

15¢

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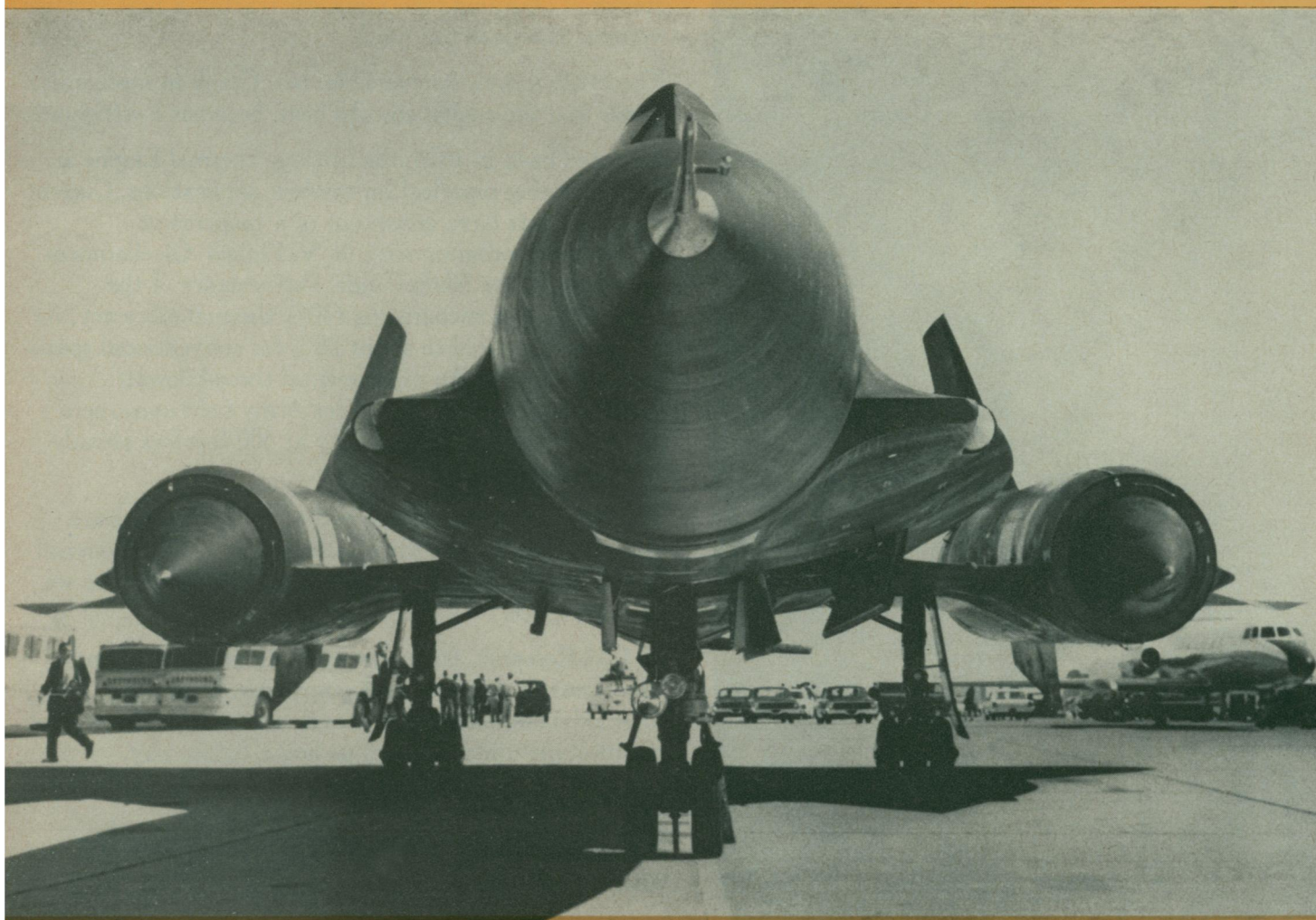
September 4, 1965

VOL. 88, NO. 10 PAGES 145-160

SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Lockheed Aircraft Corporation

World Record Breaker

See Page 152

A SCIENCE SERVICE PUBLICATION

Our Stirling Engine: Just Add Heat.

It's a thermal engine—a remarkably quiet device that can run even on heat from the sun.

There are no explosions in the cylinders, just quiet expansion and contraction of the working fluid, pushing the pistons. The fluid—hydrogen or helium—is sealed in the engine. Heat to expand it can come from any outside source . . . burning fuel, a nuclear reactor, a heat storage system, as well as the sun.

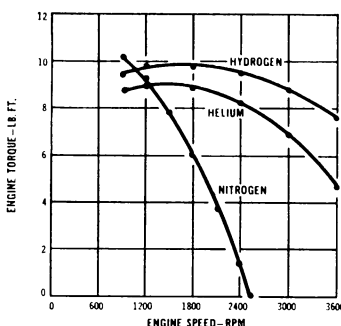
The Stirling cycle is reversible, too. Crank in mechanical power and the engine absorbs heat, becomes a refrigerator.

