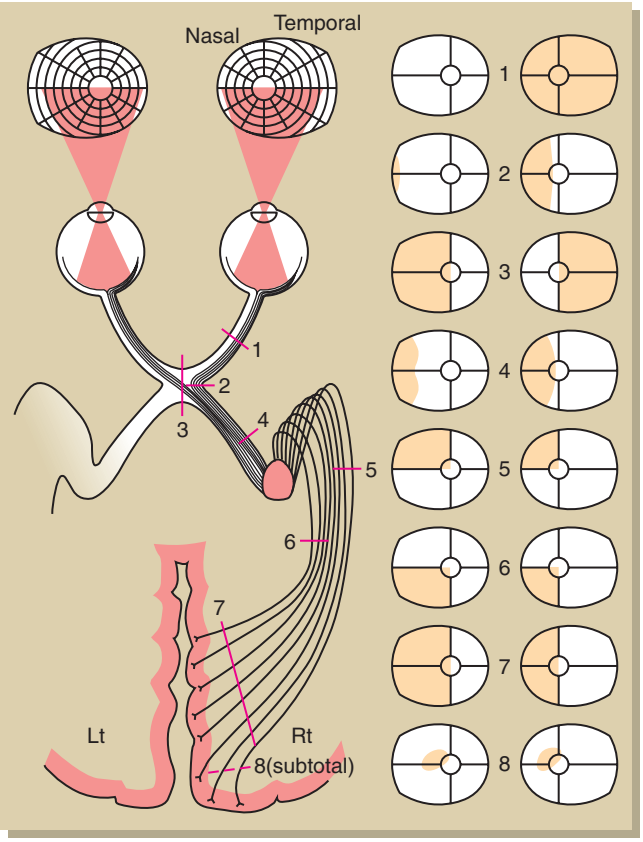

FIGURE 112-2 Visual fields that accompany damage to the visual pathways. ***1***, Optic nerve: unilateral amaurosis. ***2***, Lateral optic chiasm: grossly incongruous, incomplete (contralateral) homonymous hemianopia. ***3***, Central optic chiasm: bitemporal hemianopia. ***4***, Optic tract: incongruous, incomplete homonymous hemianopia. ***5***, Temporal (Meyer) loop of optic radiation: congruous partial or complete (contralateral) homonymous superior quadrantanopia. ***6***, Parietal (superior) projection of the optic radiation: congruous partial or complete homonymous inferior quadrantanopia. ***7***, Complete parieto-occipital interruption of optic radiation: complete congruous homonymous hemianopia with psychophysical shift of foveal point often sparing central vision, giving "macular sparing." ***8***, Incomplete damage to visual cortex: congruous homonymous scotomas, usually encroaching at least acutely on central vision. (From Baloh RW: Neuro-ophthalmology. In Goldman L, Bennett JC, editors: Cecil textbook of medicine, ed 21, Philadelphia, 1998, WB Saunders, p 2236).

whereas dilation is mediated by the sympathetic system. If the balance of these systems is disrupted, *anisocoria* (unequal pupil size) results. The pupils should be examined in both dim and bright light. If the anisocoria increases going from dim to bright light, a lesion of the parasympathetic system is likely. *Physiologic anisocoria* is characterized by pupillary asymmetry that is unchanged irrespective of the ambient light intensity; this occurs in approximately 20% of the population.

Both the direct and consensual light responses should be noted for each eye; in the latter, when the light is shone in one eye, both pupils should constrict. This is best tested using the "swinging light test," in which the light is moved quickly from one eye to the other. When light is shone into one eye, both eyes should constrict simultaneously. If there is dilation of one pupil as the light is moved to it from the other side, an abnormality of the optic nerve in that eye should be

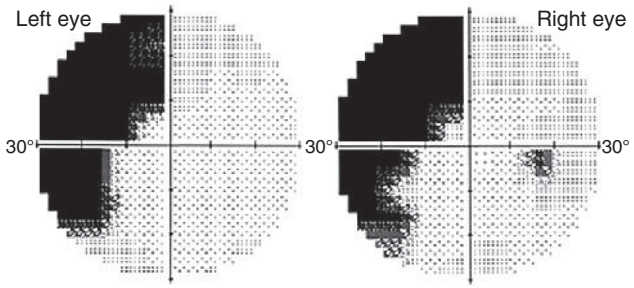

FIGURE 112-3 Humphrey visual fields demonstrating an incongruent homonymous hemianopia.

suspected. This abnormality is referred to as an *afferent pupillary defect.* The accommodative pupillary response is tested by asking the patient to look first in the distance and then at the examiner's finger, held 12 inches away. The pupils should constrict symmetrically and rapidly. *Argyll-Robertson pupils* are small, irregular pupils that constrict to near vision (accommodation reflex) but not in response to light. They are associated with neurosyphilis, diabetes, and other disorders. This so-called *light-near dissociation* may also occur in rostral dorsal midbrain lesions, in which there may be associated abnormalities of vertical gaze, eyelid retraction, and convergence retraction nystagmus (Parinaud Syndrome). This uncommon constellation of clinical findings is frequently noted in patients with lesions of the pineal gland.

The presence of ptosis should be noted. A large, unreactive pupil with ptosis indicates a lesion of the oculomotor nerve *(third cranial nerve palsy)* interrupting the parasympathetic nerve supply to the pupil. The associated paralysis of the medial and inferior rectus and inferior oblique muscles (see later discussion) results in distortion of the eye (inferolaterally, "*down and out*") and a subjective complaint of diplopia by the patient. Common causes of a third nerve palsy include compression by an aneurysm of the posterior communicating artery by transtentorial herniation, or from ischemia, usually in the setting of diabetes or vasculitis. A third nerve palsy caused by ischemia often spares the pupil but results in complete paralysis of the oculomotor and eyelid levator muscles. Acute painful third nerve palsy should be treated as an emergency, with the need to investigate for an intracranial aneurysm.

A small, poorly reactive pupil with associated ptosis is known as *Horner syndrome* and results from damage to the sympathetic fibers to the pupil, which may occur anywhere along their course from the hypothalamus, brainstem, and ascending sympathetic chain from the superior cervical ganglion to the orbit. There may be associated unilateral anhidrosis resulting from damage to sympathetic fibers. Horner syndrome may be the first sign of an apical lung tumor (Pancoast) or may occur in diseases affecting the carotid artery.

Tonic (Adie) pupils constrict slowly and incompletely in response to light. This is usually an incidental finding on examination but may be associated with areflexia (Holmes-Adie syndrome). Reaction to accommodation is preserved, and it has been suggested that the disorder is a result of parasympathetic denervation. *Hippus* refers to pupillary unrest with synchronous oscillation of the pupil size; it is considered a normal