Westinghouse Science Scholarships Winners

GRAND SCHOLARSHIPS OF $2,400
Lauer, Gloria Indus, Ames, Iowa
Schiff, Ray (Reinhart), New Rochelle, N. Y.

ALTERNATES
Lean, Elizabeth Ann, Shorewood, Wis.
Perot, Charles Poultney, IV, Lancaster, Pa.

SCHOLARSHIPS OF $400
Lean, Elizabeth Ann, Shorewood, Wis.
March, Virginia Ellen, Madison, Wis.
Harris, Donald Rosswell, Johnstown, Pa.
Kohl, Henry Hiram, Exeter, N. H.
Macy, Josiah, Jr. Concord, N. H.
Perot, Charles Poultney, IV, Lancaster, Pa.
Piper, William Weidman, Columbus, Ohio
Quermann, Thomas Richard, Clarksburg, W. Va.

ALTERNATES
Kunkel, Joan Lillian, Garden City, N. Y.
1st—Folger, Robert Lancaster, Winter Haven, Fla.
2nd—Peterson, Donald Penhallegon, Geneva, N. Y.

SCHOLARSHIPS OF $100
Cassidy, Judith Mary, Irvington, N. Y.
Ens, Catherine Clara, Dayton, Ohio
Foster, Elizabeth Jane, Oak Park, Ill.
Killingbeck, Marguerite Grace, Nyack, N. Y.
Kunkel, Joan Lillian, Garden City, N. Y.
Ronder, Joan Leslie, New Rochelle, N. Y.
Sawyer, Constance Bragdon, Bethel, Me.
Wojciechowski, Wanda Clara, Bridgeport, Conn.

Boop, Wayne Ellsworth, Matamoras, Pa.
Dickinson, Hillman, Independence, Mo.
Folger, Robert Lancaster, Winter Haven, Fla.
Fox, Joseph Milton, Philadelphia, Pa.
Gill, John Ellis, Las Cruces, N. M.
Green, Joseph M., Los Angeles, Calif.
Haftel, Howard William, Irvington, N. J.
Hammerle, William Gordon, Athens, Ohio
Kurfuerst, Leonard Charles, Philadelphia, Pa.
Lauenstein, Milton Charles, St. Louis, Mo.
McLoughlin, James Gray, Rome, N. Y.
LeLievre, William Boyd, Shaker Heights, Ohio
Mark, Robert Burton, Trenton, N. J.
Ortenburger, Arthur Irving, Norman, Okla.
Palombi, Robert Edmund, Chicago, Ill.
Pederson, Donald Penhallegon, Geneva, N. Y.
Rechtin, Eberhardt, Redondo Beach, Calif.
Robertson, Claron Atherton, Carbondale, Ill.
Rosenblatt, Murray, New York, N. Y.
Sargent, Charles Philip, Lakeville, Conn.
Strehler, Bernard Louis, Johnstown, Pa.
Willcockson, Roy, Tulsa, Okla.

Judges: Dr. Harlow Shapley; Dr. Steuart Henderson Britt; Dr. Harold A. Edgerton.

***SCIENCE TALENT INSTITUTE*—Alternates for the $2,400 scholarship are shown on the top row of the facing picture page: left, Charles Perot and, right, Elizabeth Lean. Center, Dr. Edwin G. Conklin, addressing the Institute. Second row left, Surgeon General Thomas Parran with Gloria Lauer and Ray Schiff. At right is Dr. Hugh S. Taylor, Princeton, with some of the winners. Next row: William Piper, Virginia March, Josiah Macy, Jr. Bottom row: Donald Harris, Thomas Quermann and Henry Kohl.**

Gloria, 17, has assisted her father in some of his safety studies, and plans to study some branch of science in college. Music is, however, a major interest for her. A violinist, she won first place in a state music contest and tied for first place in a music contest sponsored by the Julliard School of Music, New York City. She has played in the Iowa State Symphony orchestra for five years. An artist as well, she won first place in a district American Legion Poppy Poster contest. But some of her talents are very practical; she can operate a simple lathe, drill press, and band saw. In her high school class of 159, she ranks first.

Science News Letter, March 13, 1943

ASTRONOMY

Stars Are International

By DR. HARLOW SHAPLEY
Director of Harvard College Observatory

Address before the Science Talent Institute.

