 2 and 5, 1971. 1971. (S-A)

World Meteorological Organization. AN INTRODUCTION TO GARP. 1970. (S-A)

————SCOPE OF THE 1972–1975 PLAN WITH PARTICULAR REFERENCE TO THE METEOROLOGICAL SATELLITE SUB-SYSTEM. 1970. (A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

11. History and Biography

(For accounts of the first manned Moon landing—Apollo 11—see also Section 7B, Project Apollo, p. 14.) The books and materials in this section present the history of space exploration and rocketry, and also profiles and biographies of astronauts and the scientists and engineers who have made significant contributions to the development of space travel, both in past centuries and today.

A. History

Barbour, John. FOOTPRINTS ON THE MOON. 1969. (U-S-A)

Bergaust, Erik. THE RUSSIANS IN SPACE. 1969. (U-S)

Dolezal, Erich. CONQUEST OF SPACE. 1969. (U-S)

Emme, Eugene M. A HISTORY OF SPACE FLIGHT. 1965. (S)

Executive Office of the President. AERONAUTICS AND SPACE REPORT OF THE PRESIDENT. 1970. 1971. (S-A)

Farmer, Gene and Dora Jane Hamblin. FIRST ON THE MOON. 1970. (U-S-A)

International Business Machines. SUDDENLY, TOMORROW CAME. (S-A)

Ley, Willy. EVENTS IN SPACE. 1969. (S)

Malina, Frank J. THE ROCKET PIONEERS. 1968. (S-A)

Smithsonian Institution. MASTERS OF SPACE. (I-U-S)

U.S. National Aeronautics and Space Administration. "IN THIS DECADE . . ." Mission to the Moon. 1969. (S-A)

————SEMIANNUAL REPORTS TO CONGRESS. (S-A)

von Braun, Wernher and Frederick Ordway. HISTORY OF ROCKETRY AND SPACE TRAVEL. 1969. (S-A)

B. Biography

Akens, David S. JOHN GLENN. 1969. (U-S)

Chappell, Carl L. VIRGIL I. GRISSOM. 1971. (I-U)

Cox, Donald. AMERICA'S EXPLORERS OF SPACE. 1969. (S-A)

Goodrum, John. WERNHER VON BRAUN. 1969. (U-S)

Lessing, Erich. DISCOVERIES OF SPACE: A PICTORIAL NARRATION. 1969. (S-A)

National Aerospace Education Association. ROBERT GODDARD: "FATHER" OF MODERN ROCKETRY. 1967. (U-S-A)

————ROBERT H. GODDARD PORTFOLIO NO. 1. (I-U-S-A)

Richey, B. J. APOLLO ASTRONAUTS. 1969. (U-S)

Ronan, Colin A. EDMUND HALLEY. 1969. (S-A)

Sharpe, Mitchell R. YURI GAGARIN. 1969. (U-S)

12. Career Opportunities in the Space Program

Books and materials in this section provide information about the many careers that are involved in the nation's space program. They range from books giving general information about career fields, to leaflets offering details about specific jobs in the crafts, and in engineering, scientific, and technical occupations.

A. General Information About Career Fields

Chronicle Guidance. ATOMIC ENERGY, CAREERS IN. (S)

————CAREER GUIDANCE AND PLANNING HELP A PERSON ACHIEVE A SUCCESSFUL CAREER. 1966. (S)

————THE MEN BEHIND THE MAN IN THE MOON. (S)

Levine, Sol. YOUR FUTURE IN NASA. 1971. (U-S)

National Geographic Society. A GIANT LEAP FOR WOMANKIND, TOO. 1971. (I-U)

Science Research Associates. AEROSPACE INDUSTRIES MANUFACTURING WORKERS. (S)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

U.S. Department of Labor. EMPLOYMENT OUTLOOK: ELECTRONICS MANUFACTURING. (S)

————OCCUPATIONS IN ELECTRONIC COMPUTING SYSTEMS. (S)

————EMPLOYMENT OUTLOOK: AIRCRAFT, MISSILE AND SPACECRAFT MANUFACTURING. (S)

U.S. National Aeronautics and Space Administration. SEVEN STEPS TO A CAREER IN SPACE SCIENCE AND TECHNOLOGY. 1966. (S)

————LEARNING ABOUT SPACE CAREERS. 1966. (I-U)

————SPACE JOBS. 1966. (P)

Wilkinson, Jean and Ned Wilkinson. COME TO WORK WITH US IN AEROSPACE, 1970. (P)

Zarem, Lewis. CAREERS AND OPPORTUNITIES IN ASTRONAUTICS. 1969. (S-A)

B. Craftsmen

Careers, Inc. ASSEMBLERS, ELECTRONICS MANUFACTURING. 1966. (S)

————DIE MAKER. 1969. (S)

————INSTRUMENT MAKER. 1968. (S)

————INSTRUMENT REPAIRMAN. 1970. (S)

————METALCASTING OCCUPATIONS. 1970. (A)

————SHEET METAL WORKER. 1969. (S)

————TOOL DESIGNER. 1970. (S)

Chronicle Guidance. ELECTRONICS MANUFACTURING INDUSTRY WORKERS. (S)

————INSTRUMENT MAKER. (S)

Science Research Associates. JOBS IN MECHANICAL WORK. (S)

U.S. Department of Labor. EMPLOYMENT OUTLOOK: INSTRUMENT REPAIRMEN. (S)

————EMPLOYMENT OUTLOOK: MACHINING OCCUPATIONS. (S)

U.S. Office of Education and the National Industrial Conference Board. 25 TECHNICAL CAREERS YOU CAN LEARN IN 2 YEARS OR LESS. (S)

C. Engineers

American Institute of Aeronautics and Astronautics. YOUR CAREER AS AN AERO/SPACE ENGINEER. (S)

Careers, Inc. AEROSPACE ENGINEER. 1970. (S)

————ATOMIC ENERGY ENGINEERS AND SCIENTISTS. 1967. (S)

————CERAMIC ENGINEER. 1968. (S)

————CHEMICAL ENGINEER. 1970. (S)

————ELECTRICAL ENGINEER. 1970. (S)

————ENGINEERS, GENERAL. 1970. (S)

————MECHANICAL ENGINEER. 1966. (S)

————METALLURGICAL ENGINEER. 1970. (S)

Chronicle Guidance. THE CERAMIC ENGINEER. 1968. (S)

————CHEMICAL ENGINEER. (S)

————ELECTRICAL ENGINEER. (S)

————ENGINEERS. (S)

————MECHANICAL ENGINEER. (S)

————METALLURGICAL ENGINEER. (S)

————NUCLEAR ENGINEER. (S)

————WANTED: ELECTRONICS ENGINEERS. (S)

Engineers' Council for Professional Development. AFTER HIGH SCHOOL—WHAT? (S)

————DO I HAVE ENGINEERING APTITUDE? 1969. (S)

————ENGINEERING—A CHALLENGE. 1967. (S)

————ENGINEERING: Creating a Better World. 1970. (I-U)

————SOURCES OF ENGINEERING CAREER INFORMATION. 1969. (S)

Junior Engineering Technical Society. THE JETS PROGRAM. (S)

National Society of Professional Engineers. ENGINEERING. (S)

Science Research Associates. AEROSPACE ENGINEERS. (S)

————ELECTRICAL ENGINEERS. (S)

————JOBS IN ENGINEERING. (S)

————MECHANICAL ENGINEERS. (S)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

U.S. Civil Service Commission. SCIENTISTS AND ENGINEERS IN THE FEDERAL PERSONNEL SYSTEM. 1970. (S)

U.S. Department of Labor. EMPLOYMENT OUTLOOK: ENGINEERS. (S)

————WHY NOT BE AN ENGINEER? CAREERS FOR WOMEN. (S)

D. Mathematicians

Careers, Inc. MATHEMATICIAN. 1967. (S)

Chronicle Guidance. MATHEMATICIAN. (S)

Mathematical Association of America. GUIDEBOOK TO DEPARTMENTS IN THE MATHEMATICAL SCIENCES IN THE UNITED STATES AND CANADA. 1970. (S)

————PROFESSIONAL OPPORTUNITIES IN MATHEMATICS. 1971. (S)

National Council of Teachers of Mathematics. MATHEMATICS AND MY CAREER. 1971. (U-S)

Science Research Associates. JOBS IN MATHEMATICS. (S)

U.S. Department of Labor. EMPLOYMENT OUTLOOK: MATHEMATICIANS AND RELATED OCCUPATIONS, MATHEMATICIANS, STATISTICIANS, ACTUARIES. (S)

————WHY NOT BE A MATHEMATICIAN? CAREERS FOR WOMEN. (S)

E. Scientists

American Astronomical Society. A CAREER IN ASTRONOMY. (S)

Bell, Raymond. YOUR FUTURE IN ASTRONOMY. 1970. (S)

Careers, Inc. ASTRONOMER. 1969. (S)

————BIOCHEMIST. 1970. (S)

————BIOPHYSICIST. 1968. (S)

————CHEMIST. 1969. (S)

————GEOLOGIST. 1968. (S)

————GEOPHYSICIST. 1970. (S)

————HEALTH PHYSICIST. 1969. (S)

————METALLURGIST. 1969. (S)

————MICROBIOLOGIST. 1966. (S)

————PHYSICAL SCIENTISTS. 1968. (S)

————PHYSICIST. 1967. (S)

Chronicle Guidance. ASTRONOMER. (S)

————BIOCHEMIST. (S)

————CHEMIST. (S)

————GEOLOGIST. (S)

————GEOPHYSICIST. (S)

————HEALTH PHYSICIST. (S)

————INFORMATION FOR HIGH SCHOOL STUDENTS AND VOCATIONAL GUIDANCE COUNSELORS CONCERNING THE BROAD FIELD OF GEOPHYSICS. (S)

————METEOROLOGIST. (S)

————PHYSICIST. (S)

Science Research Associates. ASTRONOMERS. (S)

————JOBS IN SCIENCE. (S)

U.S. Department of Labor. EMPLOYMENT OUTLOOK: ENVIRONMENTAL SCIENTISTS, GEOLOGISTS, GEOPHYSCISTS, METEOROLOGISTS, OCEANOGRAPHERS. (S)

————EMPLOYMENT OUTLOOK: LIFE SCIENCE OCCUPATIONS. (S)

————EMPLOYMENT OUTLOOK: PHYSICAL SCIENTISTS, CHEMISTS, PHYSICISTS, ASTRONOMERS. (S)

F. Technicians

Brooking, Walter J., editor. ENGINEERING TECHNICIANS. 1969. (U-S)

Careers, Inc. AEROSPACE ENGINEERING TECHNICIAN. 1970. (S)

————ATOMIC ENERGY TECHNICIANS. 1969. (S)

————BIOLOGIST ASSISTANT. 1968. (S)

————CHEMICAL LABORATORY TECHNICIAN. 1968. (S)

————DATA PROCESSING MANAGER. 1969. (S)

————DRAFTSMAN, MECHANICAL 1970. (S)

————DRAFTSMEN. 1968. (S)

————ELECTRICAL ENGINEERING TECHNICIAN. 1967. (S)

————ELECTRONIC COMPUTER PERSONNEL. 1968. (S)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

————ELECTRONICS TECHNICIAN. 1970. (S)

————ENGINEERING TECHNICIAN 1966. (S)

————INSTRUMENTATION TECHNICIAN. 1969. (S)

————MECHANICAL ENGINEERING TECHNICIAN. 1966. (S)

————PHYSICIST TECHNICIAN. 1968. (S)

————PROGRAMMER. 1966. (S)

————RADIATION MONITOR. 1967. (S)

————RADIOLOGIC TECHNOLOGIST. 1968. (S)

————RESEARCH AND DEVELOPMENT TECHNICIANS. 1968. (S)

————SYSTEMS ANALYST. 1969. (S)

————TECHNICAL ILLUSTRATOR. 1967. (S)

————TECHNICAL WRITER. 1968. (S)

————TECHNICIANS, SCIENCE & ENGINEERING. 1966. (S)

Chronicle Guidance. THE CRITICAL NEED FOR TRAINED TECHNICIAN. 1968. (S)

————DRAFTSMAN, MECHANICAL (S)

————ELECTRICAL TECHNICIAN. (S)

————ELECTRONIC TECHNICIAN. (S)

————HEALTH PHYSICS TECHNICIAN. (S)

————MATHEMATICAL TECHNICIAN.

————MECHANICAL TECHNICIAN. (S)

————METEOROLOGICAL TECHNICIAN. (S)

————A MILLION AND A HALF TECHNICIANS NEEDED BY 1975. (S)

————PROGRAMMER. (S)

————TECHNICIANS. (S)

Engineers' Council for Professional Development. NEW CAREERS IN ENGINEERING TECHNOLOGY. 1970. (U-S)

————SOURCES OF ENGINEERING TECHNOLOGY CAREER INFORMATION. 1969. (S)

Englebardt, Stanley L. CAREERS IN DATA PROCESSING. 1969. (U-S)

Science Research Associates. AEROSPACE TECHNICIANS. (S)

————CHEMICAL TECHNICIANS. (S)

————DATA-PROCESSING MACHINE OPERATORS. (S)

————DRAFTSMEN. (S)

————JOBS IN ELECTRONIC DATA PROCESSING. (S)

————JOBS IN TECHNICAL WORK. (S)

————PROGRAMMERS. (S)

————SYSTEMS ANALYSTS. (S)

————TECHNICAL WRITERS. (S)

U.S. Department of Labor. EMPLOYMENT OUTLOOK: PROGRAMMERS, SYSTEMS ANALYSTS, ELECTRONIC COMPUTER OPERATING PERSONNEL. (S)

————EMPLOYMENT OUTLOOK: TECHNICIANS, ENGINEERING AND SCIENCE TECHNICIANS, DRAFTSMEN. (S)

————EMPLOYMENT OUTLOOK: WRITING OCCUPATIONS. (S)

————WHY NOT BE A TECHNICIAL WRITER? CAREERS FOR WOMEN. (S)

13. Aeronautical Research

The books and materials in this section deal with areas of aeronautical research in which NASA is presently involved. These include such subjects as V/STOL aircraft, jet engine noise abatement, the SST and efficient aircraft designs.

Aeronautics and Space Engineering Board. HELICOPTER AND V/STOL NOISE GENERATION AND SUPPRESSION. 1968. (A)

Bagby, C. L. POWER PLANT DESIGN FOR NOISE SUPPRESSION. 1970. (S-A)

Bergaust, Erik. CONVERTIPLANES IN ACTION: The VTOL Success Story. 1969. (U-S)

Blackall, T. E. CONCORDE. THE STORY, THE FACTS AND THE FIGURES. 1969. (S-A)

Bollinger, Lynn L. THE ROLE OF STOL IN THE NORTHEAST CORRIDOR. 1969. (S-A)

Continental Press. IT'S YOUR WORLD—Transportation. (I-U)

Crossfield, A. S. STOL DEMONSTRATION PROGRAM. 1969. (S-A)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

Davis, John. THE CONCORDE AFFAIR: From Drawing Board to Actuality. 1969. (S-A)

McGrath, Dorn., Jr. ENVIRONMENTAL CONSIDERATIONS AND THE METROPOLITAN AIRPORT SYSTEM. 1970. (S-A)

Metzger, Frederick B. and William M. Foley. STOL AIRCRAFT NOISE CERTIFICATION—A RATIONAL APPROACH. 1970. (S-A)

Northrop Corporation. NORTHROP CONTRIBUTIONS TO V/STOL AIRCRAFT. (S-A)

Ransone, Robin K. AIRLINE ECONOMIC REQUIREMENTS FOR 1975 STOL AND VTOL SYSTEMS. 1970. (S-A)

————AMERICAN AIRLINE-MCDONNELL DOUGLAS INTER-METROPOLITAN STOL EVALUATION. 1970. (A)

Schaffer, Laurence. PLANNING STOL FACILITIES. 1969. (S-A)

Vachel, J. D. and B. H. Florsheim. THE DESIGN OF THE U.S. SST FOR LOW COMMUNITY NOISE. 1970. (A)

U.S. Department of Transportation and National Aeronautics and Space Administration. CIVIL AVIATION RESEARCH AND DEVELOPMENT POLICY STUDY. 1971. (A)

————SECOND FEDERAL AIRCRAFT NOISE ABATEMENT PLAN. 1971. (S-A)

U.S. House of Representatives. Committee on Science and Astronautics. AERONAUTICAL RESEARCH. 1969. (S-A)

————ISSUES AND DIRECTIONS FOR AERONAUTICAL RESEARCH AND DEVELOPMENT. 1970. (S-A)

U.S. National Aeronautics and Space Administration. AERONAUTICS. 1970. (S-A)

————AERONAUTICS. 1971. (S-A)

————EXPLORING IN AERONAUTICS. (S-A)

————FIFTY YEARS OF AERONAUTICAL RESEARCH. 1968. (S-A)

————PAVEMENT GROOVING AND TRACTION STUDIES. 1969. (A)

14. Other

Jacobs, Leland B., editor. POETRY FOR SPACE ENTHUSIASTS. 1971. (P-I)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

————SPACE UNIT, AMERICAN TOPICAL ASSOCIATION. (U-S-A)

Ward, Bob, compiler. A FUNNY THING HAPPENED ON THE WAY TO THE MOON. 1969. (U-S-A)

15. Curriculum Resource Materials and Aids to Teachers, Including Model Rocketry

Books and materials in this section provide space education resources for teachers in most all curricular areas and at all grade levels. Included are curriculum guides, units, handbooks, manuals to assist in organizing student projects, brochures describing various kinds of assistance from professional organizations, suggestions for supplementing classroom instruction, source books, educational packets, catalogs of aerospace education materials, lists of special NASA services for teachers, and teaching tips. A subsection lists sources of information about model rocketry as a learning activity as well as sources of model rocketry supplies.

A. Curriculum Resource Materials

Caspers, Wesley. AEROSPACE ARITHMETIC. (A)

Civil Air Patrol. CATALOG OF AEROSPACE EDUCATION AND TRAINING MATERIALS. (A)

————EDUCATION, AVIATION, AND THE SPACE AGE. (A)

Continental Press. THE BINARY SYSTEM. (U-S)

————IT'S YOUR WORLD—Space. (I-U)

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B. Model Rocketry

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———ROCKET INDUSTRY COOPERATION WITH SUPERVISED YOUTH ROCKET PROGRAMS. (A)

———ROCKET SAFETY QUESTIONNAIRE. (S-A)

Saltrick, Daniel F. and Alfred M. Kubota. AEROSPACE EDUCATION AND MODEL ROCKETRY. 1970. (A)

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———FLYING MODEL ROCKETS. (U-S-A)

———VIKING TWO-STAGE ROCKET. (S-A)

———XS-1 SPACE SHUTTLE. (I-U)

CODE: (P) primary—grades 1–3; (I) intermediate—grades 4–6; (U) upper elementary—grades 7–8; (S) secondary—grades 9–12; (A) college and adult.

C. NASA Educational Services

For information about the services listed below, write to the NASA Educational Officer at the Center serving your geographical area. See p. 115 for correct addresses.

CURRICULUM UPDATING. This program is designed to advise and assist elementary and secondary schools, and institutions preparing teachers for these schools, in adapting and updating courses that deal with space-related information. NASA assists in the development of curriculum resource units, curriculum supplements, technical resource materials, and reading and audio-visual materials.

EDUCATIONAL VISITS. The opportunity for school classes to visit the various NASA installations is limited by personnel and program requirements. Certain installations hold periodic open house activities; others are able to accommodate a limited number of scientifically oriented student groups for special tours.

EXHIBITS. NASA educational exhibits range from posters to full-size models to slide presentations housed in a theater-type environment.

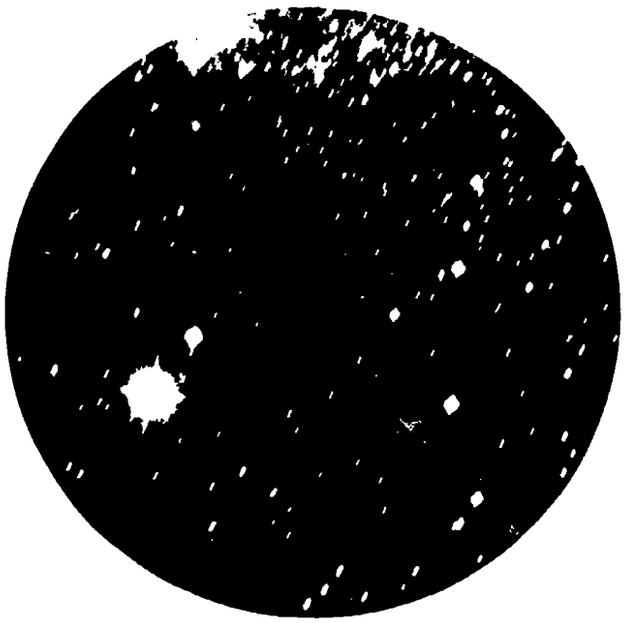
SPACEMOBILE LECTURE-DEMONSTRATION. The Spacemobile is a unit composed of a lecturer with science teaching background, equipfor space science demonstrations, and 20 to 25 models of NASA spacecraft and launch vehicles transported in a panel truck. It provides a means for filling requests from schools for classroom and assembly hall lectures and demonstrations about NASA activities.

SPEAKER SERVICES. Speakers from NASA Headquarters and from the various NASA field centers are available without charge (subject to program limitations) to student and teacher groups.

TEACHER EDUCATION COURSES, INSTITUTES, SEMINARS AND WORKSHOPS. This program encourages and assists state departments of education, school districts, professional associations and institutions of higher education in providing opportunities for preservice and in-service elementary and secondary school teachers to gain a greater understanding of developments in aerospace.

YOUTH PROGRAMS. Youth programs aim to encourage and assist schools and non-school organizations with space-related activities designed to familiarize participants with developments in the space sciences and related technologies. These include model rocketry, spacecraft model building, Youth Science Congresses, Science Fairs, Boy Scout activities, and Title I and other programs for the culturally deprived.

part ii
annotated bibliography



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A-B Emblem Corporation. CATALOG OF GEMINI AND APOLLO FLIGHT EMBLEMS, or "patches" in either 3" or 4" diameter sizes. Minimum order of 25 emblems at various prices. Write for free catalog. (P-I-U-S)

Abraham, L. H. SPACE TECHNOLOGY. Vol. I. Spacecraft Systems. U.S. National Aeronautics and Space Administration, 85 p., 1965. A basic text for upper-level college engineering students. Discusses the method of planning spacecraft and relating and utilizing various subsystems. Shows how to establish relationships of various parts and the utilization of various subsystems before designs are committed. (A) *Out of print.*

Adams, James L. SPACE TECHNOLOGY. Vol. II. Spacecraft Mechanical Engineering. U.S. National Aeronautics and Space Administration. 116 p., illus., 1965. A basic text for upper-level college engineering students. Discusses structural, temperature-control, and electronic-packaging methods and related basic theory. (A) *Out of print.*

Aeronautics and Space Engineering Board. HELICOPTER AND V/STOL NOISE GENERATION AND SUPPRESSION. National Academy of Engineering, 14 p., 1968. Free. A report of the results of a point U.S. Army, National Academy of Sciences, National Academy of Engineering Conference held in July 1968. While the primary aim of the conference related to military helicopters, conference members realized the implications of their study and recommendations for civil aviation. Discusses briefly the problem of V/STOL noise, the status of technology, and research requirements. (A)

Aerospace Corporation. SPACE PRIMER. Aerospace Corporation. An illustrated pamphlet outlining the principles of rocketry, and discussing types of rockets, thrust, launch vehicles and orbiting. Includes references to Project Apollo, and brief career information. Free. (U-S)

Ahnstrom, D. N. THE COMPLETE BOOK OF JETS AND ROCKETS. World Publishing, 184 p., illus., rev. 1970. $6.20. A revised and enlarged edition of a book which explains jet propulsion and its application to rocketry. Profusely illustrated, it includes an extensive glossary of technical terms. (U-S)

Ahrendt, Myrl H. THE MATHEMATICS OF SPACE EXPLORATION. Holt, 160 p., illus., 1965. Paperback, $2.24. Discusses some of the mathematics involved in space exploration, and the laws of celestial mechanics. Includes problems for students to solve. (S)

Akens, David S. JOHN GLENN. First American in Orbit. Strode, 128 p., illus., 1969. $3.95. The first book in a series of space biographies entitled "Heroes of Space." (U-S)

Alter, Dinsmore, Clarence H. Cleminshaw and John G. Phillips. PICTORAL ASTRONOMY, Crowell, 328 p., illus., rev. 1969. $10. A complete survey updated to cover the discovery of pulsars and quasars and new data on the nature of the planets. Discusses among other subjects, the Sun, the Moon, comets and meteors, and space science. (S-A)

American Astronomical Society. A CAREER IN ASTRONOMY. American Astronomical Society. An 18-page brochure giving information, about the nature of this science, its relation to the nation's space program, the work of an astronomer and opportunities for employment, and education requirements. Appendixes list colleges and universities offering an undergraduate major in astronomy or physics-astronomy, as well as those that grant Ph.D. degrees; and a bibliography. Free. (S)

American Institute of Aeronautics and Astronautics. BUILDING YOUR OWN ROCKET? Ameri-

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can Institute of Aeronautics and Astronautics. A brochure emphasizing the hazards of amateur rocketry and urging amateur rocketeers to use only model rockets approved by the National Association of Rocketry, or acquire qualified adult supervision for experimentation. Free. (U-S-A)

————YOUR CAREER AS AN AEROSPACE ENGINEER. American Institute of Aeronautics and Astronautics. Discusses the responsibilities and rewards of a career as an aerospace engineer, the aerospace industry, various jobs within the profession, and secondary school and college courses. Also includes a list of engineering schools accredited by the Engineers Council for Professional Development. Single copy only. Free. Bulk rates upon request. (S)

American Map Co. SOLAR SYSTEM. #9572. American Map Co. A chart, 34" x 45", with large photographs of the planets and the Moon. Also includes a map of the Moon, phases of the Moon, and data about the solar system—relative diameters of the planets, distances from the Sun, and other facts 59 cents. Minimum order $5 unless order is prepaid, including postage. (I-U-S)

————SPACE ATLAS. #1447. American Map Co., 50 p., illus., 1969. The text, by the U.S. Naval Institute, gives information on the universe, the solar syste n, Moon, the Earth in space, and calendar and time factors. Also includes a small map of the Moon. $1.25. Minimum order, $5 unless order is prepaid, including postage. (S-A)

————WORLD STAR CHART. #9574. American Map Co. A chart, 28" x 42", that shows the stars of both hemispheres, and aids in locating stars from any position on Earth at any time of the year. 59 cents. Minimum order $5 unless order is prepaid, including postage. (U-S-A)

American Meteorite Laboratory. METEORITE CRATER STUDY KIT. American Meteorite Laboratory. Includes a labeled Canyon Diablo meteorite fragment of the nickel-iron meteorite which formed the Arizona meteorite crater; a sample of metallic spheroids with description; a sample of country rock transformed by and impregnated with the exploding meteorite; and a 65-page booklet—*A Comet Strikes the Earth* —enclosing a sample of oxidized meteorite and containing basic information about meteorites. $1.25. (S-A)

American Philosophical Society. PLANET VENUS: PAST, PRESENT & FUTURE. American Philosophical Society, 50 p., illus., 1969. Paperback, $1. Papers presented in a symposium at the Nov., 1968 meeting of the American Philosophical Society. Published as Vol. 113, No. 3 (1969) of the PROCEEDINGS of the Society. (A)

Anderson, Poul. THE INFINITE VOYAGE. Crowell-Collier, 144 p., illus., 1969. $4.95. A brief history of astronomy, an explanation of the principles of rocketry, and a review of some of man's accomplishments in space. Based on these facts, the author then speculates on the future of man in space, discussing such subjects as manned orbiting laboratories, Moon colonies, and interplanetary travel. The possibility of extraterrestrial life is examined. (U-S-A)

Asimov, Isaac. THE ABC'S OF SPACE. Walker, 48 p., illus., 1969. $4.50. For each capital and each small letter of the alphabet, the author provides two definitions of space terminology, such as *Apollo* and *astronaut* for A, and *Lunar Module* and *liftoff* for L. (P)

Badgley, Peter, ed. OCEANS FROM SPACE. Gulf Publishing, 234 p., illus., 1969. $13.95. Proceedings of a symposium held in 1967 including the presentations of 15 scientists who discuss the subject of observing the oceans from space. Covers research needs and potential research facilities. Illustrated with color photographs taken by Gemini astronauts. (A)

Bagby, C. L. POWER PLANT DESIGN FOR NOISE SUPPRESSION. #700804. Society of Automotive Engineers, 8 p., 1970. Paperback. $1.50. Discusses the variety of means which design engineers are using to decrease noise in jet engines. Covers nozzle designs, acoustic treatment of engine nacelles, splitter rings and other devices and materials. Concludes that noise suppression presents considerable challenge to engineers. (S-A)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

Barbour, John. FOOTPRINTS ON THE MOON. Associated Press, 224 p., illus., 1969. $5. (Payment is required with order.) A documentary book tracing the U.S. manned space program from its beginning in the early 1960's through the Moon landing and return of Apollo 11. (U-S-A)

Barrowman, James. CALCULATING THE CENTER OF PRESSURE OF A MODEL ROCKET. #TIR-33. Centuri, 36 p., illus., 1968. Paperback, $1. Explains how to calculate and locate the exact center-of-pressure to achieve maximum performance with an adequate margin of stability in model rockets. Includes all necessary equaitons, design tips, sample problems, and easy-to-use graphs that eliminate most of the arithmetic steps. (U-S-A)

————STABILITY OF A MODEL ROCKET IN FLIGHT. #TIR-30. Centuri, 16 p., illus. 1968. Paperback, 75 cents. Presents more than 40 illustrations to assist in explaining the basic principles of model rocket stability. Shows how amount of stability can be adjusted to improve altitude performance, and demonstrates tests for determining the stability of a rocket. Answers many questions regarding model rocket stability. (U-S-A)

Bauer, Raymond A., Richard S. Rosenbloom and Laure Sharpe. SECOND ORDER CONSEQUENCES. M.I.T. Press, 240 p., 1969. $12.50. A study of the unanticipated major social effects of expanding technology, of which the space program is a prime example. The authors examine these effects, some of which are beneficial, and others, undesirable. They suggest how the consequences of technological change can be managed for the good of all. An in-depth treatment of the impact of the space program on the role of technicians is provided. This book is one of a three-volume series sponsored by NASA and prepared by the American Academy of Arts and Sciences. (S-A)

Becker, Bill. MARS—A NEW MYSTERY. Jet Propulsion Laboratory. A leaflet explaining new discoveries about Mars as a result of investigations of unmanned space probes. Free. (S-A)

Bell Aerospace Company. Leaflets giving brief explanations of techniques developed for use in Project Apollo relating to the effects of weightlessness on fuel and water, and how these effects are overcome. Bell Aerospace Company.

APOLLO COMMAND & SERVICE MODULES—Reaction Control Tanks. Free. (S-A)

APOLLO LUNAR MODULE PROPELLANT TANKS. Free. (S-A)

APOLLO LUNAR MODULE WATER TANKS. Free. (S-A)

POSITIVE EXPULSION BELLOWS. Free. (S-A)

POSITIVE EXPULSION TANKS. Free. (S-A)

————LUNAR LANDING TRAINING VEHICLE. Bell Aerospace Company. Free. A leaflet giving a brief explanation of an earthbound, non-aerodynamic craft used to train astronauts in lunar landing techniques. (S-A).

