

MINUTES OF THE House COMMITTEE ON Transportation

The meeting was called to order by Representative David Webb at
Chairperson

1:30 ~~am~~/p.m. on February 16, 1984 in room 519-S of the Capitol.

All members were present except: Representatives Shelor, Harper, Moomaw, Crowell
and Charlton - All Excused

Committee staff present:

Fred Carman, Office of the Revisor of Statutes
Hank Avila, Legislative Research Department
Donna Mulligan, Committee Secretary

Conferees appearing before the committee:

Representative Edgar Moore
Sgt. Bill Jacobs
Mr. Mike Byington, Kansas Association for the Blind
Mr. Gary Robbins, Kansas Optometric Association
Dr. Kyle Dodson, Memorial Hospital
Mr. Ken Fousek, City of Topeka Human Relations Commission
Mr. Bill Edds, Kansas Department of Revenue
Mr. Ed DeSoignie, Kansas Department of Transportation

Vice-Chairman Dave Webb called the meeting to order and the first order of business was HB-2841.

Representative Moore, sponsor of the bill, told the committee the bill would prohibit automobiles from having glass that would obscure the view of occupants of a vehicle when stopped for law enforcement purposes.

Sgt. Bill Jacobs of the Kansas Highway Patrol, appeared in support of HB-2841 and recommended an amendment to the bill which would add the word "clear" in front of the word "view" in Lines 0027 and 0036 and strike the words "stopped for law enforcement purposes" in subparagraphs (a) and (b). (See Attachment 1)

The floor was opened to committee discussion and questions. The point was brought up about vans being manufactured with smoked glass, and the question was asked if the law would have any effect on "mini blinds" in vans. Sgt. Jacobs replied that the law applies only to the front seat windows.

This ended the hearing on HB-2841.

The next order of business taken up was HB-2857. Mr. Mike Byington, Kansas Association for the Blind and Visually Impaired, testified in support of HB-2857. (See Attachment 2)

He reported to the committee that he is a visually impaired person and has been a licensed Kansas driver with a restricted license for 13 years. His reason for supporting this bill, he remarked, is to help other visually handicapped drivers have a chance to take a driving test behind the wheel to demonstrate their ability.

Mr. Gary Robbins, Executive Director of the Kansas Optometric Association testified in support of HB-2857 and related to the committee that his association supports the concept of allowing driving tests to be the primary factor in determining if individuals will be allowed to drive. (See Attachment 3)

CONTINUATION SHEET

MINUTES OF THE House COMMITTEE ON Transportation,
room 519-S, Statehouse, at 1:30 ~~xxx~~ p.m. on February 16, 19 84

Dr. Kyle Dodson, Director of the Low Vision Clinic at Memorial Hospital, Topeka, Kansas, also testified in support of HB-2857, explaining the telescopic device used by visually impaired drivers. Dr. Dodson commented that generally people are capable of safe driving, even though they must use a telescopic device. (See Attachment 4)

Mr. Ken Fousek of the City of Topeka Human Relations Commission testified in favor of HB-2857. Mr. Fousek advised that the person's physician has a good understanding of the person's capabilities and the driving test should not be the last word in achieving an answer as to whether or not the person is able to drive.

Mr. Bill Edds of the Kansas Department of Revenue testified on HB-2857, and related to the committee that the Revenue Department is quite concerned with the liability of the Division of Vehicles should the standard be changed as contained in the bill.

Vice-Chairman Dave Webb appointed Representatives Knopp, Johnson and Adam to a sub-committee for further study on this matter.

Mr. Ed DeSoignie of KDOT briefed the committee regarding a letter from Secretary of Transportation John B. Kemp to Chairman Rex Crowell. (See Attachment 5) Mr. DeSoignie said the concerns discussed in the letter were on Qualification Statements of Engineering Firms and City Connecting Links.

Representative Kent Ott discussed a proposed concurrent resolution memorializing the United States Congress to approve the revised Interstate Cost Estimate (ICE), upon which apportionments to the states of Federal Interstate Construction Funds are to be based.

Representative Ott made a motion to have the proposed concurrent resolution drafted for possible introduction as a committee resolution. The motion was seconded by Representative Johnson. Motion passed.

The meeting was adjourned at 2:00 p.m.


Rex Crowell, Chairman

SUMMARY OF TESTIMONY
BEFORE THE HOUSE TRANSPORTATION COMMITTEE

HOUSE BILL 2841

PRESENTED BY THE KANSAS HIGHWAY PATROL
(Sergeant William A. Jacobs)

February 16, 1984

APPEARED IN SUPPORT

The Patrol appears in support of HB 2841 and again wishes to thank the legislature for their concern relative to the safety of law enforcement officers.

This law not only addresses the safety of officers, but also prohibits materials on certain windows which is reflective of the sun and a hazard to other motorists.

There is a lack of enforcement of this law because of present wording which states that the condition "prohibits or substantially impairs the ability to see into such motor vehicle."

The word "substantially" causes the problem because of its vagueness, and it necessitates a judgment by the officer which is very difficult to substantiate in a court of law.

The amendments to K.S.A. 8-1749a in HB 2841 attempt to alleviate this problem.

We would suggest an amendment to the bill which would add the word "clear" in front of the word "view" in lines 0027 and 0036 and strike the words "stopped for law enforcement purposes" in subparagraphs (a) and (b).

The reason we suggest this change is that at first glance it appears that it would be legal to have these substances on the window except just when stopped for law enforcement purposes. The law would still have the same effect with those words deleted.

Again, we sincerely thank you for your past concern for the lives of all officers and the safety of the motoring public. We ask for your favorable consideration of this bill.

Attachment 1

Kansas Association for the Blind and Visually Impaired, Inc.

TO: House Committee on Transportation

FROM: Michael J. Byington, Registered Lobbyist

SUBJECT: House Bill 2857

I am Michael Byington and I am the lobbyist for the organization specified on this letterhead. I am expressing my organization's support as well as my personal support for House Bill 2857.

I am visually impaired and I drive with a restricted Kansas Driver's License. I believe my restriction of 15 miles of home is appropriate, and I stay within it. As a matter of fact, I do not drive anywhere which is unfamiliar to me. I have been driving for 16 years. I started driving around my grandfather's farm when I was 13. Counting the period of time in which I held a Kansas Learner's Permit, I have been a licensed Kansas Driver for 13 years. I use what is called a telescopic lens to achieve my distance acuity of 20/20 in my better eye. The telescopic is the thick, protruding lens at the top of my right glasses lens. The lower part of the lens is called the carrier lens. My safety record is not perfect over my 13 years as a licensed driver; I am a human being, and like any other human being, handicapped or non-handicapped, I am subject to occasional errors in judgment. My safety record is, however, considerably better than many males my age over the same period of years. My insurance rate is currently based on a safe driver's scale.

Frankly, I do not enjoy bringing all of this information to your attention. While, as a lobbyist, I testify concerning a lot of bills, and am usually not nervous, I am certainly nervous as I write this, and I am sure I shall also be nervous when I deliver my verbal remarks. This is because I do not like putting myself or my disability on display. Doing so seems to obligate me to perform not just as well as Mr. John Q. Non-handicapped Public, but rather better than he must perform. I do not like this added pressure. I thus must state that I am not here with the idea of furthering my own personal interests. It would in fact probably be within my best interest to say nothing. After all, I am one of the several people in the state who has been licensed to drive with restrictions using a telescopic lens. A few such people over the years have been licensed on a case by case basis. I come before you because I am in the position of lobbyist for an advocacy organization for the visually impaired, and because I am a disability rights advocate by profession. In these roles, I have been contacted by several people across the state who tell me that their optometrist or ophthalmologist tells them they

should be allowed to take a driver's test, and if passed, they should be granted a license, but who also tell me that the Division of Motor Vehicles will not give them a chance because apparently their standards just will not allow any flexibility in believing what the optometrist or ophthalmologist has said. This is a problem in the state affecting, at best estimate of the Low Vision Clinics serving the state, 50 to 100 Kansans. In these cases, the problem is either that the individual drives with a telescopic acuity as I have already described, or that their vision falls somewhere in the 20/60 to 20/80 range. House Bill 2857 attempts to correct this problem. It stipulates that a person having 20/40 vision or better achieved through telescopic acuity in the better eye, 20/200 achieved in the carrier lens lens of that eye, and normal periferal (side to side) fields should initially be granted a driver's test. It also stipulates that persons having up to 20/80 vision should initially have a test. In the case of someone who is renewing a license, if a visual loss is noted, say for example the person had 20/20 vision upon license renewal or granting four years previous, but then shows up testing only 20/70, or shows up achieving acuity through use of a telescopic lens when this was not the case in the past, the bill allows for an opinion of the State Board of Medical Examiners to be sought as to whether a current behind the wheel driver's test should be administered.

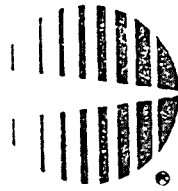
The vision standards in the bill were drawn indirectly from a report of the Drivers' Standards Committee of the Kansas Optometric Association. The report in fact suggested that a behind the wheel driver's test should be the final determining factor when vision is 20/60 to 20/80 in the better eye, or when telescopic acuity is achieved at 20/40 or better with 20/200 in the carrier lens of the better eye and normal periferal fields are present. In talking with one of the authors of this report, I learned that this does not necessarily mean that persons fitting into these visual categories should be tested behind the wheel every four years, but certainly means that not only should the new driver achieving such vision be allowed a test, but also that the driver who had been driving with normal or near-normal vision, and then suffers a visual loss to these levels should also be compelled to take a behind the wheel test. While I have been told by the Lobbyist for the Kansas Optometric Association that that association still takes this viewpoint, I have also been told that the K.O.A. is not comfortable with the current wording of the bill. They would like to have wording developed specifically mandating the behind the wheel test as the final determining factor as I have described. I have no problem with such an amendment if the Committee wishes to propose it. I have not, however, attempted to word such an amendment myself, and I do not believe the K.O.A. has done so either. My reluctance to do so comes from my questioning whether doing so would be necessary. Kansas Law currently provides that an additional behind the wheel test can be administered at any time when there is god cause to believe that an applicant for renewal may not be physically fit to drive. Thus, even if the Medical Advisory Board does not

continue to exist, the Department of Revenue could, under House Bill 2857 if passed into law, adopt administrative regulations requiring that any time an applicant for Driver's License renewal tested as having vision of 20/60-1 to 20/80 in the better eye, or achieved required acuity through telescopic correction, records would have to be checked to see if this was the case at the previous issuance or renewal of the license. If a drop in visual acuity is thus documented, then good cause would be established for requiring the behind the wheel test.

I know the Department of Revenue has expressed its intent to oppose this bill. I also know that one of the major issues of concern to the Department is the liability issue. The behind the wheel driver's test is not immunized from law suites where it would be contended that testing standards were not appropriate, or tests were not properly administered. This concern might be the case if the bill were worded to make the driver's test the final determining factor as the K.O.A. might desire. This would be one argument for leaving the bill as is. If 20/80 is the standard by law for getting to take a driver's test, then the department would be immunized against a suit where it would be contended that the driver's test was used to allow licensure of someone outside of the legal standards. The same argument holds true in reference to the telescopic driver, and yet in both cases, there would be an administrative option for administering a driver's test. Indeed, if the driver's test is not immunized from liability in reference to the disabled, then it is not immunized in reference to the non-disabled driver either. The same kind of suit could be filed whether the driver was handicapped or not. Perhaps it would be a good idea to draft separate legislation targeted toward immunizing the driver's testing process, but the fact that it is not immunized is not justification for the defeat of this bill. The bill is needed.

It is bad public policy to ignore a problem because there might be possible liabilities in addressing it. There are other ways to deal with the liability issue. Please keep in mind that it is not traditionally or statistically the disabled driver in our society who turns out to be the bad driver. I am sure you have all heard or read the statement, "Driving is not a right, but a privilege." It is one the State of Kansas uses frequently. I question, however, whether many the state's non-disabled residents really believe this statement. If you drove to the Capitol this morning and did not stop to think how lucky you are to have such an opportunity, if you do not often think about how your professional status and earning power might suffer by not driving, then driving to you is more of a right than a privilege. For the disabled, this is not the case. Nearly every time I get in my old car, I feel privileged because I have had to think about just how much my life would change if I were not able to do the very restricted amount of driving which I do. I think many disabled drivers think about this often because of the troubles they have had in obtaining their driver's licenses. I urge you to support House Bill 2857.

Attached, please find some articles on telescopic driving.
Thank you for your consideration of these matters.



August - 1982

THE USE OF BIOPTIC TELESCOPES FOR DRIVING

Bioptic telescopes are spectacle mounted telescopes that offer the wearer identification of distance objects. The amount of magnification will vary depending upon the power of the telescope used. Bioptic telescopes are mounted in the carrier lens of the spectacle and may be positioned in various positions depending upon need. Also, these telescopes may be mounted for binocular or monocular use.

In recent years, bioptic telescopes have been designed by William Feinbloom O.D., through Designs for Vision, Inc. and other manufacturers, with magnification of various powers. These telescopes have been prescribed by optometrists and ophthalmologists for visually impaired individuals and successfully utilized to improve visual performance for a number of activities, including driving.

The bioptic telescopes used for driving are mounted in the superior portion of each spectacle lens. Only individuals that are corrected through the telescope to 20/40 visual acuity can utilize the telescopes for driving purposes. The visual acuity measurement of 20/40 generally represents the legal criteria for limitation of driving licenses. As of December 1978, there were sixteen states that licensed bioptic drivers. The majority of the other states do not condemn or restrict the use of these telescopes for driving purposes. Criticism of the use of bioptics for driving stems from the misconception that the person will continually be using the telescope while driving.

