GENERAL SCIENCE

Encouragement in Science

Facts and figures about the 320 finalists in the tenth National Science Fair indicate the boys and girls became interested in science very early in their school years.

DATA ON the 320 finalists at this year's National Science Fair re-emphasizes the importance of providing opportunities to discover the exciting possibilities of science during the elementary grades and junior high school.

According to a report released by SCIENCE SERVICE, which conducts the Fair through its Science Clubs of America, 56% of these 227 boys and 93 girls were interested in science by the time they were 10½ years old. Another 26% became science-minded during the junior high school years of 7th, 8th and 9th grade. Nearly half of this junior high enthusiasm bloomed among 13-year-olds, or the 7th grade level.

Teachers at nearly every grade level, science courses, laboratory experiences, demonstrations, and appealingly written textbooks captured the initial interest of 30% of these students. The influence of parents and other family members and the atmosphere of their homes were credited for their enthusiasm by 21%. Others mentioned such catalysts as their own curiosity and drive, scientific equipment, reading material, science clubs and fairs, scientists and summer jobs in science, educational films and television programs, etc.

Asked to describe the source of the ideas that inspired the outstanding projects that won these high school sophomores, juniors, and seniors the privilege of competing at the national level, 35% said they found their ideas in magazines, journals, books, research papers and news stories. Personal experiences, observations, hobbies, experiments, and individual study yielded interesting project subjects for 28%. About 14% found stimulating questions at school and 11% at science fairs, Junior Academy of Science and science club meetings, from scientists and scientific laboratories.

Nearly all, 97.5%, of these young people are looking forward to careers in a great variety of scientific specialties, with about 21% planning work in the medical sciences, 19% in engineering and electronics, 15% in the biological sciences, 13% in physics, 7.5% in teaching (many more include teaching as part of their futures), about 6% in chemistry, and so forth.

Almost 56% of the fathers of the finalists continued their education beyond high school, earning 37 BS degrees, 13 BA's, 11 MS's, eight MA's, nine MD's, 16 LlB's, 17 PhD's, one DSc, one DrIng, etc.

More than 51% of their mothers attended college, earning eight RN degrees, 31 BS's, 40 BA's, six MA's, three MS's, one MD, one LlB, etc. About 30% of the mothers are employed.

More than a hundred different periodicals, both general science magazines, such as SCIENCE NEWS LETTER, and highly specialized journals, were named by the finalists in answer to a question concerning the scientific publications which they regularly read. Only 31 of the students do not consistently read one or several such publications.

About a fourth of these potential scientists have scientists in their family backgrounds, either in their immediate families or among their relatives. Alexander Graham Bell was the great-grandfather of one finalist and Sir Arthur S. Eddington, famous English astronomer, was the cousin of another.

It is estimated that more than 45,000 students and adults visited the Tenth Annual National Science Fair in Hartford, May 6 to 9, to study the projects exhibited by the 320 finalists representing 168 areas, regional, state, and nation-wide fairs in the United States, Japan, Germany, Canada and Puerto Rico. It is believed that well over 600,000 projects were shown in the local and school fairs that preceded the larger fairs affiliated with the National Science Fair.

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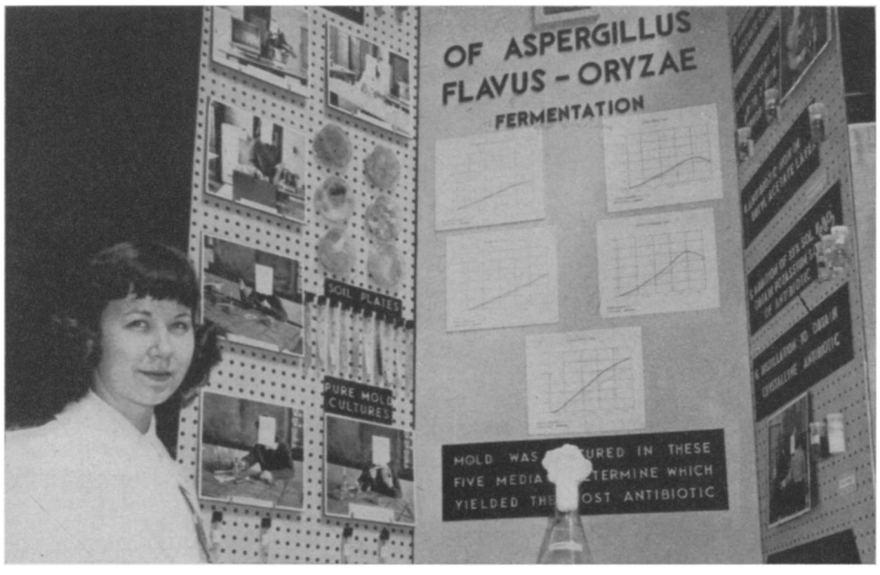

