

## GENERAL SCIENCE

# Honors at Science Fair

Thirteen young high school students were selected for top science honors in 13th National Science Fair-International after months of competition in local, regional and state fairs.

## See Front Cover

► THE MOST PROMISING teen-aged scientists of the year received top awards May 4 at the National Science Fair-International at Seattle, Wash.

All of the 387 finalists and their teachers were honored at an awards banquet presided over by Dr. Watson Davis, director of SCIENCE SERVICE which conducts the annual fair. Awards were made in botany, chemistry and biochemistry, earth and space sciences, medicine and health, physics, mathematics and computers, and zoology.

First Awards of \$100 of equipment or books were presented to:

Maryce M. Jacobs, 17, Las Cruces H. S., Las Cruces, N. Mex., for her project, "Fungal Ecology of Tularosa Basin," also the winner of a first award from the American Institute of Biological Sciences, and previously a finalist at the 11th NSF-I;

Bette Jane Wyckoff, 17, Quakertown Community H. S., Quakertown, Pa., for her project, "Microelectrophoresis";

Donna Gene Hayes, 18, Maumee Valley Country Day School, Maumee, Ohio, for her project, "Experimental Study of Nuclear Structure," who also won a U.S. Army award and an Atomic Energy Commission alternate award; was named one of the 40 top winners in the 1962 Science Talent Search; and earned a Fourth Award at the 11th NSF-I;

Melodie MacLeod Williams, 18, Chateaugay Central School, Chateaugay, N. Y., for "Research into Congenital Hydrotic Ectodermal Dystrophy," who also was a finalist at the 12th NSF-I, winning a Fourth Award;

Vickie Lynn Harper, 16, Leonia H. S., Leonia, N. J., for "Pituitary Physiology as Studied by Parabiosis";

Robert H. Timme, 17, Jesse H. Jones H. S., Houston, Texas, for "Nutrient Passage Through Plant Grafts as Tested With Radioisotopes," also a winner of a First Award from the AEC;

Gary Paul Wulfsberg, 17, Washington H. S., Cedar Rapids, Iowa, for "Discovering New Compounds of Chromium and Hydroxylamine," also the winner of an American Chemical Society alternate award;

Richard Lee Falwell, 17, Walter Johnson H. S., Rockville, Md., for "Spot Cycles of Jupiter and Saturn," also a winner of a Space Science award of the National Aeronautical and Space Administration, the first award of the Optical Society of America, the U.S. Navy Science Cruiser award, and previously a finalist at the 12th NSF-I, winning a Fourth Award;

Frederick A. Dombrose, 17, Sylvania H. S., Sylvania, Ohio, for "Psychophysiology of Color Vision," also winner of a U.S.

Army award, and finalist at the 11th NSF-I where he won a Third Award and an honorable mention from the American Veterinary Medical Association;

Leonard S. Joeris, Jr., 16, Ann Arbor H. S., Ann Arbor, Mich., for "The Design, Construction, and Operation of a Three-Inch Freon Bubble Chamber";

Henry Allen Lester, 16, Teaneck H. S., Teaneck, N. J., for "Modulating Microwaves by Varying the Plane of Polarization with Ferrites," and also winner of the Electronics award of the U.S. Air Force;

Charles Lee Dryden II, 17, Falfurrias H. S., Falfurrias, Texas, for "Derivation of the General Form of Divisibility Functions for Types of Moduli";

Lewis Binoth Haberly, 17, Schroon Lake Central School, Schroon Lake, N. Y., for "Investigation of the Hearing Ability of the Brown Bullhead," also winner of a first award of the AIBS, and, earlier this year, winner of the \$6,000 Westinghouse Science Scholarship in the 21st Science Talent Search.

Thirteen First Award winners are seen on the front cover with Vice Admiral A. M. Bledsoe, U.S.N. (Ret.), Chairman of the Judges, 13th NSF-I. Front row, left to right: Bette Jane Wyckoff, Donna Gene Hayes, Maryce M. Jacobs, Admiral Bledsoe, Melodie MacLeod Williams, Vickie Lynn Harper, Lewis B. Haberly; back row, left to right: Richard Lee Falwell, Frederick Dombrose, Gary Wulfsberg, Leonard S. Joeris, Jr., Robert H. Timme, Henry Allen Lester, Charles Lee Dryden II.