Contrary to this misunderstanding, the person using the bioptic telescopes for driving does not continually view through the telescope. The purpose of mounting the telescopes in the superior position of the carrier lens is to enable the person to drive the automobile while viewing through the carrier lens. Thus, the person will experience a full and complete field of vision as he/she would with conventional spectacles. When the individual wishes to discern some aspect of detail, such as reading a street sign, he/she lowers their head slightly to position the bioptic telescope in line with the point of fixation for spotting purposes. Used in this manner, the bioptic telescope has been used effectively for day-time driving by many visually impaired individuals in the United States.

While the visual criteria in most states for the issuance of driving licenses includes both visual acuity of 20/40 in the best corrected eye and approximately a 140 degree field of view, it must be recognized that both of

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these measurements do not necessarily represent a qualitative understanding of the person's visual performance abilities. Liebowitz and Post⁽¹⁾ and Padula⁽²⁾ point out that the visual process is composed of actually two functions: focal processing, and ambient processing. Focal processing involves the visual manipulation of the environment to discern aspects of detail, while ambient visual processing enables the individual awareness of spatial relationships. In order to drive an automobile, the individual must intergrate both processes while being able to selectively utilize each process individually.

The quantitative measurements of sight, such as acuity and field measurements, do not assess the functional abilities of focal and ambient visual processing. In addition, an impairment to the eye that limits the quantitative measurements of sight (acuity and scope of field) is not directly related to the person's ability to utilize focal and ambient visual processing. Therefore, it becomes necessary to consider the fact that there are individuals with so called "normal" sight that have driving licenses and are functionally visually impaired because of a lack of ability to utilize focal and ambient visual processes effectively to visually manipulate their environment and extract useful information. An example is the individual who is involved in a driving accident who claims that he simply did not see an approaching car from the side or see the overhead red light.

Means of analyzing functional vision abilities of visually impaired individuals with bioptic telescopes should include evaluating skills behaviorally while performing simulated and actual driving tests. Also, contrast sensitivity analysis (means of testing the person's ability to respond to varying degrees of illumination relationships) is also important to further understanding the person's ability to utilize and manipulate visual information.

To exclude a visually impaired person who meets the acuity requirements of 20/40 with a bioptic telescope, without functionally evaluating their use of vision, may discriminate against him/her. Recent court decisions in Texas and Pennsylvania have ruled that denial of the driving privilege to persons with low vision based on the use of a device and not evaluation of individual driving performance is in violation of the Rehabilitation Act of 1973, Section 504. The "normally" sighted individual is permitted a functional analysis of vision when the person is evaluated by a qualified examiner while driving an automobile. Therefore, the visually impaired individual should be given similar opportunities.

The American Optometric Association (AOA) supports safe driving practices. In 1976, the AOA House of Delegates passed the "Motorists' Vision and Highway Safety" resolution which stated: "Resolve that the American Optometric Association continue to urge that the laws of all states provide a suitable and adequate visual screening examination for a driver's license, which shall be given not only prior to licensing, but also periodically thereafter at intervals of not more than four years". This resolution emphasizes the individual differences of driving performance and that the dynamics of vision over a period of time can change.

Little relationship has been found between highway safety and corrected vision. In the United States there has not been demonstrated any significant increases in accident levels related to uncorrected vision. In the California Driver Fact Book of April, 1981, under the sub-heading, "The Relationship

between Vision and Driver Record", overall, the relationships between driver record and static acuity for 17,000 drivers was quite small (correlation - .15 or less). According to a study by the Institute for Research in Public Safety⁽³⁾, dynamic visual acuity, static acuity under low levels of illumination, and central angular movement are most consistently related factors to accidents, therefore, a prediction of the driving safety of a visually impaired individual using a bioptic telescope should not be made on the basis of the person's static visual acuity loss alone.

The 1976 AMA-AAMVA National Conference on Telescopic Devices and Driving agreed that since there is insufficient scientific data available to show precisely the potential risk of driving with telescopic devices, no one can make categorical recommendations covering them.⁽⁴⁾

In a 1978 paper presented to the American Academy of Optometry, Bostick reported that of a sample of 166 telescope equipped drivers in New York studied for a seven month period, they experienced a lower crash rate than the general New York driving population. Subsequently Bostick reportedly issued an errata sheet with an opposite conclusion. Underlining this controversial data is the fact that neither the original nor subsequent data by Bostick has been printed in a journal.

To the contrary, data from Feinbloom⁽⁵⁾ on 300 patients driving from one to ten years with biotic telescopes revealed that none had suffered an accident causing injury or severe damage to a car or other property. Data from Kelleher⁽⁶⁾ indicates that biotic lens drivers in California, Massachusetts and New York have a lower percentage of accidents than do the general driving population.

The AOA Low Vision Section concludes that the accumulated data concerning safety and the use of bioptic telescopes for driving does not offer conclusive evidence to support the ban on the use of spectacle-mounted telescopes for driving. The collection of data on driving performance of low vision drivers needs to continue so that rational, thoughtful decisions based on sound data, which could not be compiled if individuals could not be licensed, can be made. Therefore, the AOA Low Vision Section recommends that future consideration of any resolution calling for a ban on the use of telescopic lens systems by drivers be postponed until there is further research on the safety factors.

In summary, the ability of the visually impaired individual to function effectively while driving with bioptic telescopes must be considered with regard to the person's contrast sensitivity and use of focal and ambient visual processing. Static acuity and field measurements do not necessarily indicate performance abilities during dynamic visual operations while driving. Therefore, for the visually impaired person, the American Optometric Association (AOA) Low Vision Section recommends that telescopic lenses not be considered as the sole factor in denial of a driver's license, but the effectiveness of an individual's visual performance with bioptic telescopes be the determining factor.

The AOA Low Vision Section offers the professional expertise of its membership to review this issue in greater depth and to consult with those agencies and federal departments interested in further developing the appropriate means of functional vision analysis related to driving performance of visually impaired individuals.

REFERENCES

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- (3) Shinar, D.: Driver visual limitations diagnosis and treatment. Indiana University School of Public and Environmental Affairs, Contract No. DOT HS-5-01275, September 1977.
- (4) Hanes, L.: Is it safe to wear telescopic devices when driving? Traffic Safety, Vol. 76 (11), 1976.
- (5) Feinbloom, W.: Driving with bioptic telescopic spectacles. American Journal of Optometry and Physiological Optics, Vol. 54 (1), 1977.
- (6) Kelleher, D.: Driving with low-vision. Journal of Visual Impairment and Blindness, Vol. 73 (9), 1979.

Driving with Low Vision

DENNIS K. KELLEHER, ED.D.

Dr. Kelleher is currently program manager for Special Education in Sonoma County. He is a member of the Driver License Advisory Board to the California Department of Motor Vehicles, and in March 1971 became the first low vision person in California to be licensed to drive with a bioptic.

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Abstract: *Discusses the current status of driving with low vision, both with and without a bioptic telescope. It specifies licensing criteria, training sequences, and identifies problem areas. Preliminary data from a comparison of safety records in three states are presented and recommendations are made for future licensing standards and for conducting research on visually impaired drivers.*

Whether or not people with low vision should be licensed to drive is an extremely emotional and complex issue, and the purpose of this article is to discuss questions regarding the role of visual acuity in the driving task, comment on some specific problems regarding the subgroup of drivers using the bioptic telescope, and present some preliminary data regarding the safety records of the bioptic driver. Some of the discussion will be applicable to all low vision drivers, but some points will relate to bioptic drivers only.

By a low vision driver, one usually means a driver who uses a bioptic telescope to help give better visual resolution. Such a person is the central focus of the debate, a fact that is itself noteworthy, when one considers that many state Departments of Motor Vehicles (DMVs) have for years been licensing persons who do not meet the minimum visual screening standard and who do not use bioptic telescopes. For example, after a cataract operation, a person has unique visual difficulties that should have implications for driving, yet to my knowledge no controversy exists about routinely allowing such individuals to drive if they show proficiency during a road test.

It is also a fact that many senior citizens who have cataracts, glaucoma, diabetic retinopathy, and macular degeneration continue to drive, legally and illegally, after their central visual acuity has fallen below the 20/40 state screening standard—the minimum acuity level most commonly allowed for drivers in the United States. As the average age of the general population continues to rise because of longer life expectancies, there will be a greater likelihood that people with low vision will be applying for licenses to operate motor vehicles.

Given, therefore, the possibility that more individuals who do not meet the minimal vision standards will be applying for driver licenses, the issue of driving with low vision is of paramount importance for all persons interested in traffic safety and the rehabilitation of the visually impaired.

Definitions

The term low vision drivers as used in this article refers to those drivers whose central visual acuity is so impaired that they cannot meet the minimum visual screening standard required by the state DMV for driver licensing. The term bioptic driver will refer to drivers who use the bioptic telescope as a driving aid.

The bioptic consists of a miniature galilean telescope which is positioned in the upper portion of a carrier lens (see Figs. 1 and 2). The carrier lens, which incorporates the patient's refractive correction, is conventionally mounted in the frame. The advantage in this arrangement is that it allows the user to look through the telescopic portion for spotting and magnifying distant objects, while permitting a rapid change in fixation to the larger carrier lens for general viewing of the entire visual field. The transition from one lens to another may be made as rapidly as the patient is able to move his eyes and head. The most commonly used magnifications presently prescribed for driving are the 2.2X and 3.0X bioptic telescopes (see Table 1 for technical data).

AREAS OF AGREEMENT AND DISAGREEMENT

Though there are several issues upon which many

e 1. Comparison of bioptic magnifications, optical fields, and scotomas

Magnification	Bioptic Field (Degrees)	Degrees of Scotoma
2.2X	12	14
2.2X W.A.*	17	15
3.0X	8	10
3.0X W.A.	12	15
3.0X P.E.F.†	19	16
4.0X	6	11
4.0X P.E.F.	12	11

*Wide Angle Model

†Prismatic Expanded Field Model as opposed to the standard Galilean Model.

leaders in the field of low vision disagree, there is some consensus on several points:

1. Understanding the Role of Vision as It Relates to Driving

Everyone agrees that vision is essential for safe operation of a motor vehicle. Disagreement arises over the minimum visual function that enables a person to drive safely. Recent research has given some encouraging indications that there are measures of visual capabilities that may be better than static acuity, which is currently used by most DMVs, for predicting a person's likelihood of being involved in an accident (Henderson & Berg, 1974). If static visual acuity is so important to driver safety, how are persons with reduced central acuity able to build up better driver safety records than the general population in some instances? Henderson and Berg (1974) found very little relationship between static visual acuity and driver safety, as did the research department of the California DMV (1978). Attention span, psychological makeup, and sensory processing were mentioned as factors which may be more influential in affecting the safety record. No one can argue rationally that driving with reduced visual acuity does not reduce the "safety margin," just as driving with impaired hearing or an orthopedic handicap does. The question must be, are we justified in eliminating persons with low vision from consideration for licensure

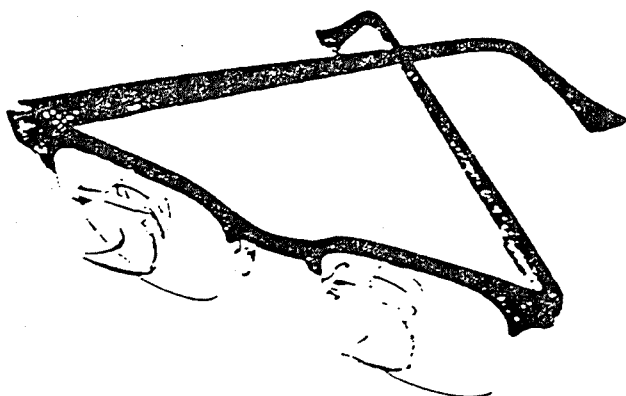


Figure 1. 2.2X standard field bioptic with clear housing.

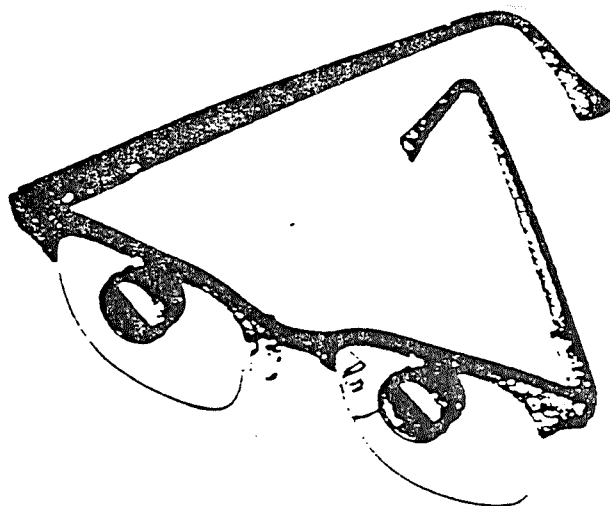


Figure 2. 2.2X standard field bioptic with black housing.

on the basis of static visual acuity alone? No one really knows how many low vision drivers we have. It is likely we have many more persons driving legally, but unmonitored, and illegally, out of necessity, than anyone imagines. Since the accident rate among this driver subgroup has not clearly demonstrated that the safety margin has been compromised to the extent of endangering the general population, we must conclude that our use of static visual acuity and the arbitrary 20/40 screening standard may not be adequate as the sole criterion for withholding a license from a low vision person who needs to drive. Insurance companies have not to my knowledge routinely placed low vision drivers in assigned risk pools, or imposed a surcharge on premiums, as they have for other driver subgroups, such as the habitual alcoholic driver, who has been shown to be a significantly higher risk than the average driver.

