A peculiar form of hereditary congenital cataract / by E. Nettleship and F. Menteith Ogilvie.

(10)

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A peculiar form of hereditary congenital cataract.

By E. Nettleship and F. Menteith Ogilvie.

In the following paper we describe the case of a family named Coppock, nearly twenty members of which are known to be affected by a very definite and peculiar variety of stationary congenital cataract. The earliest known member of the stock—John Coppock (Fig. 25, I, 1), born in 1774 —came from the village of Milton, in Oxfordshire, where he died in 1812; his wife was named Adkins, but nothing is known of her side. They had nine children —seven sons and two daughters—of whom five, *viz.*, both daughters and three of the sons, appear to have died without issue, whilst the first-born, fifth, seventh, and ninth (all sons) left descendants. Although the cataract has hitherto been traced only amongst the descendants of the first-born (James, II, 1, 1770–1838), we have thought it well to obtain as full a genealogy as possible of the whole family, including the descendants of the other three, and this laborious task has been most kindly and thoroughly undertaken by the Rev. W. F. Johnstone, the Vicar of Headington Quarry, to whom our warmest thanks are due. We are also greatly indebted for much assistance to Miss A. Johnson, matron of the Oxford Eye Hospital, and Nurse Griffin, of the same hospital.

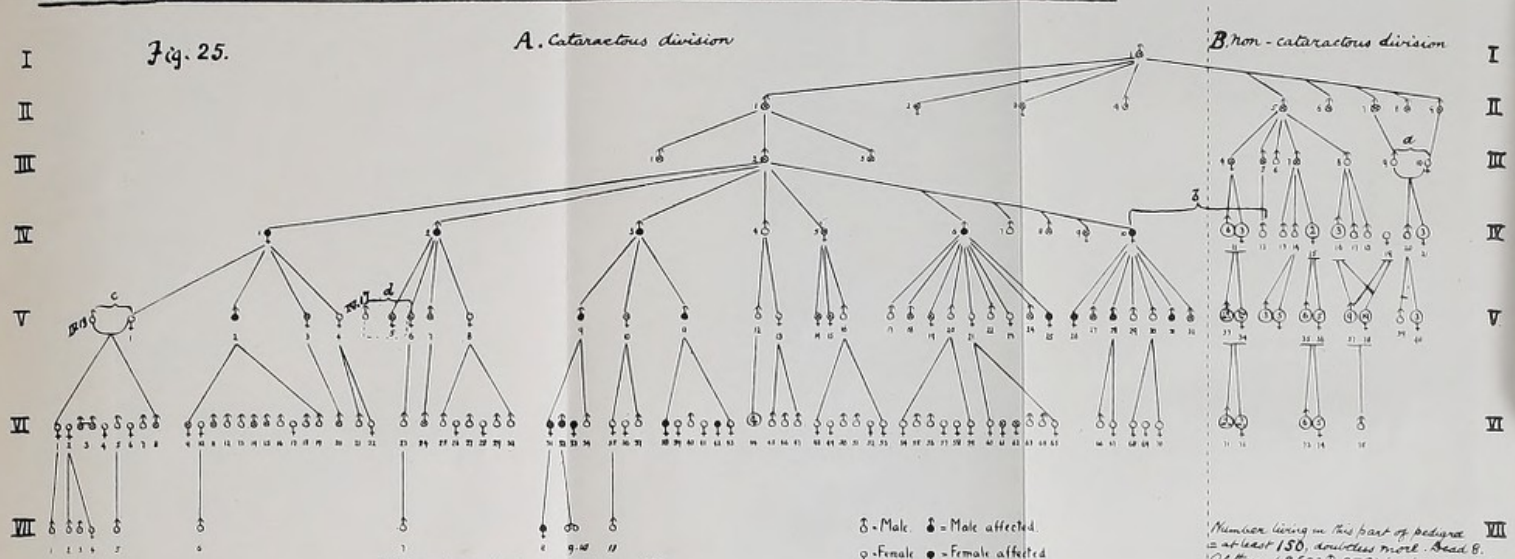
I (E. N.) must say further that the tedious work of making the recent ophthalmic examinations and collecting information generally has been carried out entirely, and with characteristic thoroughness, by Mr. Menteith Ogilvie, who during the last three or four months has himself examined the eyes of 150 or more members of the Coppock stock. Our attention was originally drawn to the family by Mr. Doyne, who saw and described the first case (IV, 6), William Coppock, senior, in 1888, at the Oxford Eye Hospital, another (V, 25) in 1891, a third (V, 9)

in 1895, and probably a fourth (V, 11) in 1896. But the greater number have been discovered by Mr. Ogilvie during the last few months. We have to thank Mr. George Mackay, of Edinburgh, and Mr. Hill Griffith, of Manchester, for their kindness in examining two small groups of Coppocks living near those cities; but none of these, nine in number, are affected. Through the kindness of Mr. Doyne and Mr. Ogilvie I have had the opportunity of seeing several of the cases at the Oxford Eye Hospital, but my share in the present paper has consisted in little more than suggesting that the family history was worth fully working out.