Bell, Raymond. YOUR FUTURE IN ASTRONOMY. Richards-Rosen Press, 127 p., illus., 1970. $4. Explains the science of astronomy and how it is related to other scientific disciplines. Gives advice about educational qualifications and preparation for a career in astronomy; suggests how to locate jobs in the area of astronomy. (S)

Bell System. SIGNALS IN SPACE. Bell System. An illustrated booklet describing the role of the Bell System in our nation's space program. Free. (S-A)

Beloit Tool Corporation. U.S.A. "GOES METRIC." Swani Publishing Co., 54 p., 1970. Paperback, $2.50. Discounts for quantity orders. Clarifies many questions about the metric system of weights and measurements. A timely book for mathematics teachers in view of the expected recommendations to Congress by the National Metric Advisory Committee that the nation begin converting to the metric system. (S-A)

Bendick, Jeanne. SPACE TRAVEL. Watts, 96 p., illus., rev., 1960. $3.75. A book in the "First Book" series answering the young reader's questions about space—what it is, why and how man explores it, what man has accomplished, and what may be accomplished in the future. (I)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

Bergamini, David. UNIVERSE. (LIFE Nature library series). Time-Life Books, 192 p., illus., 1969. $5.70. Available from Silver-Burdett Co. A book designed to give the young student concepts about the universe and its major components, emphasizing Earth's relationship to other features of the universe. (I-U)

Bergaust, Erik. CONVERTIPLANES IN ACTION: The VTOL Success Story. Putnam, approx. 100 p., illus., 1969. $3.49. Facts about the development of vertical and short take-off and landing aircraft. Discusses some of the technical problems involved and provides details on today's experimental VTOL and STOL aircraft and "convertiplanes" both for military and civilian use. (U-S)

————THE RUSSIANS IN SPACE. Putnam, 96 p., illus., 1969. $3.89. A review of Soviet accomplishments in space as of 1969, and the background of those accomplishments, beginning with their use of German scientists and engineers and equipment at the close of World War II. A detailed log of Russian space vehicles through Oct. 4, 1967 is included. (U-S)

Bernardo, James V. AVIATION AND SPACE IN THE MODERN WORLD. Dutton, 383 p., illus., rev. 1968. $7.95. A comprehensive survey of flight in the atmosphere and in space; and its social, economic, and political impacts. Discusses principles of flight and historical events. Sections related to space flight have been expanded in this revised edition. (S-A)

Black, R. P. and C. W. Foreman. CIVILIAN PUBLIC PROBLEMS AND THE AEROSPACE INDUSTRY. #AD-660 086. National Technical Information Service, 17 p., 1967. $3. Discusses the possibility that the aerospace industry could apply its capabilities to the solution of civilian public problems. The report examines the system approach as it has been used by the aerospace industry, and its possible future use in civilian public areas. Included is a discussion of what an industry move into civilian public areas would imply in relation to the transferability of industry scientists and engineers. (A)

Blackall, T. E. CONCORDE THE STORY, THE FACTS AND THE FIGURES. Foulis, 108 p., illus., 1969. Available from John W. Caler Publications, $8.50. The story of the Anglo-French supersonic transport—the *Concorde*, from conception of design to the roll-out of the prototype. Examines the airframe, systems, controls, avionics, engines, and other components. Also discusses the American and Russian supersonic transport (SST) designs, and the economic and performance phases of the Concorde. Semi-technical. (S-A)

Bollinger, Lynn L. THE ROLE OF STOL IN THE NORTHEAST CORRIDOR. #690418. Society of Automotive Engineers, 29 p., 1969. Paperback, $1.50. Points out how STOL (short takeoff and landing) aircraft technology is ready to solve the problem of air traffic congestion in the Washington, D.C.-New York City-Boston corridor. Discusses the types and sizes of aircraft required, airport facilities needed, and the role of government in setting up a STOL system. Case studies are presented to support conclusions. (S-A)

Booker, Peter, Gerald Frewer and Geoffrey Pardoe. PROJECT APOLLO: THE WAY TO THE MOON. American Elsevier, 208 p., illus., 1970. $5.50. A story of America's effort to place men on the Moon, including the Mercury and Gemini Programs—first steps toward a lunar landing. Discusses the rocket vehicles, launch equipment, Command, Service, and Lunar Modules, astronaut training, and the technical problems, setbacks, and final assault on the Moon. (S-A)

Bova, Ben. PLANETS, LIFE & LGM. Addison-Wesley, 107 p., illus., 1970. $4.25. Discusses the possibility of extraterrestrial life, how life could begin on a planet, and what is essential for its survival. Examines the radio signals that radio astronomers have picked up from space as possible evidence that life exists somewhere in space, and suggests that manned flight to search for extraterrestrial life is possible in the future. (U-S)

Branley, Franklyn M. A BOOK OF MOON ROCKETS FOR YOU. Crowell, 66 p., illus., rev. 1970. $4.50. The rockets used in unmanned and manned exploration of the Moon are discussed only briefly. However, the roles of the lunar probes—the Rangers, Surveyors, and Lunar Orbiters—and the Apollo manned flights

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are described to a greater extent, as are the Moon's physical characteristics. (P)

————A BOOK OF OUTER SPACE FOR YOU. Crowell, 57 p., illus., 1970. $4.50. An explanation for young readers of the enormity of outer space—where it begins and what it is made of. Gives concepts of distance and the physical makeup of planets, stars, galaxies and interplanetary space. Also discusses rocketry. (P-I)

————A BOOK OF SATELLITES FOR YOU. Crowell, unpaged, illus., rev., 1971. $4.50. Simple words and graphic pictures describe artificial satellites already launched and some that will be launched into space in the future. Originally published in 1959, the book has been revised to include satellites and their discoveries since 1959, and the Mercury, Gemini, and Apollo spacecraft. (I).

————A BOOK OF VENUS FOR YOU. Crowell, 58 p., illus., 1969. $4.50. A presentation for the young reader of data about the planet Venus including the latest information gathered by space probes. (I)

————MAN IN SPACE TO THE MOON. Crowell, 38 p., illus., 1970. $3.75. A brief story of the Apollo 11 flight and the landing of the astronauts on the Moon. The story ends with the successful splashdown in the ocean and a chart of manned space flight data through Apollo 11. An Index is included. (I)

————THE MOON: Earth's Natural Satellite. Crowell, 114 p., illus., rev. 1971. $4.50. An updated edition of a 1960 publication discussing recent findings about the Moon as a result of unmanned and manned lunar missions. Includes descriptions of lunar rocks, and provides new data on lunar temperature, and the far side of the Moon. Also gives new official names of physical features on the far side of the Moon. (U-S)

————THE NINE PLANETS. Crowell, 86 p., illus., rev. 1971. $4.50. An updated edition of a 1958 book presenting the newest findings about the planets of our solar system. These findings are derived from radio astronomy and U.S. and Soviet space probes. (U-S)

————ROCKETS AND SATELLITES. Crowell, 33 p., illus., rev. 1970. $3.75. A book in the "Let's Read and Find Out" series explaining the difference between rockets and satellites. (P)

Brooking, Walter J., editor. ENGINEERING TECHNICIANS. Ferguson, more than 300 p., illus., 1969. $11.95. Describes the job of the engineering technician and his contributions to the engineering field. Discusses educational opportunities, what to expect on the first job, personal and educational requirements, advancement possibilities, licenses or certification, earnings and benefits, outlook for the future and many other details associated with the career of engineering technician. The aerospace engineering technician is included. (U-S).

Brown, Lawrence W. THE AEROSPACE WORKSHOP GUIDE. Centuri Engineering, approx. 70 p., illus., 1971. Paperback. Write for price. A collection of lectures to help teachers understand the principles of rocketry, aerodynamics, space biology, and triangulation and altitude measurement, plus electronics. Experiments following the discussion of each topic often involve model rocket hardware. (A)

Brown, Robert G. INERTIAL GUIDANCE IN THE SPACE AGE. Delco Electronics, 8 p. Free. An illustrated pamphlet explaining inertial guidance. (S-A)

Brown, Sam. ALL ABOUT TELESCOPES. #9094. Edmund Scientific Co., 192 p., illus., 1967. Paperback, $3. A complete guide for teachers and students for making and using telescopes. Simple text and clear illustrations enable the reader to proceed step-by-step to build various kinds of telescopes for immediate use. (U-S-A)

————HOW TO USE YOUR TELESCOPE. #9055. Edmund Scientifice Co. A booklet presenting an introduction to the stars and to astronomical telescopes. Covers the selection of a telescope, power, light gathering, field of view, eyepieces, and adjustments. 60 cents. (S)

————TELESCOPES YOU CAN BUILD. #9065. Edmund Scientific Co. Instructions for making 27 different telescopes and ten useful accessories. 75 cents. (S)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

Burnsall, William and others, editors. PLANNING CHALLENGES OF THE 70'S IN THE PUBLIC DOMAIN. Vol. 22, Science and Technology series. American Astronautical Society, 530 p., illus., 1970. $16.75. Reports stemming from a joint meeting of the American Astronautical Society and the Operations Research Society, June 1969, during which participants examined aerospace missions and techniques for the 1970's and their potentials for application to Earth problems such as management of the world's health, food, mineral, forest, and water resources; population control; transportation; information explosion; pollution; recreation and cultural resources; and economic planning. Semitechnical. (A)

Calder, Nigel. VIOLENT UNIVERSE: AN EYEWITNESS ACCOUNT OF THE NEW ASTRONOMY. Viking, 160 p., illus., 1970. $8.95. An account of advances in methods and tools used by today's astronomers to discover and develop new facts related to the science of astronomy. Numerous analogies are provided to help the reader develop concepts. (S-A)

Cannon, Robert L. MODEL ROCKET CONTEST GUIDE. Estes Industries, 16 p., illus., 1968. 50 cents. A booklet designed for use by teachers in planning model rocket contests for school-sponsored clubs. It is also useful for others who wish to set up a contest. (A)

————MODEL ROCKET LAUNCH SYSTEMS. Estes Industries, 21 p., illus., 1969. Paperback, 25 cents. A guide for rocket modelers who wish to learn about launch systems and their electrical operation. (U-S-A)

Careers, Inc. Career Briefs and *Career Summaries* covering many occupations to be found within the space industry including scientists, engineers and technicians. *Career Briefs* are 8-page booklets discussing details of the particular occupation—the historical background, duties, working conditions, personal qualifications, educational requirements, educational opportunities, outlook for the future, advantages and disadvantages, related fields, where the jobs are to be found, and sources of further information. *Career Summaries* provided much of the same kind of information in abbreviated form.

AEROSPACE ENGINEERING TECHNICIAN. #S125. Careers, Inc. Career summary, 1970. 20 cents. (S)

AEROSPACE ENGINEER. #B103. Careers, Inc. Career brief, 1970. 35 cents. (S)

ASSEMBLERS, ELECTRONICS MANUFACTURING. #B140. Careers, Inc. Career brief, 1966. 35 cents. (S)

ASTRONOMER. #S99. Careers, Inc. Career summary, 1969. 20 cents. (S)

ATOMIC ENERGY ENGINEERS AND SCIENTISTS. #B153. Careers, Inc. Career brief, 1967. 35 cents. (S)

ATOMIC ENERGY TECHNICIANS. #S330. Careers, Inc. Career summary, 1969. 20 cents. (S)

BIOCHEMIST. #B101. Careers, Inc. Career brief, 1970. 35 cents. (S)

BIOLOGIST ASSISTANT. #S307. Careers, Inc. Career summary, 1968. 20 cents. (S)

BIOPHYSICIST. #S298. Careers, Inc. Career summary, 1968. 20 cents. (S)

CERAMIC ENGINEER. #S22. Careers, Inc. Career summary, 1968. 20 cents. (S)

CHEMICAL ENGINEER. #S136. Careers, Inc. Career summary, 1970. 20 cents. (S)

CHEMICAL LABORATORY TECHNICIAN. #S32. Careers, Inc. Career summary, 1968. 20 cents. (S)

CHEMIST. #B55. Careers, Inc. Career brief, 1969. 35 cents. (S)

DATA PROCESSING MANAGER. #S324. Careers, Inc. Career summary, 1969. 20 cents. (S)

DIE MAKER. #S61. Careers, Inc. Career summary, 1969. 20 cents. (S)

DRAFTSMAN, MECHANICAL. #S135. Careers, Inc. Career summary, 1970. 20 cents. (S)

DRAFTSMEN. #B25. Careers, Inc. Career brief, 1968. 35 cents. (S)

ELECTRICAL ENGINEER. #S112. Careers, Inc. Career summary, 1970. 20 cents. (S)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

ELECTRICAL ENGINEERING TECHNICIAN. #S224. Careers, Inc. Career summary, 1967. 20 cents. (S)

ELECTRONIC COMPUTER PERSONNEL. #B168. Careers, Inc. Career brief, 1968. 35 cents. (S)

ELECTRONICS TECHNICIAN. #S117. Careers, Inc. Career summary, 1970. 20 cents. (S)

ENGINEERING TECHNICIAN. #S168. Careers, Inc. Career summary, 1966. 20 cents. (S)

ENGINEERS, GENERAL. #B108. Careers, Inc. Career brief, 1970. 35 cents. (S)

GEOLOGIST. #S3. Careers, Inc. Career summary, 1968. 20 cents. (S)

GEOPHYSICIST. #B95. Careers, Inc. Career brief, 1970. 35 cents. (S)

HEALTH PHYSICIST. #B74. Careers, Inc. Career brief, 1969. 35 cents. (S)

INSTRUMENTATION TECHNICIAN. #S85. Careers, Inc. Career summary, 1969. 20 cents. (S)

INSTRUMENT MAKER. #S317. Careers, Inc. Career summary, 1968. 20 cents. (S)

INSTRUMENT REPAIRMAN. #B102. Careers, Inc. Career brief, 1970. 35 cents. (S)

MATHEMATICIAN. #B21. Careers, Inc. Career brief, 1967. 35 cents. (S)

MECHANICAL ENGINEER. #S171. Careers, Inc. Career summary, 1966. 20 cents. (S)

MECHANICAL ENGINEERING TECHNICIAN. #S207. Careers, Inc. Career summary, 1966. 20 cents. (S)

METELCASTING OCCUPATIONS. #B99. Careers, Inc. Career brief, 1970. 35 cents. (S)

METALLURGICAL ENGINEER. #S334. Careers, Inc. Career summary, 1970. 20 cents. (S)

METALLURGIST. #S188. Careers, Inc. Career summary, 1966. 20 cents. (S)

MICROBIOLOGIST. #S189. Careers, Inc. Career summary, 1966. 20 cents. (S)

PHYSICAL SCIENTISTS. #B171. Careers, Inc. Career brief, 1968. 35 cents. (S)

PHYSICIST. #B15. Careers, Inc. Career brief, 1967. 35 cents. (S)

PHYSICIST TECHNICIAN. #S306. Careers, Inc. Career summary, 1968. 20 cents. (S)

PROGRAMMER. #B144. Careers, Inc. Career brief, 1966. 35 cents. (S)

RADIATION MONITOR. #S228. Careers, Inc. Career summary, 1967. 20 cents. (S)

RADIOLOGIC TECHNOLOGIST. #B51. Careers, Inc. Career brief, 1968. 35 cents. (S)

RESEARCH AND DEVELOPMENT TECHNICIANS. #S316. Careers, Inc. Career summary, 1968. 20 cents. (S)

SHEET METAL WORKER. #S56. Careers, Inc. Career summary, 1969. 20 cents. (S)

SYSTEMS ANALYST. #S98. Careers, Inc. Career summary, 1969. 20 cents. (S)

TECHNICAL ILLUSTRATOR. #S260. Careers, Inc. Career summary, 1967. 20 cents. (S)

TECHNICAL WRITER. #B30. Careers, Inc. Career brief, 1968. 35 cents. (S)

TECHNICIANS, SCIENCE & ENGINEERING. #B149. Careers, Inc. Career brief, 1966. 35 cents. (S)

TOOL DESIGNER. #S120. Careers, Inc. Career summary, 1970. 20 cents. (S)

Caspers, Wesley. AEROSPACE ARITHMETIC. National Aerospace Education Association. A 16-page booklet providing sample problems showing how children's interest in aviation and space flight may be used to develop arithmetic skills. For grades 1 through 6. 25 cents. (A)

Cassidy, W. B., editor. BIOENGINEERING AND CABIN ECOLOGY. Vol. 20. Science and Technology series. American Astronautical Society, 150 p., illus., 1969. $9.75. A group of scientists discuss bioengineering training at the college level, bioastronautics in the U.S.S.R., the effects of isolation on man's performance as

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it relates to space flight, and life support systems tasks in a manned space cabin simulator. A comparison of life support systems in space and underseas is included. Semitechnical. (S-A)

Centuri Engineering Company. CENTURI MODEL ROCKET PRODUCTS CATALOG. Centuri Engineering Company. Information about model rockets, kits, accessories, books, rocket engines, tracking devices, and finishing materials emphasizing experimentation in design, launching, tracking, and instrumentation. Catalog is 25 cents which is credited against an initial order. (S-A)

————EDUCATORS GUIDE TO MODEL ROCKETRY. Centuri Engineering Co., 59 p., illus., 1968. Paperback. $1. Presents material and ideas designed to introduce the teacher or adult leader of youth groups to the basic concepts of model rocketry. Gives suggestions as to how to get started in model rocketry. (A)

————ROCKETEER'S GUIDEBOOK. Centuri Engineering Co., 36 p., illus., 1968. Paperback, $1.25. A handbook explaining what a model rocket is, how it works, launching and recovery, altitude tracking and model rocket competition. (U-S-A)

————STUDENT'S GUIDE TO MODEL ROCKETRY. #TB-10. Centuri Engineering Co., 60 p., illus., 1969. Paperback. $1.75. An introduction to model rocketry, and the application of rocketry to standard disciplines. Using photographs, diagrams, graphs and drawings, the Guide explains how to get started in model rocketry and how to conduct rocketry research projects. Includes engine data charts and Model Rocketry Examination. (U-S-A)

Chacko, George K., editor. REDUCING THE COST OF SPACE TRANSPORTATION. Vol. 21, Science and Technology series. American Astronautical Society, 257 p., illus., 1969. $9.75. A variety of viewpoints from representatives of the aerospace industry, NASA, and the U.S. Air Force as to how space research can be continued at a reduced cost through the simplification of expendable launch vehicles and the use of reusable launch vehicles. (A)

Chappell, Carl L. VIRGIL I. GRISSOM. Boy Astronaut. Bobbs-Merrill. 200 p., illus., 1971. $2.75. A child's biography of one of America's first astronauts. (I-U)

Cherrington, Ernest H., Jr. EXPLORING THE MOON THROUGH BINOCULARS. McGraw-Hill, 389 p., illus., 1969. $10. This book leads the amateur astronometer, equipped with a pair of binoculars, on a month-long guided tour of the Moon. Considers its various phases which are photographed and charted step by step. (S-A)

Chronicle Guidance. OCCUPATIONAL BRIEFS. Chronicle Guidance, Inc. Four- or eight-page leaflets, each providing an overview of a space-related occupation, discussing the nature of the job, personal and educational backgrounds required, training opportunities, salaries and working conditions, and the outlook for future employment.

ASTRONOMER. #210. 35 cents. (S)

BIOCHEMIST. #132. 35 cents. (S)

CERAMIC ENGINEER. #161. 35 cents. (S)

CHEMICAL ENGINEER. #160. 35 cents. (S)

CHEMIST. #153. 35 cents. (S)

DRAFTSMAN, MECHANICAL. #224. 35 cents. (S)

ELECTRICAL ENGINEER. #158. 35 cents. (S)

ELECTRICAL TECHNICIAN. #204. 35 cents. (S)

ELECTRONICS MANUFACTURING INDUSTRY WORKERS. #57. 50 cents. (S)

ELECTRONIC TECHNICIAN. #166. 35 cents. (S)

ENGINEERS. #151. 50 cents. (S)

GEOLOGIST. #129. 50 cents. (S)

GEOPHYSICIST. #148. 35 cents. (S)

HEALTH PHYSICIST. #185. 35 cents. (S)

HEALTH PHYSICS TECHNICIAN. #186. 35 cents. (S)

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MATHEMATICAL TECHNICIAN. #421. 35 cents. (S)

MATHEMATICIAN. #162. 35 cents. (S)

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MECHANICAL ENGINEER. #326. 35 cents. (S)

MECHANICAL TECHNICIAN. #103. 35 cents. (S)

METALLURGICAL ENGINEER. #62. 35 cents. (S)

METEOROLOGICAL TECHNICIAN. #422. 35 cents. (S)

METEOROLOGIST. #143. 35 cents. (S)

NUCLEAR ENGINEER. #320. 35 cents. (S)

PHYSICIST. #141. 35 cents. (S)

PROGRAMMER. #175. 35 cents. (S)

TECHNICIANS. #229. 35 cents. (S)

————ATOMIC ENERGY, CAREERS IN. #384. Chronicle Guidance. 35 cents. (S)

————CAREER GUIDANCE AND PLANNING HELP A PERSON ACHIEVE A SUCCESSFUL CAREER. #R15. Chronicle Guidance. A 4-page reprint from *Chemical and Engineering News*, March 1966, discussing career planning in chemistry and chemical engineering fields. 35 cents. (S)

————THE CERAMIC ENGINEER. #R167. Chronicle Guidance. A 2-page article reprinted from the American Ceramic Society Bulletin, Nov. 1968, discussing the ceramic engineering career. 35 cents. (S)

————THE CRITICAL NEED FOR TRAINED TECHNICIANS. #R164. Chronicle Guidance. A 3-page article reprinted from the June 1968 issue of Technical Education News. 35 cents. (S)

————INFORMATION FOR HIGH SCHOOL STUDENTS AND VOCATIONAL GUIDANCE COUNSELORS CONCERNING THE BROAD FIELD OF GEOPHYSICS. #R31. Chronicle Guidance. A 6-page leaflet discussing geodesy, seismology, meteorology, geomagnetism, and aeronomy, plus geochemistry, the planetary sciences, and other geophysic specialities. 50 cents. (S)

————THE MEN BEHIND THE MAN IN THE MOON. #R137. Chronicle Guidance. A reprint from the *Occupational Outlook Quarterly* discussing job opportunities with the National Aeronautics and Space Administration for scientists, engineers, technicians, and craftsmen. 35 cents. (S)

————A MILLION AND A HALF TECHNICIANS NEEDED BY 1975. #R6. Chronicle Guidance. A reprint from the *Occupational Outlook Quarterly* outlining some of the findings of a Bureau of Labor Statistics study. 35 cents. (S)

————WANTED: ELECTRONICS ENGINEERS. #R9. Chronicle Guidance. A reprint from *Electronics Magazine* discussing the many opportunities for electronics engineers. 35 cents. (S)

Civil Air Patrol. CATALOG OF AEROSPACE EDUCATION AND TRAINING MATERIALS. Civil Air Patrol. Describes the inexpensive aerospace education and training materials available from Civil Air Patrol. Includes text booklets, student workbooks, instructor guides, filmstrips, recordings, programmed instruction exercises, and self-study guides. Free. (A)

————THE DAWNING SPACE AGE. Civil Air Patrol, 230 p., illus., rev. 1971. Approx. $2.50. Paperback, $1.50. Outlines the history of rocketry and space flight. Provides basic information about rocket propulsion, guidance, space research, unmanned and manned space missions, space medicine, space stations, the geography of celestial space and many other pertinent space flight subjects. (S-A)

————EDUCATION, AVIATION, AND THE SPACE AGE. #19. Civil Air Patrol, 89 p., illus. Paperback, $1.50. Discusses aircraft and space vehicles, curricular problems, references and collateral readings. (A)

Clarke, Arthur C. Reprint from *Engineering and Science*. Jet Propulsion Laboratory. A 5-page leaflet reprinting an article by the well-known science fiction writer in which he predicts technology of the future and its impacts on human life—especially emphasizing space technology and its potential for international cooperation and world-wide education. Free. (S-A)

————*and The Editors of Life*. MAN AND SPACE. Time-Life Books, 200 p., illus., 1969. $4.95. (Available from Silver Burdett Co.) A review of the history of man's interest in space

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and an analysis of the technological developments that have enabled man to explore this new frontier. Also discusses the future of interplanetary space travel and the changes that may occur on Earth as a result of experiments in space. A book in the Life Science Library series. (U-S-A)

————*and Robert Silverberg*. INTO SPACE. A Young Person's Guide to Space. Harper, 128 p., illus., rev. 1971. $3.95. A completely revised edition summarizing the history of rocketry and manned space flight, including the historic Apollo 11 landing on the Moon. The authors also speculate on the future in space—the uses of space stations and scientific research that can be accomplished in space. (I-U-S)

Clotfelter, Beryl E. REFERENCE SYSTEMS AND INERTIA (THE NATURE OF SPACE). Iowa State University Press, 116 p., illus., 1970. Paperback, $3.50. An introduction to current work and modern thinking on one aspect of the nature of space and the related problems of the origin of inertia. Only a minimal background of physics and mathemattics is required to understand the theories and descriptions of experimental work related to the subject. Semitechnical. (A)

Colby, C. B. ASTRONAUTS IN TRAINING. Coward, 48 p., illus., 1969. $3.49. Describes astronaut training methods and the equipment required to prepare the astronauts for space flight. (P-I)

————MOON EXPLORATION. Coward-McCann, 48 p., illus., 1970. $3.29. A follow-up to the author's *Astronauts in Training* concentrating on the preparations for and techniques of lunar exploration. Discusses navigation on the Moon, Moon mapping, Moon vehicles, life-supporting systems, landmarks, etc. (I-U)

Collins, Lorence G. and Barbara J. Collins. BEYOND THE SOLAR SYSTEM. Benefic Press, 96 p., illus., 1970. $3.20. Discusses stars (their characteristics, locations, distances from Earth, motions, birth and death) and galaxies. Also considers briefly some famous astronomers, and both optical and radio telescopes. Includes at the end of each chapter a section on "Things to Think About." A Summary of Concepts, Answers to "Things to Think About" and a Glossary are provided. (I-U)

Commerce, Department of, see U.S. Department of Commerce.

Competition Model Rockets. CATALOG. Competition Model Rockets. Lists model rocket kits, engines and accessories available. 20 cents. (U-S-A)

————D-REGION TOMAHAWK. #S1. Competition Model Rockets. An exact scale model of a single stage NASA sounding rocket. A copy of a model which was developed by a rocket firm and flown to determine vehicle performance and to establish payload conditions before the proposed design was accepted by NASA. Recommended for experienced modelers. $4.50. (S-A)

————START. #C7 Competition Model Rockets. A model rocket kit of simple design for introducing the beginner to model rocketry. $1. (U-S-A)

Continental Press. THE BINARY SYSTEM. Continental Press, 72 p. A booklet of programmed instruction introducing the student to binary numerals and their application in computer techniques. 75 cents. A Teacher's Guide is free with an order for 10 or more books. (U-S)

————IT'S YOUR WORLD—Space. Continental Press. A reading enrichment program consisting of student reading selections with workbooks, activities to stimulate creativity, and a vocabulary and comprehension testing program. Includes materials for five students and a teacher's unit with sample student materials and pre-printed carbon masters for liquid duplication of test materials and record-keeping forms. Reading selections relate to weather and communications satellites, space probes, Project Apollo, and meteoroids, asteroids, and comets. One of ten similar units on various subjects, parts of which also include space subjects. $8.75 per unit. (I-U)

————IT'S YOUR WORLD—Transportation. Continental Press. A reading enrichment program consisting of student reading selections with workbooks, activities to stimulate creativity, and a vocabulary and comprehension test-

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ing program. Includes materials for five students and a teacher's unit with sample student materials and pre-printed carbon masters for liquid duplication of test materials and record-keeping forms. Reading selections relate to V/STOL aircraft, the SST, the C5 Air Force transport, plus underwater research craft. One of ten similar units on various subjects. $8.75 per unit. (I-U)

Coombs, Charles. SPACETRACK. Watchdog of the Skies. Morrow, 128 p., illus., 1969. $3.95. A description of an Air Force organization called "Spacetrack" which keeps tab on all objects in space. Includes discussions of Spacetrack headquarters inside Cheyenne Mountain near Colorado Springs, and the far-flung radar posts that are part of the "watchdog" system. Tells how the total system works. (I-U-S)

Cooper, Henry S. F., Jr. APOLLO ON THE MOON. Dial, 144 p., 1969. $4.50. Discusses a manned lunar landing including the tasks of the astronauts while on the Moon, their physical reaction to the lunar environment, the Moon samples brought to Earth, and precautionary measures against contamination from alien organisms on the Moon. (S-A)

———MOON ROCKS. Dial, 197 p., illus., 1970. $5.95. A journal in which the author records his interest in the lunar materials brought to Earth by the Apollo 11 astronauts. It is not a scientific report on Moon rocks but tells how the author followed a group of scientists in their early study of the lunar materials—especially as they confronted the many unknowns presented by the Moon samples. Describes the Lunar Receiving Laboratory at the NASA Manned Spacecraft Center, some of the scientists involved in early studies, and their experiences living in quarantine at the Laboratory. (S-A)

Cox, Donald. AMERICA'S EXPLORERS OF SPACE. Hammond, 96 p., illus., rev. 1969. $4.50. Profiles of 16 space heroes, describing their contributions to the American space program. Includes information on Goddard, von Braun, and Pickering in research and development; astronauts Shepard, Glenn and White; and engineers Kraft and Parks. Also gives a chronology of U.S. manned space flights through Apollo 11. (S-A)

Cox, L. M. Manufacturing Company. ALTITUDE FINDER. #5040. L. M. Cox Manufacturing Co. An instrument for tracking and computing altitudes of model rocket flights. $5. (U-S-A)

———CATALOG of model rockets, engines and accessories. L. M. Cox Manufacturing Co. The catalog is free. (U-S-A)

———HANDBOOK OF ROCKETRY. L. M. Cox Manufacturing Co. A 24-page booklet explaining model rocketry, model rocketry "hardware," model rocketry competition, how to organize a model rocket club, safety principles, and many other topics of interest to beginning modelers. 25 cents. (U-S-A)

———MODEL ROCKETRY SCIENCE SET. #125. L. M. Cox Manufacturing Co. A kit containing everything needed to get the beginning model rocketeer started. Includes a ready-to-launch model rocket, altitude finder, launch control system, six rocket engines and safety igniters, recovery parachute, wadding, and two helpful booklets with explanations and experiments. $20. (U-S-A)

Crossfield, A. S. STOL DEMONSTRATION PROGRAM. #690420. Society of Automotive Engineers. 68 p., illus., 1969. Paperback, $1.50. A report on an Eastern Air Lines/McDonnell Douglas demonstration of the feasibility of using STOL (short takeoff and landing) aircraft in the Northeast Corridor (the Washington, D.C. New York City-Boston area). Concludes that such an air transportation system would provide better service to the traveling public at a reduced cost to the airlines, utilize unused air space, and reduce burdens on air traffic control and airport systems. (S-A)

Current Science Staff. DISCOVERING THE MOON. American Education Publications, 32 p., illus., 1970. 40 cents. Fosters student observations, measurements, evaluations, and other activities. Helps students understand ongoing Moon exploration and prepares them to handle the new information coming through the Apollo program. (U-S)

Defense, Department of, see U.S. Department of Defense.

Davis, John. THE CONCORDE AFFAIR: From Drawing Board to Actuality. Regnery, 240 p., 1969. $5.95. A detached view of supersonic flight—specifically the British-French supersonic transport (SST) *Concorde*. The author, writing for the general reader, through interviews with government officials and airline and aircraft manufacturing personnel, considers how the *Concorde* evolved, what is it, and what are its chances for success. Details the history of the *Concorde* project, and considers problems of operation such as the sonic boom, sales prospects to airlines, and profitability. (S-A)

Dempsey, Michael W. and Angela Sheehan. INTO SPACE. World Publishing, 32 p., illus., 1970. $1.95. Covers the basic facts about astronauts, rockets, satellites, planets, the Moon, and space environment. (P)

Denoyer-Geppert Co. ASTRONOMERS AT WORK. #421491. Denoyer-Geppert Co. A chart, 54" x 44" in color, depicting astronomical instruments and how they are used; also, radio astronomy. $4.75. (U)

————LAWS OF MOTION OF PLANETS AND SATELLITES. #420772. Denoyer-Geppert Co. A chart, 33" x 47" in color, illustrating the laws of celestial mechanics—Kepler's three laws and Newton's law of gravity. $5. (U)

————LIFE IN OTHER WORLDS. #421521. Denoyer-Geppert Co. A chart, 54" x 44", showing possible nature of life and conditions in other worlds. $4.75. (U)

————LOOK AT THE STARS. #815622. Denoyer-Geppert Co. A 32-page manual to help teachers and students use a celestial globe. $1.50. (U)

————THE MOON. #81621. Denoyer-Geppert Co., 24 p., illus., 1970. Paperback. $1.50. Discusses the Moon's surface as we have come to know it firsthand. Includes explanations of pre-space age knowledge, lunar map making with space photography, and lunar surface features as discovered by Apollo astronauts. The book is designed for use with a Denoyer-Geppert Lunar Globe with student activities provided, but it may be used alone. (U-S)

————MOON GLOBE. #407502. Denoyer-Geppert Co. 6" diameter, $3.50. A metal model showing physical features of the Moon, including the far side of the Moon. The model was designed by the staff of Adeler Planetarium. An explanatory booklet is included. (I-U-S)

————OUR MOON #421421. Denoyer-Geppert Co. A chart, 54" x 44" in color, giving basic facts and relationships of the Moon to the Earth and Sun. $4.75. (U)

————PHASES OF THE MOON. #420432. Denoyer-Geppert Co. A chart, in color, 40" x 28", showing the phases of the Moon in relation to Earth. $5. (I-U-S)

————ROCKET Chart. #420782. Denoyer-Geppert Co. 33" x 47", in color. Illustrates principles of rocket propulsion, Newton's law of motion, etc. Shows internal components of a rocket, and a launching sequence of a three-stage rocket with a satellite aboard. $5. (U)

————ROCKETS AND SATELLITES. #421501. Denoyer-Geppert Co. A chart, 54" x 44", in color. Shows how rockets and satellites get into orbit and what they do. $4.75. (U)

————SOLAR PLANETARY SYSTEM. #420442. Denoyer-Geppert Co. A chart, 40" x 28" in color. $4.50. (U)

————THE SOLAR SYSTEM. #421431. Denoyer-Geppert Co. A chart, 54" x 44" in color, showing relative size of members of the solar system and their relationship to one another. A table of facts is included. $4.75. (U)

————SPACE. #421411. Denoyer-Geppert Co. A chart, 54" x 44" in color, showing relationships of various features of the universe —planets, stars, the Milky Way, and galaxies. $4.75. (U)

Department of Commerce, see U.S. Department of Commerce.

Department of Defense, see U.S. Department of Defense.

Department of Health, Education and Welfare, see U.S. Department of Health, Education and Welfare.

Department of Labor, see U.S. Department of Labor.

Desoutter, Denis M. YOUR BOOK OF SPACE TRAVEL. Transatlantic Arts, 72 p., illus., rev.