## Winning Second Honors

Second honors and \$75 Wish Awards went to: Mieko Asada, 18, Kyoto Seika Girls' H. S., Kyoto, Japan, "Studies on *Taeniophyllum aphyllum makino*"; Judith A. Rygalski, 17, Lourdes Academy, Cleveland, Ohio, "A Biochemical Study of Blood"; Helen A. Bernardi, 17, Lincoln H. S., Yonkers, N. Y., "Mathematical Analysis of the Locus of Points on a Rotating Reuleaux Triangle," a finalist for the second time; Deborah Chase, 16, Bronx H. S. of Science, New York, N. Y., "The Production and Characteristics of Interferon in Microorganisms," also winner of an American Society for Microbiology second award and, at the 12th NSF-I, winner of a Fourth Award, a Society of American Bacteriologists first award and Pathology-Medical Technology second award; Trudy Virginia Noller, 17, Berkeley H. S., Berkeley, Calif., "Studies of the Biology and Morphology of *Anthemus*," also winner of the Entomological Society of America Award; Furney Todd, Jr., 17, Wendell H. S., Wendell, N. C., "The Effect of Irradiation on Black Shank Fungus"; Jon

Gardner Wilkes, 18, Hall H. S., Little Rock, Ark., "Studies in the Effects of and Protection from Ionizing Radiations," also winner of the Aerospace Bioscience award of the USAF and a U.S. Atomic Energy Commission first award, and at the 12th NSF-I, winner of a Fourth Award and U.S. Army award; Gary Wayne Carnes, 17, Marion H. S., Marion, Ind., "The Stratigraphy and Paleontology of the Mid-Silurian Liston Creek Limestone," a member of the Honors Group of the 21st STS; Charles Lloyd Schmidt, 17, Stephen F. Austin H. S., Austin, Texas, "Mapping by Transduction," also winner of the ASM first award; William E. Murray, Jr., 16, Walter Johnson H. S., Rockville, Md., "The Stability of Radioactive Equilibria," also winner of an AEC first award; Robert Lee Williams, 17, William Fleming H. S., Roanoke, Va., "Research Work with the Gas Chromatograph," also winner of an U.S. Army award and a finalist for the second time; Phillip Ray Lawson, 16, Ruston H. S., Ruston, La., "Transistorized Digital Computer"; William Leonard Pickard, Jr., 16, Daniel C. O'Keefe H. S., Atlanta, Ga., "Radiobiologic Investigations of Contractile Activity and ATP-Induced Pinocytosis *in vitro*," also winner of an AEC first award and a second time finalist.

## Third Award Winners

Third Awards and \$50 Wishes went to: Debra Mae Thompson, 17, Falfurrias H. S., Falfurrias, Texas, "Stem Hypertrophies of Mesquite"; Cynthia M. Sajewski, 17, St. Florian H. S., Hamtramck, Mich., "A Theory for the Formation of Liesegang Rings in Silica Gels"; Elizabeth Ferree Stilwell, 18, Vermillion H. S., Vermillion, S. Dak., "Induced Color Halos as Seen by Fifteen Color-Blind Persons and Fifteen Controls Tested with Monocular Vertically Bisected Bicolor Stimuli," also winner of the OSA second award; Mary Ann Dieckmann, 17, West H. S., Waterloo, Iowa, "Determining Locus of Irradiated Mutant *Drosophila* 'bl-pt-rd,'" also winner of an AEC first award; Janet Lorraine Stauffer, 16, Salina H. S., Salina, Kansas, "An Original Contribution to Kansas Archaeology"; Hikoshiro Tachi, 19, St. Paul's H. S., Nizamachi Saitama-Ken, Japan, "Microorganisms in the Soil"; David C. Hill, 17, Grand Blanc H. S., Grand Blanc, Mich., "Discovery and Development of a New Series of Metal Organics," also winner of USAF and U.S.A. Chemical Corps awards and a three-time finalist; Robert Bruce Cornell, 17, Marion H. S., Marion, Ind., "Activating Impurities in Crystalline Minerals," also winner of an U.S. Army award; Ronald A. Gilson, 17, Marshalltown Sr. H. S., Marshalltown, Iowa, "Cytological Investigations of Interferon Stimulated by Influenza PR8," also winner of ASM, U.S. Army, U.S. Navy awards and second time finalist; Carl James Bakay, Jr., 17, Hamilton H. S., Trenton, N. J., "Advanced Ultracentrifuge Designs"; David A. Zavadil, 18, Brookfield Central H. S., Brookfield, Wis., "Plasma Acceleration," and winner of National Aeronautics and Space Administration and U.S. Army awards; George Churchill Kenney II, 18, Oxon Hill Sr. H. S., Oxon Hill, Md., "A Generalized Parabola"; Dennis Lee Fielder,

17, Melbourne H. S., Melbourne, Fla., "Studies of the Adrenal Gland," also winner of Path.-Med. Tech. merit certificate.

