

# **Blinded by the Light: an Optometric CSI Episode**

Dr Robert Reed Jr OD  
1431 Trebor Rd St Joe, Mi 49085  
[bobreed@cpuinc.net](mailto:bobreed@cpuinc.net)



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1 hr intermediate technical

**Course Description: It's more than just an old rock and roll song. This class is a REAL court case with Optometric implications. Learn, or be reminded, of just how critical our profession is to people's visual welfare, and even their mortal existence. Step into a CSI episode about vision and be stunned by the results. When all the evidence is presented how do you vote in the case? (\*\*DISCLAIMER\*\* This class involves a real homicide case.)**

- 1) Foundation of this vehicular manslaughter case
  - a. Murphy's law
  - b. Fragility of life
  - c. What prosecution must prove for conviction
  
- 2) The power of the Sun
  - a. Electromagnetic spectrum is all energy
  - b. Eclipse of the sun reducing to 1%
  - c. Effect of focused light on any tissue
  - d. Eyes Reflex natural protection system
    - i. Pupils constrict (6-8x reduction of area =<85% light
    - ii. Squint
    - iii. Shield eyes (choke reflex)
    - iv. Look away
    - v. Close eyes
  
- 3) Properties of light
  - a. Rays and particles
  - b.  $\angle$  of incidence =  $\angle$  of reflection
  - c. 4 kinds of glare
    - i. Distracting
      1. Stray light caused by lens reflections material affects on light
      2. Treatment - antireflective coating

- ii. Discomfort
  - 1. Excessive light that the eyes can't control
  - 2. Treatment- photochromatic lenses
- iii. Disabling
  - 1. Direct sunlight that overwhelms the eye
  - 2. Treatment - variable photochromatic or solid sunglass
- iv. Destructive (blinding) glare
  - 1. Light reflecting off smooth shiny surfaces like water sand or snow, acting like a mirror directing disabling glare directly into the eye
  - 2. Treatment - polarized sunglasses

#### 4) Biology of vision

- a. No pain nerves inside the retina
- b. ~150 M nerves in retina / ~ 1.2 M nerves in macula
- c. How humans anatomically built to be protected
- d. Photochemical process of vision (Rhodopsin)
  - i. Regeneration time (half life 2 ½ min)
  - ii. Afterimage
  - iii. Process slows with age and media/health changes

#### 5) Neurology of vision

- a. Central 10 degrees vision vs peripheral
- b. Shutdown of either system depending on situation (in the zone)
- c. Brain capacity to “multi-task”
- d. Light sensitivity (photophobia)
  - i. External issues
  - ii. Internal neural setting
  - iii. PTSD
- e. Primary functions of vision
  - i. Connect us to the world
  - ii. Keep us alive!
- f. Vision is “subjective”
  - i. Figure/ground
  - ii. Attention
  - iii. Things that are, OR are NOT there

6) Fallacy of recreation

- a. Go pro doesn't have vision chemical to use up
- b. Go pro doesn't have central/peripheral system
- c. Go pro doesn't have brain interpretation
- d. Go pro didn't have sunglasses reducing 90% light
- e. Angle of sun was farther left & lower than accident
- f. Recreation team KNEW to look for rider
- g. Biker wasn't on edge of road
- h. "Sully" effect --- easy to judge, but NOT in REAL time

7) Closing

- a Tragedy
- b. Biker vs car = Biker loses every time
- c. Did defendant show inattention & indifference in his actions.
  - 1 Science says no
  - 2 Defendant did show attention
  - 3 Defendant didn't show indifference
- d. If either the defendant OR victim were 30 seconds sooner, or later, this accident wouldn't have happened, as they would have not been in the blinding glare zone at the same time.
- e. But, Given the EXACT same set of circumstances, it could have just as easily been one of you or me driving the car, or just as possible riding the bike, and unfortunately the results would have been exactly the same.

8) Vote on guilty or not-guilty

9) Epilogue