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1970. $3.75. An introduction to the basic principles of space flight written for the young reader. Discusses, among other subjects, satellites, orbits, rocket propulsion, weightlessness, and manned lunar missions. A British publication, but with few British references. (I-U)

Dole, Stephen H. HABITABLE PLANETS FOR MAN. American Elsevier, 158 p., illus., 2nd ed., 1970. $7.75. The author weighs new biological, planetological and astronomical data derived from manned lunar flights to theorize on the existence of planets of other star systems that might provide the environmental requirements for man's existence. He also speculates on the biological effects on human immigrants living on the surface of a planet unlike the Earth. Semitechnical. (S-A)

Dolezal, Erich. CONQUEST OF SPACE. Abelard, 132 p., illus., 1969. Paperback, $4.50. An overview of man's progress in space through the Apollo 8 flight, December 1968. Covers both Soviet and U.S. space programs. (U-S)

Dunlap, Orrin E., Jr. COMMUNICATIONS IN SPACE. Harper, 352 p., illus., rev. 1970. $7.95. A thorough report on communications techniques and developments from the "wireless" of Marconi to the sophisticated systems used on the Apollo flights. Discusses radio, television, radar, communications satellites, lasers, and numerous other devices that have aided men to explore space. (S-A)

Dwiggins, Don. EAGLE HAS LANDED: The Story of Lunar Exploration. Golden Gate, 80 p., illus., 1970. $4.50. Speculation based on facts as to further exploration of the Moon, the planets and space itself. Considers space shuttles, space stations, and lunar bases. (I-U)

————SPACESHIP EARTH. Golden Gate, 80 p., illus., 1970. $4.50. Discusses space technology being developed to meet worldwide emergencies. Emphasizes the Earth Resources Technology Satellites—orbiting sensors that detect hidden natural resources such as oil and mineral deposits, crop diseases, forest fires and other conditions of significance to man's future existence on Earth. (I-U)

————VOICES IN THE SKY. The Story of Communications Satellites. Golden Gate, 80 p., illus., 1969. $4.95. The story of the development of communications satellites, how they operate, and what can be expected of them in the future. Covers the period from President Eisenhower's broadcast via satellite in 1958 to today's spacecraft which routinely relay TV programs and telephone coversations. Also provides information on the U.S.S.R.'s satellite communications system. (U-S)

Eckman, Philip K., editor. TECHNOLOGY AND SOCIAL PROGRESS—SYNERGISM OR CONFLICT? Vol. 18, Science and Technology series. American Astronautical Society, 170 p., 1969. $9.75. Proceedings of the Sixth AAS Goddard Memorial Symposium held in March 1968. Examines the effect of technology on human progress, (especially the effect of the space program on technology), U.S. growth patterns, and the balance between social and space goals. (S-A)

Editors of Hammond, Inc. EARTH AND SPACE. Hammond, 192 p., illus., 1970. $12.95. Although primarily an Earth science book, it includes illustrated material on astronomy, the exploration of space, views of Earth from space, the Apollo 11 journey to the Moon, and the uses of meteorological satellites. (I-U-S)

Editors of Life. TO THE MOON AND BACK. Life Education Program, 96 p., illus., 1969. Paperback, 35 cents. A special edition of *Life* Magazine covering the historic first Apollo 11 flight to the Moon and biographical details of the three Apollo 11 astronauts and their families. Also includes brief illustrations and descriptions of all previous manned flights (Mercury, Gemini, and Apollo, plus Soviet manned flights) leading to Apollo 11, and the laboratory for receiving lunar materials. (I-U-S-A)

Editors of Science Experimenter. JUNIOR SCIENCE PROJECTS. Arco, 175 p., illus., 1967. $3.95. A collection of experiments and projects in many scientific fields, with step-by-step instructions, photographs, drawings and charts. Explains, by means of experimentation, scientific theory and principles, and their applications. Sample subjects are: ion-exchange fuel cell, infrared detector, echo collecting, matrix circuits, etc. (U-S)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

Edmund Scientific Co. DIGITAL COMPUTER. #70,683. Edmund Scientific Co. A working model with all internal parts visible so students may observe how a computer works, and learn what it can and cannot do. Adds, subtracts, multiplies, memorizes, counts, compares, and arranges numbers in sequence. Price includes a 32-page manual covering its operation, and 15 experiments. Comes in kit form with instructions for assembling. $5.98. A detailed 50-page programing booklet, #9080, is also available to explain how each experiment in the manual was programed. $1. (U-S)

————MINI-MOON. #70,515. Edmund Scientific Co. A 12" washable plastic sphere with exaggerated relief to show craters, peaks, and mountain ranges, but with accurate distance relationships. Includes a wood base and a 16-page book. $13.95. (I-U-S)

————MOON MAP. #9297. Edmund Scientific Co. A black and white photo-reproduced map, 35" x 46", with named lunar features and an index to locations. 95 cents. (I-U-S)

————SIMULATED MOONDUST. #41,261. Edmund Scientific Co. prepared by Dr. Thomas Gold (one of the first scientists to examine the lunar samples brought to Earth by the Apollo 11 astronauts), the material corresponds with actual lunar material in texture, color, and overall appearance, including the minute glass particles found in some lunar samples. 1-oz. bottle. $2. (I-U-S)

————SOLAR CELL EXPERIMENT SET. #60,291. Edmund Scientific Co. A selection of selenium and silicon solar cells plus a cadmium sulphide photocell, with a handbook of explanations and suggestions for experimentation. $7.95. (S)

Edson, Lee. WORLDS AROUND THE SUN. The Emerging Portrait of the Solar System. American Heritage in association with The Smithsonian Institution. 160 p., illus., 1969. Available from Van Nostrand. $4.95. Answers basic questions about the solar system and how new knowledge gained from space exploration has changed fundamental ideas about the Sun, Moon and planets. Discusses the tools of astronomy, the history of the study of the solar system, the space between the planets, extraterrestrial life, and the future of the solar system. (S-A)

Ehricke, Krafft and Betty A. Miller. EXPLORING THE PLANETS. Silver Burdett, 64 p., illus., 1969. Paperback, 25 cents. A noted space scientist presents a step-by-step plan for the exploration of planets and other cosmic bodies. The equipment needed for such expeditions, and the hazards involved are also discussed. A book in the 21st Century Monografics series. (I-U-S)

Emme, Eurgene M. A HISTORY OF SPACE FLIGHT. Holt, 224 p., illus., 1965. Paperback, $2.24. A narrative of the development of space flight on a worldwide basis up to August, 1965. (S)

Engelbrektson, Sune and Peter Greenleaf. LET'S EXPLORE OUTER SPACE. Sentinel, 128 p., illus., 1969. Paperback, $1.50. Provides simple research projects in space science including safe experimentation with model rockets, weightlessness, life support systems, and the construction of simple astronomical instruments to observe and measure movements of the Moon, planets, Sun, and stars. (S-A)

Englebardt, Stanley L. CAREERS IN DATA PROCESSING. Lothrop, 160 p., illus., 1969. $4.50. Discusses the many kinds of jobs available within the data processing career field, requiring various levels of preparation and offering a variety of applications. Personal histories of people now working in this career area are included. (U-S)

Engineers' Council for Professional Development. AFTER HIGH SCHOOL—WHAT? EC-13. Engineers' Council for Professional Development, 5 p. One copy free. A leaflet summarizing the nature of work, qualifications, and education for engineers and technicians. Explains how engineering differs from a career in science. (S)

————DO I HAVE ENGINEERING APTITUDE? EC-14. Engineers' Council for Professional Development, 8 p., 1969. One copy free. A self-administered questionnaire which identifies the characteristics of engineers. (S)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

————ENGINEERING—A CHALLENGE. EC-10. Engineers' Council for Professional Development, 32 p., 1967. One copy free. A booklet describing opportunities and requirements of all engineering fields. (S)

————ENGINEERING: Creating a Better World. #EC-62. Engineers' Council for Professional Development, 20 p., 1970. One copy free. Describes engineering and its relevance to society in terms that young children can understand. (I-U)

————ENGINEERING GUIDANCE IDEAS —FIVE THOUGHTS. EC-60. Engineers' Council for Professional Development, 44 p., 1969. $1. Four articles written by a counselor, a science teacher, a department chairman, and a school principal, reflecting their feelings toward engineering guidance. A fifth article explains the program of ECPD's Guidance Committee. (A)

————GUIDANCE COUNSELOR KIT. EC-19. Engineers' Council for Professional Development, 1969. $4. A collection of guidance publications of ECPD and its constituent societies. Includes more than 15 different brochures in a special file folder. Suitable for a library reference shelf as well as for vocational counselors. (A)

————NEW CAREERS IN ENGINEERING TECHNOLOGY. #EC-63. Engineers' Council for Professional Development, 16 p., 1970. One copy free. Covers the field of engineering technology for the junior or senior high school student. (U-S)

————SOURCES OF ENGINEERING CAREER INFORMATION, 12th ed. #EC-16. Engineers' Council for Professional Development, 20 p., 1969. One copy free. A comprehensive bibliography of engineering career information, identified by field of specialty. Includes list of reference books and general guidance information. (S)

————SOURCES OF ENGINEERING TECHNOLOGY CAREER INFORMATION. #EC-17. Engineers' Council for Professional Development, 14 p., 1969. One copy free. A leaflet answering most frequently asked questions about engineering technician careers. Includes a bibliography and the list of ECPD acredited curricula leading to degrees in engineering technology. (S)

Estes Industries. Astron ALPHA. #671-K-25. Estes Industries, Inc. A rocket kit for beginners, easy to build and easy to fiy. Engine not included, but the kit contains several other items of interest to rocket modelers. $1.50. (U-S)

————MODEL ROCKET NEWS LIBRARY COLLECTION. #711-BK-20B. Estes Industries, $4. A collection of all back issues of *Model Rocket News.* (U-S-A)

————MODEL ROCKETRY CATALOG. Estes Industries, Inc. Information about model rockets, kits, accessories, rocket engines, launching devices, and other products of interest to modelers. Free. (U-S-A)

————MODEL ROCKETRY LIBRARY COLLECTION. #711-BK-20A. Estes Industries, Inc. $3. A collection of materials explaining model rocketry and its use in motivating upper elementary and junior and senior high school students to study rocketry and other related scientific subjects. Includes technical reports, a catalog of materials for sale, design booklet, safety literature, a club guide, and other pertinent teaching aids. (Note: MODEL ROCKET NEWS LIBRARY COLLECTION, #711-BK-20B, a collection of back issues of *Model Rocket News*—regularly $4—is available in combination with the above described MODEL ROCKETRY LIBRARY COLLECTION as LIBRARY COLLECTION #711-BK-20 at $6 for the set.) (A)

Executive Office of the President. AERONAUTICS AND SPACE REPORT OF THE PRESIDENT. U.S. Government Printing Office. Annual reports transmitted to the Congress providing comprehensive descriptions of the activities and accomplishments (in the fields of aeronautics and space) of all departments and agencies of the federal government.

For the year 1969, published in 1970. (S-A) *Out of print.*

For the year 1970, published in 1971. #PrEx 5.9:970. Stock #4103-0001. 115 p., illus. $1.25. (S-A)

————BIOMEDICAL FOUNDATIONS OF MANNED SPACE FLIGHT. #PrEx 8.2:B52. Stock #4106-0002. U.S. Government Printing Office, 30 p., 1969. 45 cents. A report of the Space Science and Technology Panel of the President's Science Advisory Committee. Semi-technical. (A)

————THE NEXT DECADE IN SPACE. #PrEx 8.2:Sp 1. Stock #4106-0015. U.S. Government Printing Office, 63 p., 1970. 65 cents. A report of the Space and Technology Panel of the President's Science Advisory Committee outlining possible missions in space throughout the 1970's. (S-A)

Faget, Max. MANNED SPACE FLIGHT. Holt, 169 p., illus., 1965. Paperback, $2.24. Covers the development of manned spacecraft, the problems of astronaut training, and their solutions. (S)

Farley, T. A. SPACE TECHNOLOGY. Vol. VI. Space sciences. #NAS 1.21:114. Stock #3300-0186. U.S. Government Printing Office, 84 p., 1967. Paperback, 35 cents. A basic text for college-level engineering students discussing the geomagnetic field, Van Allen belt, galactic and solar cosmic rays, comets, and dust. (A)

Farmer, Gene and Dora Jane Hamblin. FIRST ON THE MOON. A Voyage with Neil Armstrong, Michael Collins, and Edwin Aldrin, Jr. Little Brown, 434 p., illus., 1970. $7.95. An account of the first manned voyage to the Moon as told by the three astronauts who made the historic trip. A speculative epilogue by Arthur Clarke on the future of space flight concludes the book. (U-S-A)

Fawcett, J. E. S. INTERNATIONAL LAW AND THE USES OF OUTER SPACE. Oceana, 67 p., 1968. $4. A review of the effects of the United Nations' Outer Space Treaty, including the character and limits of State jurisdiction and control over spacecraft, the military use of space, the management of space operations, and control of their side effects including responsibility for damage, and the regulation of space communications. (A)

Feingold, S. Norman and others. STUDENT AID PLANNING IN THE SPACE AGE: A SELECTED BIBLIOGRAPHY. B'nai B'rith, 13 p., 1971. 50 cents. Sources of literature relating to student financial aid toward enrollment in colleges and universities. Listings include sources of information about educational financial assistance from college scholarship funds, federal government agencies, the armed forces, labor unions and industrial firms, and private organizations. (S-A)

Firsoff, V. A. THE OLD MOON AND THE NEW. A. S. Barnes. 286 p., illus., 1970. $8. A review of old theories about the Moon's origin and composition in light of the new knowledge gained through U.S. and Soviet unmanned spacecraft. A short postscript by Patrick Moore reveals that only a few points made in the book were refuted by findings derived from the Apollo 11 lunar landing. (S-A)

Forbes, Fred W. and Paul Dergarabedian, editors. TECHNOLOGY UTILIZATION IDEAS FOR THE 70'S AND BEYOND. Vol. 26, Science and Technology series. American Astronautical Society, 312 p., 1971. $15.75. Papers presented at a meeting which discussed how knowledge derived from the national space program could be applied in solving problems on Earth. Covers applications to air pollution control, oil-water separation, solar power stations, hurricane/tornado control, combustion of wastes, unconventional methods of propulsion and transportation, and other areas of interest to those concerned about improving the environment. (S-A)

Ford, C. Quentin. SPACE TECHNOLOGY AND EARTH PROBLEMS. Vol. 23 of the Science and Technology series. American Astronautical Society, 401 p., illus., 1970. $14.75. Proceedings of a symposium that considered how space technology might be applied to Earth problems. Examples of topics included: weather, the delivery of health care by remote methods, satellite monitoring of natural resources, atmospheric pollution, communications, world food production, oceanography and hydrology, and transportation. (U-S)

Freeman, Mae. GRAVITY AND THE ASTRONAUTS. Crown, 32 p., illus., 1970. $3. Some of the questions a young child may ask about

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

the mysteries of space flight and gravity are answered. (P)

Freundlich, Martin M. and Bernard M. Wagner, editors. EXOBIOLOGY—THE SEARCH FOR EXTRATERRESTRIAL LIFE. Vol. 19. Science and Technology series. American Astronautical Society. 184 p., 1969. $9.75. Surveys the physical environment of the Moon and planets, describes the means of detecting extraterrestrial life, and discusses the bio-chemical and sociological aspects of extraterrestrial life. (S-A)

Friskey, Margaret. THE MOONWALK ADVENTURE. Childrens Press. 44 p., illus., 1970. $3.25. A young reader's account of the Apollo 11 flight to the Moon including what the astronauts found and what they accomplished on the Moon. NASA colored photos are used to illustrate the simple text. (P)

Fuchs, Erich. JOURNEY TO THE MOON. Delacorte Press. 26 p., illus., 1969. $4.50. A book of paintings by an outstanding German artist with his impressions of an important event of each of the eight days in the Apollo 11 journey to the Moon. Each picture, in full color, has a brief caption which is subordinate to the art created especially for children. (P-I-U)

Gagarin, Yuri and V. Lebedev. SURVIVAL IN SPACE. Praeger. 192 p., 1969. $5.95. The first Russian cosmonaut and a noted Russian psychologist, referring to both Soviet and American manned space flights, describe the psychological challenges and strenuous demands of future lunar and interplanetary space travel. They compare the ideal temperament required by space travel with the actual responses of Soviet cosmonauts. (S-A)

Gal, Guyala. SPACE LAW. Oceana. 627 p., 1969. $12.50. Deals with international space law and the uses of space as they affect the rights of individuals and air sovereignty. Discusses the legal status of space and celestial bodies, the positive and negative aspects of freedom of space and the peaceful uses of space. Also reports of the activity of the United Nations in regard to space and its use. (A)

Gamow, George and Harry C. Stubbs. THE MOON. Abelard. 128 p., illus., rev. 1971. $4.25. Data on the Moon as gathered by unmanned spacecraft and manned expeditions to the lunar surface. Recounts details of man's ancient dream becoming a reality when U.S. astronauts first set foot on the Moon. (U-S)

Gardner, Marjorie H. CHEMISTRY IN THE SPACE AGE. Holt. 176 p., illus., 1965. Paperback. $2.24. Discusses the chemistry of the solar system and beyond including the possibility of life on the planets. (S)

Gardner, Martin. SPACE PUZZLES: Curious Questions and Answers About the Solar System. Simon and Schuster. 96 p., illus., 1971. $4.95. A brief discussion of the Earth, Moon, Sun, planets, comets, asteroids, and space flight, with questions and puzzles to test the reader's knowledge of the space frontier. Answers are provided. (I-U)

Garelick, May. LOOK AT THE MOON. Scott. 32 p., illus., 1969. $4.35. A "concept" book that explores a simple question—Does everyone all over the world see the same Moon that I see? (P)

Gates, Robert L. INERTIAL GUIDANCE SYSTEMS. Sams. 173 p., illus., 1968. Paperback. $4.95. An explanation of inertial guidance systems, what they are, how they work, and their applications to missiles and spacecraft. A programmed learning course. (S-A)

General Electric Company. ASTROSOLAR MAP. General Electric Company. Rev., 1971. A chart, 29" x 38", in color, illustrating the solar system and giving numerous facts about the planets, the Moon, comets, asteroids and other features of our solar system. Single copy free. (I-U-S-A)

George, Frances. YOU AND SPACE. National Aerospace Education Council. 32 p., illus., rev. 1964. Paperback. 50 cents. A primary grade supplementary reader to develop concepts of space and space travel. Suggestions for class discussion are included. (P)

Glasstone, Samuel. THE BOOK OF MARS. #NAS 1.21:179. Stock #3300-0211. U.S. Government Printing Office. 315 p., illus., 1968. $5.25. Presents information gained about Mars over many years, using increasingly powerful and sensitive instruments and "gifted insights and rigorous induction." Discusses Mars'

historical background, its relation to the solar system, atmosphere, surface, clouds, the possibility of life on Mars and its detection, and exploration of the planet by spacecraft. (S-A)

————SOURCEBOOK ON THE SPACE SCIENCES. Van Nostrand, 960 p., illus., 1965. $12.95. Stresses significant advances in existing sciences that can be contributed by space flight. Discusses the impact space exploration has on the growth of knowledge for all scientific and engineering areas. Written in cooperation with the National Aeronautics and Space Administration. Semitechnical. (A)

Goodrum, John. WERNHER VON BRAUN. Space Pioneer. Strode, 128 p., illus., 1969. $3.95. A biography of one of the world's foremost rocketry experts. The third volume in the Heroes of Space series. (U-S)

Goodwin, Harold L. THE IMAGES OF SPACE. Holt, 189 p., 1965. Paperback, $2.24. Discusses the effects of space exploration successes and failures on the struggle between the democratic and communistic ideologies. Considers the political, economic, social, and moral implications of historical space events, and their contributions to national images. (S)

Green, Jack, editor. GEOLOGICAL PROBLEMS IN LUNAR AND PLANETARY RESEARCH. Vol. 25, Science and Technology series. American Astronautical Society, 750 p., 1971. $19.75. A collection of the most significant papers presented at three symposia held between 1968 and 1970. The papers are status reports on methods, techniques, and results obtained in investigating lunar and planetary surfaces. Discusses sensing techniques, and exploration concepts, methods, and technology. Geologists' expertise from many countries is applied to an understanding of the surface of the Moon and Mars. (A)

————*with Eleanor M. Rafn.* MAN EXPLORES THE MOON: A Geological Study of the Lunar Surface. Basic, 320 p., illus., 1971. $8.95. Information based on findings from the astronauts' lunar landings to provide present knowledge of the Moon. A pictorial presentation features comparison of geological formations on Earth with similar-looking features on the Moon. (S-A)

Grolier Educational Corp. SPACE: A Teacher's Guide. Grolier Educational Corp. A 16-page illustrated booklet, one of a series designed as a guide to the user of *The New Book of Knowledge*. Includes references to related text in the reference set, and suggests class and individual activities. Free. For the teacher of intermediate and upper elementary students. (A)

Gurney, Gene. AMERICANS TO THE MOON: THE STORY OF PROJECT APOLLO. Random, 147 p., illus., 1970. $3.95. A review of the Apollo manned flights from Apollo 8 through 11—from man's first lunar orbit to his first landing. Explains Apollo goals and how they were accomplished. Many unfamiliar photographs are included. (U-S-A)

Haggerty, James J. APOLLO: LUNAR LANDING. Rand McNally, 160 p., illus., 1969. $4.95. A detailed report on Project Apollo—why, what, and how. A step-by-step explanation from launch to quarantine after the return from the Moon. (U-S)

Hajek, Stanley M. and Ramond L. Schutte SPACE AGE TECHNOLOGY. Estes Industries, 52 p., illus., 1970. Paperback, $1. A 3- to 4-week teaching unit on rocketry designed to be integrated with mathematics, science and history at the junior high school level. The unit includes an opportunity for students to assemble and launch model rockets and can be used in small schools with limited equipment as well as in large, well-equipped classrooms. (U-S)

————TEACHER'S MANUAL for Space Age Technology. Estes Industries, 30 p., illus., 1970. Paperback, $1. (Sent free with an order for 25 copies or more of SPACE AGE TECHNOLOGY by the same authors). (A)

Halacy, D. S. COLONIZATION OF THE MOON. Van Nostrand, 160 p., illus., 1969. $3.95. The technology required to overcome the difficulties of the Moon's environment is discussed in simple terms. Potential colonization of the Moon and its use for mining, manufacturing, testing sites, and as an observatory and base for more extensive exploration of space are also considered. (I-U)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

Hammond, Inc. THE EARTH IN SPACE. #8204. Hammond, Inc. Diagrams of the relative positions of the Sun and Earth at the times of the equinoxes and solstices. Includes numerous exercises and problems involving elementary geometry and algebra. $1. (U-S)

————SPACE INFOGRAPH. #9090. Hammond, Inc. Brief facts about the Moon, Mercury, Venus, the Earth, and Mars, providing answers to usual questions about these members of the solar system. 50 cents. (I)

Hammond-Newsweek. CONQUEST OF SPACE. Hammond, 32 p., illus., 1969. Paperback, $1. A brief account of man's venture to the Moon. Discusses space flight hardware, rockets, the solar system, orbits, and the space program in general. (U-S)

Harris, Jacqueline. LIVING IN SPACE. American Education Publications, 64 p., illus. 40 cents. Supplementary information for the life sciences classroom. Covers many aspects of the biology of space exploration, including psychological problems, life support systems, and extraterrestrial life. (S)

Hartman, Edwin P. ADVENTURES IN RESEARCH. A History of Ames Research Center, 1940-1965. #NAS 1.21:4302. Stock #3300-0306. U.S. Government Printing Office, 555 p., illus., 1970. $4.75. A book in the NASA Center History series detailing the development and accomplishments of NASA research conducted at the Ames Research Center, Moffet Field, California. Part III deals mainly with the Center's involvement on NASA's space flight activities (space physics, space biology, extraterrestrial life, etc.) as well as with V/STOL and hypersonic aircraft. (S-A)

Hawkins, Gerald S. SPLENDOR IN THE SKY. Harper, 292 p., illus., rev. 1969. $8.95. A history of astronomy emphasizing the contributions of noted astronomers of the past and explaining how space science has its roots in history. (S-A)

Health, Education and Welfare, Department of, see U.S. Department of Health, Education and Welfare.

Hellman, Hal. CONTROLLED GUIDANCE SYSTEMS. Sams, 244 p., illus., 1967. Paperback, $4.95. Fundamentals of guidance systems covering ballistic trajectory, hyperbolic guidance, celestial navigation, and stellar-inertial guidance. Discusses principles, operating characteristics, and construction of various systems to increase understanding of their application in navigation and space travel. A semitechnical programmed text. (S-A)

Hendricks, Stanley. ASTRONAUTS ON THE MOON. The Story of the Apollo Moon Landings. Hallmark, 28 p., illus., 1970. $3.50. A "pop-up" book illustrating Apollo manned lunar missions. The accompanying text describes the "action" from launch through orbiting, landing on the Moon, redezvous with the Command Module, and final splashdown. Three-dimension movable art work. (P-I)

Hendrickson, Walter b. Jr. APOLLO 11. Men to the Moon. Harvey House, 46 p illus., 1970. $3.50. A factual account of man's first journey to the surface of the Moon. Explains numerous technicalities. Written for young readers. (I-U)

Henry, George E. TOMORROW'S MOON. Silver Burdett, 64 p., illus., 1969. Paperback, 25 cents. Discusses possible activities for lunar pioneers—mining, establishing a fuel station for future space ships, building an astronomical observatory, and using the Moon in medical therapy. A book in the 21st Century Monografics series. (I-U-S)

Henry, James P. BIOMEDICAL ASPECTS OF SPACE FLIGHT. Holt, 174 p., illus., 1966. Paperback. $2.24. Discusses the many physiological problems faced by a man in space, and how the problems are solved. (S)

Hickman, William D. TALKING MOONS: THE STORY OF COMMUNICATIONS SATELLITES. World Publishing, 125 p., illus., 1970. $4.95. A simple explanation of the science and technology of satellite communications. Also discusses the political and organizational developments behind this new means of communications, and its implications for the benefit of mankind. Includes a glossary. (S-A)

Highland, Harold. HOW AND WHY WONDER BOOK OF PLANETS AND INTERPLANETARY TRAVEL. Grosset, 48 p., illus., rev.

1970. $1.25. Simple explanations of many basic principles and facts concerned with space flight —laws of motion, the mechanics of flight, the environment of space, rocket fuels, the planets and solar system. (I-U)

Hill, Robert W. WHAT THE MOON ASTRONAUTS DO. John Day, 64 p., illus., 1971. $3.96. A step-by-step account of the U.S. manned space flight program beginning with Project Mercury but concentrating on the first Apollo lunar landing. A revised edition of *What the Moon Astronauts Will Do All Day.* (I-U-S)

Hodge, Paul W. THE REVOLUTION IN ASTRONOMY. Holiday House, 189 p., illus., 1970. $4.95. Revolutionary aspects of astronomy, such as radio waves, radar, gamma rays, satellite observatories, quasars, pulsars, etc. are discussed. The significance of the historic first landing on the Moon and plans for exploring Mars and other planets are explained. (S-A)

Holder, William G. SATURN V, THE MOON ROCKET. Messner, 192 p., illus., rev. 1970. $3.95. An updated story of the development of the rocket booster that launches men on their way to the Moon. Discusses details of design and operation, tracking systems, the Apollo spacecraft payload, and the future of the giant Saturn rocket. (U-S-A)

Holmen, R. E. and others. SPACE STATION OPERATIONS AND LOGISTICS. #700757. Society of Automotive Engineers, 16 p., illus., 1970. Paperback, $1.50. A review of the requirements to operate a space station. Discusses crew rotation, day-to-day activities aboard the space station, crew composition, support of the flight and on-board experiments, the space shuttle, and other facets of space station operation. (S-A)

Hough, Roger W. and others. SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #1: Identification of New Occupations-Formulation and Initiation of Study. Stanford Research Institute *Aerospace Systems Series.* Vol. 1. 26 p., 1968. Available from the National Technical Information Service. #N68-34391. $6. A report on a project to identify definitely space-oriented or space-directed occupations in NASA centers and in the aerospace manufacturing industry. Gives details of methods of research and also outlines recommendations to bring about government and industry adoption of new job titles. (A)

————SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #4: Economic Impacts. Stanford Research Institute *Aerospace Systems Series.* Vol. 5. 59 p., 1968. Available from the National Technical Information Service, #N68-34387. $6. Shows the positive influence NASA activities have had on southern communities where NASA activities are located. Discusses the improvement in the quality of education, the population growth, stimulation of local business and employment, upgrading of labor skills, and increasing per capita income. (A)

House of Representatives, see U.S. House of Representatives.

Hoyt, Edwin P. THE SPACE DEALERS: A Hard Look at the Role of American Business in Our Space Effort. Day, 256 p., illus., 1970. $6.95. A critical look at the private enterprise system and its involvement with government agencies in the nation's space program. (S-A)

Hubbard, Earl. THE SEARCH IS ON. Pace Publications, 176 p., 1969. Paperback, $1.25. A view of man's future from the new perspective of space. Presents one man's concepts of what accomplishments in space mean to life today and in the future. Evaluates "the emancipation of man from the Earth". (U-S)

Hubbard Scientific Company. ASTRONOMY STUDY PRINTS. #SPA-110. Hubbard Scientific Co. A portfolio of 12 durable study prints, in color, 9" x 15", with teacher's guide. For use both in Earth science and astronomy instruction. Includes explanations of day and night, the seasons, the planets, Sun, Moon and its phases, eclipses, tides, north and south star charts, galaxies, and telescopes. $8. (I-U-S)

————LUNAR SURFACE MODEL. #LSM-230. Hubbard Scientific Co. 18" x 24". Shows in relief craters, mountains, rills, "seas", and plains of the region surrounding the crater Copernicus. Scale model enables students to measure and determine depths of craters and

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heights of mountains. $8. (U-S)

————MOON EXPLORATION CHART. #MC-430. Hubbard Scientific Co. 44" x 50", in color. Useful in plotting Moon landings. Outlines impact area and shows many surface features which may be identified from direct observations. Pinpoints previous and possible future landing sites. Chart may be marked with "wash off" markers and comes with metal rods and hangers. $12.95. (I-U-S)

————SOLAR SYSTEM GUIDE. #SSD-197. Hubbard Scientific Co. An illustrated dial providing a "statistical view" of nine planets. Gives relative size, orbital velocity and path, mass, period of rotation, diameter, density, gravity at the surface, light reflectancy, length of year, distance from the Sun, escape velocity, atmosphere, surface characteristics, and known satellites in each case. $1.25. (U-S)

————STUDENT PROJECT PLANETARIUM. #PR-160. Hubbard Scientific Co. 22" x 17". A small planetarium model and solar system chart that may be set to show actual positions of Earth, Moon, and planets at any given time. An illustrated Study Guide includes planet position tables. $3.95. (U-S)

Huber, W. G. and D. C. Cramblit. THE SPACE STATION: A FUNDAMENTAL ELEMENT OF THE INTEGRATED SPACE PROGRAM. #700755. Society of Automotive Engineers, 69 p., illus., 1970. Paperback, $1.50. A review of the possible uses of space stations and their design so as to permit multipurpose applications for a wide variety of space missions. Discusses crews, possible kinds of experimental equipment, the reusable space shuttle, and possible space missions of the 1980's. While this is a technical report, much of the material can be readily understood by the general reader. (S-A)

Hunter, Maxwell, W., II. THRUST INTO SPACE. Holt, 192 p., illus., 1966. Paperback, $2.24. Discusses the principles of rocket propulsion and propulsion requirements for interplanetary and interstellar travel. (S)

Hyde, Margaret. EXPLORING EARTH AND SPACE. McGraw-Hill, 174 p., illus., 5th ed. 1970. $4.95. The latter third of this book discusses the exploration of space through the use of sounding rockets, unmanned spacecraft, and manned flight to the Moon. Radio telescopes are explained. (I-U)

————OFF INTO SPACE! McGraw-Hill, 64 p., illus., rev. 1969. $3.95. Answers basic questions children have about long-term space travel: what will the space traveler wear, what will he eat, how long will he be gone, etc. Provides important facts about gravity, the solar system, and rocketry. (I)

Hymoff, Edward. GUIDANCE AND CONTROL OF SPACECRAFT. Holt, 170 p., illus., 1966. Paperback, $2.24. Explains systems used to guide and control spacecraft on various kinds of missions, both manned and unmanned. (S)

Hynek, Allen. EXPLORING THE UNIVERSE. American Education Publications, 48 p., illus., rev. 1970. 40 cents. An introduction to astronomy. Discusses the solar system, stars, observatories and planetariums, manned spacecraft, artificial satellites, the role of balloons in space research, radio astronomy, and many other related topics. (U-S)

Independent Tracking Coordination Program of the Society of Photographic Scientists and Engineers.

SATELLITE PREDICTION SERVICES. ZIPSAT satellite prediction schedules give fix details of all satellite passes of interest to a particular subscriber. Prediction schedules are computed at two-week intervals from fresh orbital elements on more than 500 satellites. The BASIC OPTIC subscription provides all the information an observer needs to look at or take pictures of all passes of the 40 brightest satellites predicted to pass more than 30 degrees above his horizon on moonless evenings. One-year BASIC OPTIC subscription is expected to cost about $12.50. The OPTIC fix detail supplied by ZIPSAT includes date, civil time, azimuth, elevation, slant range, right ascension, declination, satellite heading at the fix point, the direction of the observer's zenith at the fix point (for map orientation), apparent magnitude, and the satellite's Catalog Number, Popular Name, COSPAR Designation and the stan-

dard brightness. The BASIC OPTIC service details only one fix per pass. ZIPSAT RADIO prediction service covers more fix points per pass, but details date, time, azimuth, elevation, range and satellite identity only. Prediction services covering groups of satellites selected by the ZIPSAT subscriber, covering longer search periods per day and/or supplying greater pass detail, are available. Charges for extended ZIPSAT services will be based on computer processing time until group rates can be established. (S-A)

PATHFINDER STAR ATLAS. A set of sixteen 17 1/2" x 23" star charts for outdoor use in taking pictures of or looking at artificial earth satellites, and for celestial navigation. All stars of 7.75 magnitude or brighter are mapped. A range of sixteen star image sizes is used to represent relative brightness. Right ascension and declination coordinate grids are printed in black. Rationalized coordinate grids are overprinted in red, as are the standard constellation patterns developed by George Lovi for use with the monthly star charts published in *Sky and Telescope* magazine. The Bayer and proper names of all stars listed in the Air Almanac are also printed in red ink. Red information detail "drops out" when charts are illuminated at night with a ruby, dark-room lamp or a flashlight with a No. 70 Wratten filter behind the lens. Six ZIPSAT detail overlays are provided for mapping satellite fix points and directions, and the direction of the observer's zenith for chart orientation. THE PATHFINDER STAR ATLAS is waterproof and tearproof. Satellite preplan information may be marked in pencil and/or ZIPSAT detail overlays may be taped in position without damaging the surface. The price of the PATHFINDER STAR ATLAS, including overlays, is $15. (S-A)

RATIONALIZED GENERAL CATALOG OF 33,342 STARS. Epoch 1950.0 for use in determining: (1) General Catalog Number (identity); (2) Apparent photo-visual magnitude in hundreths of magnitude units; spectral type, and proper motion of stars mapped in the PATHFINDER STAR ATLAS (see above). The rationalized coordinate grid overprinted in red on the PATHFINDER STAR ATLAS permits direct entry into the Rationalized General Catalog. $4. (S-A)

ORBITAL ELEMENT ANNOUNCEMENT SERVICE. Biweekly airmail announcements giving current orbital elements on approximately 500 selected artificial satellites in Earth orbit are supplied to computing centers in the U.S., Canada and Mexico for $3.25 per year and for overseas addresses at $6.50 per year. (A)

Institute of Electrical and Electronic Engineers. FREQUENCY SPECTRUM CHART. Institute of Electrical and Electronic Engineers. Approximately 40" x 15", in color, showing the range of electromagnetic wave lengths and illustrating numerous details as to man's use of these frequencies on Earth and in space. Also provides information on the propagation effects, generation and side effects of these natural phenomena. Free. (S-A)

International Business Machines. SUDDENLY, TOMORROW CAME. International Business Machines, 36 p., illus., single copy free. A booklet outlining the historical background of manned space flight. Includes sketches of famous scientists such as Kepler, Newton and Galileo and their contributions and then discusses modern scientists such as Tsiolkowski and Goddard to explain today's manned space flights. Shows how computers are a major factor in space technology. (S-A)

Jacobs, Leland B., editor. POETRY FOR SPACE ENTHUSIASTS. Garrard, 64 p., illus., 1971. $2.39. A selection of children's poems on space, astronomy and aviation subjects. (P-I)

Jaffe, Leonard. COMMUNICATIONS IN SPACE. Holt, 167 p., illus., 1966. Paperback, $2.24. Explains theories and operation of Communications satellites such as Echo, Relay, Telstar and Syncom spacecraft. Also considers the future of this kind of communications system. (S)

Jammer, Max. CONCEPTS OF SPACE: The History of Theories of Space in Physics. 2nd ed.