Fourth Place Awards and \$25 went to participants from fairs in the following states:  
ALABAMA—John H. Thornton, 18, Huntsville H.S., Huntsville.

ARIZONA—Sondra Kay Johnson, 18, Rincon H.S., Tucson.

ARKANSAS—Charles William Berry, 16, Hall H.S., Little Rock.

CALIFORNIA—Patricia Arlene Vickers, 17, Mt. Whitney H.S., Visalia; Joanne Fiscalini, 17, Modesto H.S., Modesto; David Edward Voit, 17, Patterson Union H.S., Patterson; David Louis Coplin, 16, Encina H.S., Sacramento.

CANADA—David John Isbister, 16, Welland High and Vocational School, Welland, Ontario; Wendy Patricia Gibbs, 17, King Edward H.S., Vancouver, B.C.

COLORADO—Alan Lee Dudley, 15, North Denver H.S., Denver; Kenneth Linn Weaver, 16, Greeley H.S., Greeley; Wanda LaDeen Hakel, 17, Central Jr.-Sr. H.S., Grand Junction; James Oran Huff, Jr., 16, Grand Junction H.S., Grand Junction.

DISTRICT OF COLUMBIA—Karl Henry Miller, 16, Woodward Preparatory School for Boys, Washington.

FLORIDA—Raymond Clyde Roy, 17, Robert E. Lee Sr. H.S., Jacksonville; Tommy Linwood Tyler, 15, Nathan Bedford Forrest Sr. H.S., Jacksonville.

GEORGIA—Benjamin Frank Hatfield, Jr., 16, W. F. Dykes H.S., Atlanta; William Fred Moss III, 17, Southwest H.S., Atlanta.

IDAHO—Joseph L. Parkinson, 16, Blackfoot H.S., Blackfoot; Ward D. Parkinson, 16, Blackfoot H.S., Blackfoot.

ILLINOIS—Joseph A. Neisendorfer, 17, Tilden Technical H.S., Chicago.

INDIANA—Bill M. Murley, 17, Garrett H.S., Garrett; Steven L. Hart, 17, Bluffton H.S., Bluffton; Mitchell Pilot, 17, Oliver P. Morton H.S., Hammond; Ronald Edward Waltz, 18, Warren Central H.S., Indianapolis; Ronald Wesley Johnson, 17, A. J. Kent H.S., Kentland; Anthony Eugene Akers, 16, Coal Creek Central H.S., New Richmond; David H. Avery, 15, Portage Township H.S., Portage.

IOWA—Carol Ann Marvitz, 17, West H.S., Waterloo; Donald John Crownover, 17, Rock Island Sr. H.S., Rock Island, Ill.

KANSAS—Sheldon Edward Nuss, 16, Topeka H.S., Topeka.

LOUISIANA—Salpi Adrouny, 18, Benjamin Franklin Sr. H.S., New Orleans; Linda Gayle Freeman, 17, Marthaville H.S., Marthaville.

MARYLAND—Ralph Hopper Morgan, Jr., 17, Bel Air Sr. H.S., Bel Air; Linnea Stewart, 17, High Point H.S., Beltsville.

MASSACHUSETTS—Lili Ann Motta, 15, Bishop Stang H.S., North Dartmouth.

MICHIGAN—Mary Helen Sherburne, 16, St. Thomas the Apostle H.S., Ann Arbor; Lawrence L. Dickerson, 17, Caro Community Schools, Caro; Pamela Kay Gill, 17, Midland Sr. H.S., Midland.

MINNESOTA—John Dozier Roome, 18, John Marshall Sr. H.S., Rochester.

MISSISSIPPI—Malcolm D. May, Jr., 17, Greenwood H.S., Greenwood.

