

GENERAL SCIENCE

Science Scholarships

16-year-old "vacant lot" ecologist shares top honors in Science Talent Search with 17-year-old girl who hopes to become a brain surgeon.

See Front Cover

► BRAINS LITERALLY won a \$2,400 college scholarship for a 17-year-old girl, while the other top Westinghouse Science Scholarship in the Fifth Annual Science Talent Search went to a 16-year-old boy, whose science studies began in a vacant lot near his home. The winners are Marilyn Rohrer, 306 College Ave., Elizabethtown, Pa., and Jules Kernens, 5065 Oleatha Ave., St. Louis, Mo.

Portraits of the top winners are shown on the front cover of this SCIENCE NEWS LETTER.

Eight other high school seniors were awarded Westinghouse Science Scholarships worth \$400, while 30 received one-year \$100 scholarships.

Jules

Proving that science laboratories are where you find them, Jules Kernens, who won a \$2,400 scholarship, made an ecological survey of a three-acre lot inside the city of St. Louis in which he catalogued 245 different varieties of plants and animals in one month. Medical research also interests Jules and he hopes to help find the causes of cancer. In addition to his ecological survey in the vacant lot, he has experimented with white rats to study nutritional deficiencies, and

SCIENCE TALENT INSTITUTE
—Alternates for the \$2,400 scholarships are shown on the top row of the facing page: left, Stephen Arnold and right, Josephine Raskind. Center, Henry Wallace talks to a group after addressing a session of the Science Talent Institute. Second row left, Stephen Arnold, Marilyn Rohrer, Jules Kernens, and Josephine Raskind congratulate one another, Dr. Glenn T. Seaborg discusses new chemical elements with a group. The \$400 scholarship winners below are: Douglas Baird, Richard Lewontin, Gordon Newkirk, Abraham Schweid, Arthur Sicular and Harold Zirin. Photographs by Fremont Davis, Science Service staff photographer.

has published the results of some of his work.

Marilyn

Miss Rohrer, who hopes to become a brain surgeon, boasts a collection of carefully preserved brains from such animals as squirrels and dogs and even has a human brain carefully preserved for study. Jokingly called "the brain" by her friends, her interests are not limited to

science. She is a "hot" trumpet fan of the Harry James school. Her brain exhibit at the Science Talent Institute consisted of 33 different specimens weighing 80 pounds.

Alternates to the \$2,400 scholarships are two \$400 winners, Josephine Raskind, 16, 108-21 70th Ave., Forest Hills, N. Y., and Stephen Arnold, 17, 1128 Washington St., Oak Park, Ill., a student at Culver Military Academy.

A student of embryology, Miss Raskind conducted extensive experiments with small snails.

In his study of cosmic radiation by use of Geiger counting tubes, Stephen Arnold found that commercial tubes were too expensive so he built his own. He plans to continue his study of high energy particles.

Science News Letter, March 16, 1946

GENERAL SCIENCE

Science and Our Future

Military operations and scientific research are two different kinds of activity, and neither should be subordinated to the other.

By DR. E. U. CONDON
Director, National Bureau of Standards

Address given before the Awards Dinner of the Fifth Annual Science Talent Institute, March 5, 1946.

► WE ARE MET here tonight to do honor, not only to the 40 boys and girls who are the winners in the Fifth Annual Science Talent Search, but also to the thousands of boys and girls throughout our land and throughout the world, who are our hope for the scientific development of the future. You 40 are bright boys and girls. You are therefore intelligent enough to realize that you are fortunate. You know that there are plenty more of equal promise and enthusiasm back home where you come from. You know that your presence here does not mean that you are already "made" as scientists. You know that it simply means that you have shown yourselves worthy of the support and encouragement which Westinghouse Science Scholarships afford.

And you know that with this support you accept a responsibility to work for maximum self development, as creative scientists and good citizens.

The future of science in the world indeed need give us no concern if in every land the boys and girls of eager intelli-

gence comparable to yours will be sought out and given the opportunities for growth which await you. I have no fears for the future if we entrust it to free, inquiring, critical minds such as yours.

