Your light and your sight

M S. Pickett

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A WELL-LIGHTED home is a true joy in which to live. In it, you and your family have the best opportunities to see easily, accurately and comfortably.

There's plenty of light for safety and accident prevention—making your family feel more secure at home. Tasks and hobbies can be done in comfort with a minimum of eye discomfort and irritation.

Why Be Concerned?

Today, light for seeing is vital; 75 per cent. of our activity depends on the eyes, and 75 per cent. of all stimulus to the brain comes through the eyes. Good lighting, therefore, becomes a must. Man's eyes, because they function in cooperation with a higher intelligence, are particularly essential to him in carrying out the activities of our complex world.

Although good lighting is vital to all members of the family, every age has its special needs:

The young child, as he begins to learn to live in our world, responds most favourably to a well-lighted path. The need looms larger when we realise that the number of children under 10 years of age who wear glasses is increasing each year. It is estimated that 20 per cent. of the children of elementary school age have eye defects.

By the time our young people reach college age, about 40 per cent. of them do not have normal vision. This, coupled with the fact that young people are extremely sensitive about their personal appearance and resist wearing glasses, makes one wonder just how well young people really see the world in which they live.

Homemakers need good light to perform their many close vision tasks—food preparation, sewing, ironing, cleaning, keeping books—all done by indoor light. It has been estimated that about 70 per cent. of all homemakers suffer eye defects.

The lighting needs of husbands and fathers vary a great deal, depending on their work. For example, only 10 per cent. of farmers have known eye defects. They work mostly by daylight in relation to the distance of the sky and the field. On the other hand, among men who do work with different seeing requirements, such as drafting and accounting, for 40 hours a week by artificial lighting, about 90 per cent. have eye defects.

Seeing of the aged requires a high level of light for effective, safe living. The ability of the eye to function properly decreases with age and needs to be compensated by a higher level of light.

Thus—regardless of the age or the task—fast, accurate seeing is a part of everyone's daily life in our modern world. And that's why the value of good light is immeasurable.

Danger Signals . . .

As we live and work with our family in the house, we ourselves are very poor judges of the correct amount of light needed for each task, since our eyes "try" to adjust to the existing light. But sometimes we expect or demand too much from our eyes.
Studies conducted with young children have revealed some very useful “signals” that indicate poor lighting in the environment of a child. Regular medical checkups that include eye examinations are your best bet in detecting eye defects your child might have or be developing. But these “danger signals” may help you spot poor lighting conditions in your home that may be causing difficulty.

The very young child is likely to respond quickly to poor lighting. He won’t freely choose to go to poorly lighted areas to play, and he may show symptoms of defective sight even before he learns to read. Here are some types of behaviour that may be regarded as possible danger signals among children:

- Attempting to brush away a blur;
- Blinking more than usual;
- Frowning and frequent rubbing of eyes;
- Undue sensitivity to light;
- Watery eyes; and
- Frequent headaches.

After he begins to read, a child may show other signs of visual difficulty such as:

- Holding a book too far from or too close to his face when reading;
- Evidence of difficulty in reading or in other work requiring close use of eyes;
- Inability, or lack of desire, to participate in games requiring distance vision;
- Tilting his head to one side or thrusting his head forward to near or distant objects; and
- Irritability when doing close work.

These are important signals as to the special needs of a child, but they may also indicate that the lighting isn’t good enough for the older members of the family—the adults who have become so accustomed to getting along in their surroundings that their behaviour may not reflect their actual needs.

How Much Light?

How much light does your family need for reading, studying, food preparation or enjoying hobbies? That depends on several conditions.

First, it depends on the kind of work you’re doing. Some tasks are more difficult than others. It’s harder to read the fine print of a newspaper than to read the headlines. It’s even more difficult to read black print on coloured backgrounds or on backgrounds such as many comic books have. The colours absorb some of the light, so more light must be supplied to make the print as easy to read as black print on white paper.

Second, the amount of light you need also depends partly on how good your eyes are and on your general health. If your sight isn’t perfect, your eyes may need more light to help them see easily.

Finally, the amount of light you need depends partly on the length of time you’ll be doing the same task. Less light is needed for a casual scanning of the pictures in your favourite magazine than for your teenager to study one of her textbooks. The eyes may not complain when forced to work for a few minutes under poor light, but they’ll probably become very tired if you continue that task for an hour or two.

