**Definitions:**

- **Homonymous:** Same side of VF affected in each eye
- **Bitemporal:** Opposite temporal sides of VF affected in each eye

- **Complete:** Entire VF area affected (ex. complete hemianopia)
- **Incomplete:** A portion of the field is spared
- **Congruity:** Tendency for homonymous field defects to be symmetrical (Similar size, location, shape in each eye’s field)

**An Approach to Visual Field Analysis: Joel Glaser**

| Territory I | Retinal rods and cones
| Territory II | Retinal ganglion cell (RGC), nerve fiber layer (NFL) and optic nerve
| Territory III | Optic chiasm
| Territory IV | Optic tract, lateral geniculate body (LGB), optic radiations, visual cortex

**Details:**

- **Territory I:**
  - Retinal rods and cones
  - Outer retinal layers with bipolar cell connections
  - Visible on fundus examination:
    - Choroidal disease (ischemia, scars)
    - Photoreceptor disease (RP – ring scotoma @ 30-50°)
    - RPE disease (macular degeneration)

- **Territory II:**
  - Retinal ganglion cell (RGC) and axons in nerve fiber layer (NFL) and optic nerve (includes inner retinal layers)
  - Respects the horizontal midline
  - Field defects follow the NFL architecture:
    1) Papillo-macular (PM) bundle
       - Central scotoma: Involves macular area RGC or axons
       - Cecocentral scotoma: Involves RGC or axons arising both from the fovea and from the retina between the fovea and the disc
    2) Arcuate bundles
       - Altitudinal defect spares nasal radiations thus temporal field is normal across the midline (not so with cortical lesions, for example)
    3) Nasal radial nerve fiber bundle
       - Points toward the blind spot (not fixation as with LGB)
Territory III:

- Optic chiasm
- Anatomy:
  - Nasal fibers (including nasal half of macula of each eye) cross the chiasm, to the contralateral optic tract while temporal fibers remain uncrossed. Thus chiasmal lesions produce a bitemporal hemianopia due to interruption of decussating nasal fibers
  - Lower retinal fibers project through the optic disc and chiasm to lie laterally in the tracts; upper retinal fibers lie medially (90° rotation)
  - Inferonasal retinal fibers cross in the chiasm and course anteriorly 4 mm in the contralateral optic nerve (Wilbrand’s knee) before turning back to join uncrossed inferotemporal fibers in the optic tract (lesions produce a “junctional scotoma”)

Territory IV:

- Optic tract, lateral geniculate body (LGB), optic radiations, visual cortex
- Respects the vertical midline
- Retrochiasmal lesions result in contralateral homonymous hemianopias
- Congruity increases with more posterior lesions
- Fixation may be spared
- Example: classic “Meyer’s loop” – “pie-in-the-sky” homonymous quadrantanopia from anterior temporal lobe lesion
- Optic tract anatomy:
  - Nasal fibers (including nasal 1/2 of macula) cross in chiasm, to contralateral optic tract; temporal fibers remain uncrossed; Thus bitemporal hemianopia created by lesion
  - Lower retinal fibers project through the optic nerve and chiasm to lie laterally in the tracts; upper retinal fibers lie medially (there is a 90° rotation of fibers from the nerve through chiasm and into the tracts)
  - Inferonasal fibers cross in the chiasm and course anteriorly 4 mm in the contralateral optic nerve (Wilbrand’s knee) before turning back to join uncrossed inferotemporal fibers in the optic tract (Lesion produces a “junctional scotoma”)

- Optic tract defect criteria:
  - Incongruous homonymous hemianopia
  - Bilateral retinal NFL atrophy or optic atrophy (“bow-tie”)
  - Pupillary abnormalities:
    - Relative APD on the side opposite the lesion (eye with no temporal VF loss)
    - Wernicke pupil: Light stimulation of “blind” retina causes no pupillary constriction while light projected on “intact” retina produces normal pupillary constriction
    - Behr’s pupil: Anisocoria with larger pupil on the side of the hemianopia (probably does not really exist)
Analysis:
1) Is there a hemianopic defect?
   • Homonymous = Territory IV
   • Heteronymous = Territory III
2) Is there a NFL defect?
3) If neither 1 or 2: Territory I lesion exists
4) For a quadratic VF defect, does the defect go to fixation (Territory IV) or to the blind spot (Territory II)