But, my young friends, there are quite a few of your elders gathered here tonight, and there are some things I want to say to them. The people of my generation, and those who are my elders, have made quite a sorry mess of the world in which you are going to have to live. I want to talk to them about some things we need to do right away—in the next few years—to make amends as best we can, while you are acquiring the background knowledge and technique with which you will make your contributions to science in the future.

Millions are dead, millions more are homeless, hungry and shivering, at the end of the worst war in man's history. In America we have been more fortunate, although even here we have war-born difficulties—there is, for instance, a serious shortage of women's stockings made of a particularly favored synthetic fiber!

The war's destruction far exceeds that of any catastrophe yet known. The war ended with the application of a new weapon that is a thousand times more frightful than the weapons which produced most of the war's frightfulness. And already we have responsible state-

ments from scientists who made this development, that bombs a thousand times more powerful than those already used are capable of being made in the near future. There are men living who know how to make a single bomb whose destructiveness is equal to a million ten-ton blockbusters. One such bomb, dropped on Washington or any other major city, may be expected to wipe out its population, to destroy its buildings utterly, and to render the site uninhabitable due to poisoning by radioactive materials.

In the face of this situation, people react essentially in one of two ways. The first kind say: "It's just another weapon. Mankind learned to adapt to the long bow, and the cross bow, and the B-29. We have always had wars." An extreme expression of this kind is found in a speech by Prof. Leslie A. White of the anthropology department of the University of Michigan, delivered in Philadelphia last December. He says, "As for the extermination of the human race as a consequence of hurling atomic thunderbolts, this too may be admitted as a possibility, and all we can say is that if it is to come it will come." This is indeed a rather coldly hopeless, fatalistic expression. Prof. White further says, "Extravagant expressions of horror will not alter the course of events."

There is a certain rhetorical trick here in that in our language, "extravagant" connotes exaggeratedly inaccurate and thus emotionally detracts from the serious warnings which responsible physicists are trying to give us. Now I would agree that expressions of horror *alone* will not alter the course of events. But I insist that if we look at what civilization has suffered in World War II, even before the atom bomb, and couple it with the picture of a war with plentiful use of the old-fashioned one hoss shay atom bombs, and further with the picture of a war with both sides equipped with the really potent 1950 models—then, I say, no expression of horror of which our hearts are capable can be exaggerated or extravagant. I say we need not and should not fatalistically await death, reading papers to an academic society, meeting in a museum in Philadelphia.

The second kind of people react differently. We say, this is the end. Mankind has brought down suffering and death on its head, spiritual values have been destroyed, hatreds have been nourished and developed into great social cancers by war, and the war fears, and the war suspicions and divisions among men.

This has been going on since the beginning of time and will surely destroy us all if we let it continue. This second kind of people say simply that this must stop. We say there is such a thing as progress toward a higher level of development. With all the stumbling and fumbling, we see an upward trend throughout human history. We read the lesson of history to be that men can go forward together, and that men can progress to new freedoms, and new areas of social adjustment.

We see that man's growing mastery over the forces of nature also serves to amplify the magnitude of the social crises which confront him. Centuries ago, wars were local affairs. However, terrible, they affected only relatively small sectors of civilization. But the last two major wars were world wars in a true sense. Their damage literally affected everyone. We face a situation in which a future world war, employing atom bombs, in rockets guided by radio, and many other marvels of man's perverted ingenuity, will achieve a destructiveness thousands of times greater than ever achieved before. The magnitude of the crisis is such that we must soberly think of the choice as being between drifting into a war which will lead to the destruction of civilization, leaving a remnant of stunned, confused, poverty-stricken, frightened men and women amid the ruins,—or a wholesome healthy development of a united mankind, using its intelligence cooperatively for the good of all.

I beg of you, cast in your lot with the persons of the second kind—the people who believe there is a possibility that men throughout the world can live in freedom and justice, in love and goodwill, that they can devote their full energies to constructive application of the rational thinking to call science to the arts of peace. In asking you to join with us, I make no promise of certain security. I only promise hope, and tell you that the other way leads to certain doom. If we try to establish the brotherhood of man on earth we may fail, but if we do not even try we shall surely fail, and what an unbearable load of guilt our consciences will then have to carry.