The whole race seems healthy, is fairly prolific and intelligent, and has held its own and multiplied largely without, in the main, spreading far afield. Thus of the present population of the village of Headington Quarry, numbering 1500, at least 300 are descended from the original John Coppock, and others are scattered in neighbouring villages. We were therefore prepared to find that consanguineous marriage had been common, and felt some hope that the history might throw light upon the question whether consanguinity is in itself a cause of degeneracies. This hope has been but very partially realised, for only five instances of cousin-marriage have been proved in the entire pedigree, and they throw no decided light on the *general* question just raised. In regard to the influence of consanguinity in causing the peculiar cataract itself, a glance at Fig. 25, which is a condensed combination of the pedigrees drawn up by Mr. Ogilvie and the vicar respectively, will show that the family cataract has been found hitherto (as already mentioned) only in one branch of the stock; that although in three of the four consanguineous marriages (*b*, *c* and *d*) one of the cousins was a member of that branch, we find that the cataract appeared in the offspring of only one of the cousin-marriages, and that in that case one of the parents had it; in the other cousin-marriages, where all the parents were free, their children were free also.

Peculiar Congenital Cataract — Coppock of Headington Quarry — [Mr Menteith Ogilvie (April 1906) and Rev. H.F. Johnstone (Vicar of H.Q.)]

Fig. 25.



♂ = Male. ♂ = Male affected.
♀ = Female. ♀ = Female affected.
⊗ = Dead, and no information.

Husband & wife joined by brackets (⌒) are cousins. Four such are shown. There should be a fifth, between one of the sons of IV. 12 and his 2nd cousin a daughter of one of IV. 18. This pair, their respective fathers and their 2 children are unaffected.

Total number in this part of pedigree ... 136
Living 101
Dead 33
Examined 90
Affected, 18. Normal, 72

Number living in this part of pedigree = at least 150, doubtless more. Dead 8. Of these, 68 (23 ♂. 25 ♀) had been examined, up to June 1906, and all found normal, including [illegible] of Gen. III.

PLATE VIII.

Illustrates the paper on A Peculiar Form of Hereditary Cataract, by E. Nettleship and F. Menteith Ogilvie (p. 191).

Fig. 1.—Typical form of the cataract. Left eye of William Coppock æt. 55 years (Gen. V, No. 9).

Fig. 2.—Atypical form, showing a triradiate opacity of greater density than the rest. Left eye of Mrs. Packford, æt. 24 years (Gen. VI, No. 38).

From drawings by Miss C. E. Hacking.

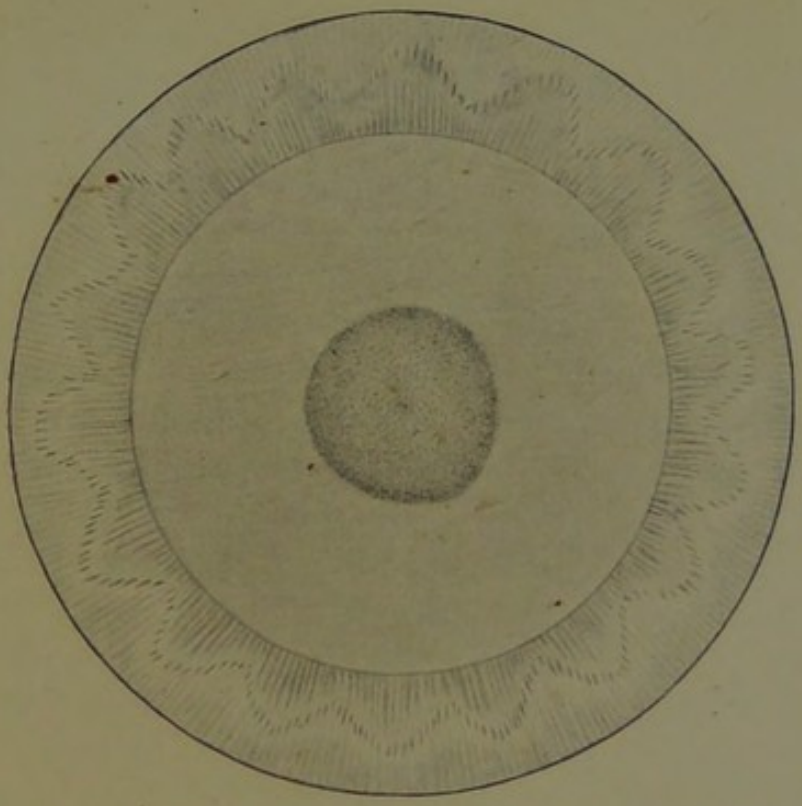


Fig. 1.