MISSOURI—William Harris Batson, 18,

Rosedale H.S., Kansas City, Kansas; Jeffrey William Lang, 17, St. Louis University H.S., St. Louis.

MONTANA—Robert R. Greenheck, 18, Granite County H.S., Philipsburg; Gerald M. Wilkins, 18, Great Falls H.S., Great Falls.

NEW JERSEY—Fred Chin Jew, 16, William L. Dickinson H.S., Jersey City.

NEW MEXICO—Alleah Sue Barnes, 16, Valley H.S., Albuquerque; Joseph Toulouse, 16, Santa Fe H.S., Santa Fe; John Taft Nicholson, 18, Alamogordo H.S., Alamogordo.

NEW YORK—Paul Allan Stokstad, 18, Pearl River H.S., Pearl River; Cecilia Veronica Huala, 16, St. Vincent Ferrer H.S., New York; James B. Rand, 14, Andrew Jackson H.S., Cambria Heights; Roger Sassen, 16, Martin Van Buren H.S.; Queens Village; Howard H. Kirtland, 17, Our Lady of Lourdes H.S., Poughkeepsie; Amelia Mary Martinko, 17, Our Lady of Lourdes H.S., Poughkeepsie; John Walter Glendenning III, 16, Pelham H.S., Pelham.

NORTH CAROLINA—Geoffrey F. Walker, 15, Lee H. Edwards H.S., Asheville; Lewis T. Karriker, Jr., 18, South Rowan Sr. H.S., China Grove.

NORTH DAKOTA—Clara Steier, 16, St. Mary's H.S., Richardson.

OHIO—John Lawrence Kowalski, 18, Benedictine H.S., Cleveland; William G. Hutchison, Jr., 15, Whetstone H.S., Columbus.

OKLAHOMA—Jo Lynne Birkhead, 16, Harding H.S., Oklahoma City; Minette Marian Frizzell, 18, Classen H.S., Oklahoma City.

PENNSYLVANIA—Astrid Imke Hausch, 18, Lower Moreland H.S., Huntingdon Valley; George Edward Halloran, 15, Cathedral H.S., Scranton; Marguerite Mary Yevitz, 15, St. Nicholas H.S., Wilkes-Barre.

RHODE ISLAND—Edward F. Turco, 17, Cranston H.S., Cranston.

SOUTH CAROLINA—Sandra Charlene Thomason, 17, Hillcrest H.S., Simpsonville; Murray O'Neil Meetze, Jr., 17, Heath Springs H.S., Heath Springs.

TENNESSEE—Albertine Buyck, 17, Howard H.S., Chattanooga; Mark Allan Spivey, 17, West H.S., Knoxville; William Joseph Busler, 17, Christian Brothers H.S., Memphis; Robert Leon Carney, 17, Isaac Litton H.S., Nashville.

TEXAS—Elaine Walter, 18, Cooper H.S., Abilene; Joel Anthony Moser, 18, Longview H.S., Longview; James Lee Ash, Jr., 17, Bryan Adams H.S., Dallas; Gerald Henry Jordan, 17, S. F. Austin H.S., El Paso; Glen Allen Calvert, 18, Brazosport Sr. H.S., Freeport; Linda Charlene Hayes, 16, Andrews H.S., Andrews; Michael R. Gorman, 17, San Angelo Central H.S., San Angelo; Lois Levelle McCoy, 19, San Angelo Central H.S., San Angelo; Berta Alicia Rodriguez, 17, Luther Burbank Vocational H.S., San Antonio; John Taboada, 18, L. W. Fox Vocational and Technical H.S., San Antonio; Jimmy Weldon Worley, 18, Wichita Falls Sr. H.S., Wichita Falls.

UTAH—Gary N. Foulks, 17, West H.S., Salt Lake City.

VIRGINIA—Randall Craig Zisler, 15, Wakefield Sr. H.S., Arlington; Clifton Eugene James, Jr., 17, McLean H.S., McLean; Ruth Ann Ziegler, 17, James Madison H.S., Vienna.

WASHINGTON—Paul Leland Andre Tremblay, 17, Coeur d'Alene Sr. H.S., Coeur d'Alene, Idaho.

WISCONSIN—John Charles Schaefer, 17, North H.S., Sheboygan.

