Three new pedigrees of eye disease / Nettleship.

9.

NETTLESHIP:

THREE NEW PEDIGREES OF EYE DISEASE

Reprinted from the 'Ophthalmological Society's Transactions,' Vol. XXVIII. 1908.

PRINTED BY ADLARD AND SON
LONDON AND DORKING
1908

Reprinted from the 'Ophthalmological Society's Transactions,' Vol. XXVIII, 1908.

Senile cataract in husband and wife; condition of the lenses in their children and grandchildren.

By E. Nettleship.

In this case (Fig. 18) II, 2 the wife, and II, 3 the husband, were each æt. 21 years when they married; neither they nor their respective parents were consanguineous in any degree. They had 10 children (III, 5 to 16) of whom 9 are living, and 33 grand-children (IV, 1 to 33) of whom 26 are living. Of this total of 2 + 10 + 33 = 45 we know the condition of the lenses in 36 and the interest of the pedigree centres in them; 8 of the 45 died without any record as to their eyes, and 1 (IV, 30) living in New Zealand cannot be examined. The account of the 36 who have been examined is as follows: II, 2, of Irish birth, was the elder of two; she had excellent sight till past 50 when she took to glasses for reading; was operated upon for senile cataract by myself at Moorfields Hospital in October, 1891 (I. P., 1891, No. 1556) when she was 72; she did well and lived to be 82; she was 22 when her first child was born. Her younger sister (II, 1) died at about 45 with good sight; her father (I, 2) died at the age of 28 in or about 1826 at Tottenham, where several of the descendants still reside; he had some brothers or sisters (I, 3) who

have left some descendants, but up till now I have not been able to see them;* her mother (I, 1) died at about 40; both I, 1 and 2 are believed to have had perfectly good sight. II, 3, of Scottish descent; his sight was particularly good till after 50 when he began glasses for reading. Was operated upon for senile cataract at Moorfields by Mr. Treacher Collins at the age of 85 in 1904, his other eye having been dealt with unsuccessfully elsewhere a year earlier; he did well and was living, aged 88 in 1907; he was 22 when his first child was born. He (II, 3,) was the first-born of 9, 3 of whom died in very early infancy, and their places in the childship are now unknown; all the others seem to have had good sight up to an advanced age and cataract has not been heard of in any of them. II, 4 and 9 are alive and aged about 78 and 76; II, 6, 8, and 11 died at about the age of 70; the two latter certainly had good sight, but about the sight of II, 6, there is no information. The parents (I, 4 and 5) of this childship (like I, 1 and 2) both died comparatively young (45 to 50) with good sight.

II, 2 and 3 had 10 children, as follows; all have grey-blue irides but dark hair:

III, 5, female, seen March, 1907, æt. 66 years; not short-sighted; lenses clear and sight good.

III, 6, female, died æt. 45 years, with sight quite good.

III, 8, male, æt. 61 years, was seen in 1907 and has striæ in his lenses.

III, 10, female, æt. 58 years, was operated for cataract

* August 26th, 1908.—I have now obtained some further persona information. I, 2 was the eldest of six, 4 ♂, 2 ♀; No. 6, ♂, had 15 children, of whom 7 grew up and 8 died in infancy. Of the 7 who grew up, 4 ♂ and 2 ♀ died between the ages of 34 and 75. One, the youngest of those who lived, is now 52, and would be a first cousin of II, 2; she has 3 children. I examined her and her eldest daughter, aged about 20, on the 13th inst., and found their lenses perfectly clear. She had never heard of cataract in her father or any of her uncles or aunts (I, 3), nor in her own sibs (in II) or their offspring (her own nephews and nieces) other than those shown on the pedigree, nor had there been consanguineous marriages anywhere.

at Moorfields, by Mr. Flemming in 1904, *i. e.*, when about 54.

III, 11, male, æt. 57 years, seen; two small striæ in R. lens only; became "short-sighted" when about forty-five, wears — 1·25 D., and I find his refraction is slightly myopic; irides blue-grey; though no opacities are visible in his L. eye, a perfectly clear image of fundus could not be obtained with any lens. None of his six children are short-sighted (*see below*).

III, 12, female, æt. 55 years, has been attending under Mr. Lister and Mr. Worth at Moorfields, with incomplete cataract, for seven years.

III, 13, female, æt. 53 years, operated upon for cataract at Moorfields by Mr. Fisher, in January, 1907, and a month later with + 7 D. and a cylinder V. = $\frac{6}{6}$; she may therefore have had some axial myopia.

III, 14, male, æt. 48 or 49 years, seen; marginal striæ and small scattered opacities in both lenses; has — 2 D.

III, 15, female, æt. 47 years, seen; changes as in No. 14, perhaps rather more advanced; irregular myopia; has — 3·5 D. for R. and — 5·5 D. for L.

III, 16, male, æt. 45 years, seen; no trace of opacity in either lens; refraction Em.

Of the 10 individuals III, 5 to 16, just described, 7 married and have had, between them, a total of 33 children (IV, 1 to 33); 7 of the 33 are dead; of the remaining 26 who are alive, and aged from 18 to 40, 25 have been examined, and some lenticular changes are present in 5 of these, *viz.*:

IV, 10, æt. 31 years; R. lens normal, L. a well-defined rather large opacity at anterior pole of lens with small spur-like projections from circumference; iris and cornea perfect.

IV, 11, æt. 29 years; L. lens normal, R. a single round dot of opacity upwards and inwards of posterior pole.

IV, 16, æt. 25½ years; hair nearly black, irides grey-brown; R. lens n., L. a single sharply-defined lanceolate stria downwards and inwards in anterior layers of cortex;

FIG. 18.