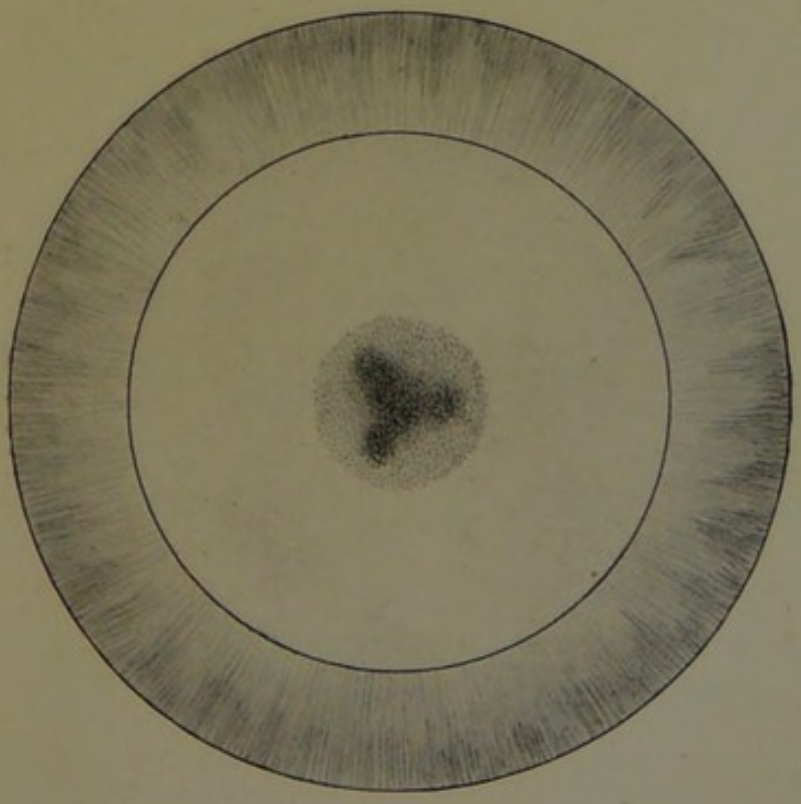


Fig. 2.

Adlard & Son, Impr.

The cataract itself, always very partial and circumscribed, is sometimes so slight as to require carefully seeking. The patient is often unaware that he has any imperfection of his eyes, and frequently shows no symptom, except liking to shade his eyes against strong light. There has therefore been nothing for it but to use the ophthalmoscope by routine upon as many of the family as possible; and as no more than four generations are now living, although the pedigree extends to seven, it is impossible to tell with certainty whether any of the three earlier generations were affected*, and whether in the first affected generation the disease was introduced by the Coppock husband or his wife. If, for instance, it was brought about by the wife of George (III, 2) (Charlotte Bateman), cases may exist in her relations, a good many of whom are still living at or near the Quarry, and Mr. Ogilvie is endeavouring to follow this clue. If, on the other hand, the disease goes back to James (II, 1), who was one of the nine children, we find it difficult to believe that he should be the only one of his childship to transmit it; and yet amongst a considerable number—at least fifty—of unselected descendants of his brethren whom Mr. Ogilvie has examined not a single case has been found (Fig. 25, Part B). The name of this James's wife has been ascertained, and Mr. Ogilvie hopes also to follow up her descendants, as well as those of Charlotte Bateman.