The American Chemical Society presented First Awards of plaques and \$100 for purchase of materials to further winners' study and experimentation to Sandra Kay Stellingwerf, 18, Penn H. S., Mishawaka, Ind.,



**LIGHT-WEIGHT SATELLITE**—Shown is an inflatable satellite model of aluminum and plastic foil weighing one-third less than materials now used. It was developed by Aluminum Company of America, Pittsburgh, Pa.

"Absolute Mobility of the H<sup>+</sup> Ion in Ice" and to Seth Sharr, 17, Sistersville H. S., Sistersville, W. Va., "Demineralization of Sea Water by Hydrate Formation." Alternate Awards of inscribed plaques were given to Salpi Adrouny, 18, Benjamin Franklin Sr. H. S., New Orleans, La., "Comparative Chemistry of Hickory Nut Oils" and to Gary Paul Wulfsberg, 17, Washington H. S., Cedar Rapids, Iowa, "Discovering New Compounds of Chromium and Hydroxylamine." Winners were given subscriptions to the Journal of Chemical Education, and certificates recognized the winners' sponsoring teachers.

The American Institute of Biological Sciences presented its awards of all-expenses paid trips to participate in and exhibit at its annual meeting, August 26-31, 1962, Oregon State University, Corvallis, Ore., to Maryce M. Jacobs, 17, Las Cruces H. S., Las Cruces, N. Mex., "Fungal Ecology of Tularosa Basin" and to Lewis Binoth Haberly, 17, Schroon Lake Central School, Schroon Lake, N. Y., "Investigation of the Hearing Ability of the Brown Bullhead."

The American Society for Microbiology gave a plaque, certificate of merit, and \$100 to further the winner's career in science to its First Award winner: Charles Lloyd Schmidt, 17, Stephen F. Austin H. S., Austin, Texas, "Mapping by Transduction." The Second Award, a plaque, certificate, and \$75, were given to Deborah Chase, 16, Bronx H. S. of Science, New York, N. Y., "The Production and Characteristics of Interferon in Microorganisms." Honorable Mention Awards were given to: Linnea Stewart, 17, High Point H. S., Beltsville, Md., "Chemical Structure and Biological Activity"; Susan Kay Pilger, 17, Washington-Lee H. S., Arlington, Va., "Biochemical Fuel Cell"; and to Ronald A. Gilson, 17, Marshalltown Sr. H. S., Marshalltown, Iowa, "Cytological Investigations of Interferon Stimulated by Influenza PR8."

The Entomological Society of America presented an award of a \$100 Savings Bond and the current Annual Review of Entomology to Trudy Virginia Noller, 17, Berkeley H. S., Berkeley, Calif., "Studies of the Biology and Morphology of *Anthemus*."

The National Pest Control Association presented a certificate and \$100 for purchase of materials to further the winner's study and experimentation in biology to Sandra Ann Tucker, 18, Frederick H. S., Frederick, Okla., "Ionization—Its Limitless Possibilities."

The Optical Society of America first award of \$100 for materials, equipment, books, etc., in the field of optics went to Richard Lee Falwell, 17, Walter Johnson H. S., Rockville, Md., "Spot Cycles of Jupiter and Saturn." The second award of \$75 to be used for the same purpose was given to Elizabeth Ferree Stilwell, 18, Vermillion H. S., Vermillion, S. Dak., "Induced Color Halos as Seen by Fifteen Color-Blind Persons and Fifteen Controls Tested with Monocular Vertically Bisected Bicolor Stimuli."

The Pathologist-Medical Technologist first award of certificate and a summer job with the American Registry of Pathology at the Armed Forces Institute of Pathology in

Washington, D. C., plus up to \$100 travel expenses went to Robert R. Greenheck, 18, Granite County H. S., Philipsburg, Mont., "The Effects of Hypoxia on the Embryonic Development of Mice." Merit Certificates were given to Linda Beatrice Holk, 18, Foley H. S., Foley, Ala., "In the Path of Fleming"; Dennis Lee Fielder, 17, Melbourne H. S., Melbourne, Fla., "Studies of the Adrenal Gland"; Tomas Garza, 17, Dimmitt H. S., Dimmitt, Texas, "Radioactive Uptake of P<sup>32</sup> in Animals and the Subsequent Recovery Period"; Sallie Blyth Payne, 16, Arlington Heights H. S., Fort Worth, Texas, "Morphological Deviation"; John H. Thornton, 18, Huntsville H. S., Huntsville, Ala., "Experimenting with Penicillin."