Invented back in 1816, the Stirling Thermal Engine is now becoming practical for modern applications. Current improvements have grown out of a cooperative development program with N. V. Philips' Gloeilampenfabrieken, of the Netherlands. Performance of the latest models is encouraging (40% thermal efficiency, for instance, compared to about 28% for conventional spark-ignition engines). An experimental three-kilowatt generator set is being tested for Army field use, where quiet is important. Inaudibility at 300 feet has already been attained.

The Research Laboratories and other GM groups are also studying Stirling systems from five to five thousand horsepower, for applications ranging from under the sea to outer space.

At GM Research, engineers study all kinds of engines. The research may be all-encompassing, from basic thermodynamics and engine cycle analyses to the design of prototype units. It helps us find a better way.

General Motors Research Laboratories Warren, Michigan



Effect of working fluid on engine output—from a recent GMR paper on Stirling engine research.

SPOTLIGHTING SCIENCE TALENT OF TOMORROW...



OCTOBER—NATIONAL SCIENCE YOUTH MONTH

OCTOBER 1965

| Sun. | Mon. | Tues. | Wed. | Thurs. | Fri. | Sat. |
|------|--------------------------------------|-------|------|--------|------|------|
| | | | | | 1 | 2 |
| 3 | PLAN YOUR ACTION PROGRAM NOW! | | | | | 9 |
| 10 | | | | | | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

October as National Science Youth Month Inaugurates the Year's Activity of Over a Million Science Students and Thousands of Dedicated Teachers Throughout the World

Science Service has organized the Tenth Annual National Science Youth Month in cooperation with more than 50 national agencies to nurture science talent in youth.

TODAY'S YOUTH = TOMORROW'S SCIENTISTS

Organize a local National Science Youth Month Committee to plan a full scale program in your community • Encourage professional and technical societies, civic groups, PTA's, school science clubs, and other groups to devote an October meeting to science youth activities, science careers and new developments in science • Help science teachers, classes, clubs and other school groups schedule scientific tours, workshops and clinics on club activities, science projects and fairs, and career opportunities • Publicize what you are doing through the media of radio, television and newspapers.

Cooperating in National Science Youth Month:

American Association for the Advancement of Science

AAAS sponsors a Commission on Science Education concerned with improvement of science teaching from the kindergarten through the college level. Scientists and teachers have prepared experimental science materials for grades K through 6. Address Dr. John R. Mayor, Director of Education, AAAS. Through AAAS-affiliated Academies of Science, Junior Academies of Science are encouraged and grants are given for student projects. A Junior Scientists' Assembly is sponsored at the AAAS Annual Meeting by the Academy Conference. The AAAS Annual Meeting will be held December 26-31, 1965, at the University of California, Berkeley. During Christmas and Easter vacations of each school year, Holiday Science Lectures by outstanding scientists are scheduled in several cities. Open to selected students and teachers by invitation only. Address Edward G. Sherburne, Jr., AAAS. AAAS publishes science book lists for schools and public libraries prepared under the direction of Dr. H. J. Deason, who also provides consultant services on science collections for school libraries. Currently available are: *The AAAS Science Book List for Children* (\$1.50); *The AAAS Science Book List for Young Adults* (\$2.50); *A Guide to Science Reading* (paperbacks; ask for Signet P2283 at local bookstores or send 70¢); *Careers in Science*, a selected bibliography for high school students (50¢); and *Science Books: A Quarterly Review* which includes elementary, secondary, and college and undergraduate titles (subscription \$4.50 per year). Write: AAAS Publications, 1515 Massachusetts Ave., N.W., Washington, D. C. 20005.

American Cancer Society

The ACS provides teaching aids, materials and services to help science instruction in high schools and colleges. The Society also helps

conduct and support science fairs, provides medical and research speakers, facilitates student visits to hospitals and research centers—and in other ways seeks to stimulate and aid student interest in science studies and careers. As part of an active career-incentive program, certain Divisions of the Society have provided training grants for careers in medical technology and cytotechnology and certain other student scholarships have been granted. Teaching aids, materials and information on cancer may be obtained by science teachers and students, free upon request to local Units of the Society.

American Chemical Society

The ACS sponsors a variety of educational activities. Four International Science Fair (ISF) awards are presented by the ACS which also publishes career literature and the journal *Chemistry* for the high school student and teacher. The ACS initiates conferences and institutes in chemistry. The Division of Chemical Education's activities include a test program for high schools and colleges, and publication of the *Journal of Chemical Education*. Over 160 local sections in all areas of the U.S. are active in educational activities. More than 400 student affiliate chapters in colleges and universities engage in programs to better prepare students for careers in chemistry. Consult your local section or the American Chemical Society, 1155 16th St., N.W., Washington, D.C. 20036.

