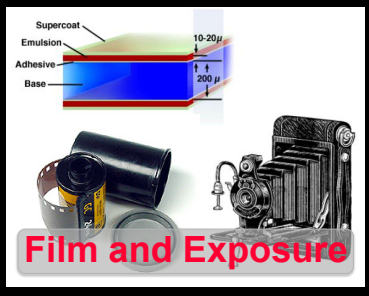


Film and Exposure

BA in Photography
Stage I semester 2
2015/16

Early History

- 1727, Johann Schulze
  - Silver Nitrate darkens to light
  - Process very slow
  - Schulze used stencils on bottles to make fugitive images

Silver Halides

- Early 1800's
  - Silver Halide crystals (e.g. Chloride, Bromide, Iodine) substituted for Silver Nitrate
  - Crystals found to be much faster to darken

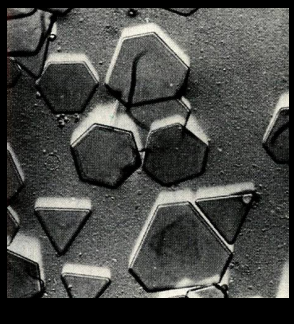
Light sensitive coatings

- Coatings used to suspend the Silver Halide crystals on a base, e.g. glass, paper, acetate.
  - 1830's - Albumen (egg white)
  - 1850's - Wet Collodion (gun cotton and ether)
  - 1880's - Nitrocellulose (nitrate stock)
  - 1920/30's - Gelatin (safety film)

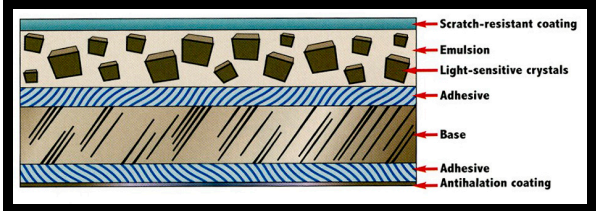
Light on Film

- Light + Silver Halide Salts = Darkening of silver crystals
- Produces a Latent Image
  The latent image is invisible to the eye
- Latent image is revealed by chemical development
- Exposed areas produce a dark silver image under processing – ie. a negative image

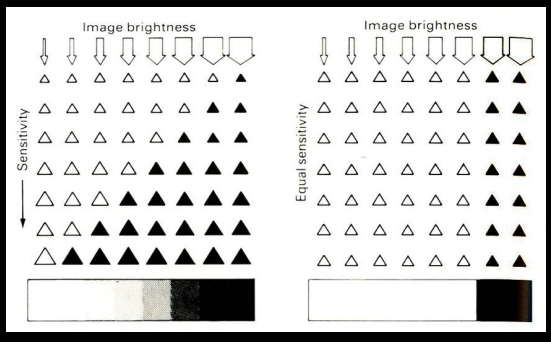
Silver Halide Grains



Composition of Monochrome Film



Sensitivity and Grain Size



Film Sensitivity

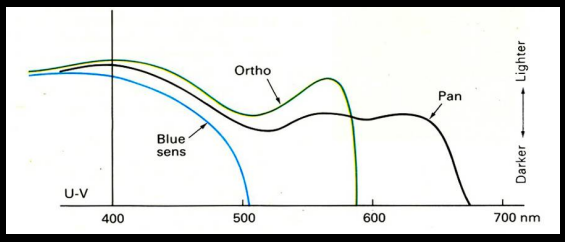
- Film sensitivity is measured using the ISO Standard (the similar to ASA)
- Doubling the ISO number doubles the sensitivity
- ISO numbers increase in 'increments of one third'
- The numbers are similarly proportional to a 1/3 increase or decrease in exposure (aperture or shutter speed)

25	32	40
50	60	80
100	125	160
200	250	320
400	500	650
800	1000	1280
1600	2000	2500
3200	4000	5000

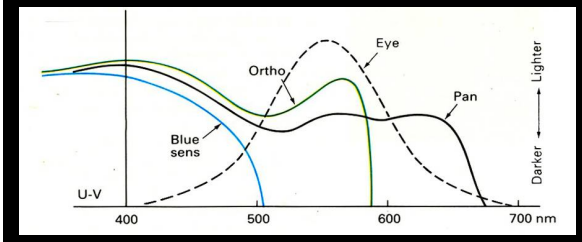
Spectral (colour) Sensitivity monochrome films

