of the U. S. Naval Observatory have furnished valuable assistance in this project. Dr. John A. O'Keefe and Mrs. Rose L. Rowen of the Army Map Service had a large part in the work described.

1. *A. J.* **48**, 170, 1940.

*U. S. Army Map Service,
Washington, D. C.*

Nininger, H. H. Structure and composition of Canyon Diablo meteorites as related to zonal distribution of fragments.

It has long been known that all, with one or two exceptions, of the meteorites found on the slopes of the Arizona Crater rim have been small, mostly less than two pounds in weight, the average about one-half pound. It was equally well known that large specimens, ten pounds to 1000 pounds, had been found in various locations one to six miles from the crater pit and on all sides of it. It was also known that small specimens were often found in the outlying areas; but it seems that no one ever thought to compare meteorites from remote and the close-in locations as to structure.

By the help of a grant from the American Philosophical Society in 1947 the American Meteorite Museum has been making such a comparison. It finds that all specimens from the outlying points whether large or small show good clear Widmanstätten figures in contrast with some 200 small specimens from the crater rim that have been cut and studied during the past twenty-five years in nearly all of which the etching pattern had been destroyed by heat.

This is interpreted as an indication that the large meteoritic mass which produced the crater underwent a two-fold disruption—a shattering upon contact with the firm-textured limestone beds of the region and seconds later a true explosion in the depths of the crater. The shattering was facilitated by the irregular distribution of two brittle minerals, schreibersite and cohenite, neither of which are known to exist in terrestrial rocks. Both of these minerals are as brittle as window glass. Their brittleness occasioned the slivering of the peripheral zone with local discharge of fragments that were subjected to no great heat.

The material which survived the final explosion in the crater's depth was subjected to temperatures which altered their texture, obliterating the crystalline structure. These were thrown aloft in a nearly vertical position, their course being restricted by the surrounding high

wall of sediments. Consequently they fell near the opening of the pit.

*American Meteorite Museum,
Winslow, Ariz.*

Page, Thornton. The isophotometer—a new instrument for astrophysical use.

In studies of the solar corona, of polarization in the diffuse nebulae, and of the structure of all types of nebulae, it is often necessary to determine isophotes from astronomical photographs. The reduction of such contours of equal photographic density by standard methods is long and tedious, although a possible use of the Michigan direct-reading microphotometer for this purpose has been noted¹ and an obvious but uncontrolled high-contrast copying technique has been used.²

At the College of Medicine of the University of Illinois an instrument is being developed for viewing x-ray plates.³ Its principle of operation is briefly this: the plate to be examined is scanned in transmitted light by a television tube, the output of this tube is then amplified and “clipped” electronically to cut out high and (or) low plate densities in a controllable way, and the “clipped” output is fed into a standard television viewer, a cathode-ray tube, the screen of which can be photographed.

A preliminary test of this principle applied to a photograph of Messier 8 was made with the television equipment of station WBKB, Chicago, on Nov. 17, 1949, with the results shown in Plate I. The “clipping” control was by no means as sharp as desired in these tests; nevertheless the four photographs of the television screen at the top and right of Plate I show that sharp outlines can be produced at a controllable level of density on the original plate.

The Armour Research Foundation of the Illinois Institute of Technology has estimated that the development and construction of the first of these instruments will cost between \$10,000 and \$15,000, and that later models can be produced for medical use at \$3000 to \$5000 each. It is estimated that the resolution should be about 35 lines per millimeter over a circle on the photographic plate of a few centimeters' diameter, and proportionately less for larger areas. There seems to be no reason why the “clipping” cannot be made sharp enough to give isophotes accurate to a few per cent in intensity. The isophotes would be traced from photographs of the viewing screen like those in Plate I, and calibrated by standard wedge or sensitometer methods.