The literature is given in Mr. Griffith's paper, though unfortunately some errors have crept into the references. The present case makes the eighth on record, and the third with transmission from the father. Owen's case is the earliest, the father's eye having been removed in 1859, the child's in 1898. The second case in chronological order is that of de Gouvêa, in which the father's eye was removed in 1872. Until recently the existence of hereditary glioma was doubted; its appearance has followed, and probably largely resulted from, advances in medical skill, such as the adoption of chloroform anaesthesia and the development of ophthalmoscopic diagnosis: measures which now often enable individuals to attain the age of reproduction, who would previously have died in childhood. It is, therefore, to be expected that these cases will be more numerous in future.

Writers on glioma are generally agreed that the beginning of the disease always, or at least very often, takes place in intrauterine life. In the present case, and in both of Mr. Griffith's families, still-births occurred. It would be of great interest if it could be ascertained whether still-births are relatively more numerous in gliomatous families and what is the exact cause of foetal death in such cases.

My thanks are due to Dr. J. V. Paterson for kindly permitting the publication of this case.

COUNCIL OF BRITISH OPHTHALMOLOGISTS

Report on Standard Illumination of Snellen's Distant Test Types

The Council of British Ophthalmologists appointed a committee in July, 1918, to determine a standard of illumination of Snellen's test types of distant vision. The Committee consisted of the following members: Sir George Berry (Chairman), Sir Richard Glazebrook, C.B., F.R.S. (Director, National Physical Laboratory), Mr. Leon Gaster (Society of Illuminating Engineers), Mr. J. Herbert Fisher, Col. J. Herbert Parsons, Mr. A. B. Cridland, Mr. C. C. Paterson, O.B.E., and Mr. W. H. McMullen, O.B.E. (Secretary). The unanimous report of this committee was, after full consideration and discussion, adopted and is now issued by the Council.

Report of Committee on the Illumination of Snellen's Distant Test Types

The effect upon visual acuity of variations in the illumination of test objects has been the subject of a series of careful investigations
**FIG. 17.** Mushroom head with circular holes.

**FIG. 18.** Unusual form of mushroom head after iridectomy for recurrent iritis, the concave edge assumes a geometrical form.

**FIG. 19.** Secondary opacity shaped like a fern leaf with tracks of vessels.

**FIG. 20.** Complete circle gilled on its concave surface after interstitial keratitis.

**FIG. 21.** Secondary opacity forming an irregular arcus after many attacks of scleritis.

**FIG. 22.** Secondary opacity after dermoid of limbus.
Fig. 11. Three mushroom heads on one stalk, the result of three leash ulcers.

Fig. 12. Multiple mushroom heads with gills on both surfaces; senile arcus.

Fig. 13. Mushroom head forming a complete circle, dipping beneath the stalk.

Fig. 14. Mushroom head forming a complete circle, with gills on both surfaces.

Fig. 15. Multiple mushroom heads, scars of leash ulcers, one umbel, one geometrical track, all in one cornea.

Fig. 16. A mushroom head with an old perforation of cornea.
FIG. 5. Geometrical lines. No history. Wedge-shaped masses of corneal haze lying between the ends of an umbel vessel.


FIG. 7 and 8. Interstitial vessels which afterwards became geometrical lines.

FIG. 9. Geometrical lines and mushroom heads.

FIG. 10. Mushroom heads, tracks of umbel vessels and large sinuous tracks.
ILLUSTRATIONS
ON THE
FORMATION OF CLEAR SPACES IN CORNEAL NEBULAE
BY
W. T. HOLMES SPICER.

FIG. 1. Types of vessels in the cornea.
A. Arborescent type. B. Terminal loop type.
C. Brush or besom type. D. Umbel type.

FIG. 2. Formation of a single trunk vessel in the cornea from small vessels at each end.

FIG. 3. Clear geometrical lines in a nebula. Terminal loop vessels at limbus.