So much for the generalities of the situation in which we find ourselves. Now, if I may, I would like to comment a little more specifically on the immediate choices which lie before us.

We must assert ourselves in every kind of agency of world cooperation toward positive wholesome working together for human welfare. This means the fullest kind of active support to the efforts of

peoples everywhere to go forward, in political and economic freedom, to the highest level of educational, scientific and cultural achievement. This means specifically support to UNO, UNRRA, and UNESCO and whatever other such activities lie ahead.

We must particularly seek to bring about closer working relationships with our friends and allies, the Russians. Russia and the United States are today the most powerful nations in the world so unless we can get along together, there is no hope for peace. We must seek to recapture something of the feeling of joy and pride we had in being on their side, after Stalingrad and during their long, arduous drive to push the Nazi war machine out of their devastated lands. We must welcome their scientists to our

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Westinghouse Science Scholarship Winners

GRAND SCHOLARSHIPS OF \$2,400

Rohrer, E. Marilyn, Elizabethtown, Pa.
Kernen, Jules Alfred, St. Louis, Mo.

ALTERNATES

Raskind, Josephine Baron, Forest Hills, N. Y.
Arnold, Stephen Reynolds, Culver, Ind.

SCHOLARSHIPS OF \$400

Raskind, Josephine Baron, Forest Hills, N. Y.
Arnold, Stephen Reynolds, Culver, Ind.
Baird, Douglas Page, Whitesboro, N. Y.
Lewontin, Richard Charles, Forest Hills, N. Y.
Newkirk, Gordon Allen, Jr., West Orange, N. J.
Schweid, Abraham Isaac, New York, N. Y.
Sicular, Arthur, New York, N. Y.
Zirin, Harold, Bridgeport, Conn.

ALTERNATES

Roemer, Elizabeth, Alameda, Calif.
Hummel, James Alexander, Los Angeles, Calif.
Gall, Walter George, Garfield, N. J.

SCHOLARSHIPS OF \$100

Jackson, Dorothy Jean, South Charleston, W. Va.
Jones, Elaine Carlota, Mill Valley, Calif.
Karasz, Ilonka, St. Albans, N. Y.
Kingman, Alice May, Eugene, Oreg.
Kohnen, Dorothy Margaret, Chicago, Ill.
Laufer, Elizabeth Ursula, Villanova, Pa.
Lines, Joan Louise, Syracuse, N. Y.
McMillin, Patricia Ruth, Boulder, Colo.
Roemer, Elizabeth, Alameda, Calif.
Bush, Leon Reginald, New York, N. Y.
Champeny, John Charles, Wellington, Kans.
Cudaback, David Dill, Napa, Calif.
Cumming, James Burton, St. Albans, N. Y.
Durell, Jack, New York, N. Y.
Gaines, George Loweree, Jr., Hamden, Conn.
Gall, Walter George, Garfield, N. J.
Gibson, James Benjamin, Ellensburg, Wash.
Herbert, Donald Edmonds, Jr., Tulsa, Okla.
Hopkins, John Taylor, IV, Washington, D. C.
Hummel, James Alexander, Los Angeles, Calif.
Johnson, Russell Dee, Jr., Granite City, Ill.
Kindig, Neal Bert, Medicine Lodge, Kans.
Larson, Daniel Herbert, Downers Grove, Ill.
Ludwig, Gerald Wilbur, New York, N. Y.
Sack, Seymour, Poughkeepsie, N. Y.
Seely, Gilbert Randall, Blaine, Wash.
Shields, James William, San Francisco, Calif.
Shombert, Donald James, Pittsburgh, Pa.
West, Robert C., Jr., Upper Montclair, N. J.
Widing, Kenneth Gordon, Brainerd, Minn.
Judges: Dr. Steuart Henderson Britt, Dr. Rex
E. Buxton, Mr. Watson Davis, Dr. Harold
A. Edgerton.

laboratories, as they have welcomed ours to theirs, and extend the base of scientific cooperation with this great people. Of course we must behave this way toward the scientists of all nations—I only mention Russia because she is right now the target of attack by those irresponsible who think she would be a suitable adversary in the next world war.