The Society of Women Engineers presented a \$100 Savings Bond to Patricia Arlene Vickers, 17, Mt. Whitney H. S., Visalia, Calif., "The Kettleman Hills Formation."

### Government Agencies Awards

The National Aeronautics and Space Administration awarded Certificates of Merit and two-day visits to NASA facilities to winners in three categories: in Manned Space Flight, awards went to Susan Kay Pilger, 17, Washington-Lee H. S., Arlington, Va., "Biochemical Fuel Cell," Ross Gregory Sisk, 17, Leon H. S., Tallahassee, Fla., "Astro-Navigation"; in Rockets, to Bruce D. Pomeroy, 18, Reading Central Catholic H. S., Reading, Pa., "Effect of Expansion Ratio on the Thrust of Rocket Nozzles," David A. Zavadil, 18, Brookfield Central H. S., Brookfield, Wis., "Plasma Acceleration"; in Space Science, to John Taboada, 18, L. W. Fox Vocational and Technical H. S., San Antonio, Texas, "Cosmic Rays Studied with a Counter Controlled Cloud Chamber," Richard Lee Falwell, 17, Walter Johnson H. S., Rockville, Md., "Spot Cycles of Jupiter and Saturn." Each of the six winners will name a teacher to accompany him on the NASA trip.

The U.S. Air Force honored finalists in eight special categories with awards of certificates of achievement and invitations to spend two to five days at a USAF Research and Development facility. In Aerospace Power, the award went to John Taft Nicholson, 18, Alamogordo H. S., Alamogordo, N. Mex., "Photovoltaic Cells"; in Aerospace Propulsion, to James Edward Miles, 17, Shady Spring H. S., Beaver, W. Va., "Electrostatic Rocket"; in Electronics, to Henry Allen Lester, 16, Teaneck H. S., Teaneck, N. J., "Modulating Microwaves by Varying the Plane of Polarization with Ferrites"; in Electronic Computers, to Jack Berton Atkinson, 18, El Campo H. S., El Campo, Texas, "Transistorized Nerve Cell"; in Atmospheric Physics, to Eric Edward Sunberg, 17, Watsonville Joint Union H. S., Watsonville, Calif., "Possible Origin of Moon's Craters"; in Aerospace Bioscience, to Jon Gardner Wilkes, 18, Hall H. S., Little Rock, Ark., "Studies in the Effects of and Protection from Ionizing Radiations"; in Photography and Optics, to Edward F. Turco, 17, Cranston H. S. West, Cranston, R. I., "The New Catadioptric Optical Systems"; and in Materials Research, to David C. Hill,

17, Grand Blanc H. S., Grand Blanc, Mich., "Discovery and Development of a New Series of Metal Organics."

The U.S. Army invited each of sixteen winners to spend about a week of the summer vacation at an Army research facility in the field of his or her special interest: at U.S. Ordnance Missile Command, Huntsville, Ala., Paul Leland Andre Tremblay, 17, Coeur d'Alene Sr. H. S., Coeur d'Alene, Idaho, "The Optical Maser (Gas)," David A. Zavadil, 18, Brookfield Central H. S., Brookfield, Wis., "Plasma Acceleration"; at Army Chemical Center, Edgewood, Md., Sandra Ann Tucker, 18, Frederick H. S., Frederick, Okla., "Ionization—Its Limitless Possibilities," Henry Brian Highfill, 20, West H. S., Columbus, Ohio, "Guinea Pig Nervous System—Effects of Tranquilizers"; at Army Engineers Center, Fort Belvoir, Va., Seth Sharr, 17, Sistersville H. S., Sistersville, W. Va., "Demineralization of Sea Water by Hydrate Formation"; at U.S. Army Waterways Exp. Sta., Vicksburg, Miss., Minette Marian Frizzell, 18, Classen H. S., Oklahoma City, Okla., "A Study of the Verdigris River Sediment"; at Walter Reed Army Research Institute, Washington, D. C., Ronald A. Gilson, 17, Marshalltown Sr. H. S., Marshalltown, Iowa, "Cytological Investigations of Interferon Stimulated by Influenza PR8," Stephen George Waxman, 16, West Orange Mountain H. S., West Orange, N. J., "Skin Homografts in Rats"; at U.S. Army Ballistics Research Labs., Aberdeen Proving Grounds, Md., Donna Gene Hayes, 18, Maumee Valley Country Day School, Maumee, Ohio, "Experimental Study of Nuclear Structure"; at U.S. Army Ordnance Fuse Lab., Washington, D. C., Robert Karl Herman, 18, Conestoga Valley Sr. H. S., Lancaster, Pa., "An Electronic Syllable Analyzer"; at Army Quartermaster Research and Engineering Command, Natick, Mass., Robert Lee Williams, 17, William Fleming H. S., Roanoke, Va., "Research Work with the Gas Chromatograph," Frederick A. Dombrose, 17, Sylvania H. S., Sylvania, Ohio, "Psychophysiology of Color Vision"; at Army Signal Center, Fort Monmouth, N. J., Robert Bruce Cornell, 17, Marion H. S., Marion, Ind., "Activating Impurities in Crystalline Minerals," Susan Kay Pilger, 17, Washington-Lee H. S., Arlington, Va., "Biochemical Fuel Cell"; and at Army Transportation Center, Fort Eustis, Va., Raphael Belgique, 18, Granite H. S., Salt Lake City, Utah, "Radio Controlled Aircraft," Lloyd M. Clark, 17, Sandia H. S., Albuquerque, N. Mex., "Circulation Theory of Lift."