➤ "I AM the little brother of the Sun," said recently a distinguished artist who works in the medium of stained glass windows. He went on to point out that without this cooperation of man and stars, of artist and sunlight, the contribution of stained glass to beauty and to the lift of the human spirit would be of little value.

When you listen to the radio you cooperate with a phenomenon of the natural world. You are working with the electric machinery in the earth's atmosphere. You use the radio roof to bring to you a voice from a great distance. When we utilize the radio we are the children of the ether waves.

The brotherhood of man and stars and atmosphere is interesting but it is not so easily appreciated as the association of man with other men in their efforts to learn about stars and atmospheres, or about plants, rocks, and man himself. I should like to discuss this world wide community of scientific effort, and show that world wide action is the most efficient way to advance in many of our intellectual enterprises.

Let's start with a total eclipse of the sun. Most of you have never seen one. You know, of course, that a total eclipse is one of the most stupendous natural spectacles that man can ever hope to see. But probably you and a total solar eclipse have not been in the same place at the same time. They are indeed so rare, and frequently so hard to get to, that we remain ignorant about many of the features of that remarkable upper atmosphere of the sun, called the corona, which flashes forth for a minute or two when the moon gets exactly between us and the sun and the total eclipse is in operation. It turns out, therefore, that scientists who seek knowledge of this upper atmosphere of the sun in the hope of finding more about its relationship with the earth, generally form international groups. The important narrow path of totality on the earth's surface may fall almost anywhere, without respect to nationality. Frequently most of the path is over the open oceans, or in the Arctic or Antarctic regions; frequently the path of totality crosses inaccessible mountain ranges, or goes through regions disturbingly rich in clouds and rain.

But if the eclipse path is at all accessible the scientists of a dozen countries are likely to be strewn along its path, with their elaborate specialized instruments for the study of the solar corona and other eclipse phenomena.

Astronomers from twenty nations observed the total solar eclipse of 1936 which passed from Southeastern Europe across Russia, Siberia, all the way to Japan and the open Pacific Ocean. Methods of observation were intercompared before the eclipse, and the results intercompared afterwards. Men of half a dozen different nationalities sometimes cooperated in a single eclipse camp.

In recent years there have been important eclipses in Sumatra, Brazil, Canada, Mexico, Peru, and Australia. Each one attracted scientists from many countries and thus helped to emphasize that science is international.

Some years ago a Swiss astronomer, working with American equipment on a total solar eclipse most suitably observed from Western Australia, provided another example of the internationalism of the various sciences. His main job was to make photographs of stars in the vicinity of the sun during the total solar eclipse in order to check the truth of the theory of relativity. The weather, by the way, was good; his very elaborate eclipse camera operated successfully, and the resulting photographs were highly important in establishing the correctness of the theory proposed by Einstein. He checked the deduction that light rays

will be bent when passing by a gravitating body like the sun.

I had feared that clouds would prevent his observations and that the expedition might be a loss. In order to be sure of at least some scientific returns, I prepared and sent to him some instructions about collecting insects in that somewhat unexplored part of the world, and sent him also some bottles of alcohol in which to preserve the specimens he might pick up. He was doubly successful—he captured both the corona on his eclipse plates and some rare ants in the alcohol. But some of the insects were practically identical with those that could be picked up in Asia, Europe, and America. They are cosmopolitan. They too ignore national boundaries.

The point we should make, however, is that when scientists start out to examine and understand the distribution and evolution of beetles, ants, butterflies, and the like, they will fail completely if they do not recognize the world wide significance of similarities and differences in animal forms collected from many continents and islands. All the great museums contain plants and animals from all over the world. The evolution of plants and animals in Darwin's English garden could not have been successfully studied without much knowledge of the animal and plant forms the world over.

We remember, indeed, that Darwin's great contributions to man's comprehension of the biological world was slowly developed by him *after* the famous voyage of the Beagle, which for two years sailed most of the seven seas in one of the famous demonstrations of the necessary internationalism of science and scientific scholarship.

Cooperation Is Simple

But I should return to my stars and tell you of some of the current examples of scientific cooperation. It is my hope that these illustrations, which could be multiplied many fold, will remind you that these stars of ours point out to the wise men of the East and West, of the North and South, that international cooperation is simple, in almost any field of science and probably not too difficult in language, in economics, and in political administration.