- Blue Sensitive Film
  - blue light sensitive
- Orthochromatic Film
  - blue and green light sensitive
- Panchromatic Film
  - blue, green and red light sensitive

Spectral Sensitivity of Monochrome Films



Film and Vision



Colour View

Blue Sensitive Film

Orthochromatic Film

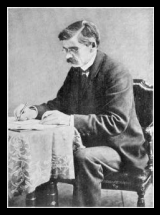
Panchromatic Film

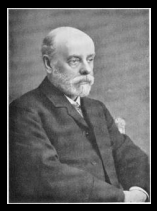
Light on Film

- More light = more density
- Density is in proportion to exposure. This is subject to the characteristics of the film and developer used
- *What you see is not what you get*

Sensitometry
The study of the effects of light on film

- Ferdinand Hurter and Vero C. Driffield
- Published their findings in the 1890's





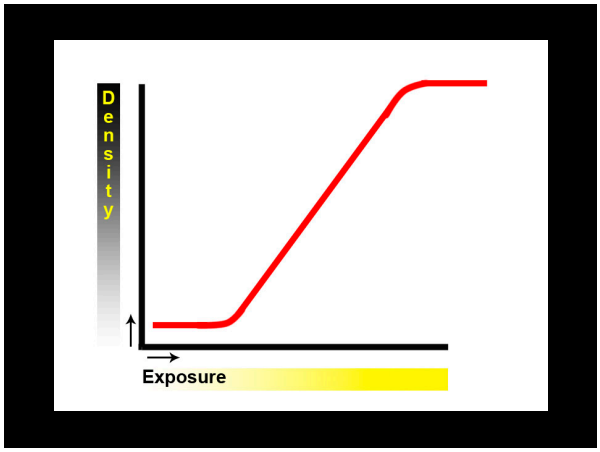
Sensitometry

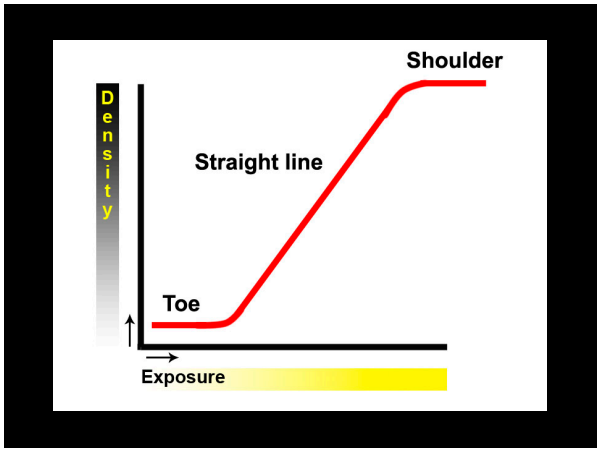
- The H&D Rating for films adopted by manufacturers in the late 1890s
- Quantifying film response and sensitivity to a defined amount of light
- Film density plotted against exposure
- Use of the *Characteristic Curve*

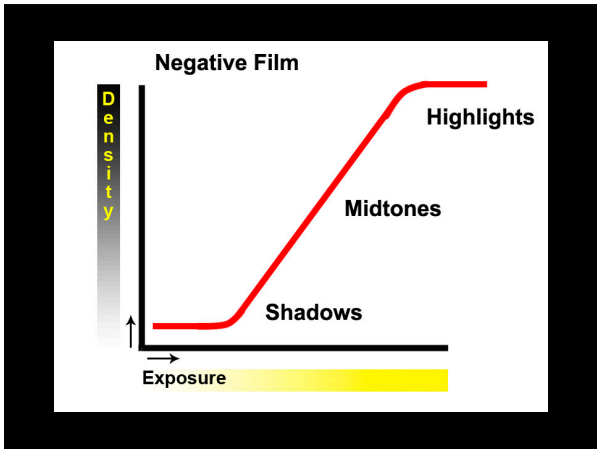
Characteristic Curve

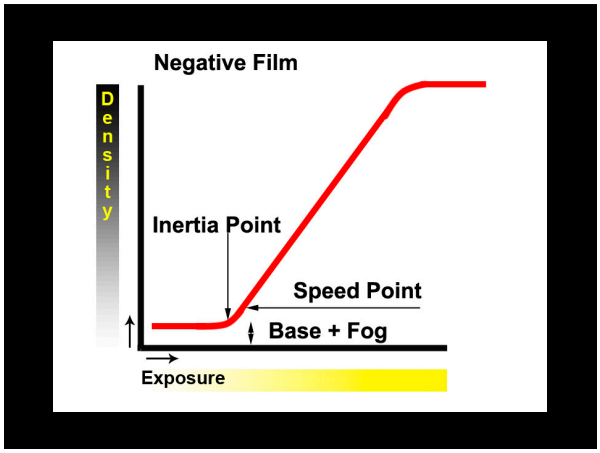
- The plotting of the density of a film against exposure

