permanently impaired vision. Good eyes are as necessary as good lamps, and the importance of assisting the eyes scarcely needs to be emphasised.

This brings us right to the question of the control of the light. It will reasonably be asked: "How are you going to see if you do not have the light near to your work?" The answer brings in the next part of our subject—Reflectors. With an electric lamp of nominally 16 candle-power, it will be observed that quite a large proportion of the light given strikes out at an upward angle, and the maximum light is given in a horizontal plane level with the centre of the filament of the lamp. Its minimum is at a point immediately below the centre of the lamp. It is said to be giving 16 candle power, but that light is given at the very point where it is of the least use. The same difficulty occurs with every form of lamp when used without a reflector. With *correct* reflectors, it is possible to make use of all this otherwise wasted light by directing it to the plane to be illuminated. Without a reflector we had at a point immediately under the lamp, six candle power, whereas now *with* a reflector we have thirty-six candle power.

One of the most important developments in connection with this subject is that of the scientifically designed reflector. Care must be taken, however, to use the right kind or type for the actual conditions that exist, a decision which cannot be got at by any rule of thumb method. It is possible for an illuminating engineer to decide upon the correct amount of illumination necessary and then to select such reflectors as, with the proper spacing of the lamps at the proper height, will give just the desired results with great efficiency and economy.

The results to be obtained from reflectors are now figured out in cold mathematics. For most industrial purposes, of course, those made of steel are to be preferred, and in all these, whilst the details vary with different makes, the principles of all are the same, though no two makes or types will give the same results. In most of these the reflecting surface is of white enamel or (in one or two makes) of matt aluminum, either of which is very efficient. Some makers have at times adopted mirrored glass as a reflecting medium, but most engineers of repute object to its use—for many important reasons.

Light, when it strikes upon a reflecting surface, is reflected off from that surface at a similar angle but in an opposite direction to that line in which it came. The important thing then in the design is to have the *shape* of the reflector such that the light will be reflected to a given area and direction, with the least possible waste. It must be remembered that the intensity decreases as the area increases and *vice versa*. If all your light is confined to an area of four square feet and has an intensity of twenty candles, you will find that if you increase the area to