FIG. 4. Geometrical lines after interstitial keratitis.
since the time of Tobias Mayer (1754). Two chief facts emerge from these researches: (1) that there is a rapid rise in acuity as the illumination is increased from zero up to about two foot candles*; (2) that above two or three foot candles there is scarcely any appreciable rise in acuity. The results obtained by different observers are not entirely concordant, the discrepancies being attributable to variations in the test object, contrast, size of pupil, etc. So far as the testing of visual acuity for clinical purposes is concerned, it appears to be sufficiently accurate to regard the results obtained with an illumination of three foot candles or more as valid and comparable under the ordinary conditions of clinical testing.

There is, however, no doubt that this minimum is by no means always ensured under the actual conditions in which the testing of candidates for military or other public services occurs. Apart from the fact, which should be borne in mind, that the test types often do not conform to Snellen's criteria, they are frequently dirty, thus diminishing contrast, are varnished, thus giving rise to disturbing direct reflection of light, and are viewed under very great variations of daylight, in rooms which are often ill-suited for the purpose.

It is possible to lay down precise and simple rules for the efficient illumination of test types, and we see no reason why these rules should not be generally adopted. For the public services it is in our opinion unfair to the candidates and detrimental to the services themselves that the examinations should take place under unsatisfactory, and often hurriedly improvised, conditions. The testing of visual capacity is now an essential part of the physical examination of candidates for a large number of the public services, such as the Navy, the Army, the Mercantile Marine, the Indian Civil Service, and so on. We are of opinion that these tests should be conducted under approved conditions, and that this object would be best attained if the examinations were held at properly equipped centres.

We fully recognize that variations of visual acuity arise from many causes other than the actual illumination of the test types, such as the condition of retinal adaptation, contrast between the test object and its background, the size of the pupil, lateral illumination, and so on. We think, however, that these effects can be minimized sufficiently for practical clinical purposes if the testing takes place in a moderately well illuminated room, with the test types efficiently lighted, and with the careful elimination of any glaring lights or bright objects from the candidate's field of vision.

We consider that the requirements are sufficiently well-satisfied by the following means:

*One foot candle is the illumination received from a source of one candle power falling perpendicularly on a surface at a distance of one foot from the source.
Two ordinary 20 watt tungsten lamps with straight filaments are fixed vertically 15 inches in front of the plane of the test card, one on each side, at a horizontal distance of 12 inches from the vertical plane normal to and bisecting the card. One lamp is placed higher than the other, one being opposite the junction of the upper and middle thirds of the card, the other opposite the junction of the middle and lower thirds. Opaque non-reflecting screens are fitted, so as to prevent direct light from the lamps reaching the candidate's eyes.

The accompanying diagrams illustrate the arrangement recommended.

This method ensures:
(1) Sufficient illumination. With new lamps the illumination on the test types will be of the order of 10 foot candles. The ordinary variations of current, deterioration of lamps, and the darkening of the test card with age will not reduce the brightness of the test card so illuminated to a value less than that of a perfectly white surface receiving an illumination of 3 foot candles.

(2) Sufficient uniformity of illumination. Whilst we are aware that the same result can be achieved by the employment of properly designed and carefully placed reflectors we have had to recognize in making these proposals that the testing of visual acuity must often be carried out in circumstances which do not admit of the use of special lighting arrangements, requiring technical skill in their installation or upkeep. We have, therefore, endeavoured to prescribe a method of ensuring the necessary illumination which is simple to erect, is not liable to become deranged by subsequent treatment, and which enables ordinary lamps on the market to be employed.

Where electric light is not available a similar arrangement can be installed, using other illuminants (see appendix).

Daylight Illumination.—There is no theoretical objection to the
use of diffuse daylight so long as the illumination on the test types is adequate, i.e., does not fall below 3 foot candles. In cases of doubt, it would be necessary to apply tests requiring the skilled use of some form of photometer. We are therefore of opinion that, in order to secure uniformity and comparable results, artificial illumination should in general be used, and invariably in testing for the public services.

