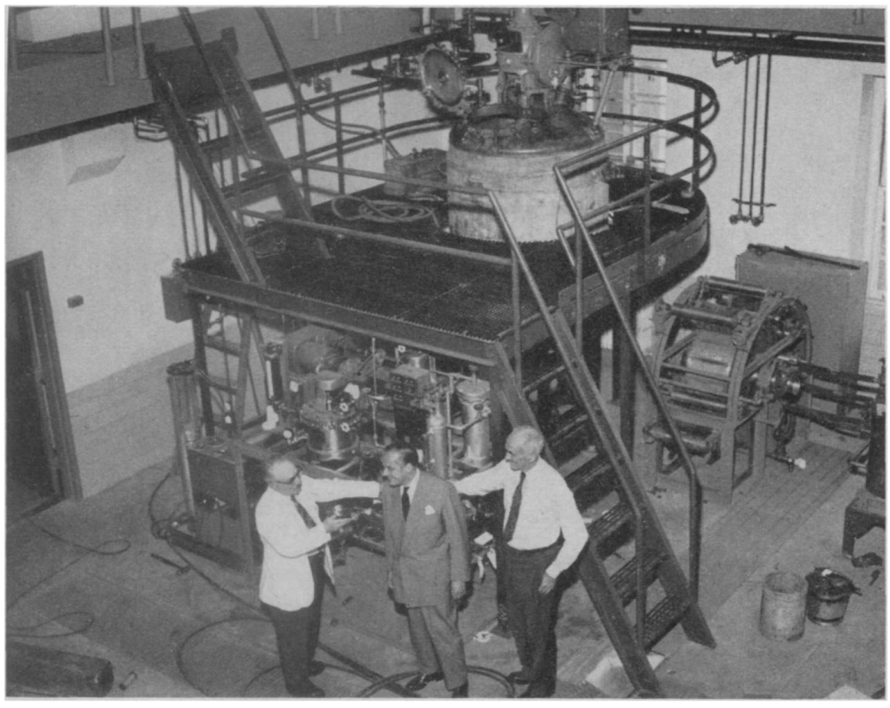

MICROBIOLOGICAL INSTITUTE—Dr. Selman A. Waksman, left, director, shows a visitor around the pilot plant room of the new Rutgers Institute of Microbiology. The visitor is Dr. O. Hubner of Copenhagen, Denmark. At the right is Dr. Adolph Zimmerli, honorary professor of microbiological engineering, in charge of proposed mass production experiments.

BIOLOGY

Institute for Tiny Giants

Microbes such as those that produced a giant among disease conquerors, streptomycin, will be studied in laboratories financed by that discovery.

➤ SOME OF the world's smallest living things have a new research institute devoted to them.

The new laboratories of the Institute of Microbiology at Rutgers University, costing approximately $3,500,000, have been financed by royalties earned by discoveries used in man's medical warfare against infectious diseases, principally tuberculosis.

Dr. Selman A. Waksman, Nobelist in medicine and physiology in 1952, is not only the builder and scientific spirit of the Institute, but is the scientist whose research brought about the discoveries in antibiotics that have made the Institute possible. The greatest of Dr. Waksman's discoveries to date has been streptomycin.

This "wonder drug" was isolated in September of 1943. However, the work which made its discovery possible had been under way in Dr. Waksman's laboratory at the College of Agriculture, Rutgers University, since 1915, when he undertook a comprehensive study of actinomycetes in soil.

This long and valuable work was aimed at specific agricultural and industrial problems linked with microbes in the soil, their role in the decomposition of plant and animal residues in nature, their activities in the production of composts, in providing the necessary nutriment for the growth of mushrooms, in the manufacture of enzymes, in the production of sulfuric acid, in the attachment of fouling organisms to ships' bottoms, in destroying steel pipes and other valuable industrial products.

Underlying all work in antibiotics is the discovery by early investigators that certain microbe varieties could destroy others.

Dr. Waksman had formally explored this phenomenon in its application to human disease in 1932 when, under a grant from the National Tuberculosis Association and the National Research Council, he undertook to study the fate of tuberculosis germs exposed to the action of the microbes present in soils and in water basins.

He also made a detailed study of the interrelationships of microbes in the soil and, as expressed by a famous university president, "led microbes in battle against one another."

In 1939, he sharply altered the line of his former investigations and set to work on the isolation and development of microbial species that would aid treatment of infectious diseases in man and animals.

His early experience with salvarsan, the 'magic bullet" of Ehrlich, gave him a background for this point of view. The outbreak of war helped make his decision, as did the success of a former student and protege, Dr. Rene J. Dubos of the Rockefeller Institute, in developing tyrothricin.

Dr. Dubos, who came to the U. S. from France and was trained at Rutgers under Dr. Waksman, contrived the unbelievable feat of actually training a microbial strain to exist on pneumonia germs as food. This resulted in the isolation of *Bacillus brevis,* which produced in the laboratory gramicidin and tyrocidine, combined under the name of tyrothricin.

Dr. Waksman set himself two specific problems. One was to find microbes capable of destroying pathogenic (dangerous) microbes without harmful effects upon the tissues of the host, namely the human and animal body. The other was to find microbes with the power to produce antibiotics that were capable of interfering with the growth of and destroying the hard, waxy, water-repellent, walled microbe that causes human tuberculosis.

Penicillin was rediscovered in England during the progress of these experiments and showed great power against some of the major disease germ enemies of mankind. One of streptomycin's early predecessors of the same general family, namely streptothricin, showed promise in affecting the half of the microbial population, the gram-negative organisms, that penicillin did not touch.

From the beginning of his work in 1915, Dr. Waksman had taken particular interest in a variety of microbes known as actinomycetes. His work with this particular group of organisms is probably one of the longest continued investigations by a single individual upon a research project.

When his new line of investigation began, he quite naturally used as laboratory material those organisms upon which he had worked so long. Back in 1915, he and R. E. Curtis, an assistant of Dr. Jacob Lipman, isolated from several soils an organism which they identified as *Actinomyces griseus.* From a strain of this organism, now known as *Streptomyces griseus,* came the miracle drug streptomycin.

A year after the work on antibiotics began in 1939, the first important result evolved. It was actinomycin, derived from one of Dr. Waksman's old friends the actinomycetes, an organism named *Actinomyces antibioticus.*

It had remarkable properties to destroy microbes, but was almost as efficient at destroying living animals. Although actinomycin could reduce the size of the spleen, which led recently to the study of its effect in Hodgkin's disease, it was put aside because of its toxicity.