KAREN LEE GABBARD—A top winner in biology with her studies of a mold.

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SCIENCE SERVICE

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GENERAL SCIENCE

Science Fair Winners

Six scientists, three boys and three girls because of two ties for honors in both the biological and physical sciences, were chosen top winners in the tenth National Science Fair.

See Front Cover

SIX TEEN-AGED scientists have been awarded top honors at the National Science Fair. A platoon of more than 100 judges, after viewing about 300 scientific exhibits developed by the finalists, awarded three top honors each for biological and physical exhibits.

In the biological class, the three top winners were: Karen Lee Gabbard, 18, of Terre Haute, Ind., for her study of a mold that was found to produce an antibiotic; Eric Vollrath, 17, of San Marino, Calif., for photographic studies and research on protozoa; and Robert R. Dickey, 16, Fort Worth, Texas, for experiments with embryos.

Three top winners in the physical science competition went to: Gwenda Dowden, 15, of Florien, La., for her comparison of synthetic and natural dyes; Patricia Van de Vyver, 17, Detroit, Mich., who extracted and separated pigments in plant leaves; and Joie Pierce Jones, 18, Abilene, Texas, who designed a complete rocket that climbed 50 miles and sent back cosmic-ray data.

All six top winners appear on the cover of this week's SCIENCE NEWS LETTER. They are (top row, left to right): Karen Lee Gabbard, Joie Pierce Jones, Patricia Van de Vyver, and (bottom row, left to right), Eric Vollrath, Gwenda Dowden, and Robert R. Dickey.

Each of these top winners can request $125 in equipment, apparatus and publications designed to further his scientific career.

The National Science Fair is conducted by SCIENCE SERVICE through its Science Clubs of America. Its goal is to interest America's youth in science careers. The activity has spread to other countries, and finalists this year came from as far away as Alaska, Hawaii, Canada, Puerto Rico, Germany and Japan.

More Award Winners

Second place awards of $75 in "wish" equipment were made to: Janice Ann Picchioni, 18, Roundup, Mont.; Elaine Joy Baskin, 15, Yonkers, N. Y.; Anne Haley Nash, 15, Tulsa, Okla.; Robert Curtis Anderson, 17, Glendale, Calif.; Alan H. Chaiet, 15, Springfield, N. J.; Robert Clinton Bast Jr., 15, Arlington, Va.

Also, Dale A. Anno, 17, Topeka, Kans.; Rosemarie Ann Leandri, 17, Luzerne, Pa.; David Paul Eartly, 17, Hammond, Ind.; David Stephen Ecklein, 18, Cedar Falls, Iowa; and Jon Denis Canaday, 18, Pauls Valley, Okla.

Third Place Awards and $50 Wishes go to: Eddie C. Stone, 16, Heidelberg American H. S., Heidelberg, Germany; Kathleen Bauernfeind, 18, Butler H. S., Butler, N. J.; Barbara L. Neal, 16, Central H. S., Knoxville, Tenn.; Masayuki Takahashi, 16, Hamamatsu Kita H. S., Hamamatsu, Japan; Richard Serwin, 17, Pontiac Central H. S., Pontiac, Mich.; Richard P. Bentley, 16, Tupper Lake H. S., Tupper Lake, N. Y.; L. Thomas Oxley Jr., 18, Charleston Catholic H. S., Charleston, W. Va.; Janice M. Reeder, 17, Puyallup H. S., Puyallup, Wash.; Richard D. Copaken, 17, Paseo H. S., Kansas City, Mo.; and Blair D. Savage, 17, White Plains H. S., White Plains. N. Y.