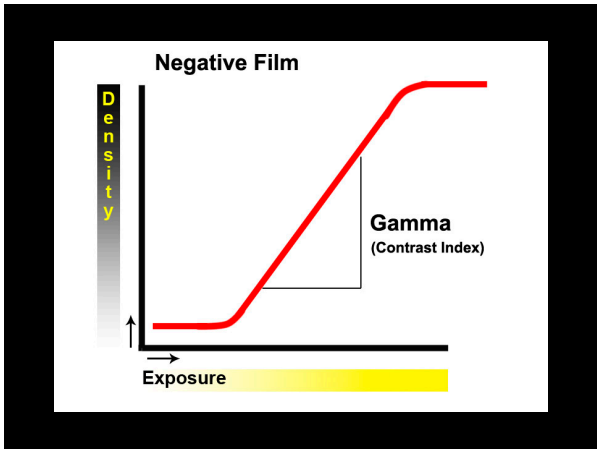
- Conditions:
  - Use of the same film type and batch
  - Use of a controlled exposure source
  - Use of a single film developer type

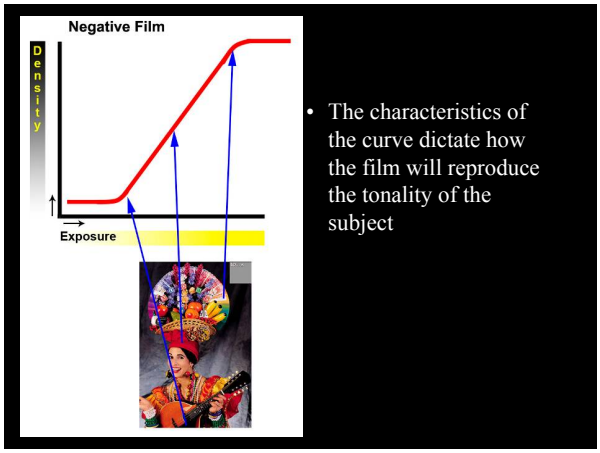




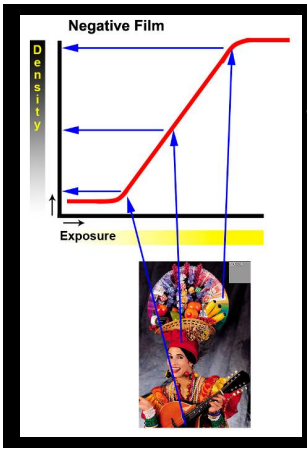




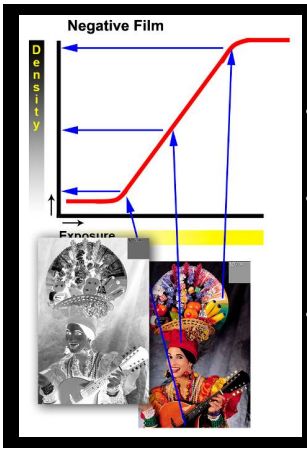




- The characteristics of the curve dictate how the film will reproduce the tonality of the subject



- At any point there is a direct relationship between the subject and the negative



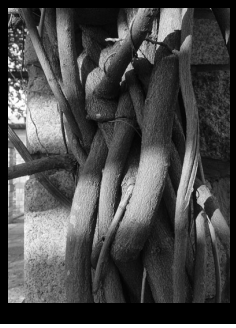
- The full characteristics of the curve only apply when the film is processed
- The characteristics of a film may be varied after exposure through variations in development
- These relationships are quantifiable and predictable

Take One Subject

Correct Exposure

- Shadow detail falls above the inertia point
- Highlight detail falls below the shoulder
- Mid tones are well separated on the straight line portion

Correct Exposure



Under Exposure

- Shadow detail falls on the toe and is lost. Similar to *clipping the blacks* in digital.
- Highlight detail falls on the straight line portion and lacks specular highlights.
- Tonal range is shortened and lacks luminosity.
- Image may appear to be flat and lacking shadow detail and contrast.