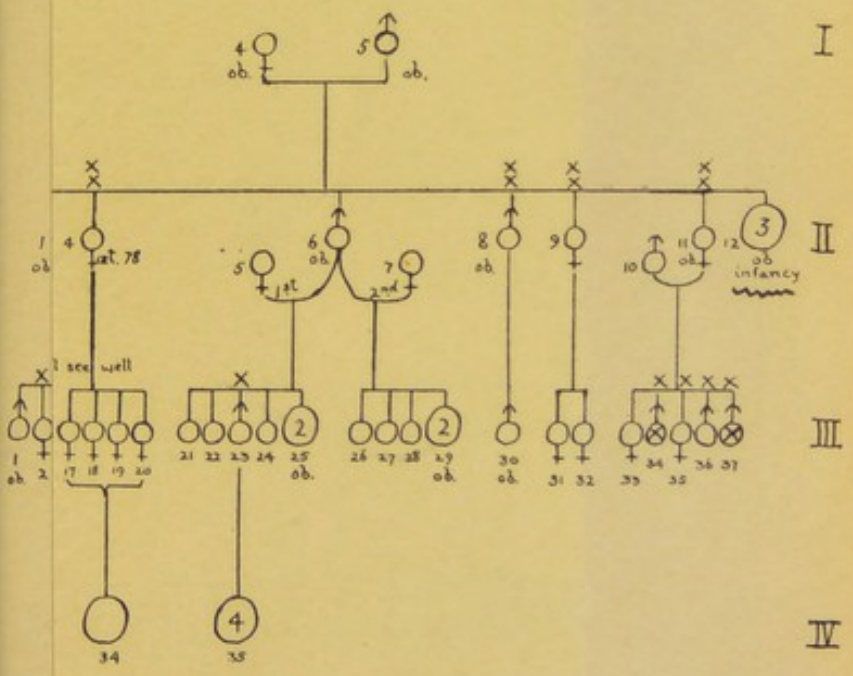
Se[t] Gens. II, III & IV

[y]ung or no information		37
(x)	40	47
[i]nformation (x̄/x̄)	7	
	Total	84

an[d]

[A]nced Cataract

[P]ient "



the Oxford cases the opacity was large enough to block the ordinary—say 4 mm.—pupil; and in Chance's case the opacities which, as in the Coppock family, took the form of thin, circular, well-defined discs, "were large enough to block the usual pupillary spaces," and when measured had an apparent diameter of about 4 mm. In some members of my present series the disc was not large enough to block the ordinary pupil; in some others that I have described as "lamellar," the apparent diameter was, I should say, not more than about 4 mm., whilst in yet others it was much larger. The conclusion seems to be that we have more to learn about the relationship between these two forms of cataract, and that a graduated series will probably be found passing from the smallest and faintest disc of intransparency between nucleus and posterior pole, to the common lamellar cataract with its well-developed anterior and posterior layers and riders and having a diameter considerably larger than the natural pupil.

Not to be burdensome, it may be briefly stated that of the total thirty-two cases of congenital cataract in the present pedigree, twenty-four are marked as "lamellar," sixteen males, eight females; eight as of the discoid type, three males and five females, and that each of these will be briefly described in an appendix.

In one instance a mother (III, 29) had twins twice; of the first pair, both males, one (IV, 61), now æt. 21 years, had his lenses needled for lamellar cataract when a boy, by Mr. Hartridge; the other (IV, 62) has perfect sight, and although, as he lives abroad, I could not examine him, I think his mother's diagnosis, that he is free from the family blemish, may be accepted, for I found that she had formed a correct opinion as to the presence or absence of the family cataract in each of her five children whom I did see.

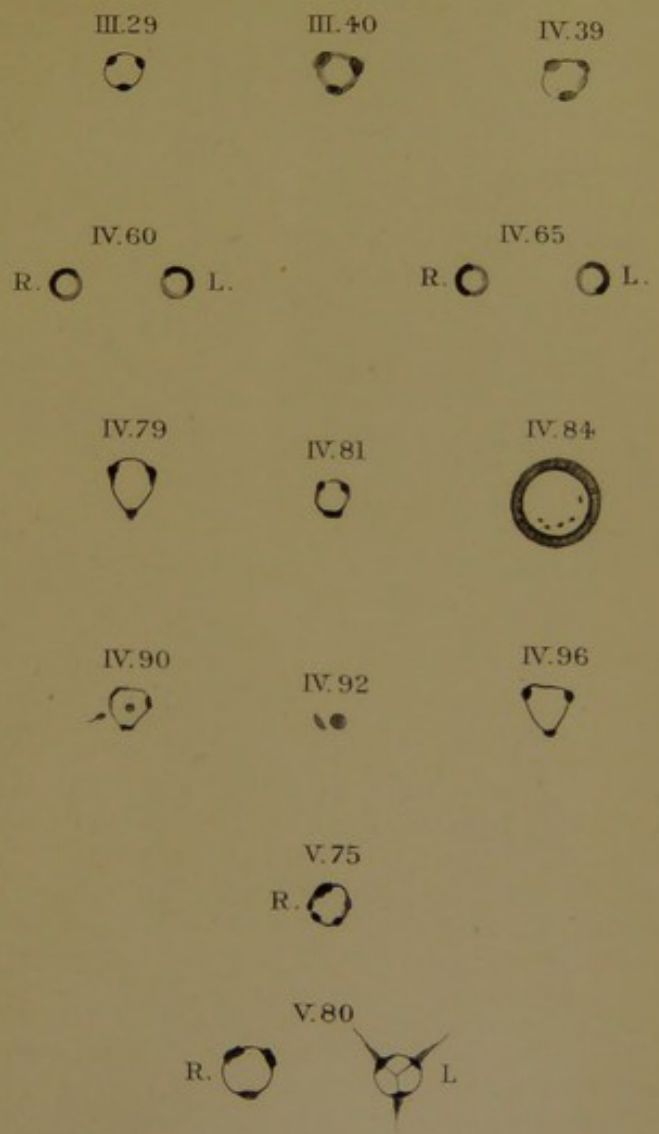
In the Oxford family there was a tendency to the occurrence of small scattered lenticular opacities in early life, sometimes in those who had the peculiar discoid

