Notes marked `Macdonald's drawings, Optical Manual'

Publication/Creation

Mid-late 19th Century

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Macdonald's Drawings

Optical Manual

Fig 3. L 97/1

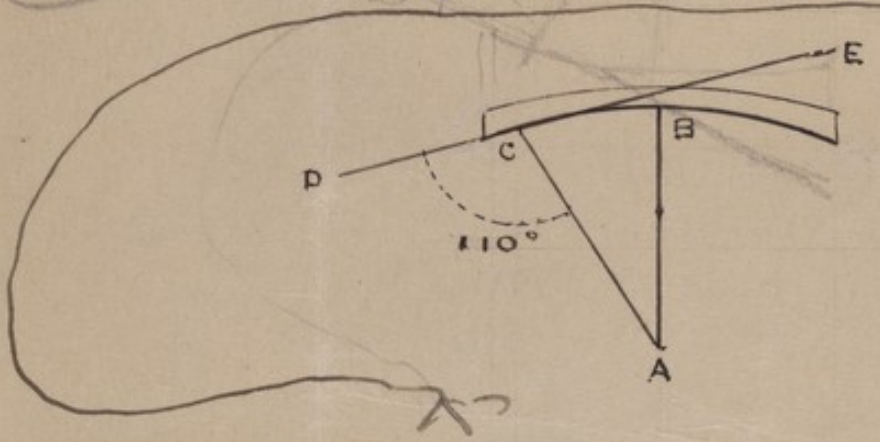
(Polyphemus
founded upon fact in
the agenus Dus. (result
highly classical)

To Printer in MX p. 24

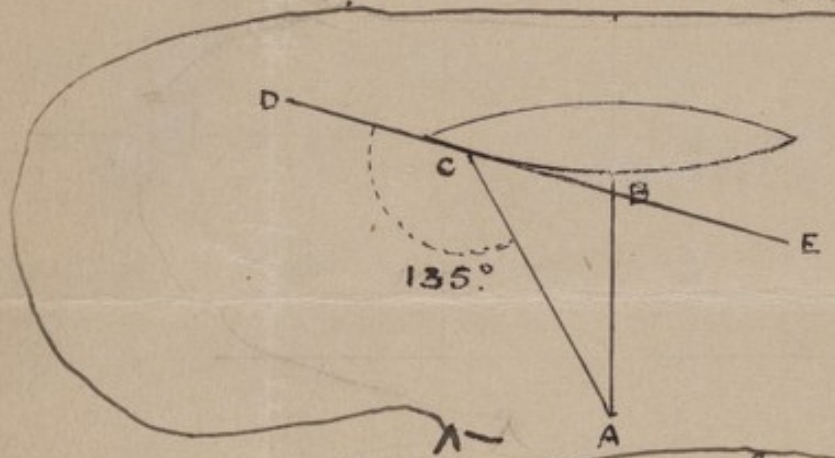
Fig. 42.

L 97/2

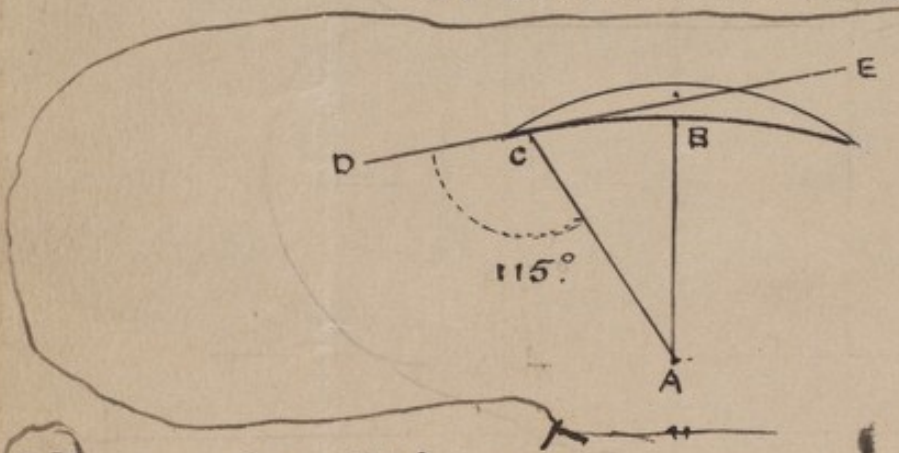
B. Concavo-convex lens.



