

BIOLOGY

The Biological Future

By DR. EDWIN G. CONKLIN

An address before the Science Talent Institute at Washington being attended by 40 winners of the Second Annual Science Talent Search competing for the Westinghouse Science Scholarships. Dr. Conklin is President, American Philosophical Society, and President, Science Service.

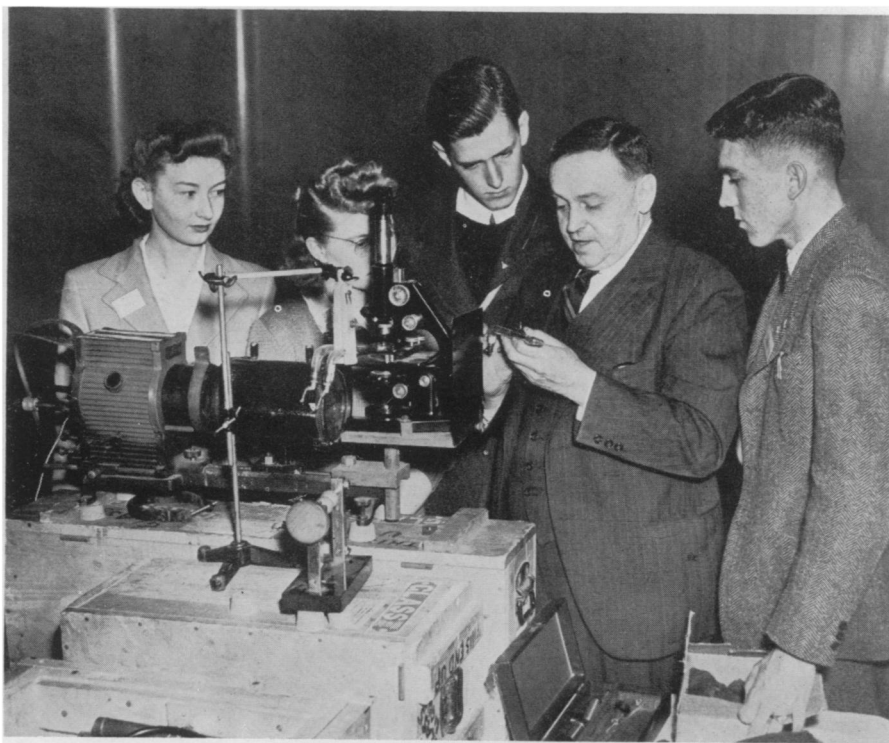
FIRST OF ALL I want to offer my congratulations to you future scientists of America, to the "Forty Immortals." I don't know how it happened that the organizers of this enterprise fixed upon the number *forty* to be selected. They may have had in mind the *Academie francaise*, founded more than 300 years ago, whose membership is always limited to the "Forty Immortals." At least the selection of forty out of thousands shows that you are a highly selected group. But lest you may get the big head it is well for you to remember that most of you won by a rather narrow margin. The judges have had difficulty in separating the sheep from the goats, many of them look alike and you may be one of those.

I must also remind you that any future distinction in science that you may win will be based on hard work. When I was a schoolboy we practiced penmanship in copybooks, in which we copied some twenty times on a page some famous saying or maxim. One of these maxims which I have never forgotten, and which I hope you may take to heart is this: "There is no excellence without great labor." Louis Pasteur, whom the people of France have rated greater than Napoleon, and of whom Sir William Osler said, "He was the most perfect man who ever entered the Kingdom of Science," once said in an address to young persons: "I do not think that I have ever spoken for the first time with a student without saying to him, Work perseveringly. Work can be made a pleasure, and alone is profitable to man, to his city, to his country—If work should be the very life of your life, if the cult for great men and great things should be associated with your every thought, that is still not enough. Try to bring into everything you undertake the spirit of scientific method, founded on the immortal work of Galileo, Descartes, and Newton,"—and as a biologist I add, "of Pasteur and Darwin."

The purpose of science is to understand and control as far as that is possible the phenomena of nature. The kind of science that aims to *understand* is called *pure science*; that which aims at *control*, *applied science*. In the midst of war the world is more interested in applied than in pure science, but all applications of science are based upon the results of pure science. I heartily sympathize with an admirable article by Professor P. W. Bridgman of Harvard, published in *Science* for February 12, in which he points out the mistake of supposing that the chief aim of science is material success in war or in peace. We have all heard the maxim, "Science is power," and many think that it is fame and wealth. These may result from its applications, but pure science has a larger usefulness; it not only makes possible the applications, but it satisfies the human

craving to know, and it broadens the minds and ennobles the characters of the searchers for truth.