opacity, but quite as often in those who were free.* Something of the same kind is noticed in the present case, for no less than eighteen members of Generations III, IV, and V have striæ or vacuoles in smaller or larger numbers, three of them with coincident lamellar cataract (III, 39 and 40, and IV, 81), and one with coincident discoid cataract (IV, 93); the ages of these eighteen range from forty-three to twelve years. III, 36, æt. 50 years, has numerous progressive striæ (senile) with no appearance of lamellar opacity, but it is impossible to say whether a faint discoid opacity is also present or not.

By far the greater number of the cataract cases were found in the London contingent, only five being in the Cornish section, *viz.*, III, 20, IV, 39 and 102, and V, 44 and 48. On the other hand the latter division (the left-hand portion of the chart, Fig. 19) contained the retinitis pigmentosa. The Londoners were examined first, and as no suspicion of retinitis pigmentosa had then been raised no special search was made for it amongst them, and one can only say that neither night-blindness nor progressive loss of sight was mentioned by a single individual in III between 28 and 44, or by any of their descendants in IV and V. The only shreds of evidence as to the sources of the two diseases relate to II, 3 and II, 12, both belonging to the Cornish portion; III, 18, an old man over 70, himself night-blind all his life but with quite good sight by day, and convinced that he himself had no cataract (see below), told me that his brother, III, 20, was operated upon for cataract several times at Plymouth when a young man and finally by Mr. Bader in London (a history confirmed by various other relations in London), and I found the son of this brother (IV, 39) suffering from lamellar cataract (see below); the old man also said that his elder sister (III, 15), now dead, had always been night-blind like himself but had "no cataract"; he said further his father (II, 3) had "had cataracts for certain," but was able to see "pretty well," and said

* These *Transactions*, *loc. cit.*, pp. 194, 195.

Ophth. Soc. Trans., Vol. XXVIII. Pl. XVI.



Leonardson & Co. lith.

nothing about night-blindness in him. We may therefore take it that II, 3 had either retinitis pigmentosa or lamellar cataract, probably the latter (he is therefore marked with the alternative on the chart Fig. 19); of his five brothers, one (II, 2) went to Australia, and one (II, 4) left only two children who had no progeny. Next, the 10 females marked II, 12, first cousins of II, 3, are said to have had "very close sight and could not wear glasses," and I have therefore marked them as perhaps having partial cataract; this information is from their niece, III, 44, æt. 62 years; she herself has clear lenses, but her youngest child, æt. 20 years (IV, 102) shows a large thin lamellar cataract in his L., the R. one having been needled by Mr. Rolston, and her eldest (IV, 99), æt. 34 years, has prœsenile opacities.

Appendix. The S— Pedigree.

[The following gentlemen kindly examined for me the cases indicated: Mr. Chetwood-Aiken (Truro). Cases IV, 1, 2, 4, 19, V, 28, 29, 30, 31, and took much trouble to re-examine III, 18. Mr. Rolston (Plymouth), IV, 9 and V, 14, 15, 16. Mr. Elliot Square (Plymouth) V, 35–42. Mr. John Rowan (Glasgow) IV, 12 and V, 20–27. I have also to thank Sir Anderson Critchett and Mr. Hartridge for information about III, 30, IV, 73 and IV, 61.]

I, 1, 2, 3. No information. I, 2, had 13 sibs.; most of the 14 lived to be old and had good V. so far as is known.

4. No information.

5. "Captain" Johnson S—, had good sight according to report.

6. "Captain" Tom S—, brother of 5, kept an inn; believed to have had good sight; killed by kick from a horse. Had 13 children (II, 9–12).

7. Catherine.

8. Others: number and sexes not known, but some were male.

II, 1, 2, 3, 4, 6, 8. Six sons of I, 5 and 4. None are living. There seem to have been no daughters.

1. Thomas, married a Cornish wife, and had 11 children (III, 1–13).

2. Went with his family to Australia; no information.

3. Is said by his son III, 18 to have "had cataracts for certain, but saw pretty well" and was not night-blind. He (II, 3) lived to be 89 years; married his first cousin, II, 9.

4. Henry had only 2 children, and both died childless (III, 24 and 25).

6. Jacob S—, married a Somerset woman of 17 (II, 5) when he was 28, and died at about 70, about 1897, having founded tailoring business in London some forty years ago, now carried on by III, 28.

8. Robert, married at 26, his (Cornish) wife (II, 7) being 22, and had 9 children (III, 32–40).

9. Grace S—, wife and first cousin of II, 3; no information.

10. His only brother, Henry, went to Australia; no information. Had several children.

11. Thomas S—, of Mount Charles, son of I, 6; believed to have had good sight.

12. Ten daughters. Some of them are said by III, 44, to have been "very close sighted and could not wear glasses"; these defective ones had dark hair and dark eyes; all that had fair hair and blue eyes had good sight.

III. Of the 45 indicated 13 are certainly living; 12 of these have been seen (April, 1907). Nos. 17, 19, and 41 went abroad, and nothing is known of their sight.