Another point to help demonstrate the relative unimportance of static visual acuity in driving safely is to consider how the average normally sighted driver can perform well under adverse driving conditions, such as rain, snow, sleet, and nighttime glare, when visual acuity is probably below the 20/40 level. One probable explanation is that in driving we primarily use peripheral vision, where 20/20 resolution is not physiologically possible. Since the eye fixates on many things the viewer is not aware of, we may assume that central acuity is used either as a response to low resolution stimuli or as a result of a conscious decision made by the driver. Certainly, one does not have to resolve a target in detail to be able to react to it. A person who normally has 20/20 vision, but may have 20/40 at night, may even feel more uncomfortable than the low vision person, who is accustomed to dealing with low acuity and an ill-defined image.

2. Visual Perception

It is generally agreed that the phenomenon of vision is not experienced unless and until the brain receives and interprets the incoming visual stimuli. Therefore, both low vision and normally sighted people "see" with their brain, not their eyes. The disagreement is about whether visual perception training can overcome some of the dis-

ages to which the brain of the low vision person is subjected. Reaction time is a combination of the time it takes the eye to resolve and transmit an image to the brain, plus the time it takes the brain to interpret that image and respond to it. Can the brain be trained to process less-detailed information more efficiently? Research indicates that it can (Barraga, 1976).

3. Blind Spots

Scotomas or blind spots, especially those caused by the housing of the bioptic telescope, are another area of both agreement and disagreement among low vision professionals. It is agreed that every driver contends with blind spots while driving. In a normally sighted binocular driver, the windshield support posts, the mirrors, and other objects may cause blind areas in the forward field of the driver. The monocular or one-eyed driver has also to contend with the three to five degree physiological blind spot caused by the optic disc. These blind spots are absolute, or totally obscuring, and are not relative or partial as scotomas may be in some eye diseases. The disagreement arises when we consider the significance of these scotomas. If objects around you are moving, as when driving, it is extremely difficult, if not virtually impossible, to "lose" any object in the blind area for any length of time unless it is moving in the same direction and at the same speed, in which case a collision course would not be a concern. [There is an exception to this rule: An object traveling perpendicularly and at a slower speed could theoretically be obscured in a blind area, however this would assume that the person was not moving his head, and hence the scotoma, from side to side (Keller & Eskridge).] As you approach an object the visual image enlarges on the retina. Assuming that one is moving the head and eyes to observe other moving objects, as most people do while driving, blind spots do not pose a significant hazard. To my knowledge no one has suggested that we do not license one-eyed drivers because of the increased risk from their physiological blind spot and accompanying field loss.

4. Non-Visual Cues

It is agreed that non-visual information is significant. The disagreement lies in the degree of significance to the overall driving task. Though many factors must be considered in attempting to explain how low vision drivers are seemingly able to operate motor vehicles safely, one thing which may be underrated or overlooked is the importance of auditory and other sensory cues. A visually impaired person is not born with greater auditory discrimination abilities or more acute hearing, he simply develops it out of necessity. The low vision driver may be able to use auditory cues to better advantage than the normally sighted driver in an effort to compensate for and augment the visual input.

5. Self Preservation

There is general agreement that all of us have an instinctive will to survive. It is difficult to explain why certain critics of the low vision driver feel these individuals possess less of this instinct. Most of us can agree that no one intentionally wishes to injure himself or anyone else. The low vision driver may therefore voluntarily restrict himself from driving in conditions which he knows to be hazardous because of his visual limitations, e.g., at rush

hour, into the direct sunrise or sunset. This may be one of the factors which explain the superior safety record of the bioptic driver, as recently shown in statistics compiled by the DMV in the State of New York.

Criteria for Licensure

Though there is some agreement on the performance and driving competencies expected of both the normally sighted and low vision driver, the major issue centers around the significance of reduced visual acuity and its relationship to driving safely. There is a consensus that some low vision individuals should be licensed provided they meet specific visual prerequisites. It is agreed that all the bioptic applicants should be carefully screened with respect to these visual prerequisites, at least until we can develop more valid and reliable criteria for licensing. The following prerequisites are recommended:

1. Visual fields of at least 130 degrees.
2. A stable visual condition, which is preferably either congenital or of long duration and is accompanied by no other health problems.
3. Adequate central visual acuity through the bioptic to meet minimum requirements as prescribed by the state licensing law (usually 20/40) and no less than 20/160 visual acuity through the carrier lens. Admittedly this is a "guestimate" but it is probably no more arbitrary than the 20/40 screening standard now used in most states.
4. Normal color perception.
5. Normal ability to move the eyes for tracking.
6. High motivation, intelligence, and a need to drive for employment, school, or for independence.
7. A highly developed sense of moral responsibility. (Although this is intangible and difficult to evaluate, it is desirable to select individuals who would voluntarily restrict themselves from driving under hazardous conditions.)

The 1975 New York Conference on telescopic lens systems and driver licensing also recommended in addition to most of the above that:

1. A special form be developed by the DMV to collect medical information.
2. The bioptic driver applicant should receive training from a professional driving instructor.
3. The applicant should be re-evaluated annually.
4. The applicant should be required to pass a road test which is more stringent than the routine one.
5. The DMV should keep special data on bioptic and low vision drivers for study and research.
6. The DMV should identify special examiners who would give all road tests to bioptic drivers to assure more uniformity in standards and expectations.

Some other recommendations which have been discussed in other meetings are:

1. The DMV should help to establish special driver training programs for low vision drivers.
2. A driver licensing advisory board should be established and include at least one low vision specialist who is familiar with the problems encountered in driving with low vision.

Rec. g Sequence for Bioptic Users
Tr. important aspect of driving with a biop-
tic, and include:

1. Learn to locate stationary objects while the trainee is not moving.
2. Learn to locate moving objects while the trainee is not moving.
3. Learn to locate moving objects while the trainee is moving.
4. Develop visual tracking skills under varying illumination and vibration conditions.
5. Develop short term visual memory and visual discrimination skills to be able to select and identify rapidly those visual stimuli which demand the most rapid attention and action.

The rationale for this training sequence is discussed in greater detail elsewhere (Levin & Kelleher, 1975; Jose & Butler, 1975; Weiss, 1979).

Driving Test Considerations

Though it has been recommended that the low vision driver be given a more rigorous road test, the same general criteria for evaluating driving performance will be used with the low vision driver as with the normally sighted driver. These criteria are:

1. Speed control and braking.
2. Depth perception and spatial orientation.
3. Steering.
4. Use of mirrors.
5. Backing and parking.
6. Shifting and engine control, as applicable to manual transmissions.

Good Driving Habits

Good driving habits that should characterize the normally sighted driver, are especially important to develop in the low vision driver. These may include, but are not necessarily limited to:

1. Keep your eyes moving constantly.
2. Aim high in steering, i.e., look out in the distance, not directly over the hood.
3. Get the whole picture of what is going on.
4. Be sure that you are seen by the other guy.
5. Be sure to leave yourself an escape path in the event of an emergency.
6. Keep the vehicle in good mechanical order and keep the windshield and other windows clean for maximum visibility.
7. Use headlights under any adverse driving conditions to increase your visibility to others.
8. Never drive under the influence of alcohol or other drugs.
9. Use other sensory input in addition to vision to assist you while driving.
10. Keep alert and expect the unexpected. (Driver inattention is the largest cause of traffic accidents [California DMV, 1978].)

Other good habits suggested for the low vision driver, but which may also be helpful to the normally sighted driver are:

1. Study maps, so you know where you are going before you leave.
2. Never make any rapid, last minute, maneuvers. (Changing your mind and not giving the other drivers time to react can be extremely hazardous, especially on freeways. It would be better to make the wrong turn than to cut across several lanes to get to your exit.)
3. Carry any additional personal necessities, such as an extra pair of glasses, a wide brimmed hat, and a monocular for use in spotting house numbers or street signs when your car is parked.
4. Using a smaller car with standard transmission, non-reflective hood, and dark interior color, may help some low vision drivers who are sensitive to light and have difficulty with spatial perception. Speed control can be more closely monitored with a standard transmission, though it requires greater coordination. It may also be an advantage in giving the driver better control over braking on hills and curving roads.

Misunderstandings about the Bioptic

In considering the bioptic telescope, we need to clarify several misunderstandings about its advantages and disadvantages. A bioptic is used only as a spotting system and should never be used constantly. In using the bioptic in this manner, however, it is agreed that a low vision person is then driving with his reduced central acuity for most of the time. The advocates of driving with low vision feel this is acceptable for several reasons. As stated earlier, everyone uses his strong central acuity as a response to low resolution or as a result of a conscious decision, therefore it is likely that much lower acuity levels are used during the driving task than those for which we are presently screening. It is concluded that acute vision at the 20/20 or 20/40 range is probably not used and hence not necessary during most of the time a person is driving. For example, a four-foot tall child subtends a visual angle larger than 20/200 at a distance of 1200 feet. If one were traveling at 50 miles per hour, or 73 feet per second, a driver would have 16½ seconds to see this object and take necessary action. Of course the child's image would be constantly enlarging the angle it subtends as the driver approaches, thus increasing the probability of its being recognized as a situation requiring driver response.

For those low vision drivers who use a bioptic telescope, the bioptic field can be used as a "pseudo fovea" when high resolution is necessary, as determined by and in response to their peripheral vision. Since the normal foveal field is equivalent to between only three and five degrees in the sighted person, it is felt that training in visual tracking, visual perception, and use of the bioptic can help the driver compensate for reduced central acuity by learning how to change fixation rapidly and use the bioptic field efficiently.

One opinion which has erroneously been stated as a "fact" is that a normally sighted person can duplicate low vision by removing his glasses, which correct a refractive error. This is inaccurate, because clearly focused light rays which are not properly transmitted or processed by an underdeveloped macula are quite different from out-of-focus light rays stimulating a normal macula. In addition, a low vision person's brain is accustomed to processing a sub-standard visual stimulus and has probably

compensate for this far better than the brain of a normal person has learned to compensate for a visual defect without glasses.

Comments about the importance of the ring scotoma caused by the housing on the bioptic has been mentioned earlier. It should suffice to point out that when considering head, eye, object, and body movement in a dynamic situation such as driving, problems which might be caused in a static situation are eliminated or greatly diminished. This is why it is crucial to continually move the head and eyes and frequently change fixation from the bioptic to the carrier lens. In doing this the brain becomes accustomed to totally ignoring the absolute ring scotoma.

Using mirrors in conjunction with the bioptic does not pose a problem during driving because the image of the mirror will appear at optical infinity if the object is more than 20 feet from the mirror. Though vibrations will cause some loss of image clarity, the interpretive mechanism of the typical low vision person is accustomed to resolving a sub-standard visual image. This is probably why many low vision patients are capable of using 10X or 20X power binoculars in a moving bus, train, plane, boat, while the normally sighted person is unable to do so. It may also explain why low vision persons do not seem to have difficulty in judging depth through the telescope (telescopic parallax) nor do they seem to be disturbed by objects passing rapidly through the telescopic field (Jack-in-the-Box effect). It is interesting to note that persons who cite these problem areas in using a bioptic do not have low vision themselves and are basing their opinion on their own experience in trying to use bioptic telescopes and other magnifiers.

DATA ON BIOPTIC DRIVERS IN THREE STATES

Though no one knows how many persons are driving with low vision, either legally or illegally, it is commonly agreed that those states with facilities to conduct research on low vision drivers should do so. Thus far we have a very small sample of low vision drivers, but they are being scrupulously screened—as they should be. Though our data at this point are not conclusive because the sample is too small and there were no adequate controls regarding number of miles driven, driving conditions, and other factors that would allow a valid comparison with the general driver population, we do have preliminary indications in the three states who have most of the licensed bioptic drivers. These indications are that the bioptic driver is not a high risk driver. (See Table 2 for states which currently license drivers with bioptics. Table 3

Table 2. States approving licensing of drivers with bioptic lens*

1. California	9. Nebraska
2. Connecticut	10. New Hampshire
3. Delaware†	11. New Jersey
4. Florida†	12. New York
5. Louisiana	13. Ohio
6. Massachusetts	14. Oregon
7. Michigan	15. South Carolina
8. Montana	16. Washington

* This list was compiled by the California DMV in January 1978 from a questionnaire which it circulated to all states. New York DMV reported that as of December 1978, two additional states will license drivers with bioptics. There are additional states which will license low vision drivers without bioptics.

† Licenses granted only with the approval of the Medical Advisory Board.

compares a sample of bioptic drivers in New York, California, and Massachusetts with normally sighted drivers.)

Notice that there are differences among states in the age ranges that included the largest proportion of licensed bioptic drivers and in the periods when data were collected. The one common trend, however, is that the bioptic driver appears to be compiling a better safety record than the general population. There may be many explanations for this, probably the most important of which is that these individuals recognize driving as a true privilege that is crucial to their independence and they are extremely careful to insure they do not inadvertently place themselves in a high risk driving situation; they carefully select and control when, where, how, and what they will drive.

SUMMARY

No one is suggesting that low vision is as good as normal vision for driving since it reduces the safety margin. The real issue is whether this reduced safety margin poses such an insurmountable problem that the low vision driver cannot operate a motor vehicle safely and is a hazard to the general population.