A. Bi-convex Lens.



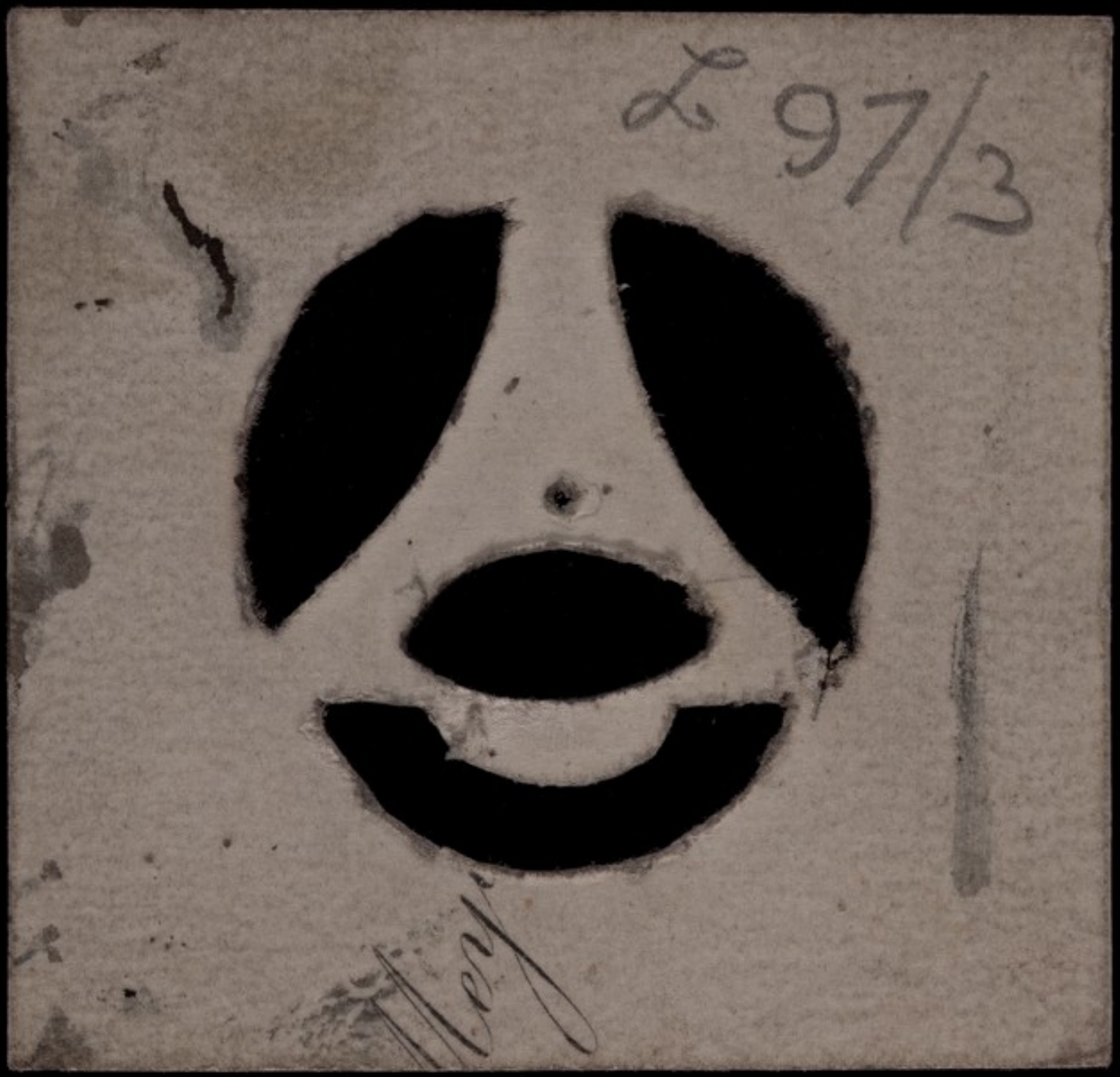
C. Meniscus lens.