American Dental Association

State and local dental societies and dental schools are urged to participate in science fair activities. They are prepared to offer advice and material assistance to science teachers and students. ADA annually presents awards at the ISF. Resource material available includes: *Frontiers in Dental Science* (50¢) from Scholastic Book Services, 904 Sylvan Ave., Englewood Cliffs, N. J.; *Dental Projects for High School Science Students* (25¢ for single copy; 20¢ each for 10 or more) from Science Service; and *ADA Catalog* describing dental health literature, information and films on career oppor-

tunities in dentistry (single copy on request). Write: Dr. Sholom Pearlman, ADA, 222 E. Superior St., Chicago, Ill. 60611.

American Federation of Labor and Congress of Industrial Organizations

AFL-CIO supports better schools and encourages scientific education. Many of its affiliated unions conduct apprenticeship schools to transmit skills to young apprentices and the latest scientific processes to journeymen members. Central labor organizations and local unions of skilled workmen in almost every community stand ready to help pupils with their science projects, clubs and fairs. Students are invited to contact the local union bodies or write AFL-CIO, Coord. of State and Local Councils, 815 16th St., N.W., Washington, D. C. 20036.

American Heart Association, Inc.

AHA is actively engaged in programs to interest young people in science and health careers. State and local associations cooperate extensively with science fairs and other school-related science activities. AHA and many of its state and local associations have health career committees which plan and conduct specific youth activities such as field trips, seminars, student research, work experience in science laboratories and consultation on special projects. For program information and educational materials contact your local heart association.

American Institute of Biological Sciences

Among major AIBS educational activities are continuous liaison with the Biological Sciences Curriculum Study (BSCS), directed at the secondary level with three approaches using fundamental concepts and modern trends, a Visiting Biologist Program in radiation biology administered by AIBS and supported by the U.S. Atomic Energy Commission. The Secondary School Biological Sciences Film Series, directed primarily at 10th grade level, consists of 120 lecture-demonstrations 30-min. films, each with correlated teachers' manuals and study guides, and information on careers in biology.

Write: Educational Activities, AIBS, 3900 Wisconsin Ave., N.W., Washington, D.C. 20016.

American Medical Association

County and state medical societies cooperate with local science clubs and fairs by joining in sponsoring committees, giving special awards and scholarships, arranging counseling, etc. AMA presents citations at the ISF and selected winners are guests at AMA annual meeting. A 25-min. color, sound motion picture—*I am a Doctor*; a large-scale exhibit on Medicine as a Career; descriptive literature on the study of medicine, scholarship information and school guidance program suggestions are available without charge from the AMA and local medical societies. Write: Norman H. Budde, AMA, 535 N. Dearborn St., Chicago, Ill. 60610.

American Pharmaceutical Association

The National Advisory Commission on Careers in Pharmacy (a working committee with representatives of all national pharmaceutical organizations) is encouraging practicing pharmacists to assist students and teachers in the development of science projects. APHA presents two awards at the ISF and is a co-sponsor of the Health Awards Banquet. Material available includes: 3 career brochures, 2 films about career opportunities and pharmaceutical education and *Pharmaceutical Sciences Project Handbook* (single copy 25¢). Write: Division of Pharmaceutical Services, American Pharmaceutical Association, 2215 Constitution Ave., N.W., Washington, D. C. 20037.

American Physiological Society

The education committee arranges teaching sessions and refresher courses in conjunction with semiannual meetings of the Society, and visits of senior physiologists to colleges and universities where physiology is taught. High school students can obtain the name of a local physiologist willing to talk to clubs or individuals and perhaps arrange tours. Free career brochures are sent out upon request to Dr. R. G. Daggs, American Physiological Society, 9650 Wisconsin Ave., Bethesda, Md. 20014.

American Psychological Association

APA members are interested in helping students become familiar with research, theory and practice of psychology. APA awards prizes at the ISF for projects relating to psychology conceived broadly as a behavioral science. For information and booklet, *A Career in Psychology*, write: American Psychological Association, 1200 17th St., N.W., Washington, D. C. 20036.

American Society for Metals

ASM provides publications, activities and services to keep students aware of the latest developments in the technology of metals and materials. ASM provides the following: (1) Career Brochure and guidance literature; (2) Films and filmstrips; (3) FSA Awards; (4) JETS Awards; (5) International Science Fair Awards; (6) Metals Science Kits; (7) Counselors for the Boy Scout Merit Badge in Metallurgy; and (8) Engineering advisors to local science youth activity programs. The American Society for Metals Foundation for Education and Research provides scholarships to colleges and universities, plus a National Merit Scholarship. Contact: Harold W. Phend, Coordinator for Career Guidance Activities, American Society for Metals, Metals Park, Ohio 44073.

