THE EXTINCTION OF THE STARS

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Jun 05 2003
Edited Jun 23 2003

The damage from the aerosol operations has now curtailed one of the most ancient sciences, that of astronomy. The inspirations from the night sky no longer fully reign and humanity now accepts the deprivation of many divine rights, including the beauty of and the awe from the clear heavens.

Another study to impress upon us this loss has been completed, and it involves nothing more than the observation of the stars that are now visible under a "clear" and dark sky. From numerous sources[1,2,3,4,5,6,7,8,9,10], the stars that should be visible to the human eye under favorable conditions are approximately of the 6th magnitude, or slightly greater.

Observational tests have now repeatedly been conducted under the most optimum of conditions and in remote locations, and a maximum visible magnitude of approximately 3.5 to 4 has been commonly measured in this region. To translate this obscuration to a practical level, the following estimates can be provided[11]:

Under visibility conditions with a maximum magnitude of 4, approximately 400 stars are visible under the night sky. This appears to be the norm for current atmospheric conditions. In contrast, under the expected conditions of magnitude 6, approximately 6000 stars would be visible. This is the level of degradation that has now occurred within our atmosphere, in direct association with the criminal aerosol operations that continue to be conducted without informed consent. This damage has been caused, in large part, by the injection of massive amounts of particulate matter into the atmosphere by aircraft for more than four years.

The memory of a truly clear sky and night has already become a distant reality for most of us.

The details of this study will be presented below for those with an additonal level of interest. It will also be demonstrated that the limiting magnitude of the night sky can also be used to estimate daylight visibility conditions, and that these two perspectives are now in coincidence with one another.

Additional Notes:

The first helpful information concerns the definition of magnitude. The magnitude system is one of relative brightness, where a star that has a magnitude 5 times as great as another star will have a light intensity 100 times greater than that of the original star. A definition of magnitude can therefore be provided as:

$$x^5 = 100$$

where x is the ratio of light intensity from a magnitude increase of 1. A solution of this equation for x will lead to x = 2.512. This means, for example, that a magnitude 3 star will have a light intensity 2.512 times that of a magnitude 4 star. A star of magnitude 1 will have a light intensity 2.512 times 2.512, or 6.31 times that of a magnitude 3 star.[12] A increasing magnitude results in a decrease in brightness by this factor of 2.512.

The next item to discuss is the expected numher of stars visible at a particular magnitude. The following table of number of stars visible at a particular magnitude is provided[13]:

Magnitude	No. of Stars Visible
0	8

1	20
2	60
3	150
6	6000

A reasonable approximation to this table exists in the exponential form:

$n = 8 * \exp^m$

where m represents the magnitude limit of visibility, and n equals the expected number of stars visible. An estimate for the number of stars visible at the 4th magnitude is therefore $8 * \exp^4$, or approximately 400 stars.

The first test for visibility has been conducted on the stars in the constellation Ophiuchus, where it has been observed that the star Marfik repeatedly represents the limit of visibility by this observer under optimum conditions in remote locations. As one example, one of the many tests has been conducted on a moonless, "clear" night adjacent to the Rio Chama wilderness area in New Mexico. Marfik is located approximately 40 degrees above the horizon at this time of year at this location, and it is adequately separated from the reduction effects of the horizon.[14] Marfik has a visiblity of 3.8, and therefore a magnitude limit of 4 has conservatively been chosen for this study. Several other stars ranging in magnitude from 2 to 4 are available at the upper end of this constellation for comparison.

The second test conducted used binoculars as a cross check against the visibility limit achieved with the naked eye. It is possible to predict the upper limit of visibility achievable with an optical aid using the following relationship:[15]

$(\text{Area of optical aperture}_{2})^2$
______________________ = Light gathering ratio

$(\text{Area of optical aperture}_{1})^2$

In the case of the human eye, a reasonable estimate of the aperture is approximately 8mm.[16]

In the case of 10x50 binoculars, the aperture is 50mm. Therefore, the expected light gathering capability of the binoculars relative to the human eye is approximately:

$2 * (50^2 / 8^2) = 78.1$

The factor of 2 stems from the fact that two objectives exist within binoculars.

Solving for the expected magnitude increase that should be available with the use of binoculars, we have:

$2.512^{dM} = 78.1$

and this is solved with dM = 4.73.