The 12 living ones seen are:

13. Mrs. B—, the only survivor of 11 children of II, 1; æt. about 70 years; retinitis pigmentosa with some patches of choroidal atrophy, many senile opacities; lenses, more in R.

18. "Jack" S—, æt. 71 years, examined by myself in April, 1907, and by Mr. Chetwood-Aiken some months later; (no mydriatic used). Slight striæ lower part of each lens, but certainly no polar or other axial cataract. Fundus n.; retinal vessels at and near O.D. not perceptibly diminished; periphery seen well and no pigmentation found; refraction about Em. Mr. Chetwood-Aiken's result agreed with mine; the above note is a summary of both findings. He was the first of the family I saw in Cornwall; on first looking I thought only of lamellar or "Coppock" cataract, and having found none was going on to the next member of the family when he asked me whether I could "see what was the matter with his sight"? "No." "Ah: I cannot see at night and never have been able to all my life." This was the first I had heard of night-blindness in the family, and I accordingly looked again, and I made the above negative note. He was positive he had never since he could recollect been able to see at night like other people, and further, that he was not getting worse; he said he could see by gas-light or moon-light. His account was confirmed by his wife, and a few days later by IV, 25, a woman, æt. 46 years, living almost next door, who told me that he used to drive a cart for various purposes, and that if he came home after sunset he could not see to turn into his own gate, and had to have the horse led in; she also did not think he was getting worse, and said he gave up his carting work two or three years ago because he was getting too old, not because of his sight. He has had no children; his wife is much younger than he; I do not know their ages at marriage.

28. Mr. A. C. S—, æt. 49 years. Seen in London (February 1907), wears + cylinders. In each lens, deeply seated behind the nucleus but apparently in front of the posterior pole, a small axial, finely-granular opacity of the "Coppock" type, but with the addition of a second smaller opacity close to the axial one, on its temporal side and slightly up, in each lens (as in Plate XVI, IV, 92).

His wife (III, 37), who is his first cousin, also has a very small opacity in each lens, apparently at the posterior pole, but less circular than the "Coppock" type, more radiating. Their children, IV, 50–56, see below.

29. Mrs. B—, æt. about 47 years. Seen March, 1907. Typical rather small lamellar cataracts with clean well-defined edge and no spokes, but the usual three knobs. Formerly had very good teeth. Shadows My. Her children, IV, 57–69, see below. (Plate XVI.)

30. Mr. E. J. S—, æt. 44 years (in 1906). Seen February, 1907. Had both lenses needled by Mr. Brundenell Carter for lamellar cataract when æt. 11 years. Both eyes did well, but some years later one eye was lost from detachment of retina following a violent blow against some piece of furniture in the dark. The remaining eye is quite good and enables him to do his business (tailor's cutter) quite well. He wears high +, but I do not know the number. His children, IV, 70–75, see below.

33. Mr. James S—, æt. about 65 years. Seen March, 1907. Sight perfect. No trace of opacity in either lens; refraction, slight H. in each.

35. Selina (Mrs. W—), æt. 53 years. Seen March, 1907. Was operated for cataracts by Mr. Brudenell Carter, when æt. about 17 years; several operations. Now L. good with free circular p., and can read with her glasses; fundus n. R. corneal haze and old iritis, etc. Her daughter, IV, 85, see below.

36. Kate (Mrs. C—), æt. 50 years, seen March, 1907. Numerous cortical striæ in both lenses. V. getting worse and seems to have been good originally. No appearances of lamellar cataract, but a small "Coppock" opacity could not be excluded.

37. See under 28.

39. Mrs. K—, æt. 43 years (seen February, 1907). Well-marked, moderate-sized lamellar cataracts. R. denser than L.; also many large striæ in lower anterior cortex of each. Teeth good, but some molars carious. Has had no children.

40. Jacob S—, æt. 41 years. Seen March, 1907. Small, faint, lamellar cataracts exactly alike in each lens, with, in addition, many coarse peripheral spokes in upper and lower cortex. Teeth large and enamel good. Refraction H. 4 D.; uses + 4 D. (Plate XVI.)

42. Miss S—, æt. more than 62 years; only surviving sib. of III, 44. Not seen, but reported to have good sight.

44. Lavinia (Mrs. R—, senior), æt. 62 years. Seen at St. Austell, April, 1907. Ophth.: All quite n. Her husband, not consanguineous, æt. 68 years, (III, 43) has many senile striæ and some nuclear blurring. Their children, IV, 99–102, see below.

The following in III are dead, but a trustworthy history was obtained:

III, 1. Jane (Mrs. B—), *ob.* in 1887, æt. about 75 years. Good sight.

2. Mrs. L—, *ob.* at birth of first child. Good sight.

3. Elizabeth, *ob.* young. Place in the childship unknown.

4. "Blind Tom" S—, of Mount Charles, *ob.* in 1897, æt. 60 years. Driver of a stationary engine and had to give up at fifty from his defective sight. "He could never see when it was moonlight." His cousin Jack S—, (III, 18) in describing Tom's defect to me said he used to turn his head from side to side to see things (as if from tubular F.). He had no operation. Doubtless retinitis pigmentosa.

5. Grace (Mrs. W—), *ob.*, childless. Good sight.

7. Elisha S—, a farm-labourer and preacher, *ob.* 1892, æt. about 68 years. Could see to do his farm work till he was about fifty, when he had to give it up from defective sight. Was called "moon-blind" and "could only see in certain lights." Married twice; by first wife, who was his first cousin, four children (IV, 19–22), by second wife, not a cousin, six children (IV, 13–18); only one of the ten (IV, 19) can be traced. Doubtless retinitis pigmentosa.

