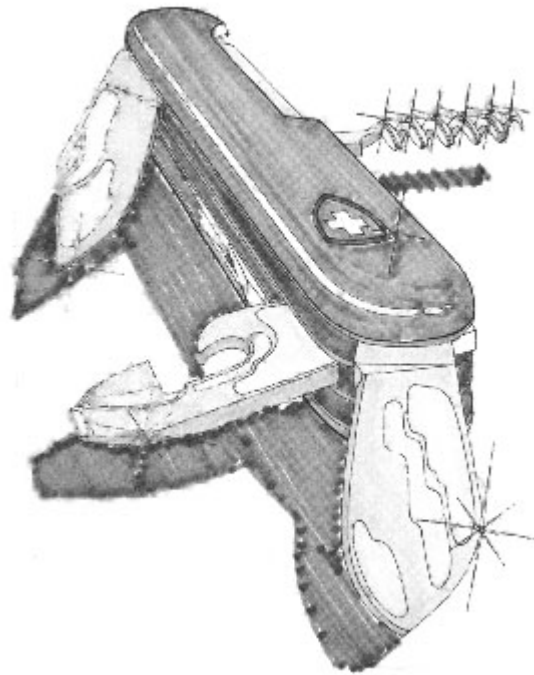


REFLECTIONS

I would like to illustrate an exercise how to work with reflections. This is one of the harder assignments to create to perfection as it requires a definite control of light. Let us start with the brief:

The art director has given you a sketch in which you can see a pocket knife with the knives and other bits open. There is a distinct shadow of the knives on the white background and the knives themselves will be highly reflective, the colour of the blade should be a very light grey, like silver, not totally white containing some detail if there is anything engraved on the blade.



After considering the sketch on the layout you can deduce the following:
The distinct shadow of the knife blade on the background indicates that we have to use a directional light, as only a directional light will create a distinct shadow.

The reflection on the knife blades is a different story, we will notice as soon as we put the directional light on the pocket knife that we have only a distinct shadow, but no reflection on the knife blades.

Therefore the reflection on the knife blades must be created by another light source, let us consider that after we have set up the light for the distinct shadow first. You may notice I have split this exercise in two parts, one is the light to create a shadow, the other one is the light to create the reflection. You have to work on **the main light first**, the one that creates the shadow.

Okay let us start the set up.

On a white background you place a pocket knife at the very front of the white background, do not place the knife in the middle of the background, it is always more useful to start a still life on a

white background front's edge, this way you can utilise the space behind the pocket knife more efficiently if required.

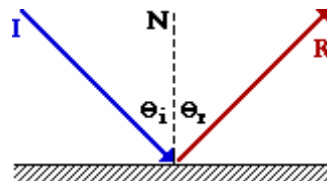
Have a look at our first photograph, this shows a distinct shadow, the colour red is preserved as in reality of the pocket knife, but the knife blades are black. The knife blades are black because they reflect something, in this case my walls of the studio are all black, and I have not placed anything around the pocket knife that is possible to reflect anything back, therefore the pocket knife reflects a black, nothing.



If we want to create a silver reflection, we have to make something white, so it is possible to be "seen" and reflected by the knives blade.

Let us digress a little and explain what light does. Light travels in a straight line, the angle of incidence is the same as the angle of reflection. To make light travel in a straight line we have to use a directional light source, a soft box scatters light in all directions and therefore creates a diffuse light source that has very little shadow effect.

See the following diagram of travel of light:



In the diagram, the ray of light approaching the mirror is known as the incident ray (labeled I in the diagram). The ray of light which leaves the mirror is known as the reflected ray (labeled R in the diagram). At the point of incidence where the ray strikes the mirror, a line can be drawn perpendicular to the surface of the mirror; this line is known as a normal line (labeled N in the diagram). The normal line divides the angle between the incident ray and the reflected ray into two equal angles.

The angle between the incident ray and the normal is known as the angle of incidence. The angle between the reflected ray and the normal is known as the angle of reflection. (These two angles are labelled with the Greek letter "theta" accompanied by a subscript; read as "theta-i" for angle of incidence and "theta-r" for angle of reflection.) The law of reflection states that when a ray of light reflects off a surface, the angle of incidence is equal to the angle of reflection.

So imagine that in the position of the letter I we have our camera lens, the dashed line at the bottom is our knife blade, therefore we can deduct that in the position of the letter R we have to have something white.

It is easy to place some material in that position that is white and see-through, the cover of a soft box will do nicely, or if you have a panel that has a translucent white material strapped over it you can use that panel in that position of the letter R.

When you just place that white translucent material in that position and look through the lens you will not get a white reflection, you may possibly see a faint dark grey. You have to make this very bright white by shining a light through it. If you use a soft box, you will not get the desired effect, the soft box will shatter its light in all directions and it will also travel downwards (and up and side wards...) towards the pocket knife and illuminate the pocket knife.

