Second of a series

RESEARCH ON THE

Jesuit scientists at the Manila Observatory study the solar region for detailed data which have local as well as international significance

CURVED "FIERY" RANGE IS ACTUALLY AN ARC OF SOLAR EXPLOSIONS RECORDED IN THE SPECTROHELIOGRAPH. THIS

STANDING on a rock-basin foundation, facing the bronze statue of St. Ignatius of Loyola on the campus of the Ateneo de Manila, is a cylindrical structure made of concrete and steel which houses a two and one-half ton machine designed to do what scientists call solar patrol.

Technically, the instrument is known as spectroheliograph. It could, of course, have been given some other name. For one thing, it contains certain unique features which make it the only one of its kind. But the three Jesuits who designed it — Deppermann, Hennessey, and Miller—never got around to giving it a distinctive name.

The actual construction, however, was undertaken by the American Optical Company, one of the world's biggest companies handling solar equipment. And shortly after it was installed, a certain Juan Bussolini, Director of the San Miguel Observatory in Argentina, flew all the way to the Philippines to copy the original blueprint of the Jesuit-designed instrument.

Viewed from the ground floor of the solar building, the white-painted vacuum tank of the spectroheliograph looks like a rocket cradled on a launching pad, ready to take-off. What it does, however, mounted on a single support, is to rotate as it follows the movements of the sun from day to day.

Solar photography

Actually, the machine — with the aid of special color filters — is designed for solar photography. Sunspots, for example, show up as dark holes. Twisted ribbon-like patches, on the other hand, are hydrogen vapors in the vicinity of the disturbed areas. Finally, the speckled, salt and pepper background, is believed to be gas burst which is subject to rapid change.

Solar cyclones, geysers, storms — not visible either to the human eye or direct photography using ordinary methods — are recorded in photos taken by the spectroheliograph.

The activities of Jesuit scientists at the Manila Observatory are as varied as the demands of their work require. Some may call them tacticians who study the fluctuations produced by the rising and setting of the sun. Others may regard them as explorers, equipped with radar, out to chart unknown solar regions. Still others may imagine them to be solar "spies" who receive radio signals from certain distant stars in Milky Way.

For, in addition to the spectroheliograph, they operate instruments like the Ionosondo which shoots upward short bursts of radio waves and detects the returning echoes from the upper atmosphere. The findings are plotted in the form of a graph on motion picture film.

Then they have the Riometer, a special sensitive receiver, which detects overheated electrical charges in regions from 60 to 250 miles above the earth. Severe magnetic storms, on the other hand, are detected by means of the Magnetometers.

Patience and vigilance

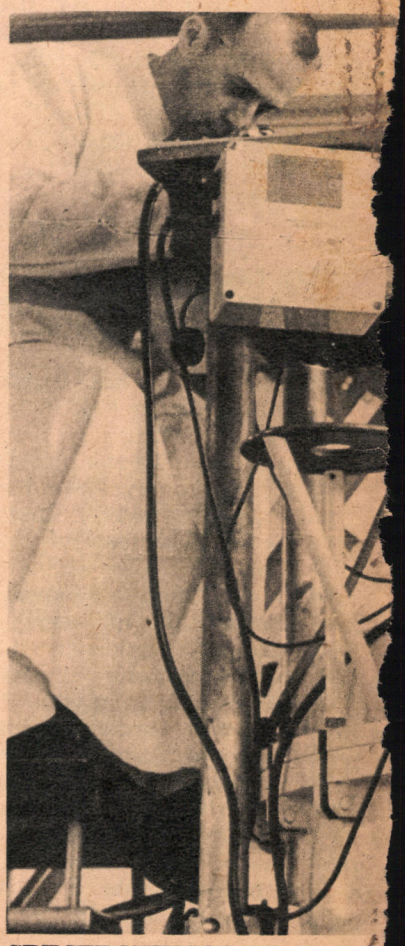
Some of the machines are operated automatically day and night. Other instruments, however, like the spectroheliograph require the constant vigilance of the researcher who may be mounted on a rotating chair for long hours, his back stooped, while his eyes are glued on the telescopic lens of a solar camera.

The main work of the Manila Observatory, however, has to do with the sun whose age is estimated to be about 500 million years — maybe more — and whose size is about 329,390 times that of the earth. (The sun is about 93,005,000 miles from the earth. It is said that a jet pilot going at 1000 miles per hour would require some 10 years of uninterrupted flight to cover an equal distance).

To be more precise, however, it is not so much the sun as the effects of the sun on the earth's upper atmosphere that is the subject of the research being conducted by the Manila Observatory.

Radio fadeouts, for example, may follow sudden ionospheric disturbances such as those revealed in the spectroheliograph as tongues of luminous gas. The actual fadeout may last for a few minutes to several hours. They may also occur in rapid succession. Cause of it all is what is known as solar flares or brilliant hydrogen explosions on the face of the sun.

Ionospheric storms



SPECTROHELIOG R A P H (above) has unique features

Then there is the so-called ionospheric storm which is believed to be caused by the sun when it expels "a great stream of ions and electrons