Order items directly from sources as indicated. Addresses of sources may be located on pages 111–116.

Harvard University Press, 221 p., illus., rev. 1969. $5.50. A scholarly history of the concepts of space from antiquity to modern times. Includes excerpts from many original documents. The revision has a greatly expanded conclusion reflecting changes in thought and events that have occurred since the book was first published in 1954. (A)

Jastrow, Robert. RED GIANTS AND WHITE DWARFS. Harper, 190 p., rev. 1971. $6.95. The history of the universe is traced back to "a swirling cloud of primordial hydrogen" billions of years before even our solar system was formed. A discussion of the emergence of intelligent life is expanded to include an examination of the possibilities of extraterrestrial life. The book has been updated to include results of manned lunar landings and space probes to Mars. (S-A)

————*and M. H. Thompson.* ASTRONOMY: FUNDAMENTALS AND FRONTIERS. Wiley, 464 p., 1972. $12.50. Gives the modern view of astronomy, stressing latest developments in astronomy, including stellar evolution, radio astronomy, galaxies, quasars, and pulsars. Gives full accounts of the findings from lunar and planetary exploration. Planned as an introductory college textbook for nonscience majors, but also useful in high school. (S-A)

Jet Propulsion Laboratory. THE JET PROPULSION LABORATORY TODAY. Jet Propulsion Laboratory, 12 p., illus., 1970. Free. A booklet explaining the work of the Laboratory and its contributions to the U.S. space program —particularly the Ranger and Mariner projects. Also outlines ongoing research and development programs. (S-A)

————MARINER MARS 1969. PICTURES AND RESULTS FROM MARINER VI AND VII. Jet Propulsion Laboratory. An illustrated leaflet providing information received from the unmanned Mariner spacecraft exploring Mars in 1969. Reproduces photographs of the surface of Mars and indicates which portion of the surface is depicted. Free. (S-A)

————MARINER MARS 1971 MISSIONS. Jet Propulsion Laboratory. An illustrated leaflet giving information about the unmanned exploration of Mars in 1971. Free. (S-A)

————SURVEYOR. Soft-Landing Lunar Spacecraft. Jet Propulsion Laboratory. An illustrated brochure describing the Surveyor spacecraft, their missions on the Moon, and the results. Free. (S-A)

Junior Engineering Technical Society. THE JETS PROGRAM. Junior Engineering Technical Society. A booklet explaining the purposes of JETS (Junior Engineering Technical Society) and how to organize and obtain sponsorship for a student chapter in this non-profit educational organization for stimulating interest in engineering and technical careers. Free. (S)

Kash, Don E. THE POLITICS OF SPACE COOPERATION. Purdue University Studies, 137 p., 1967. $4.95. A study of the foreign policy implications of U.S. participation in international space programs. Emphasizing the peaceful rather than the military activities in space, the study examines U.S. goals, the means of achieving them, and whether these means are leading the nation toward unanticipated results. (S-A)

Kennan, Erlend A. and Edmund H. Harvey, Jr. MISSION TO THE MOON. Morrow, 396 p., illus., 1969. $8.95. A critical examination of NASA and the nation's space program. Discusses the race to the Moon, and suggests that NASA's program in the future be considered as just *one* of several national technological and scientific endeavors required by the nation. (A)

Knight, David C., editor. AMERICAN ASTRONAUTS AND SPACECRAFT. Watts, 159 p., illus., 1970. $7.95. A pictorial history of the U.S. space program from Project Mercury through Apollo 13. Brief biographies of each astronaut, and a glossary are provided. (I-U-S-A)

————METEORS AND METEORITES. Watts, 91 p., illus., 1969. $3.75. An introduction to meteoritics explaining the differences among meteoroids, meteors, and meteorites, and the phenomena associated with them. (U-S)

Kondo, Herbert. THE MOON. Watts 96 p., illus., rev. 1971. $3.75. An updated description of the Moon based on Apollo 11 and 12 discoveries. Includes the latest theories of the origin of the planets, an evaluation of Moon rocks and an

account of scientific experiments being carried out on the lunar surface. (U-S)

Kopal, Zdenek. TELESCOPES IN SPACE. Hart Publishing Co., 256 p., illus., 1970. $12.50. Traces the development of telescopes from the invention in the 17th century to today's spacecraft-borne instruments. Discusses the use of balloons and rockets in putting astronomical instruments into space, and the potentials of manned orbiting telescopes in space. (S-A)

Kosofsky, L. J. and Farouk El-Baz. THE MOON AS VIEWED BY LUNAR ORBITER. #NAS 1.21:200. Stock #3300-0219. U.S. Government Printing Office, 152 p., illus., 1970. $7.75. A selection of captioned distant and closeup black and white photographs of the Moon taken by cameras in five Lunar Orbiter spacecraft during the 12-month period August 1966-August 1967. Also describes briefly the Lunar Orbiter program, the spacecraft, and their camera systems. Colored spectacles for stereoscopic viewing are included in an envelope inside the book cover. (S-A)

Labor, Department of, see U.S. Department of Labor.

Larmore, Lewis and R. L. Gervais, editors. SPACE SHUTTLES AND INTERPLANETARY MISSIONS. Vol. 28 of the Advances in the Astronautical Sciences series. American Astronautical Society, 473 p., illus., 1970. $17.75. A collection of papers presented at the 16th Annual Meeting of the American Astronautical Society, June 1970. Discussions of space shuttle design, maneuvers, operations and propulsion, including nuclear engines, for missions to the Moon and the planets. Semitechnical. (A)

————SPACE STATIONS. Vol. 27, Advances in the Astronautical Sciences series. American Astronautical Society, 591 p., illus., 1970. $18.75. Papers delivered at the 16th Annual Meeting of the American Astronautical Society, June 1970. Topics discussed include astronaut capabilities for scientific observations, commercial uses of space stations, habitability, international cooperation in space exploration, safety, space shuttle systems, manned planetary missions, and numerous other related subjects. While some of the material is technical, a good part of it can be understood by the general reader. (S-A)

Lay, S. Houston and Howard J. Taubenfeld. THE LAW RELATING TO ACTIVITIES OF MAN IN SPACE. University of Chicago Press, 360 p., 1970. $17.50. An analysis of the relevant laws of nations as they now exist in relation to the control of space. Examines treaties, customs, statutes and related sources. Also discusses ways in which this body of law may develop in the future. (A)

Layton, J. Preston, editor. PROCEEDINGS OF THE PRINCETON UNIVERSITY CONFERENCE ON AEROSPACE METHODS FOR REVEALING AND EVALUATING EARTH'S RESOURCES. Princeton University Conference, approx. 350 p., illus., 1970. Paperback, $10. A collection of papers delivered by scientists and engineers working on remote sensor technology. Discusses hardware, potentials, manned and unmanned spacecraft sensing systems, data requirements from the user's viewpoint, and the economic and international aspects of remote sensor technology. While a good part of the material is technical, much of it can be understood by the general reader. (S-A)

Lessing, Erich. DISCOVERIES OF SPACE: A PICTORIAL NARRATION. Herder & Herder, 200 p., illus., 1969. $22.50. Biographical essays on six great scientists who contributed to our knowledge of the universe—Kepler, Copernicus, Galileo, Pascal, Newton, and Einstein. Includes 50 color plates of the environment, instruments and data associated with the discoveries made by these men; and an article on space flight written by Wernher von Braun. (S-A)

Levine, Sol. YOUR FUTURE IN NASA. Arco, 185 p., illus., rev. 1971. Paperback, $1.95. A study of the aerospace industry from the vocational viewpoint. Discuss NASA-related occupations, qualifications, both personal and educational opportunities, advantages and disadvantages, and many other topics of interest to young people. (U-S)

Levitt, I. M. SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #3: Astronomy As An Example of Scientific Impacts.

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

Stanford Research Institute *Aerospace Systems Series*, Vol. 3, 60 p., 1968. Available from the National Technical Information Service. #N68-34390. $6. Discusses the revolution in astronomy resulting from new error-free methods and new facts derived from exploration of the planets and sun by unmanned spacecraft. (A)

———*and others*. SOME MAJOR IMPACTS OF THE NATIONAL SPACE PROGRAM. #7: Final Pilot Study Report. Stanford Research Institute *Aerospace Systems Series*, Vol. 7, 54 p., 1968. Available from the National Technical Information Service. #N69-12564. $6. A summary of the six areas of study covered by the Aerospace Systems Series. Spin-off benefits of the space program were defined and measured for their impacts upon aviation, science, materials technology, economy, public health, medicine, biology, and newly derived occupations. The study found that the very successful technological advances were not positively presented to the American public for full appreciation. (A)

Lewis, Richard S. APPOINTMENT ON THE MOON: The Inside Story of America's Space Program. Viking, 434 p., illus., rev. 1969. $10. An overvew of the U.S. space program up to preparations for landing on the Moon. Also includes background material on German rocketry during World War II, and forecasts for the exploration of the lunar surface in the 1970's. (S-A)

Ley, Willy. EVENTS IN SPACE. McKay, 180 p., illus., 1969. $5.95. Available in paper covers from Popular Library, 75 cents. A history of space exploration through the Apollo 9 flight, covering the scientists, astronauts, and space vehicles that have figured in the "race of nations into the solar skies." Also comments on future space flights and includes numerous useful tables. (S)

———GAS GIANTS: THE LARGEST PLANETS McGraw-Hill, 144 p., illus., 1970. $3.95. Decribes the entire family of planets of our solar system and then concentrates on Jupiter, Saturn, Uranus, Neptune, and Pluto. Historical and scientific information are interwoven. (I-U-S)

———VISITORS FROM AFAR: THE COMETS. McGraw-Hill, 144 p., illus., 1969. Facts about comets in general, and about Halley's comet in particular. Also investigates the possibility of sending a space probe to a comet. (U-S) *Out of print.*

Lieberman, Alvin and Peter Schipma. AIR-POLLUTION-MONITORING INSTRUMENTATION. #NAS 1.21:5072. Stock #3300-0268. U.S. Government Printing Office, 74 p., 1969. 40 cents. A review of 32 instruments and techniques originally developed for aerospace work such as monitoring spacecraft cabin atmosphere, clean rooms and other areas where both gas and vapor analysis, and particle collection and monitoring were in progress. Useful to a study of control of air pollution. Semitechnical. (A)

Lindaman, Edward B. SPACE: A NEW DIRECTION FOR MANKIND. Harper, 160 p., 1969. $4.95. The story of space science, how man's activities in space are changing the world today, and what changes may be expected in the future. (U-S)

Logsdon, John M. DECISION TO GO TO THE MOON. The Apollo Project and the National Interest. M. I. T. Press, 240 p., 1970. $10. A political scientist relates how the decision to make a manned lunar landing was made. An historical record based on numerous NASA records and government documents, many not before released, including Presidential papers. (A)

Logsdon, Thomas S. THE RUSH TOWARD THE STARS. Franklin, 224 p., illus., 1970. $6.80. An introduction to space flight summarizing technological breakthroughs. Discusses extraterrestrial life, astrodynamics, launch vehicles, space propulsion, satellites and their accomplishments, and life support in space. Provides motivation for science students. (S)

Mailer, Norman. OF A FIRE ON THE MOON. Little, Brown, 472 p., 1970. $6.95. The writer gives his impressions of the U.S. space program, the Apollo 11 flight to the Moon, and space technology. Also discusses his own philosophy about the significance of the Moon landing. (S-A)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

Malewicki, Douglas. MODEL ROCKET ALTITUDE PERFORMANCE. #TIR-100. Centuri, 52 p., illus., 1968. Paperback, $1. Uses graphs and explanations to assist in understanding the interrelationship among parameters such as engine thrust, rocket weight, aerodynamic drag on various nose and body shapes, and how these parameters affect altitude performance. Graphs permit selection of engines for specific altitudes without the use of mathematics. Useful for model rocket design reference. (U-S-A)

————ROCKETRY SCIENCE HANDBOOK OF FLIGHT EXPERIMENTS. L. M. Cox Manufacturing Co. A 20-page illustrated booklet giving answers to many questions about model rocket performance. Also includes experiments that test the validity of the answers. 50 cents. (U-S-A)

Malina, Frank J. THE ROCKET PIONEERS. Memoirs of the infant days of rocketry at Caltech. Jet Propulsion Laboratory, 8 p., illus., 1968. Free. A leaflet recalling interesting events in the early days of rocket research in the U.S. Includes references to Dr. Goddard and Dr. von Karman and their work in the 1930's and 1940's. (S-A)

Mallan, Lloyd. SUITING UP FOR SPACE. Day, 272 p., illus., 1971. $9.95. The story of the engineering and technology involved in the development of the space suit. Explains how as the goals of the space program moved forward, space suit design was improved to meet the demands of manned space flight. (S-A)

Martin, E. J. THE USE OF SPACE SYSTEMS TO SUPPORT THE GROWTH OF INTERNATIONAL AIR TRANSPORTATION. #700760. Society of Automotive Engineers, 8 p., illus., 1970. Paperback, $1.50. Discusses the nature and magnitude of anticipated air traffic, the control of this traffic and how space systems can contribute to potential problems in this field. Discusses communications, air traffic control, and navigation applications. (S-A)

Massachusetts Department of Education. AERO-SPACE CURRICULUM RESOURCES GUIDE. See Packard, John W. and Hiram R. Haggett, p. 131.

Mathematical Association of America. GUIDEBOOK TO DEPARTMENTS IN THE MATHEMATICAL SCIENCES IN THE UNITED STATES AND CANADA. 4th ed., 1970. Mathematical Association of America. A summary of facts about the location, size, staff, library facilities, course offerings, and special features of departments in mathematical sciences in four-year colleges and universities. 75 cents. (S)

————PROFESSIONAL OPPORTUNITIES IN MATHEMIATICS. 8th ed., 1971. Mathematical Association of America. A booklet discussing employment of mathematicians in industry, government, and in the teaching profession. Describes work, qualifications, and training, and where employment may be found. 35 cents. (S)

Mathews, William, III. SCIENCE PROBES THE EARTH. New Frontiers of Geology. Sterling, 176 p., illus., 1969. $4.95. One of the Advances in Science series, emphasizing new methods of geologic research through satellite techniques and study of the Moon by spacecraft —the latter in an effort to determine if the Moon can explain the origin of the Earth. Relates research in geology to space research. (S-A)

McCauley, John F. MOON PROBES. Silver Burdett, 64 p., illus., 1969. Paperback, $1.35. Vital data on the Moon provided by the unmanned lunar probes, Ranger, Surveyor, and Lunar Orbiter, plus Soviet spacecraft. Non-technical explanations. A book in the 21st Century Monografics series. (I-U-S)

McGrath, Dorn C., Jr. ENVIRONMENTAL CONSIDERATIONS AND THE METROPOLITAN AIRPORT SYSTEM. #700253. Society of Automotive Engineers, 8 p., 1970. Paperback, $1.50. Examines the nature of the environmental challenges that airports face. Discusses aircraft noise and the use of land planning and zoning for future airports. Includes a report on the effects of aircraft noise on a school near an airport. (S-A)

McIntyre, Kenneth M., editor. SPACE SCIENCE EDUCATIONAL MEDIA RESOURCES. A Guide for Junior High School Teachers. Bureau

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

of Audiovisual Education, University of North Carolina, 107 p., rev. 1966. Paperback, $3.50. Course outlines, activities, and related audiovisual and classroom materials. While much of the material deals with Earth science, a major portion includes elementary astronomy limited to the solar system and the place of the Earth in the Sun's family. Space exploration is treated as a related topic. For the teacher. (A)

McWinney, Edward, editor. THE INTERNATIONAL LAW OF COMMUNICATIONS. Oceana, 170 p., 1971. $7.50. A discussion by experts from 5 continents meeting on the legal problems posed by the rapidly developing technology of communications satellites. Proceedings of a conference co-sponsored by the Twentieth Century Fund and the Institute of Air and Space Law, McGill University. (A)

————*and Martin A. Bradley, editors.* NEW FRONTIERS IN SPACE LAW, Oceana, 134 p., 1969. $6.50. A collection of essays on numerous topics dealing with international space law. The essays were written in nonlegal language by jurists representing all the major political and social systems of the world community. Some topics: the law-making process for outer space; fundamental principles of space law; tendencies and prospects concerning the development of space law; liability; space rescue; and registration of spacecraft. Several chapters are in French. (S-A)

Menzel Donald H., Fred L. Whipple and Gerard de Vaucouleurs. SURVEY OF THE UNIVERSE. Prentice-Hall, 860 p., illus., 1970. $16.50. Three eminent astronomers provide a comprehensive examination of the elements of the universe. Considers the history of astronomy, the motions of Earth, gravity, astronomical tools including radio telescopes, measurements of the solar system, radiation, the Moon, Mars, and Venus as studied by manned and unmanned missions, space exploration, the possibilities of extraterrestrial life, stars, galaxies and many other major pertinent topics. (S-A)

Metzger, Frederick B. and William M. Foley. STOL AIRCRAFT NOISE CERTIFICATION—A RATIONAL APPROACH. #700325. Society of Automotive Engineers, 12 p., illus., 1970. Paperback, $1.50. Presents background information on STOL (short takeoff and landing) aircraft noise, STOL airport site characteristics, and noise evaluation units. Emphasizes the uniqueness of STOL ports, approach paths and other related topics. Semi-technical, but should be readily understood by readers who are familiar with noise terminology. (S-A)

Model Products Corporation. FLYING MODEL ROCKETRY. Model Products Corp. A leaflet describing flyable model rockets and accessories, including ready-to-fly models as well as those to be assembled. Free. (U-S-A)

————FLYING MODEL ROCKET STARTER SET. #3-0904. Model Products Corp. Includes a rocket launch pad, launch controller, a Pioneer 1 Rocket, 2 rocket engines, carrying case, and instruction sheet with explanations of flying model rocketry, safety code, suggested beginner projects and construction diagrams. $8.95. (U-S-A)

————MINIROCS. Model Products Corp. A leaflet cataloging minature rockets, rocket engines, and accessories which have been developed to overcome the weight and drag problems of regular size model rockets. Free. (U-S-A)

Model rocketry. See Section 15—Curriculum Resource Materials and Aids to Teachers—(p. 29) for listings related to model programs, experimentation, sources of supplies, etc. (U-S-A)

Moore, Carleton. COSMIC DEBRIS. Silver Burdett, 64 p., illus., 1969. Paperback, 25 cents. An examination of meteors, asteroids, comets, and other kinds of cosmic matter. A book in the 21st Century Monografics series. Nontechnical language. (I-U-S)

Morgenthaler, George W. and Robert Morra, editors. PLANNING CHALLENGES OF THE 70'S IN SPACE. Vol. 26, Advances in the Astronautical Sciences series. America. Astronautical Society, 445 p., illus., 1970. $16.75. A collection of papers presented at a joint meeting of the American Astronautical Society and the Operations Research Society, June 1969. Subjects of papers include manned and automated Earth orbital missions; large space

stations; space logistics and rescue; space ports; space ecology and human factors; manned planetary missions; further lunar missions; planetary probes; space applications for weather, navigation, communications, and data transfer; the commercial utilization of space; and space flight safety. While some of the articles are technical, many can be understood readily by the general reader. (S-A)

Moulton, Forest R. INTRODUCTION TO CELESTIAL MECHANICS. Dover, 450 p., 1970. Paperback, $4. A general overview of celestial mechanics, of interest to all who want to know the essentials of the subject. (A)

Mutch, Thomas A. GEOLOGY OF THE MOON: A Stratographic View. Princeton Univ. Press, 324 p., illus.. 1970. $17.50. Beginning with 17th century telescopic observations of the Moon and ending with a description of the preliminary results of the Apollo 11 landing, the book presents a synthesis of lunar geologic study. Provides considerable scientific data from scattered sources not readily available, yet essential for lunar study. Semi-technical. (A)

Narimanov, G. S. FROM SPACESHIPS TO ORBITING STATIONS. A Transdex Book available from CCM Information Corporation, 80 p., 1969. Paperback, $9.50. A study of Soviet cosmonautics: Vostok, Voskhod, and Soyuz spacecraft, and the first experimental space stations. An English translation. (A).

NASA. See U.S. National Aeronautics and Space Administration listings beginning on page 75.

National Aerospace Education Association. INVITATION TO MEMBERSHIP IN THE NATIONAL AEROSPACE EDUCATION ASSOCIATION National Aerospace Education Association. A brochure describing the aims, objectives, services, and publications of NAEA, a non-profit professional aerospace education organization. Free. (A)

————PROJECT APOLLO. National Aerospace Education Association. Chart, 44" x 25" with 27 captioned drawings, photographs and diagrams tracing, step-by-step, how the astronauts land on the Moon, and how they return to Earth. $1 (I-U-S)

————ROBERT GODDARD: "FATHER" OF MODERN ROCKETRY. National Aerospace Education Association, 1967. Illustrated booklet giving the main facts of Dr. Goddard's life and work. Includes hard-to-find information such as Dr. Goddard's autobiography written in 1927, and a compilation of Goddard exhibits, honors, and memorials. 50 cents. (U-S-A)

————ROBERT H. GODDARD PORTFOLIO No. 1. National Aerospace Education Association. Ten selected black and white captioned pictures from the life and work of the "father" of modern rocketry, specially selected by Mrs. Robert Goddard. 8 1/2" x 11". $1 per set. (I-U-S-A)

————SUGGESTIONS FOR COMMEMORATING GODDARD DAY—March 16. National Aerospace Education Association. A 4-page leaflet calling attention to the significance of March 16 and providing numerous suggestions for individual and class activities for commemorating the anniversary of the first flight of a liquid fuel rocket. 25 cents. (A)

National Association of Rocketry. MODEL ROCKETRY, the Space Age Hobby. National Association of Rocketry. Minimum order 10 copies for $1.00. An illustrated leaflet explaining model rocketry and NAR's rocket safety program. Outlines model rocket safety codes for solid propellants. Discusses advantages of membership in the Association. (U-S-A)

National Council of Teachers of Mathematics. MATHEMATICS AND MY CAREER. National Council of Teachers of Mathematics. 54 p., 1971. $1.30. Writing about the usefulness of mathematics in their widely differing careers, seven young men encourage young people to continue the study of mathematics even if they expect to work in another field. (U-S)

National Geographic Society. THE EARTH'S MOON. National Geographic Society. 42" x 28". Includes both the familiar near side and the largely hidden far one. Indexed with descriptive notes, lunar flight data. Paper edition, $2; plastic edition, $3. (U-S-A)

————A GIANT LEAP FOR WOMANKIND, TOO. *National Geographic School Bulletin*, Jan. 25, 1971. National Geographic Society. 10 cents. A brief illustrated article on the

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roles which women play in the U.S. space program. (I-U)

————A LIST OF ASTRONOMY ARTICLES appearing in issues of the *National Geographic Magazine* from November 1932 through August 1970. National Geographic Society. Free. (U-S-A)

————A LIST OF SPACE TRAVEL ARTICLES appearing in issues of the *National Geographic Magazine* from Dec. 1926 through August 1970. National Geographic Society. Free. (U-S-A)

————RADIO TELESCOPES HELP BOYS EAVESDROP ON THE STARS. *National Geographic School Bulletin*, Feb. 10. 1969. National Geographic Society. 10 cents. A young student tours the National Radio Astronomy Observatory at Green Bank, West Virginia. (I-U)

National Research Council. SUMMARIES OF PANEL REPORTS. Useful Applications of Earth-Oriented Satellites series. National Academy of Sciences. 92 p., 1969. $2. Summaries of National Academy of Sciences reports made by Technical Panels over a two-year period 1967-69, on the "probable future usefulness of satellites in practical Earth-oriented applications." Reports and recommendations cover forestry, agriculture, geography, geology, hydrology, meteorology, oceanography, sensors, data systems, communications, broadcasting, navigation, air traffic control, cartography, and geodesy, together with economic analyses. (S-A)

————*Committee on Remote Sensing for Agricultural Purposes.* REMOTE SENSING. WITH SPECIAL REFERENCE TO AGRICULTURE AND FORESTRY. National Academy of Sciences. 468 p., illus., 1970. $12.95. Discusses such subjects as the use of remote sensors for taking agricultural and forestry inventory data in relation to world food-population disparity, forest fire and disease detection, wildlife inventories, soil and water resources studies, and the techniques for collecting this data in this manner. A portion of this book describes the potentials of the use of specially equipped satellites to achieve these facts. Semi-technical. (A)

————*Space Committee on Rocket Research.* SOUNDING ROCKETS: THEIR ROLE IN SPACE RESEARCH. National Academy of Sciences, 49 p., 1969. Free. Evaluates scientific progress in rocket research and recommends future direction of the program. (A)

National Science Teachers Association. A UNIVERSE TO EXPLORE. A Space Sciences Source Book for Junior High School Teachers. 471-14562. National Science Teachers Association, 139 p., illus., 1969. Available from the NEA Publications Sales Division. Paperback, $4, cash with order unless requested on official school stationery. A joint project of the National Science Teachers Association and NASA. "A springboard for a study in depth of selected topics related to the space sciences." Topics include the Earth as a platform in space, astronomical measurement, solar cells, space environment, and simulation in the laboratory. The book also offers a section on student experiments, sources of information, and a bibliography. For the teacher. (A)

National Society of Professional Engineers. ENGINEERING. A Career of Opportunity. National Society of Professional Engineers. An illustrated booklet with brief discussions of the engineering profession in general, fields where engineering backgrounds are required, preparing for an engineering career, and opportunities for women in the profession. Free. (S)

Naturegraph Co. CONSTELLATION GAME. Naturegraph Co. A game for any number of players that teaches the positions of the constellations, major stars, and planets. May be played while observing the night sky. $1.25. (U-S-A)

Naugle, John E. UNMANNED SPACE FLIGHT. Holt, 175 p., illus., 1965. Paperback, $2.24. Discusses the scientific experiments carried on by instrumented unmanned satellites and space probes. (S)

Newell, Homer E., Jr. SPACE BOOK FOR YOUNG PEOPLE. McGraw-Hill. 176 p., illus., rev. 1968-$4.95. An updated edition of an authoritative book about space exploration. Explains the solar system and its individual members, supplies the mathematics which is necessary for a real comprehension of space.

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distances, rocket speeds, etc., and examines discoveries obtained from scientific satellites. Emphasizes the mechanics of space flight. (I-U)

Newlon, Clarke. 1001 QUESTIONS ANSWERED ABOUT SPACE. Dodd, Mead, 356 p., illus., rev. 1971. $7.50. A review of space exploration and space flight presented in a question and answer form. Explains techniques such as telemetry, guidance and reentry, and discusses space propulsion, life support systems, and extraterrestrial life. The revised edition covers events in space through the flight of Apollo 12. (U-S-A)

Nicks, Oran W. THIS ISLAND EARTH. NASA SP-250. #NAS 1.21:250. Stock #3300-0021. U.S. Government Printing Office. 182 p., illus., 1970. $6. Illustrated with many large color photographs taken by Apollo astronauts, this is an account of how our planet would appear to visitors from afar, and suggests the ways in which further exploration of the solar system may increase appreciation and enjoyment of Earth. Discusses the Sun, Earth's atmosphere, water and land areas, plus evidences of man's activities on Earth as seen from space. (S-A)

Nicolson, Iain. ASTRONOMY. Grosset, 160 p., illus. 1970. $3.95. A book in the All Color Guides series, presenting the development of astronomy and man's view of the universe. (S-A)

Nininger, H. H. A COMET STRIKES THE EARTH. American Meteorite Laboratory, 65 p., illus., rev. 1969. Paperback, 75 cents. Basic information about meteorites—how to recognize them, the phenomenon of "fall", crater-forming meteorites, and the Arizona meteor crater. Also includes a sample of oxidized meteorite. (S-A)

Niskern, Kieth. MODEL ROCKET DESIGNERS MANUAL. Centuri Engineering, 32 p., illus., 1971. Paperback, $1.25. Step-by-step instructions on how to design and build model rockets. (U-S-A)

Northrop Corporation. LIFTING BODIES. Northrop Corp. An illustrated leaflet describing the HL-10 and M2-F3 lifting body vehicles built for NASA under a program to develop a means to allow astronauts to choose landing sites anywhere on Earth as they return from space missions. Free. (S-A)

————NORTHROP CONTRIBUTIONS TO V/STOL AIRCRAFT. Northrop Corp., 3 p., illus. Describes briefly various developments in V/STOL aircraft design and testing for which the company is responsible. Free. (S-A)

Nourse, Alan E. NINE PLANETS. Astronomy for the Space Age. Harper, 322 p., illus., rev. 1970, $8.95. Updated facts about the planets of our solar system—especially emphasizing the Moon, Venus and Mars and both the U.S. and Soviet unmanned space probes. The author develops a vivid picture of the physical nature of the planets and satellites on the basis of known fact and strong probabilities. He also discusses the philosophical problems that space exploration has created concerning the nature of the universe and man's place in it. (S-A)

Ogden, Herbert S. and M. V. DeVault. ASTRONOMY. Steck-Vaughn, 48 p., illus., 1969, $2.25. A young reader's introduction to the science of astronomy, including discussions of stars, galaxies, elementary celestial mechanics, the planets, comets, and meteors. (I-U)

O'Leary, Brian. THE MAKING OF AN EX-ASTRONAUT. Houghton-Mifflin, 243 p., illus., 1970. $5.95. A former scientist astronaut, who resigned from NASA's manned space flight program, reveals his personal disenchantment with NASA and his frustrations as a scientist in a program which he believed to be test pilot oriented. (S-A)

Olney, Ross. AMERICANS IN SPACE. Nelson, 188 p., illus., rev. 1970. $5.95. An updated and enlarged edition of a 1969 book which summarizes advances in U.S. manned space flight. Gives accounts of Astronaut Shepard's flight in 1961 through manned flights terminating with the ill-fated Apollo 13 flight. Includes a glossary and several charts on manned flights and astronaut status at the time the book was published. (U-S)

Packard, John W. and Hiram R. Haggett, project directors. AEROSPACE CURRICULUM RESOURCE GUIDE. #NAS 1.18:Ac8. Stock #3300-0108. U.S. Government Printing Office, 197 p., illus., 1968. $1.75. A guide for

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elementary and secondary school teachers representing a compilation of space-related information to parallel and reinforce the topics and concepts normally taught, and to motivate teaching in every curriculum area. Suggests learning activities, reinforcement projects, references, and audio-visual resources. Covers the language arts, social studies, the fine arts, science, mathematics, industrial arts, and career guidance. A Teacher Education appendix gives guidance in organizing in-service institutes and space science workshops to orient the teaching staff. Published in cooperation with the Massachusetts Department of Education. (A)

Page, Lou. ASTRONOMY: HOW MAN LEARNED ABOUT THE UNIVERSE. Addison-Wesley, 208 p., illus., 1969. $4.25. A survey of astronomy from ancient theories through modern science. A supplement for a physical science or Earth science course. Mathematical calculations require a knowledge of simple algebra. An appendix gives explanations of the required mathematics. (S-A)

Parrish, Lex. SPACE FLIGHT SIMULATION TECHNOLOGY. Sams, 144 p., illus., 1969. Paperback, $4.95. A primer covering the development capabilities and future potentialities of flight simulation techniques. Most of the book deals with aircraft flight simulators, but there are several chapters on simulators of training for space flight. (S-A)

Parrott, Bob. EARTH, MOON & BEYOND. World Books, 176 p., illus., 1969. $4.95. The pastor to some of the astronauts and space scientists presents a "spiritual dimension to the headlines" from first-hand knowledge of the space program. (A)

Perkins, Otho. EARTH AND SPACE SCIENCE SKILLCARDS. #1531. Merrill. A set of 72 Skillcards with individualized learning activities to introduce and/or reinforce basic concepts of space and Earth science such as the planets, satellites, the Moon, and Earth and its relationships in space. Each Skillcard includes five sections: (1) a statement of a scientific principle accompanied by a statement of the problem, (2) a list of required materials, (3) step-by-step procedures that lead the student to the solution of the problem, (4) questions leading to the results, and (5) the conclusion to the problem, which is printed on the back of the Skillcard to encourage the student to draw his own conclusion and then compare it with given conclusion. $5. (U-S)