This article does not try to discuss whether it is in the best public interest to license low vision drivers so they can be gainfully employed and removed from the welfare roles, nor does it examine possible consequences of driving or not driving for self concept. The question considered here is whether low vision drivers pose an unacceptable risk to society. Answers to this question must not be based on the opinion of some "expert," who may have an

Table 3. Accident rates of bioptic drivers compared with those of normally sighted drivers*

State	No. of Licensed Drivers (millions)	No. of Bioptic Drivers	% Drivers in Accidents	% Bioptic Drivers in Accidents	Age Range with Highest Proportion of Bioptic Drivers
Calif.	12.9	145	10.6%	9.0%	32% in 20-29
Mass.	3.2	128	5.7	5.5	34% in 50-59
N.Y.	9.0	166	12.4	9.0	53% in over 60

* These data were collected during different time periods (1967-73 in Mass., 1971-78 in Calif., and 1977-78 in N.Y.). Reportable accidents have different criteria in each state.

either a personal, professional, or financial vested interest. Objective data must be collected to ensure that any decision made regarding the driving privilege, which is so crucial to us all, is neither needlessly discriminatory nor arbitrary and capricious. If the data are less than compelling on either side of the issue, it is likely that there will be numerous tests in a court of law—litigation on this issue is proceeding in Texas.

Since only one exception is needed to disprove the hypothesis that no one can drive safely with low vision or with a bioptic, I feel that the information we already have makes it difficult to support the contention that no one with reduced central acuity can operate a motor vehicle safely. We cannot collect the data unless we license low vision drivers, since simulation cannot duplicate the many complex driving situations and cannot therefore provide the valid data needed to answer this question. The best way to refute the notion that low vision drivers pose an unacceptable hazard is by quoting empirical data which show that low vision drivers have been driving safely and are currently being monitored by the state Departments of Motor Vehicles.

On the other hand we should not interpret these preliminary positive results as justification for licensing all persons with low vision. We must continue to regard as eligible candidates only those persons capable of satisfying the previously discussed prerequisites, at least during the data collecting phase.

The primary objective for collecting data on low vision drivers is to expand our knowledge about the role of vision in driving safely. All state DMVs with the appropriate data collection and analysis capabilities should be encouraged to design, implement, and evaluate studies of the low vision driver with and without the bioptic. ■

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New Light on an Old Problem

It is estimated that in the United States about 70 percent (one million) of all severely visually impaired persons are 65 years of age or older. Now a team of researchers from Britain, where 80 percent of those who are visually impaired are elderly, has evidence that poor lighting may be an important cause of up to half the cases of "functional blindness" in aging persons.

Investigators from St. Bartholomew's Hospital in an earlier study of 15,000 households concluded that half of the individuals tested had better vision in the eye clinic than in their own homes, according to an item in *Medical*

World News, August 20, 1979. More recently, a study of 13 men and 43 women in their seventies revealed that the median home lighting level was only a tenth that of the hospital. Physicians believe that a major reason for dim lighting in homes of aging persons is the hoary myth that bright light is harmful to the eyes. Also, many elderly persons face their light source when reading, thereby increasing glare rather than illumination.

Another factor in functional blindness, speculates Dr. Robert N. Butler, director of the National Institute on Aging, Bethesda, Maryland, may be that declining central nervous system functioning leads older individuals to withdraw from unpleasant stimuli such as bright lighting. Low incomes, too, he believes cause people to use as little lighting as possible, in order to keep electricity bills low.

DRIVING WITH SUB-NORMAL VISION

MOST INDIVIDUALS HAVE A STRONG DESIRE TO DRIVE. THOSE WITH LESS THAN 20/40 ACUITY FACE A GREATER STRUGGLE BUT SHOULD BE GIVEN WHATEVER HELP POSSIBLE IN THEIR EFFORTS TO OBTAIN A LICENSE. WHEN THE DRIVER'S LICENSE BUREAU VISION SCREENING IS FAILED, THE EYE SPECIALIST ENDS UP IN THE ADVISORY POSITION. THIS SITUATION CAN BE FRUSTRATING FOR BOTH PATIENT AND DOCTOR UNLESS STATE DRIVING STANDARDS ARE WELL UNDERSTOOD BY ALL PARTIES INVOLVED.

A NUMBER OF PATIENTS SEEN AT THE KANSAS LOW VISION CLINIC HAVE BEEN DENIED A LICENSE TO DRIVE BUT ARE STILL SEEKING HELP IN THIS REGARD. DUE TO THIS, THE CLINIC STAFF MAINTAINS AN ACTIVE INTEREST IN DRIVER'S LICENSE REGULATIONS. THE CLINIC EXAMINED 43 INDIVIDUALS IN 1978 WITH BEST SPECTACLE AIDED ACUITY OF 20/40 TO 20/100 AND MANY MORE THAT OBTAINED 20/40 WITH 2 TO 4X TELESCOPIC AID. IN AN ATTEMPT TO ELIMINATE SOME OF THE EXISTING CONFUSION, WE FORMULATED A QUESTIONNAIRE WHICH WAS MAILED IN APRIL OF 1979. A COPY WAS SENT TO BOTH THE OPTOMETRIC ASSOCIATION AND THE DRIVER'S LICENSE AUTHORITY OF KANSAS AND 5 SURROUNDING STATES. THE TABLE BELOW SHOWS SOME OF THE MORE INTERESTING INFORMATION GAINED IN THIS EFFORT. (TABLE ON NEXT PAGE)

WHEN POSSIBLE, THE EXACT RESPONSE GIVEN IS STATED ON THE TABLE. OKLAHOMA DID NOT COMPLETE THE QUESTIONNAIRE BUT INSTEAD MAILED A COPY OF THE AMERICAN ASSOCIATION OF MOTOR VEHICLE ADMINISTRATORS (AAMVA) VISUAL STANDARDS WHICH THEY HAVE ADOPTED. THESE STANDARDS, UPDATED LAST IN 1966, WERE A JOINT EFFORT OF THE AAMVA AND THE AMERICAN OPTOMETRIC ASSOCIATION.

IN REVIEWING THE TABLE IT IS OF INTEREST TO NOTICE:

1. ONLY SIX REPLIES WERE RECEIVED AS OF THIS WRITING (JUNE 1979). OF

	KANSAS OPTOMETRIC ASSOC.	NEBRASKA DEPT OF MOTOR VEHICLES	MISSOURI DRIVER'S LICENSE BUREAU	OKLAHOMA DEPT OF PUBLIC SAFETY	COLORADO DRIVER'S LICENSE BUREAU	TEXAS DEPT OF PUBLIC SAFETY
WHAT VISUAL ACUITY DOES YOUR STATE REQUIRE OR LICENSURE WITHOUT CORRECTIVE LENSES?	DOWN TO 20/40, MONOCULAR OR BINOCULAR	20/40 OR BETTER WITH BOTH EYES WORKING TOGETHER	20/40 OR BETTER, EITHER EYE OR BOTH-- NO AID	AAMVA STANDARDS 20/40 OU OR 20/30 IF MONOCULAR	20/40 OR BETTER	20/40 OR BETTER EACH EYE & BOTH EYES TOGETHER
WHAT VISUAL FIELD DOES YOUR STATE REQUIRE OR UNRESTRICTED LICENSURE?	90°	140° TOTAL	NO ANSWER GIVEN	AAMVA STANDARDS 120° IN ONE EYE	NOT TESTED	VISUAL FIELD NOT TESTED BY DRIVER'S BUREAU ONLY RESTRICTED WHEN EYE SPECIALIST RECOMMENDS IT
WHAT IS THE LOWEST VISUAL ACUITY YOUR STATE WILL CONSIDER FOR LICENSURE?	20/60 MONOCULAR OR BINOCULAR	20/50 MONOCULAR 20/60 BINOCULAR	20/160 MONOCULAR OR BINOCULAR--PENDING VISION ADVISORY BOARD REVIEW	AAMVA STANDARDS CONSIDERED WHEN BEST CORRECTABLE ACUITY IS BELOW 20/60 OU, 20/50 IF MONOCULAR, APPLICANT IS REFERRED TO SUPERVISORY EXAMINER	FOR LIMITED LICENSURE WHEN ACUITY IS BETTER THAN 20/200	20/70 AND MAY RESTRICT TO 45 MPH DAYTIME ONLY OR LOCAL DRIVING
DOES YOUR STATE UTILIZE A REVIEW COMMITTEE?	YES - TO ADVISE THE MOTOR VEHICLE DIRECTOR ON INDIVIDUAL CASES - FOR EXAMPLE WHEN ACUITY IS BELOW 20/60	YES - A HEALTH ADVISORY BOARD IS USED WHEN ACUITY IS 20/70 OR WORSE	YES - TO REVIEW SITUATIONS WHERE ACUITY IS 20/100 TO 20/160	NO DIRECT ANSWER - SEE ABOVE	YES - WHEN EYE SPECIALIST REPORTS 20/100 TO 20/200, CASE REFERRED TO THE DISTRICT SUPERVISOR	YES - A MEDICAL ADVISORY BOARD
DOES YOUR STATE ALLOW THE USE OF A REDUCED FIELD TELESCOPIC AID FOR DRIVING?	YES - CONSIDERED ON AN INDIVIDUAL BASIS	No	YES-UP TO 4X POWER & AIDED ACUITY MUST BE AT LEAST 20/40 WITH AT LEAST 20/160 IN THE CARRIER & MUST HAVE BOARD REVIEW & APPROVAL	NO ANSWER	No	YES - IF RECOMMENDED BY THE MEDICAL ADVISORY BOARD

THE SIX RECEIVED ONLY ONE WAS FROM A STATE OPTOMETRIC ASSOCIATION (KANSAS).

2. THE VISUAL ACUITY REQUIRED FOR DRIVING WITHOUT CORRECTION IS CONSISTENT AT 20/40.

3. THE VISUAL FIELD REQUIRED FOR DRIVING SHOWS NO CONSISTENCY. NO INFORMATION ON VISUAL FIELD WAS RECEIVED FROM MISSOURI WHILE COLORADO AND TEXAS APPARENTLY DO NOT ROUTINELY CONSIDER THIS ASPECT OF VISION. THE VALUE OF 90° RECEIVED FROM KANSAS WAS NOT SPECIFIED AS BEING MONOCULAR OR BINOCULAR AND NO VALUE IS GIVEN IN THE NEW KANSAS REGULATIONS (DISCUSSED BELOW). THIS AREA OF TESTING WOULD SEEM TO NEED CLARIFICATION AND STANDARDIZATION.

4. THE LOWEST LEVEL OF ACUITY CONSIDERED FOR LICENSURE ALSO SHOWS MUCH FLUCTUATION, VARYING FROM 20/50 MONOCULARLY TO 20/200.

5. MOST OF THESE STATES REPORT UTILIZING A REVIEW COMMITTEE OF SOME VARIETY. THIS COMMITTEE IS GENERALLY USED FOR CASES WHERE ACUITY IS BELOW 20/60 OR WHEN A MEDICAL CONDITION NEEDS SPECIAL CONSIDERATION.

6. THE QUESTION ON TELESCOPIC AID YIELDED A SURPRISING VARIETY OF RESPONSES. THIS TOPIC WAS OF SPECIAL INTEREST IN THE LOW VISION CLINIC WORK. WE HAD KNOWLEDGE OF ONLY THREE STATES (NEW YORK, CALIFORNIA, AND FLORIDA) WHICH HAVE DRIVER'S LICENSE LAWS FORMALLY DESIGNATING THE CONDITIONS UNDER WHICH TELESCOPIC AID IS ALLOWED. OTHER STATES GRANT APPROVAL ON AN INDIVIDUAL BASIS BUT THE CRITERIA EMPLOYED IS OFTEN NOT INCLUDED IN INFORMATION GIVEN TO THE STATE'S EYE SPECIALISTS. OUR KANSAS LOW VISION CLINIC STAFF HAVE THROUGH THE YEARS BEEN FRUSTRATED IN ITS ATTEMPTS TO UNDERSTAND WHAT CRITERIA KANSAS APPLIED IN THESE CONSIDERATIONS. IN 1978 WE RECEIVED INFORMATION SUGGESTING THAT REDUCED FIELD TELESCOPIC AID WAS NO LONGER ACCEPTABLE IN KANSAS. IT WAS THEREFORE OF MUCH SURPRISE THAT THIS RECENT RESPONSE INDICATES IT IS AT TIMES ALLOWED IN KANSAS AS WELL AS MISSOURI AND TEXAS. TO FURTHER CONFUSE THIS ISSUE, NEBRASKA

STATED "NO" ON THE QUESTIONNAIRE BUT THEIR VISION REGULATIONS STATED:
"TELESCOPIC LENSES - UPON RECEIPT OF A VISION STATEMENT THAT HAS TELESCOPIC LENSES CHECKED, THIS STATEMENT MUST BE CHECKED BY THE HEALTH ADVISORY BOARD BEFORE IT IS TO BE HONORED."

ONE ADDITIONAL SURPRISE RESULTED FROM THIS QUESTIONNAIRE. AFTER CONTACTING THE KANSAS DEPARTMENT OF MOTOR VEHICLES, THE KOA WAS INFORMED LATE IN MAY THAT AS OF MAY 1, 1979 KANSAS MOTOR VEHICLE DRIVER'S LICENSE REGULATIONS HAD BEEN REVISED. THIS WAS THE KOA'S FIRST NOTICE OF THIS CHANGE AND AS A RESULT, THIS MUCH NEEDED INFORMATION HAS BEEN SERIOUSLY DELAYED IN GETTING TO THE EYE SPECIALISTS OF KANSAS.