American Society for Microbiology

ASM local branches have committees which provide speakers on microbiological topics and give aid to biology students and teachers. ASM issues citations to students and their sponsors for microbiological exhibits at science fairs. Certain local branches give additional awards. ASM sponsors awards at the ISF. Teaching aid materials are available free to teachers. A career

brochure, *Microbiology in Your Future*, is available free to students and teachers. A list of universities offering degree programs in microbiology is available at 50¢. Address: American Society for Microbiology, 115 Huron View Blvd., Ann Arbor, Mich. Rent or purchase movie, *A Career in Bacteriology*, from Audio-Visual Center, Indiana University, Bloomington, Ind.

American Veterinary Medical Association

Veterinary associations actively participate in science fairs at the local and state level, and assist students in the development of proper scientific attitudes and techniques when using animals in their exhibits. The American Veterinary Medical Association distributes two booklets, *Career Facts About Veterinary Medicine* and *Dimensions of Veterinary Medicine* (single copies free, additional copies 3¢ each), and a list of veterinary medical associations to contact for direct assistance. AVMA presents two awards at ISF. Top winner is guest at AVMA annual meeting. Address: John P. Lynch, Asst. Dir., Public Information Division, AVMA, 600 S. Michigan Ave., Chicago, Ill. 60605.

Army Aviation Association of America

AAAA participates in the ISF by awarding five \$100 cash awards and inscribed plaques to the finalists having the most outstanding Army aviation oriented projects in aerodynamics, propulsion, or supporting techniques. AAAA plans to continue its participation in all ISF affiliated local and regional fairs by offering certificates of achievement, and where feasible, by providing qualified judges. Directors of ISF affiliated fairs are requested to contact AAAA on or before Jan. 1, 1966. Write: AAAA, 1 Crestwood Rd., Westport, Conn. 06882.

B'nai B'rith Vocational Service

BBVS has 24 field offices in various U.S. cities and Canada which offer individual counseling and group guidance activities. Write for free publications listing: BBVS, 1640 Rhode Island Ave., N.W., Washington, D. C. 20036.

Boy Scouts of America

The Boy Scouts are expanding their scientific opportunities for boys from 8 to 18. There are now seven science electives for Cub Scouts (8-10). For the Boy Scouting program (11-13) 17 merit badges in scientific subjects are now available in addition to the new badges in Communications, Metallurgy and Space Exploration. Explorers (14-18) have specialty posts in scientific subjects, usually sponsored by industries or science groups. Monthly themes for all three programs stress scientific subjects regularly. Merit badge pamphlets are available at your local Scout Headquarters (35¢) and further information can be had by writing School Relationships Service, Boy Scouts of America, New Brunswick, N. J. 08903.

Chamber of Commerce of the United States

The National Chamber publicizes Education and Manpower Training activities sponsored by its 3,500 member local and state chambers of commerce, 1,000 trade associations and businesses of all sizes throughout the country. Many of the business leaders of these organizations cooperate with educators in arranging career conferences, science fairs, visits to business and summer employment for students. Through participation, students learn about job opportunities, training requirements and possibilities for advancement. Businessmen stress the importance of early career planning. Business and professional leaders work with teachers and school administrators to improve guidance programs, to provide material and equipment, and to assist youth in acquiring a better understanding of America's economic system. Contact local chambers of commerce, trade associations or the Education and Manpower Training Department, Chamber of Commerce of the United States, 1615 H Street, N.W., Washington, D. C. 20006.

Cooperative Extension Service

The Cooperative Extension Service of the U.S. Department of Agriculture in cooperation with the Land Grant College or University in each state, provides through 4-H Club work a program of youth development based on scientific approach to problem solving. This is supported by extension specialists representing various divisions of each college or university. It is increasingly imperative that materials relating to science be provided volunteer local leaders who work directly with 4-H members in 50 States, Puerto Rico and 76 foreign countries. Information from the 4-H and Youth Development Div., Federal Extension Service, USDA, Washington, D. C. 20250; Land Grant Colleges or county extension offices.

Engineering Manpower Commission

Engineering Manpower Commission is sponsored by 23 engineering societies representing the principal branches of the engineering profession. EMC is concerned with general problems of education, training, and utilization of engineers and engineering technicians. Teachers and administrators may make inquiries on special problems in engineering and technological careers. Students making career inquiries are sent a folder prepared by the Engineers' Council for Professional Development. Descriptive information on specific fields of engineering should be requested directly from the appropriate professional society or educational institution. Write: Engineering Manpower Commission of Engineers Joint Council, 345 E. 47th Street, New York, N. Y. 10017.

Entomological Society of America

ESA is a professional society of entomologists, students of entomology and others with related interests. Membership is principally North American with about 100 other countries represented. The Society publishes: *Annals of the Entomological Society of America*, *Bulletin of the Entomological Society of America*, *Journal of Economic Entomology*, *Miscellaneous Publications of the Entomological Society of America*. Write: Executive Secretary, ESA National Headquarters, 4603 Calvert Rd., College Park, Md. 20740.