Recently the Royal Astronomer of England has made a new and accurate determination of the basic unit of measurement in the universe, that is, a determination of the distance from the earth to the sun. His result, announced a year ago, was based on a special campaign of observations and calculations carried on since 1931 by scientists from all continents, from most of the major countries now at war, from national and private observatories. Without such cooperation this distinguished step in pure science could not have been made. The cooperation was natural, it was easy. Why? Because the sun, stars, and planets are the same to all intelligent men; they are indifferent to trade barriers, to linguistic misunderstandings, to spheres of influence.

Our planet is too small, and our means of communicating with each other in thought, voice, or person, too quick and varied to permit us to be isolated, and insulated from other thinkers and doers. The earth has shrunk in size, relatively, because man's techniques of communication have expanded.

International Right

Occasionally all of you look at the stars. But probably none of you says to himself, "Those stars belong to my nation. Those planets are for my countrymen to investigate." Quite rightly you recognize that scientific exploration of the surrounding universe is an inalienable international right.

For example, some of the stars that in color and temperature are much like our own star, the sun, have been discovered to oscillate in brightness. The studies of these variations are scientifically important because they lead us to knowledge of the structure of stars (like our sun), to knowledge of the structure of the chemical elements (like hydrogen, oxygen, iron) with which we are in continuous association in the day's work. Most important of all, these variable stars guide us to that high adventure of tracing the steps in evolution throughout the universe.

To follow the oscillations of the light, color, temperatures, and motions of these variable stars that are scattered all over the northern and southern skies, requires skillful and continuous work. You may be interested to hear that variable star observation is carried on in all countries of the world, and that much of it is done by amateur scientists—astronomers young and old for whom the watching of the stars is the hobby, the private-time joy and chance to serve in the ranks of those who fight against darkness.

One large and active organization of amateur astronomers has its headquarters at the Harvard Observatory, where we have men who can teach the beginner, directly or by mail. We receive the rough observations and prepare them for publication. We analyze the results, provide star charts, select new objects for observation.

These are not wholly American amateur and professional astronomers in the Variable Star Association. Our reports on the behavior of the stars come from all over the world. Especially active are observers in South Africa, in Australia, in India, Italy, the Argentine, Mexico, and Canada.

Some variable stars in fact could not be well followed, their secrets not learned, if it were not for the wide distribution of observers.

The variable stars have not only promoted a practical international cooperation among the scientists, but they have also helped to break down barriers between professional and amateur. Among the active observers in the Variable Star Association are some of the leading scientists at the greatest of the American observatories; and along with them are inspired "hobby" men and women from many fields. A retired minister, an insurance broker, a famous Arctic explorer, a garage mechanic, many housewives, a bookkeeper, a lawyer, a jeweler, the man who drove the locomotive on the Pittsburgh to Chicago express — these are the types of people who have broken the barriers that surround their ordinary jobs and begun to reach for the stars.

A few weeks ago a nova, or new

"The progress of science has not been based upon a moment's inspiration but has been slowly and carefully built, piece by piece, by patient and tireless investigation. A classic example lies in Edison's search for a suitable filament for the incandescent light bulb.

"Few if any great inventions have been perfected in a 'flash.' New ideas concerning aviation, housing, sources of energy and power, synthetic materials such as plastics and rubber, and a hundred other things must be nurtured until full maturity and practical usefulness is realized.

"In the frame of science is focused the future of mankind, the course of nations, and the destiny of civilization. Unless a balanced program is followed, science could well become the master rather than the benefactor of mankind. It is the task of youth today to accept the responsibility for the progress of science. Youth will accept the challenge!"

—From the essay of Gloria Lauer.

"For progress in any direction, it is necessary to establish a system free from war or the threat of war, and free from tyranny and oppression anywhere. For civilization to advance to its highest peak, that progress must not be hampered by national boundaries which cut the bonds of cooperation, intellectual as well as material. At the end of this war we will have the greatest opportunity in history to organize the world along sound scientific lines which will make possible a just and permanent peace. Our generation thus has before it the most difficult task and the most thrilling challenge ever to face mankind. If we fail, humanity will be doomed; but if we succeed, as we will, we shall usher in an era of prosperity beyond our wildest dreams. For man will conquer nature by conquering himself."—From the essay of Ray Schiff.

star, suddenly appeared in a southern constellation. Its explosive rise to first magnitude glory was followed by a rapid decline. Many kinds of observations were immediately needed. Nova Puppis, as it is called, needed to be watched carefully, and continuously measured as it wavered in light, because analysis of the explosion could much increase our scanty knowledge of exploding stars and their consequence in the general problem of the setup and operation of the stellar universe.

