

Vision Aids for “People Sighted in One Eye that is Hemianopic” (One Eye Blind – Other Eye Sighted but Missing Peripheral Vision to One Side)

The National Institute for Rehabilitation Engineering (NIRE) is a non-profit organization which operated clinics for the development and dispensing of low-vision aids from 1967 to 1997. These clinics assisted *hundreds* of people having permanent impairments of visual acuity and/or visual fields. This paper discusses successful clinical methods developed and used during this period, and to the present time, for assisting individuals having normal *Monocular Vision ... or Hemianopic Monocular Vision*. Because the NIRE no longer operates these clinics, the information is being made available in hopes that NIRE's methods and data may be used by other vision-care professionals all over the world to help functionally rehabilitate individuals having Monocular Vision. This paper is current to the year 2004. The N.I.R.E. is still active in research, publishing papers, and giving personalized information, advice and referrals.

This copyrighted (c) paper, and the associated papers that are referenced below, may be freely copied and distributed provided all copies are complete and unaltered.

MEDICAL CARE FIRST: Patients should always seek medical eye care, first! This is essential because many vision losses can be stopped or reversed with early care from a qualified ophthalmologist. The methods and devices described in this and other N.I.R.E. papers, are intended only as functional aids for those with permanent, irreversible vision losses who are already receiving proper primary (medical) care. *These devices do not substitute for or replace medical vision care!*

Sighted in One Hemianopic Eye – Vision Aids often help, functionally.

Alternate terms with similar meanings: hemianopsia, hemianopia, hemiopia, half-eye vision

The NIRE has previously published these basic and relevant papers, available on request via e-mail, from a website, or via regular mail. Printed copies of this paper, and some of the others, should be given to **both** one's eye doctor and one's optical dispenser.

1-ref) People with “normal” or “near normal” visual fields in the one useful eye should read NIRE's paper: “Vision Aids for People Sighted in One Eye”

2-ref) People with “normal” or “near normal” acuity in BOTH EYES, with hemianopsia, can refer to NIRE's papers on: “Homonymous Hemianopsia,” “Bi-Temporal Hemianopsia,” and “Bi-Nasal Hemianopsia.”

3 *) People with “Hemianopsia” (half eye vision) in the One Useful Eye” should refer to the above referenced papers AND this paper. Together, the various papers can be very helpful to the patient and his service provider professionals. NOTE: People with “Two-Sided Hemianopsia” in “One Useful Eye” should refer to NIRE's paper on: “Vision Aids for People with Tunnel Vision”**

“Vision Aids for People Sighted in One Eye” by The N.I.R.E. illustrates and describes two types of “Cros-Vision Eyeglasses” which expand the vision of the one normal eye, over the nose, toward the blind side. *This paper should be read even though it does not deal fully with the added problems of the monocular person - also blind to one side of the good eye due to hemianopsia.* The present paper fills this gap.

“Vision Aids for People Having Homonymous Hemianopsia” by The N.I.R.E. illustrates and describes eyeglasses that expand the field of vision for each eye (both eyes), toward the common blind side. “Homonymous” means the blind side is the same for each eye. That is, the person is blind, lacking peripheral vision, to the same side of each eye. For these people, the lenses need to maintain fused binocular vision for the two eyes while expanding both eyes’ visual fields in the same direction - that side toward which vision is lost. Other forms of hemianopsia include: monocular, bi-temporal, and bi-nasal. *The present paper adds information necessary for to help monocular hemianopes.*

Optical Vision Aids, including special eyeglasses and prisms, may be available in the offices of some ophthalmologists. However, many ophthalmologists prefer to spend their time performing medical and surgical procedures. For this reason, some patients may find it best to stay with their ophthalmologists for regular eye exams and treatments, and to additionally seek optical vision aids from optometrists, optical dispensers or low vision clinics. OPTICAL VISION AIDS for MONOCULAR HEMIANOPES can be made by any optical dispenser. Of the three optical elements, only one is standard in the optical dispensing industry. This is the prismatic Rx carrier lens. Over-the-nose prisms and cemented-on vertical segment prisms are readily available from commercial sources. However, their inclusion in a pair of eyeglasses always requires a lot of intensive shop work, by hand. For this reason, only some optical dispensers are willing to make these eyeglasses. When they do make them, the final costs can be high. **Caution: Only high resolution ground lenses should be used for the cemented-on segment – never grooved plastic Fresnel lenses!**

Benefits and Limitations – The optical aids described herein usually help the visually impaired people, who use them, for many tasks and functions. While usually helpful and worth having, for most users, these assistive devices do not restore “normal” vision and may not be as helpful as desired, for all tasks. Driving may be feasible for some monocular hemianopes but not for others. LOCAL DOCTORS and OPTICAL DISPENSERS can make and fit the devices described in this paper. There is no need to travel to obtain these items and they cannot be usefully purchased by mail.