Fourth Awards of $25 Wishes will be given to:

From Alabama — Michael Carpenter; Alaska—Jack Griffith; Arizona—William Max Ivey; Arkansas—John Sullins; California—Leslie Naman, Carol Solodyna, Daniel Cribbs, Marcelline Ferrari; Colorado—Donald Phillipson, Martin Murphy Jr.; Connecticut—Barbara D'Anzi, George Wisner; Florida—Sheila Most, Vernon Harris, Richard Rieth; Hawaii—Jack Semura, Jr.; Idaho—Brent Wadsworth; Illinois—Roland Gubisch, Joseph Roos Jr.; Indiana—Dennis McCutcheon, Stephen Sheets, David Pfendler, James Tunis; Iowa—Mary Sue Wilson, Ronald Moses Jr., Edward Saulvester; Kansas—Sally Campbell, Paul Krehbiel; Louisiana—Ronnie Rambin, Betty Moore; Maryland—John Clauser, John Wood; Massachusetts—David Palmer, Theron Cole Jr., Anne Smith; Michigan—William Brenner, Jo Ann Charters; Minnesota—Perry Robinson; Montana—Arlene Markin; New Jersey—Louis Caruso, Sandra Duffield; New Mexico—James Brown; New York—Ilsa Roslow, Robert Fischer; North Carolina—Nancy Lawson; Ohio—Gail Tuttle, Ralph Grabowski; Oklahoma — Leudric Harman, David Bass, Dan Dickey; Pennsylvania—Terrance Matzuk, JoAnne Swartz, Dandridge Tomalin, Beulah Garrison, Emory Zimmers; Rhode Island—Alfred Goldberg; South Carolina — Ronald Anderson, Wilhelm Meriwether; South Dakota—Virginia Lievan, Julianne Nielson; Tennessee—Lucy Adams, James Lindsey, James Foster; Texas—Herman Weller, Robert Jernigan, Ricky Matsen, John Olsen, Fred Parce, Catherine Vreeland, Virgil Graves, George Bettle, William Cruce, William Mebane, Jay Solomon, Mary McElroy; Virginia — Frank Taylor, Charles Whitener Jr.; West Virginia—Billy Hunt; Wisconsin—David Shong.

GWENDA DOWDEN—Dye study made her a winner.

Special additional "wish awards" provided by the Connecticut Valley Section of the Instrument Society of America for exhibits in the fields of measurement, control and data handling were presented as follows:

A $75 award to Joie Pierce Jones, 18, Abilene, Texas, for instrumentation and telemetering rockets for upper atmosphere data.

A $50 award to George R. Wisner, 17, Hartford, Conn., for an apparatus for transcribing information in Braille code.

Awards of $25 went to Robert E. Fischer, Forest Hills, N. Y., Joe Ed Gaddes, Nashville, Tenn., and John W. Kopp Jr., Yakima, Wash.

Special Awards Made

Special awards by groups seeking to encourage interest in specific fields included, among others, the American Medical Association awards to Edith Katherine Schuele, 15, Memphis, Tenn., and Martin J. Murphy Jr., 16, Colorado Springs, Colo. Both winners are to show their exhibits at the AMA's big meeting in June at Atlantic City, N. J. Dr. Stanley P. Reimann of the Hahnemann Medical College presented the awards to Edith and Martin and to the two alternates, Jo Ann Charters of Bay City, Mich., and Marc Willard Deitch of Jersey City, N. J.

The American Dental Association's top awards went to Sheila Marie Most, 14, Gulfport, Fla., and Mary Sue Wilson, 15, Cedar Falls, Iowa. President-elect Dr. Paul H. Jeserich presented the awards. Awards were also presented to Albert Ceasar Simmons of Americus, Ga., and to Billy Paul Hunt of Huntington, W. Va. Their exhibits will be shown in New York in September at ADA's centennial meeting.

The American Veterinary Medical Association gave an award to Wilhelm Delano Meriwether, 16, Charleston, S. C., for his study of internal parasites found in dogs. He is to show the exhibit at the Pan American Veterinary Congress and AVMA meeting in Kansas City, Mo., in August. Dr. T. Carl Jones of Angell Memorial Hospital, Boston, Mass., presented the award. Martin Grosvenor Myers of Washington, D. C., was honored as an alternate for his study.