Federal Surplus Property

Science students can benefit from their school's participation in the surplus property donation program administered by U.S. Department of Health, Education, and Welfare. Surplus property donated to eligible schools may be used by students in their science projects which are under school supervision. Science teachers may arrange with their school's authorized surplus property representative to visit the State surplus property distribution center. To secure copies of donation program pamphlets and name and address of your State Surplus Property Director, correspond with Regional Representative, Division of Surplus Property Utilization, Department of Health, Education, and Welfare, for your Region: Region I, 120 Boylston St., Boston, Mass. 02116; Region II, 42 Broadway, New York, N. Y. 10004; Region III, 700 E. Jefferson St., Charlottesville, Va. 22901; Region IV, 50 Seventh St., N.E., Atlanta, Ga. 30323; Region V, 433 W. Van Buren St., Room 712, Chicago, Ill. 60607; Region VI, 560 Westport Rd., Kansas City, Mo. 64111; Region VII, 1114 Commerce St., Dallas, Texas 75202; Region VIII, 621 Seventeenth St., Room 551, Denver, Colo. 80202; Region IX, 50 Fulton St., Room 406, San Francisco, Calif. 94102.

Junior Engineering Technical Society

Program designed to stimulate and encourage interest in engineering, applied science and mathematics among high school students. JETS chapters are sponsored by local industry and/or professional groups throughout the U.S. and 11 foreign countries. JETS provides materials

for initiating and operating chapters. Program includes four Regional Expositions and Conferences. JETS offers students an opportunity to explore various technical fields and to compare attitudes, interests and abilities with requirements of technical professions through actual experiences and contacts. Write: JETS, 345 E. 47th St., New York, N. Y. 10017.

Junior Science and Humanities Symposium Program

The U. S. Army cooperates with universities, educational and civic organizations, and industries in conducting this program. Symposia are normally held on college campuses and are designed to seek out, motivate and stimulate talented youth toward careers in science and provide recognition for outstanding students and teachers. Programs consist of presentations of research papers by high school students, presentations by outstanding scientists and humanists, panel discussions on career and technical matters and visits to research laboratories. Presentations on humanities stress to young scientists the need to be intellectually well-rounded. A National U. S. Army JSHS is held honoring outstanding student speakers and teachers. Write: Director, JSHS Office, Duke University, Box EM, Duke Station, Durham, N. C.

Manufacturing Chemists' Association, Inc.

MCA, representing the chemical manufacturing industry, executes an aid-to-education program from kindergarten to college. Request free copy: *An Industry Helps Our Schools*. Holt, Rinehart and Winston, 383 Madison Ave., New York 17, N. Y., distributes *Scientific Experiments in Chemistry* (for senior highs), *Superstition to Supersonics* (for junior highs) and *Matter, Energy and Change* (for elementary supervisors and teachers). For MCA's chemistry films information write Sutherland Educational Films, Inc., 201 N. Occidental Blvd., Los Angeles 26, Calif. Free publications: *Guide to Aid-to-Education Materials Available from the Chemical Industry*; *Frontiersmen of the Future*; *Careers Ahead in the Chemical Industry*; *Film Guide on Chemicals, Chemistry and the Chemical Industry*; *Chemical Industry Facts Book* (single copy free to educators). Address: Manufacturing Chemists' Association, 1825 Connecticut Ave., N.W., Washington, D. C. 20009.

Mathematical Association of America

MAA offers guidance and information to students interested in mathematics. The guidance pamphlet: *Professional Opportunities in Mathematics* may be purchased (25¢ for single copy, five or more 20¢ each). Annual High School Mathematics Contest is sponsored jointly by MAA and Society of Actuaries. For information, write: Harry M. Gehman, Exec. Dir., MAA, SUNY at Buffalo (University of Buffalo), Buffalo, N. Y. 14214.

National Achievement Scholarships

National Achievement Scholarships are four-year college scholarships available to outstanding Negro students. Stipends of \$250 to \$1500 per year are based on need. Winners choose colleges and curricula. In the first Achievement Program last year, 225 scholarships were awarded, including about 25 offered by and named for corporate sponsors. Candidates for the 1966-67 Achievement Program may be nominated by their high schools or request consideration on the basis of high scores on the National Merit Scholarship Qualifying Test administered in February-March 1966. U. S. secondary schools, public and private, are invited to submit names of candidates. Winners will be announced early in 1967. See your principal or write: National Achievement Scholarship Program, 990 Grove Street, Evanston, Ill. 60201.

National Aeronautics and Space Administration

NASA has organized the Educational Pro-

grams and Services Office to inform educators, students, and the public. EPSO programs encompass development, production, and distribution of publications, reports, motion pictures, other visual aids and the Spacemobile, a space science lecture-demonstration presented to school assemblies, science fairs, teacher workshops and institutes, adult and higher education groups, civic organizations, and public groups. Included are services to educational and commercial networks, curriculum planners of schools, colleges and professional educational organizations, which activities involve personal consultative services of NASA educational specialists and NASA experts in space science and technology. Address: Educational Programs and Services Office, National Aeronautics and Space Administration (Code AFEP), Washington, D. C. 20546.