THIS PAPER is for people (Monocular Hemianopes) who see in only one eye, with a horizontal visual field that is reduced by up to half, by hemianopsia, toward one side. Rarely, hemianopsia results from a partially detached or damaged retina. Mostly, it results from neurological or brain lesions. Most people with hemianopsia should consult a neuro-ophthalmologist or neurologist. *People with hemianopsia sometimes have poor night vision. They may also have slow reflexes, and/or word recognition or other cognitive problems - due to damage in the brain or central nervous system.*

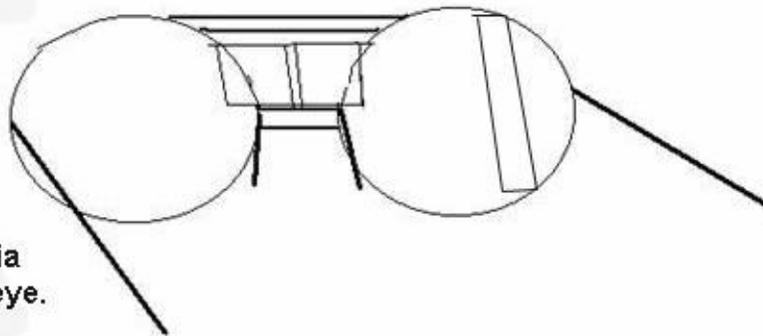
This conditions discussed in this paper, while fairly rare, are referred to as: “**Hemianopic Monocular Vision.**” and may occur in any of four forms, depending on whether the functional eye is the right eye or the left eye ... and which one side of the good eye is blind. *If a monocular person is blind on both sides of the one eye, he should refer to the NIRE paper on “Vision Aids for People with Tunnel Vision.”* ###

RES-RH: Right-Eye-Sighted with Right-Hemianopsia – is when the person sees with his right eye, only, ... but is half blind (hemianopic) to the right side. This person can see fully to the nasal side, and straight ahead ...but not to the right - using the right eye. (The left eye is sightless.)

Optical compensations to help this person are: (a) a standard lens before the right eye with needed distance corrections ... and 3 to 5 diopters of prism, base-right; to partly expand central vision to right; (b) Cros-Vision prism over-the-nose, to facilitate seeing over the nose toward the left side; and (c) a vertical prism, segment cemented to the inside of the right lens, toward the person’s right side, to enable the person to see farther to the right through the prism segment, simulating lost peripheral vision to the right.

Notes: (a) and (c) above are fully detailed in the paper on Homonymous Hemianopsia. (b) above is fully described in the paper on eyeglasses for people “Sighted in One Eye,” under the section on Type-2 Cros-Vision Glasses.

Fig. 1
Dual Prism FX
Eyeglasses for
Person Sighted
Only in Right Eye
and also with
Right Hemianopsia
in that one good eye.



Optics for “Right-Eye-Sighted with Right-Hemianopsia”: Referring to Figure 1, above, the lens for the left eye is cosmetic, only, assuming the left eye to be sightless. All optics are for use by the sighted but hemianopic right eye. Before purchasing such glasses, the patient should have trial-lenses temporarily fitted for training and assessment purposes.

- (a) Looking straight ahead through the main right lens, the person sees clearly straight ahead (central vision) and to his left, over the nose, through the over-the-nose clip-on prism (with his normal left peripheral vision). He sees a very little to

his right, through the base-right prism in the carrier lens – and more to the right through the vertical segment prism cemented to the main lens - when the prism has been properly positioned by the optical dispenser. *The right main or carrier lens, is made with all needed corrections and has 3 to 5 diopters of prism, base-right, to expand the user’s central vision up to 5 degrees to the right.*