We do not want that light to get anywhere near the pocket knife, after all we have already established the exposure for the pocket knife with our what directional light in setup number one, see the first photograph.

The light to create the reflection has to be a separate entity that does not illuminate the pocket knife, it only has to create a very bright white area that the surface of the knife blade can reflect as a white colour. In order To do this effectively we place a focusing spot some distance away from the white panel in the position R.

We use a focusing spot or another very directional light to illuminate only the white cloth in that position. Perhaps you may even position a directional light source with a very narrow deep reflector upwards to reach the white panel, see my sketch. In both positions no light will reach the pocket knife.

To illustrate what the reflection looks like only on the knife blade without the first light source that created the drop shadow, see photograph number two.

The second photograph clearly illustrates that there is no light falling onto the knife at all, the white background is a deep grey, we can still see detail but not sufficient to create a well exposed pocket knife.



To finalise this exercise we will establish light readings, and this has to be done in this order:

- Take an **incident light meter reading** of the pocket knife with a directional light only that creates the drop shadow on the pocket knife. This is our "main light". An incident light meter reading will establish the correct aperture to see the pocket knife and a white background correctly exposed, to do this you aim the diffuser dome parallel with pocket knife, in other words straight up, do not point it towards the camera lens. The meter reading I got was aperture F11. This aperture of F11 establishes our mid grey point, our next light reading will establish the white reflection.
- Take a **reflected light meter reading** of the white panel in the position R. In order to create a white, not a grey panel, we have to over expose the white cloth by three stops. I will in brief explain this, an exposure of F11 of the white panel will make a grey panel, an

18 percent reflection as a light meter always meters for a mid grey. One stop brighter, F16, will create a lighter grey, 36 percent reflection. Another stop brighter, F22, will create an even lighter grey, 72 percent reflection grey. Another stop brighter, we are now three stops brighter, F-32 gives a very bright white, theoretically 144 percent reflection, something that does not exist but it gives you an idea it should be very bright. Just to make sure I was going to get a very bright white reflection on the pocket knife I gave it another stop, created with my light source (focussed spot) an exposure of F 45 in the reflected mode of the white panel. This light meter reading was only done in order to create the contrast ratio, I had to know the difference in contrast between black, grey, and white. Once I knew that F45 was measured in the reflected mode of the white cloth I knew that the knife would reflect a white, if it was a reflected light meter reading of F11, it would reflect a mid grey.

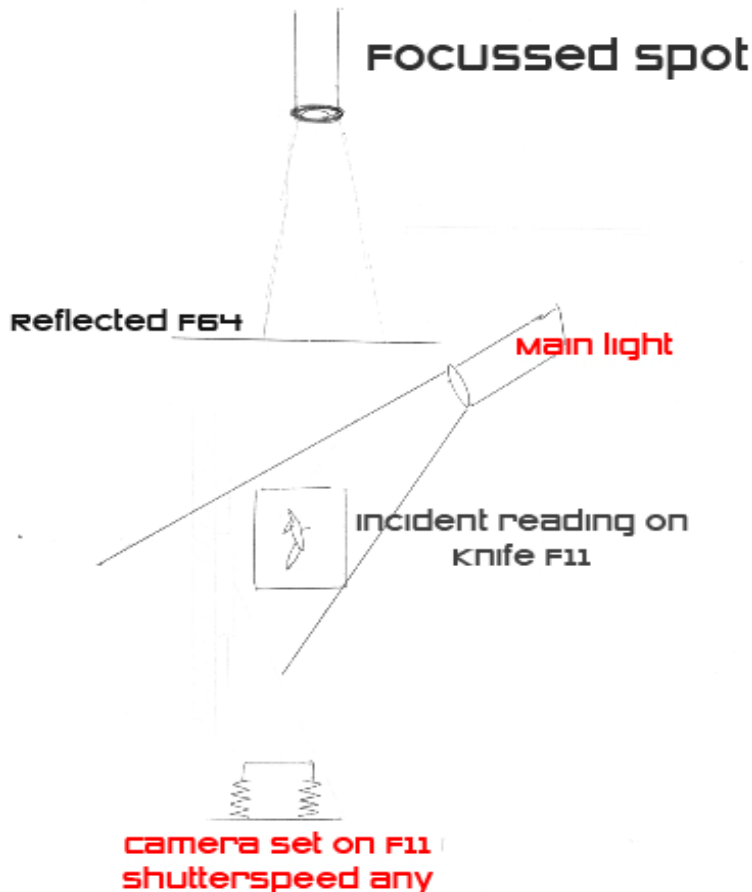
In other words you do not alter to the aperture that you have set on your camera, that stays on F11, that is the main light and the reading to see the pocket knife correctly, the second reading was purely done to work out the reflection value. Below is the photo of our 2 exposures combined:



The secret of working with reflections is the way you angle your camera and light – play snooker! You may think that when the panel is a few meters away from the pocket knife, the light from it will have to travel to the pocket knife and therefore it may be dimmer. But, and it is a BIG but, **we do not photograph the light reflection, we photograph the light source**, and whatever that measures in reflected mode does not change on any given distance because you are photographing the lightpanel (=lightsource=reflection!)