9. Caroline (Mrs. W—), *ob.* Had ten children of

whom one (IV, 24), now *ob.*, had bad sight ; III, 9, herself, and her other nine children said to have seen well.

15. Caroline, now dead, said by III, 18 to have been night-blind exactly like himself, but saw well in the day ; he said nothing of her having got worse or become blind. So far as he knew none of the others had been affected in the same way, but 5 (III, 23) of the 13 died young. IV, 32 gave a similar history of III, 15 quite spontaneously.

16. Grace (Mrs. H—), *ob.* Had good sight. Had eleven children, of whom some went abroad and three sons are living (IV, 34–36).

20. Tom S— was operated upon for cataract repeatedly as a young man at Plymouth, with poor result, and finally by Mr. Bader, without better result, at the house of III, 33, London ; said to have become quite blind when about 50 ; sight said never to have been good, but no mention of night-"blindness" or "moon-blindness." He had only one child (wife's only conception), IV, 39.

31. Youngest sib. of III, 30, female, died of visceral disease, unmarried, æt. 34 years, and is known to have had cataract of same kind at III, 30, but was not operated upon.

32. John Collins S—, first-born of 9, was operated upon for the same sort of cataract. Died in 1894, æt. 52 years.

34. Henry S—, dead, was operated upon for cataract, believed to be of the same kind, about "forty" years ago at St. George's Hospital. Died æt. about 50 years. His children, IV, 81–84, see below.

38. Robert S—, died æt. about 50 years. Some of his relations say he had the family cataract, others say he had perfect sight. He had no children.

IV. Of the 102 indicated at least 18, and probably some others, are dead ; 48 have been examined, and what seems trustworthy information obtained as to 7 others ; the remainder are inaccessible.

IV, 1–4. Issue of III, 1. No other pregnancies. 1.

Mrs. P—l, æt 61 years, V. $\frac{6}{6}$ in each and in glasses J 1. Peripheral striæ in lenses; fundi n. Has had 3 children, who all died young.

2. Thomas Henry B—, æt. 54 years, farm labourer; unmarried. Has never seen well, especially at dusk, but no marked deterioration till about ten years ago, since when he has not been able to see well enough to do his farm work. V.: counts fingers 1 foot. Ophth.: Posterior polar radiating opacities of lenses, and advanced retinitis pigmentosa with optic atrophy. No children.

3. Mrs. P—a (Mary), æt. 49–50 years. Seen by me, April, 1907; peripheral striæ in both lenses, more in L. than R. Not specially examined for retinitis pigmentosa; but no complaint made. Has had no children.

4. Mrs. H—, æt. 50 years. "Sight was never so good as some people's, but never very bad." V., R. $\frac{6}{24}$, L. $\frac{6}{12}$; R. high degree of convergent squint (40°). Ophth.: A few fine peripheral striæ in each lens; "both O.Ds. greyish and atrophic looking, especially the R." No retinitis pigmentosa.

IV, 6–12. Issue of III, 4. 6. Mrs. R— (Mary), æt. 50 years, widow; seen April, 1907. Lenses n.; refraction high My. No other note. Sees well. Has one daughter, æt. 16 years, seen same time; ophth., all n. No other conceptions.

7. Tom, æt. 49 years. Seen March, 1907. Ophth., all quite n. His children, V, 2–7, see below.

8. Jim, æt. 42 years. Seen April, 1907. Ophth., lenses n.; no special note as to retinitis pigmentosa; irides grey-brown; hair dark. His children, V, 8–13, *see below*.

9. Mary (Mrs. T—), æt. 49 years. Seen April, 1907. High My. As., with macular choroiditis and vitreous opacities. Lenses quite clear. All front teeth gone. Her children V, 14–16A.

10. Mary. Dead. Had good V

11. Kate (Mrs. R—). Seen April, 1907. Ophth., quite n. Her children, V, 17–19.

12. Eliza (Mrs. G—). Seen at Glasgow with Mr.

Rowan, November, 1907. She is normal, except some presenile opacities and myopia, 10 D. Has eight children, all living (V, 20–27), of whom we saw 7; 2 of the 3 sons have well-marked ordinary retinitis pigmentosa; 4 of the 5 daughters examined and found normal, except My. 10 and 13 D. in R. and L. of V, 24; the remaining one (V, 23) reported to see perfectly. Mother knew of the night-blindness of the 2 sons.

19–22. Four children of III, 7, by first wife (III, 8), who was her husband's first cousin, but how is not stated.

19. Mrs. B—, first-born of her father's 4+6 children. Cannot be seen, but is reported to have perfect sight. Her children, V, 28–31, *see below*.

25–28. Children of III, 13. 25. First-born, Mrs. W—, æt. 46 years. Seen April, 1907, with high My. and fine presenile peripheral striæ chiefly below. Her children V, 35–42, *see below*. IV, 26, *ob.*, æt. 18 years; had good V.; 27, 28, both *ob.*

29–33. Thirteen children of III, 15; 8 of the 13 grew up, and 4 are still living; *viz.* 29, 30, and 31, all believed to have good sight, but live far off and cannot be seen; and 32, Mr. P—, æt. 43 years, seen at St. Austell, April, 1907, ophth., all quite n. except nebulæ of corneæ, no consanguinity between him and his wife; he was about ninth of the 13 sibs. His children, V, 44–49, *see below*.

34–37. Eleven children of III, 16. Some went abroad; 34, 35, 36 are living, and all have very good sight.

38. Only child of III, 17; he and his mother are abroad. Both said to see quite well.

39. Charles S—, æt. 25 years, unmarried. Only child (only conception) of III, 20. Seen April, 1907; typical small lamellar cataracts. The usual three knobs. Teeth excellent. Fundus, no note. (Plate XVI.)

