‘Facet Designer’ - Newsletter 06

LOOKING AT THE ‘EDGES’

OBJECTIVE

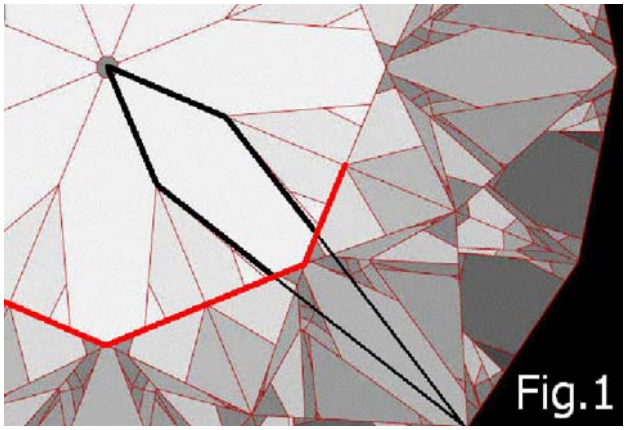
Usually we turn off ***Edges*** because we don’t want to see them when viewing the stone’s behavior in various lighting. But here we will look at them to see what they can tell us.

THE ‘RETRO-REFLECTOR’

Fig.1 shows a gem which is identical to the Tolkowsky diamond except that we have adjusted ***Max.Slope*** of the pavilion (break facets) to get 45° mains (red arrow). In Fig.s 1 & 2 we have selected only 2 reflections to simplify the study.

We have drawn the black outline of a pavilion main facet as you would see it through a flat-top gem (100% table), without distortion by refraction. However, this perfect view is disrupted when the table ends (heavy red line); beyond which this outline appears, distorted by refraction, in the crown main facet just above it.

Because the pavilion main facet slope is 45°, this outline is also that of the far pavilion main being reflected in the near one!



WITH A PRACTICAL PAVILION SLOPE

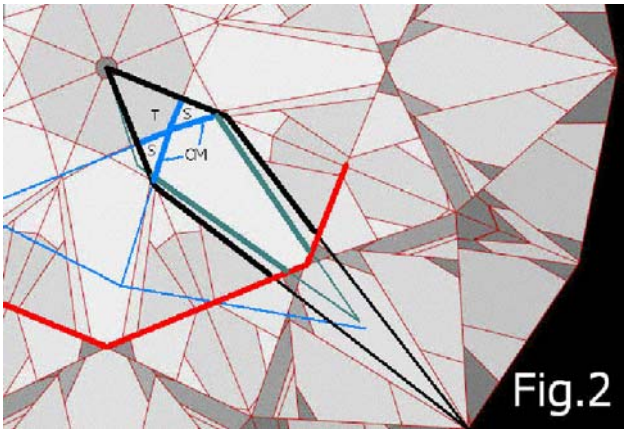
In Fig.2 we have the ‘ideal’ pavilion main slope of 40.75°. Again the direct view of the pavilion main is outlined in black and is undistorted until it reaches the edge of the table (heavy red line). The remainder appears distorted by refraction in the crown main facet just above it (this is the tip of the ‘arrow’).

The reflection of the opposite pavilion main, in the near one, is shown in green. Both ends of it disappear – the culet end because of the limits of the near pavilion main, and the girdle end because of the table edge.

The thin blue lines show the reflected outlines of the far crown main and stars as they would appear on the plane of the near pavilion main (via the far one) if it was large enough, and seen through the table if it was wide enough.

The area within all of these limits is the ‘shaft of the arrow’, which is black by certain viewing.

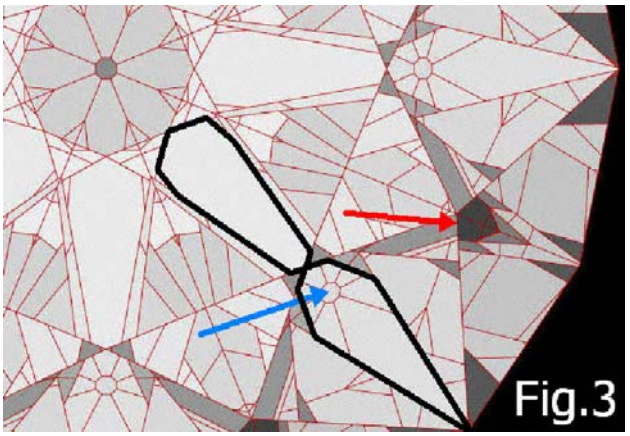
The culet does not show in the bezel – a criterion the author once used to define minimum table size, based on 2D-analysis.



3 REFLECTIONS

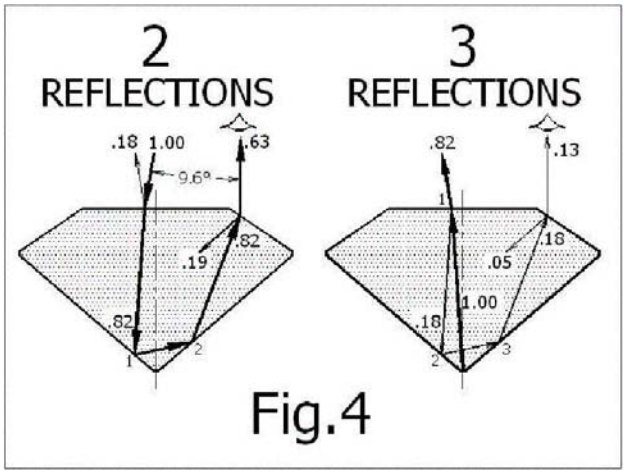
Fig.3 shows the same stone considering the first 3 reflections. The ‘arrow’, familiar in diamond, is outlined in black. The ‘black hole’ (red arrow) now has four parts; Newsletter 07 isolates the sources of this on the sphere.

. Now the culet appears in the bezel (blue arrow) but it is very faint in realistic images.



INTENSITY vs. EDGES

Intensity is not considered in showing edge reflections; the real image of the culet is barely noticeable because of its low intensity. Fig.4 shows that 2 reflections of the light source reach the viewer’s eye at 63% of source intensity, while 3 reflections show only 13% of whatever comes from the culet (which is only 15% of what originally entered the crown)



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