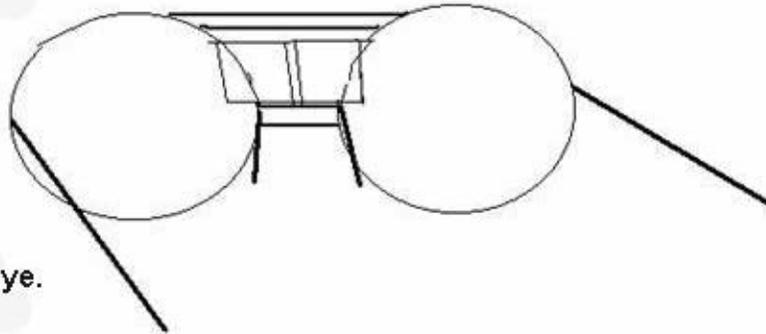
- (b) To see farther and more clearly to either side, the person simply turns his eyes a little left or right so that his central vision sees directly through one or the other mounted prism. One mounted prism is over the nose for seeing to the left – this is the CVG-Type 2 prism as detailed in the NIRE paper on “Monocular Vision.” The other prism, for seeing farther to the right, is the FX-Type 2 vertical segment prism, mounted base-right to the inside of the right carrier lens, at the distance toward the right where the right-side vision is just about to cease. This can add 15 to 20 degrees of vision toward the right, to the carrier lens’ 3 to 5 degrees.
- (c) To see clearly and much farther to either side, the person momentarily turns his eyes and his head father to either his left or his right, gazing directly through either the left (nasal) or right (segment) prism.
- (d) Scanning eye and head movements are learned and become automatic, in a short time. Once horizontal scanning movements become automatic, the person will see and recognize what surrounds him and what is happening around him.
- (e) Driving an automobile may or may not be feasible for this person, even with 20/20 corrected visual acuity and undivided macular vision. At best, the person would need special wide-angle rearview mirrors and special on-the-road driver training, by a qualified and licensed driver training instructor. All states in the USA road-test and license people blind in one eye but with corrected to normal acuity with the one good eye. However, some states require a minimal “unaided” horizontal field-of-vision angle and refuse to road-test or license people who do not meet the stated requirements. Other states will rigorously road-test the applicant and will issue a license if the tests are all passed and the tester certifies the applicant as a safe driver. **NOTE:** Many hemianopes have poor night vision which can preclude driving at night, even when daytime driving is permitted. All hemianopes should be evaluated by their eye doctors for night vision whether or not they wish to drive. ###

RES-LH: Right-Eye Sighted with Left-Hemianopsia – is when the person sees with his right eye, only, ... but is blind (hemianopic) to the left side. This person can see normally to the right (outside), and straight ahead but not to the left (past the nose).

Optical compensations to help this person are: (a) a standard lens before the right eye with needed distance corrections, and 4 to 8 diopters of prism, base-left; and (b) Cros-Vision prism over-the-nose, to facilitate seeing over the nose toward the left (blind side).

Notes: (a) and (b) above are fully detailed in the paper on eyeglasses for people “Sighted in One Eye,” under both the sections describing Type-1 and Type-2 Cros-Vision Glasses.

Fig. 2
Single Prism FX
Eyeglasses for
Person Sighted
Only in Right Eye
and also with
Left Hemianopsia
in that one good eye.



Optics for “Right-Eye-Sighted with Left-Hemianopsia”: Referring to Figure 2, above, the lens for the left eye is cosmetic, only, assuming the left eye to be sightless. All optics are for use by the sighted but hemianopic right eye. Before purchasing such glasses, the patient should have trial-lenses temporarily fitted for training and assessment purposes.

- (a) Looking straight ahead through the main right lens, the person sees clearly straight ahead (central vision) and to his right side (both central & peripheral vision). Because of the prism, base-left, in the main or carrier lens, the person can see left far enough to see through the over-the-nose prism. (The carrier lens for the right eye has all needed optical corrections plus 4 to 8 prism diopters, base-left.) The person can see normally to his right; no special aids are needed.
- (b) To see farther and more clearly to his left side, the person simply turns his eyes a little left so that his central vision sees directly through the nose-mounted prism. This prism is over the nose for seeing to the left – this is the CVG-Type 2 prism as detailed in the NIRE paper on “Monocular Vision.”
- (c) To see clearly and much farther to either side, the person momentarily turns his eyes and his head farther to either his left or his right, gazing directly through the left (nasal) prism or directly to the right.
- (d) Scanning eye and head movements are learned and become automatic, in a short time. Once horizontal scanning movements become automatic, the person will see and recognize what surrounds him and what is happening around him.