The opacity takes the form of a sharply-defined circular disc placed deep in the lens between the nucleus and the posterior pole (Pl. VIII, fig. 1, from Case V, 9, William Coppock, æt. 55). In the great majority the texture of the cataract appears to be uniform, but in one case (VI, 38, Mrs. Packford, æt. 24, shown in Plate VIII, fig. 2) a triradiate structure is very evident, and two or three others showed slighter indications of this. The cataract is of the same kind in all the cases, but is divisible into minor

* The only exceptions are IV 2 and 3, now dead, both of whom are believed by their younger brother, IV 6, on what seem good grounds, to have been affected like himself.

varieties. It is generally large enough to about block the ordinary—say 4 mm.—pupil. It is always double, and, without exception, accurately symmetrical in the two eyes. The earliest age at which it has been seen is ten years and the latest eighty-two, and the condition seems to be absolutely stationary. There is, however, some reason to think that the cataractous branch of the family has an unusual tendency to præsenile lenticular change in the common form of scattered dots and small smudgy striæ. Such changes were noted in at least twelve of the affected division; six of these have also the typical family cataract, whilst of the other six, who have only the scattered changes, three are the adult children of a father who himself has the typical cataract. In three of the above twelve there was also a single, defined, pin-point opacity somewhat deep in the lens, but in front of the typical cataract disc, and placed up and in from the pole; it was limited to the left eye in all three cases.

Mr. Ogilvie finds the following minor varieties of the peculiar family cataract: (1) In what may be called the most typical variety the disc of opacity is of steel-grey colour by focal light and almost homogeneous in texture, though often showing some speckling or stippling; it is so dense that the fundus is either invisible or at best only dimly seen through it. Quite half the cases are of this variety, *viz.*, IV, 1, 6, 10; V, 2, 9, 25; VI, 31, 38. (2) In another variety the opacity, though like the above in size, shape, and clearness of outline, is so extraordinarily faint that it may easily escape detection even when the pupil is dilated, the fundus being readily visible through the translucent disc (Cases VI, 31, 42; and VII, 8). (3) In a third variety the diameter of the opacity is rather less, its outline, though circular, slightly irregular or eroded, and the texture, though very translucent, is at the same time rather granular (Cases V, 11, 26, 28). Cases VI, 32 and 33, are intermediate between the above forms. The differences above described have no relation to age, nor is the same variety always present in parent

and child, or in the affected members of the same childship. Thus John (V, 11) has the third or small, irregular variety, his daughter (Mildred, VI, 38) the first or large dense form, and a younger daughter (Doris, VI, 42) the second or transparent variety; again, Harriet (IV, 10), æt. 62 years, and her youngest living child (V, 31), æt. 28 years, have the first variety, whilst in her two eldest children (V, 26, 28), æt. 40 and 38 years, the third form is found.

The exact position and nature of the opacity has been a good deal discussed by various competent observers who have seen some of the cases from time to time at the Oxford Eye Hospital, the diagnosis having varied from small lamellar cataract to opacity on the posterior capsule. Mr. Ogilvie, who has seen all the cases and studied them with extreme care, believes the opacity to consist of a single layer, always thin, though varying in the degree of its intransparency, situated behind the nucleus but well in front of the posterior capsule. Although the regularity and sharp definition of the outline suggest lamellar cataract, there is never any evidence of a second layer, either complete or in the form of "riders," and the term "lamellar" therefore certainly cannot be used for descriptive purposes. Nor can we suppose that the opaque disc represents a lamellar cataract of which the layers have coalesced after absorption of the centre, for then the opacity ought to lie in the nucleus, whereas both the parallactic test and focal illumination agree in placing it decidedly behind the nucleus; developmentally, therefore, the word "lamellar" seems a misnomer, unless it should be shown that the part of the lens that is nuclear in early embryonic life becomes postnuclear at a later stage. Can the opacity result from the persistence of the separate mass of epithelial cells described as existing at the bottom of the lens-cup in early embryonic life? (*Quain's Anatomy*, Part I, vol. i, p. 85, fig. 100; and *Norris and Oliver*, vol. i, p. 39).

Visual acuity is not much lowered by the Coppock

cataract, being sometimes normal and seldom less than $\frac{6}{12}$, unless from coincident refractive error. There is generally a dislike of bright light, shown by the habit of shading the eyes with the hand when the patient wants to see as well as possible. But, as already mentioned, the inconvenience is so slight that several in whom Mr. Ogilvie found the typical opacity refused to believe that their eyes were not quite perfect.

Of the 288 persons included in Mr. Ogilvie's and the Vicar's pedigrees together, 131 were male, 115 female, and in forty-two the sex is not noted; a few of these cannot be correctly placed, and are therefore omitted from Fig. 25 (Part B). A certain number of others, known but not actually identified, would bring the total to 300 or more.