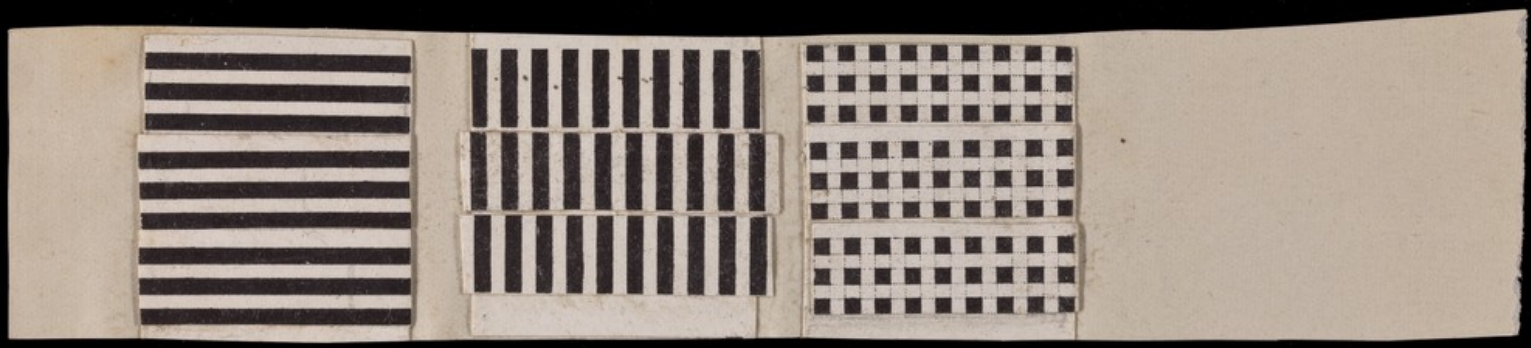


To Printer, Larger reference &c.

A.B. Central ray;
A.C. Ray meeting surface of lens in each instance at distance C.B. from centre.
D.E. Tangent to spherical surface, at point C.
The angles A.C.D. show the relative obliquity of the lateral rays in the three lenses.—

The surfaces of the Biconvex lens are segments of circles of $1\frac{3}{4}$ in: radius.—

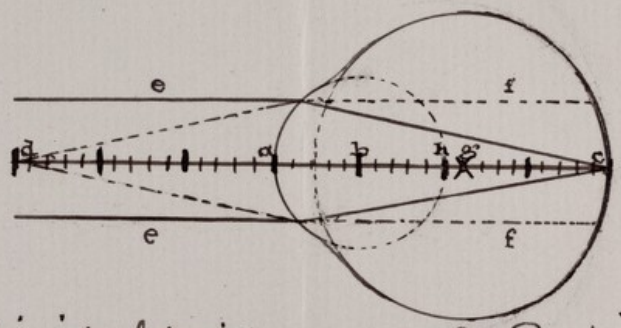

L 97/3



L 97/5

The Diagramatic Eye. (enlarged)

(Scale supposed to be expressed in mm.)



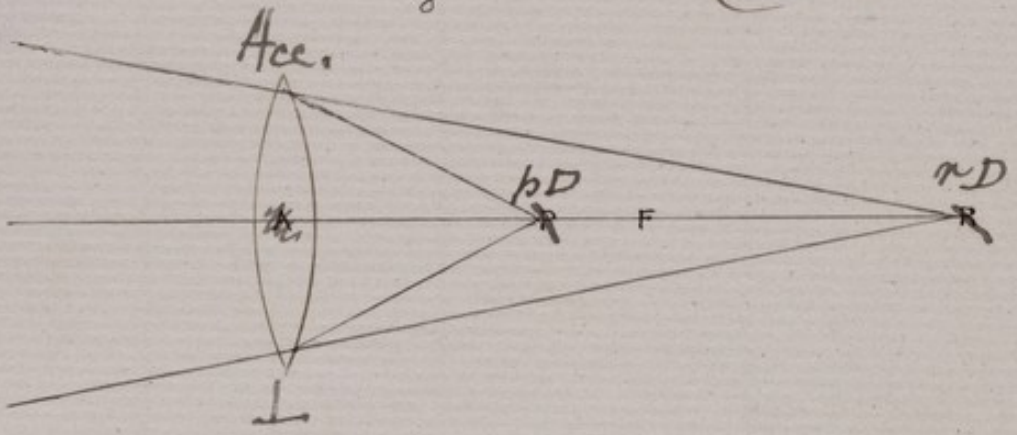
a. Principal point
b. Optical centre.
c. Posterior focus.
d. Anterior focus.
e.e Parallel rays in air focused at c.
f.f. Parallel rays in Vitreous " " humour focused at d.

a – b. Radius of curvature of " " refracting surface. 5 mm.
a – c. Posterior focal distance, or ant: " " retro-posterial diameter of eye 20 mm.
a – d. Anterior focal distance 15. mm.
g. Centre of motion, from which the fore " part of the globe is described.
n. Centre of longitudinal axis from which the " fundus is described.