42–49. Eight children of III, 26.

42. Mrs. I—, æt. 37 years. Seen March, 1907; all n. Her 10 children in V, see below. 43. Mrs. A—, æt. 36 years; all n. Her 4 children in V, see below. 44. James, æt. 32 years. Refused examination. V., quite good.

45. Female, *ob.*, æt. 1½ years. 46. Clara; was away and could not be seen. V., quite good. 47. Albert; refused. V., quite good. 48. Thomas, *ob.*, æt. 2 years. 49. Ada (Mrs. C—), æt. 26 years; could not be seen; all n. Her 2 children in V see below.

50–56. Seven children of III, 28. All examined February, 1907.

50. Elsie, æt. 16 years. Small, finely granular, post-nuclear opacity in each lens, "just like the Coppock cataract." Incisors all very good; first molars carious. This girl was the first of the whole pedigree I examined. 51. May, *ob.*, æt. 5 years; "meningitis" after injury to head. 52. Reginald, *ob.*, æt. 1 5/12 years; pneumonia. 53. Leslie, æt. 11 years. Lenses perfect (mydriasis). Teeth, including first molars, all perfect. 54. Queenie, æt. 9½ years. Lenses perfect. Teeth, including molars, very good. 55. Albert, *ob.*, æt. 1½ years; pneumonia. 56. Edgar, æt. 5 years. Mydriasis. Lamellar cataracts well-marked in each; two shells in R. and three shells in L., with riders and edge of outer shell not quite a regular circle. Not very dense, but enough so to prevent view of vessels at fundus. No fits. Teeth temporary and n.

57–69.—Thirteen children of III, 29 (Mrs. B—), March, 1907. 57. George, born 1881, in America; V. perfect. 58. Bertie, born 1883, in America; V. perfect. 59. Miscarriage.

60. Alice (Mrs. L—), born 1886, married three years, no issue, husband being in India. Exactly symmetrical circular post-nuclear opacity in each; circle not quite perfect in L.; down-in part of edge; each very faint; no knobs. The circle of opacity is much smaller than the lamellar ones in her mother, and is quite of the "Coppock" type (Plate XVI); teeth very good.

61 and 62. Twins. Both in America, æt. 21 years. Claud (the elder) was operated on for cataracts by Mr. Hartridge and did well. 62. Percy; perfect V.

63 and 64. Twins. Hilda, æt. 19 years; lenses perfect; refraction Em. Maud, *ob.*, æt. 9 weeks.

65. Mabel; born 1888; æt. 18 years. Opacities exactly like 60 (Alice), and each very faint down-in. Refraction slight H. (Plate XVI.)

66. Theodore; *ob.*, æt. 4 years; spasmodic croup; had had no fits; V. quite good.

67. Reginald, æt. 16 years; L., a single vacuole at or near posterior pole. R. lens perfect. Refraction Em. both.

68. Still-born; male.

69. Ruby, female, æt. 13 years, R. a single vacuole, rather deep in lens, not at pole. L. lens perfect. Refract. Em. both. Teeth perfect.

60, 63, 65, 69, irides blue-grey.

61, 67, and some of the other males, brown or grey-brown.

70–75. Six children of III, 30.

70. Maud, æt. 19 years. Seen February 9th, 1907. R. needled for lamellar cataract æt. 12 or 13 years at St. Mary's Hospital. L. done later; good result.

71. Alice, *ob.*, æt. 3 years. Diphtheria. 72. Hilda, æt. 16½ years. Mydriasis. Ophth.: All perfectly normal. Refract. Em. or slight H. Teeth good, except the first molar carious.

73. Willie, æt. 15 years. Had optical iridectomies by Sir Anderson Critchett for "small lamellar cataracts, not more than 4 mm. in diameter, rather dense, and surrounded by a faint second lamella of opacity," with good result in 1900, æt. 8 years. V. before operation R. $\frac{5}{60}$ and 4 J. difficult. L. the same. V. after operation R. $\frac{6}{18}$ and 2 J. L. $\frac{6}{18}$ and 2 J. (Published in these *Transactions*, vol. xx, 1900, p. 230.)

74. Adeline, æt. 12½ years. Lenses perfect. Refract. Em. Teeth all very good. 75. Norah, æt. 10 years. Lenses perfect. Refract. Em. Teeth all perfect.

76–80. Five children of III, 32. 76. Male, *ob.*, æt. 4½ years. 77. Male, *ob.*, æt. about 4 years. 78. Miscarriage or still-birth.

79. Louis S—, æt. 37 years. In L. dense, circular ordinary lamellar cataract with many peripheral striæ;

this eye is getting worse. No note of exact size. In R. ? discoid subtriangular opacity with three knobs, the up-out one specially large (Plate XVI). No cortical spokes. Moves very much "against" the iris. No note as to relative size of cataract in R. and L. All teeth, including first molars, good. His children in V., *see below*.

80. Mrs. R—, æt. 27 years (March 9th, 1907). A single well-defined vacuole in each lens between nucleus and periphery down-in. Married her third cousin, IV, 100. Her children in V., *see below*.

81–84. Four children of III, 34.

81. Lily S—, æt. 23 years (March 27th, 1907). Small, faint, nearly circular lamellar opacity in each, with 3 knobs (Plate XVI). Also scattered dots and minute striæ chiefly below. Refract. H. 2 or more. Teeth very good.

82. Ernest, in the Navy and away at Hong-Kong. Seen later and found to have very slight lenticular changes.

83. Katie, æt. 20 years. Many vacuoles in each, especially in lower half, and in L. a few fluffy striæ. Refract. Em. or slight H. Teeth good except loss of two lower first molars.