National Aerospace Education Council

NAEC helps teachers locate free and inexpensive aerospace teaching aids. *Pictures, Pamphlets and Packets* (25¢) lists over 600 booklets, pamphlets, charts, pictures, films, bibliographies, units, etc., produced by industry, government agencies, private and professional organizations; *1965 U.S. Aircraft, Missiles and Spacecraft* (\$2) pictorial descriptions, three-view drawings, specifications; *Earth and Space Science* (\$1.50) secondary teachers' guide covering geology, climate, oceans and space science; a similar book for elementary grades—*Earth and Space Guide for Elementary Teachers* (\$1); *Aviation Education Bibliography* (25¢), a 72-page annotated compilation of childrens', youths', and adults' books, periodicals, films, filmstrips and teaching aids. NAEC offers a mailing service (\$10 a year). Address National Aerospace Education Council, 616 Shoreham Bldg., 806 15th St., N.W., Washington, D. C. 20005.

National Association of Manufacturers

The NAM encourages study of science and mathematics in schools and cooperates with local and regional science fairs and the ISF. NAM Education Dept. and Committee on Research promotes development of science talent. Write for booklets, *Industrial Research and Development* and *The Growth of American Industry*. Education Dept., NAM, 277 Park Ave., New York, N. Y. 10017.

National Association of Rocketry

NAR, an affiliate of National Aeronautic Association, U.S. Representative to Federation Aeronautique Internationale, is nationally recognized for the Space Age Hobby and is the USAF-approved model rocketry organization. Model rocketry is a sport, hobby and educational tool involved with building and flying small, light, non-metallic, recoverable models powered by factory-made solid propellant rocket engines of proven reliability and safety. Membership includes information, plans, club charters, contest sanctions, etc. Write: National Association of Rocketry, 1239 Vermont Ave., N.W., Washington, D. C. 20005.

National Committee for Careers in Medical Technology

Cooperating with the Intersociety Committee on Pathology Information, NCCMT supplies certificates for local and state medical technologist and pathologist societies to award at science fairs. Summer jobs in hospital laboratories, science equipment, books and other prizes often accompany certificates. A summer job with the Armed Forces Institute of Pathology in Washington, D. C., plus travel expenses is awarded for a pathology-medical technology project at the ISF. Career information is available. NCCMT is sponsored by the American Society of Clinical Pathologists, American Society of Medical Technologists and College of American Pathologists. Address: National Committee for Careers in Medical Technology or Intersociety Committee on Pathology Information, 1785 Massachusetts Ave., N.W., Washington, D. C. 20036.

National Institute of Neurological Diseases and Blindness (NIH)

NINDB conducts research on the brain and nervous system, neurological and sensory disorders. Pamphlets explain many of these disorders. Write for pamphlets, film list, information on research materials: NINDB, National Institutes of Health, Bethesda, Md. 20014.

National Merit Scholarships

National Merit Scholarships are four-year college scholarships available to high school seniors. Stipends are based on need and vary from \$100 to \$1500 per year for most awards. Winners choose colleges and curricula. Last year over 1,900 Merit Scholarships were awarded, including nearly 1,400 Merit Scholarships offered by and named for some 270 sponsors. Each principal is sent registration materials in September. The National Merit Scholarship Qualifying Test is administered late in the following winter to second semester juniors and first semester seniors. Participating students pay a \$1 testing fee. The 1966-67 competition begins with the Qualifying Test in late February or early March, 1966. Winners will be announced in the spring of 1967. See your principal or write: National Merit Scholarship Program, 990 Grove St., Evanston, Ill. 60201.

National Pest Control Association

NPCA stimulates interest in biological sciences by encouraging individual members and affiliated state associations to assist teachers, student clubs, science fairs and other local programs. For free list of local members and associations and informative one-page description of career opportunities in the pest control industry, write: National Pest Control Association, 250 West Jersey Street, Elizabeth, N. J.

National Safety Council

NSC, organizing framework of the safety movement in America, is a voluntary non-commercial, nonprofit membership association. Its purpose is to reduce number and severity of accidents and serves as a national and international clearing house to gather and distribute safety information. It stimulates continuous and coordinated accident prevention programs and interest in safety in all fields. For information on materials and services for science clubs write: Youth Activities Dept., National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

National Science Foundation

This Federal Government agency makes grants to organizations to support scientific research and science education. Programs in education include institutes, research participation, summer fellowships and other training programs for secondary schools and college teachers of science and mathematics; research participation and independent study for college undergraduates; special programs for high school students in science and mathematics; holiday lectures; fellowships for graduate students and advanced scholars in science, mathematics and engineering; and projects for improvement of course content materials and development of new teaching and learning aids in science and mathematics. For information on these programs write for *National Science Foundation Programs for Education in the Sciences* to National Science Foundation, Washington, D. C. 20550.