ARTICLE 52 NOW READS:

- (A) "ANY APPLICANT TESTING 20/40 OR BETTER IN EACH EYE SEPARATELY AT THE EXAMINATION STATION SHALL MEET THE VISION REQUIREMENTS. ANY APPLICANT FAILING TO MEET THIS REQUIREMENT SHALL BE GIVEN A VISION FORM AND REFERRED TO A VISION SPECIALIST OF THEIR CHOICE.
- (B) ANY APPLICANT WHO HAS RECEIVED A VISION REPORT FROM A VISION SPECIALIST SHALL HAVE 20/60 OR BETTER IN EACH EYE SEPARATELY TO MEET THE VISION REQUIREMENTS.
- (C) ANY APPLICANT WHO HAS ONLY ONE (1) EYE SHALL BE REQUIRED TO HAVE 20/60 VISION OR BETTER TO MEET THE VISION REQUIREMENT. A PERSON BLIND IN ONE (1) EYE SHALL HAVE 20/60 VISION IN THE OTHER EYE TO BE ISSUED A LICENSE. A BLIND EYE SHALL BE DETERMINED AS 20/200 VISION OR LESS.
- APPLICANTS FAILING TO MEET ANY OF THE ABOVE STANDARDS MAY REQUEST AN ADMINISTRATIVE REVIEW BY THE DIRECTOR OF VEHICLES."

THIS REPRESENTS A CONSIDERABLE CHANGE IN WORDING AND AS OF JUNE 1979 WICHITA DRIVER'S LICENSE EXAMINERS STILL ADMIT BEING CONFUSED AS TO PROPER APPLICATION. AS ONE EXAMPLE: WHEN ASKED IF UNDER THESE REGULATIONS AN INDIVIDUAL WITH 20/20 OD AND 20/60 OS CORRECTABLE TO 20/30 OS WOULD BE

RESTRICTED TO CORRECTIVE LENSES, THE ANSWER WAS THAT RESTRICTION WOULD BE REQUIRED. LET US HOPE CLARIFICATION IS SOON TO COME.

THE OPTOMETRISTS AND OPHTHALMOLOGISTS OF KANSAS NEED TO BE INFORMED OF THESE REGULATIONS AND THEIR INTERPRETATIONS. THE NEW REGULATION MUST BE DISTRIBUTED AND EXPLAINED SO WE CAN PROPERLY ADVISE OUR PATIENTS. ANY ESTABLISHED CRITERIA IN DECIDING TELESCOPIC AID USAGE SHOULD ALSO BE DISTRIBUTED SO POTENTIAL DRIVERS KNOW WHERE AND UNDER WHAT CIRCUMSTANCES THESE EXPENSIVE AIDS MAY ALLOW THEM THE PRIVILEGE OF DRIVING.

TESTIMONY ON HOUSE BILL 2857

Mr. Chairman and Members of the Committee:

I am Gary Robbins, Executive Director of the Kansas Optometric Association. I'm here to present some of the concerns the Kansas Optometric Association has in regard to House Bill 2857. We support the concept of House Bill 2857 but we have reservations about several key provisions in the bill. First, we question if it's in the public's best interest to lower the driving standard to 20/80 across the board. However, we do recognize that there is a gray area of individuals in the range of 20/60 to 20/80; and we would support the concept of allowing a drive test as the primary factor in allowing these individuals to drive. We recognize that there are individuals in this category who could drive safely, and we believe that they should have an opportunity to demonstrate their ability with a drive test. We would consider the drive test to be one of the primary considerations in making a determination by the Director of Motor Vehicles for those individuals in this gray area. I wish to express our support for the concept of allowing individuals with telescopic corrections to drive. We recognize that individuals with telescopic corrections may drive safely with appropriate telescopic spectacles and appropriate training in their use. However, we believe it's in the public's best interest and safety to mandate a drive test again as the primary factor in determining if these individuals should be licensed to drive. The 20/40 correction achieved through a telescopic device in the better eye is agreeable to us as stated in the bill. We would

Attachment 3

hope that the committee would give this bill careful scrutiny and consider allowing some flexibility in dealing with the individuals in the gray area on a case-by-case basis if possible. We have no specific amendments to propose at this time, but we would be supportive of any changes that would be able to rectify our concerns in regard to House Bill 2857. This concludes my testimony. I have with me Dr. Phil Ernzen, President of the Kansas Optometric Association, and Dr. Kyle Dotson who is the Director of the Topeka Low Vision Clinic as resource individuals for any committee members who may have questions about vision standards or low vision aids.

Thank you.

TO: KOA Board
RE: Drivers license standards - Committee Report
DATE: February 15, 1983

As directed by the Board, we held a committee meeting on Tuesday, Feb. 8, 1983 with the following individuals present: Dr. Rich Marks, Dr. Leslie Nesmith, a drivers license examiner consultant, and myself.

After carefully reviewing the attached background information we identified the following problems.

- 1) As seen on the attached comparison of three low vision patients seen in 1982-83, some individuals have received licensure using a telescopic aid while others with equally good vision have been denied.
- 2) The recent change from 20/80 to 20/60 as lowest passable acuity seems questionable especially considering that those individuals affected were not evaluated for past or present driving performance - only for static distance acuity.
- 3) The doctors of Kansas are not sufficiently informed of drivers vision standards and could better advise their patients if these problem areas were clarified.

After further discussion and deliberation we propose the following: The Kansas Drivers License Department should allow a drive test for final determination when:

- 1) best spectacle corrected acuity (better eye) is 20/60 to 20/80. License with no restriction if drive test is passed and no night vision problem is apparent.
- 2) monocular telescopic acuity corrects to 20/40 or better, carrier spectacle aided acuity measures 20/200 or better in the best eye, and peripheral fields are normal.

Our committee strongly believes that for all visually questionable individuals a drive test should be the primary determining factor and that upper bifocal type telescopic aid should be allowed for achieving the required distance acuity.

Respectfully submitted,

David L. Waldie, O.D.

Attachment 4

Diagnosis	License Granted	Age	Telescope Power	Telescopic VA	Best Spec. VA	Unaided VA	
Fundus Flavimacula- tus	Yes	22	?	20/20 ?	20/200 OD 20/200 OS	20/400 OD 20/400 OS	K.C.
Optic Atrophy- Nystagmus	Yes	24	3X	20/25 OD	20/60-2 OD 20/70+2 OS	20/70-2 OD 20/80-2 OD	D.N.
Macular Toxoplas- mosis - Nystagmus	No	21	3X	20/30-2 OD	20/80+2 OD 20/80-2 OS	20/200 OD 20/200 OS	R.M.

AGENDA ITEM #29-5 Dr. Werthamer reported on the activities of the Low Vision LVS Section.

Werthamer/Chan: That the Board of Trustees adopt the following statement:

The Use of Bioptic Telescopes for Driving

The American Optometric Association recommends that further research and study should continue into the use of telescopic devices for drivers. Furthermore, that persons requiring spectacle-mounted telescopic devices to pass state acuity requirements for driver's licensing should be individually evaluated to determine their functional capability and limitations. Carried.

ADOPTED

YES: Bucar, Chan, Demmer, Easton, Ferris, Gazaway, Tumblin
Waldie, Werthamer - 9

NO: None

ABSTAIN: Scholles

AGENDA ITEM #30
REPORT OF
FINANCE
COMMITTEE

Easton/Bucar: That \$5000 be funded for the Project Team on Certification from Supplemental Funds. Carried unanimously.

ADOPTED

Easton/Ferris: That on Page 6 of the Fiscal & Financial Policy Manual the word "aggregate" be added after "section's". Carried unanimously.

ADOPTED

Easton/Bucar: That the \$5799.77 from the Third International Conference on Visual Science (ICVS) account #2331-0 be closed out and be put into General Fund balances. Carried unanimously.

ADOPTED

Easton/Bucar: That the funding of \$3800 for IA/IP be approved from Supplemental Funds. Carried unanimously.

ADOPTED

Driving with Low Vision

DENNIS K. KELLEHER, ED.D.

Dr. Kelleher is currently program manager for Special Education in Sonoma County. He is a member of the Driver License Advisory Board to the California Department of Motor Vehicles, and in March 1971 became the first low vision person in California to be licensed to drive with a bioptic.

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law. (Title 17 U.S. Code)

Abstract: *Discusses the current status of driving with low vision, both with and without a bioptic telescope. It specifies licensing criteria, training sequences, and identifies problem areas. Preliminary data from a comparison of safety records in three states are presented and recommendations are made for future licensing standards and for conducting research on visually impaired drivers.*

Whether or not people with low vision should be licensed to drive is an extremely emotional and complex issue, and the purpose of this article is to discuss questions regarding the role of visual acuity in the driving task, comment on some specific problems regarding the subgroup of drivers using the bioptic telescope, and present some preliminary data regarding the safety records of the bioptic driver. Some of the discussion will be applicable to all low vision drivers, but some points will relate to bioptic drivers only.

By a low vision driver, one usually means a driver who uses a bioptic telescope to help give better visual resolution. Such a person is the central focus of the debate, a fact that is itself noteworthy, when one considers that many state Departments of Motor Vehicles (DMVs) have for years been licensing persons who do not meet the minimum visual screening standard and who do not use bioptic telescopes. For example, after a cataract operation, a person has unique visual difficulties that should have implications for driving, yet to my knowledge no controversy exists about routinely allowing such individuals to drive if they show proficiency during a road test.

It is also a fact that many senior citizens who have cataracts, glaucoma, diabetic retinopathy, and macular degeneration continue to drive, legally and illegally, after their central visual acuity has fallen below the 20/40 state screening standard—the minimum acuity level most commonly allowed for drivers in the United States. As the average age of the general population continues to rise because of longer life expectancies, there will be a greater likelihood that people with low vision will be applying for licenses to operate motor vehicles.

Given, therefore, the possibility that more individuals who do not meet the minimal vision standards will be applying for driver licenses, the issue of driving with low vision is of paramount importance for all persons interested in traffic safety and the rehabilitation of the visually impaired.

Definitions

The term low vision drivers as used in this article refers to those drivers whose central visual acuity is so impaired that they cannot meet the minimum visual screening standard required by the state DMV for driver licensing. The term bioptic driver will refer to drivers who use the bioptic telescope as a driving aid.

The bioptic consists of a miniature galilean telescope which is positioned in the upper portion of a carrier lens (see Figs. 1 and 2). The carrier lens, which incorporates the patient's refractive correction, is conventionally mounted in the frame. The advantage in this arrangement is that it allows the user to look through the telescopic portion for spotting and magnifying distant objects, while permitting a rapid change in fixation to the larger carrier lens for general viewing of the entire visual field. The transition from one lens to another may be made as rapidly as the patient is able to move his eyes and head. The most commonly used magnifications presently prescribed for driving are the 2.2X and 3.0X bioptic telescopes (see Table 1 for technical data).

AREAS OF AGREEMENT AND DISAGREEMENT

Though there are several issues upon which many

Table 1. Comparison of bioptic magnifications, optical fields, and scotomas

Magnification	Bioptic Field (Degrees)	Degrees of Scotoma
2.2X	12	14
2.2X W.A.*	17	15
3.0X	8	10
3.0X W.A.	12	15
3.0X P.E.F.†	19	16
4.0X	6	11
4.0X P.E.F.	12	11

*Wide Angle Model

†Prismatic Expanded Field Model as opposed to the standard Galileian Model.

leaders in the field of low vision disagree, there is some consensus on several points:

1. Understanding the Role of Vision as It Relates to Driving

Everyone agrees that vision is essential for safe operation of a motor vehicle. Disagreement arises over the minimum visual function that enables a person to drive safely. Recent research has given some encouraging indications that there are measures of visual capabilities that may be better than static acuity, which is currently used by most DMVs, for predicting a person's likelihood of being involved in an accident (Henderson & Berg, 1974). If static visual acuity is so important to driver safety, how are persons with reduced central acuity able to build up better driver safety records than the general population in some instances? Henderson and Berg (1974) found very little relationship between static visual acuity and driver safety, as did the research department of the California DMV (1978). Attention span, psychological makeup, and sensory processing were mentioned as factors which may be more influential in affecting the safety record. No one can argue rationally that driving with reduced visual acuity does not reduce the "safety margin," just as driving with impaired hearing or an orthopedic handicap does. The question must be, are we justified in eliminating persons with low vision from consideration for licensure

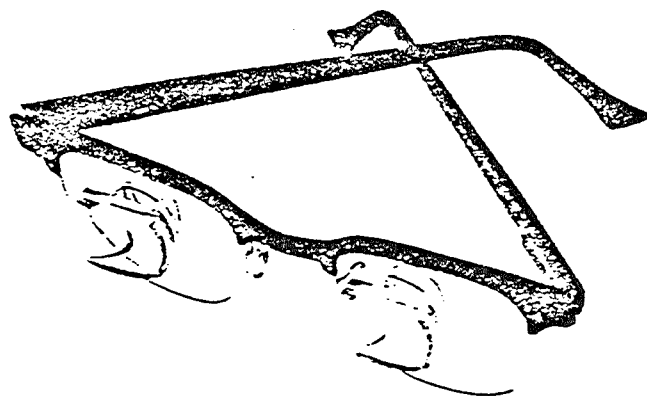


Figure 1. 2.2X standard field bioptic with clear housing.