84. Joseph, æt. 18 years, R. lens n. L. scattered minute dots at about the circle of undilated pupil, quite in anterior cortex ; best seen by direct ophthalmoscopy, only a few of them seen by focal illumination. (No mydriatic used, so there may have been others concealed by iris.) (Plate XVI.)

85. Ada (Mrs. T—) only child of III, 35 ; March 27th, 1907 ; æt. 24 years. Lenses quite perfect. Refract. slight H. Has had 3 conceptions. See V below.

86–89. Four children of III, 36. (February 9th and April 6th, 1907.)

86. Archie C—, æt. 23 years. Lenses perfect. Refract. Em. Teeth good. 87. Katie, *ob.* æt. $3\frac{9}{12}$ years, diphtheria.

88. George, æt. 18 years. Rather small lamellar cataracts ; R. less dense, but less defined, than L. No operation has been done.

89. Douglas, æt. 14 years. Lenses perfect. Refract. slight M. As. Teeth particularly good.

90–98. Nine children of III, 40.

90. Maud, æt. 17 years. In each, faint, small subtriangular opacity behind the nucleus, quite well defined and with knobs. Coppock or discoid type. (Plate XVI.) Also one or two small striæ near the periphery of the ring. Teeth good. 91. Percy, *ob.* æt. $2\frac{9}{12}$ years, "fits."

92. Robert, æt. 14 years. Very small but typical discoid opacity in each with another rather elongated streak a little to temporal side. (Plate XVI.)

93. Jacob, æt. $11\frac{1}{2}$ years. Discoid type of opacity, deep and rather larger than usual, and numerous vacuoles scattered at various depths towards periphery. Teeth all good.

94. Elizabeth, æt. 9 years. All quite n. H. 5 D. and periodic squint; has glasses. 95. James, æt. 7 years. All quite n.; slight H.

96. Albert, æt. 6 years; small 3-knobbed lamellar cataract in each. (Plate XVI.) 97. Ada, æt. $4\frac{1}{2}$ years; all quite n. 98. Hilda, æt. 1 year, *not seen*.

99–102. Four children of III, 44. They are third cousins of the last and of many others in IV.

99. Richard H. R—, æt. $33\frac{1}{2}$ years. April 1907: many fine peripheral striæ in each lens; has one child (V, 87), not seen, æt. 5 years, girl, whose sight is good. 100. Arthur, æt. 32 years; married his third cousin, IV, 80; not seen; very good sight. 101. Female, *ob.*, æt. 8 years, "croup"; eyes were good.

102. Willie, æt. 20 years. L.; large thin typical lamellar cataract with riders; O.D. cannot be seen through it. R. was operated by Mr. Rolston in August, 1898, æt. 11 years, and did well. Now good clear pupil. H. only 5 or 6 D. Fundus n. Had no fits, but upper and lower incisors show the characteristic defect of enamel.

V, 1. Three children of IV, 1; all died young; no details.

1*a*. Rhoda R—, daughter of IV, 6, æt. 16 years; all quite n. Em.

2–7. Issue of IV, 7. All are children, but ages were not noted (March, 1907).

2. Archie; 3. May; 4. Elsie; all examined and quite normal. 5. Miscarriage. 6. Thomas or Bert; 7. Fredk. (baby); both examined and quite n.

8–13. Six children of IV, 8 (April, 1907). None specially examined for retinitis pigmentosa.

8. Elizabeth Jane, æt. 19 years, lenses n.; blue eyes; dark hair. 9. William Thomas, æt. 18 years, railway porter, V. quite good; *not seen*. 10. Bessie, *ob.*, æt. 4 years, pneumonia; V. was very good. 11. Sidney, *ob.*, æt. 9 months. 12. Sidney (second), æt. 7½ years, lenses n.; dark hair and eyes. 13. James Leslie, æt. 3½ years; lenses n.; dark hair, grey blue eyes.

14–16*a*. Four children of IV, 9.

14. John T—, æt. 23 years. Typical retinitis pigmentosa, with pale waxy O.Ds.; refraction My., but amount and V. not noted; no marked night-blindness; Fs. full (*Charts*); teeth good.

15. Ethel, æt. 19 years. Fine peripheral dot opacities in each lens; refraction; mixed As.; teeth good.

16. Bertha, æt. 15 years. Lenses and fundus n., except My. crescents; refraction; My. As., but amount not given.

16*a*. Male, died of phthisis, æt. 24 years. Her place in the childship not noted.

17–19. Three children of IV, 11.

17. Charles, æt. 13 years; 18. Maud, æt. 11 years; lenses quite n. in both. 19. Gladys, æt. 9 years; L. lens n., R. large vacuole up-in near posterior pole.

20–27. See under IV, 12, above.

28–31. Four children of IV, 19.

28. John B—, æt. 21 years. V. of each $\frac{6}{12}$, with M. As. corrected R. − 2·5 s. − 1 c., L. − 3·5 s. − 1·5 c.; lenses clear; patch of choroiditis at Y.S. region of R. Both abundant retinitis pigmentosa, pigment very fine and occupying the whole visible periphery.

29. George, seen January, 1908. All quite n.

30. James, æt. 18 years, "could never see well at night."

Lenses clear; well-marked retinitis pigmentosa in early stage; V. with + 1 D. cyl., each $\frac{6}{18}$.

31. Sydney, æt. 13 years, "Gropes for things unless the light is strong." Lenses clear; well-marked early retinitis pigmentosa, and in L. O.D. atrophied; R. $\frac{6}{12}$, not improved, L. $\frac{6}{0}$.

33. Gordon S—, æt. 18 years; not seen; said to be quite well. 34. Lily, æt. 17 years; has nebulæ and My., and is deaf; lenses n. so far as could be seen.

