

there are more than 1,000 clusters of nebulae in the heavens, as compared with the twenty known prior to the survey. These clusters are great masses of stars and gas, some as far as 350 million light years away.



FIG. 2. The 'Big Schmidt' telescope.

But the most revolutionary discovery of all was made by Dr. Walter Baade, early in 1953. Working at Palomar, Dr. Baade found that, contrary to scientific belief, all stellar systems beyond the earth's own galaxy (the Milky Way) are twice as far away as previously believed.

The most distant galaxies visible through the 200" Hale telescope, Dr. Baade discovered, are two billion light years away.

What is the significance of this discovery? The observable universe has a volume eight times as great as believed, while its age is put at four billion years.

Almost daily new aggregations of stars and systems of stars, nebulae like the Milky Way, are discovered. Of the Milky Way itself much new information has been added. In shape it is now seen as a great flat wheel of stars, slowly spinning in space, with "arms" of stars, gas and dust spiralling off its rim.

The foregoing is but a microscopic fragment of new knowledge about the universe which the sky atlas has already revealed. Equivalent in size to about 20 very fat volumes, the completed sky atlas will comprise 1,758 photo-maps. The first section of the atlas is in the form of 14-inch unbound prints, totalling about 200 sky charts. Overall cost of one printing and handling only, and omitting all other expenses involved, will be about £ 712 (\$ 2,000) per copy. By 1959, it is planned, all sections of the atlas will have been printed and despatched to the hundred or so observatories which have ordered it.

With its aid, perhaps we shall learn how large creation really is. We may even learn whether the universe is of uniform structure, and whether it had a definite beginning in space and time? Perhaps, also, we may discover whether the universe will end one day, or simply go on extending outward endlessly into space.—UNESCO.

### ARIZONA METEORITE CRATER

**D**URING the summer of 1956, the Smithsonian Astrophysical Observatory sent an expedition to investigate the distribution of pieces of meteoritic material that are scattered through the mantle of soil surrounding the Arizona Meteorite Crater, the object being to determine more accurately the mass of the meteorite that made the crater and also the direction of its flight.

Estimates of the total mass of finely divided meteoritic material around the crater suggested that this is about 12,000 tons, but this figure is subject to some uncertainty. It is believed that about one-fourth of this mass may be terrestrial oxygen that combined with the meteoric iron after its encounter with the earth. In addition, there does not appear to be any way for ascertaining accurately the amount of con-

taminating material present. After taking into consideration a number of uncertain factors, it is believed that the computed mass of 12,000 tons may have to be reduced by about 10-20%.

It is suggested that the meteorite approached the earth from a south-westerly direction, and after the collision threw forward large quantities of meteoritic material to the position where it now rests. As no piece more massive than 2,000 lb. has ever been found, while thousands of pieces weighing a few ounces or less have been recovered, it is believed that the meteorite was shattered into fragments when it struck the earth, melting and evaporation accompanying this disintegration. The results so far provide no indication as to whether a large mass of meteoritic material lies buried in the crater.