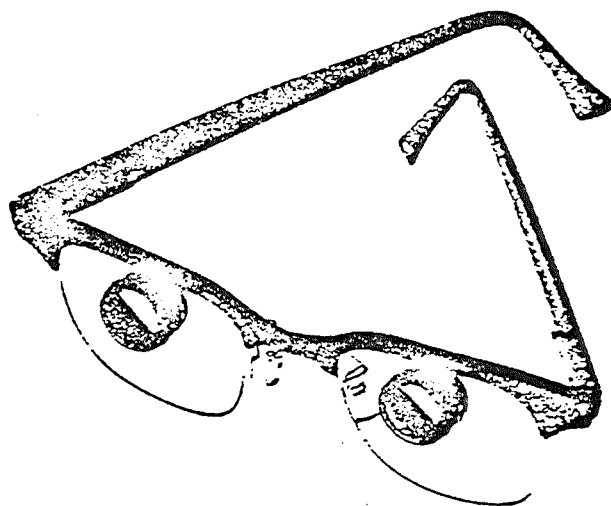


Figure 2. 2.2X standard field bioptic with black housing.

on the basis of static visual acuity alone? No one really knows how many low vision drivers we have. It is likely we have many more persons driving legally, but unmonitored, and illegally, out of necessity, than anyone imagines. Since the accident rate among this driver subgroup has not clearly demonstrated that the safety margin has been compromised to the extent of endangering the general population, we must conclude that our use of static visual acuity and the arbitrary 20/40 screening standard may not be adequate as the sole criterion for withholding a license from a low vision person who needs to drive. Insurance companies have not to my knowledge routinely placed low vision drivers in assigned risk pools, or imposed a surcharge on premiums, as they have for other driver subgroups, such as the habitual alcoholic driver, who has been shown to be a significantly higher risk than the average driver.

Another point to help demonstrate the relative unimportance of static visual acuity in driving safely is to consider how the average normally sighted driver can perform well under adverse driving conditions, such as rain, snow, sleet, and nighttime glare, when visual acuity is probably below the 20/40 level. One probable explanation is that in driving we primarily use peripheral vision, where 20/20 resolution is not physiologically possible. Since the eye fixates on many things the viewer is not aware of, we may assume that central acuity is used either as a response to low resolution stimuli or as a result of a conscious decision made by the driver. Certainly, one does not have to resolve a target in detail to be able to react to it. A person who normally has 20/20 vision, but may have 20/40 at night, may even feel more uncomfortable than the low vision person, who is accustomed to dealing with low acuity and an ill-defined image.

2. Visual Perception

It is generally agreed that the phenomenon of vision is not experienced unless and until the brain receives and interprets the incoming visual stimuli. Therefore, both low vision and normally sighted people "see" with their brain, not their eyes. The disagreement is about whether visual perception training can overcome some of the dis-

advantages to which the brain of the low vision person is subjected. Reaction time is a combination of the time it takes the eye to resolve and transmit an image to the brain, plus the time it takes the brain to interpret that image and respond to it. Can the brain be trained to process less-detailed information more efficiently? Research indicates that it can (Barraga, 1976).

3. Blind Spots

Scotomas or blind spots, especially those caused by the housing of the bioptic telescope, are another area of both agreement and disagreement among low vision professionals. It is agreed that every driver contends with blind spots while driving. In a normally sighted binocular driver, the windshield support posts, the mirrors, and other objects may cause blind areas in the forward field of the driver. The monocular or one-eyed driver has also to contend with the three to five degree physiological blind spot caused by the optic disc. These blind spots are absolute, or totally obscuring, and are not relative or partial as scotomas may be in some eye diseases. The disagreement arises when we consider the significance of these scotomas. If objects around you are moving, as when driving, it is extremely difficult, if not virtually impossible, to "lose" any object in the blind area for any length of time unless it is moving in the same direction and at the same speed, in which case a collision course would not be a concern. [There is an exception to this rule: An object traveling perpendicularly and at a slower speed could theoretically be obscured in a blind area, however this would assume that the person was not moving his head, and hence the scotoma, from side to side (Keller & Eskridge).] As you approach an object the visual image enlarges on the retina. Assuming that one is moving the head and eyes to observe other moving objects, as most people do while driving, blind spots do not pose a significant hazard. To my knowledge no one has suggested that we do not license one-eyed drivers because of the increased risk from their physiological blind spot and accompanying field loss.

4. Non-Visual Cues

It is agreed that non-visual information is significant. The disagreement lies in the degree of significance to the overall driving task. Though many factors must be considered in attempting to explain how low vision drivers are seemingly able to operate motor vehicles safely, one thing which may be underrated or overlooked is the importance of auditory and other sensory cues. A visually impaired person is not born with greater auditory discrimination abilities or more acute hearing, he simply develops it out of necessity. The low vision driver may be able to use auditory cues to better advantage than the normally sighted driver in an effort to compensate for and augment the visual input.

5. Self Preservation

There is general agreement that all of us have an instinctive will to survive. It is difficult to explain why certain critics of the low vision driver feel these individuals possess less of this instinct. Most of us can agree that no one intentionally wishes to injure himself or anyone else. The low vision driver may therefore voluntarily restrict himself from driving in conditions which he knows to be hazardous because of his visual limitations, e.g., at rush

hour, into the direct sunrise or sunset. This may be one of the factors which explain the superior safety record of the bioptic driver, as recently shown in statistics compiled by the DMV in the State of New York.

Criteria for Licensure

Though there is some agreement on the performance and driving competencies expected of both the normally sighted and low vision driver, the major issue centers around the significance of reduced visual acuity and its relationship to driving safely. There is a consensus that some low vision individuals should be licensed provided they meet specific visual prerequisites. It is agreed that all the bioptic applicants should be carefully screened with respect to these visual prerequisites, at least until we can develop more valid and reliable criteria for licensing. The following prerequisites are recommended:

1. Visual fields of at least 130 degrees.
2. A stable visual condition, which is preferably either congenital or of long duration and is accompanied by no other health problems.
3. Adequate central visual acuity through the bioptic to meet minimum requirements as prescribed by the state licensing law (usually 20/40) and no less than 20/160 visual acuity through the carrier lens. Admittedly this is a "guestimate" but it is probably no more arbitrary than the 20/40 screening standard now used in most states.
4. Normal color perception.
5. Normal ability to move the eyes for tracking.
6. High motivation, intelligence, and a need to drive for employment, school, or for independence.
7. A highly developed sense of moral responsibility. (Although this is intangible and difficult to evaluate, it is desirable to select individuals who would voluntarily restrict themselves from driving under hazardous conditions.)

The 1975 New York Conference on telescopic lens systems and driver licensing also recommended in addition to most of the above that:

1. A special form be developed by the DMV to collect medical information.
2. The bioptic driver applicant should receive training from a professional driving instructor.
3. The applicant should be re-evaluated annually.
4. The applicant should be required to pass a road test which is more stringent than the routine one.
5. The DMV should keep special data on bioptic and low vision drivers for study and research.
6. The DMV should identify special examiners who would give all road tests to bioptic drivers to assure more uniformity in standards and expectations.

Some other recommendations which have been discussed in other meetings are:

1. The DMV should help to establish special driver training programs for low vision drivers.
2. A driver licensing advisory board should be established and include at least one low vision specialist who is familiar with the problems encountered in driving with low vision.

Recommended Training Sequence for Biotptic Users

Training is an important aspect of driving with a biopptic, and should include:

1. Learn to locate stationary objects while the trainee is not moving.
2. Learn to locate moving objects while the trainee is not moving.
3. Learn to locate moving objects while the trainee is moving.
4. Develop visual tracking skills under varying illumination and vibration conditions.
5. Develop short term visual memory and visual discrimination skills to be able to select and identify rapidly those visual stimuli which demand the most rapid attention and action.

The rationale for this training sequence is discussed in greater detail elsewhere (Levin & Kelleher, 1975; Jose & Butler, 1975; Weiss, 1979).

Driving Test Considerations

Though it has been recommended that the low vision driver be given a more rigorous road test, the same general criteria for evaluating driving performance will be used with the low vision driver as with the normally sighted driver. These criteria are:

1. Speed control and braking.
2. Depth perception and spatial orientation.
3. Steering.
4. Use of mirrors.
5. Backing and parking.
6. Shifting and engine control, as applicable to manual transmissions.

Good Driving Habits

Good driving habits that should characterize the normally sighted driver, are especially important to develop in the low vision driver. These may include, but are not necessarily limited to:

1. Keep your eyes moving constantly.
2. Aim high in steering, i.e., look out in the distance, not directly over the hood.
3. Get the whole picture of what is going on.
4. Be sure that you are seen by the other guy.
5. Be sure to leave yourself an escape path in the event of an emergency.
6. Keep the vehicle in good mechanical order and keep the windshield and other windows clean for maximum visibility.
7. Use headlights under any adverse driving conditions to increase your visibility to others.
8. Never drive under the influence of alcohol or other drugs.
9. Use other sensory input in addition to vision to assist you while driving.
10. Keep alert and expect the unexpected. (Driver inattention is the largest cause of traffic accidents [California DMV, 1978].)

Other good habits suggested for the low vision driver, but which may also be helpful to the normally sighted driver are:

1. Study maps, so you know where you are going before you leave.
2. Never make any rapid, last minute, maneuvers. (Changing your mind and not giving the other drivers time to react can be extremely hazardous, especially on freeways. It would be better to make the wrong turn than to cut across several lanes to get to your exit.)
3. Carry any additional personal necessities, such as an extra pair of glasses, a wide brimmed hat, and a monocular for use in spotting house numbers or street signs when your car is parked.
4. Using a smaller car with standard transmission, non-reflective hood, and dark interior color, may help some low vision drivers who are sensitive to light and have difficulty with spatial perception. Speed control can be more closely monitored with a standard transmission, though it requires greater coordination. It may also be an advantage in giving the driver better control over braking on hills and curving roads.

Misunderstandings about the Biotptic

In considering the biopptic telescope, we need to clarify several misunderstandings about its advantages and disadvantages. A biopptic is used only as a *spotting system* and should never be used constantly. In using the biopptic in this manner, however, it is agreed that a low vision person is then driving with his reduced central acuity for most of the time. The advocates of driving with low vision feel this is acceptable for several reasons. As stated earlier, everyone uses his strong central acuity as a response to low resolution or as a result of a conscious decision, therefore it is likely that much lower acuity levels are used during the driving task than those for which we are presently screening. It is concluded that acute vision at the 20/20 or 20/40 range is probably not used and hence not necessary during most of the time a person is driving. For example, a four-foot tall child subtends a visual angle larger than 20/200 at a distance of 1200 feet. If one were traveling at 50 miles per hour, or 73 feet per second, a driver would have 16½ seconds to see this object and take necessary action. Of course the child's image would be constantly enlarging the angle it subtends as the driver approaches, thus increasing the probability of its being recognized as a situation requiring driver response.

For those low vision drivers who use a biopptic telescope, the biopptic field can be used as a "pseudo fovea" when high resolution is necessary, as determined by and in response to their peripheral vision. Since the normal foveal field is equivalent to between only three and five degrees in the sighted person, it is felt that training in visual tracking, visual perception, and use of the biopptic can help the driver compensate for reduced central acuity by learning how to change fixation rapidly and use the biopptic field efficiently.

One opinion which has erroneously been stated as a "fact" is that a normally sighted person can duplicate low vision by removing his glasses, which correct a refractive error. This is inaccurate, because clearly focused light rays which are not properly transmitted or processed by an underdeveloped macula are quite different from out-of-focus light rays stimulating a normal macula. In addition, a low vision person's brain is accustomed to processing a sub-standard visual stimulus and has probably

learned to compensate for this far better than the brain of a normally sighted person has learned to compensate for a brief period without glasses.

Disagreement about the importance of the ring scotoma caused by the housing on the bioptic has been mentioned earlier. It should suffice to point out that when considering head, eye, object, and body movement in a dynamic situation such as driving, problems which might be caused in a static situation are eliminated or greatly diminished. This is why it is crucial to continually move the head and eyes and frequently change fixation from the bioptic to the carrier lens. In doing this the brain becomes accustomed to totally ignoring the absolute ring scotoma.

Using mirrors in conjunction with the bioptic does not pose a problem during driving because the image of the mirror will appear at optical infinity if the object is more than 20 feet from the mirror. Though vibrations will cause some loss of image clarity, the interpretive mechanism of the typical low vision person is accustomed to resolving a sub-standard visual image. This is probably why many low vision patients are capable of using 10X or 20X power binoculars in a moving bus, train, plane, boat, while the normally sighted person is unable to do so. It may also explain why low vision persons do not seem to have difficulty in judging depth through the telescope (telescopic parallax) nor do they seem to be disturbed by objects passing rapidly through the telescopic field (Jack-in-the-Box effect). It is interesting to note that persons who cite these problem areas in using a bioptic do not have low vision themselves and are basing their opinion on their own experience in trying to use bioptic telescopes and other magnifiers.

DATA ON BIOPTIC DRIVERS IN THREE STATES

Though no one knows how many persons are driving with low vision, either legally or illegally, it is commonly agreed that those states with facilities to conduct research on low vision drivers should do so. Thus far we have a very small sample of low vision drivers, but they are being scrupulously screened—as they should be. Though our data at this point are not conclusive because the sample is too small and there were no adequate controls regarding number of miles driven, driving conditions, and other factors that would allow a valid comparison with the general driver population, we do have preliminary indications in the three states who have most of the licensed bioptic drivers. These indications are that the bioptic driver is *not* a high risk driver. (See Table 2 for states which currently license drivers with bioptics. Table 3

Table 2. States approving licensing of drivers with bioptic lens*

1. California	9. Nebraska
2. Connecticut	10. New Hampshire
3. Delaware† ←	11. New Jersey
4. Florida† ←	12. New York
5. Louisiana	13. Ohio
6. Massachusetts	14. Oregon
7. Michigan	15. South Carolina
8. Montana	16. Washington

* This list was compiled by the California DMV in January 1978 from a questionnaire which it circulated to all states. New York DMV reported that as of December 1978, two additional states will license drivers with bioptics. There are additional states which will license low vision drivers without bioptics.