The cataractous branch alone (A, Fig. 25), contains 134 persons—seventy-one male, fifty-seven female, and six whose sex is not given; the cousin-husbands belonging to the non-cataractous division are not counted. Of the 134 thirty-three are dead, and of the remaining 101 ninety have been examined, with few exceptions by Mr. Ogilvie himself, *viz.*, forty-four males, forty females, and six sex not stated. In sixteen of the ninety, seven males and nine females, the peculiar family cataract has been found, It is nearly certain that two others, males (Generation IV, 2 and 3) now dead, were affected, for both of them are known to have always had somewhat imperfect sight and the habit of shading their eyes; this brings the total to eighteen—nine of each sex.

The descent of the cataract was continuous in every instance—once through four generations (IV, 3 to V, 9 to VI, 31 to VII, 8); once through three generations (IV, 3 to V, 11 to VI, 38, etc.); twice through two generations (IV, 6 to V, 25, and IV, 10 to V, 26, etc.).

Transmission was by the father four times, by the mother thrice, the four fathers having twenty-two children, of whom eight were affected, the three mothers twelve children, of whom five were affected.

Descent being, so far as we know, always continuous

in this family, it follows that the descendants of a normal continue normal, as is shown in the descendants of IV, 4 and of V, 1.

This rule, "once free always free," holds good in several previously published pedigrees of hereditary cataract, notably Berry's, Tatham Thompson's, Bergmeister's, and one of my (E. N's.) own; and Mr. Herbert Fisher has lately given me (E. N.) a good instance of hereditary lamellar cataract showing the same feature. The rule is well known to be obeyed more or less strictly in several hereditary diseases of the eye and of the nervous system and in hæmophilia. We find no evidence that the liability to the peculiar Coppock cataract is influenced in any constant manner by the order of birth of the children.

Appendix.

(1) The Coppocks and their descendants now form a considerable part of the population of Headington Quarry, and offshoots are to be found in Oxford and the neighbouring villages. As a race they are bright and intelligent, something over the average height and girth, and exceeding the average duration of life. They seem to suffer very little from constitutional diseases; pulmonary disease is quite rare, and of nervous disease only one case was found—a man, said to be epileptic. Not a trace of syphilis has been observed in any of them, though the disease is widely diffused amongst the poorer classes in Oxfordshire and the adjoining counties. Rickets seems unknown to them. Their teeth are good, in most cases exceptionally so; in none was any serious defect found in the enamel.

Mr. Ogilvie thinks there is little doubt, from their appearance, relatively high intellectual standard, and manner, that they are a different race from the local inhabitants. When seeing them in batches for the purpose of his examinations he has often suspected, from their brilliant eyes, luxuriant dark hair and white teeth, that there was some mixture of gipsy blood, and other

observers who know them even better have taken the same view. At one time it was thought they were of Cornish stock, imported long ago, in order to quarry the Headington stone used in building the Oxford Colleges, but this hypothesis has not been proved. In the present investigation they gave every help, and without their willing assistance no such extensive and accurate family record could have been drawn up.

(2) *Statement as to the members of the surviving generations (IV to VII) of the cataractous division (A, Fig. 25) of the Coppock family.**—When not otherwise stated every person mentioned was examined, and the examinations and notes made by Mr. Ogilvie himself in the spring of 1906. A mydriatic was used whenever posssible. The fundus was examined and vision tested as often as practicable; but for various reasons, such as the patient's illness in bed, or unwillingness to allow sufficient time, the inspection had to be limited to the lenses in a few instances.

IV (1) Hannah Sturges, æt. 82 years. Seen March 12th, 1906. Typical central, symmetrical cataracts of rather above the average size and rather more than medium density, also some peripheral changes of ordinary senile type. Vision and fundus not noted, patient being ill and feeble. Four children.

V (1) Sarah, æt. 60 years, married Stephen Coppock, her first cousin once removed. Not affected; a few fine peripheral striæ. Nine children, six living.

VI (1–8) None affected; three of them have five children.

VII (1–5) Three not affected; the other two not seen.

V (2) Richard Sturges, æt. 56 years. Seen March, 1906. Typical central symmetrical cataracts of average size and density, and rather freely stippled; outline regular and perfectly circular; a few fine peripheral opacities. Vision, fundus, and teeth not noted (patient very ill in bed). Eleven children.

* The non-cataractous division (B, Fig. 25) contains 150 persons or more, of whom at least fifty have been examined, including three members of Gen. III; none of the fifty are affected.

VI (9–19) Eleven children; seven living, none affected.

VII (6) Grandchild, not affected.

V (3) Charlotte, *ob.*, no information; one child, also dead, *viz.:*

VI (20) *Ob.*, æt. 22 years; no information.