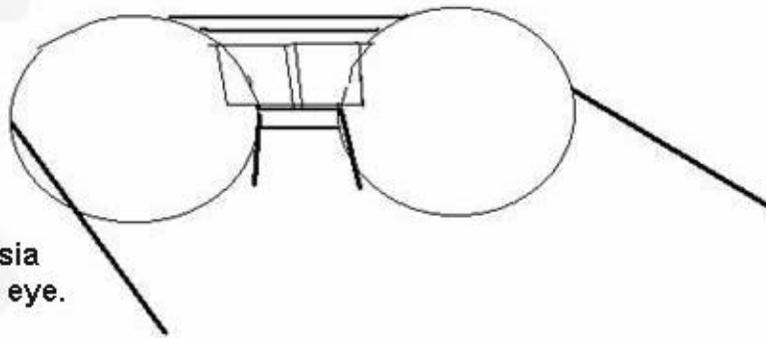
- (e) Driving an automobile may or may not be feasible for this person, even with 20/20 corrected visual acuity and undivided macular vision. At best, the person would need special wide-angle rearview mirrors and special on-the-road driver training by a qualified and licensed driver training instructor. All states in the USA road-test and license people blind in one eye but with acuity corrected to normal with the one good eye. However, some states require a minimal “unaided” horizontal field-of-vision angle and refuse to road-test or license people who do not meet the stated requirements. Other states will rigorously road-test the applicant and will issue a license if the tests are all passed and the tester certifies the applicant as a safe driver. **NOTE:** Many hemianopes have poor night vision which can preclude driving at night, even when daytime driving is permitted. All hemianopes should be evaluated by their eye doctors for night vision whether or not they wish to drive. *(This person has the least visual impediment to driving to the right, as in the USA, of the four case types discussed in this paper.) ###*

LES-RH: Left-Eye Sighted with Right-Hemianopsia – is when the person sees with his left eye, only, ... but is blind (hemianopic) to the right side. This person can see normally to the left (outside), and straight ahead ...but not to the right, toward or past the nose.

Optical compensations to help this person are: (a) a standard lens before the left eye with needed distance corrections, and 4 to 8 diopters of prism, base-right; and (b) Cros-Vision prism over-the-nose, to facilitate seeing over the nose toward right (blind side).

Notes: (a) and (b) above are fully detailed in the paper on eyeglasses for people “Sighted in One Eye,” under both the sections describing Type-1 and Type-2 Cros-Vision Glasses.

Fig. 3
Single Prism FX
Eyeglasses for
Person Sighted
Only in Left Eye
and also with
Right Hemianopsia
in that one good eye.



- (a) Looking straight ahead through the main left lens, the person sees clearly straight ahead (central vision) and to his left side (both central & peripheral vision). Because of the prism, base-right, in the main or carrier lens, the person can see right far enough to see the through the over-the-nose prism. (The carrier lens for

the left eye has all needed optical corrections plus 4 to 8 prism diopters, base-right.) The person can see normally to his left; no special aids are needed.

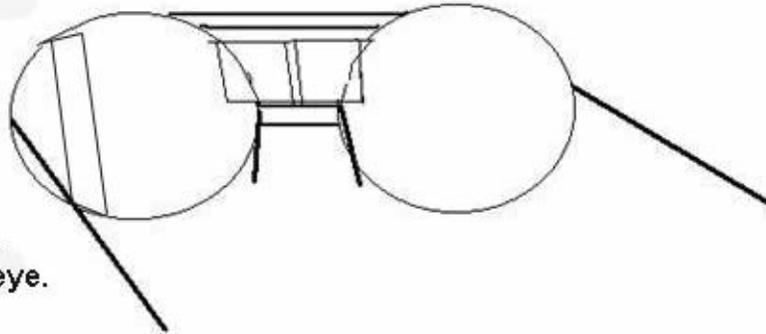
- (b) To see farther and more clearly to his right side, the person simply turns his eyes a little right so that his central vision sees directly through the nose-mounted prism. This prism is over the nose for seeing to the right – this is the CVG-Type 2 prism as detailed in the NIRE paper on “Monocular Vision.”
- (c) To see clearly and much farther to either side, the person momentarily turns his eyes and his head farther to either his left or his right, gazing directly and through the right (nasal) prism or directly to the left.
- (d) Scanning eye and head movements are learned and become automatic, in a short time. Once horizontal scanning movements become automatic, the person will see and recognize what surrounds him and what is happening around him.
- (e) Driving an automobile may or may not be feasible for this person, even with 20/20 corrected visual acuity and undivided macular vision. At best, the person would need special wide-angle rearview mirrors and special on-the-road driver training by a qualified and licensed driver training instructor. All states in the USA road-test and license people blind in one eye but with acuity corrected to normal with the one good eye. However, some states require a minimal “unaided” horizontal field-of-vision angle and refuse to road-test or license people who do not meet the stated requirements. Other states will rigorously road-test the applicant and will issue a license if the tests are all passed and the tester certifies the applicant as a safe driver. **NOTE:** Many hemianopes have poor night vision which can preclude driving at night, even when daytime driving is permitted. All hemianopes should be evaluated by their eye doctors for night vision whether or not they wish to drive. ###

