Image Capture and Problems

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A reasonable [?]

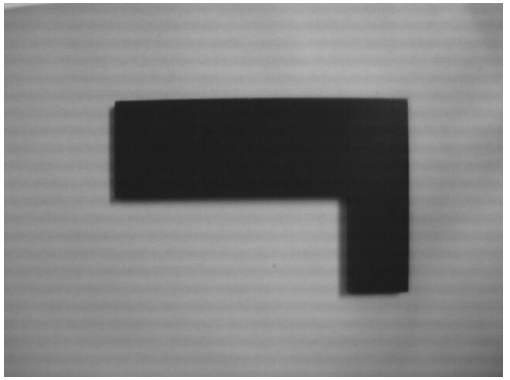

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Image Capture: Focus problems

http://www.cambridgeincolour.com/tutorials/depth-of-field.htm

Focus set to one distance, and other nearby distances in focus ([?] of focus). Further or closer not so well focused. Compare 'identical' lines.

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Image Capture: Shadow problems

False colour to emphasise the [?] location.
Often hard to separate from part.

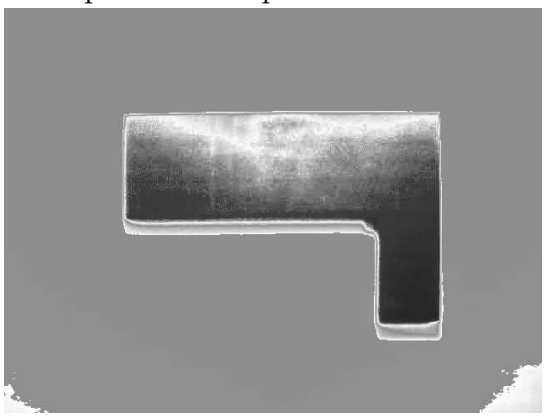

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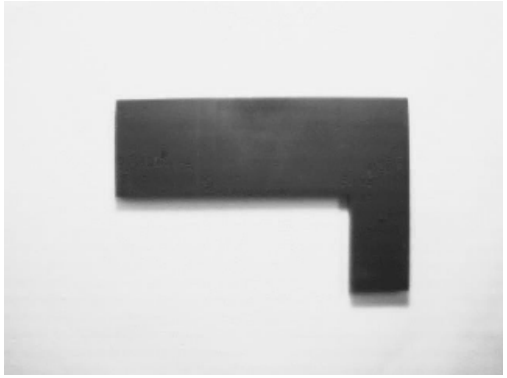
Image Capture: ? problems



Pixels clip at 255.

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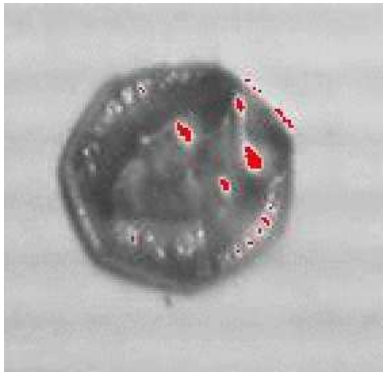
Image Capture: ?/highlights



Saturated pixels set to red.

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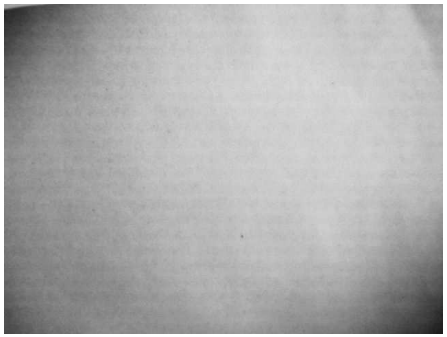
Image Capture: ? illumination



Contrast on background enhanced: may cause analysis problems.