The nova was first reported to us by radiogram from the Argentine. A little later, in a roundabout way, a telegraphic report came in from southern Germany. The new exploding star was independently found also by a cook on a mountain in California, by a keen-eyed observer in southern Canada, although the new star was just barely visible before dawn from his far northern location. It was also discovered by a worker in a New York factory, while he waited for the train to take him to his early morning work.

From the Harvard Observatory we announced telegraphically to as much of the world as we could reach the appearance of the exploding star and within two weeks we had accurate observations from half a dozen countries. The analyzing spectroscopes of the great American observatories closely followed the fading star as it changed from equality with our brightest naked eye stars to invisibility. A month after the discovery was announced there came to us in Cambridge, Massachusetts, numerous photographs and spectrograms of Nova Puppis made by a Greek astronomer in the Orange Free State in South Africa.

How clear it is that the stars are international.

The Northern Lights are studied in the United States, Canada, Russia, Sweden, and especially in Norway. The shooting stars, commonly called meteors, are the friction flashes of dust particles and small rock fragments flowing into our atmosphere from interplanetary space. They certainly are not *national* in any sense. They come, night and day, in all latitudes and longitudes; millions of millions strike the earth every day, although only a fragment are near enough or bright enough or swift enough to be seen, and then mostly at night.

Thus it appears that whether we are charting stars, chasing the solar eclipses, collecting meteors, or recording the variations of stars, sunspots, and Northern Lights, the astronomers are also friendly little brothers of the Sun. We are so readily in cooperation whenever any tough problem comes along that we wonder why all of the children of the ether waves, whatever their national affiliations, cannot overlook the trivialities and rise to the dignity of a world wide manhood.

Science News Letter, March 13, 1943

MEDICINE

Physicians Need to Know How the Viruses Grow

By DR. ELEANOR BLISS

Johns Hopkins School of Medicine

Excerpt from address given before Science Talent Institute.

➤ THE SULFONAMIDES are not effective against animal parasites; nor are they of any use against the viruses —except for two. This is too bad. We can get along with what we have in the way of antiprotozoal drugs but something is needed badly for virus diseases. The drugs are deficient too in respect to bacteria. There are two or three species which are insusceptible. This is trying to the doctor who wants to cure an infection caused by one of the recalcitrants but it adds zest to the study of the drugs. It would be dull if they were perfect. Look at how much more fun physicians are having pointing out the bad effects of the sulfonamides than in describing the cures! Aside from adding spice, however, the fact that there are sulfonamide resistant bacteria is scientifically interesting.

The current concept of the mode of action of the sulfonamides is that they interfere with the action of certain bacterial enzymes—the digestive juices so to speak. So, if a bacterium is resistant, it must mean that it has a different enzyme setup from the other, susceptible, bacteria. I believe that the same hypothesis serves to explain why these drugs are ineffective against animal parasites and viruses—these germs grow by means of mechanisms which are quite different from those by which bacteria grow. If we could find out what that difference is—and we already have a good deal of information about bacterial metabolism—if we could find out how viruses grow, we could perhaps devise a chemical which would be to them what sulfanilamide is to bacteria.

That is a problem which will probably still be waiting for you when you have your PhDs and MDs. If I've made it sound simple don't believe me. It's a honey.

Science News Letter, March 13, 1943

MEDICINE

Cancer Cells Marked By Uncontrolled Growth

By WARREN H. LEWIS

The Wistar Institute of Anatomy and Biology

Excerpt from address made before Science Talent Institute.

➤ THE MOST important characteristic of cancer cells is their uncontrolled growth in the body. All normal cells are subject to rigid control throughout life. The unknown mechanism which keeps normal cells of different types from multiplying beyond their proper limits seems to have no effect on cancer cells. They behave like new species of cells for which there is no control mechanism.

Here at the very beginning we encounter a great fundamental phenomenon, still unsolved, yet this control mechanism extends throughout the entire realm of biology and is of the utmost importance for the understanding of the behavior of cancer cells.

It may be secretions something like the hormones, which have so much control over the reproductive system, are given off by the metabolic activities of many other types of cells and have something to do with the maintenance of the proper size of the various organs and tissues of the body.

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