† Licenses granted only with the approval of the Medical Advisory Board.

compares a sample of bioptic drivers in New York, California, and Massachusetts with normally sighted drivers.)

Notice that there are differences among states in the age ranges that included the largest proportion of licensed bioptic drivers and in the periods when data were collected. The one common trend, however, is that the bioptic driver appears to be compiling a better safety record than the general population. There may be many explanations for this, probably the most important of which is that these individuals recognize driving as a true privilege that is crucial to their independence and they are extremely careful to insure they do not inadvertently place themselves in a high risk driving situation; they carefully select and control when, where, how, and what they will drive.

SUMMARY

No one is suggesting that low vision is as good as normal vision for driving since it reduces the safety margin. The real issue is whether this reduced safety margin poses such an insurmountable problem that the low vision driver cannot operate a motor vehicle safely and is a hazard to the general population.

This article does not try to discuss whether it is in the best public interest to license low vision drivers so they can be gainfully employed and removed from the welfare roles, nor does it examine possible consequences of driving or not driving for self concept. The question considered here is whether low vision drivers pose an unacceptable risk to society. Answers to this question must not be based on the opinion of some "expert," who may have an

Table 3. Accident rates of bioptic drivers compared with those of normally sighted drivers*

State	No. of Licensed Drivers (millions)	No. of Bioptic Drivers	% Drivers in Accidents	% Bioptic Drivers in Accidents	Age Range with Highest Proportion of Bioptic Drivers
Calif.	12.9	145	10.6%	9.0%	32% in 20-29
Mass.	3.2	128	5.7	5.5	34% in 50-59
N.Y.	9.0	166	12.4	9.0	53% in over 60

* These data were collected during different time periods (1967-73 in Mass., 1971-78 in Calif., and 1977-78 in N.Y.). Reportable accidents have different criteria in each state.

emotional, professional, or financial vested interest. Objective data must be collected to ensure that any decision made to limit the driving privilege, which is so crucial to us all, is neither needlessly discriminatory nor arbitrary and capricious. If the data are less than compelling on either side of the issue, it is likely that there will be numerous tests in a court of law—litigation on this issue is proceeding in Texas.

Since only one exception is needed to disprove the hypothesis that no one can drive safely with low vision or with a bioptic, I feel that the information we already have makes it difficult to support the contention that no one with reduced central acuity can operate a motor vehicle safely. We cannot collect the data unless we license low vision drivers, since simulation cannot duplicate the many complex driving situations and cannot therefore provide the valid data needed to answer this question. The best way to refute the notion that low vision drivers pose an unacceptable hazard is by quoting empirical data which show that low vision drivers have been driving safely and are currently being monitored by the state Departments of Motor Vehicles.

On the other hand we should not interpret these preliminary positive results as justification for licensing all persons with low vision. We must continue to regard as eligible candidates only those persons capable of satisfying the previously discussed prerequisites, at least during the data collecting phase.

The primary objective for collecting data on low vision drivers is to expand our knowledge about the role of vision in driving safely. All state DMVs with the appropriate data collection and analysis capabilities should be encouraged to design, implement, and evaluate studies of the low vision driver with and without the bioptic. ■

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New Light on an Old Problem

It is estimated that in the United States about 70 percent (one million) of all severely visually impaired persons are 65 years of age or older. Now a team of researchers from Britain, where 80 percent of those who are visually impaired are elderly, has evidence that poor lighting may be an important cause of up to half the cases of "functional blindness" in aging persons.

Investigators from St. Bartholomew's Hospital in an earlier study of 15,000 households concluded that half of the individuals tested had better vision in the eye clinic than in their own homes, according to an item in *Medical*

World News, August 20, 1979. More recently, a study of 13 men and 43 women in their seventies revealed that the median home lighting level was only a tenth that of the hospital. Physicians believe that a major reason for dim lighting in homes of aging persons is the hoary myth that bright light is harmful to the eyes. Also, many elderly persons face their light source when reading, thereby increasing glare rather than illumination.

Another factor in functional blindness, speculates Dr. Robert N. Butler, director of the National Institute on Aging, Bethesda, Maryland, may be that declining central nervous system functioning leads older individuals to withdraw from unpleasant stimuli such as bright lighting. Low incomes, too, he believes cause people to use as little lighting as possible, in order to keep electricity bills low.

DEPARTMENT OF MOTOR VEHICLES OPTOMETRIC ADVISORY BOARD
DIVISION OF DRIVERS LICENSES
P. O. BOX 12590
SACRAMENTO, CA 95852.
(916) 445-8933



June 9, 1982

Mr. Robert Molise, Chief
Division of Driver Licenses
Department of Motor Vehicles
P.O. Box 12590
Sacramento, CA 95852

Dear Mr. Molise,

I am writing to you at the request of Dr. Rebecca L. Ng, O.D., Chairperson of the Department of Motor Vehicles Optometric Advisory Board to address the recent resolution adopted by the AAMVA Region IV Driver License workshop regarding denial of licenses to drivers who use telescopic lenses. The full text of the resolution is attached for your reference.

As you know, California has licensed persons who do not meet the screening standard due to reduced visual acuity on the recommendation of eye doctors and DIA's for many years. Beginning in 1971, the department issued its first license to a low vision driver who utilized bioptic lenses, a type of telescopic lens.

Though the resolution doesn't differentiate between bioptic telescopes and full field telescopic lenses, there is a tremendous difference. I am unaware of any agency or eye practitioner who supports the use of full field telescopic lenses for use in driving since they reduce peripheral vision, which is essential to the driving task. This resolution does not address low vision drivers who have reduced visual acuity but are licensed to drive without a bioptic. It appears, therefore, that this resolution pertains to a device, the bioptic telescope, rather than driving performance and acuity.

Would it seem reasonable to license a low vision driver without a bioptic, but deny a license to the same individual if he/she used a bioptic? There is no mention of performance in driving, but only some criticisms of a device which are cited as "problems."

It is an opinion not shared by all, that bioptic telescopes "are of little value under conditions of driving." Drivers who use the bioptic do not agree. If the bioptic wasn't useful, it wouldn't be worn. Advantages of using bioptics exceed those stated. Vibration causing vision decay and the blind spots are not insurmountable problems for the low vision driver. Every driver deals with blind spots safely on a routine basis because the driving environment is dynamic and not static. Persons with low vision have learned how to compensate for the "educated blur" they see due to the substandard visual image caused by their visual deficit. These points have been debated extensively in the literature and do not merit extensive review here.

The number of persons licensed to drive with bioptics is so small in comparison to the general population, that meaningful statistical inferences cannot be made relative to driving safety and ability of such individuals.

Recent court decision in other states (Texas and Pennsylvania) have ruled that denial of the driving privilege to persons with low vision based on the use of a device and not evaluation of individual driving performance is in violation of the Rehabilitation Act of 1973, Section 504. (Pa. vs Liberati)

We need to continue to collect data as we are currently doing regarding driving performance of low vision drivers so that we can make rational, thoughtful decisions based on sound data, which we could not compile if we did not license selected individuals.

In short, I would recommend that our department continue to carefully select and license low vision drivers who use bioptic telescopes. Specifically trained driver improvement analyst professionals augmented by the eye doctor's recommendations should make the determination of granting or denying a license on an individual basis and base the decision on demonstrated driving performance and how the person compensates, not on USE of a particular device. To follow the course suggested by the AAMVA resolution would be arbitrary, impudent and, perhaps, even out of compliance with Federal mandates as determined by other state courts.

I hope this information has been helpful to you and your staff. Please contact me should you wish to discuss any aspects of this issue in greater detail.

Sincerely,



Dennis K. Kelleher, Ed.D.
ADVISORY BOARD MEMBER

DKK/aw
cc: Dr. Rebecca Ng



Kansas
DEPARTMENT OF REVENUE

Division of Vehicles

State Office Building
TOPEKA, KANSAS 66626

May 11, 1978

Brandon D. Hunt
2400 West 51st Terrace
Shawnee Mission, Kansas 66205

Dear Mr. Hunt:

Our Medical Advisory Board met on May 9, 1978. They appreciated the excellent current information about your vision.

In the meantime, the board has made a firm policy about this type of visual disability. They have decided to recommend that no driver's license be issued in this type of situation, after reviewing considerable information from research projects and other states. The board does not foresee any change in this policy in the near future.

We regret that we are unable to authorize you to apply for any type of driver's license based on the Medical Board's recommendation. However, if this office can be of assistance to you at anytime, you have but to let us know.

Sincerely

Damon F. Weber, Director
Division of Vehicles

gju
cc: David L. Waldie, O.D.
Clinic Director
Kansas Low Vision Clinic
801 East Lincoln
Wichita, Kansas 67211

C
O
P
Y



Dr. Lawrence N. Kline
Dr. Thomas J. DeLuca
Dr. Robert Connors
Optometrists

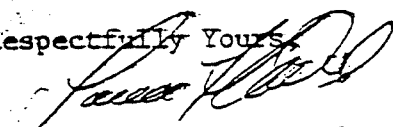
July 22, 1982

To Whom It May Concern,

I am writing in support of driving with telescopic lenses. As a low vision practitioner having treated thousands of visually impaired persons, I am concerned about legislation which might prevent qualified persons with reduced vision from driving. I have concluded that it is safe for low vision drivers to drive with telescopic lenses provided they are given instruction and training.

It is essential that the law allow driving with telescopic glasses in order to give a large visually impaired population the right and freedom to be vocationally and socially independent in our society.

Respectfully Yours,


Lawrence N. Kline, O.D.
Low Vision Consultant/Board of
Education Services For The Blind

Acting Chairman, Low Vision Practical
Examination Section/American Academy
of Optometry

Former Clinical Instructor, Dept. of
Ophthalmology/Yale University of ~~Medicine~~
Medicine

New Haven Office
856 Howard Avenue
New Haven, Connecticut 06519
Telephone (203) 562-4111

Prospect Office
Corner Scott Road & Birchwood Terrace
Prospect, Connecticut 06712
Telephone (203) 758-6644

DEPARTMENT OF MOTOR VEHICLES OPTOMETRIC ADVISORY BOARD
DIVISION OF DRIVERS LICENSES
P. O. BOX 12590
SACRAMENTO, CA 95852.
(916) 445-8933



June 9, 1982

Mr. Robert Molise, Chief
Division of Driver Licenses
Department of Motor Vehicles
P.O. Box 12590
Sacramento, CA 95852

Dear Mr. Molise,

I am writing to you at the request of Dr. Rebecca L. Ng, O.D., Chairperson of the Department of Motor Vehicles Optometric Advisory Board to address the recent resolution adopted by the AAMVA Region IV Driver License workshop regarding denial of licenses to drivers who use telescopic lenses. The full text of the resolution is attached for your reference.

As you know, California has licensed persons who do not meet the screening standard due to reduced visual acuity on the recommendation of eye doctors and DIA's for many years. Beginning in 1971, the department issued its first license to a low vision driver who utilized bioptic lenses, a type of telescopic lens.

Though the resolution doesn't differentiate between bioptic telescopes and full field telescopic lenses, there is a tremendous difference. I am unaware of any agency or eye practitioner who supports the use of full field telescopic lenses for use in driving since they reduce peripheral vision, which is essential to the driving task. This resolution does not address low vision drivers who have reduced visual acuity but are licensed to drive without a bioptic. It appears, therefore, that this resolution pertains to a device, the bioptic telescope, rather than driving performance and acuity.

Would it seem reasonable to license a low vision driver without a bioptic, but deny a license to the same individual if he/she used a bioptic? There is no mention of performance in driving, but only some criticisms of a device which are cited as "problems."

It is an opinion not shared by all, that bioptic telescopes "are of little value under conditions of driving." Drivers who use the bioptic do not agree. If the bioptic wasn't useful, it wouldn't be worn. Advantages of using bioptics exceed those stated. Vibration causing vision decay and the blind spots are not insurmountable problems for the low vision driver. Every driver deals with blind spots safely on a routine basis because the driving environment is dynamic and not static. Persons with low vision have learned how to compensate for the "educated blur" they see due to the substandard visual image caused by their visual deficit. These points have been debated extensively in the literature and do not merit extensive review here.

The number of persons licensed to drive with bioptics is so small in comparison to the general population, that meaningful statistical inferences cannot be made relative to driving safety and ability of such individuals.

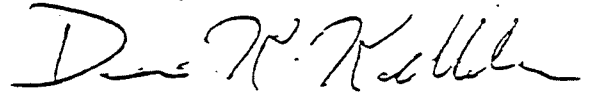
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We need to continue to collect data as we are currently doing regarding driving performance of low vision drivers so that we can make rational, thoughtful decisions based on sound data, which we could not compile if we did not license selected individuals.

In short, I would recommend that our department continue to carefully select and license low vision drivers who use bioptic telescopes. Specifically trained driver improvement analyst professionals agumented by the eye doctor's recommendations should make the determination of granting or denying a license on an individual basis and base the decision on demonstrated driving performance and how the person compensates, not on USE of a particular device. To follow the course suggested by the AAMVA resolution would be arbitrary, impudent and, perhaps, even out of compliance with Federal mandates as determined by other state courts.

I hope this information has been helpful to you and your staff. Please contact me should you wish to discuss any aspects of this issue in greater detail.

Sincerely,



Dennis K. Kelleher, Ed.D.
ADVISORY BOARD MEMBER

DKK/aw
cc: Dr. Rebecca Ng



The New York Association for the Blind

111 East 59th Street • New York, New York 10022 • (212) 355-2200

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Mrs. Winifred Holt Mather

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Under the Patronage of the
President of the United States

August 27, 1982

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Acting Chairman
AOA, Low Vision Section
P.O. Box 1408
Gilford, CT 05437

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Assistant Secretary
*R. Preston Searle

Dear Dr. Padula:

There is a small number of people who qualify for driving with telescopic lenses (i.e., a telescope inserted at the top of a spectacle carrier lens). These lenses are used for spotting signs and objects, much as a normally sighted driver uses a rear-view mirror.