But I am requested to bring you some message from the science of biology, the science of life, rather than of death, of peace, rather than of war. Biologists have not been drawn in large numbers into the technical services of war. The colleges and universities have been stripped of many of their physicists, chemists, engineers, even mathematicians, but the biologists have been left to teach medical students or have been used in scientific studies of agriculture, health, and nutrition. Biology is in times of war less applied than these other subjects, but it is no less important. Nothing concerns man so much as understanding life,—his own life and that of animals and plants. The great lesson of evolution is not that we are descended from monkeys, (which we are not) but the fact that all life, that of plants, animals and men, is fundamentally alike. So we study the cells of *Ascaris*, the heredity of *Drosophila*, the effects of X-rays or colchicine on *Datura*, and a thousand other worthless animals



GERM KILLER—Dr. Harvey C. Rentschler, director of research of the Lamp Division, Westinghouse Electric and Manufacturing Co., is shown demonstrating to a group of Science Talent Search winners the effectiveness of ultraviolet light in killing bacteria. Left to right are shown: Catherine Clara Ens, of Dayton, Ohio, Gloria Indus Lauer, of Ames, Iowa, Henry Hiram Kohl, of Exeter, New Hampshire, Dr. Rentschler and John Ellis Gill of Las Cruces, New Mexico.

and plants, not because we are interested in them, but because they all have applications to man.

It was suggested that I talk to you on the Biological Future. Well, this speech is behind us and all the future is before. Predictions are always precarious and almost all the "Sensational Science" of which the newspapers and the public are so fond, is the science of the future, the prediction of things to come. A few years ago an enterprising publisher issued more than 100 booklets on the future of everything from electricity to swearing. I am not going to add to this too long list of prophecies. But you are going to be leaders in science; some of you are going to be leaders in biology. What opportunities will biology offer you for the increase of knowledge? I shall list only a few fields where there is great need of more knowledge.

Opportunities Ahead

1. Which one of you will be the Darwin of the future to discover the unknown factors of evolution? It is generally recognized that some great factor, perhaps as great as Darwin's Natural

Selection, is still undiscovered. Biology is today in much the same position that physics was in before the discovery of radio-activity. Who will be the Madame Curie to find the missing element?

2. Who will be the Pasteur of tomorrow to discover the causes of cancer? This great discovery may come from a biologist, as Pasteur's discoveries in the biology of infection and immunity came from a chemist. Several years ago the Director of the Crocker Cancer Institute said to me, "We are waiting for you biologists to give us a lead."

3. Who among you will be the Morgan of the future to find out how the genes, those inheritance factors in the chromosomes, direct the development of a plant or animal or man. We know that they do direct this development, but the manner of their action is largely unknown.

4. Finally, who among you will be the

Columbus to sail the uncharted sea between the living world and the lifeless one. This has been the great unknown, by some thought to be unknowable, but recent discovery of viruses, bacteriophage, and things so small that they go through the finest porcelain filters, seem to bridge this gulf between the living and the lifeless. The new electron microscope offers one means of transport into this newest world. Who will embark with the Admiral of this Ocean Sea.

I close with another quotation from that great scientist, Louis Pasteur, which has been inscribed on the walls of his tomb in the Pasteur Institute in Paris: "Blessed is he who carries within himself a God, an ideal, and who obeys it—ideal of art, ideal of science, ideal of the gospel virtues; therein lie the springs of great thoughts and great actions; they all reflect light from the Infinite."

Science News Letter, March 6, 1943

NUTRITION

Food Is a War Weapon

All major powers have nutrition problems. Government responsibilities in field increase. Fight food waste by eating what is on your plate.

By DR. M. L. WILSON

Associate Director in Charge of Nutrition,
Office of Defense Health & Welfare Services

Excerpts from Science Service's "Adventures in Science" program over the Columbia Broadcasting System during the Science Talent Institute attended by the 40 winners of the Second Annual Science Talent Search for the Westinghouse Scholarships.

► FOOD ALWAYS plays a dominant part in wars. It is a weapon, just as guns and ammunition, for men cannot fight when they lack strength to march. Nutrition, and through it, the ability to do a good day's work, is of the utmost importance in wartime. No country is free from problems of nutrition. All the major powers are concerned with it. In this country and Great Britain, however, much is being done to keep civilian, as well as armed-force strength in that state of well being that can only be achieved when the right food is eaten.

Developments in nutrition are paralleling those in sanitation. When people first heard of the germ-theory of disease, they began boiling their own water, watching their milk supply. Gradually

public sanitation developed and such matters became governmental responsibilities. For some time, well-informed people have been watching their eating habits, but recently groups and nations have come to recognize their responsibility for promoting good nutrition. Great progress has already been made in the medical and public health fields through acceptance of nutrition.

It is up to each individual to learn what to eat for health and to put that knowledge into practice. Fight food waste by eating what is on your plate. Help the local nutrition committees plan for food conservation demonstrations. Help with home gardens and community canning projects.

These are not small things. These are large things, for it is only by adding all these small things together that we can build the large. One man does not make an army, but one man, plus another and many others do. So it is with nutrition and science. Everyone working at what he can do best, all of these added together to make the whole—that hastens victory, and gives us strength to build a better world.

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INSTITUTE SPEAKER—Dr. M. L. Wilson, associate director in charge of nutrition of the Office of Defense Health and Welfare Services, speaking on the *Adventures in Science* program from the Nutrition Luncheon of the Science Talent Institute.