Pope, Billy N. and Ramona W. Emmons. LET'S VISIT A SPACESHIP. Taylor, 32 p., illus., rev. 1971. $3. A pictorial account with brief text, covering the training of astronauts and final preparations leading to a manned launching. The text in the revised edition has been changed while the illustrations remain the same. (P)

Porter, T. R., compiler. TEACHING TIPS FROM TST. Earth-Space Science. #471-14350. National Science Teachers Association, 121 p., illus., 1967. Available from NEA Publications Sales Division. Paperback, $4, cash with order unless requested on official school stationery. A compilation of articles from *The Science Teacher* magazine dealing with Earth-space science. Titles include "Satellite Orbits", "Signals from Space", "The Planetarium As An Educational Tool", and "Overhead Projection-Constellations". For the teacher. (A)

Rabinowitch, Eugene and Richard S. Lewis, editors. MAN ON THE MOON. The Impact on Science, Technology, and International Cooperation. Basic, 240 p., illus., 1969. $5.95. A collection of views of noted scholars and scientists as to the effects that exploration of the Moon and space will have on life on Earth. A sampling of topics includes the impact of the Moon landing on the U.S.S.R., international cooperation, joint exploration of the Moon, the impact on the aerospace industry, and the future of man in space. (A)

Randel, Hugh W., editor. AEROSPACE MEDICINE. 2nd. ed. Williams & Wilkins, approx. 800 p., illus., 1970. $45. Thirty-three contributors discuss the multidisciplinary nature of aerospace medicine. Although some portions of the book deal with medical factors of flight in the atmosphere, much of it relates to life support in space and to men on the Moon. Semi-technical. (A)

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Ransone, Robin K. AIRLINE ECONOMIC REQUIREMENTS FOR 1975 STOL AND VTOL SYSTEMS. #700313. Society of Automotive Engineers, 4 p., 1970. Paperback, $1.50. Urges a demonstration of STOL (short takeoff and landing) aircraft and helicopters to provide short-haul (50-500 miles) air service in the Northeast Corridor (Washington D.C.-New York City-Boston area). Discusses the economic factors, problems of developing the system, and a practical solution using 40-60 passenger, propeller-driven aircraft. (S-A)

————AMERICAN AIRLINE-MCDONNELL DOUGLAS INTER-METROPOLITAN STOL EVALUATION. #700336. Society of Automotive Engineers, 12 p., illus., 1970. Paperback. $1.50. A report on the feasibility of setting up a STOL (short takeoff and landing) aircraft system between metropolitan areas at relatively short distances from each other, and within these metropolitan areas. Discusses the experiences encountered in actual flying conditions in Chicago and New York City and the supporting equipment required. This semitechnical report will be easily understood by those familiar with aviation and avionics terminology. (A)

RCA. MAN AND SPACE. RCA/Government and Commercial Systems. Cat. #G&CS/SCN 001-71. An illustrated booklet giving a synopsis of the Apollo manned space flight program through Apollo 11. Also provides a brief history of space flight and descriptions of unmanned satellite systems. Free. (I-U-S-A)

Revell, Inc. APOLLO LUNAR MODULE MODEL KIT. #H-1842. Revell, Inc. 1/48th scale model, five inches high with two astronaut figures, radio and radar antenna. Clear windows. $1.50. (I-U-S)

————APOLLO LUNAR SPACECRAFT MODEL KIT. #H-1838. Revell, Inc. 1/48th scale, 20 inches high. Includes Command Module with detailed interior, Service Module, adapter section, launch escape system, Lunar Module with removable ascent and descent sections, and foldable legs. Clear plastic windows reveal interiors and three astronaut figures. Display stand. $6. (I-U-S)

————APOLLO SATURN V MOON ROCKET SYSTEM. #H-1843. Revell, Inc. A 1/96th scale model nearly four feet high including the Saturn V Rocket, Apollo Command and Service Module, Escape Tower and the Lunar Module which is inside the Service Module. A display stand is provided. Approx. $12. (I-U-S)

————APOLLO SPACECRAFT Columbia and Eagle MODEL KIT. #H-1862. Revell, Inc. 1/96th scale with detachable Command and Service Modules, separable Lunar Module and display base. $1.50. (I-U-S)

Richey, B. J. APOLLO ASTRONAUTS. First Men to the Moon. Strode, 128 p., illus., 1969. $3.95. Biographies of the first astronauts to land on the Moon. The fourth volume in the Heroes of Space series. (U-S)

Rittenhouse, John B. and John B. Singletary. SPACE MATERIALS HANDBOOK, 3rd ed. #AD-692 353. National Technical Information Service, 734 p., rev. 1970. Paperback, $3. Considers the space environment, its effect on materials, materials in space, and biological interaction with spacecraft materials. Includes information on the mechanical, physical, and chemical properties of a wide variety of materials including structural materials, electronic components, thermal control materials, adhesives, seals, and lubricants. Semitechnical. (A)

Rocket Research Institute. INTRODUCTION TO THE ROCKET RESEARCH INSTITUTE, INC. Rocket Research Institute. A 5-page description of this nonprofit organization which is devoted to rocket safety. Gives information about its educational consultants; its Perkins Rocket Safety Test Center and Smoke Creek Flight Range for model rocket and supervised experimental rocket activities; and its National Rocket Safety Registry Program. 10 cents, with self-addressed, stamped envelope. (S-A)

————ROCKET INDUSTRY COOPERATION WITH SUPERVISED YOUTH ROCKET PROGRAMS. Rocket Research Institute. An illustrated presentation (14 pages) given at the XIX International Astronautical Congress describing four different projects in student experimental and student model rocke-

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try which were supervised by rocket industry personnel. $1. (A)

————ROCKET SAFETY QUESTIONNAIRE. Rocket Research Institute. An information sheet describing the terms "Student Astronautics," "Student Model Rocketry," and "Supervised Student Experimental Rocketry" in the form of a questionnaire and application for registration in the National Rocket Safety Registry student program. Free, with a self-addressed, stamped envelope. (S-A)

Ronan, Colin A. DISCOVERING THE UNIVERSE. Basic, 248 p., illus., 1971. $6.95. A history of astronomy with emphasis on the newest findings through the use of modern tools—radioastronomy, improved telescopes, and unmanned space probes. (S-A)

————EDMOND HALLEY. Doubleday, 251 p., illus., 1969. $5.95. A biography of the discoverer of the comet which bears his name. An extraordinary personality who contributed greatly to scientific knowledge during his life. (S-A)

————INVISIBLE ASTRONOMY. Lippincott. 224 p., illus., rev. 1971. $8.50. A survey of radioastronomy and the techniques which allow scientists to study the universe beyond the range of telescopes. (S-A)

Rosenfeld, Sam. ASK ME A QUESTION ABOUT ROCKETS, SATELLITES AND SPACE STATIONS. Harvey House, 95 p., illus., 1971. $3.50. Brief answers to 56 questions covering the history of rocketry, living in space, rocket propulsion, escape velocities, orbits, reentry maneuvers, space stations, etc. Also includes brief descriptions of selected U.S. space projects. (I-U)

Ross, David. SPACE CLUB MANUAL. Space Clubs of America, 100 p., illus., 1969. Paperback. $2.50. Suggestions for organizing and operating a Space Club under the Space Clubs of America. Complete information for adults who wish to organize a model rocket club. (A)

Ross, Frank, Jr. MODEL SATELLITES AND SPACECRAFT. Lothrop, 159 p., illus., 1969. Paperback. $2.25. Discusses the history, purposes, and development of 12 unmanned American satellites. Also gives directions for making models of these satellites out of simple materials. Directions are full, and photographs of the original spacecraft as well as the models made by the author provide further assistance. Models may be displayed on stands or as mobiles. (U-S)

————SPACE SCIENCE AND YOU. Lothrop, 190 p., illus., 1970. $4.95. An overview of the benefits accruing from the exploration of space—"spin-offs" derived from space science and technology that have down-to-earth beneficial applications in communications, meteorology, medicine, education, navigation, geology, industry, etc. (U-S)

Ruggieri, Guido. SECRETS OF THE SKY. Golden Press, 174 p., illus., 1969. $5.95. Information about the Sun, the Moon, the solar system and the universe. Presents also a history of astronomical discoveries and contains a comprehensive appendix on space travel. (A)

Ruzic, Neil P. WHERE THE WINDS SLEEP. Doubleday, 236 p., 1970. $5.95. A projected history of man's future on the Moon. Not science fiction, but is based on valid information from NASA's current programs and a "true projection" of what might be expected from life on the Moon. Cites economic advantages of the exploitation of the Moon's mineral resources, and its use as a laboratory for research not possible on Earth and as a stepping-stone to the planets. (S-A)

Sagan, Carl, Jonathan N. Leonard and the Editors of Time-Life Books. PLANETS. Time-Life Books, 200 p., illus., 1969. $4.95. (Available from Silver Burdett Co.). A book in the Life Science Library series describing the members of our solar system. Include a brief history of astronomy, Earth as viewed from space, the tools of astronomy, the Moon as explored by lunar probes and Apollo astronauts, Mars and Venus exposed by space probes, and facts about the other planets. (U-S-A)

Saltrick, Daniel F. and Alfred M. Kubota. AEROSPACE EDUCATION AND MODEL ROCKETRY. Estes Industries, 36 p., illus., 1970. Single copy free to teachers requesting it on school stationery. An educator's guide for

grades four through ten. Includes suggestions for teacher preparation in setting up a model rocketry unit, helping students build models and launch them, and several experiments to demonstrate the properties of air and the principles of rocket propulsion. (A)

Sandford, J. W. and J. E. Martin, Jr. THE SATURN V FOR THE '70'S. #690715. Society of Automotive Engineers, 8 p., illus., 1969. Paperback, $1.50. A study which concludes that the Saturn V launch vehicle, with relatively minor modifications, can meet the booster requirements of NASA space missions in the decade of the 1970's. Semitechnical. (A)

Schaffer, Laurence. PLANNING STOL FACILITIES. #690421. Society of Automotive Engineers, 14 p., illus., 1969. Paperback, $1.50. Suggestions for planning for the requirements of a STOL (Short takeoff and landing) aircraft system in metropolitan areas. Discusses approach paths such as rivers, railroad yards, landing strips, terminal facilities, and other requirements for operating STOL aircraft within or very close to city centers. (S-A)

Science Research Associates. Occupational Briefs and Job Family booklets. Science Research Associates. Briefs and booklets discuss the history of the occupation, and give details about work categories, working conditions, requirements, preparation, earnings, and outlook for the future.

AEROSPACE ENGINEERS. #201. Occupational brief. 66 cents. (S)

AEROSPACE INDUSTRIES MANUFACTURING WORKERS. #81. Occupational brief. 66 cents. (S)

AEROSPACE TECHNICIANS. #381. Occupational brief. 66 cents. (S)

ASTRONOMERS. #213. Occupational brief. 66 cents. (S)

CHEMICAL TECHNICIANS. #318. Occupational brief. 66 cents. (S)

DATA-PROCESSING MACHINE OPERATORS. #322. Occupational brief. 66 cents. (S)

DRAFTSMEN. #33. Occupational brief. 66 cents. (S)

ELECTRICAL ENGINEERS. #3 Occupational brief. 66 cents. (S)

JOBS IN ELECTRONIC DATA PROCESSING. Job Family Booklet #20. $1.87. (S)

JOBS IN ENGINEERING. Job Family Booklet #7. $1.87. (S)

JOBS IN MATHEMATICS. Job Family Booklet #8. $1.87. (S)

JOBS IN MECHANICAL WORK. Job Family Booklet #2. $1.87. (S)

JOBS IN SCIENCE. Job Family Booklet #1. $1.87. (S)

JOBS IN TECHNICAL WORK. Job Family Booklet #4. $1.87. (S)

MECHANICAL ENGINEERS. #4. Occupational brief. 66 cents. (S)

PROGRAMERS. #281. Occupational brief. 66 cents. (S)

SYSTEMS ANALYSTS. #357. Occupational brief. 66 cents. (S)

TECHNICAL WRITERS. #286. Occupational brief. 66 cents. (S)

Scott, Ronald F. ON MEETING AN OLD FRIEND, SLIGHTLY THE WORSE FOR WEAR, AFTER A LAPSE OF TWO AND A HALF YEARS. Jet Propulsion Laboratory, 4 p., illus., 1970. Free. A reprint of an article from *Engineering and Science Magazine* in which one of the engineers responsible for the final development of SURVEYOR III is able to inspect a part of that spacecraft after it was brought back from the Moon by Apollo 12 astronauts—" . . . a circle completed." (S-A)

Scull, J. R. SPACE TECHNOLOGY, Vol. IV, Spacecraft Guidance. U.S. National Aeronautics and Space Administration, 143 p. illus., 1967. *Out of print.* A basic text for upper-level college engineering students, discussing tradeoffs among injection, midcourse, and terminal guidance, and ways of mechanizing systems. (A)

Seamans, Robert C., Jr. ACTION AND REACTION. American Institute of Aeronautics and Astronautics, 48 p., illus., 1969. Minimum order of 100 copies, $388. The 1969 Minta Martin Lecture in which the author, a former NASA administrator, describes the origin and development of the U.S. space program. Using his personal records, the author analyzes the processes of decision making and implementa-

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tion involved in the commitment to a manned lunar landing. He discusses the concept of a goal-oriented and "action" program and the competitive and cooperative aspects of space exploration. A framework for evaluation of research and development programs is developed and is then applied to the national space program. Note: this publication is reprinted from the August, September and October 1969 issues of ASTRONAUTICS & AERONAUTICS magazine. (A)

Seiden, Jacob, editor. OAR 1968 PROGRESS. #D 301.69/3:68-0007. Stock #0870-1219. U.S. Government Printing Office, 143 p., illus., 1969. Paperback, $1.75. Brief descriptions of recent and promising research accomplished by OAR—Office of Aerospace Research, U.S. Air Force. Includes descriptions of scientific research projects in general physics, nuclear physics, chemistry, mathematics, mechanics, terrestrial sciences, meterology, astronomy, astrophysics, bioscience, and behavioral and social sciences. While these scientific advances are primarily related to Air Force sciences and technology, they have applications to comparable civilian developments. (A)

Sells, S. B. and James R. Rawls. EFFECTS OF ISOLATION ON MAN'S PERFORMANCE. Institute of Behavioral Research, 28 p., 1969. $1. A reprint of an article from Vol. 20, Science and Technology Series, of the American Astronautical Society, reviewing research on the effects of isolation, confinement, and sensory restriction, and makes recommendations for application to long-duration manned space flights. (S-A)

Senate, see U.S. Senate.

Shapp, Martha and Charles Shapp. LET'S FIND OUT ABOUT SPACE TRAVEL. Watts, 48 p., illus., 1971. $3.75. An explanation of manned space travel, how it developed and what is involved, written for the young reader. (P)

Sharpe, Mitchell R. LIVING IN SPACE. The Astronaut and His Environment. Doubleday, 192, p., illus., 1969. $5.95. Paperback, $2.45. A book in the Doubleday Science series discussing the physical hazards of space, human response to space conditions, simulating space conditions, maintaining life in space, medical spin-offs from manned space flight, telemetry, astronaut training and many other bioastronautical subjects. (S-A)

————SATELLITES AND PROBES. Doubleday, 192 p., illus., 1970. $5.95. An account of the development of unmanned space flight. Discusses sounding rockets, launch vehicles, rocket propulsion, launching and tracking facilities, satellites—their instrumentation, guidance and missions—space probes, and the possibility of extraterrestrial life. (U-S)

————YURI GAGARIN. First Man in Space. Strode, 128 p., illus., 1969. $3.95. A profusely illustrated biography of the Soviet space pioneer. The second book in the series Heroes of Space. (U-S)

Silverberg, Robert. THE WORLD OF SPACE. Hawthorn, 185 p., 1969. $5.95. The story of man's efforts to travel into space. Includes descriptions of lunar conditions and environments of all the planets. Discusses the possibilities of extraterrestrial life. (S-A)

Simmons, Gene. ON THE MOON WITH APOLLO 15. A Guidebook to Hadley Rille and the Apennine Mountains. Stock #3300-0384. U.S. Government Printing Office, 46 p., illus., 1971. 50 cents. A booklet prepared before the Apollo 15 launch (July 26, 1971) to serve as a guide to the activities of the astronauts during their exploration and scientific experimentation while on the moon. (S-A)

Simon, Tony. THE MOON EXPLORERS. Scholastic, 128 p., illus., 1970. 75 cents. An account of all the Apollo manned flights, with emphasis on the historic Apollo 11 lunar landing. (I-U-S)

Slote, Alfred. THE MOON IN FACT AND FANCY. World Publishing, 128 p., illus., rev. 1971. $4.95. Folk tales and myths about the Moon are related and contrasted in alternating chapters to explanations of what we have learned about the Moon from telescopes and manned exploration. (I-U)

Smith, Kevin R. SPACE ADVENTURE. Tri-Ocean, 100 p., illus., 1969. $5.95. An Australian author writes about the U.S. and Russian and other nations' space programs. Covers rocketry,

manned space flight, Project Apollo life support in space, lunar and planetary exploration, and Earth satellites. Information on Australia's contributions to space flight—specifically the tracking facilities at Woomera—are also provided. (U-S-A)

Smith, Norman F. UPHILL TO MARS, DOWNHILL TO VENUS. Little, Brown, 136 p., illus., 1970. $4.95. Explains the effects of the gravitational fields of the sun and planets on spacecraft traveling by or around members of our solar system. Also provides concepts of space through familiar analogies, and describes equipment and techniques for manned space flight. (U-S-A)

Smith, S. W., editor. HANDBOOK OF ASTRONAUTICS. British Interplanetary Society, 128 p., illus., U.S. edition, 1969. Available from Dufour Editions, $5. An American edition of a British book first published in 1963, for use in British schools. While some of the material is not up-to-date, it considers many still timely topics such as space dynamics, the mathematics of space flight, space navigation, Earth-Moon system, etc. The book is designed to relate astronautics to subjects in the high school curriculum. (S)

Smithline, Frederick. ANSWERS ABOUT THE MOON, STARS, AND PLANETS. Grosset, 48 p., illus., 1969. $1.95. Pictures and diagrams aid in answering children's questions about the solar system, planets, eclipses, meteors, the Sun, gravity, and other phenomena of our universe. (I-U)

Smithsonian Astrophysical Observatory. METEORITES. Smithsonian Astrophysical Observatory. A 16-page illustrated booklet discussing the origin, physical appearance, and chemical composition of meteorites. Also explains meteor "fall", craters, the Prairie Network of 16 unmanned automatic camera stations in the midwestern U.S., hunting for meteorites, tests for meteorites and a form for reporting meteor sightings. Free. (U-S.A)

————SPACE SCIENCES AND SATELLITE TRACKING AT THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY. Smithsonian Astrophysical Observatory. A 6-page review of the history of the Observatory's part in the nation's satellite tracking program plus a description of its research program in astrophysics. Free. (S-A)

————SPACE TRACKING WITH LASERS. Smithsonian Astrophysical Observatory. A 12-page illustrated booklet on the use of lasers for geophysical research. Defines the term "laser" and discusses its application in industry and research, laser safety, and the future of laser tracking. Also includes a brief bibliography. Free. (S-A)

Smithsonian Institution. COMMUNICATIONS IN SPACE. Smithsonian Institution Press. An illustrated booklet giving brief explanations of various kinds of communications satellites—Echo, Syncom, Telstar, Relay, Comstat and others—emphasizing their differences and uses. 50 cents. (U-S-A)

————MASTERS OF SPACE. Smithsonian Institution Press. An illustrated 32-page booklet giving the highlights of the development of rocketry and our space program. 50 cents. (I-U-S)

————TRAINING BY SIMULATION. Smithsonian Institution Press. A booklet presenting the 1964 Edwin A. Link Lecture given by Astronaut Alan B. Shepard, Jr. Discusses the numerous kinds of simulators and their uses in preparing man for flight in space. 50 cents. (S-A)

Society for Visual Education. ASTRONAUT—TRAINING AND EQUIPMENT. #SP-155. Society for Visual Education. A set of eight full color pictures, 18" x 13", covering zero gravity, suiting up, manned altitude test, wet mock, fit and function, man and equipment test, and man on the Moon. The reverse side of each picture provides explanations of the picture, suggestions for use, questions for discussion, plus a list of related SVE filmstrips. $8 per set. (I-U-S)

————BUILDING TOWARD THE MOON. #SP-158. Society for Visual Education. A set of eight full color pictures, 18" x 13", showing a capsule heat-cold test, the manufacture of the Apollo spacecraft, testing the Lunar Module, transporting the booster rocket, Cape Ken-

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aedy, the readying, rollout and liftoff of the Apollo spacecraft. The reverse side of each picture provides explanations of the picture, suggestions for use, questions for discussion, plus a list of related SVE filmstrips. $8 per set. (I-U-S)

————COUNTDOWN TO SPLASHDOWN. #SP-156. Society for Visual Education. A series of 8 full color pictures, 18" x 13", covering mission control, docking maneuvers, space walk, rendezvous, frogman, and recovery procedures. The reverse side of each picture provides explanations of the picture, suggestions for use, questions for discussion, plus a list of related SVE filmstrips. $8 per set. (I-U-S)

————GEOGRAPHY FROM SPACE. #SP-157. Society for Visual Education. A set of eight full color pictures, 18" x 13", depicting the Moon and Earth, Red Sea and Nile River, a storm off Morocco, the Nile Delta, South India, the Gulf of California, and numerous other Earth features as photographed from manned and unmanned satellites in space. The reverse side of each picture provides explanations of the picture, suggestions for use, questions for discussion, plus a list of related SVE filmstrips. $8 per set. (I-U-S)

————MAN ON THE MOON. #SP-160. Society for Visual Education. A set of eight full color pictures, 18" x 13", showing the Apollo 11 crew, the exit from the Lunar Module on the Moon, the American Flag on the Moon, the solar wind experiment, seismic experiments package, walk on the Moon, and lunar surface views. The reverse side of each picture provides explanations of the picture, suggestions for use, questions for discussion, plus a list of related SVE filmstrips. $8 per set. (I-U-S)

————PREPARATION FOR MOON LANDING. #SP-159. Society for Visual Education. A set of eight full color pictures, 18" x 13", depicting lunar surface simulation, the Apollo 8 liftoff, Earth as seen from the Apollo 11 spacecraft, the far side of the Moon, Earthrise from Apollo 8, the Apollo 9 Lunar Module in orbit, extravehicular activity, and features of the Moon. The reverse side of each picture provides explanations of the picture, suggestions for use, questions for discussion, plus a list of related SVE filmstrips. $8 per set. (I-U-S)

Space Age Industries. BLINKIN' BEACON. Space Age Industries. A model rocket tracking light kit. The electronic flasher mounted on the nose cone of a model rocket produces a brilliant white light to help in tracking the flight of the rocket. $2.95. (U-S-A)

————CATALOG. Space Age Industries. A booklet describing model rocket kits and accessories for beginners as well as for experienced amateur rocketeers. The catalog is free. (U-S-A)

————HEN GRENADE. #K25. Space Age Industries. A model rocket designed to launch a raw egg to demonstrate that skillful launching can lift a fragile payload and return it to the ground intact. Ready to assemble. $2.50. (U-S-A)

————MINI BAT. #K17. Space Age Industries. A model rocket useful in boost glide competition. Recommended for beginners. $1.50. (U-S-A)

————OMEGA III. #K22. Space Age Industries. An advanced design three-stage model rocket which employs the principles of rocket staging as used in the Saturn V Apollo launch vehicle. Ready to assemble. Recommended for experienced amateur model rocketeers. $2.95. (S-A)

————PULSAR. #K24. Space Age Industries. A model rocket which employs the principles of parallel staging like that of the Titan 3C. Easy to assemble. Recommended for experienced amature model rocketeers. $2.95 (U-S)

————SAI ACCELEROMETER. Space Age Industries. A payload that measures the average acceleration of the model rocket on which it is flown. Useful in many scientific experiments and for calculating burnout velocity, maximum altitude, and many other basic facts. $2. (U-S-A)

————TEACHERS PACKET. Space Age Industries. A packet of materials on model rocketry developed by a science teacher as an aid to educators who wish to set up a safe model

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rocket program. The Teachers Packet is free when requested on school stationery. (A)

————TEMPUS FUGIT. #K15. Space Age Industries. An easy-to-assemble model rocket whose light weight and small size make it ideal for parachute duration events. $1.50. (U-S-A)

Space Age Technology Series. Bobbs-Merrill. 5 vols., 1969. $24.95 per set. A series of programmed texts to acquaint the student with new technology introduced by the space age. Relates these new developments to space and everyday applicatons. Semitechnical.

Hellman, Hal. CONTROLLED GUIDANCE SYSTEMS. 224 p. (A)

Gates, Robert. INERTIAL GUIDANCE SYSTEMS. 176 p. (A)

Pike, Charles. LASERS AND MASERS. 176 p. (A)

Kalish, Israel. MICROMINIATURE ELECTRONICS. 304 p. (A)

Brite, Robert, and C. H. Fiorenelli. SYNCHROS AND SERVOS. 192 p. (A)

Space General Company. Illustrated booklets on the various sounding rockets produced. Space General Co. Includes the Astrobee 1500. Astrobee "F", Astrobee "D", Aerobee 170 and NIRO. Specifications, development history, and missions are discussed briefly. Free. (S-A)

————PERFORMANCE CAPABILITIES OF SPACE GENERAL COMPANY SOUNDING ROCKETS. A leaflet illustrating the various sounding rockets manufactured by Space General Co., together with a graph showing their relative payloads and peak altitudes. Free. (S-A)

Space Science Board. SPACE BIOLOGY. National Academy of Sciences. 55 p., 1970. Free. Report of a study convened by the Space Science Board in July 1969 at the request of NASA to "look anew at the foundations of space biology and attempt to assess the value to science of future studies in the space environment". Discusses biological rhythms; cells, plants and invertebrates in space; man and vertebrates in space; radiobiology; and animal orientation and tracking. Presents a summary and recommendations. (S-A)

————*Ad Hoc Committee on the Large Space Telescope.* SCIENTIFIC USES OF THE LARGE SPACE TELESCOPE. National Academy of Sciences. 1969. 47 p. Free. A study of the scientific potentials of the Large Space Telescope, which concluded that it would make "dominant" contributions to understanding the content, structure, scale and evolution of the universe; and aid in the detection of interstellar matter, the measurement of gases in space, etc. Discusses performance characteristics and the need for increased ground-based instruments. (A)

————*National Academy of Sciences.* INFECTIOUS DISEASE IN MANNED SPACEFLIGHT. National Academy of Sciences. 211 p., 1970. Paperback. Single copy free. A report of a study conducted in 1969 at the request of NASA to consider the problems of infectious disease on manned space missions, and the effects of the space environment on an astronaut's resistance to disease. Discusses the spacecraft environment, respiratory infections, gastrointestinal diseases, skin infections, microbial mutations, and disease prevention and treatment. While the report is somewhat technical, most of it can be readily understood by the nonspecialist. (S-A)

————LUNAR EXPLORATION. Strategy for Research 1969-1975. National Academy of Sciences. 40 p., 1969. Paperback. Single copy free. Prominent scientists' recommendations for further lunar scientific experiments for the period 1969-1975 following the Apollo 11 flight. Considers measurement of the Moon's age, its geochemistry, geophysics, petrology, geology, and geomorphology. (S-A)

————THE OUTER SOLAR SYSTEM. A Program for Exploration. National Academy of Sciences, 85 p., 1969. Paperback. Single copy free. A report of a study in cooperation with NASA's Lunar and Planetary Missions Board to consider the feasibility of exploratory projects in the outer reaches of the solar system during the period 1972-1980. Discusses exploration of planetary atmospheres and interiors; particles, fields, and radio physics; gravitational and celestial dynamics; the planet Pluto, satel-

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lites, asteroids, and comets. The Board's recommendations are presented. Semitechnical. (A)

————PRIORITIES FOR SPACE RESEARCH 1971-1980. National Academy of Sciences, 147 p., 1971. Paperback, $4.50. Report of a study made in the summer of 1970 at the request of NASA to determine criteria for setting priorities, and to make recommendations for future NASA projects in planetary and lunar exploration, astronomy, gravitational and solar-terrestrial physics, and the life sciences. To accomplish these objectives, 90 scientists were divided into working groups according to their specialities to develop programs within three budgetary levels. From these programs priorities were set up as the scientists' recommendations. (S-A)

————UNITED STATES SPACE SCIENCE PROGRAM. Report to COSPAR. National Academy of Sciences, 250 p., illus., 1971. Paperback. Single copy free. An extensive review of U.S. space science during the previous year, with a comprehensive bibliography. The Report has been issued annually since 1960, but some earlier editions are out of print. Semitechnical. (A)

————USEFUL APPLICATIONS OF EARTH-ORIENTED SATELLITES. National Academy of Sciences, 13 vols., 1969. Paperback, $2 per volume. Reports of a series of scientific panels that considered useful applications of earth satellites. Titles of the volumes follow:

Report of the Central Review Committee. (A)

Summaries of Panel Reports. (A)

Panel #1-Forestry, Agriculture, and Geography. (A)

Panel #2-Geology. (A)

Panel #3-Hydrology. (A)

Panel #4-Meteorology. (A)

Panel #5-Oceanography. (A)

Panel #6-Sensors and Data Systems. (A)

Panel #7-Point-to-Point Communications. (A)

Panel #8-Systems for Remote Sensing. (A)

Panel #9-Point-to-Point Communication. (A)

Panel #10-Broadcasting. (A)

Panel #11-Navigation and Traffic Control. (A)

———— —VENUS. STRATEGY FOR EXPLORATION. National Academy of Sciences, 79 p., 1970. Paperback. Single copy free. A report of a cooperative study with NASA's Lunar and Planetary Missions Board on the feasibility of further relatively low cost unmanned probes of the planet Venus. Discusses the present state of knowledge about Venus and many questions about the planet's atmosphere and surface conditions. Advises on the best strategy for exploring conditions with scientific instruments. (S-A)

SPACE UNIT, AMERICAN TOPICAL ASSOCIATION. A membership service. Space Unit, American Topical Association. A service concerned with space-related philately—specifically the collection of postage stamps and souvenir covers commemorating events in space. Services include a subscription to THE ASTROPHILE, a membership directory, Space Unit-produced philatelic materials, and free covers commemorating special events in space. $5 a year, plus $1 initiation fee. (U-S-A)

Sparks, James C. MOON LANDING, PROJECT APOLLO. Dodd, Mead, 109 p., illus., 1970. $4.50. A step-by-step account of the flight of Apollo 11, from preparation for launching to return to Earth and quarantine. (U-S-A)

Stambler, Irwin. PROJECT VIKING: Space Conquest Beyond the Moon. Putnam, 128 p., illus., 1970. $3.64. A discussion of Project Viking—plans for unmanned missions to Mars to search for possible life forms. Includes a review of the history of Project Viking, a description of the spacecraft and equipment involved, and conjectures about the possibility of manned exploration of Mars and other planets. (U-S)

Steinhoff, Ernst A. AEROSPACE RESEARCH AND DEVELOPMENT. Vol. 24, Science and Technology series. American Astronautical Society, 500 p., 1970. $15.75. Proceedings of a meeting having broad aerospace coverage in the fields of aerothermodynamics, materials, flight sciences, and physics. Semitechnical. (A)

Stern, Phillip D. OUR SPACE ENVIRONMENT. Holt, 160 p., illus., 1965. Paperback. $2.24. A guide to the planets, comets, and stars. Dis-

cusses facts and theories about the universe resulting from the exploration of space. (S)

Stiffler, J. J. SPACE TECHNOLOGY. Vol. V. Telecommunications. U.S. National Aeronautics and Space Administration, 142 p., illus., 1967. *Out of print.* A basic text for upper-level college engineering students discussing fundamentals, modulations, data compression, and systems in use and planned. (A)

Stine, G. Harry. THE MODEL ROCKETRY MANUAL. Sentinel, 96 p., illus., rev. 1970. Paperback, $4.95. A handbook for amateur rocketeers, stressing safety in model rocketry. Discusses types of model rocket kits, engines, launch pads, and controllers. Each chapter provides sample projects. (U-S-A)

Stoiko, Michael. SOVIET ROCKETRY: PAST, PRESENT AND FUTURE. Holt, 272 p., illus., 1970. $7.95. Recently available new sources of information are examined to assess the ten years of Soviet space exploration, and to predict its future directions. Includes a brief history of Russian space technology and descriptions of rocket boosters, spacecraft, and launch facilities. Contains charts and tables comparing U.S. and Soviet records. (S-A)

Strafford Industries, Inc. MAP OF THE MOON. Strafford Industries, Inc. Black and white map, 35" x 45" with 600 named lunar features indexed for easy location. Lunar features such as craters, mountains, rills, rays and seas are readily identified. $1. (P-I-U-S-A)

Strickler, Mervin K., Jr., editor. AN INTRODUCTION TO AEROSPACE EDUCATION. American Family ENTERPRISES, 336 p., illus., 1968. Paperback, $2.98. Discusses the many phases and approaches of aerospace education, and answers "how to start", "what to do" and "where to get" questions for those who are developing courses in aviation and space education, or who are searching for materials and techniques to enrich regular classroom instruction in most subjects and at all grade levels. Includes an extensive bibliography and descriptions of actual classroom units and courses. May also be used as a teacher's guide for the 14-volume ABOVE AND BEYOND—The Encyclopedia of Aviation and Space Sciences. (See, Johnson, Raymond, editor, p. 92, for information about the encyclopedia). (A)

Sutton, Felix and Alvin Maurer. CONQUEST OF THE MOON. Grosset, 64 p., illus., 1969. The story of the conquest of the Moon, from the time when men first began to dream about visiting it through the complete story of the historic Apollo 11 flight. (I-U) *Out of print.*

