

will be carried out, especially during the equatorial and southwestern Pacific portions of the trip. The biological program will consist of plankton sampling throughout the cruise and of mid-water trawls and dredging for benthic organisms in the southwest Pacific and the Indian Ocean.

An earlier announcement of Monsoon's program and track, released in April 1959, indicated that a large portion of the cruise would be in the northwest Pacific and that no investigations would be carried out in the southwest Pacific. Monsoon Expedition, as now planned, includes much more extensive explorations in the Indian Ocean than had been formerly suggested. The northwest Pacific investigations proposed earlier will be carried out at a later date, possibly in the spring and summer of 1961.

Monsoon's investigations of the southern and central Indian Ocean will provide reconnaissance of part of the basin prior to the large-scale, multinational cooperative International Indian Ocean Expedition of 1960-64, proposed by SCOR. Monsoon will be Scripps Institution's initial contribution to that joint effort.

The program outlined here covers the 6-month period that provides the best chance for good weather throughout the cruise. Observations will be carried out along a track of more than 35,000 miles.

Monsoon will employ the newly converted research vessel *ARS-27*, using her auxiliary boat for seismic-refraction shooting, detailed sounding on stations, and exploration of shoal areas. Perhaps the *ARS-27* will work in company with a research vessel of another nation in the Indonesia-Australia region. The *ARS-27* will accommodate a scientific party of 23 to 25.

About 18 marine scientists, chiefly from Scripps Institution, will be needed to carry out the basic program. Thus there will be room, and facilities, for several visiting scientists from other countries or laboratories.

A tentative schematic track is shown in the figure. Suggestions for participation in the expedition are invited, and provision will be made for such participation in so far as time and ship's capacity permit.

Robert L. Fisher is coordinating the over-all Monsoon scientific program and will supervise the Indian Ocean investigations. George Shor, T. H. van

Andel, and Henry W. Menard will head the San Diego-Port Moresby, the Arafura Shelf, and the Wellington-San Diego segments of Monsoon, respectively.

X-Ray Picture of the Sun Taken from a Rocket

Most x-ray radiation reaching the earth is absorbed in the upper atmosphere, where it creates the belts of ionized air that make long-range radio transmission possible. The picture on this page, therefore, had to be taken from a rocket fired 130 miles into the outer reaches of the atmosphere. It shows the sun as our eyes would see it if they responded to x-rays rather than the longer wavelength radiation we call light.

A glass lens cannot be used to focus x-rays (the rays will simply pass through the glass unrefracted); the scientists, therefore, had recourse to the primitive pinhole camera, which has no lens at all. The camera works because only a single beam of light from each point on

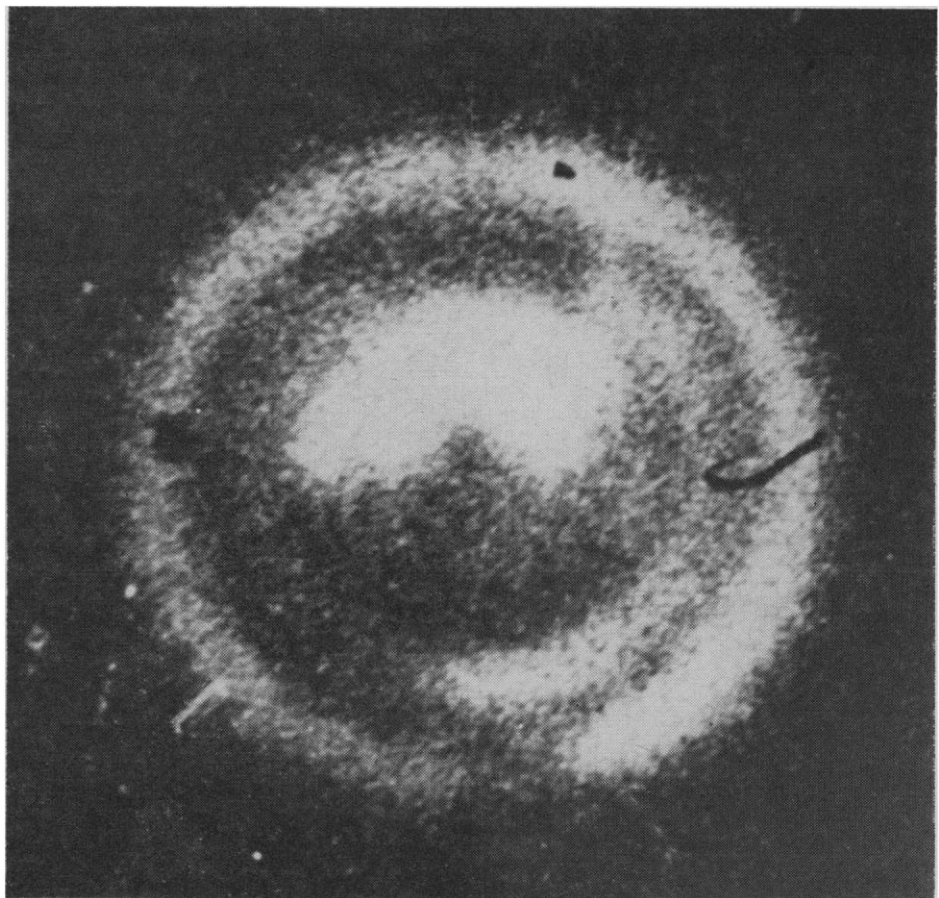
the object can pass through the hole, so forming a point-to-point relationship between the object and an image that is formed on a screen behind the pinhole.

In this case the hole was 0.005 inches wide, and an extremely thin aluminum film was used to screen out visible light, which would have blackened the film.

The picture shows that the principal source of x-rays reaching the earth is the low-density corona surrounding the mass of the sun. Immensely larger quantities of this radiation are produced within the sun proper. But most of these x-rays, except in the case of storms such as the one appearing near the center of the photo, are re-absorbed within the sun itself and not radiated into space.

The peculiar J-shaped marking and the small blotch at the top of the corona have been subjected to the scrutiny of scientists, who have decided that they are imperfections on the film.

The project was carried out under the direction of Herbert Friedman of the Naval Research Laboratory.



X-ray photograph of the sun, taken from a rocket fired 130 miles above the earth.