L 97/6

Measure of Power of Accommodation.

Fig. (ink p. 83)

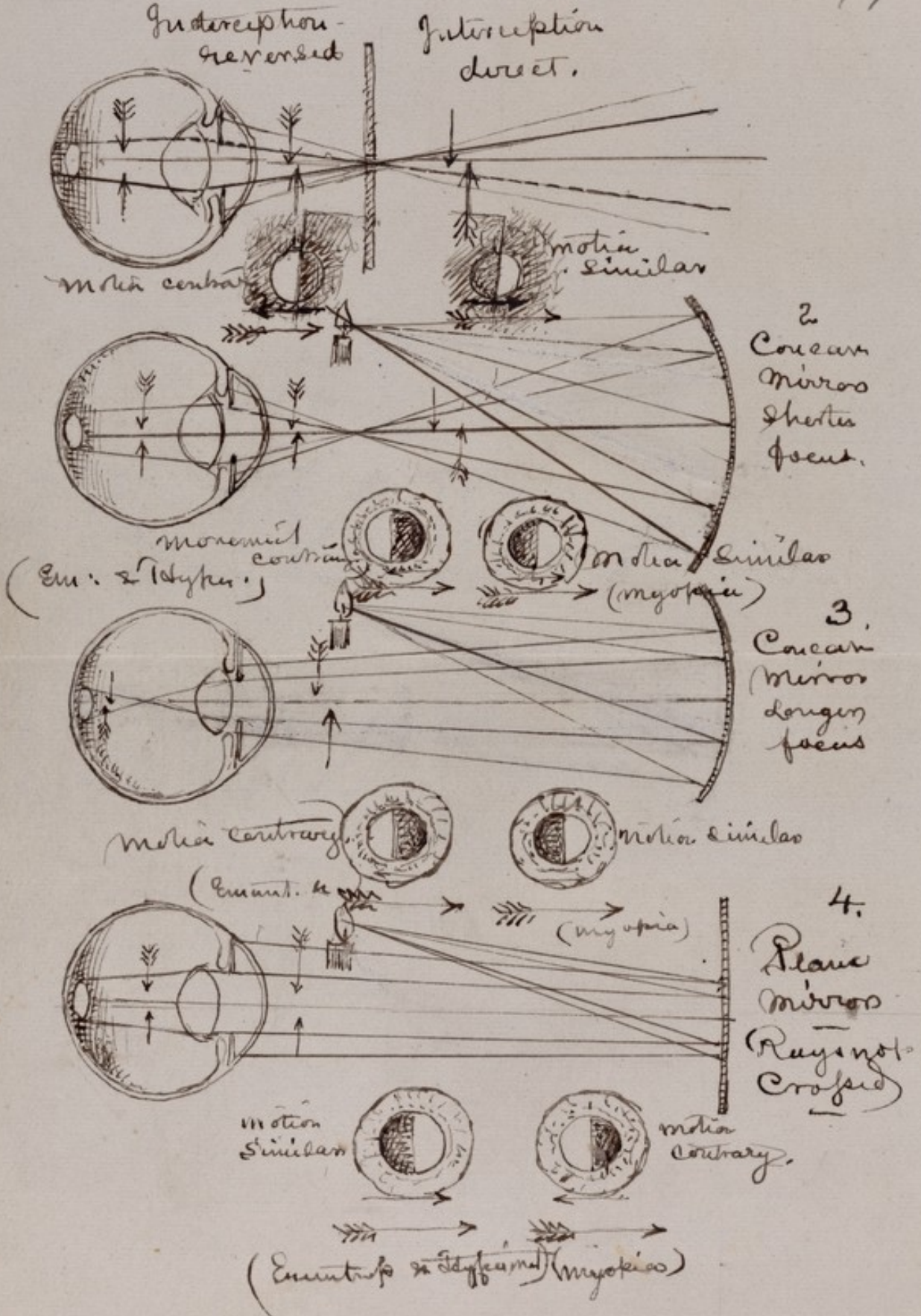


$\frac{1}{A} = \frac{1}{P} - \frac{1}{R}$ (Donders). F. the principal focus of the convex lens A

This formula and the drawing mutually helps to explain one another; In both R is the measure of distance of the remote point for which the eye is primarily adjusted, whether expressed in inches or parts of a metre; P is the measure of the nearest or proximate point for which the eye becomes adjusted when accommodation is exerted; &c &c.