V (4) Harriet Matthews, æt. 49 years; not affected; two children.

VI (21) Not seen.

VI (22) Not affected.

IV (2) Robert Coppock, born 1826, *ob.* 1894, æt. 68 years; probably affected. Saw badly in bright light, and used to shade his eyes in order to see clearly; was never examined; four children.

V (5) *Ob.*, æt. 19 years; no information.

V (6) Alice, *ob.*, æt. 23 years, married Henry Coppock (IV, 17), her first cousin once removed; no information; one child.

VI (23) Reginald, æt. 23 years; not affected; one child.

VII (7) Not seen.

V (7) *Ob.*, æt. 27 years; no information; one child.

VI (24) *Ob.*; no information.

V (8) Emily Parsons, æt. 33 years; not affected; lenses perfectly clear. High my. (R. 13 and 1 D., As., L. 10 and 2 D., As.) and sees badly with correction; large crescents; no other disease. The only member of pedigree seen who has any considerable my.; six children.

VI (25–30) All seen and none affected; all em., and those old enough for testing see $\frac{6}{5}$.

IV (3) John Coppock, died 1904, æt. 76 years. Never had eyes examined, but the living affected members of the family believe firmly that he was affected like themselves. He probably had senile changes also towards the end; three children.

V (9) William Coppock, of Gothic Cottage, æt. 55 years, 1906, came to the hospital in November, 1895, for an abrasion of cornea; made no complaint of vision. On examination Mr. Doyne found he had "symmetrical circular and perfectly regular flat-looking opacities in both

lenses, through which the fundus can be seen, though somewhat blurred; the opacity is towards the posterior part of the lens, not at the nucleus" (Pl. VIII, fig. 1).

V., R. $\frac{6}{12}$ H.m., O. 75, not improved; L. $\frac{6}{9}$ H.m., O. 75, not improved. Seen repeatedly since, and no change; carefully examined by Mr. Ogilvie on March 6th, 1906, R. $\frac{6}{12}$, L. $\frac{6}{9}$; teeth very good, enamel perfect. Four children.

VI (31) Annie Kimber, æt. 29 years. Seen March 23rd, 1906. Makes no complaint of her sight, though V. of R. is only $\frac{6}{36}$ and of L. $\frac{6}{24}$; refraction H. As., but no opportunity of working it out yet. Central symmetrical cataracts so very faint that they might easily be overlooked, the fundus being easily seen in all its fine details through the opacity; no stippling or granular appearance; the opacity appears simply as a flat circular disc of homogeneous haze; in size and perfect regularity of outline they are like the type. There are also a few peripheral smudges of opacity. Teeth very good; one child only.

VII (8) Annie Kimber, æt. 10 years. V., R. $\frac{6}{36}$, L. $\frac{6}{36}$; H. As. not worked out. Central very faint, circular cataracts exactly like those in her mother (VI, 31); in L. eye there is, in addition, a small pin-point opacity close to inner circumference of the circular patch, but lying slightly in front of the latter, as is proved by the parallactic test.

VI (32) William Coppock, æt. 24 years. Attended in 1901, but no notes were taken. April 30th, 1906, symmetrical circular cataracts, somewhat granular, and not very dense—*i. e.* intermediate in size and other characters between the small granular and large transparent forms; fundus seen fairly well through the opacity. V., R. $\frac{6}{6}$ partly, L. $\frac{6}{6}$ partly; teeth fairly good; slight deficiency of enamel of incisors; enamels of molars and bicuspids good; R. lateral temporary incisor remains in the jaw behind the permanent one. His first-born,

twins (VII, 10 and 11), were examined by Mr. Ogilvie under a mydriatic when they were fourteen days old (June, 1906); lenses perfectly clear in both.

VI (33) Bessie Coppock, æt. 19 years. Attended in January, 1901, but no notes taken. April 30th, 1906: Central symmetrical cataracts of about the full size, stippled, less dense than the type, outline quite regular—in fact, of intermediate characters. Fundus can be seen through. V., R. $\frac{6}{24}$, L. $\frac{6}{24}$, mixed As. in each (H. 1 D., My. 1 D.), with oblique axes; V. $\frac{6}{9}$ corrected.

VI (34) Gilbert; not affected.

V (10) Charlotte Elmes (1854–1888). No information; three children.

VI (35) Ada Major; not seen yet; one child.

VII (11) Not seen yet.

VI (36) Elsie Elmes; seen, not affected.

VI (37) Jack Elmes; cannot be seen.