Sutton, Richard M. THE PHYSICS OF SPACE. Holt, 176 p., illus., 1965. Paperback, $2.24. Space science and its relationship to the study of physics are discussed. Explains the nature of and structure of the universe and some of the discoveries revealed by spacecraft and space probes. (S)

Swenson, Loyd S., Jr. and others. THIS NEW OCEAN: A HISTORY OF THE PROJECT MERCURY. #NAS 1.21:4201. Stock #3300-0244. U.S. Government Printing Office, 680 p., illus., 1966. $5.50. A complete, authoritative history of the first U.S. manned space flight program, Project Mercury, covering the research involved in laying the groundwork for the project; the development of Project Mercury spacecraft, and training of the astronauts; and finally, the Mercury missions. (S-A)

Teachers Publishing Corporations. SPACE. #20034. Teachers Publishing Corp. Vol. 6 in the "Investigating Science With Children" series. A 90-page illustrated handbook for the teaching of intermediate grade science, prepared under the sponsorship of the National Science Teachers Association and NASA. Helps teachers incorporate space science into the science curriculum. Suggests almost 80 activities to help children understand scientific principles relateed to space travel: space navigation, rocketry, spacecraft guidance, life support systems, and many other subjects. Revised and updated 1968. Paperback, $2.75. (A)

Tharp, Edgar. GIANTS OF SPACE. Grosset, 128 p., illus., rev. 1970. $3.95. Short biographies of the astronauts and cosmonauts, and what they accomplished in space. (U-S)

Thomas, Davis, editor. MOON: MAN'S GREATEST ADVENTURE. Abrams, 264 p., illus., 1970. $45. Primarily a picture book including many photographs of the Earth and Moon taken

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in space. Includes essays by Wernher von Braun on the implications of the lunar flights; by Fred Whipple on Apollo scientific findings; and by Silvio Bedini of the Smithsonian Institution, who provides an historical survey of man's interest in the Moon from antiquity through the Apollo 12 flight. (S-A)

Twentieth Century Fund. PLANNING FOR A PLANET: AN INTERNATIONAL DISCUSSION ON THE STRUCTURE OF SATELLITE COMMUNICATIONS. Twentieth Century Fund, 27 p., 1971. 1 to 5 copies free, 6 to 25 copies, $1 to cover postage and handling. A report of proceedings of a meeting held in Cap Ferrat, France in 1971. (A)

————*Task Force on International Satellite Communications.* THE FUTURE OF SATELLITE COMMUNICATIONS: RESOURCE MANAGEMENT AND THE NEEDS OF NATIONS. Twentieth Century Fund, 80 p., 1970. $1. Second report of the Task Force on the subject of the title. (S-A)

United Nations. AGREEMENT ON THE RESCUE AND RETURN OF ASTRONAUTS. United Nations. General Assembly Official Records: 22nd Session, Supplement No. 16. $2. Resolution 2345 (XXII) contains the text of an international agreement effective December 3, 1968, in which the signing nations agreed on the rescue of astronauts, the return of astronauts, and the return of objects launched into space. (S-A)

————TREATY ON PRINCIPLES GOVERNING THE ACTIVITIES OF STATES IN THE EXPLORATION AND USE OF OUTER SPACE. General Assembly Official Records: 21st Session Supplement No. 16. United Nations, $2. Text of the treaty may be found in Resolution 2222 of the 21st Session of the General Assembly. The treaty was signed January 27, 1967. (S-A)

United Nations Educational, Scientific, and Cultural Organization. BROADCASTING FROM SPACE. #60. Unipub, 65 p., $1.50. Examines regulatory and technical problems of satellite broadcasting. Provides a framework for promoting international arrangements needed to supervise satellite communication. (A)

————COMMUNICATION SATELLITES FOR EDUCATION, SCIENCE, AND CULTURE. #53. Unipub, 23 p., $1. A booklet focusing on the international problems of bringing communication satellites into use to serve the objectives of education, science, and culture. (A)

U.S. Civil Service Commission. SCIENTISTS AND ENGINEERS IN THE FEDERAL PERSONNEL SYSTEM. #CS 1.2 :Sci 2/3/970. Stock #0600-0008. U.S. Government Printing Office, 23 p., 1970. 40 cents. (S)

U.S. Department of Commerce. MODERNIZED METRIC SYSTEM, THE. #C 13.10:304. Stock #0303-0079. U.S. Government Printing Office, 50 cents. A 29" x 45" full-color chart issued by the National Bureau of Standards, depicting the six base units of measurement (length, time, mass, temperature, electric current, and luminous intensity) and giving their definitions, abbreviations, and some International System of Units derived from them. (S-A)

U.S. Department of Defense. LUNAR PLANNING CHART. #D 301.49/4:LPC-1. Stock #0870-0160. U.S. Government Printing Office, 1970. 50 cents. A 26" x 38" chart prepared by the U.S. Air Force. Scale, 1:10,000,000. Provides coverage of the entire lunar surface. Lunar Orbiter 1, 2, 3, 4, and 5 photographs were used as the source in compiling the chart. (S-A)

U.S. Department of Labor. EMPLOYMENT OUTLOOK: AIRCRAFT, MISSILE AND SPACECRAFT MANUFACTURING. #L 2.3:1650-108. Stock #2901-0459. U.S. Government Printing Office, 15 cents. (S)

————EMPLOYMENT OUTLOOK: ELECTRONICS MANUFACTURING. #L 2.3:1650-112. Stock #2901-0463. U.S. Government Printing Office, 15 cents. (S)

————EMPLOYMENT OUTLOOK: ENGINEERS—Aerospace, Agricultural, Ceramic, Chemical, Civil, Electrical, Industrial, Mechanical, Metallurgical, Mining. #L2.3:1650-23. Stock #2901-0600. U.S. Government Printing Office, 15 cents. (S)

————EMPLOYMENT OUTLOOK: ENVI-

RONMENTAL SCIENTISTS, GEOLOGISTS, GEOPHYSICISTS, METEOROLOGISTS, OCEANOGRAPHERS. #L2.3:1650-24. Stock #2901-0601. U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK: INSTRUMENT REPAIRMEN. #L 2.3:1650-87. Stock #2901-0438. U.S. Government Printing Office. 10 cents. (S)

————EMPLOYMENT OUTLOOK: LIFE SCIENCE OCCUPATIONS. LIFE SCIENTIST, BIOCHEMIST. #L 2.3:1650-25. Stock #2901-0598. U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK: MACHINING OCCUPATIONS—All-round Machinists, Machine Tool Operators, Tool and Die Makers, Instrument Makers (Mechanical), Setup Men (Machine Tools), Layout Men. #L 2.3:1650-98. Stock #2901-0449. U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK: MATHEMATICIANS AND RELATED OCCUPATIONS. MATHEMATICIANS, STATISTICIANS, ACTUARIES. #L 2.3:1650-37. Stock #2901-0524. U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK: PHYSICAL SCIENTISTS. CHEMISTS, PHYSICISTS, ASTRONOMERS. #L 2.3:1650-26. Stock #2901-0602. U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK: PROGRAMMERS, SYSTEMS ANALYSTS, ELECTRONIC COMPUTER OPERATING PERSONNEL. #L 2.3:1650-41. Stock #2901-0519. U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK: TECHNICIANS, ENGINEERING AND SCIENCE TECHNICIANS, DRAFTSMEN #L 2.3:1650-27. Stock #2901-0603 U.S. Government Printing Office. 15 cents. (S)

————EMPLOYMENT OUTLOOK WRITING OCCUPATIONS, NEWSPAPER REPORTERS, TECHNICAL WRITERS. #L 2.3:1650-49. Stock #2901-0400 U.S. Government Printing Office. 15 cents. (S)

————OCCUPATIONS IN ELECTRONIC COMPUTING SYSTEMS. #L 7.2:E1 2/965. Stock #2913-0003. U.S. Government Printing Office. 40 cents. (S)

————WHY NOT BE A MATHEMATICIAN? CAREERS FOR WOMEN. #L 13.11:45. Stock #2902-0021. U.S. Government Printing Office. 10 cents. (S)

————WHY NOT BE A TECHNICAL WRITER? CAREERS FOR WOMEN. #L 13.11:47. Stock #2902-0023. U.S. Government Printing Office. 5 cents. (S)

————WHY NOT BE AN ENGINEER? CAREERS FOR WOMEN. #L 13.11:41. Stock #2902-0039. U.S. Government Printing Office. 10 cents. (S)

U.S. Department of Transportation. SECOND FEDERAL AIRCRAFT NOISE ABATEMENT PLAN, FISCAL YEAR 1970-71. #5000-0047. U.S. Government Printing Office. 65 p., illus., 1971. 65 cents. A summary of all subsonic aircraft noise and sonic boom research and development programs of federal government agencies and departments. Page 27 describes NASA's research programs related to aircraft noise abatement and the quiet jet engine. (S-A)

————*and National Aeronautics and Space Administration.* CIVIL AVIATION RESEARCH AND DEVELOPMENT POLICY STUDY. #PB-198 802. National Technical Information Service, 106 p., 1971. Paperback, $3. A comprehensive report, sponsored jointly by DOT and NASA, reviewing national policies affecting civil aviation, the problems confronting aviation, and the potentials it has for future contributions to the nation. Discusses such subjects as economic impacts, benefits from past safety policies, civil aircraft manufacturing, aircraft noise, and ground congestion related to air transportation. Concludes that further research and development can contribute to the solution of these problems—especially aircraft noise, congestion, and short haul transportation. Appendix A refers the reader to a second volume of supporting papers covering a variety of technical and nontechnical subjects—commercial air transportation, air cargo, general aviation,

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airports, air traffic control, environmental factors, military contributions to civil aviation, foreign competition, and other pertinent subjects. This second volume, also available from the National Technical Information Service, (#PB-198 803, 250 p., 1971, $3) provides analyses of the characteristics and growth to date, current problems, future requirements, potential solutions, implications for research and development, and recommendations on the elements which make up civil aviation or are factors having a bearing on civil aviation. (A)

U.S. House of Representatives. Committee on Science and Astronautics. AERONAUTICAL RESEARCH. U.S. House of Representatives, Committee on Science and Astronautics. 91st Congress, 1st Session. Committee Print #14, 400 p., Dec. 1, 2, 4, 8, 9, 10, and 11, 1969, Free. Hearings before the Subcommittee on Advanced Research and Technology of the Committee on Science and Astronautics, on aeronautical research goals in the 1970's and how they might be achieved. Part of the hearings was devoted to aircraft engine noise abatement. (S-A)

———EARTH RESOURCES SATELLITE SYSTEM. U.S. House of Representatives, Committee on Science and Astronautics. 90th Congress, 2nd Session. #W-68. Dec. 31, 1968, published 1969. 28 p. Free. A report for the Subcommittee on NASA Oversight, which considers the feasibility of producing and operating an Earth Resources Satellite System and shows how the system can be applied efficiently in gathering data in areas of cartography, agriculture and forestry, oceanography, geology, and hydrology. (S-A)

———FOR THE BENEFIT OF ALL MANKIND. A Survey of the Practical Returns from Space Investment. U.S. House of Representatives, Committee on Science and Astronautics, 91st Congress, 2nd Session. House Report No. 91-1673. Union Calendar No. 805. Dec. 7, 1970. 61 p. Free. Presents the broad values and specific tangible benefits derived from the national space program in such areas as communications, weather forecasting, medicine, aeronautics, business, management techniques, the home, and international relations. Appendices include supporting remarks made by various Congressmen. (S-A)

———ISSUES AND DIRECTIONS FOR AERONAUTICAL RESEARCH AND DEVELOPMENT. U.S. House of Representatives, Committee on Science and Astronautics, 91st Congress, 2nd Session. Serial M. House Report No. 91-932, Union Calendar No. 435, March 23, 1970, 102 p. Free. A report of the Subcommittee on Advanced Research and Technology summarizing the conclusions and recommendations of hearings held Dec. 1969 on goals in aeronautical research for the 1970's. (S-A)

———THE NATIONAL SPACE PROGRAM: PRESENT AND FUTURE. U.S. House of Representatives, Committee on Science and Astronautics, 91st Congress, 2nd Session. #U-70, 246 p., Dec. 10, 1970, Free. A compilation of papers prepared for the Subcommittee on NASA Oversight in which the national space program of the future is considered. The papers, representing viewpoints of representatives of the aerospace industry, the federal government, and the academic community, discuss possible objectives of our national space program during the 1970's, and the funds required to meet these objectives. Conclusions support the theme that a vigorous space effort is in the national interest since it sets the pace for the country's technological advancement. (S-A)

U.S. National Aeronautics and Space Administration. AEROSPACE FOOD TECHNOLOGY. #N70-33835, National Technical Information Service, 224 p., 1970, $3. A collection of papers presented by food scientists and engineers at a 1969 conference held under the sponsorship of the National Academy of Sciences and NASA. The papers discuss methods of feeding men in spacecraft, submarines, aircraft and in other unusual circumstances. Semitechnical. (A)

———AERONAUTICS. NASA EP-61. #NAS 1.19:61. Stock #3300-0325. U.S. Government Printing Office, 24 p., illus., 1970. 45 cents. Traces the history and accomplishments of aeronautical research under the Na-

tional Advisory Committee for Aeronautics (the parent organization of NASA) and NASA's continued interest in aeronautical research. Discusses the X-15 research aircraft, variable sweep wing designs, the supersonic aircraft (SST), helicopters and V/STOL aircraft, and the quiet jet engine research project. (S-A)

————AERONAUTICS. NASA EP-85. A booklet in the "Space in the Seventies" series. Stock #3300-0409. U.S. Government Printing Office, 24 p., illus., 1971. 75 cents. Outlines NASA's programs for lessening jet engine noise, improving flight efficiency for subsonic transport aircraft, increasing safety in flight among private and business aircraft pilots, and developing short-haul air transports for heavily-travelled routes. (S-A)

————AMERICA IN SPACE: THE FIRST DECADE. U.S. Government Printing Office. 1969. A series of illustrated booklets published in recognition of NASA's tenth anniversary. See individual listings for annotations. Titles of booklets are:

SPACE PHYSICS AND ASTRONOMY. NASA EP-51. #NAS 1.19:51. 45 cents. (S-A)

EXPLORING THE MOON AND PLANETS. NASA EP-52. #NAS 1.19:52. 50 cents. (S-A)

PUTTING SATELLITES TO WORK. NASA EP-53. #NAS 1.19:53. 50 cents. (S-A)

NASA SPACECRAFT. NASA EP-54. #NAS 1.19:54. 50 cents. (S-A)

SPACECRAFT TRACKING. NASA EP-55. #NAS 1.19:55. 40 cents. (S-A)

LINKING MAN AND SPACECRAFT. NASA EP-56. #NAS 1.19:56. 40 cents. (S-A)

MAN IN SPACE. NASA EP-57 #NAS 1.19:57. 55 cents. (S-A)

AERONAUTICS. NASA EP-61. #NAS 1.19.61. 45 cents. (S-A)

————ANALYSIS OF APOLLO 8 PHOTOGRAPHY AND VISUAL OBSERVATIONS. NASA SP-201. #NAS 1.21:201. Stock #3300-0220. U.S. Government Printing Office, 337 p., illus., 1969. $4.25. Contains numerous photographs and presents an analysis of the Apollo 8 photographic and visual observations as reported by professional and amateur astronomers throughout the world. (S-A)

————APOLLO 8, MAN AROUND THE MOON. NASA EP-66. #NAS 1.19:66. Stock #3300-0157. U.S. Government Printing Office. 24 p., illus., 1969. 50 cents. A report on the Apollo 8 flight around the Moon by Astronauts Borman, Lovell, and Anders. (U-S-A)

————APOLLO 11: PRELIMINARY SCIENCE REPORT. NASA SP-214. #N70-10030, National Technical Information Service. 204 p., illus., 1969. $3. A preliminary report on scientific results, including a photographic summary, crew observations, lunar samples (rocks), the passive seismic experiment, laser ranging retroreflector, solar wind composition, lunar surface closeup stereoscopic photography and modified dust detector. (S-A)

————APOLLO 12: A New Vista for Lunar Science. NASA EP-74. #NAS 1.19:74. Stock #3300-0163. U.S. Government Printing Office, 20 p., illus., 1970. 65 cents. The scientific accomplishments of the second manned landing on the Moon are described as adding significantly to man's knowledge of the Moon. A brief summary of events during the flight to and from the Moon is included. (S-A)

————APOLLO 12: PRELIMINARY SCIENCE REPORT. NASA SP-235. #N70-35271. National Technical Information Service. 340 p., 1970. $3. Describes the apparatus set up on the Moon by the Apollo 12 astronauts, and their collection of lunar soil and rock. Also discusses the astronauts' initial findings, which have added significantly to knowledge about the Moon and have suggested further ideas for exploration of the lunar surface: (A)

————APOLLO 13, "HOUSTON, WE'VE GOT A PROBLEM." NASA EP-76. #NAS 1.19:76. Stock #3300-0165. U.S. Government Printing Office. 25 p., illus., 1970. 75 cents. An account of the ill-fated Apollo 13 mission

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and how both astronauts and ground based scientists and engineers overcame the difficulties and brought the mission safely back to Earth. The dramatic story is told mainly in excerpts from conversations between the astronauts and Mission Control. (S-A)

————APOLLO 14: SCIENCE AT FRA MAURO. NASA EP-91. #NAS 1.19:91. Stock #3300-0347. U.S. Government Printing Office, 48 p., illus., 1971. $1.25. An overview of the Apollo 14 flight with emphasis on its scientific accomplishments during the astronauts' stay on the Moon. (S-A)

————APOLLO 15 AT HADLEY BASE. NASA EP-94. Stock #3300-0402. U.S. Government Printing Office, 32 p., illus., 1971. 75 cents. An account of Endeavour and Falcon with many full color photographs of the lunar traverse in the first Lunar Rover Vehicle.

————APOLLO PROGRAM WALL POSTERS. #NAS 1.43:AP 4/2/No. 1-10. Stock #3300-0335. U.S. Government Printing Office. A rolled set of ten 30" x 40" posters in color showing Astronaut Training and Wardrobe, the Vehicle Assembly Building, Saturn V, Command/Service Modules, Lunar Module, Flight to the Moon, Return Flight to Earth, Apollo 8, and Workshop in space. Sold in complete sets only. $4.75. (P-I-U-S-A)

————BIOSATELLITE II. NASA FACTS. #NAS 1.20:NF-3. Stock #3300-0168. U.S. Government Printing Office, 12 p., illus., 1969. 35 cents. A description of biology experiments in an orbiting spacecraft to study the effects of radiation and weightlessness on specimens of plants, seedlings, bread mold, insects, frog eggs, and other forms of life. (U-S-A)

————CODE NAME: SPIDER, Flight of Apollo 9. NASA EP-68. #NAS 1.19:68. Stock #3300-0158. U.S. Government Printing Office, 16 p., illus., 1969. 40 cents. The flight of Apollo 9, in which the first manned flight test of the lunar module was successfully attempted, is reported in full color. (U-S-A)

————COUNTDOWN. NASA FACTS Science Series. #NAS 1.20:S-4. Stock #3300-0383. U.S. Government Printing Office, 4 p., illus., 1967. 5 cents. Describes the activities and preparations that take place before, during, and immediately after the launching of a spacecraft. (I-U)

————EARTH ORBITAL SCIENCE. NASA EP-83. A booklet in the "Space in the Seventies" series. #NAS 1.19:83. Stock #3300-0365. U.S. Government Printing Office, 28 p., illus., 1971. $1. Introduces the reader to research in space physics and astronomy through the use of satellites. Describes the Interplanetary Monitoring Platforms, the Small Scientific Satellites, Orbiting Solar Observatories, and the Orbiting Astronomical Observatory. Explains their instrumentation and accomplishments. (S-A)

————ECOLOGICAL SURVEYS FROM SPACE. NASA SP-230. #NAS 1.21:230. Stock #3300-0226. U.S. Government Printing Office, 75 p., illus., 1970. $1.75. A condensation of technical reports dealing with the potentialities of remote sensing of Earth resources in seven areas: geography, agriculture, forestry, geology, hydrology, oceanography, and cartography. Explains technical matters in nontechnical language. Illustrated with color photographs of Earth taken on Gemini and Apollo flights. (S-A)

————ELECTRIC POWER GENERATION IN SPACE. NASA FACTS. #NAS 1.20:NF-38. Stock #3300-0169. U.S. Government Printing Office, 20 p., illus., 1968. 20 cents. A discussion of the sources of power for spacecraft. Describes power sources for instruments, radio, environment control, and other purposes. (S-A)

————EXHIBITS. U.S. National Aeronautics and Space Administration. NASA educational exhibits range from posters to full-sized models of spacecraft. For further information write to the Exhibits Division, National Aeronautics and Space Administration, Code FGE, Washington, D.C. 20546. (U-S-A)

————EXPLORER XXIX (THE GEODETIC EXPLORER). NASA FACTS. NF-25. #NAS 1.20:3 4. Stock #3300-0382. U.S. Government Printing Office, 8 p., illus., 1968.

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10 cents. A description of the role of Explorer XXIX in discovering new information about our planet Earth, and the use of satellites in geodesy. (S-A)

————EXPLORING IN AERONAUTICS. NASA EP-89. Stock #3300-0395. U.S. Government Printing Office. 398 p., illus., 1971. $3.50. A series of essays on aeronautical technology prepared originally for Explorer Scouts. (S-A)

————EXPLORING IN AEROSPACE ROCKETRY. NASA EP-88. Stock #3300-0394. U.S. Government Printing Office. 362 p., 1971. $3.25. A series of essays on the various aspects of rocketry including engines, fuels, launching procedures, etc. The essays were prepared originally for Explorer Scouts to explain this technical subject. (S-A)

————EXPLORING THE MOON AND PLANETS. NASA EP-52. #NAS 1.19:52. Stock #3300-0150. U.S. Government Printing Office. 26 p., illus., 1969. 50 cents. A summary of the lunar space probe program (Ranger, Lunar Orbiter and Surveyor spacecraft) and the exploration of Mars and Venus by Mariner spacecraft. (S-A)

————FIFTY YEARS OF AERONAUTICAL RESEARCH. NASA EP-45. #NAS 1.19:45. Stock #3300-0146. U.S. Government Printing Office. 72 p., illus., 1968. 55 cents. A chronological account of the most significant aeronautical research projects undertaken by the National Advisory Committee for Aeronautics and its successor organization, NASA, from 1917 through 1967. The contributions and scientific breakthroughs of both NACA and NASA engineers and scientists leading to the growth and superior position of U.S. aviation are traced. (S-A)

————THE FIRST LUNAR LANDING/As Told by the Astronauts. NASA EP-73. #NAS 1.19:73. Stock #3300-0162. U.S. Government Printing Office. 24 p., illus., 1970. 75 cents. The Apollo 11 postflight press conference is recorded in the astronauts' own words. They describe the historic mission and answer reporter's questions. (U-S-A)

————*Office of International Affairs.* INTERNATIONAL PROGRAMS. NASA Office of International Affairs. Published annually in January. Free. A booklet listing current international space programs involving NASA. Includes brief information on satellite projects, foreign experiments aboard NASA satellites, sounding rocket projects, ground-based projects and other cooperative activities. Provides such information as name of country and project, launch site and date, launch vehicle, orbit and altitude, and general project description. (S-A)

————"IN THIS DECADE . . ." Mission to the Moon. NASA EP-71. #NAS 1.19:71. Stock #3300-0160. U.S. Government Printing Office, 48 p., illus., 1969. $1.25. A summary of scientific and technological breakthroughs in the 1960's that led to Apollo 11 and man on the Moon. Describes the advances in rocket propulsion, astronaut training and preparation, the role of unmanned spacecraft such as the Surveyors and Lunar Orbiters, the tracking network, and lunar materials brought to Earth by the Apollo 11 astronauts. (S-A)

————ITOS, Night-Day Meteorological Satellite. #NAS 1.2:M56/2. Stock #3300-0309. U.S. Government Printing Office, 28 p., illus., 1970. 40 cents. Provides information on the structure, spacecraft subsystems, orbit selection and other related material on the improved TIROS operational satellite (ITOS) that furnishes both day and night weather coverage of the entire Earth from space, doubling the amount of weather information from each satellite. (A)

————JOURNEY TO THE MOON. NASA FACTS. #NAS 1.20:NF-40. Stock #3300-0170. U.S. Government Printing Office, wall sheet, illus., 1968. 30 cents. A color wall sheet depicting manned space flight to the Moon, including landing on the Moon, rejoining the Apollo spacecraft, and the return to Earth. (P-I-U-S-A)

————LEARNING ABOUT SPACE CAREERS. NASA EP-32. #NAS 1.19:32. Stock #3300-0350. U.S. Government Printing Office,

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24 p., illus., 1966. 25 cents. A booklet providing ideas and suggestions to help upper elementary students determine career choices. Includes information about the space industry. (I-U)

————LINKING MAN AND SPACECRAFT. NASA EP-56. #NAS 1.19:56. Stock #3300-0154. U.S. Government Printing Office. 18 p., illus., 1969. 40 cents. A booklet explaining the communications systems that exist between the ground and every rocket or spacecraft traveling in space. (S-A)

————LIVING IN SPACE. NASA FACTS. #NAS 1.20:NF-27. Stock #3300-0167. U.S. Government Printing Office. 12 p., illus., 1969. 20 cents. A description of the ingenious life support systems devised by science and industry to enable spacecraft crews to remain in space for extended periods of time in an Earth-like environment. (U-S-A)

————LOG OF APOLLO 11. NASA EP-72. #NAS 1.19:72. Stock #3300-0161. U.S. Government Printing Office, 12 p., illus., 1969. 35 cents. A booklet, in color, documenting the greatest voyage in the history of mankind—the journey to the Moon of Apollo 11. (U-S-A)

————LUNAR FARSIDE CHART. #NAS 1.43/3:LMP2. Stock #3300-0343. U.S. Government Printing Office, 29" x 41" in color. 1970. 50 cents. Scale. 1:5,000,000. Prepared by the U.S. Air Force for NASA. Provides coverage of the farside hemisphere of the Moon from North 50 degrees to South 50 degrees. Lunar Orbiter 1, 2, 3, 4, and 5 photographs were used as the source in compiling this chart. (S-A)

————LUNAR ORBITER. NASA FACTS NF-32. #NAS 1.20:4/4. Stock #3300-0197. U.S. Government Printing Office. 12 p., illus., 1967. 15 cents. A description of the manned Lunar Orbiter spacecraft which have transmitted spectacular photographs of the Moon taken from lunar orbits. (I-U-S-A)

————MAN IN SPACE. NASA EP-57. #NAS 1.19:57. Stock #3300-0155. U.S. Government Printing Office. 30 p., illus., 1969. 55 cents. A booklet presenting the story of Projects Mercury and Gemini, and preparations for Apollo. (U-S-A)

————MAN IN SPACE. NASA EP-81. A booklet in the "Space in the Seventies" series. #NAS 1.19:81. Stock #3300-0346. U.S. Government Printing Office, 28 p., illus., 1971. $1. Explains NASA's manned space plans for the 1970's. Discusses the coming SKYLAB, the reusable space shuttle, space stations as permanent bases in space, and possible Moon bases. (S-A)

————MEDICAL BENEFITS FROM SPACE RESEARCH. NASA EP-46. #NAS 1.19:46/2. Stock #3300-0147. U.S. Government Printing Office, 16 p., illus., 1968. 30 cents. A booklet presenting examples of the ways in which research discoveries and engineering innovations coming from the nation's space program have been applied to major medical problems. (U-S-A)

————MISSION REPORT/APOLLO 10. NASA EP-70. #NAS 1.19:70. Stock #3300-0159. U.S. Government Printing Office, 12 p., illus., 1969. 35 cents. A booklet, in color, presenting the final full-dress rehearsal for a manned lunar landing. An overview of the eight-day voyage of Apollo 10 around the Moon. (U-S-A)

————NASA EDUCATIONAL PUBLICATIONS. U.S. National Aeronautics and Space Administration. A booklet listing educational materials published by the National Aeronautics and Space Administration for teachers, students and the public. Lists booklets and fact sheets on NASA programs and projects, also curriculum resource aids for teachers, and includes instructions for ordering materials. The booklet is free. (P-I-U-S-A)

————NASA FACTS ORGANIZATION SERIES. U.S. National Aeronautics and Space Administration. Fact sheets describing the functions and organization of the NASA Centers. One copy free. (S-A)

#0-2 NASA Ames Research Center

#0-4 NASA Flight Research Center

#0-5 NASA Goddard Space Flight Center

#0-6 NASA John F. Kennedy Space Center

#0-7 NASA Langley Research Center

#0-8 NASA Lewis Research Center

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#0-9 NASA Manned Spacecraft Center
#0-10 NASA George C. Marshall Space Flight Center
#0-11 NASA Wallops Station

————NASA FILM LIST. U.S. National Aeronautics and Space Administration. A booklet listing selected free-loan general interest films describing NASA research and development programs in space and aeronautics, and documenting the results of this research. A separate list of NASA technical films is also available. Lists are free. (I-U-S-A)

————NASA SCIENCE AND TECHNOLOGY ADVISORY COMMITTEE FOR MANNED SPACE FLIGHT. 2 vols. Vol. I, #N69-22510. $6. Vol. II. #N70-17026 $3. Available from the National Technical Information Service. Subtitled "Proceedings of the Winter Study on Uses of Manned Space Flight, 1975-1985", these volumes report on a conference held Dec. 1968 dealing with values, guidelines, and costs of space operations, lunar, planetary and other programs. Vol. II of Appendixes contains papers written for the study. Semitechnical. (A)

————NASA SPACECRAFT. NASA EP-54. #NAS 1.19:54. Stock #3300-0152. U.S. Government Printing Office. 26 p., illus., 1969. 50 cents. A booklet describing the present family of NASA spacecraft. All types are discussed—some small, some large; some spin-oriented, some accurately attitude-controlled; some manned, some automated; some in low orbits, some in trajectories to the Moon and the planets; some free in space until they expire, others commanded to return to Earth or land on the Moon. (S-A)

————ON THE MOON WITH APOLLO 15. 1971. A guidebook to the scientific exploration program of Hadley Rille and the Appenine Mountains carried on by the crew of Apollo 15. *Out of print.*

————ORBITS AND REVOLUTIONS. NASA FACTS Science Series. #NAS 1.20:S-7. Stock #3300-0404. U.S. Government Printing Office. 4 p., illus., 1968. 10 cents. A discussion of synodic and sidereal periods of satellites in Earth orbit. (S)

————PAVEMENT GROOVING AND TRACTION STUDIES. #N69-20451. National Technical Information Services, 512 p., 1969. $6. Papers presented by representatives of government and civil organizations at a conference held in November 1968 concerning research on the landing and braking of aircraft on wet runways. Runway grooving research conducted by NASA is featured. Semitechnical. (A)

————PICTURE SET 1. "Apollo—In the Beginning." #NAS 1.43/2:1. Stock #3300-0292. U.S. Government Printing Office. A set of seven 12" x 16" pictures, in color, covering various scenes of the Apollo missions. $1.25 per set. (P-I-U-S-A)

————PICTURE SET 2. "Men of Apollo." #NAS 1.43/2:2. Stock #3300-0293. U.S. Government Printing Office. A set of five 11" x 14" pictures, in color, of the crews of Apollo 7, 8, 9, 10 and 11. $1 per set. (P-I-U-S-A)

————PICTURE SET 3. "Eyewitness to Space." #NAS 1.43/2:3. Stock #3300-0294. U.S. Government Printing Office. A set of twelve 16" x 20" color prints of reproductions of paintings of space subjects as interpreted by well-known American artists. $2.75 per set. (P-I-U-S-A)

————PICTURE SET 4. "First Manned Lunar Landing." #NAS 1.43/2:4. Stock #3300-0295. U.S. Government Printing Office. A set of twelve 11" x 14" full-color lithographs depicting the landing on the Moon. $1.75 per set. (P-I-U-S-A)

————PICTURE SET 5. "Apollo, Man on the Moon." #NAS 1.43/2:5. Stock #3300-0296. U.S. Government Printing Office. A 16" x 20" full-color lithograph showing man on the Moon for the first time. $1. (P-I-U-S-A)

————PICTURE SET 6. "Apollo 12, Pinpoint Landing on the Moon." #NAS 1.43/2:6. Stock #3300-0297. U.S. Government Printing Office. Eight full-color and two black and white pictures, each 11" x 14", showing highlights of man's return to the Moon. Depicts the Surveyor III spacecraft visited by an astronaut from "home", the Sun being eclipsed by Earth.