The U.S. Army Chemical Corps presented first awards of certificates and salaried summer jobs at Army research laboratories in the fields of their interests to three finalists: John Charles Schaefer, 17, North H. S., Sheboygan, Wis., "The Effect of a Cancer Chemotherapeutic Agent, 5-Fluorouracil, on *Escherichia coli*," Raymond Clyde Roy, 17, Robert E. Lee Sr. H. S., Jacksonville, Fla., "3D Electrons in Transition Metal Complexes," and John Taft Nicholson, 18, Alamogordo H. S., Alamogordo, N. Mex., "Photovoltaic Cells." Certificates went to three alternatives: Ronald Wesley Johnson,

(Continued on p. 318)

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## Honors at Science Fair

(Continued from p. 311)

17, A. J. Kent H. S., Kentland, Ind., "Factors Influencing Growth of *Colpidium colpoda*," David C. Hill, 17, Grand Blanc H. S., Grand Blanc, Mich., "Discovery and Development of a New Series of Metal Organics," and Martin E. Walter, 17, San Jacinto H. S., San Jacinto, Calif., "3-Way Roulettes."

The Armed Forces Chemical Association awarded an engraved plaque and \$50 travel expenses to each of the winners of the summer jobs.

The U.S. Atomic Energy Commission gave certificates and trips to Argonne National Laboratory, Argonne, Ill., Aug. 13-17 to ten finalists: Ward D. Parkinson, 16, Blackfoot H. S., Blackfoot, Idaho, "Controlled Thermonuclear Reaction," Patricia Arlene Vickers, 17, Mt. Whitney H. S., Visalia, Calif., "The Kettleman Hills Formation," William E. Murray, Jr., 16, Walter Johnson H. S., Rockville, Md., "The Stability of Radioactive Equilibria," Jon Gardner Wilkes, 18, Hall H. S., Little Rock, Ark., "Studies in the Effects of and Protection from Ionizing Radiations," John Jay Vanden Hoek, 18, South H. S., Grand Rapids, Mich., "Nuclear Magnetic Resonance," Mary Ann Dieckmann, 17, West H. S., Waterloo, Iowa, "Determining Locus of Irradiated Mutant *Drosophila* 'bl-pt-rd,'" William Leonard Pickard, Jr., 16, Daniel C. O'Keefe H. S., Atlanta, Ga., "Radiobiologic Investigations of Contractile Activity and ATP-Induced Pinocytosis *in vitro*," Robert H. Timme, 17, Jesse H. Jones H. S., Houston, Texas, "Nutrient Passage Through Plant Grafts as Tested with Radioisotopes," John Taboada, 18, L. W. Fox Vocational and Technical H. S., San Antonio, Texas, "Cosmic Rays Studied with a Counter Controlled Cloud Chamber," and Charles Theodore Womack III, 18, Greenwood H. S., Greenwood, Miss., "Ascorbic Acid Synthesis Determinations as Indicated by Success of Rat-Guinea Pig Liver Heterograft." Each of these winners will designate a teacher who also will be honored with an expenses-paid trip. AEC alternate awards were presented to: Bill M. Murley, 17, Garrett H. S., Garrett, Ind., "The Effects of Irradiated Neoplastic Extracts on Carcinoma in Cottontail Rabbits," Donna Gene Hayes, 18, Maumee Valley Country Day School, Maumee, Ohio, "Experimental Study of Nuclear Structure," Malcolm May, Jr., 17, Greenwood H. S., Greenwood, Miss., "The Effects of Total Body Irradiation on the Longevity of Tissue Homografts in Rabbits," Richard Franklin Mooney, 17, Sperry H. S., Sperry, Okla., "Emission Studies of a Nitrogen Plasma," R. Andrew Hatfield, 17, Carlisle Sr. H. S., Carlisle, Pa., "A Combination 3 MEV. Neutron Source and Medium Energy X-ray Source," Alan Inglis, 17, Mandan Sr. H. S., Mandan, N. Dak., "Measuring the Mass of an Electron," Larry Robert Alexander, 16, Fort Jones H. S., Fort Jones, Calif., "Expansion-Type Cloud Chamber," Lewis T. Karriker, Jr., 18, South Rowan Sr. H. S., China Grove, N. C., "Comparative Determination of Radioactivity in Rowan County Soils," Joel Anthony Moser, 18, Longview H. S., Longview, Texas, "Van de Graaff Electron Accelerator," and Kenneth Linn Weaver, 16, Greeley H. S., Greeley, Colo.,