V (11) John Coppock, æt. 50 years; seen March 5th, 1906. Central symmetrical cataracts, finely stippled, smaller and less perfectly circular than in the type, the circumference being slightly irregular or eroded; they are also much less dense than usual; remainder of lens perfectly clear; fundus normal. V., R. $\frac{6}{6}$ partly, L. $\frac{6}{12}$; not improved by glasses. Teeth exceptionally good, "the finest I have seen in a man of his age and station in life" (Mr. Ogilvie's note). At 14 years of age lost every hair all over his body, and has remained perfectly bald ever since; cause unknown. Attended at the hospital in February, 1896, probably at request; V. then, R. $\frac{6}{6}$, L. $\frac{6}{12}$; "a peculiar congenital opacity in lens peculiar to this family. Diagnosis, posterior polar opacities." Six children.

VI (38) Mildred Packford, æt. 24 years; considers her sight perfect. V., R. $\frac{6}{9}$, L. $\frac{6}{12}$ partly. Typical central symmetrical cataracts perfectly regular in outline, denser than usual, freely stippled, and showing triradiate marking; fundus barely visible through the opacity; remainder of lens clear (Plate VIII, fig. 2). Teeth very good.

VI (39) Agnes Coppock, æt. 19 years; not affected.

VI (40) Arthur Coppock, æt. 17 years; not affected.

VI (41) Muriel Coppock, æt. 12 years; not affected.

VI (42) Doris Coppock, æt. 10 years. V., R. $\frac{6}{9}$, L. $\frac{6}{9}$; central symmetrical cataracts of the ordinary size and with perfectly regular outline, but extraordinarily faint and very difficult to see; they are even fainter than in VI (31) and VII (8). In L. a small pin-point of opacity, lying in front of inner circumference of cataract, as in VII (8). Teeth good.

VI (43) Margaret Coppock, æt. 7 years; not affected.

IV (4) Richard Coppock, æt. 76 years; not affected; a few fine peripheral striæ. Two children.

V (12) Thomas. Has four children; live near Manchester. He and the children fully examined for us by Mr. Hill Griffith, of Manchester, June, 1906, and all found quite normal.

V (13) Harriet Shepherd, æt. 41 years; not affected. Has fine peripheral opacities in both lenses. Three children.

VI (45) Joseph; not affected.

VI (46) Thomas, æt. 16 years; not affected.

VI (47) Charlie, æt. 13 years; not affected.

IV (5) Eliza Barnes, *ob.*; no information. Married first Barnes, and had three children; second, Johnson, s.p.

V (14 and 15) *Ob.*, probably in infancy. No information.

V (16) William Barnes, æt. 49 years; not affected; six children.

VI (48–53) Six children of V (16); none affected. Eldest not seen, the other five seen and none affected.

IV (6) William Coppock, now æt. 72 years. The member of the family in whom the typical cataract was first discovered by Mr. Doyne in August, 1888, æt. 54 years. He was complaining that he had never been able to see well in a bright light, but could see well at other times. The condition was at first diagnosed as a very small lamellar cata-

ract, about filling the ordinary pupil ; there were also some commencing striæ in the cortex ; R. $\frac{6}{36}$, L. $\frac{6}{24}$. In 1892 visual iridectomy was done upon the R. and soon afterwards—January, 1893—upon the L., with advantage. Now (March, 1906), æt. 72 years, V. is $\frac{6}{36}$ with each eye ; the typical central opacity appears not to have altered; the cortical striæ are somewhat denser. Teeth, so far as they remain, good and the enamel perfect. Nine children, six living.

V (17) William, æt. 41 years ; not affected ; lenses perfectly clear.

V (18 and 19) ♂ and ♀ , *ob.* infancy ; no information.

V (20) Josiah, æt. 36 years; not affected; has fine peripheral changes ; is epileptic ; six children.

VI (54) Dorothy, æt. 14 years ; not affected.

VI (55) Leslie, æt. 12 years ; not affected.

VI (56) Cyril ; æt. 10 years ; not seen.

VI (57) Gladys, æt. 9 years ; not affected.

VI (58) Ella, æt. 8 years ; not affected.

VI (59) Miriam, æt. 1 year and 3 months; not affected.

V (21) Bella Botterill, æt. 34 years ; not affected ; a few fine peripheral and scattered presenile changes. Six children, four living.

VI Lottie, æt. 13 years ; not affected.

VI ♀ —, *ob.*, æt. 2 years ; no information.

VI ♀ —, *ob.*, æt. 10 weeks ; no information.

VI Charles, æt. 10 years ; not affected.

VI Cecil, æt. 8 years ; not affected.