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an unexplained "mound" on the lunar surface, and other photographic firsts. $1.50 per set. (P-I-U-S-A)

———THE PLANETARIUM, An Elementary-School Teaching Resource. NASA EP-42. #NAS 1.19:42. Stock #3300-0356. U.S. Government Printing Office, 60 p., 1966. 40 cents. A report by the University of Bridgeport on projects for elementary school classes in the Bridgeport Planetarium. (P-I-U-S)

———PLANETARY EXPLORATION. NASA EP-82. A booklet in the "Space in the Seventies" series. Stock #3300-0399. U.S. Government Printing Office. 28 p., illus., 1971. 75 cents. Discusses exploration of Venus, Mars and the edge of our solar system by unmanned spacecraft. Describes the probable missions, schedules, spacecraft, experiments and some of the questions that may be answered as a result of these exploratory flights. Analyzes information gathered by past flights of spacecraft that have collected and transmitted data during flybys of Mars and Venus. (S-A)

———PUTTING SATELLITES TO WORK. NASA EP-53. #NAS 1.19:53. Stock #3300-0151. U.S. Government Printing Office, 26 p., illus., 1969. 50 cents. A booklet describing communications, navigation, geodetic, and meteorological space systems that are in operation today. Also covers the applications satellites of future programs, including surveying the Earth's resources from space. (S-A)

———REPORT FROM MARS. NASA EP-39. #NAS 1.19:39. Stock #3300-0144. U.S. Goverment Printing Office, 52 p., illus., 1966. 50 cents. A booklet summarizing the successful Mariner IV mission to the planet Mars. (U-S-A)

———SATELLITES AT WORK. NASA EP-84. A booklet in the "Space in the Seventies" series. Stock #3300-0405. U.S. Government Printing Office. 28 p., illus., 1971. 60 cents. Discusses today's use of satellites for transcontinental television, telephone, and data transmissions, for meteorological photography, and for other purposes. Explains how satellites can contribute toward improved aircraft communications, navigation, and Earth resources surveys. The potentials for challenging illiteracy, disease, and poverty through satellite technology are also discussed. (S-A)

———SATURN V. NASA FACTS. NF-33. #NAS 1.20:4/5. Stock #3300-0178. U.S. Government Printing Office, wall sheet, illus., 1967. 25 cents. A full-color display sheet of Saturn V, America's largest rocket vehicle which launches the Apollo spacecraft. (P-I-U-S-A)

———SEMIANNUAL REPORTS TO CONGRESS. U.S. Government Printing Office. A series of reports covering NASA activities and events for the six-month period as indicated below:

20th Semiannual Report to Congress. (July-Dec. 1968) #NAS 1.1:968-2. Stock #3300-0005. $1.25. (S-A)

21st Semiannual Report to Congress. (Jan.-June 1969) #NAS 1.1:969. Stock #3300-0327. $1.25. (S-A)

22nd Semiannual Report to Congress. (July-Dec. 1969) #NAS 1.1:969-2. Stock #3300-0024. $1.25. (S-A)

———NASA SEVEN STEPS TO A CAREER IN SPACE SCIENCE AND TECHNOLOGY. NASA EP-33. #NAS 1.19:33. Stock #3300-0355. U.S. Government Printing Office. 62 p., 1966. 45 cents. A booklet for high school students presenting an overview of career choices in space science, engineering, and technology. Includes ideas and suggestions to follow up in exploring these career opportunities. (S)

———SHAPES OF TOMORROW. #NAS 1.2Sh 2. Stock #3300-0015. U.S. Government Printing Office. 204 p., illus., 1967. $1.50. A supplement in space-oriented geometry for secondary grades. Prepared by NASA in cooperation with the U.S. Office of Education. (A)

———SOLAR CELLS. NASA FACTS. Science Series. #NAS 1.20:S-6. U.S. Government Printing Office, 4 p., illus., 1968. 5 cents. An explanation of the primary source of electrical power for the majority of NASA's unmanned space missions. (S)

———SPACECRAFT POWER. NASA EP-59. #NAS 1.19:59. Stock #3300-0307. U.S. Government Printing Office, 18 p., illus., 1970.

35 cents. Today's power sources aboard manned and unmanned spacecraft, such as batteries, fuel cells, and solar cells, are discussed. Research on tomorrow's chemical and nuclear spacecraft power plants as well as radioisotope thermoelectric generators is described. The advantages and disadvantages of each are explained. (S-A)

————SPACECRAFT TRACKING. NASA EP-55. #NAS 1.19:55. Stock #3300-0153. U.S. Goverment Printing Office. 18 p., illus., 1969. 40 cents. A booklet describing how spacecraft are precisely located in space. (S-A)

————SPACECRAFT TRACKING AND COMMUNICATION. NASA FACTS Science Series. #NAS 1.20:S-2. Stock #3300-0357. U.S. Government Printing Office, 4 p., illus., 1967. 5 cents. A simplified description of the electronics bridge between Earth-based controls and mission-performing manned and unmanned spacecraft. (U-S)

————SPACE IN THE SEVENTIES series. U.S. Government Printing Office. A series of booklets outlining NASA's programs of research, development and exploration in the 1970's. See individual listings for annotations:

MAN IN SPACE EP-81. #NAS 1.19:81. Stock #3300-0346. 1971. $1. (S-A)

PLANETARY EXPLORATION. EP-82. Stock #3300-0399. 1971. 75 cents. (S-A)

EARTH ORBITAL SCIENCE. EP-83. #NAS 1.19:83. Stock #3300-0365. 1971. $1. (S-A)

SATELLITES AT WORK. EP-84. Stock #3300-0405. 1971. 60 cents. (S-A)

AERONAUTICS. EP-85. Stock #3300-0409. 1971. 75 cents. (S-A)

————SPACE JOBS. NASA EP-31. #NAS 1.19:31. Stock #3300-0349. U.S. Government Printing Office. 11 p., illus., 1966. 15 cents. An illustrated booklet written especially for pupils in kindergarten through third grade. (P)

————SPACE MATHEMATICS. A RESOURCE FOR TEACHERS. NASA EP-92. Stock #3300-0389. U.S. Government Printing Office. 174 p. 1972. Paperback. $2.00. A collection of problems in mathematics related to space science, designed to improve understanding of both mathematics and space technology. The problems are grouped according to topics in mathematics, so that real applications of mathematics in grades 9 through 14 can readily be found to enrich the regular courses. Complete solutions are given to all problems. Developed at Duke University in cooperation with NASA.

————SPACEMOBILE LECTURE-DEMONSTRATION PROGRAM. U.S. National Aeronautics and Space Administration. Provides a systematic means of filling requests from schools for classroom and assembly hall lectures and demonstrations about NASA activities. The Spacemobile is a unit composed of a lecturer with science teaching background, equipment for space science demonstrations, and 20 to 25 models of NASA spacecraft and launch vehicles transported in a panel truck. (I-U-S-A)

————SPACE NAVIGATION. NASA FACTS. #NAS 1.20:NF-37. Stock #3300-0380. U.S. Government Printing Office, 8 p., illus., 1968. 10 cents. Describes the techniques which will be used for long trips in space, based upon techniques in use for the navigation of ships and airplanes, and now adapted to the special needs of space flight. (U-S-A)

————SPACE PHYSICS AND ASTRONOMY. NASA. EP-51. #NAS 1.19:51. Stock #3300-0328. U.S. Government Printing Office, 22 p., illus., 1969. 45 cents. A booklet listing progress made in the study of cosmic rays, energetic particles, magnetic measurements, ionospheres, radio physics, planetary atmospheres, solar physics, astronomy, cosmic rays, and interplanetary dust. (S-A)

————SPACE PROGRAM BENEFITS. U.S. National Aeronautics and Space Administration. 138 p., illus., 1971. Free. Excerpts from hearings before the Committee on Aeronautical and Space Sciences, U.S. Senate, April 6, 1970. Testimony from NASA officials regarding the impact of the space program on society, education, technology, meteorology, communications, and management processes. Statements concerning the future benefits that may be ex-

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pected, and examples of NASA technology transfer are also provided. (S-A)

————SPACE RESOURCES FOR TEACHERS: BIOLOGY. NASA EP-50. #NAS 1.19:50. Stock #3300-0149. U.S. Government Printing Office, 236 p., illus., 1969. $2.75. An education tool to update the biology teacher and to relate classroom instruction to fast-growing developments in the life sciences coming out of the space program. Selected ideas, topics and illustrations to enrich instruction. Prepared for NASA by the staff of the Lawrence Hall of Science, University of California, Berkeley. (S-A)

————SPACE RESOURCES FOR TEACHERS: CHEMISTRY. NASA EP-87. #NAS 1.19:87. Stock #3300-0362. U.S. Government Printing Office, 228 p., illus., 1971. $2.50. A curriculum supplement designed to enrich chemistry instruction with recent discoveries coming from the nation's space program. Monographs giving background information are included along with detailed suggestions for activities, experiments, demonstrations, projects, and topics for discussion. Developed at Ball State University in cooperation with NASA. (S-A)

————SPACE RESOURCES FOR TEACHERS: SPACE SCIENCE. NASA EP-64. #NAS 1.19:64. Stock #3300-0156. U.S. Government Printing Office, 144 p., illus., 1969. $2. A curriculum resource guide with units in space science to supplement standard science and mathematics courses in the secondary school or in the first two years of college. Covers measurement, distance, and size in astronomy; atoms, spectra, and stars; atomic nuclei and stars; the solar system; the origin and evolution of life; and motion, rockets, and gravity. (S-A)

————SPACE RESOURCES FOR THE HIGH SCHOOL: INDUSTRIAL ARTS RESOURCE UNITS. NASA EP-44. #NAS 1.19:44. Stock #3300-0145. U.S. Government Printing Office, 178 p., illus., 1968. $2.25. Suggestions for relating space concepts to instruction in secondary school industrial arts. Prepared by industrial arts teachers under the direction of the Western Michigan University Industrial Arts Department. (S-A)

————SPACE SHUTTLE. NASA EP-77. #NAS 1.19:77. Stock #3300-0386. U.S. Government Printing Office, 8 p., illus., 1971. 25 cents. A description of a reusable spacecraft that will be launched from Earth to orbit or rendezvous with an orbiting space station, and then return to the surface of the Earth to land in a manner similar to that of an aircraft. (U-S-A) *Out of print.*

————SPACE STATION: KEY TO THE FUTURE. NASA EP-75. #NAS 1.19:75. Stock #3300-0164. U.S. Government Printing Office, 40 p., illus., 1970. 45 cents. NASA's next big step in space involves the space station as a permanent base for a variety of scientific experiments. The space shuttle, or reusable vehicle that will transport men between Earth and the space station, is also discussed. (S-A)

————SPEAKER SERVICES. Speakers from NASA Headquarters and from the various NASA field centers are available without charge to student and teacher groups for the purposes of discussing NASA programs. Further information may be obtained from Speaker Services, National Aeronautics and Space Administration, Code FGE, Washington, D.C. 20546 (U-S-A)

————THIS IS NASA. NASA EP-22. #NAS 1.19:22. Stock #3300-0396. U.S. Government Printing Office, 20 p., illus., rev. 1971. 60 cents. A booklet providing a brief resume of NASA's past, present and future programs. (S-A)

————TWO OVER MARS. NASA FP-90. Mariner VI and Mariner VII. #NAS 1.19:90. Stock #3300-0351. U.S. Government Printing Office, 40 p., illus., 1971. 50 cents. An introduction to the technical characteristics, engineering development, flight performance, and scientific results of the two Mars probes. (S-A)

————U.S. LAUNCH VEHICLES FOR PEACEFUL EXPLORATION OF SPACE. NASA FACTS. #NAS 1.20:NF-20. Stock #3300-0166. U.S. Government Printing Office, wall sheet, illus., rev. 1969. 25 cents. Describes the rocket engines and gives scale drawings and statistics for the principal NASA launch vehicles. (P-I-U-S-A)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

———VANGUARD—A HISTORY. NASA SP-4202. #NAS 1.21:4202. Stock #3300-0364. U.S. Government Printing Office, 322 p., illus., 1970. $2.75. Traces the story of the first U.S. Earth satellite project, one of several programs planned for the International Geophysical Year. Analyzes the scientific and technical problems and examines the organization of the project which was "bound by an inexorably fixed time limit." Discusses briefly the state of public opinion in the U.S. both before and after the launching of the first Soviet Sputniks, and concludes with an evaluation of what the satellite program contributed to human knowledge. (S-A)

———WEATHER IN MOTION. NASA EP-79. #NAS 1.19:79. Stock #3300-0310. U.S. Government Printing Office, 8 p., plus "Xograph", 1970. 50 cents. Explains the elements of weather observations accomplished by meteorological satellites. Discusses the satellite, the camera, the display, picture information, and the benefits derived from the use of these satellites. The removable cover display is an "Xograph" representation of progressive movement of weather systems. (S-A)

———WEIGHTLESSNESS. NASA FACTS Science Series. #NAS 1.20:S-5. Stock #3300-0381. U.S. Government Printing Office, 4 p., illus. 1967. 5 cents. The term "weightlessness" is explained by everyday experience and simple experiments in this description of a complex phenomenon. (U-S)

U.S. Office of Education and the National Industrial Conference Board. 25 TECHNICAL CAREERS YOU CAN LEARN IN 2 YEARS OR LESS. A 6-page leaflet defining the term "technician" and listing the various kinds of technician occupations. Tells how to become a technician, gives sources of possible financial aid for training, and lists accredited technical schools. Available from the National Council of Technical Schools. Free. (S)

U.S. Senate, Committee on Aeronautical and Space Sciences. NASA AUTHORIZATION FOR FISCAL YEAR 1972. Part 1, March 30 and April 1, 1971. U.S. Senate, Committee on Aeronautical and Space Sciences, 92nd Congress, 1st Session. Hearings on a bill to authorize appropriations to NASA for research and development, construction of facilities, and for other purposes for the fiscal year ending June 30, 1972. Testimony from NASA officials on plans and funds needed for projects related to the Apollo program, space shuttle, and space science and applications, plus statements from the National Science Foundation and the Depts. of Agriculture, Commerce, and Interior concerning their special interests in a continuing space program. See also U.S. NASA SPACE PROGRAM BENEFITS. Free. (S-A)

———NASA AUTHORIZATION FOR FISCAL YEAR 1972. Part 2, April 2 and 5, 1971. U.S. Senate, Committee on Aeronautical and Space Sciences, 92nd Congress, 1st Session. Continuation of testimony of NASA officials concerning NASA's financial requirements for proposed plans and projects for the year ending June 30, 1972. Discusses the Skylab program, space shuttle, space sciences and applications, nuclear systems in space, and tracking and data acquisition. Free. (S-A)

United States Ship New Orleans LPH 11. THE USS NEW ORLEANS Apollo 14 MOON BOOK. Allen, 104 p., illus., 1971. $7.50. An illustrated account of the Apollo 14 flight from prelaunch activities at Cape Kennedy to recovery aboard the USS NEW ORLEANS. The recovery portion of the flight is highlighted. (S-A)

Useller, James W. CLEAN ROOM TECHNOLOGY. #NAS 1.21:5074. Stock #3300-0269. U.S. Government Printing Office, 69 p., 1969. 35 cents. A "how to" book providing a series of lectures for people who operate a clean room. The lectures were given at the NASA Lewis Research Center, and present a set of standards for industrial and scientific use. (S-A)

Vachal, J. D. and B. H. Florsheim. THE DESIGN OF THE U.S. SST FOR LOW COMMUNITY NOISE. #700808. Society of Automotive Engineers, 8 p., illus., 1970. Paperback, $1.50. Discusses the design of the SST (supersonic transport) in relation to lowering noise levels in flight. Does not discuss engine noise, but does consider the effect on noise of engine-airframe matching. Semitechnical. (A)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

Valens, E.G. THE ATTRACTIVE UNIVERSE. Gravity and the Shape of Space. World Publishing, 187 p., illus., rev. 1970. $6.20. An explanation of the force of gravity and its application to space travel. Includes many helpful diagrams and analogies. (S-A)

Vashon Industries, Inc. COMPLETE STARTER OUTFIT. #5091M. Vashon Industries, Inc. A model rocket with instructions for assembly and everything required to achieve lift-off to 500 feet or more. Includes propellant for three launches. Also useful in combination with other Vashon products for remote electrical firing, for boosting a model rocket plane, or for forming a two-stage rocket. $10.95. (U-S-A)

————FLYING MODEL ROCKETS. Vashon Industries, Inc. A catalog of model rocket kits and accessories, with the accent on safety. Free. (U-S-A)

————VIKING TWO-STAGE ROCKET. #5104M. Vashon Industries, Inc. A model rocket kit for advanced modelers who wish to experiment with a two-stage rocket. All parts may be recovered for future flights. $15.95. (S-A)

————XS-1 SPACE SHUTTLE. Vashon Industries, Inc. A rocket powered model space shuttle ready to fly, with propellant for ten flights. $4.95. (I-U)

Vermillion, Charles H. WEATHER SATELLITE PICTURE RECEIVING STATIONS. #N69-31985. National Technical Information Service. 83 p., 1969. Paperback, $3. Advice and directions about building a weather satellite picture receiving station using inexpensive materials. (S-A)

von Braun, Wernher. SPACE FRONTIER. Holt, 307 p., illus., rev. 1971. $6.95. A rocket pioneer and leading authority on space flight explains the nature of space flight, what is ahead in relation to manned exploration of the Moon, and big issues confronting NASA. This updated edition includes many of the author's own technical drawings and special photographs from NASA and the Marshall Space Flight Center. (S-A)

. . . *and Frederick Ordway.* HISTORY OF ROCKETRY AND SPACE TRAVEL. Crowell, 276 p., illus., rev. 1969. $17.50. A survey of man's efforts to conquer space, including new sections on the Apollo lunar landing and on significant development and discoveries in space science since 1966. (S-A)

Ward, Bob, compiler. A FUNNY THING HAPPENED ON THE WAY TO THE MOON. Fawcett, 144 p., illus., 1969. A collection of humorous events, jokings, and other tension-relieving grins and chuckles that evolved from the frustrations and failures of the finally successful American space program. The anecdotes are those about people associated with and working in the space program, from the scientists, engineers, technicians, to the astronauts themselves. (U-S-A) *Out of print.*

Warshofsky, Fred. THE 21st CENTURY: The New Age of Exploration. Viking, 180 p., illus., 1969. $6.95. Discusses in the main two new frontiers of exploration—the oceans and space, and the tools such as computers, lasers, nuclear powered rockets, underwater equipment, and telescopes that will be used to discover answers to many of the mysteries of oceans and space. (S-A)

Watson, Paul. GRAPHIC TIME TABLE OF THE HEAVENS. Maryland Academy of Sciences. A condensed and simplified almanac in graphic form published annually. Gives rising and setting times of the Sun, Moon, and brighter planets; occurrences of eclipses, and other useful astronomical information including instructions for using the Time Table. While the Time Table is computed for 40° north latitude and 90° west longitude, a correction table for using it at other locations is provided. 50 cents. (S-A)

Weart, Spencer. HOW TO BUILD A SUN. Coward-McCann, 95 p., illus., 1970. $4.29. Explains how scientists have discovered many important things about the Sun: its size, distance from Earth, its mass, and its composition. Discusses the complex equipment used in studying solar phenomena. (U-S)

Webb, James E. SPACE AGE MANAGEMENT. McGraw-Hill, 173 p., 1969. $6.95. A former NASA Administrator gives his views on the management problems of a diverse, large-scale

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technical organization working within the framework of the federal government and the democratic process. (A)

Webster Division, McGraw-Hill Book Co. ARIZONA CRATER: THE CASE FOR IMPACT. Webster Division, McGraw-Hill Book Co. An 11-page illustrated booklet reproducing a scientific paper published by D. M. Barringer in 1905 in support of his theory as to the origin of the Arizona Crater. A booklet in the Time, Space and Matter Science Reading Series. 63 cents. (S)

————THE LUNAR [illegible]ST. Webster Division, McGraw-Hill Book Co. An illustrated 16-page booklet reproducing a translation of Galileo's "The Starry Messenger" or his first observation of the Moon made upon completion of his first telescope. A booklet in the Time, Space and Matter Science Reading Series. 63 cents. (S)

————THE MOON'S FACE. Webster Division, McGraw-Hill Book Co. A 16-page booklet providing an adaptation of a paper by G. K. Gilbert in which he defends his theory about the volcanic origin of the Moon's craters. The paper was first presented in 1892. A booklet in the Time, Space and Matter Science Reading Series. 63 cents. (S)

————THE MOTIONS OF EARTH ABOUT A FIXED SUN. Webster Division, McGraw-Hill Book Co. A 13-page illustrated booklet providing a translation of Copernicus' "Concerning the Revolutions of the Heavenly Spheres". A booklet in the Time, Space and Matter Science Reading Series. 63 cents. (S)

Weltman, Gershon and others. NASA CONTRIBUTORS TO BIOINSTRUMENTATION SYSTEMS. NASA SP-5054. #NAS 1.21:5054. Stock #3300-0262. U.S. Government Printing Office. 97 p., 1969. $1. A survey of devices and techniques, developed to monitor Mercury and Gemini astronauts, which have much potential for more efficient use of time of medical personnel. Discusses sensors and their attachment to human beings, signal transmission data processing and analysis, and the fabrication of bioinstrumentation. Semitechnical. (A)

Whirlpool Corporation. FOOD MANAGEMENT IN SPACE. Whirlpool Corp. An illustrated folder outlining the problems of eating aboard a spacecraft and how these problems are being solved. Free. (P-I-U-S)

White, Irvin L. DECISION-MAKING FOR SPACE. Law and Politics in Air, Sea, and Outer Space. Purdue University Studies. 277 p., 1970. $6.50. A review of international air and sea law, and their applications to legal problems likely to be encountered in space. (A)

Whittingham, Richard. ASTRONOMY. #BAF-190. Hubbard Press. 48 p., illus., 1971. $2.95. Basic facts on the Moon, planets, Sun, stars, the instruments and techniques of astronomy including radio astronomy, meteors, comets and other major features of space. Profusely illustrated. (U-S)

Widger, William K., Jr. METEOROLOGICAL SATELLITES. Holt. 272 p., illus., 1966. Paperback. $2.24. The applications of spacecraft to meteorological observations and weather forecasting, and the development and operation of the TIROS and Nimbus weather satellites and the more sophisticated meteorological satellites of the future are discussed. (S)

Wilford, John N. WE REACH THE MOON. Norton. 384 p., illus., 1971. $10. (Note: A 1969 edition of this book is available from Grosset in a shorter version, edited for young readers in the intermediate and upper elementary grades, at $4.99.) An account of the Apollo 12 and 14 round trip flights to the Moon, and the story of the near tragedy of Apollo 13. Also discusses the scientific debates concerning the origin and significance of the Moon, and lunar materials brought back to Earth. (I-U-S-A)

Wilkinson, Jean and Ned Wilkinson. COME TO WORK WITH US IN AEROSPACE. Sextant Systems. 46 p., illus., 1970. $4.50. Available from Childrens Press. Brief text illustrated with photographs showing children working as adults in a selection of typical aerospace jobs—chemist, astronaut, rocket design engineer, rocket parts tester, cable assembler, etc. (P)

Woodbury, David O. GLASS GIANT OF PALOMAR. Dodd, Mead. 390 p., illus., rev. 1970. $7.50. The history of the making, financing and transporting to California of the 200-inch telescopic lens. Includes tributes to the men who designed the telescope. New material has

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been added to update this book. (S-A)

World Meteorological Organization. AN INTRODUCTION TO GARP. Unipub. 22 p., 1970. $2. A semi-popular account of the origins, objectives, and scientific basis of GARP (Global Atmospheric Research Program). Describes problems, proposed solutions, predictions, and echniques of weather prediction partially based on weather satellites, and accompanying ground facilities. (S-A)

————SCOPE OF THE 1972-1975 PLAN WITH PARTICULAR REFERENCE TO THE METEOROLOGICAL SATELLITE SUBSYSTEM. Planning Report No. 30. Unipub. 23 p., plus appendices. 1970. $4.50. Covers scope and objectives of the World Weather Watch plan for 1972-75, especially the effect the satellite subsystem will have on the Global Observing System as a whole, the Global Data Processing System, and the Global Telecommunication System. Reviews data requirements, probable operational capabilities of meteorological satellites during 1972-75, and the reception and processing of satellite information. Semitechnical. (A)

Worsnop, Richard L. MISSION TO MARS: BENEFITS VS. COSTS. Congressional Quarterly, Inc., 15 p., 1969. $2. A reprint from the *Congressional Quarterly*, Oct. 1, 1969 discussing one of the challenges of space exploration in the 1970's. (S-A)

Young, Hugo, Bryan Silcock and Peter Dunn. JOURNEY TO TRANQUILITY. Doubleday. 119 p., illus., 1969. $6.95. A British viewpoint of the U.S. space program—its history, rationale, and events leading up to the landing of the Apollo 11 astronauts at Tranquility Base. (S-A)

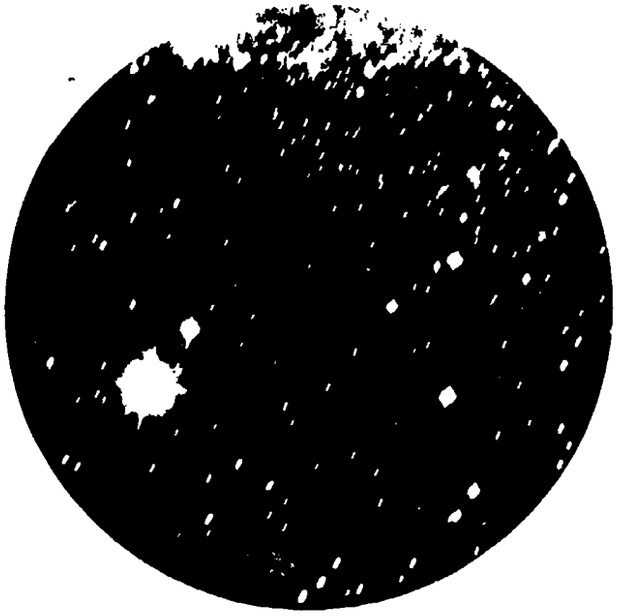
Young, Richard S. EXTRATERRESTRIAL BIOLOGY. Holt. 121 p., illus., 1966. Paperback. $2.24. A discussion of the possibilities of life on other planets with respect to ancient and recent theories of the origin of life. Describes experimental investigations carried on in laboratories and in space. (S)

————LIFE BEYOND EARTH. Silver Burdett. 64 p., illus., 1969. Paperback, 25 cents. Considers life on other planets and how scientists search for evidences of extraterrestrial life. A book in the 21st Century Monografics series. (I-U-S)

Zaffo, George J. THE GIANT BOOK OF THINGS IN SPACE. Doubleday. 160 p., illus., 1969. $4.95. An illustrated account of the many facets of space travel for young children. A minimum of text accompanies the drawings. (P)

Zarem, Lewis. CAREERS AND OPPORTUNITIES IN ASTRONAUTICS. Dutton. 290 p., illus., rev. 1969. $6.95. A comprehensive guide to careers in all branches of the science and technology of space flight. Covers opportunities in both government and industry. Discusses nature of work, preparation required, and rewards. Also discusses the nation's space program in general. (S-A)

part iii
reference materials



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Bibliographies

Kemp, D. A. ASTRONOMY AND ASTROPHYSICS: A Bibliographical Guide. Shoe String Press, 607 p., 1970. $25. Significant books, papers and bibliographies in the following fields: The Sun, Moon and planets, cosmic rays, observational techniques, celestial mechanics, stars, interplanetary matter, magnetic fields, gravitation, and numerous other related subjects. Covers literature from early times to spring 1968, plus more recent additions. (A)

Marshall, Jane N., editor. AVIATION EDUCATION BIBLIOGRAPHY. National Aerospace Education Association. Fifth edition. 66 p., 1967. Paperback. 50 cents. An annotated, graded list of selected aviation books, references, periodicals, free and inexpensive teaching aids, films, and filmstrips on such subjects as aviation history, biography, types of aircraft, aviation weather, air transportation, learning to fly, military aviation, and the theory of flight. Books include those published in the period 1964 through spring 1967. Books and materials concern all reading levels, primary through adult. (P-I-S-U-A)

McGraw-Hill. MCGRAW-HILL BASIC BIBLIOGRAPHY OF SCIENCE AND TECHNOLOGY. McGraw-Hill, 738 p., 1966. $19.50. More than 8,000 listings of books in all scientific and technological fields, including astronautics and space technology. Each entry gives title, author, publisher, publication date, a concise description of the book and its user level. Includes textbooks, handbooks, manuals, technical titles as well as more general publications. Includes a topical index. (S-A)

Ordway, Frederick I., III, editor. ANNOTATED BIBLIOGRAPHY OF SPACE SCIENCE AND TECHNOLOGY. Arfor, 77 p., rev. 1962. Paperback. $1.95. A list of the literature of space science and technology, 1931 through 1961, arranged by year. Includes more than 450 titles, a third of them in the Astronomical Supplement. (S-A)

Smithsonian Astrophysical Observatory. GENERAL BOOKS ON SPACE SCIENCES AND ASTRONOMY FOR STUDENTS. Smithsonian Astrophysical Observatory, 10 p., undated. Free. A listing of books on space flight and astronomy subjects selected by the Observatory staff for all reading levels through high school. The entries are graded but are without annotations. (P-I-U-S)

U.S. National Aeronautics and Space Administration. U.S. Government Printing Office. Selected annotated lists of books on space flight, space exploration, and aeronautical research subjects under study by NASA. Also includes sources of related teaching materials.

AERONAUTICS AND SPACE BIBLIOGRAPHY FOR ELEMENTARY GRADES. 1961. Listings cover books published from January 1958 through June 1961. (P-I-U) *Out of print.*

AERONAUTICS AND SPACE BIBLIOGRAPHY FOR ELEMENTARY GRADES. 2nd ed., 1963. Listings cover books published from January 1960 through March 1963. (P-I-U) *Out of print.*

AERONAUTICS AND SPACE BIBLIOGRAPHY FOR SECONDARY GRADES. 1961. Listings cover books published from January 1958 through June 1961. (S-A) *Out of print.*

AERONAUTICS AND SPACE BIBLIOGRAPHY FOR SECONDARY GRADES. 2nd ed., 1963. Listings cover books published from January 1960 through March 1963. (S-A) *Out of print.*

AERONAUTICS AND SPACE BIBLIOGRAPHY. A Bibliography of Adult Aerospace Books and Materials. 1961. Listings include books published from January 1958 through June 1961. (A) *Out of print.*

AERONAUTICS AND SPACE BIBLIOGRAPHY. Adult Aerospace Books and Materials. 2nd ed., 1963. Listings cover books published from January 1960 through March 1963. (A) *Out of print.*

AEROSPACE BIBLIOGRAPHY. 3rd ed., 1966. Listings, mostly nontechnical, cover books published from January 1963 through Summer 1965, including under one cover for the first time books for the

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general reader—primary through adult levels. (P-I-U-S-A) *Out of print.*

AEROSPACE BIBLIOGRAPHY. 4th ed., 1968. Listings, mostly nontechnical, cover books published from January 1965 throu[illegible] Summer 1967. Reading levels are from primary grades through college and adult. (P-I-U-S-A) *Out of print.*

AEROSPACE BIBLIOGRAPHY. 5th ed., 1970. NASA EP-48. #NAS 1.19:48/2. Stock #3300-0148. Listings cover books published from January 1967 through Fall 1969. Reading levels from primary grades through college and adult. $1. (P-I-U-S-A)

————AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY. National Technical Information Service. Published monthly with an annual cumulative Index. A bibliography of world literature on aviation and space medicine subjects: space biology, ecology, psychology, sensory mechanisms, physiology, psychiatry, stress physiology, toxicity, accidents, safety, etc. Note: Vols. I and II—*Aviation Medicine: An Annotated Bibliography*, and Vols. III-XI—*Aerospace Medicine and Biology: An Annotated Bibliography*—covering literature for the years 1952-63 also are available from the National Technical Information Service at various prices. *Aerospace Medicine and Biology: A Continuing* Bibliography picks up with 1964 literature and continues to the present. Write to the National Technical Information Service for catalog numbers, dates, and prices. Semitechnical. (A)

————REMOTE SENSING OF EARTH RESOURCES: A LITERATURE SURVEY WITH INDEXES. NASA SP-7036. #N70-41047. National Technical Information Service. 1,232 p., 1970. $10. Lists about 3,700 citations to unclassified reports and journal literature between January 1962 and February 1970 regarding remote sensing from orbiting spacecraft of the Earth's various features and resources. (A)

Chronologies

Baker, Norman, editor. SOVIET SPACE LOG 1957-1969. Space Publications, approx. 60 p., illus., rev. 1969. *Out of print.* A concise report on every Soviet space flight mission from the launch of SPUTNIK 1 on October 4, 1957 through 1968. Data include information on orbits, launch sites, launch vehicles, orbital life, number of objects involved, and an analysis of the missions' objectives. Compiled in chronological order and also by mission category. (U-S-A)

Emme, Eugene M., compiler. AERONAUTICS AND ASTRONAUTICS. An American Chronology of Science and Technology in the Exploration of Space, 1915-60. Supt. of Documents, 240 p., 1961. A chronological list of achievements in scientific research and engineering development which lie behind the major milestones in man's conquest of the air and space. Appendices include a log of earth satellites and space probes through 1960, and major astronautics awards and honors over the years. (S-A) *Out of print.*

————AERONAUTICAL AND ASTRONAUTICAL EVENTS OF 1961. Committee on Science and Astronautics, U. S. House of Representatives, 113 p., 1962. A sequel to Eugene Emme's chronological list of aerospace achievements from 1915 through 1960—*Aeronautics and Astronautics 1915-60.* An inventory of decisions, announcements, technical progress and flight achievements in 1961. (S-A) *Out of print.*

————ASTRONAUTICAL AND AERONAUTICAL EVENTS OF 1962. Supt. of Documents, 370 p., 1963. Report of NASA to the Committee on Science and Astronautics, on the activities, problems, and accomplishments of NASA and its academic, industrial, governmental and international partners in the exploration of space during 1962. Also includes a chronology of major NASA launchings from 1958 through 1962. (S-A) *Out of print.*

————ASTRONAUTICS AND AERONAUTICS, CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY. U.S. Government Printing Office. Chronologies of events and statements compiled from open public sources for years indicated:

1963, 610 p. (S-A) *Out of print.*

1964, 527 p. (S-A) *Out of print.*

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

1965. 681 p. (S-A) *Out of print.*

1966. 479 p. (S-A) *Out of print.*

1967. 487 p. #NAS 1.21:4008. $2.25. (S-A)

1968. 429 p. #NAS 1.21:4010. Stock #3300-0242. $2. (S-A)

1969. 542 p. #NAS 1.21:4014. Stock #3300-0305. $2.25. (S-A)

Sheldon, Charles S. A CHRONOLOGY OF MISSILE AND ASTRONAUTIC EVENTS. Supt. of Documents, 189 p., 1961. A comprehensive list of significant events in missilery and astronautics from 1686, when Sir Isaac Newton described how an earth satellite is placed into orbit, through Feb., 1961. Includes dates of decisons affecting U.S. space efforts, important launchings, progress reports, predictions for the future, etc. (S-A) *Out of print.*

