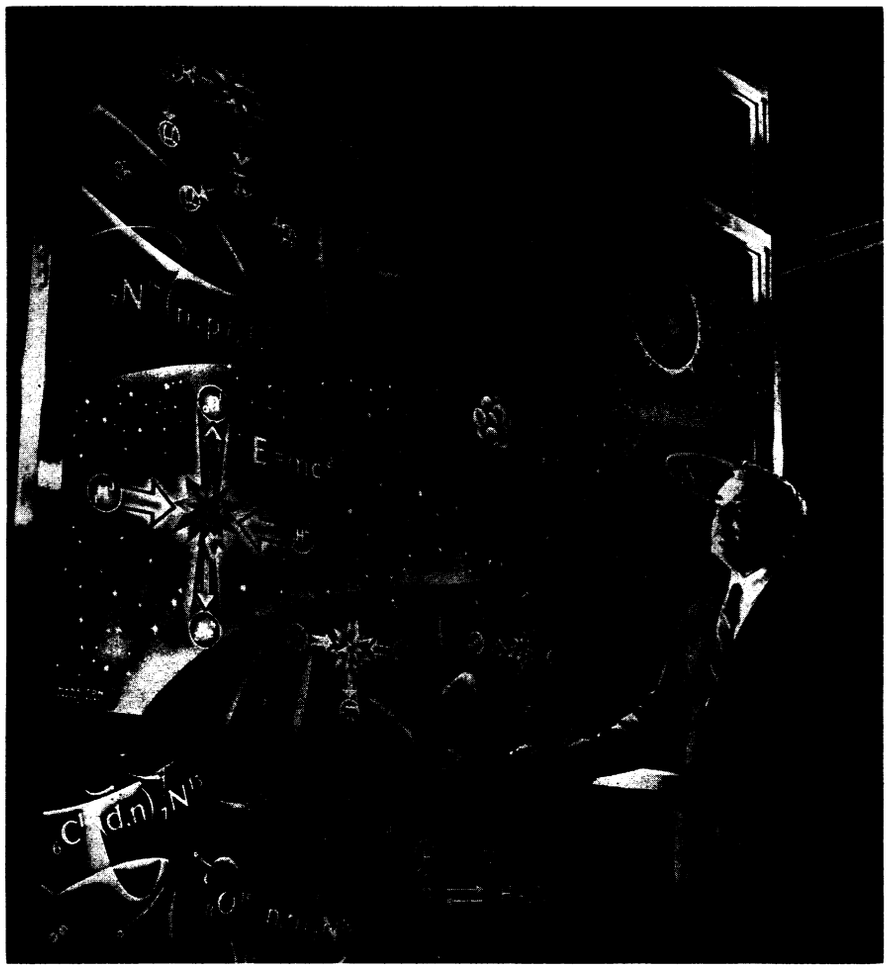

SCIENTIFIC ART—The huge glass panel shows the flow of energy from the sun, storage within an atom and ultimate release in nuclear reactions. It is installed in the new administration building of the ACF Industries Nuclear Energy Products Division, Buffalo, N. Y., which will be formally opened in early February. The panel was done by Tony D'Attilio and is being inspected by Rudolph Ferrer of Nuclear Energy Products Division.

MEDICINE

New Wonder Drugs Near

➤ NEW wonder drugs have been put within reach of scientists by the knowledge of how penicillin goes about its life-saving job of destroying bacteria.

The powerful antibiotic works by stopping the formation of the hard protective wall found around bacterial cells, Dr. James T. Park, Germ-free Animal Research Unit, Walter Reed Army Institute of Research in Washington, and Dr. Jack L. Strominger, Washington University School of Medicine, St. Louis, Mo., report in *Science* (Jan. 18).

If further scientific evidence proves their theories, it will open the way for laboratory creation of drugs that can stop bacteria from growing enough to be dangerous.

Earlier studies have shown that penicillin-loaded bacteria fail to finish growing. Somehow the drug stops the cell from generating its hard outside wall. This wall is needed to protect the fragile, membrane-enclosed cell body, Dr. Park states.

Inside the cells that had been inhibited with penicillin, Dr. Park found an increasing amount of the material used by the cell to form its outside wall. For some reason these cell wall materials were not being used up in the normal way, and more and more of them were backing up inside the cell itself.

"Although much of our evidence is circumstantial, it appears that a certain enzyme is needed to convert these materials into cell wall components. It is this enzyme's action that is probably interfered with when penicillin is added. The logical place for the enzyme to exist is in the membrane that surrounds the cell."

Two experimental findings seem to bear out these conclusions. One is that cells treated with penicillin are known to bind the antibiotic within the cell membrane, and the other is that the amount of backed up cell wall material is about the same that would normally be used by the cell for making its wall.

Penicillin combined with the cell membrane material seems to disrupt the action of the enzyme, since cell wall materials are not passed through the membrane as they normally would be, Dr. Park reports.

It is now known that there are two or three biochemical structures in the cell wall that are unique to bacteria. Since they do not exist in animal tissue, it may be possible to develop chemical analogues to them (compounds which inhibit their use) that would be non-toxic to humans.

These might be useful as new antibiotic-like drugs that could be synthesized in the laboratory, he says.

Science News Letter, February 2, 1957

ENGINEERING

Neutrons Are Used to Take Pictures of Atoms

➤ A METHOD of taking pictures of atoms, faster and more sensitive than previous techniques, has been devised by scientists at Westinghouse Electric Corporation in Pittsburgh.

Because neutrons instead of X-rays are used, the method promises to be particularly valuable for studying organic crystals, which comprise about 90% of all the known substances on earth.

All organic compounds contain hydrogen atoms that are not easily "seen" with usual X-ray methods.

The technique will also reveal the crystal structure of many thousands of different materials, including magnetic ones, that are now either impossible or impractical to analyze by X-rays. The neutron "picture-taking" method was developed by Dr. K. H. Sun and Miss Frances Pecjak of Westinghouse in cooperation with Dr. W. O. Wollan of the Oak Ridge National Laboratory, Oak Ridge, Tenn.

They discovered how to make the neutrons show up on photographic film, obtaining the first neutron powder diffraction patterns ever known.

Neutrons instead of X-rays are beamed through the material to be analyzed. In passing through it, the neutrons are scattered or diffracted by the atoms just as X-rays are, then allowed to strike a special fluorescent screen placed next to the film.

The screen is made by embedding a phosphor in a thin layer of glass or plastic that contains boron atoms. When the neutrons smash into the boron atoms, powerful atomic particles are released that cause light flashes on the screen. It is these flashes that are recorded by the photographic film, giving an exact picture of the diffracted neutrons.

This technique shortens exposure time as much as 100 times.

Science News Letter, February 2, 1957