VI Mary, æt. 5 years ; not affected.

V (22) Felix, æt. 32 years ; not affected ; lenses perfect.

V (23) Anna, æt. 30 years ; not affected, but has presenile changes.

V (24) Arnold, *ob.* infancy ; no information.

V (25) Miriam, æt. 25 years ; affected, and now has presenile changes. First attended September 30th, 1891, æt. 10 years, complaining that she could not see well at her lessons. "Circular central posterior polar

opacities." V., R. $\frac{6}{9}$, L. $\frac{6}{6}$. Refraction, under mydriatic: R. H. 3, 25 D; L. 2, 25; very slight As. in each. Examination under mydriatic in 1896, 1898, 1903, and 1906, showed steady increase of As., due to increase of refraction, from H. 3 to Em., in the approximately horizontal meridian (up—in, 165°), the opposite meridian remaining unaltered, *viz.*, H. 3·5 or 4 D.; V. fell moderately and very slowly, and in March, 1906, was $\frac{6}{12}$ in each eye. In 1903 ill-defined, smudgy opacities were found in the cortical layers of the lenses, quite independent of the peculiar central opacities; these cortical changes appear to be increasing (1906). The peculiar central opacities resemble in size those of her father (IV, 6) and cousin (V, 9), and in density are intermediate between the two. Teeth very good. Is now a school-mistress.

IV (7) George Coppock, æt. 66 years; not affected, and lenses quite clear, s.p.

IV (8) *Ob.* infancy; no information.

IV (9) *Ob.* infancy; no information.

IV (10) Harriet Coppock, æt. 62 years. Married her first cousin, Frederick Coppock, who is not a member of the affected branch. Seen March 12th, 1906. Typical central symmetrical cataracts very similar, both in size and density, to those in her son George (V, 31). There is also rather a large peripheral opacity down-in in R., and several fine spokes in various parts of the circumference in L.; V. and fundus not noted. Has only two or three teeth left, but the enamel of them is perfect. Her husband died in 1905 of epithelioma of tongue; no information. Seven children, five living.

V (26) Charlotte Evans, æt. 40 years. Seen March, 24th, 1906. "Has always had perfect sight, but does not like a very bright light." Central symmetrical cataracts, smaller and less dense than usual, so that fundus can easily be seen through; texture rather roughly stippled; outline circular, but slightly irregular or eroded. Fundus normal, V. not noted. Many teeth lost, enamel of those remaining is quite good; no children.

V (27) George, *ob.*, æt. 7 years; no information.

V (28) James Coppock, æt. 38 years. Seen March 17th, 1906. V., R. $\frac{6}{6}$ well, Em.; L. $\frac{6}{9}$ Em. Symmetrical central cataracts; they are in all respects the exact counterpart of those in his sister (V, 26). Has lost some teeth; enamel very good in those remaining. Two children (VI, 66 and 67); neither affected.

V (29) John, æt. 34 years; not affected, lenses perfect.

V (30) Thomas, æt. 31 years. Lives in Edinburgh, where he and his three children (VI, 68–70) have been (May 8th) very carefully examined for us by Mr. George Mackay, to whom we are much indebted for his full and accurate report. Thomas (V, 30): V. $\frac{6}{5}$ fairly with each eye; pale grey-blue-green irides, but on each is a narrow radial pigmented band in the lower outer quadrant, more marked in R. In each eye there are fine but well-marked traces of persistent capsulo-pupillary membrane, more in R. than L., but no opacity of lens whatever. Teeth: Incisors and canines in both jaws very regular and sound; some premolars and molars decayed. Three children.

VI (68) Lizzie, æt. 10 years. V. $\frac{6}{6}$ nearly with each; no traces of pupillary membrane; lenses perfectly clear.

VI (69) Sarah, æt. 7 years. Lenses and fundi quite normal. Teeth are still the first set, and for the most part sound.

VI (70) Maud, æt. 3 years. Lenses and fundi quite normal; sound milk dentition.

V (31) George Coppock, æt. 28 years. Seen March 12th, 1906. V. R. $\frac{6}{18}$, L. $\frac{6}{18}$; slightly improved by 1 + D. Typical central symmetrical cataracts, perfectly regular in outline and rather denser than usual, so that the fundus cannot be seen through the opacity. The cataracts closely resemble those in his mother (IV, 10), and differ decidedly from those in his brother and sister (V, 26 and 28). Teeth very good as regards enamel; has lost a few.

V (32) William, *ob.*, æt. 6 years; no information.

(*June 14th*, 1906.)

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