Dictionaries

Allen, William H., editor. DICTIONARY OF TECHNICAL TERMS FOR AEROSPACE USE. NASA SP-7. #NAS 1.21:&. Stock #3300-0280. U.S. Government Printing Office, 314 p., 1965. Contains more than 6,000 carefully chosen and precisely defined terms. (S-A) *Out of print.*

Caidin, Martin. THE MAN-IN-SPACE DICTIONARY. Dutton, 256 p., illus., 1963. $7.95. Definitions and nontechnical explanations of 1900 terms dealing with the science and technology of manned space flight. (S-A)

Gentle, Ernest and Charles E. Chapel, editors. AVIATION AND SPACE DICTIONARY. 5th edition [illegible]ro Publishers, 450 p., 1970. $12.50. (Sixth ed. in preparation.) Comprehensive definitions of more than 10,000 aerospace terms. (U-S-A)

International Academy of Astronautics. ASTRONAUTICAL MULTILINGUAL DICTIONARY 1970. American Elsevier, 936 p., 1970. $37.50. Definitions of approximatley 5,000 English scientific and technical terms selected from vocabulary definitions of the National Aeronautics and Space Administration's dictionary. (See Allen, William H.) with their equivalents in six other languages—Russian, German, French, Spanish, Italian, and Czech, also includes definitions of 900 space law terms in the same language as indicated above. (S-A)

Marks, Robert W., editor. THE NEW DICTIONARY AND HANDBOOK OF AEROSPACE. Praeger, 531 p., illus., 1969. $10. A compilation of more than 50,000 definitions of space terms composing a layman's guide to space technology. Includes data on Project Apollo, special features on space navigation, guidance systems, rocket fuels, radar, and power sources, star charts, tables of constellations, planets, and navigational stars plus details on all major scientific satellites and space probes. (S-A)

Nayler, J. L. DICTIONARY OF ASTRONAUTICS. Hart, 316 p., illus., 1964. $9. Paperback, $2.65. More than 2,000 definitions of space terms plus chemical and mathematical tables, formulas, and details on space navigation, planetary conditions, orbits, and satellite instrumentation. (S-A)

Newlon, Clarke, compiler. AEROSPACE AGE DICTIONARY. Watts, 282 p., 1965. *Out of Print.* A comprehensive, quick-reference dictionary of aerospace technical terms that the general reader as well as the specialist can use. Appendices include brief biographies of persons having major roles in our civilian and military space programs, locations and purposes of NASA centers, military units involved in the space program, conversion factors, and units of measurement. (S-A)

Roes, Nicholas. SPACE FLIGHT DICTIONARY. Follett, 224 p., illus., 1968. $3.95. Explanations of terms related to the vehicles and administration of the American and Soviet space programs, illustrated with line drawings and photographs. (A)

Ruffner, Frederick G., Jr. and Robert C. Thomas, editors. CODE NAMES DICTIONARY. Gale, 555 p., 1963. $25. A glossary of more than 8,500 code names, cover words, and nicknames identifying (without technical information) aviation, military and scientific space activities, systems, equipment, and other terms that have come into use from the year 1910. (S-A)

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

Turnill, Reginald. THE LANGUAGE OF SPACE. A Dictionary of Astronautics. Day, 165 p., 1970. $6.95. An annotated dictionary of astronautical terms with explanations that are anecdotal in style. Compiled and written by a correspondent of the British Broadcasting Corporation who has covered the American space program for more than ten years. (U-S-A)

U.S. National Aeronautics and Space Administration. SHORT GLOSSARY OF SPACE TERMS. 2nd ed., 51 p., 1966. Brief definitions of frequently used space terms selected from the *Dictionary of Technical Terms for Aerospace Use.* (U-S-A) *Out of print.*

Encyclopedias

Asimov, Isaac, editor. ASIMOV'S BIOGRAPHICAL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY. Doubleday, 1,000+ p., illus., rev. 1971. $12.95. Biographies of the world's great scientists and inventors arranged chronologically in order of birth. Covers the entire sweep of history with greatest emphasis on scientists of the 19th and 20th centuries including the space age. (S-A)

Bergaust, Erik. NEW ILLUSTRATED SPACE ENCYCLOPEDIA. Putnam, 192 p., illus., rev. 1970. $4.29. A dictionary/encyclopedia of 2,500 space terms including information about all space flights—from Sputnik I in 1957 through Apollo 12 in 1969. Provides brief biographies of all U.S. astronauts. (U-S)

Cowles Book Company. COWLES ENCYCLOPEDIA OF SCIENCE, INDUSTRY AND TECHNOLOGY. Cowles, 639 p., illus., rev. 1969. A one-volume reference including numerous articles on space flight topics—space biology, astronautics, astronomy, rocket engines and fuels, telemetry, solar cells, etc. (U-S-A) *Out of print.*

Fairbridge, Rhodes W., editor. ENCYCLOPEDIA OF ATMOSPHERIC SCIENCES AND ASTROGEOLOGY. Vol. 2 of the Encyclopedia of Earth Sciences series. Reinhold, 1,120 p., illus., 1967. $37.50. Basic information "intended for all scientists, from those still in high school to the emeritus professor who would like to check on a few items without having to trek over to the library." (S-A)

Galiana, Thomas de, compiler. CONCISE ENCYCLOPEDIA OF ASTRONAUTICS. Follett, 320 p., illus., 1968. $3.95. Paperback, $2.95. Treats all aspects of astronautics from the dreams of Jules Verne to manned lunar flights. Includes brief biographies of the scientists and engineers who have contributed significantly to astronautics, and brief summaries about the men who have pioneered in manned space flight. Specific subjects such as rockets, space installations, space communications, etc. are arranged in alphabetical order. (S-A)

Johnson, Raymond J., editor. ABOVE AND BEYOND, the Encyclopedia of Aviation and Space Sciences. American Family Enterprises, 14 vols. plus Teacher's Guide., illus., rev. 1969. $99. A definitive encyclopedia of aviation and space with 3,500 entries including extensive definitions and cross references, 4,000 illustrations, and index. Written by more than 100 recognized experts in aviation and space flight subjects. (I-U-S)

McGraw-Hill Book Co. MCGRAW-HILL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY. 3rd ed. McGraw-Hill, 15 vols., 1971. $360. Includes numerous articles on space science subjects listed alphabetically. (S-A)

————MCGRAW-HILL ENCYCLOPEDIA OF SPACE. McGraw-Hill, 830 p., illus., 1968. $27.50. A one-volume encyclopedia featuring rocketry, artificial satellites, space navigation and electronics, man in space, extraterrestrial life, astronomy-astrophysics, the conquest of the Moon, interplanetary and far space exploration, and the present status of astronautics. Also includes historical material and approximately 1,200 photographs, diagrams, and drawings. Gives extensive coverage of space activities of France, Great Britain, Italy, West Germany, Poland, Belgium, Japan, and the Soviet Union. The authorship of individual articles is not disclosed. (S-A)

Muller, Paul, compiler. CONCISE ENCYCLOPEDIA OF ASTRONOMY. Follett, 320 p., 1968. $3.95. Paperback, $2.95. Covers the principal

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phenomena observable to the naked eye or with simple instruments. Also includes biographies of leading astronomers, optical instruments, the planets, coordinate systems, and astronomical theory. (S-A)

Spencer-Jones, Harold, and others. THE NEW SPACE ENCYCLOPEDIA. Dutton, 332 p., illus., rev. 1969. $13.95. A completely revised edition which combines details of satellites, missiles and latest upper atmosphere research with an updated survey of all branches of astronomy. (A)

Weigart, A. and H. Zimmerman. A CONCISE ENCYCLOPEDIA OF ASTRONOMY. American Elsevier, 367 p., illus., 1968. $9. Presents about 1,500 articles on various aspects of astronomy including celestial mechanics, radio astronomy, and astronomical instruments, plus artificial satellites and space travel. (S-A)

Young, Richard G., executive editor. 1970 BRITANNICA YEARBOOK OF SCIENCE AND THE FUTURE. Encyclopedia Britannica, 448 p., illus., 1969. $12.50. Includes among other science subjects articles on navigating a course to the Moon, extraterrestrial life, and the Mount Wilson and Palomar Observatories. (S-A)

Special References

Academic Media, Inc. NASA FACTBOOK. Academic Media. Issued annually. $35. An unofficial guide to NASA programs and activities. Includes current information on such topics as legislation concerning NASA, statistics, research activities, personnel, organizational functions, grants and awards, manned missions, lunar and planetary exploration, propulsion systems, nuclear power systems, spacecraft, tracking and data acquisition and many other subjects. This is not a NASA publication. (A)

Alter, Dinsmore, editor. LUNAR ATLAS. Dover, 343 p., illus., 1968. Paperback. $5. A first reprinting of an original limited edition prepared by the Space Sciences Laboratory, Space Division, North American Aviation, Inc. (now North American Rockwell). Includes 219 of the finest telescopic photos of the Moon made by the Mt. Wilson, Palomar, Lick, Yerkes, and McDonald observatories, and observatories in the Soviet Union and in France. A descriptive text accompanies each plate. (S-A)

Baker, Norman, editor. WHO'S WHO IN SPACE. 1966-67. 1st ed. Space Publications, approx. 500 p., 1966. $26. A second edition, 1971-72, ready winter 1971. $30. A biographical listing of the world's leaders in space activities. Included are leaders in government, industry, and academia; Russian cosmonauts and U.S. astronauts; space socieites, organizations, and awards. (S-A)

Caler, John W., Publications, Inc. Can supply back issues of National Aeronautics and Space Administration publications as well as those of its predecessor organization, the National Advisory Committee on Aeronautics. Some of the latter publications date back to 1915. For price and availability of specific publications write to John W. Caler Publications, Inc. (S-A)

Cortright, Edgar M., compiler and editor. EXPLORING SPACE WITH A CAMERA. NASA SP-168. #NAS 1.21:168. Stock #3300-0207. U.S. Government Printing Office, 214 p., illus., 1968. $4.25. A superb collection of photographs, many in color, selected from thousands of pictures taken of the Earth, the Moon, and space phenomena by cameras in manned and unmanned spacecraft. Each photograph is accompanied by a nontechnical explanation. All are organized under three sections: "Above the Atmosphere", "To the Moon and Beyond", and "Man's Ventures Into Space". An Appendix includes photographs of major spacecraft, and their specifications. (U-S-A)

Dean, Donald W., editor and publisher. WORLD SPACE DIRECTORY, Including Oceanology. Approx. 780 p., published each March and September. Available from Ziff-Davis Aviation Division. $25. Lists officers and addresses of U.S. major and component space/oceanology manufacturers; U.S. Government and foreign agencies involved in space/oceanology programs; academic, nonprofit research and professional organizations; and colleges and uni-

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versities offering courses related to space/oceanology research and manufacturing. (S-A)

Editors of SCIENCE YEAR. SCIENCE YEAR—The World Book Science Annual. Field Enterprises Educational Corp. Issued annually. Approx. 440 p., illus. $6.95 to *World Book* owners; $7.95 to others. The 1969 edition (copyrighted 1969) includes a special report on the elaborate facilities for studying samples of lunar materials, and space navigation techniques. The 1971 edition (copyrighted 1970) includes special reports on the planet Jupiter, and plans for a reusable space shuttle. Brief coverage of current events in astronomy, meterology, space exploration, and air travel is included among other scientific and technological topics. (U-S-A)

Editors of The WORLD BOOK Year Book. THE WORLD BOOK YEAR BOOK. Field Enterprises Educational Corp., approx. 625 p., illus., $6.95 to *World Book* owners, $5.95 to schools and libraries, and $12.50 to others. The 1970 edition includes articles on the Apollo 11 lunar landing, biographical material on the Apollo 11 astronauts, as well as articles on astronomy, space exploration and communications. Also includes former astronaut John Glenn's comments on the past and future of the U.S. Space program. The 1971 edition contains brief reports on major events in astronomy, space exploration, communications, and the supersonic transport (SST). (U-S-A)

Engel, Ralph, compiler. CATALOG OF AMERICAN SPACE COVERS. International Association of Space Philatelists, 50 p., illus., rev. 1971. $5. ($3 to members of the Association). A catalog listing major commemorative space covers and their retail prices. Covers are listed in chronological order and are cross-refereneed to indicate series name and number. It is not a price list, as the IASP does not sell covers. The prices represent what a collector would expeet to pay if he bought a cover from a dealer. (U-S-A)

Goddard, Esther and G. Edward Pendray, editors. THE PAPERS OF ROBERT H. GODDARD. 3 vols. McGraw-Hill. 1,707 p., illus., 1970. $150. A selection of writings compiled from more than 6,000 pages of "orderly and continuous records" made by Dr. Goddard over the years 1898-1945. This ten-year editorial project, sponsored by the Daniel and Florence Guggenheim Foundation, has resulted in a comprehensive collection of material that reveals not only the ingenuity and technical competence of the "father" of modern rocketry, but his personality and devotion to his dream of flight in space. The three volumes include invaluable basic source material. (S-A)

Haggerty, James J., editor. THE 1970 AEROSPACE YEAR BOOK. Spartan, 650 p., illus., 1970. $12. 1969 edition, $12. An official and comprehensive report of aerospace activities in industry and government. Covers U.S. aerospace manufacturing, commercial aviation, government research and development in aerospace fields, and highlights of the 1969 aerospace year. Includes a reference section with descriptions and photographs of more than 700 aircraft, missiles, spacecraft, launch vehicles, engines, sounding rockets, and major systems in these products. Check your library for editions for years previous to 1969. The series ends with the 1970 edition. (U-S-A)

————1970 UNITED STATES AIRCRAFT, MISSILES AND SPACECRAFT. National Aerospace Education Association, 224 p., illus., 1970. Paperback, $3. A pictorial review of all U.S. aircraft, missiles, and spacecraft in production in 1969. Includes photographs, brief specifications, performance data and comments; aerospace records and awards, and significant aerospace events of the year. Some yearbooks dating back to 1957 also are available. Write for list and prices. (U-S-A)

Interavia. INTERAVIA ABC, WORLD DIRECTORY OF AVIATION AND ASTRONAUTICS. Interavia, approx. 1,300 p., revised each March. $20. Listings in English, French, German, Spanish and Italian giving addresses of all segments of the aviation and astronautics industries of 180 countries. Cross-indexed in 86 separate categories. (S-A)

Kondo, Herbert, editor-in-chief. ENCYCLOPEDIA SCIENCE SUPPLEMENT. Americana, 406 p., illus., 1969. $6.95. Includes articles on the

Order items directly from sources as indicated. Addresses of sources may be located on pages 111-116.

launching of the Orbiting Astronomical Observatory, the Apollo 8 flight around the Moon, a Glossary of Space Terms, the Apollo 11 lunar mission with brief biographies of the Apollo 11 astronauts, principles of space flight, man in space, the supersonic transport (SST), and the Apollo space suit. (S-A)

————ENCYCLOPEDIA SCIENCE SUPPLEMENT. Americana, 406 p., illus., 1970. $6.95. Includes articles on the Moon, lunar rocks, new theories about gravitation, extraterrestrial life, radio telescopes, Apollo 10 and 11 astronauts, the flights of Apollo 12 and 13, planned space probes of the future, and other related subjects. (S-A)

————ENCYCLOPEDIA SCIENCE SUPPLEMENT. Americana, 406 p., illus., 1971. $6.95. Includes articles on the geology of the Moon, SKYLAB, the flight of Apollo 14 with details on the astronauts' work on the lunar surface at Fra Mauro, the Soviet Luna 16 and 17 spacecraft accomplishments, Soviet-U.S. agreements to cooperate in space, and other current topics related to space exploration. (S-A)

Kopal, Zdenek. NEW PHOTOGRAPHIC ATLAS OF THE MOON. Taplinger, 320 p., illus., 1971. $20. Compiled by one of the foremost lunar authorities, this book reflects the achievements of recent years in both astronomy and space science. Presents a composite picture of the Moon through a selection of unique photographs obtained from spaceborne telescopes and cameras (from Orbiters 1 through 5, and from Apollo flights). Supporting text describes highlights of important lunar landmarks and interprets significant lunar surface details. (A)

McAllister, Gerald J., editor. 1971 AEROSPACE FACTS AND FIGURES. Aviation Week and Space Technology, publishers, 140 p., illus., 1971. Paperback, $3.95. (Note: The 1970 edition, 144 p., is also available at $3.95.) Information and statistics on the U.S. aerospace industry activities such as aircraft production, missile and space programs, foreign trade, research and development, manpower, air transportation, and finance. The data are for the year previous to that indicated by the edition date. (S-A)

McGraw-Hill Book Company. MCGRAW-HILL MODERN MEN OF SCIENCE. McGraw-Hill. Vol. I, 620 p., 1966; Vol. II, 679 p., 1968. $45 for the set of two volumes. Facts about hundreds of outstanding contemporary scientists throughout the world. In addition to biographical information, each article includes a description of what its subject accomplished in science, the problems he faced, and how he solved them. Space scientists are included. (S-A)

Moore, Patrick. AMATEUR ASTRONOMERS GLOSSARY. Norton, 162 p., illus., 1967. $5.95. Definitions of more than 400 words and phrases in the language of astronomy. (S-A)

————ATLAS OF THE UNIVERSE. Rand McNally, 272 p., illus., 1970. $35. Explains the step-by-step story of man's expanding knowledge of the universe and future expectations of astronomers. An atlas designed for use in the space age. (S-A)

————MOON FLIGHT ATLAS. Rand McNally, 64 p., illus., rev. 1970. $6.95. More than the usual kind of atlas, this book records in text, charts, drawings and color photographs of man's conquest of the Moon. Includes reports on Apollo 11 and 12 landings and their scientific findings, and the efforts involving the rescue operations of the ill-fated Apollo 13 flight. Also discusses the solar system, mapping of the Moon, the planet Mars, the Grand Tour plan for studying Pluto, Neptune, Jupiter, and Uranus through space probes.

————YEARBOOK OF ASTRONOMY. Norton. Issued annually. Monthly star charts, topical notes for the year, the positions of the planets; eclipses, comets, and meteors. Written for the amateur astronomer, the book also includes a list of astronomical societies and a bibliography. Price varies according to the year. The 1970 edition (194 p.) is $4.95. (S-A)

Moser, Reta C., editor. SPACE-AGE ACRONYMS: Abbreviations and Designations. 2nd edition. Plenum, approx. 600 p., rev. 1969. $17.50. Acronyms of NASA, the U.S. Air Force and Army, and the Federal Aviation Administration, plus abbreviations used for engineering drawings and publications of the aero-

space industry. Also includes numerous acronyms of foreign origin. (S-A)

NATIONAL REFERRAL CENTER FOR SCIENCE AND TECHNOLOGY. A brochure explaining this information service which is free to serious students of any physical, biological, social, and engineering science and the many technical areas relating to them. The Center puts the inquirer in touch with any government, industry, academic, and professional organization, institution, group or individual who is listed with the Center as willing to share special knowledge on subjects within the above named fields. Space science and technology as well as aeronautical research fields are represented on the list. The brochure describing the service is free also. (S-A)

TRANSDEX BOOKS IN PRINT. CCM Information Corp. A catalog of foreign scientific materials compiled from those translated by the U.S. Joint Publications Research Service. A portion of the catalog lists space science items from the U.S.S.R. which may be of interest to students who are searching for such materials from foreign sources. Materials originated in 145 countries in the form of books, newspaper articles, research reports, and scientific journals. The prices of the translated materials vary, but the catalog is free. (A)

United Nations. INTERNATIONAL DIRECTORY OF FACILITIES FOR EDUCATION AND TRAINING IN BASIC SUBJECTS RELATED TO THE PEACEFUL USES OF OUTER SPACE. United Nations, 102 p., 1968. Paperback, $2. A list of organizations, schools, learned societies, foundations, trusts, research establishments and other facilities carrying on work related to the peaceful uses of space. Agencies are listed by country of origin or, if international, under "International Facilities". (S-A)

U.S. Government Printing Office. SPACE. Price List 79A. U.S. Government Printing Office. A catalog of government publications for sale to the public, relating to space flight, missiles, the Moon, NASA, satellites, space education, research and technology, and many other pertinent subjects. The Price List is free. (S-A)

U.S. National Aeronautics and Space Administration. EARTH PHOTOGRAPHS FROM GEMINI III, IV, AND V. NASA SP-129. #NAS 1.21:129. Stock #3300-0189. U.S. Government Printing Office, 266 p., illus., 1967. $7. An atlas containing reproductions of 244 color photographs of the Earth taken by astronauts during the early flights of the Gemini spacecraft. Shows natural features and some man-made features in 50 countries. Clearly visible details include shorelines, river courses, valleys, geologic fault zones, glaciers, sand dunes, storm cloud formations, highways, canals, areas of recent rainfall, and smoke from forest fires and industrial plants. (I-U-S-A)

————EARTH PHOTOGRAPHS FROM GEMINI VI THROUGH XII. NASA SP-171. #NAS 1.21:171. Stock #3300-0208. U.S. Government Printing Office, 327 p., illus., 1968. $8. Spectacular color photographs made of Earth by Gemini astronauts. Many of the pictures have been put to geologic, meterologic, and oceanographic use. All are of value in agriculture, urban, and other kinds of research. Commentary is included. (I-U-S-A)

————NASA SPECIAL PUBLICATIONS. U.S. Government Printing Office. A catalog of reports on recent results in space exploration, detailed accounts of significant conferences and symposia, and state-of-the-art reviews in various scientific and technical fields. While most of the publications listed are technical, many may be of use to advanced secondary school students, teachers, and interested adults. The catalog lists handbooks, charts, histories, chronologies, and bibliographies, as well as publications of the Technology Utilization series for sale by the U.S. Government Printing Office and the National Technical Information Service. Write to the U.S. Government Printing Office, c/o Public Documents Department, Washington, D.C. 20402 for the date and price of the latest issue. (S-A)

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periodicals

part iv - periodicals

AEROSPACE. Aerospace Industries Association. Published bimonthly. Free to teachers and librarians requesting it on school or library stationery. News about new developments in aviation and space from the aerospace manufacturing viewpoint. (S-A)

AEROSPACE BULLETIN. Parks College of Aeronautical Technology. Published quarterly. Free. A 4-page leaflet featuring some aspect of aeronautics or space technology written in nontechnical language. (S-A)

AEROSPACE MEDICINE. Aerospace Medical Association. Published monthly. $18 per year; $20, foreign. Single copy, $2. Articles cover such subjects as case reports in clinical aviation and space medicine, medical problems related to flying high performance aircraft and manned spacecraft, psychophysiological problems, the aging pilot, life support systems, weightlessness, civilian and commercial aviation medicine, radiation, and many other medical aspects of flight. The medical aspects of oceanographic exploration are also included. Semitechnical. (A)

AIAA STUDENT JOURNAL. American Institute of Aeronautics and Astronautics. Published 4 times a year. $12 per year. Includes articles written for and by students. Special sections in each issue feature information of particular interest to students: October issue—an up-to-date listing of scholarships, fellowships, and loans available from industry; December issue—professional employment opportunities for graduating AIAA student members; February issue—bibliography of AIAA technical disciplines; and April issue—a comprehensive list of Aerospace Thesis Topics. The magazine is designed primarily for college-age students. (A)

AMERICAN ROCKETEER. Centuri Engineering Co. Published irregularly. Distributed free to those who request information on model rocketry and/or submit orders for products produced by Centuri Engineering Co. A newsletter to acquaint interested persons with the hobby of model rocketry and with new products and services available. (U-S-A)

AMERICAN SCIENTIST. American Scientist. published bimonthly. $9 per year. Includes general articles describing research in the physical, natural, and behavioral sciences; mathematics; engineering; and the philosophy and history of science. Numerous articles deal with space science. (A)

ASTRONAUTICS & AERONAUTICS. American Institute of Aeronautics and Astronautics. Published monthly. $20 a year; $22, foreign. Articles on subjects of interest to members of AIAA, including research and development projects in both aeronautics and space flight. Many articles are written in nontechnical language. (S-A)

ASTROPHILATELIST, THE. Rocket Research Institute. $2 a year for two or three issues, including an associate membership in the Rocket Research Institute. A newsletter reporting on mail-by-rocket activities. (S-A)

AVIATION WEEK AND SPACE TECHNOLOGY. McGraw-Hill Book Company. Published weekly. $20 per year. Single copies, $1. Subscriptions solicited only from management men, engineers, scientists, pilots, and military officers having a commercial or professional interest in aerospace, including missiles and space technology. Position and company connection must be indicated on subscription orders. Available also to public libraries at $30 per year. Subjects covered: aeronautical engineering, missile engineering, space technology, avionics, air transport, management, finance. (A)

CURRENT SCIENCE. American Education Publications. Published weekly during the school year—32 issues. $2.20 per year. Club rates for 10 or more subscriptions sent to one address. $1.10 per subscription per year. An 8-page periodical for junior high school students giving current news about scientific developments. Space flight subjects and space science news are featured regularly. (U-S)

EXPLORER. International Association of Space Philatelists. Published monthly. Free to members of the Association. A newsletter dedicated to the study of space philately topics including outer space, rockets and nuclear energy. Designed to serve the needs of collectors interested in this specialized field. (Membership $4 per year.) (U-S-A)

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INTERAVIA—World Review of Aviation-Astronautics-Avionics. Interavia, 212 Fifth Ave., New York, N.Y. 10010. Published monthly in separate English, French, German and Spanish editions. 1 year, $17. Reports current events related to air transportation, aeronautical engineering and technology, and avionics throughout the world, as well as important developments and trends in world space events. (A)

MODEL ROCKET NEWS. Estes Industries. Published two to four times per year. A newsletter containing latest developments in model rocketry, safety tips, and technical information. Free to teachers and adults working with youth groups, when requested on official stationery. (U-S-A)

MODEL ROCKETRY. Model Rocketry. Published monthly, $7. Single copy, 75 cents. Includes articles of interest to model rocketeers, such as new products, design data, technical information, and club activities. (U-S-A)

NASA ACTIVITIES. U.S. National Aeronautics and Space Administration. Published monthly, $1 per year. Available through the U.S. Government Printing Office. Provides a single source of information that cannot be found elsewhere. Contents cover significant space statements, legislative affairs concerning space, news related to agreements, press releases, calendar of events, personnel changes, current launch programs, and many other NASA activities. Indexed. (S-A)

NATURE. Nature, published weekly, $48. Articles covering the entire spectrum of scientific thought and research, including space science, astronomy, planetary science, etc. Many articles are original research papers. (Readers who wish to find more specific articles on these subjects may wish to investigate NATURE—PHYSICAL SCIENCE, also published biweekly, costing an additional $35, or $83 for both editions. NATURE—PHYSICAL SCIENCE must be subscribed to in combination with NATURE, but NATURE is available separately as indicated above.) (S-A)

NOAA WORLD. #C55.14, Stock #0317, Dept. of Commerce, National Oceanographic and Atmospheric Administration. Available from the U.S. Government Printing Office. Published quarterly, $3 a year, 75 cents for a single copy. Contains articles of general interest on what NOAA is doing in meteorology, oceanography, seismology and other geophysical sciences, and in the development of new knowledge, equipment, and techniques. Space activities of NOAA are included. (S-A)

ROCKET-JET FLYING. Pen-Ink Publishing Co. Published quarterly, $7 per year. An "ideas" publication devoted to the advancement of rocketry and jet propulsion. Provides up-to-date information on newest developments, and data useful in the design of reaction engines. (A)

ROCKET SAFETY EDUCATOR. Rocket Research Institute. Published at irregular intervals, $5 for five issues. A newsletter for educators and youth program supervisors concerned with rocket safety education. Includes reports on current projects in student astronautics, student model rocketry, and supervised student experimental rocketry; activities of various groups; and safety suggestions. (A)

SCIENCE. American Association for the Advancement of Science. Published weekly, $20 per year school year subscriptions, $12 for nine months; $13.50 for ten months. Individual membership including SCIENCE, for $16 per year. Outstanding articles on newsworthy scientific happenings, discussions on vital issues, and presentations of scholarly reports and scientific papers. Numerous articles on space science subjects are included. (A)

SCIENCE BOOKS. American Association for the Advancement of Science. Published quarterly in September, December, March, and May. $6.50 per year; single copies $2. Each issue includes critical evaluations by professional scientists, engineers, and mathematicians of more than 200 current books on scientific subjects, many of which deal with space science and astronautics. For all reading levels. (A)

SCIENCE NEWS. Science Service. Published weekly, $7.50 per year. A weekly news magazine of science and technology, summarizing current events in these areas. Useful to the nonspecialist. Includes articles on space travel,

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astronomy and other space-related subjects. (S-A)

SCIENCE WORLD. Scholastic Magazines. Published during the school year. 28 issues per year. $1.85. Feature articles, interviews with scientists, science news stories, and project ideas. Space science topics are included and a teacher's edition is provided with classroom subscriptions. (S)

SCIENTIFIC AMERICAN. Scientific American, published monthly. $10 per year. Includes articles on the physical, biological and social sciences; technology, and medicine. Numerous articles involve space science topics. (S-A)

SKY AND TELESCOPE. Sky Publishing Corporation. Published monthly. $8 per year; $9, Canadian; $10, foreign. Covers a wide range of topics of interest to both amateur and professional astronomers. (S-A)

SKYLIGHTS. National Aerospace Education Association. Published monthly September through May. $2 per year. An eight-page publication including current aviation and space travel news, historical items, unusual aerospace facts and figures, aerospace education news, pictures, etc. Useful in providing background information for junior-senior high school students, for teachers and librarians. (U-S-A)

SOUNDING BOARD. Space General Company. Published bimonthly. Free. An illustrated leaflet emphasizing sounding rocket technology and its accomplishments. (S-A)

SOVIET REPORT. Center for Foreign Technology. Published biweekly. $32 per year. Topics covered include aerospace engineering, spaceflight summaries, ecology, nuclear physics, oceanography, astronomy, engineering physics and aviation in the U.S.S.R. Also included are biographical sketches of Soviet cosmonauts and scientists. Contents emphasize space-related activities. Semitechnical. (S-A)

SPACE WORLD. Palmer Publications. Published monthly. $8 per year. Feature articles and interviews with leading scientists, astronautical engineers, test pilots and planning experts covering manned and unmanned spacecraft, interplanetary flight, space probes and other subjects related to space exploration. Includes reprints of hard-to-find articles, and material on Soviet space activities. (S-A)

STUDENT ROCKETEER. Rocket Research Institute. Published two or three times a year, $1 per year. Designed for student rocket clubs to provide information about club launching schedules and safety programs. (S-A)

TECHNOLOGY REVIEW. M. I. T. Alumni Association. Nine issues per year, $9. Reports on current technology events in science, engineering, architecture, management, and the social sciences, and their implications for human affairs. Numerous articles deal with space science and technology. Semitechnical. (S-A)

WORLD AND U.S.A. NATIONAL AVIATION-SPACE RECORDS. National Aeronautic Association. Complete and up-to-date listings of official aviation and manned spacecraft records, issued by the NAA which is the U.S. Representative of the Federation Aeronautique Internationale, the world authority for the certification of aircraft and space records. Published in loose leaf, three-ring binder form, with replacement pages distributed to subscribers four to six times a year to keep record lists up to date. $15 for first year, including binder; $10 per year thereafter. (S-A)

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addresses of sources of books and other materials

Abelard-Schuman, Ltd., 257 Park Ave. S, New York, N.Y. 10010

A-B Emblem Corp., Weaverville, N.C. 28787

Harry N. Abrams, Inc., 110 59th St. E, New York, N.Y. 10022

Academic Media Inc., 1736 Westwood Blvd., Los Angeles, Calif. 90024

Addison-Wesley, Publishers, Reading, Mass. 01867

Aerospace Corp., P.O. Box 95085, Los Angeles, Calif. 90045

Aerospace Industries Association, 1725 DeSales St., N.W. Washington, D.C. 20036

Aerospace Medical Association, Washington National Airport, Washington, D.C. 20001

Aero Publishers, 329 Aviation Rd., Fallbrook, Calif. 92028

Allen Publishing Co., 1422 N Central Park Ave., Anaheim, Calif. 92802

Americana Interstate Corp., 501 E. Lange St., Mundelein, Ill. 60060

American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W. Washington, D.C. 20005

American Astronautical Society, P.O. Box 746, Tarzana, Calif. 91356

American Astronomical Society, 211 FitzRandolph Rd., Princeton, N.J. 08540

American Education Publications, 55 High St., Middletown, Conn. 06457
(Note: for *Current Science* write to Education Center, Columbus, Ohio 43216)

American Elsevier Publishing Co., 52 Vanderbilt Ave., New York, N.Y. 10017

American Family Enterprises, 25583 Stanford Ave., Valencia, Calif. 91355

American Institute of Aeronautics & Astronautics, 1290 Ave. of the Americas, New York, N.Y. 10019

American Map Co., 3 61st St. W, New York, N.Y. 10023

American Meteorite Laboratory, P.O. Box 2098, Denver, Col. 80201

American Philosophical Society, 104 S. Fifth St., Philadelphia, Pa. 19106

American Scientist, 155 Whitney Ave., New Haven, Conn. 06510

Arco Publishing Co., 219 Park Ave. S, New York, N.Y. 10003

Arfor Publishers, 4118 Shelby Ave. SE, Huntsville, Ala. 35801

Associated Press, 50 Rockefeller Plaza, New York, N.Y. 10020

Aviation and Space Technology, 330 W. 42nd St. New York, N.Y. 10036

A. S. Barnes Co., Forsgate Dr., Cranbury, N.J. 08512

Basic Books, Inc., 404 Park Ave. S, New York, N.Y. 10016

Bell Aerospace Co., P.O. Box 1, Buffalo, N.Y. 14240

Bell System. Request from the Educational Representative of your nearest major Bell Telephone Company office.

Benefic Press, 10300 W. Roosevelt Rd., Westchester, Ill. 60153

B'nai B'rith Vocational Service, 1640 Rhode Island Ave., N.W., Washington, D.C. 20036

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