35–42. Nine children of IV, 25 (April, 1907).

35. William J—, æt. 24 years; moderate My.; glasses since æt. 10 years; ophth.; all n; has one child (male), æt. 10 months; seen, and lenses n. (VI, 1). 36. John Henry, æt. 22 years; My. 5 or 6 D.; well-marked retinitis pigmentosa; lenses n. 37. Jane, æt. 19 years; lenses and fundus all n. 38. Lottie, æt. 17 years; not seen; has "splendid sight." 39. Edward, æt. 16 years; lenses n.; My. refraction; well-marked retinitis pigmentosa. 40. Reginald W—, æt. 9 years; all n. 41. Frank, æt. 7 years; all n. 42. Two miscarriages.

43. Cannot be seen.

44–49. Six children of IV. 32.

44. Mary, æt. 15 years; typical small, dense, lamellar cataracts; teeth have good enamel. 45. William, æt. 14 years; 46. Bronwen (female), æt. 12 years; both n. 47. Edith, æt. 11 years; R. lens n., L. 1, vacuole in anterior cortex. 48. Victor, æt. 7½ years; lamellar cataracts; R. typical, dense, filling the p.; L. smaller, less dense, and with many irregular projections from outer periphery; teeth n. 49. Lawina (female), æt. 3 years; all n. No other conceptions.

V, 50 and 51 cannot be seen; are said to have bad sight.

52–61. Ten children of IV, 42 (March, 1907).

52. Albert, æt. 19 years; army. 53. Louisa, æt. 18 years; service. Both said to see print well; could not be seen. 54. Miscarriage. 55. Annie, æt. 14 years; seen, all n. 56. Alice, æt. 12 years; R. a vacuole up-in of posterior pole; L. lens n. 57. William, æt. 10 years; R. a vacuole

up-in; L. lens n. 58. Harry, æt. 9 years; all n.; H. 5 or 6 D. 59. Miscarriage. 60. Ada, æt. 5 years; all n. 61. Female, *ob.*, æt. 2½ years, "accident."

62–65. Four children of IV, 43 (March, 1907).

62. Henry Charles, æt. 8½ years. 63. Ada, æt. 7½ years. 64. Jackie, æt. 3½ years. 65. Edward, æt. 12 months. All examined and n.

66–69. Four children of IV, 44 (March, 1907).

66. May, æt. 9 years. 67. Norah, æt. 8 years. 68. James, æt. 4½ years. 69. Kathleen, æt. 2 months. All examined and normal.

70. John, æt. 6 years; all n. (son of IV, 49). 71. Miscarriage.

72–81. Ten children and one miscarriage of IV, 79 (March, 1907).

72. John, *ob.*, æt. 4½ years; "abscess of lung"; would be 17; V. believed to have been good. 73. William, *ob.*, æt. 6 weeks. "Wasting."

74. Frank, æt. 14 years. Examined. All normal. Teeth normal.

75. Doris, æt. 13 years. Typical small lamellar cataracts; the L. has three knobs; R. less regular as to knobs (Plate XVI); teeth all normal; refraction H. 5 D. Here a miscarriage. 77. William (second), *ob.* at birth; would be 10. 78. Ivy, female, æt. 9 years; lenses perfect; refraction H. 79. Mildred, *ob.*, æt. 11 months; "dysentery"; would be 8.

80. Louis, æt. 5 years. Well-marked lamellar cataracts of rather small size. R. shows three knobs and is more circular and denser than L.; L. has a long, straight, sharp, nearly clear refraction spoke projecting from each knob. (Plate XVI).

81. Irene, æt. $1\frac{8}{12}$ years. All normal.

82 and 83. Two children of IV, 80 and 100 (March, 1907); æt. $6\frac{8}{12}$ and $4\frac{9}{12}$ years. Both examined, and lenses perfect.

84–86. Three children of IV, 85.

84. George, æt. 4½ years. All normal. 85. Male, *ob.*, æt. 1 month. 86. Miscarriage. (*June 11th*, 1908.)

51. *A colour-blind family.*

By E. Nettleship.

This case (Fig. 20) displays nothing new. It is interesting only as giving the result of an attempt to examine, by the ordinary wool-tests, the colour-vision of all the available members of a rather extensive pedigree of educated persons. Amongst the members of this "tree" are several military and naval officers, clergymen, doctors, and business men. The three current generations contain about 110 persons: 53 males, 57 females, varying in age from 70 to childhood. Of this number 63 were examined and information that seemed to be trustworthy was obtained as to 6 others. The condition of colour-vision may, therefore, be said to have been ascertained in 69—33 males, 36 females; of the remaining 41, 33 were either dead, living abroad, or too young, and 7 or 8 who were within reach were missed for one reason or another.

Amongst the 33 males examined or known, 14 were colour-blind; 13 of these were seen and found to be good examples of red-green blindness, the colour-blindness of the fourteenth, the grandfather (II, 3), who died in 1851, rests upon the perfectly definite and trustworthy statement of IV, 3, whose parents repeatedly told him that the grandfather (II, 3) was colour-blind like himself (IV, 3); nothing is known on the subject further back than generation II. The genealogy shows, so far as it goes, the ordinary mode of descent of this defect. All the offspring of the colour-blind ancestor (II, 3) escaped, but in the next generation a certain number of the sons of some of the daughters are colour-blind. In generation V only 3 well-marked cases, all in males, have hitherto been found, but several members are either abroad or too young to be tested; one female, æt. 15 years (V, 18), is slightly defective. At a first examination she (V, 18) matched orange (Edridge-Green's tests) approximately with a salmon pink containing yellow, and

FIG. 20.