Other awards were made by the U. S. Army, Navy and Air Force. During the

fair, finalists had opportunities to tour the U. S. Naval Submarine Base at New London, Conn., Pratt & Whitney Aircraft Corporation, Hamilton Standard, Combustion Engineering, several life insurance companies, the University of Connecticut, Electric Boat Co., and Mystic Seaport.

Armed Services Awards

NATIONAL Science Fair projects especially relevant to science in the Navy, Army, and Air Force were honored at an Armed Forces awards luncheon.

RADM. Rawson Bennett II, USN, Chief of Naval Research, made National Navy Science Cruiser awards to: Joseph L. Page, 17, Pacific H. S., San Bernardino, Calif., for "Is Tin Can Astro-Photography Practical?"; Ronnie Rambin, 17, Fair Park H. S., Shreveport, La., for "Project Fusion"; Frederick Andrew Moore, 17, Richard Montgomery H. S., Rockville, Md., for "Experimental Investigation of Thermoelectric Cooling"; David W. Palmer, 16, North Andover H. S., North Andover, Mass., for "Missiles Muscles"; Robert E. Fischer, 15, Forest Hills H. S., Forest Hills, N. Y., for "Spectrotelescope and Spectrum Analysis"; Richard P. Bentley, 16, Tupper Lake H. S., Tupper Lake, N. Y., for "A Method of Obtaining a Complete Balance of Life Within a Closed System"; and Terrance Matzuk, 17, Palmerton Area Joint H. S., Palmerton, Pa., for "Electronic Music Synthesizer."

Each of these seven Cruisers were given a pair of precision binoculars. Since two of the seven already have been awarded Navy Science Cruises at their regional fairs, two additional winners were named National Navy Science Cruisers: John A. Labow, 16, Forest Hill Collegiate, Toronto, Ontario, Canada, for "Basic Telemetry as Employed by Earth Satellites," and George A. Hallenbeck, Jr., 17, John Marshall H. S., Rochester, Minn., for "Some Principles of Electronic Computing."

PATRICIA VAN DE VYVER—She studied plant pigments.

Named as Alternate Navy Science Cruisers were: Daniel Foster Cribbs, 16, Ventura Sr. H. S., Ventura, Calif.; George R. Wisner, 17, Bulkeley H. S., Hartford, Conn.; David Charles Brickell, 16, Jersey Shore Area Joint H. S., Jersey Shore, Pa.; and James Madison Foster, Jr., 18, East H. S., Memphis, Tenn.

Maj. Gen. H. N. Toftoy, Commanding General of Aberdeen Proving Grounds, Md., presented the Army Science Awards. Trips to Army Ordnance Missile Command, Huntsville, Ala., were awarded to Joe Ed Gaddes, 17, David Lipscomb H. S., Nashville, Tenn., for "Safe Testing of Rocket Propellants" and to William Lovel Raney Cruce, 16, Spring Branch Sr. H. S., Houston, Texas, for "Design of a Rocket Research Vehicle."

Trips to Walter Reed Army Institute of Research, Washington, D. C., were given to Karen Lee Gabbard and to Richard Serwin, 17, Pontiac Central H. S., Pontiac, Mich., for "A Preventive and a Treatment of Frostbite."