National Science Teachers Association

NSTA is a department of NEA and an affiliate of AAAS. Regular membership (\$8.00) provides 9 issues of *The Science Teacher*, 4 issues of the Packet Service. Elementary membership (\$4.00) provides 8 issues of *Science and Children*. Youth activities include: Future Scientists of America clubs, Ford-FSA awards, Vistas of Science® original paperback books, International Youth Science Fortnight. Annual Convention (Apr. 1-5, 1966, New York) and 10

Regional Conferences. For information, write: National Science Teachers Association, 1201 16th St., N.W., Washington, D. C. 20036.

National Wildlife Federation

The National Wildlife Federation is a national organization with affiliates in all fifty states. Consideration of natural resource problems covers the broad spectrum of the local area to sectional, national and international management needs. The National Wildlife Federation stimulates proper public attitude and appreciation regarding wise use and management of all natural resources. Conservation Education is recognized by the National Wildlife Federation as the principal tool for appraising the values and importance of all resources, and learning to husband and wisely manage them in perpetuity. For a list of educational publications and/or further information write: Educational Servicing, National Wildlife Federation, 1412 16th St., N.W., Washington, D. C.

National Youth Conference on the Atom

The 1965 conference will be held Dec. 9-11, Sheraton-Chicago hotel, Chicago. More than 60 investor-owned electric utility companies are sponsoring outstanding high school students and teachers who will be presented an authoritative and inspiring picture of the peaceful atom in its various applications and help advance interest in the study of science. Delegates will tour Argonne National Laboratory and Museum of Science and Industry. Co-sponsored by National Science Teachers Association, the conference is supported by 16 other scientific and academic organizations. Delegates are selected by local educators working with electric companies. Contact local electric company or write: T. R. Jordan, Bozell & Jacobs, Inc., 230 Park Avenue, New York, N. Y. 10017.

Oak Ridge Institute of Nuclear Studies

ORINS is a nonprofit educational and research corporation of Southern colleges and universities, operating under contract with the U. S. Atomic Energy Commission. It is a major avenue through which these institutions participate in and support the nation's nuclear energy program. Programs are designed to further the cause of science and science education from the precollege to postdoctoral levels. Activities include training secondary science teachers; administration of graduate fellowship programs, traveling atomic energy exhibits, student tours of nuclear facilities and college student training programs; special courses for teachers, symposia and conferences; maintenance of a museum of atomic energy and mobile radioisotope laboratories for on-campus college training. Write: Oak Ridge Institute of Nuclear Studies, P. O. Box 117, Oak Ridge, Tenn. 37831.

Optical Society of America

OSA has an active career-incentive program. A booklet, *Careers in Optics*, is available. OSA sections welcome young scientists to meetings. OSA student memberships, available at \$3 a year, give students the right to attend OSA meetings and receive as a gift OSA publications. OSA will present two awards at the ISF of \$100 and \$75 plus one to three honorable mention awards, if merited. All awardees receive a one-year student membership in OSA, including gratis subscriptions to *Journal of the Optical Society of America* and to *Applied Optics*. For information about local OSA sections, write: Optical Society of America, 1155 16th St., N.W., Washington, D. C. 20036.

Science Service

Adult sponsors are invited to affiliate their groups with Science Clubs of America and receive the free SCA Sponsor Aids, Science Talent Search, conducted by Science Clubs of America and sponsored by Westinghouse Educational Foundation, is open to high school seniors. Teachers should request examinations about October 15. Affiliated regional science fairs send

their top two finalists to the International Science Fair to be held in Dallas, Texas, May 11-14, 1966. A news service for newspapers is operated. *Science News Letter*, a weekly summary of current science (\$5.50 per year), is published. THINGS of science, monthly experimental kits (\$5 per year), are produced. Books valuable in science youth activities are available. Write: Science Service, 1719 N St., N.W., Washington, D. C. 20036.

Scientific Apparatus Makers Association

SAMA represents some of the nation's principal manufacturers and dealers in scientific laboratory and equipment. Leaflets and reprints available without charge: *A Guide to Evaluating Your Science Facilities*, *Your Career With the Instrument and Control Industry by the Recorder-Controller Section*, *I Am the Science Teacher*, *SAMA Motion Picture Film Directory*, *Chart—Suggested Built-In Instruments and Equipment for Laboratory Furniture*. Write: Scientific Apparatus Makers Association, 20 N. Wacker Dr., Chicago, Ill. 60606.

Scientific Manpower Commission

SMC is a nonprofit corporation sponsored by eleven major scientific societies representing the various scientific disciplines. SMC is concerned with the problems of recruitment, education and utilization of scientific manpower. The Commission publishes *Search*, a bibliography of scientific and engineering career information (single copies free). *Salaries of Scientists and Engineers*, a summary of salary information (\$1.00 per copy), and *Draft Act* (\$.25 per copy) details deferment and appeal procedures of the Selective Service Act. SMC also may be consulted on Selective Service and other military problems. Write: SMC, 2101 Constitution Ave., N.W., Washington, D. C. 20418.