This implies that the binoculars should allow us to observe a star at a limiting magnitude of approximately:

3.8 + 4.7 = 8.5

This estimate was subsequently tested on two stars in the vicinity of Spica under optimum conditions, and it was

found to agree extremely well with this expected limit. TYC5547-592-1 and TYC5547-612-1 are two stars immediately adjacent to Spica. TYC5547-592-1 is of magnitude 7.8. TYC5547-612-1 is of magnitude 8.8. It was found by direct observation with the specified binoculars that TYC5547-592-1 was barely visible and that TYC5547-612-1 was not. This test with an optical aid, in conjunction with that of the human eye, supports the assessment that the limiting magnitudes have been properly identified.

The latter part of this discussion concerns the use of the limiting magnitude as a means to estimate the visibility of the atmosphere as it is expected to occur under daylight conditions. The visibility of clear skies under normal conditions can be determined from a number of sources to extend easily from 90 to 120 miles[17, 18, 19]. Unfortunately, this also is no longer the case as has been previously discussed in other papers on this site.

We can begin the study of expected daylight visibility using star magnitudes with the relationship of light intensity and the extinction coefficient[20]:

$$I / I_o = \exp^{(-gamma * z)}$$

where gamma is the extinction coefficient, z is the visibility limit in kilometers, I is the intensity of light received and I_o is the intensity of the light at the source.

From the definition of magnitude, we can also extract that:

$$I / I_o = 2.512^{dM}$$

where dM represents the change in observed visible magnitude vs. the expected visible magnitude.

Therefore,

$$\exp^{(-gamma * z)} = 2.512^{dM}$$

or

$$gamma = (-dM * \ln (2.512)) / z$$

where in this case z represents the depth of the atmosphere in kilometers. The depth of the atmosphere, as related to astronomic effects and significance is stated[21] to be approximately 10 miles (90% of mass). Another source[22] states the characteristic depth of the atmosphere to be approximately 8.8km. The characteristic depth is that point at which the light intensity falls to a value of 1 / exp of the original value (~0.37). If we again choose to act in a conservative fashion of incorporating 98% of the mass of the atmosphere (vs. 90%), this would lead to an atmospheric depth of approximately 34.6km. (~21.5mi.). It would therefore seem reasonable to choose an average depth of significance for the atmosphere of approximately 15.7 miles (25.3km).

Now dM is defined as the difference between the measured and the expected magnitude of stars visible with the unaided eye under favorable conditions, or:

$$dM = M - 6$$

where M is the measured limiting magnitude of the visible star with the unaided eye.

Therefore an estimate for gamma is given as:

$$gamma = ((6 - M) * (\ln (2.512))) / 25.3km$$

which provides us with an estimate for the extinction coefficient as a function of the limiting magnitude.

With respect to daylight visibility, the limit of contrast (I / I_o) is commonly taken as 0.02[23]

This means that a relationship for daylight visibility can be estimated as:

$.02 = \exp^{(-gamma * z)}$

where z, representing the daylight visiblity in kilometers, can now be estimated as:

z_{km} = (- ln (.02) (25.3)) / ((6 - M) * ln (2.512))

or

z_{km} = 107.5 / (6 - M)

or a final approximate and usable relationship expressed in miles:

z_{mi} = 66.6 / (6 - M)

and in the case where M = 3.8 (as observed above)

z_{mi} = 66.6 / (6 - 3.8)

or

z_{mi} = 30 miles (estimated visibility - approximate)

which agrees quite well with the maximum daylight visibility that is now ever achieved in this high desert environment. This study, using conservative estimates, arrives at a value that represents a significant degradation in the expected daylight visibility of 90 to 120mi. The visibility is now often reduced to a value far lower than this estimate (~15 miles) when the aerosol banks drop to ground level.

This study can be used to demonstrate a level of coincidence between the light characteristics of both night and day skies as measured by direct observation, and the results reflect the significant damage from the aerosol operations that now impacts our atmosphere and planet.

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Stars

My little night lights
Are out.

I cannot see the holes in
The fabric.

I know there is a shining
Bright light

On the other side,

Hidden now, with blue mist
And grey.

Only in my dreams do I remember
The stars.

How do the Down Under
People navigate?

And what is left to
Wish upon?

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