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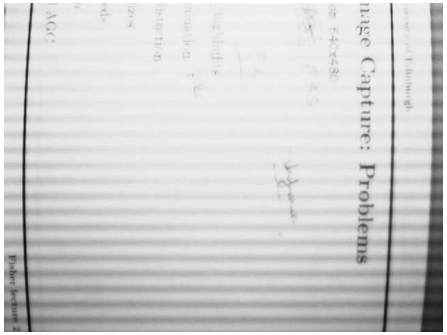
Image Capture: ? lens distortion



Note 'straight' lines at image edge. May make accurate measurements hard.

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Image Capture: Overcoming Problems

- **Shadows, specularities, non-uniform illumination**: increase ambient lighting by using light diffusing panels or lots of point lights
- **Depth of Focus**: use smaller aperture and brighter light
- **Motion Blur**: use shorter capture time and brighter light
- ? : use smaller aperture, reduce gain and adjust gamma

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- **Lens Distortion**: more expensive lenses, view from further away
- **Aliasing**: use incandescent lights

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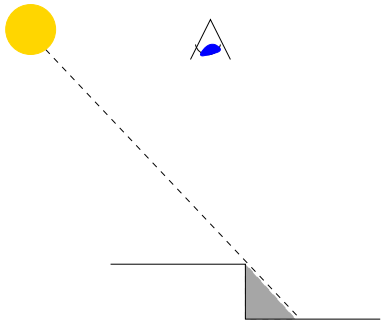
Illumination control techniques

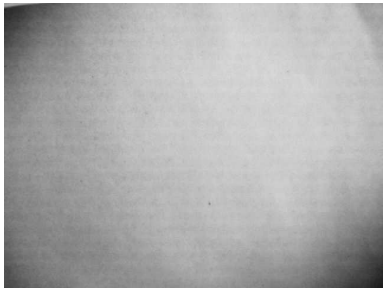
Main cause of problem: ? light sources

Brightness = B / (surface distance from source)^2

Sharp shadows:



Strong illumination variations



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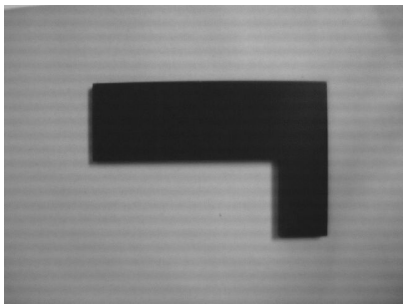
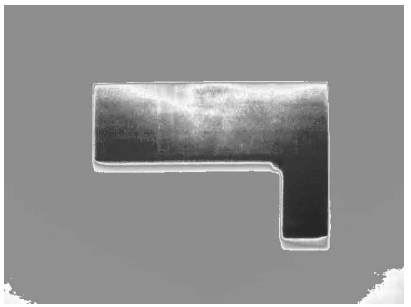
Shadow Example

Figure and ? at bottom left emphasised





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Lighting control

To reduce complications arising from illumination:

- Increase ambient (all direction) light with light diffuser panels
- Illumination by camera to move shadows to non-visible places
- ? panel

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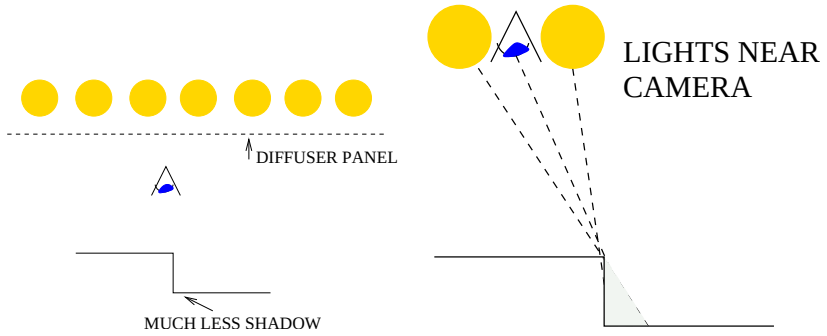

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Lecture Overview

- A set of typical image capture problems: focus, saturation, specularities, shadows, lens distortion, illumination
- Some approaches to ? the problems

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