Society of Women Engineers

Objectives of SWE are to inform the public of qualifications, abilities and achievements of women engineers, bring about better utilization of engineering talent, encourage young women with suitable aptitudes and interest to enter the engineering profession and guide them in educational programs. SWE presents a \$100 U. S. Savings Bond to the girl with the best project showing engineering aptitudes at the ISF. Write: Society of Women Engineers, Room 305, 345 E. 47th St., New York, N. Y. 10017.

Soil Conservation Service

The Soil Conservation Service of the U. S. Dept. of Agriculture furnishes technical assistance to land owners and operators to establish soil and water conservation programs and practices. SCS provides teachers, librarians and other leaders with publications about soil and water conservation and the program it directs. Contact local and state SCS offices.

The National Foundation—March of Dimes

Present activities include broad basic and clinical research in the area of birth defects, patient care through a network of fifty-one birth defects special treatment centers and clinics, professional and public education, and support of The Salk Institute for Biological Studies. Films, filmstrips, exhibits and educational materials available. Headquarters: 800 Second Avenue, New York, N. Y. 10017.

U. S. Air Force

The USAF participates in regional, state and local science fairs, recognizing high achievement in fields related to aerospace and providing tours of its research laboratories or student summer employment for ISF finalists. The Aerospace Education Foundation of the Air Force Association awards recognition prizes to USAF recognized finalists.

U. S. Army

The Department of the Army provides judges from Army Reserve R&D Units for the regional and state science fairs and awards

Certificates to winning students with exhibits of interest to the Army. The Army also participates in the ISF by awarding prizes to approximately 20 students with outstanding exhibits. These awards consist of offers of summer employment at Army R&D laboratories or a one-week all-expense-paid tour to an Army laboratory of interest to winning students.

U. S. Atomic Energy Commission

The AEC encourages interest of elementary and secondary school students in nuclear science and applications by providing educational literature and motion picture films (write USAEC, P. O. Box 62, Oak Ridge, Tenn. 37831); traveling exhibits and student assembly demonstrations (see ORINS listing); and AEC Special Awards for outstanding nuclear-related exhibits at the ISF to 10 students and their science teachers for a Nuclear Research Orientation Week at an AEC national laboratory. AEC has published a "how-to" booklet on display techniques and nuclear energy projects at science fairs. Write: USAEC, P. O. Box 62, Oak Ridge, Tenn. 37831.

U. S. Department of Defense

The Department of Defense, including Military Departments, cooperates with individuals and groups in providing guidance and assistance on projects designed to stimulate interest in scientific pursuits. This includes speakers' programs, films, instructional and informational materials, demonstrations, exhibits and displays of military products, installation tours and briefings, and assistance in certain forms of scientific experimentation. Address: Commanding Office of local military installations.

U. S. Forest Service

Through its Conservation Education Branch the Forest Service, U. S. Department of Agriculture, assists teachers developing conservation materials in the curriculum. Forest Service provides teaching materials, charts and posters. Its personnel serve as resource specialists in school programs. Several publications inspire and inform youth of career opportunities. Special ideas are outlined for science fair projects. Write: Conservation Education Branch, Forest Service, USDA, Washington, D. C. 20250.

U. S. Geological Survey

The Geological Survey has prepared *Project Ideas in the Earth Science*, describing 20 projects, for free distribution to teachers and students. Write to nearest U. S. Geological Survey Office: 108 Skyline Bldg., 508 2nd Ave., Anchorage, Alaska; Rm. 7638 Federal Bldg., 300 N. Los Angeles St., Los Angeles, Calif.; 504 Custom House, 555 Battery St., San Francisco, Calif. 94111; 15426 Federal Bldg., Denver, Colo.; 602 Thomas Bldg., Dallas, Texas; 125 S. State St., Salt Lake City, Utah 84111; South 157 Howard St., Spokane, Wash.; or Director, U. S. Geological Survey, Washington 25, D. C.

U. S. Patent Office

The Patent Office provides a vital public service by issuing patents and granting inventors the exclusive right to exclude others from making, using or selling their inventions for 17 years. The Patent System affords incentives for scientific and technological advancement. Before granting a patent, all prior patents and literature must be searched. The Patent Office and its reservoir of over three million U.S. and seven million foreign patents form the major concentration of applied technological know-how in the world. Information is provided to students, teachers, inventors, researchers, scientists and the public. For pamphlets: *Answers to Questions Frequently Asked About Patents*; *Obtaining Information From Patents*; *List of Publications Obtainable From the Patent Office*, write Office of Information Services, U. S. Patent Office, Washington, D. C. 20231.

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