LES-LH: Left-Eye Sighted with Left-Hemianopsia – is when the person sees with his left eye, only, ... but is blind (hemianopic) to the left side. This person can see normally, for one eye, to the right (nasal side), and straight ahead but not to the left (blind side).

Optical compensations to help this person are: (a) a standard lens before the eye with needed distance corrections, and 3 to 5 diopters of prism, base-left; to partly expand central vision to left; (b) Cros-Vision prism over-the-nose, to facilitate seeing over the nose toward the right side; and (c) a vertical base-left prism, segment cemented to the inside of the left lens, toward the person’s left side, to enable the person to see farther to the left through the prism segment, simulating lost peripheral vision to the left. This can add 15 to 20 degrees to the left, in addition to the 3 to 5 degrees of prism in the carrier lens.

Notes: (a) and (c) above are fully detailed in the paper on Homonymous Hemianopsia. (b) above is fully described in the paper describing eyeglasses for people “Sighted in One Eye,” under the section on Type-2 Cross-Vision Glasses.

Fig. 4
Dual Prism FX
Eyeglasses for
Person Sighted
Only in Left Eye
and also with
Left Hemianopsia
in that one good eye.



- (a) Looking straight ahead through the main left lens, the person sees clearly straight ahead (central vision) and to his right, over the nose, through the over-the-nose clip-on prism (with his normal right peripheral vision). He sees a very little to his left, through the base-left carrier lens prism, and much more through the vertical segment prism cemented to the main lens, when the prism has been properly positioned by the optical dispenser. The left main lens, is made with all needed corrections and also has 3 to 5 diopters of prism, base-left, to expand the user’s central vision a little to the left. The cemented-on segment prism add 15 to 20 degrees toward the left.
- (b) To see farther and more clearly to either side, the person simply turns his eyes a little left or right so that his central vision sees directly through one or the other mounted prism. One mounted prism is over the nose for seeing to the right – this is the CVG-Type 2 prism as detailed in the NIRE paper on “Monocular Vision.” The other prism, for seeing farther to the left, is the FX-Type 2 vertical segment prism, mounted base-left to the inside of the left carrier lens, at the distance toward the left where the left-side vision is just about to cease.
- (c) To see clearly and much farther to either side, the person momentarily turns his eyes and his head farther to either his left or his right, gazing directly through either the left (segment) or right (nasal) prism.
- (d) Scanning eye and head movements are learned and become automatic, in a short time. Once horizontal scanning movements become automatic, the person will see and recognize what surrounds him and what is happening around him.
- (e) Driving an automobile may or may not be feasible for this person, even with 20/20 corrected visual acuity and undivided macular vision. At best, the person would need special wide-angle rearview mirrors and special on-the-road driver

training, by a qualified and licensed driver training instructor. All states in the USA road-test and license people blind in one eye but with acuity corrected to normal with the one good eye. However, some states require a minimal “unaided” horizontal field-of-vision angle and refuse to road-test or license people who do not meet their stated requirements. Other states will rigorously road-test the applicant and will issue a license if the tests are all passed and the tester certifies the applicant as a safe driver. **NOTE:** Many hemianopes have poor night vision which can preclude driving at night, even when daytime driving is permitted. All hemianopes should be evaluated by their eye doctors for night vision whether or not they wish to drive. ###

RESIDUAL VISION or LIGHT PERCEPTION in the BAD EYE – may require either of two additional steps. (1) If the two eyes track together and converge properly without the poor vision degrading the good vision, then prism lenses, base-toward-blind side can be used for both eyes. Sometimes, the two lenses need to have prism variations to assure convergence and tracking. Such variations have to be determined with testing using trial lenses. Or, (2) If residual vision in the bad eye is so poor as to be useless, and if it merges with and impairs the good vision of the better eye, then the inside surface of the lens for the bad eye can be frosted or blackened.

BE SURE TO READ the Referenced Papers concerning: (1) Monocular Vision Aids and (2) Hemianopic Vision Aids. These papers contain important information not included in this paper.

For additional information, please email: nire@warwick.net or contact:

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