The vision through the telescope must conform to the state's minimum vision requirement (20/40 for most states). Vision should be 20/100 or better with standard lenses. The peripheral field must be intact, since this is an essential part of safe driving for everyone.

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The decision to license a driver is the responsibility of the Department of Motor Vehicles in each state. The American Association for Auto-motive Medicine has suggested, each applicant should be licensed after individual review and evaluation. The state of New York has carefully defined its regulations.

Further study should be initiated to determine the actual driving and safety records of those currently licensed with an analysis of the types of violations; whether vision related, whether a time of day related, their records should be matched to drivers wearing corrective lenses with correlation of age and sex.

Sincerely yours,

Eleanor E. Faye, M.D.
Director, New York Lighthouse
Low Vision Service

*Non-voting members

Executive Director

Wesley D. Sprague

Dictated E.F.



Accredited Member

75 years of service to blind and visually impaired people

August 27, 1982

Joseph H. Maino, O.D.
KC VAMC (112F-G)
4801 Linwood Boulevard
K.C. Mo. 64128

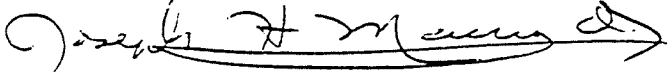
William Padula, O.D.
c/o Fairmont Hotel
1750 Welton Street
Denver, Colorado 80202

Re: Driving with Biotics - Individual Evaluations

Dear Dr. Padula:

Based upon my professional experience as an extern at the Illinois College of Optometry Low Vision Clinic, Chicago Lighthouse for the Blind, and West-Side VA Medical Center; as the Low Vision Rehabilitative Optometry Resident at the Kansas City VA Medical Center; and currently as the Assistant Chief, VICTORS* Regional Low Vision Rehabilitation Program, I believe every case involving driving with a bioptic system requires an individual evaluation to determine fitness to operate a motor vehicle. To categorically deny a driver's license to all individuals who utilize a bioptic system would place an undue hardship on those people who can successfully and safely operate a motor vehicle.

Sincerely,



JOSEPH H. MAINO, O.D., F.A.A.O.
Assistant Chief, VICTORS

JHMsfr

NOTE: VICTORS (Vision Impairment Center to Optimize Remaining Sight) is a multidisciplinary program created by the Veterans Administration involving optometrists, ophthalmologists, social workers, blind rehabilitation specialists and others in the treatment of low vision patients.



August - 1982

THE USE OF BIOPTIC TELESCOPES FOR DRIVING

Bioptic telescopes are spectacle mounted telescopes that offer the wearer identification of distance objects. The amount of magnification will vary depending upon the power of the telescope used. Bioptic telescopes are mounted in the carrier lens of the spectacle and may be positioned in various positions depending upon need. Also, these telescopes may be mounted for binocular or monocular use.

In recent years, bioptic telescopes have been designed by William Feinbloom O.D., through Designs for Vision, Inc. and other manufacturers, with magnification of various powers. These telescopes have been prescribed by optometrists and ophthalmologists for visually impaired individuals and successfully utilized to improve visual performance for a number of activities, including driving.

The bioptic telescopes used for driving are mounted in the superior portion of each spectacle lens. Only individuals that are corrected through the telescope to 20/40 visual acuity can utilize the telescopes for driving purposes. The visual acuity measurement of 20/40 generally represents the legal criteria for limitation of driving licenses. As of December 1978, there were sixteen states that licensed bioptic drivers. The majority of the other states do not condemn or restrict the use of these telescopes for driving purposes. Criticism of the use of bioptics for driving stems from the misconception that the person will continually be using the telescope while driving.

Contrary to this misunderstanding, the person using the bioptic telescopes for driving does not continually view through the telescope. The purpose of mounting the telescopes in the superior position of the carrier lens is to enable the person to drive the automobile while viewing through the carrier lens. Thus, the person will experience a full and complete field of vision as he/she would with conventional spectacles. When the individual wishes to discern some aspect of detail, such as reading a street sign, he/she lowers their head slightly to position the bioptic telescope in line with the point of fixation for spotting purposes. Used in this manner, the bioptic telescope has been used effectively for day-time driving by many visually impaired individuals in the United States.

While the visual criteria in most states for the issuance of driving licenses includes both visual acuity of 20/40 in the best corrected eye and approximately a 140 degree field of view, it must be recognized that both of

American Optometric Association
600 Maryland Avenue, S.W., Suite 400
Washington, D.C. 20024
(202) 484-9400

these measurements do not necessarily represent a qualitative understanding of the person's visual performance abilities. Liebowitz and Post⁽¹⁾ and Padula⁽²⁾ point out that the visual process is composed of actually two functions: focal processing, and ambient processing. Focal processing involves the visual manipulation of the environment to discern aspects of detail, while ambient visual processing enables the individual awareness of spatial relationships. In order to drive an automobile, the individual must intergrate both processes while being able to selectively utilize each process individually.

The quantitative measurements of sight, such as acuity and field measurements, do not assess the functional abilities of focal and ambient visual processing. In addition, an impairment to the eye that limits the quantitative measurements of sight (acuity and scope of field) is not directly related to the person's ability to utilize focal and ambient visual processing. Therefore, it becomes necessary to consider the fact that there are individuals with so called "normal" sight that have driving licenses and are functionally visually impaired because of a lack of ability to utilize focal and ambient visual processes effectively to visually manipulate their environment and extract useful information. An example is the individual who is involved in a driving accident who claims that he simply did not see an approaching car from the side or see the overhead red light.

Means of analyzing functional vision abilities of visually impaired individuals with bioptic telescopes should include evaluating skills behaviorally while performing simulated and actual driving tests. Also, contrast sensitivity analysis (means of testing the person's ability to respond to varying degrees of illumination relationships) is also important to further understanding the person's ability to utilize and manipulate visual information.

To exclude a visually impaired person who meets the acuity requirements of 20/40 with a bioptic telescope, without functionally evaluating their use of vision, may discriminate against him/her. Recent court decisions in Texas and Pennsylvania have ruled that denial of the driving privilege to persons with low vision based on the use of a device and not evaluation of individual driving performance is in violation of the Rehabilitation Act of 1973, Section 504. The "normally" sighted individual is permitted a functional analysis of vision when the person is evaluated by a qualified examiner while driving an automobile. Therefore, the visually impaired individual should be given similar opportunities.

The American Optometric Association (AOA) supports safe driving practices. In 1976, the AOA House of Delegates passed the "Motorists' Vision and Highway Safety" resolution which stated: "Resolve that the American Optometric Association continue to urge that the laws of all states provide a suitable and adequate visual screening examination for a driver's license, which shall be given not only prior to licensing, but also periodically there after at intervals of not more than four years". This resolution emphasizes the individual differences of driving performance and that the dynamics of vision over a period of time can change.

Little relationship has been found between highway safety and corrected vision. In the United States there has not been demonstrated any significant increases in accident levels related to uncorrected vision. In the California Driver Fact Book of April, 1981, under the sub-heading, "The Relationship

between Vision and Driver Record", overall, the relationships between driver record and static acuity for 17,000 drivers was quite small (correlation - .15 or less). According to a study by the Institute for Research in Public Safety⁽³⁾, dynamic visual acuity, static acuity under low levels of illumination, and central angular movement are most consistently related factors to accidents, therefore, a prediction of the driving safety of a visually impaired individual using a bioptic telescope should not be made on the basis of the person's static visual acuity loss alone.

The 1976 AMA-AAMVA National Conference on Telescopic Devices and Driving agreed that since there is insufficient scientific data available to show precisely the potential risk of driving with telescopic devices, no one can make categorical recommendations covering them.⁽⁴⁾

In a 1978 paper presented to the American Academy of Optometry, Bostick reported that of a sample of 166 telescope equipped drivers in New York studied for a seven month period, they experienced a lower crash rate than the general New York driving population. Subsequently Bostick reportedly issued an errata sheet with an opposite conclusion. Underlining this controversial data is the fact that neither the original nor subsequent data by Bostick has been printed in a journal.

To the contrary, data from Feinbloom⁽⁵⁾ on 300 patients driving from one to ten years with biotic telescopes revealed that none had suffered an accident causing injury or severe damage to a car or other property. Data from Kelleher⁽⁶⁾ indicates that biotic lens drivers in California, Massachusetts and New York have a lower percentage of accidents than do the general driving population.

The AOA Low Vision Section concludes that the accumulated data concerning safety and the use of bioptic telescopes for driving does not offer conclusive evidence to support the ban on the use of spectacle-mounted telescopes for driving. The collection of data on driving performance of low vision drivers needs to continue so that rational, thoughtful decisions based on sound data, which could not be compiled if individuals could not be licensed, can be made. Therefore, the AOA Low Vision Section recommends that future consideration of any resolution calling for a ban on the use of telescopic lens systems by drivers be postponed until there is further research on the safety factors.

In summary, the ability of the visually impaired individual to function effectively while driving with bioptic telescopes must be considered with regard to the person's contrast sensitivity and use of focal and ambient visual processing. Static acuity and field measurements do not necessarily indicate performance abilities during dynamic visual operations while driving. Therefore, for the visually impaired person, the American Optometric Association (AOA) Low Vision Section recommends that telescopic lenses not be considered as the sole factor in denial of a driver's license, but the effectiveness of an individual's visual performance with bioptic telescopes be the determining factor.

The AOA Low Vision Section offers the professional expertise of its membership to review this issue in greater depth and to consult with those agencies and federal departments interested in further developing the appropriate means of functional vision analysis related to driving performance of visually impaired individuals.

REFERENCES

- (1) Liebowitz, H.; Post, R.: Two modes of processing concept and some implications. National Academy of Sciences, July 1980.
- (2) Padula, W.: Low vision related to function and service delivery for the elderly. National Academy of Sciences, April 1980.
- (3) Shinar, D.: Driver visual limitations diagnosis and treatment. Indiana University School of Public and Environmental Affairs, Contract No. DOT HS-5-01275, September 1977.
- (4) Hames, L.: Is it safe to wear telescopic devices when driving? Traffic Safety, Vol. 76 (11), 1976.
- (5) Feinbloom, W.: Driving with bioptic telescopic spectacles. American Journal of Optometry and Physiological Optics, Vol. 54 (1), 1977.
- (6) Kelleher, D.: Driving with low-vision. Journal of Visual Impairment and Blindness, Vol. 73 (9), 1979.

KANSAS DEPARTMENT OF TRANSPORTATION

STATE OFFICE BUILDING—TOPEKA, KANSAS 66612



JOHN B. KEMP, Secretary of Transportation

JOHN CARLIN, Governor

FEBRUARY 3, 1984

The Honorable Rex Crowell, Chairman
House Transportation Committee
Statehouse, Room 431-N
Topeka, KS 66612

Dear Representative Crowell:

The following concerns of the Kansas Department of Transportation are presented for consideration by the Legislature during the 1984 Session. The information presented herein is provided as a brief. A more exhaustive coverage can be provided upon request.

Qualification Statements of Engineering Firms

Background

K.S.A. 1983 Supp. 75-5803(b) requires that when state agencies consider a project which requires engineering services, current statements of qualifications and performance data on file with the state agency shall be evaluated "together with those that may be submitted by other firms."

Reason for Request

This provision requires the KDOT to accept any and all qualification statements which may be submitted, even up to the time when the contract is actually being negotiated. This requirement produces delays in the finalization of contract negotiations because there is no allowed cut-off date permitted for the receipt of qualifications statements.

Request

Amend K.S.A. 1983 Supp. 75-5803(b) to read similar to the following:

"Except as otherwise provided in subsection (c), whenever a project requiring engineering services is proposed for a state agency, the agency head of such state agency shall evaluate current statements of qualifications and performance data on file with the agency head, together with those that may be submitted by other firms regarding the proposed project.

The agency head may establish time frames for the receipt of qualifications statements and performance data from any firm wishing to be considered for the proposed project. and The agency head shall conduct discussions..."

Attachment 5

The Honorable Rex Crowell, Chairman
February 3, 1984
Page 2

City Connecting Links

Background

Under present provisions of K.S.A. 1983 Supp. 68-406, a "city connecting link" means a routing inside the city limits of a city which: "(1) Connects a state highway through a city; (2) connects a state highway to a city connecting link of another state highway; (3) is a state highway which terminates within such city; or (4) connects a state highway with a road or highway under the jurisdiction of the Kansas turnpike authority." A route which begins and ends within a city may not be designated as a connecting link.

Reason for Request

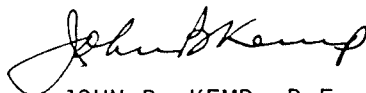
The KDOT desires to amend the definition for "city connecting links" to specifically address Interstate highways which may begin and end within a city, thereby allowing maintenance responsibilities to be clearly defined for these highways.

Request

Amend K.S.A. 1983 Supp. 68-406 to read similar to the following:

(b) "... City connecting links means a routing inside the city limits of a city which: (1) Connects a state highway through a city; (2) connects a state highway to a city connecting link of another state highway; (3) is a state highway which terminates within such city; (4) connects a state highway with a road or highway under the jurisdiction of the Kansas turnpike authority; or (5) begins and ends within a city's limits and is designated as part of the National System of Interstate and Defense Highways."

Sincerely,



JOHN B. KEMP, P.E.
SECRETARY OF TRANSPORTATION