



CAMERA OBSCURA RECORDING THE WEAK IMAGES

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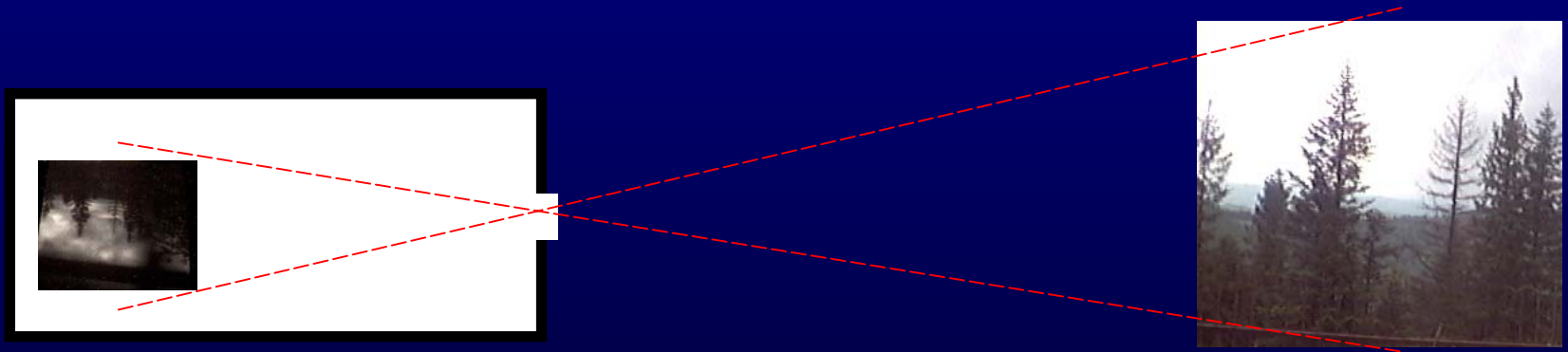
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Camera Obscura

- Camera obscura is the simplest optical instrument discussed at school
- Its presentation at school helps the pupils to get easily acquainted with some definitions and problems of the optics (straight way of the rays of light, optical images etc.)
- Moreover, this simple and easy experiment makes the lesson more attractive and encourages independence

What We Need?



- Dark room
- A hole 5 mm thick
- White screen



The window has to be curtained with just a little opening
left

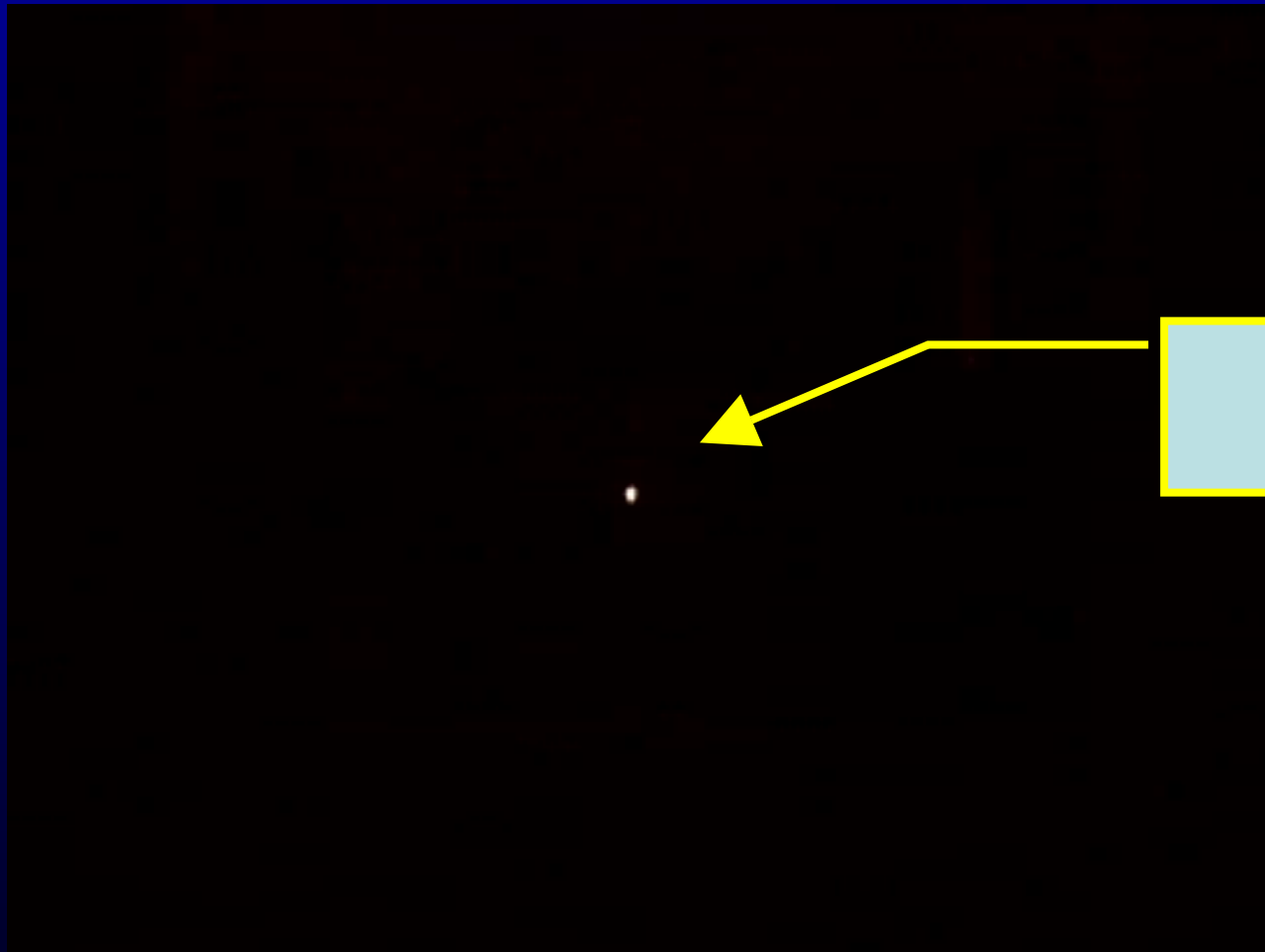


We have used what we had at hand....



a hole

The remaining slit was covered by a piece of cardboard, pierced by a hole as thick as a pencil.



A hole

The view with the light turned off

Camera obscura

- Unfortunately, the image from camera obscura is very dark. To see it the eye has to adapt to the darkness for some 15 min., what may prove rather difficult at school
- Other possible solution is to record the image on the screen with aid of a webcam
- To this purpose the best is the camera with very slow shutter speed
- **The presented view of the camera obscura screen was recorded with the webcam over 20 s, although the unadapted pupil's eyes couldn't see anything.**

A View on the Screen



- The image is inverted...
- And real
- To remove „snow“ we have to subtract the so called dark frame

Dark Frame

- The dark frame was recorded by 20 s exposure with the covered webcam lens
- In the most of software, controlling the webcams with the prolonged time of exposure (AstroVideo, for example) an option to subtract the dark frame automatically is included.

Dark Frame

- The picture taken from the covered webcam.
- It has to be subtracted from the recorded images.



A View after subtracting the Dark Frame



- The image after subtracting the dark frame and turning it upside-down

The View in front of Camera Obscura



- The picture was taken under slightly different angle

Comparison: Webcam vs. Camera Obscura