As you notice, the red surface also reflects some of the light from the white panel, thus the red is a little lighter.

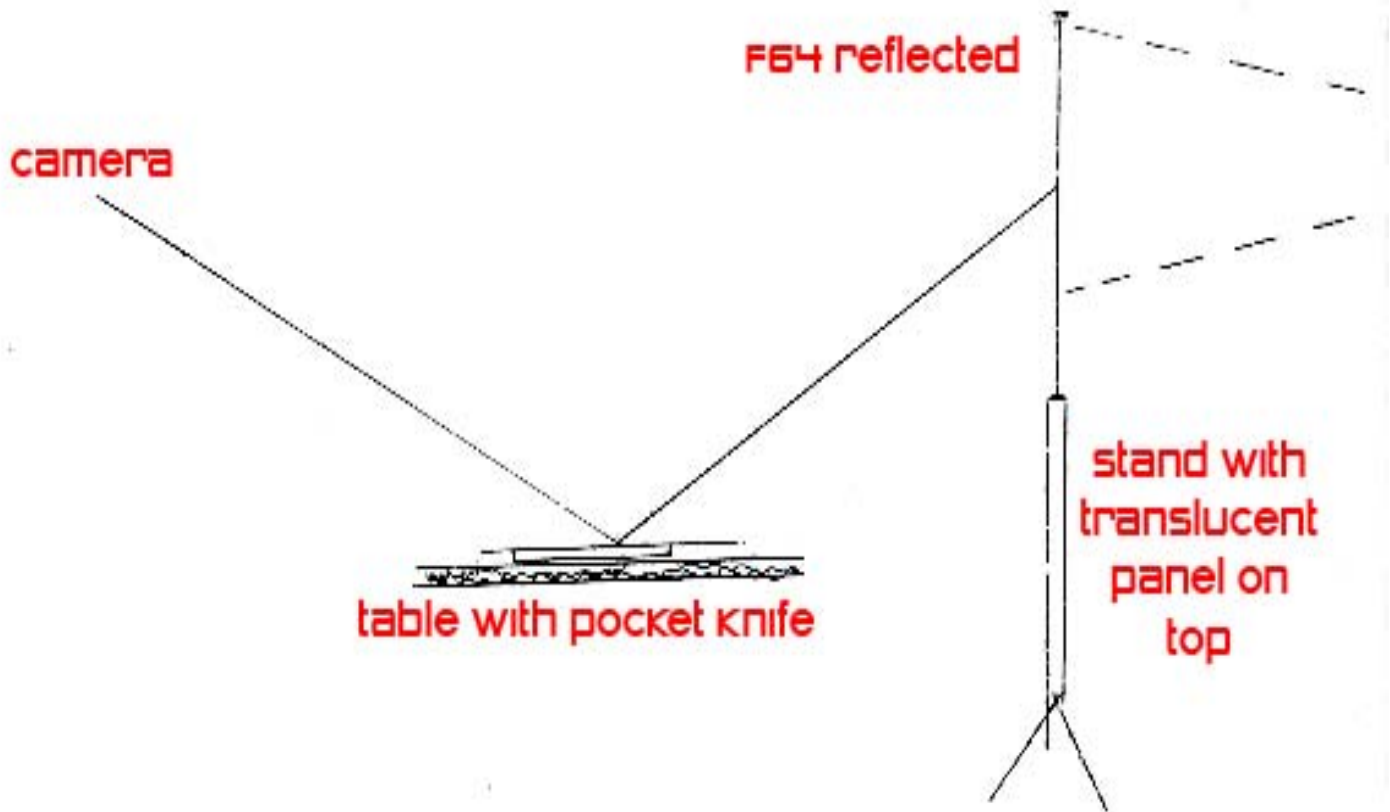
We could not eliminate the reflection on the red with a polariser filter as that would eliminate all reflections on the knife blades too!



The side view (see next page) of the set up shows the set up for the reflection. The light on the right came from a gobo or focussed spotlight and travelled almost straight out, slightly spreading out but not as much as my diagram suggests. It illuminated a circle of light on the translucent white cloth, big enough to be “seen” by the reflection on the knife blades.

The top view (see left) shows the position of the “Main light” and the reflection panel. The light reading of this set up governs the aperture setting on the camera. The shutterspeed is irrelevant because we use flash. As long as the ambient light is 3 stops (or shutter speeds) less than the reading set on the camera for the mainlight it (ambient

light) will not register. Please read my other articles about light readings to find more about my +3 and -3 system of contrast.....Hope you enjoyed this exercise, any suggestions appreciated!



Side view of set up, the distance between the panel on the right hand side was about 1.5 meters, the "gobo" was about 3 meters behind panel on the right.

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