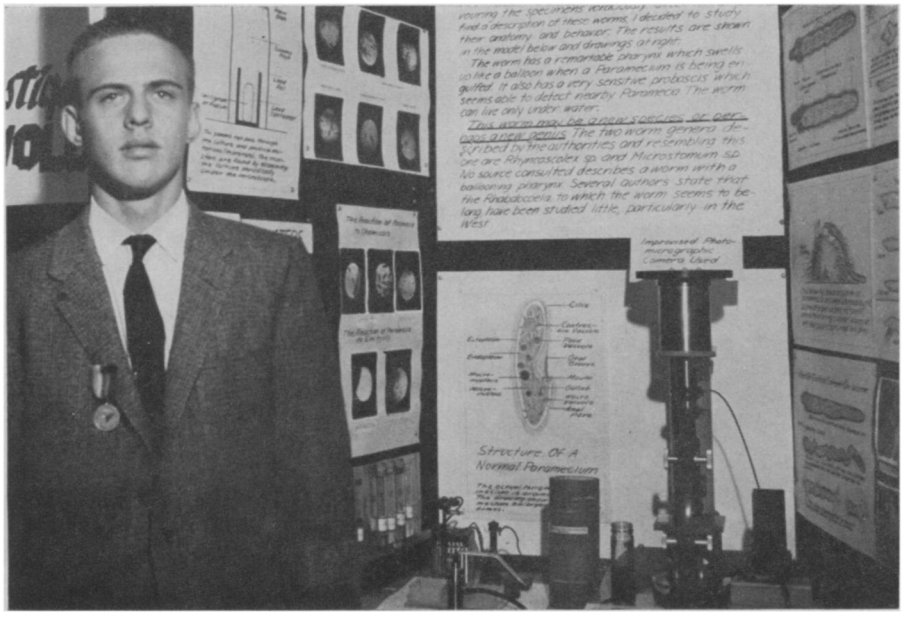
Trips to the Ballistics Research Laboratory, Aberdeen, Md., were won by David Stephen Ecklein, 18, Cedar Falls H. S., Cedar Falls, Iowa, for his "Checker Playing Digital Computer" and by Henry Woods Bowman, 17, Charleston H. S., Charleston, W. Va., for "Magnetohydrodynamic Friction Reduction."

Trips to the U. S. Army Research and Development Laboatory at Fort Monmouth, N. J., were given to David Paul Eartly, 17, Bishop Noll H. S., Hammond, Ind., for his "Methods and Procedures in Electron Microscopy," and to Ralph Edward Grabowski, 17, Benedictine H. S., Cleveland, Ohio, for his project on "Nuclear Magnetic Resonance and Spectrometry."

Maj. Gen. Leland S. Stranathan, Director of Development Planning at U. S. Air Force Headquarters, presented the U. S. Air Force and Air Force Association citations to Joie Pierce Jones, 18, of Abilene High School, Abilene, Texas, as the winner of the Air Power Award for his "Experiment, Design, and Application of Solid Propellant Rockets to Radiation Studies of the Upper Atmosphere," and to Robert E. Fischer, 15, Forest Hills, H. S., Forest Hill, N. Y., as winner of the Air Exploration Award for his project, "Spectrotelescope and Spectrum Analysis."

Brent Earl Wadsworth, 17, Idaho Falls H. S., Idaho Falls, Idaho, was named alternate Air Power winner for his "Gyro-Controlled Guidance System," and David Wesley Shong, 17, Pewaukee H. S., Pewaukee, Wis., was designated alternate Air Exploration winner for his project "Simulated Gravitation Field."

The two winners will be guests at the Airpower Panorama in Miami.



ERIC VOLLRATH—He studied protozoa.

GENERAL SCIENCE

Praise and Advice

PRESIDENT EISENHOWER sent the following telegram:

"To the students and teachers assembled at the Tenth National Science Fair, I send greetings. Our age of science demands the fullest development of all our human resources and abilities. The Science Clubs of America contribute importantly to this development. Best wishes for the success of your Science Fair."

Remarks by Dr. C. S. Draper, director of Massachusetts Institute of Technology Instrumentation Laboratory:

Recognition of boys and girls with outstanding talents for leadership should be made early in their educational careers. Once well-qualified individuals are identified, fellowships, scholarships, assistantships, research grants, and the many other encouragements toward advanced education that are now available may be brought into action to make sure that opportunities for classroom and laboratory studies are given to able students. Beyond these formal phases of personal development, it is important to provide potential leaders with experiences in independent thinking coupled with active work on problems of actual practice. After schooling is over, education of all sorts must and will continue throughout the career of any person who deals with the situations of our modern world. Any leader who does not keep himself abreast of essential changes in his environment will not be likely to retain a position of prominence for long.

Individuals differ among themselves so greatly that no single path for education can be acceptable for all students. Many patterns must be established; law, religion, medicine, business, humanities, science, engineering, and other disciplines may all provide the background of knowledge and experience to bring out latent creativity and leadership. Aside from the detailed bodies of information involved, the differences between persons trained in the various disciplines lie in the mental attitudes and methods of attack on problems.