"Temperature Variation and the Effects of Radiation on Reproduction and Mortality."

The U.S. Navy designated ten Navy Science Cruisers and awarded them certificates and official Navy binoculars in addition to five-day science-oriented trips on Naval vessels and at USN research facilities. The Cruisers are: Ross Gregory Sisk, 17, Leon H. S., Tallahassee, Fla., "Astro-Navigation"; Richard Lee Falwell, 17, Walter Johnson H. S., Rockville, Md., "Spot Cycles of Jupiter and Saturn"; Ernest T. Comisac, 18, Tamaqua Area Joint H. S., Tamaqua, Pa., "Regulating Shock Waves"; Tomas Garza, 17, Dimmitt H. S., Dimmitt, Texas, "Radioactive Uptake of P<sup>32</sup> in Animals and the Subsequent Recovery Period"; Ronald A. Gilson, 17, Marshalltown Sr. H. S., Marshalltown, Iowa, "Cytological Investigations of Interferon Stimulated by Influenza PR8"; Gerald Austin Stolz, Jr., 17, El Dorado Sr. H. S., El Dorado, Ark., "A Comparison in the Growth and Metastasis of Two Sarcomas"; Geoffrey F. Walker, 15, Lee H. Edwards H. S., Asheville, N. C., "The Plasma Torch"; Robert Karl Herman, 18, Conestoga Valley Sr. H. S., Lancaster, Pa., "An Electronic Syllable Analyzer"; William F. Orr, 17, Cherry Creek H. S., Englewood, Colo., "Analytic Geometry in N Dimensions"; and Bill M. Murley, 17, Garrett H. S., Garrett, Ind., "The Effects of Irradiated Neoplastic Extracts on Carcinoma in Cottontail Rabbits."

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### GENERAL SCIENCE

## President Sends Greeting To National Science Fair

► OUR CONTINUED PROGRESS in science and technology, so critical to our nation's strength, will depend on our success in preparing today the scientists and engineers needed for the future. The scientific interest and abilities of young students are therefore among the nation's most important resources.

On the occasion of the thirteenth annual National Science Fair-International, which does so much to recognize these resources and encourage their development, I am particularly pleased to cite the accomplishments of all the participants and to thank personally, on behalf of a grateful nation, their dedicated teachers.

I extend my best wishes to the Science Clubs of America for the success of the Fair.

JOHN F. KENNEDY.

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## Questions

**PHARMACOLOGY**—What are the psychological ill effects of tranquilizers? p. 312.

**SPACE**—What is Titov's theory on the cause of the "Glenn effect"? p. 307.

**TECHNOLOGY**—What type of vehicle has been predicted for commuters in year 2000? p. 314.

Photographs: Cover, Science Service; p. 307, Aerojet-General; p. 310, Aluminum Company of America; p. 314, Sylvania Electric Products Inc.; p. 320 (top), Roberts Colonial House, Inc.; p. 320 (bottom), Dr. Eliot Porter.