Under Exposure


Over Exposure

- Highlight detail falls on the shoulder and lacks any detail. Similar to *clipping the whites* in digital.
- Shadow detail falls on the straight line portion and lacks tonal depth
- Negative will show excessive grain in the light tonal and the highlight areas
- Image may appear *washed out*

Over Exposure


Negatives




Positives




What is Subject Brightness range?

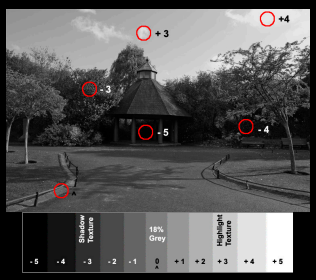
- It is the difference in terms of stops between the darkest and brightest part of a scene
- The greater the SBR, the greater the contrast range of a scene

Measuring SBR

- Determining the SBR is crucial under certain situations. This is because if the SBR is too great, details within the scene will either be too bright or too dark
- Typically, the SBR should be 5 stops or less, in order for the details to be retained

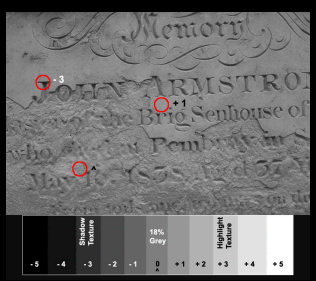
The optimal SBR
9 stops tonality - 7 stops detail

The optimal SBR
9 stops tonality - 7 stops detail



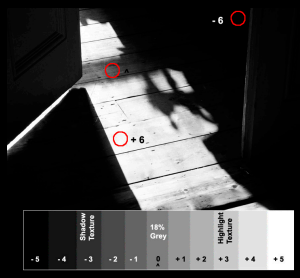
A short SBR
5 stops tonality – low contrast

A short SBR
5 stops tonality – low contrast



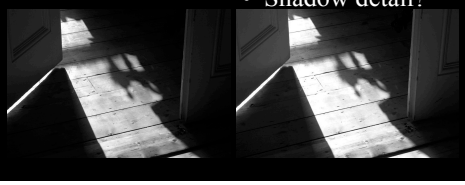
High SBR
13 stops tonality – high contrast

High SBR
13 stops tonality – high contrast

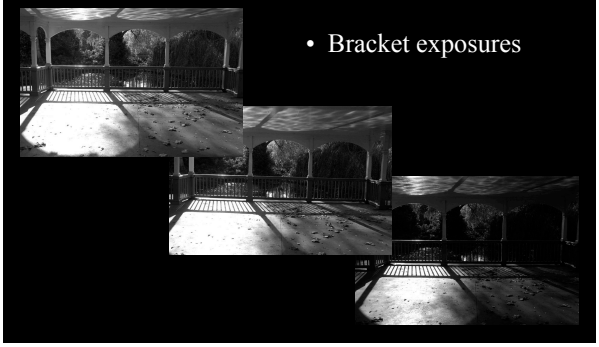


Large Subject Brightness Range

- More than the film can reproduce?
- What is important?
- Highlight detail?
- Shadow detail?



When in doubt . . .

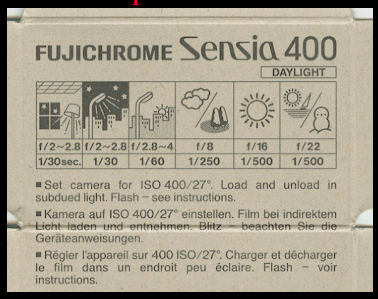


- Bracket exposures

Criteria in choosing a film

- Sensitivity to light
  - ISO number
- Contrast
  - rate of change of tonality from shadow to highlights
  - suitability to Subject Brightness Range (SBR)
- Resolution
  - ability to reproduce small detail
  - effects grain size
- Spectral sensitivity
  - sensitivity to different light sources

No meter?
Use the tip sheet in the box


FUJICHROME Sensia 400

DAYLIGHT

f/2~2.8	f/2~2.8	f/2.8~4	f/8	f/16	f/22
1/30sec.	1/30	1/60	1/250	1/500	1/500

- Set camera for ISO 400/27°. Load and unload in subdued light. Flash – see instructions.
- Kamera auf ISO 400/27° einstellen. Film bei indirektem Licht laden und entnehmen. Blitz – beachten Sie die Geräteanweisungen.
- Régler l'appareil sur 400 ISO/27°. Charger et décharger le film dans un endroit peu éclaire. Flash – voir instructions.

Now process your own film!

Notes @: www.fixerstain.com