compared with about 0.5 magnitude for the great cloud in Sagittarius, some four degrees away, which Baade has shown is undoubtedly the outer region of the bulge about the galactic center.

The infrared surface intensity of the central region turns out to be magnitude 19 per square second of arc, referred to the infrared brightness of an A0 star at the zenith, but the photographic brightness would be something like magnitude 24.5 per square second, more than 2.5 mag. or 10 times fainter than the darkest piece of blank sky in the neighborhood. Hence, to photograph the bulge with blue-sensitive plates would mean the detection of an addition of 10 per cent to the blank sky brightness superimposed also upon the star clouds in the foreground. The conversion of our red minus infra measures into international color excess of 2 mag. and thence to total photographic absorption of 8 mag. is rather doubtful, but it is evident that we are dealing with a very red region about the center.

Although a concentrated nucleus has not been found, it is believed that the central region of the galaxy has been outlined, because of its position, its form, and especially its color.

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Whipple, F. L. Meteorites and space travel.

Meteorites represent a potential hazard to a pressurized space vessel. Of fundamental interest is the value of the probability that the skin of the vessel will be punctured by a meteorite. In case this probability is appreciable the problem of protection from meteorites becomes important.

We shall assume: (a) That the space vessel travels in a part of the solar system where the meteoritic frequencies and velocities approximate those at the earth.

(b) That 4.5×10^7 fifth-magnitude meteors strike the earth daily and that the number increases by a factor of 2.51 per magnitude fainter (Watson).

(c) That (with Opik) the total kinetic energy of a telescopic meteor is 1/0.0006 the energy observed in the wave length region from 4500 to 5700 angstroms.

(d) That the penetrating distance of a meteorite into a solid is equal to (extreme assumption) the length of a right circular cone of 60° total apex angle the volume of which in the solid can be heated and melted by the total kinetic energy of the meteorite.

It follows that a spherical space vessel of 12 feet diameter covered with a $\frac{1}{4}$-inch steel skin will be penetrated by a meteorite corresponding to an eighth magnitude or brighter meteor at a rate of once in 50 years. Such a meteorite weighs approximately a milligram. For thinner coverings the probability increases rapidly.

Although the probability of meteor penetration is small, a simple protection can be provided other than by the avoidance of known meteor streams. Considerations of the conservation of momentum and energy show that when a meteorite collides with a sheet of thickness comparable to the meteorite's diameter the result is an explosion in which both the meteorite and the corresponding material of the sheet are vaporized and ionized at very high temperatures. Hence a "meteor bumper" consisting perhaps of a millimeter-thick sheet of metal surrounding the $\frac{1}{4}$-inch skin of the space vessel at a distance of an inch would dissipate the penetrating power of meteorites several times larger than one corresponding to an eighth-magnitude meteor.

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Whitford, A. E. Angular diameters of stars from occultations by the moon.

The occultations of four stars were observed with the 100-inch telescope of the Mount Wilson Observatory in the summer of 1946. The intensity variations as the diffraction pattern swept over the telescope were recorded by means of a multiplier phototube, cathode ray oscilloscope and moving film camera. The multiplier tube gave a much better signal-to-noise ratio than that of the 1938 apparatus[1] and permitted use of fainter stars. The stars, with their calculated angular diameters, were:

Star	Mag.	Spectrum	Ang. Diam.
ν Virginis	4.2	gM1	0″008
κ Virginis	4.3	gK2	.005
191B Ophiuchi	6.3	gK1	.002
44b Ophiuchi	4.3	A9	.0008

The diffraction maxima and minima for the two larger stars were less pronounced than those calculated for a point source; for the two smaller stars no significant departure from a point-source pattern was expected and none was observed. Preliminary calculations based on resolving the stars into equivalent doubles shows agreement with theory within the limits of observational error. In the range from 0″005 to 0″015 it seems possible to determine the angular diameters of stars within 10 per cent. This corresponds for a