Science fairs make tremendous contributions to the development of youth for the responsibilities of adult living. The science fair method is to provide an arrangement under which boys and girls may benefit from the use of personal initiative. . . .

Dr. Louis M. Orr, president-elect of the American Medical Association:

As I witness the outstanding results of your talents and enthusiasms in your exhibits, I feel that your achievements deserve a generous portion of our interest, enthusiasm, and encouragement.

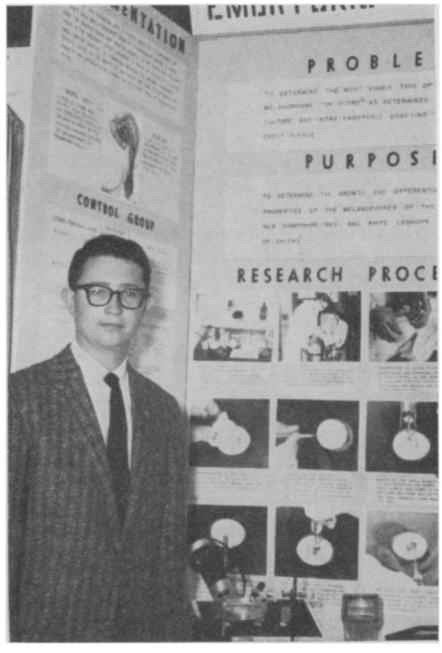
To those of you who are seriously planning to continue your career in the various fields of medical science, may I say that your opportunities have never been better, nor your horizons more far-reaching. The practice of medicine has changed dramatically in the last 25 years. It shows every evidence of changing just as dramatically in the next 25. This age of the atom and space is just one area which holds unprecedented promise for the inquiring mind. Change always brings opportunity to those who are alert and ready for it.

For example, authorities in the electrical engineering research field believe that scientific fields will merge. They see a closer relationship between the abstract and the medical, for instance, in the study of the brain. Brain specialists, working with physicists, engineers, chemists, and physicians will one day combine their knowledge as a step forward in understanding the brain and how it works.

More than that, in order to work effectively together, these varied scientific fields will develop a common language—an understanding of each other's professional terms—and through this come to recognize the way in which each individual specialty contributes its part to the final understanding of the common problem. We do not have such understanding yet. However, a beginning is being made.

Science is frequently a lonely endeavor, in some cases an isolated endeavor. It is easy for scientists to confine themselves and their thinking to their immediate problems, interests and specialties. It is usual for them to communicate only with each other. If young people like yourselves devote your time to scientific delving exclusively, you will probably hardly notice that you are growing up in a restricted world filled only with the requirements of your interest.

It is on this point of scientific isolation that I want to express a word of caution.



ROBERT R. DICKEY—This young scientist worked with embryos for his award-winning project.

JOIE PIERCE JONES—Award winner is shown with drawings of rocket.

Today, we have a tendency to insist from every scientist a dedication so complete that we are in some danger of creating a sort of totalitarian man as a single-purposed and as dominating as a totalitarian state.

I believe that dedication is the backbone of achievement, but it should have a broad base. The individual must be prepared not just to work, but to live—at the same time both as a unique person and as a fellow member of the human race. American philosophy places a fundamental value on its regard for the uniqueness and worth of the individual in his own right. The individual is the end of the free society.

We should not make the mistake of thinking science into a narrow channel. A scientist must be concerned with the environment in which he lives. One of the most frustrating aspects of contemporary life is its tendency to develop compartmental divisions. Business is business, politics is politics, science is science. We have all heard the often repeated fear that our scientific knowledge has far outstripped our human and moral understanding so that we are in danger of destroying ourselves. Without widespread understanding, it could be true. . . .

Maj. Gen. H. N. Toftoy, Commanding General, Aberdeen Proving Ground:

The Army's interest in the development of scientists and engineers is long and honorable. It stems from the earliest days of its history. It led to the founding of the United States Military Academy on July 4, 1802, at an Army Post known as West Point.

History records how the U S. Army gave the light of inspiration which has guided American scientists and engineers for many years. And it was your forebears in the fields of science who worked closely with Army research and development through those years. Today, the Army with scientists and engineers, both civilian and military, has built a vast, imaginative research and development program to plan and equip the United States Army of the future for our national defense. . . .