We must regain for all scientists that freedom from military domination which is so necessary if science is to be used for

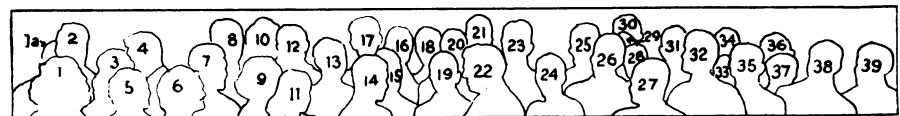
peaceful ends. With Nazism not wholly exterminated, we must have scientists contributing to the development of our tools of war, since, God forbid, we may, if all else fails, have to use them. But the scientific life of the country must not be subordinated to, nor derive its chief support from, the military.

This is essential in the interests of the military themselves. Because the scientific spirit is so completely opposite to the military spirit, science simply will not go forward under domination. Nowadays men must work together in large organizations. It is characteristic of the military organizations that operations are planned and directed from the top, with the details executed by men below, by persons who unquestioningly and obediently respond to the orders given them from above. The flow of original thinking is from the top to the bottom. I conceive just the opposite to be true in a properly administered scientific organization. The function of a scientific director is to set up working conditions where the lowliest novice is put in touch with all the problems in his field and en-

couraged to worry about them and to come out creatively with new ideas and results. He is the sole judge of what knowledge he needs in order to work effectively on his problem. The flow of original thinking in this case is mainly from the bottom to the top.

Every worker must have access to the whole story because no one can foresee which scientist will have the truly creative idea. And each scientist must be free to discuss his ideas, while in the formative state, with his colleagues anywhere, for it is from the working together of many minds that new science comes.

In contrasting the military and scientific, I do not wish to imply that one is wholly wrong and the other wholly right. Just as I do not recommend the military procedure for the conduct of scientific research, neither would I want our safety to depend on the outcome of a battle in which the scientific method of free discussion, independent thinking and mutual criticism was followed by all the captains and lieutenants on the battlefield. Military operations and scien-



VISIT TO CAPITOL—The group of winners met the President of the Senate, Hon. Kenneth McKellar. They are: 1 Kingman, 1a Widing, 2 Herbert, 3 Raskind, 4 Durell, 5 Roemer, 6 Kohnen, 7 Gaines, 8 Zirin, 9 McMillin, 10 Hopkins, 11 Karasz, 12 Champeny, 13 Lewontin, 14 Newkirk, 15 Larson, 16 Bush, 17 Cudaback, 18 West, 19 Sack, 20 Sicular, 21 Johnson, 22 Hon. McKellar, 23 Shields, 24 Jones, 25 Baird, 26 Hummel, 27 Schweid, 28 Lines, 29 Shombert, 30 Seely, 31 Ludwig, 32 Arnold, 33 Rohrer, 34 Kerner, 35 Cumming, 36 Gall, 37 Laufer, 38 Gibson, 39 Jackson.

tific research are two quite different kinds of human activity and neither should be subordinated to the other.

Of course my reason for stressing this point is that right now we are confronted in America with a situation in which scientists are being held very strictly under military domination, to the severe detriment of our scientific development and the development of wholesome international relations.

What is going on? Prominent scientists are denied the privilege of traveling abroad. Physicists are not allowed to discuss certain areas of their science with each other, even as between individuals working on closely related phases of the same subject. They can only communicate through official channels, involving censorship of their communications by army officers without knowledge and so without competence. Information essential to understanding is being denied to students in our universities, so that, if this situation were to continue, the young students we honor here tonight will get from their professors only a watered-down army-approved version of the laws of nature.

In this connection one is reminded of the Holy Scriptures, where in the 18th verse of the 8th chapter of Ecclesiastes we read,

"Wisdom is better than weapons of war; but one sinner destroyeth much good."

The laws of nature, some seem to think, are ours exclusively, and that we can keep others from learning by locking up what we have learned in the laboratory and not telling it to our allies. Later they will learn what we know and more besides, which because of our unfriendly behavior, we cannot expect them to tell us. In the course of time, because of such provocations, we are allies no more—we start as friends and end as snarling, suspicious neighbors.