We therefore make the following recommendations:

I. *The Test Types.*—The test types shall be of the dimensions laid down by Snellen, and printed on a matt white surface.

II. *Illumination.*—

a. The minimum illumination on the test card shall be such that its brightness shall be equivalent to that of a new card illuminated to at least 3 foot candles;
b. The illumination of the test types shall be as uniform as possible;
c. Artificial illumination shall be used in preference to daylight;
d. The testing room shall be moderately illuminated, and care shall be taken that there are no glaring lights or bright objects in the candidate's field of vision;
e. Extreme contrast between the illuminated test card and the background shall be avoided.

III. *Method of Lighting.*—

a. The method of lighting described in this report shall be in general adopted;
b. This method shall be made compulsory for sight testing in all public services.

**Appendix.—Illumination of Test Types by Gas or Oil Lamps**

*Gas Lighting.*—Two "medium" inverted incandescent burners, consuming $2\frac{1}{2} - 2\frac{3}{4}$ cubic ft. of gas per hour, are fixed 2$\frac{1}{2}$ ft. in front of the test card, one on each side, at a horizontal distance of 12 inches from the vertical plane, normal to and bisecting the card. One burner should be higher than the other, one being opposite the junction of the upper and middle thirds of the card, the other opposite the junction of the middle and lower thirds. Burners should be equipped with clear glass globes, and care should be taken to ensure, by regular maintenance, that mantles and burners are kept in good order and in clean condition. Opaque non-reflecting screens are fitted, so as to prevent direct light from the burners reaching the candidate's eyes.

*Oil Lighting.*—Two standard "Duplex" oil lamps, each having a double straight wick, 1 inch in width, and a chimney 10$\frac{1}{2}$ inches in length, are fixed 2 ft. in front of the test card, one on each side, at
a horizontal distance of 12 inches from the vertical plane, normal to and bisecting the card. One lamp should be higher than the other; one being opposite the junction of the upper and middle thirds of the card, the other opposite the junction of the middle and lower thirds. The wick should be turned up as high as is possible without smoking, and the face of the wick should be turned towards the card. The distance from top of wick to level of oil in reservoir should not exceed 5 inches. The lamp should be lighted 20 minutes before the test, so as to ensure steady conditions of burning. Opaque non-reflecting screens are fitted, so as to prevent direct light from the lamps reaching the candidate's eyes.

ANNOTATION

Standard Illumination of Distant Tests of Vision

The desirability of securing fair and equal conditions in the visual examination of all candidates for public services is obvious. That these examinations are sometimes carried out under unsatisfactory and often hurriedly improvised arrangements is unfair to the men examined and detrimental to the services themselves. Under the present regulations for most of the services the examination is supposed to take place in daylight, and in this country at least no more variable factor could be introduced. We are glad to note that one of the first duties undertaken by the Council of British Ophthalmologists has been to investigate this question and to set up a standard of illumination which, if generally adopted, will secure equal and fair treatment for all candidates for public services. The report of the Council which we publish in this number has been drawn up by a strong committee, consisting of Sir George Berry, Sir Richard Glazebrook, C.B., F.R.S., Director of the National Physical Laboratory, Mr. C. C. Paterson, O.B.E., also of the National Physical Laboratory, Mr. Leon Gaster, Secretary of the Society of Illuminating Engineers, Mr. J. Herbert Fisher, Col. J. Herbert Parsons, Mr. A. B. Cridland, and Mr. W. H. McMullen, O.B.E. The aim of the committee has been to secure that under no circumstances shall the illumination falling on the test types go below a standard of three foot candles. Above this minimum there is a very considerable range in which very little change in visual acuity takes place. With the arrangements suggested an illumination of ten foot candles is secured on the test types. They find that this is sufficiently above the minimum to allow for all ordinary causes of deterioration, such as variations in the current, age of lamps, and darkening of the test card. Opaque screens are used