Lighting specialists have set up standards to meet the basic lighting requirements for family activities that involve close vision. There are no differences in the need for amounts of light between the farm and city dwelling or between the most pretentious and the most modest residence. The only differences may be in the ways of providing light, in costs and in the choice of lighting equipment appropriate to the decoration of the home.

Seeing is a complex task performed with two tools—light and vision. Always interrelated are the job to be done, the light needed to make the job visible and the sensation felt by the person performing the job.

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The amounts of light that are recommended for some of the areas where much of the family's time may be spent are listed in the table. The light values are listed in terms of foot-candles. You can check at home yourself if you have a camera exposure meter that gives foot-candle readings.

The table and examples given below are Australian standards, which differ somewhat from the American figures given in Professor Pickett's original article.

The figures used here are from the Standards Association of Australia publication "Artificial Lighting of Dwellings." They are minimum recommended levels of illumination, described by the Association as a somewhat conservative approach to home lighting. This useful publication describes how these levels can be obtained in various situations and should be consulted for further detail.

Living room lighting is best produced by a combination of general lighting from central fittings and local lighting from portable lamps (100 to 200 watts per fitting). This provides flexible lighting in a room where the requirements vary from soft background lighting to high levels of illumination for reading, writing and so on.

The centre of interest in the dining room is the dining table. Direct or semi-direct lighting over the table should give an illumination 10 foot-candles, where the table is used for eating only. Where it is also used for writing or study the level should be at least 15 to 25 foot-candles, which may if necessary be obtained with the assistance of portable study lamps.

### AMOUNT OF ILLUMINATION REQUIRED TO PROVIDE ADEQUATE SEEING CONDITIONS FOR VARIOUS TASKS

<table>
<thead>
<tr>
<th>Task</th>
<th>Recommended Illumination (Foot-candles)</th>
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<tbody>
<tr>
<td>Sewing or mending—Dark goods</td>
<td>25-50</td>
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<tr>
<td>Light goods</td>
<td>15-25</td>
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<tr>
<td>Reading—Newspaper or books with small print; poor contrast between print and paper; reading for prolonged periods</td>
<td>15-25</td>
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<tr>
<td>Books with large print; good contrast between print and paper; casual reading</td>
<td>10-15</td>
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<tr>
<td>Studying</td>
<td>15-25</td>
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<tr>
<td>Ordinary writing</td>
<td>10-15</td>
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<tr>
<td>Food preparation</td>
<td>10-15</td>
</tr>
<tr>
<td>Shaving</td>
<td>10-15</td>
</tr>
<tr>
<td>Games—Table tennis; billiards</td>
<td>25-50</td>
</tr>
<tr>
<td>Other games</td>
<td>5-10</td>
</tr>
<tr>
<td>General lighting in rooms (average illumination)</td>
<td>5</td>
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<tr>
<td>Movement light in passages (average illumination)</td>
<td>2</td>
</tr>
</tbody>
</table>

Note.—The amount of light recommended in this table is to be provided on the working surface. For general lighting, the surface taken is a horizontal plane 2 ft. 6 in. above the floor.
In the kitchen, best results are obtained by placing supplementary local lights over the working areas, each fitting using globes of about 40 watts. If only a single central fitting is used the housewife works almost continuously in her own shadow; if ceiling lights only are used reasonable results will be obtained from not less than two fittings placed to give the best distribution for the particular working surfaces. The most important light in the bathroom is at the mirror. The best mirror lighting is all around it but a bracket each side of the mirror (40 watts each bracket) is very effective. If only one light can be installed in the bathroom it is best placed over the mirror provided the lamp bulbs are shaded. The average general level for the bathroom should be 3 to 5 foot-candles; at the mirror it should be 10 to 15 foot-candles on the face.

Your home decorating also has an effect. The lighting methods recommended for each of the situations just mentioned will provide the needed amounts when the colours in the room are within recommended reflectance values. Colours used on the ceiling should reflect 60 to 90 per cent. of the light falling on the surface; the walls, 35 to 60 per cent.; the floors, 15 to 35 per cent. Usually, you'll get these reflectance values if you use light to medium colours.

Other factors are of equal importance to consider in designing the lighting in your home to meet the needs of your family. In your plans, keep in mind, too, the quality of the light and its placement in relation to the task. We'll discuss these factors in more detail in forthcoming articles.

Acknowledgment

Most of this article was reprinted from "Iowa Farm Science," for November, 1962. The section dealing with standards of lighting was from "Artificial Lighting of Dwellings," published by the Standards Association of Australia, Science House, Gloucester and Essex Streets, Sydney.
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