It is sinister indeed how one evil step leads to another. Having created an air of suspicion and mistrust, there will be persons among us who think other nations can know nothing except what is learned by espionage. So, when other countries make atom bombs, perhaps much better than those we have, these persons will cry "Treason" at our scientists, for they will find it inconceivable that another country could make a bomb in any other way except by aid from Americans.

Let us cast this isolationist, chauvinist poison from our minds before we cor-

rode our hearts and arouse suspicions of our motives in the minds of the decent peoples of the world. Let us cooperate wholeheartedly with the other nations of the world to agree to use atomic energy only for peaceful purposes and to set up an inspection system to enforce such agreement. The United Nations Assembly has unanimously voted to establish an Atomic Energy Commission to draw up such a plan. In the face of the frightfulness of atomic warfare, it is inconceivable to me that any nation will refuse to participate in a program of international cooperation and inspection. Yet, much public discussion, and even more private conversation, is based upon the assumption of such a refusal. We must push forward with all possible speed in order to find out where we stand in the world today so that it is no longer possible for different groups and different nations to base their thinking and their planning upon different hypotheses. I am confident that if we do this the outcome will be world friendship and cooperation, and not atomic war and the destruction of civilization.

In closing I would like again to quote Scripture, this time the New Testament, 17th verse of the 8th chapter of Luke:

"For nothing is secret, that shall not be made manifest, neither anything hid that shall not be made known and come abroad."

Finally, I want to read to you from a poem by Elizabeth Barret Browning, called "The Truth Is Whole":

"Use is the aim of Science! give again
A golden sentence to the faithful pen—
Dwell not on parts! For parts contract
the mind;
And knowledge still is useless when
confined,
The yearning soul, enclosed in narrow
bound
May be ingenious, but is ne'er profound:
Spoiled of its strength, the fettered
thought grows tame;
And want of air extinguishes the flame!"

My young friends, do not be depressed by my remarks. Go on, work hard, enjoy to the fullest the expanding view and the communion with nature which your study of science will bring—the while, I hope, we others shall join together in healing war's wounds, and making the kind of world in which your talents can have free play to develop wholesome applications to human welfare for all the peoples of the world.

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"The investigation which I conducted was manifestly of a preliminary nature, as it was impossible for me to study completely the hundreds of species of organisms found within the area. Nevertheless, I have proved that all of the axioms of bio-ecology can be demonstrated from the intensive study of an area no larger than three acres. In addition, I have learned the characteristic features of the flora and fauna to be found near my home. Finally, I have gained a clear conception of the method that can be utilized by the entomologist, parasitologist, or bacteriologist in conquering our numerous organic foes, such as certain species of insects and bacteria. Perhaps it is too optimistic to hope that, some day, man, aided by the knowledge gained from ecological studies, will be capable of eradicating all of the insects that devour his crops and transmit disease from organism to organism. Yet who is able to say what the scientist of tomorrow will be able to accomplish when we contemplate the recent unleashing of atomic energy?"—From the essay of Jules Alfred Kernén.

"The value of anesthetics to mankind cannot be overestimated. Besides making possible the wonders of modern surgery, they have enabled biochemists to use lower animals in the study of diseases and methods of surgery. Since the introduction of ether by Dr. Crawford Long, of Jefferson, Georgia, in 1842, scientists have been searching for the perfect anesthetic. I believe a great step forward was made toward this end when our scientists discovered the modern anesthetic, intravenous pentothal sodium, a barbituric acid derivative.

"My interest in this anesthetic is a direct result of my detailed study in the past year of all types of anesthetics. This study itself was in conjunction with my intense desire to study brain surgery, a desire I have had as far back as I can remember."—From the essay of E. Marilyn Rohrer.

Nylon fabrics are improved in handle and appearance by heat treatment; they become softer and more mellow.

When the high-frequency ultraviolet energy of a low-pressure mercury arc, such as that inside a fluorescent lamp, is used for killing bacteria and fungi it is called germicidal radiation.