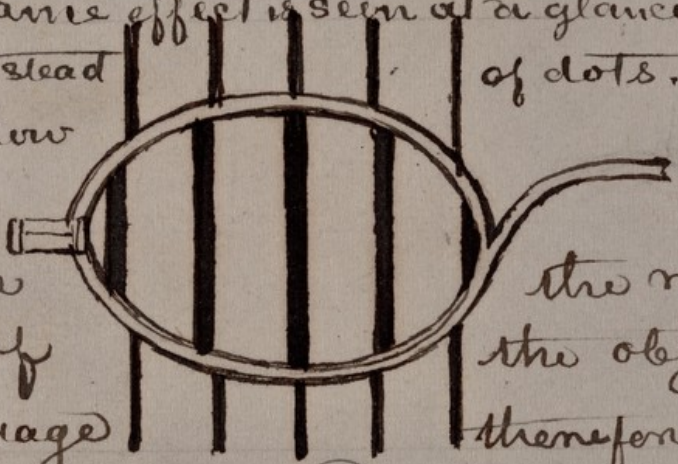
1. Looking through a pin hole &
shifting it to right or left.
Subjective results.

L 97/7

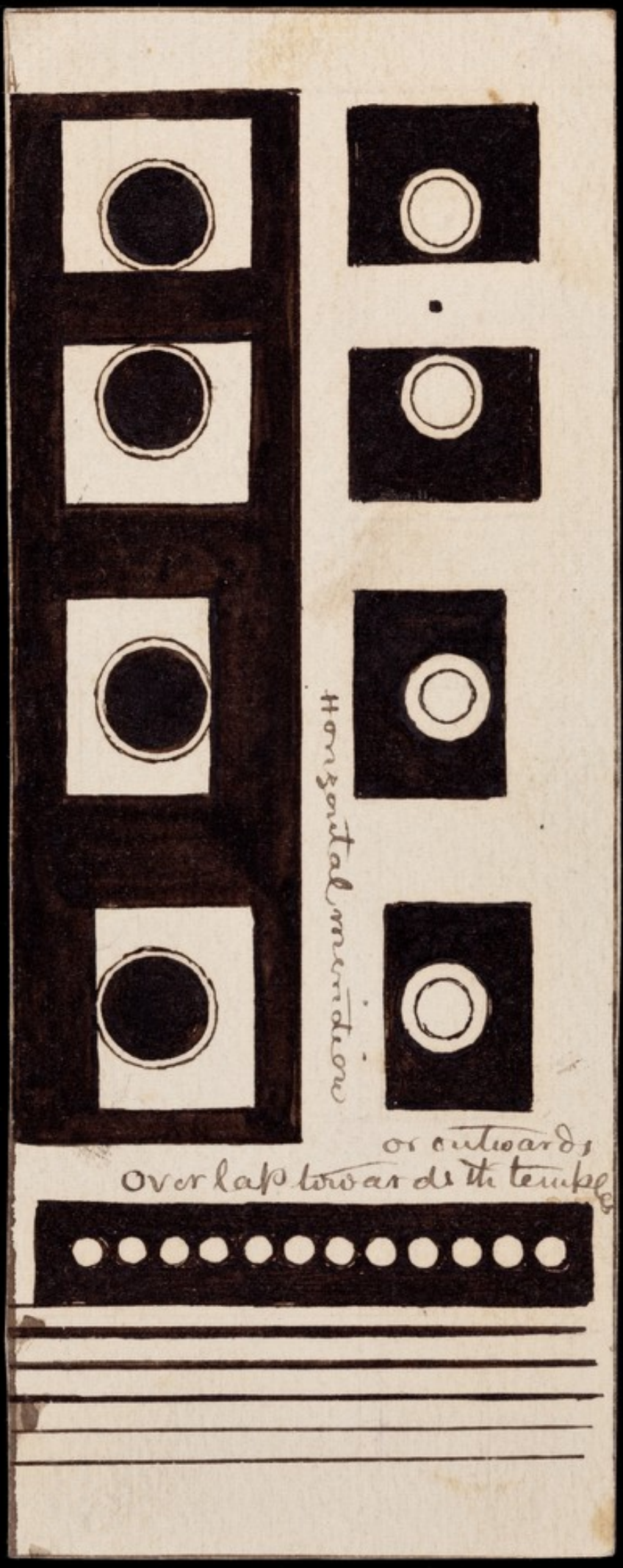


L 97/13

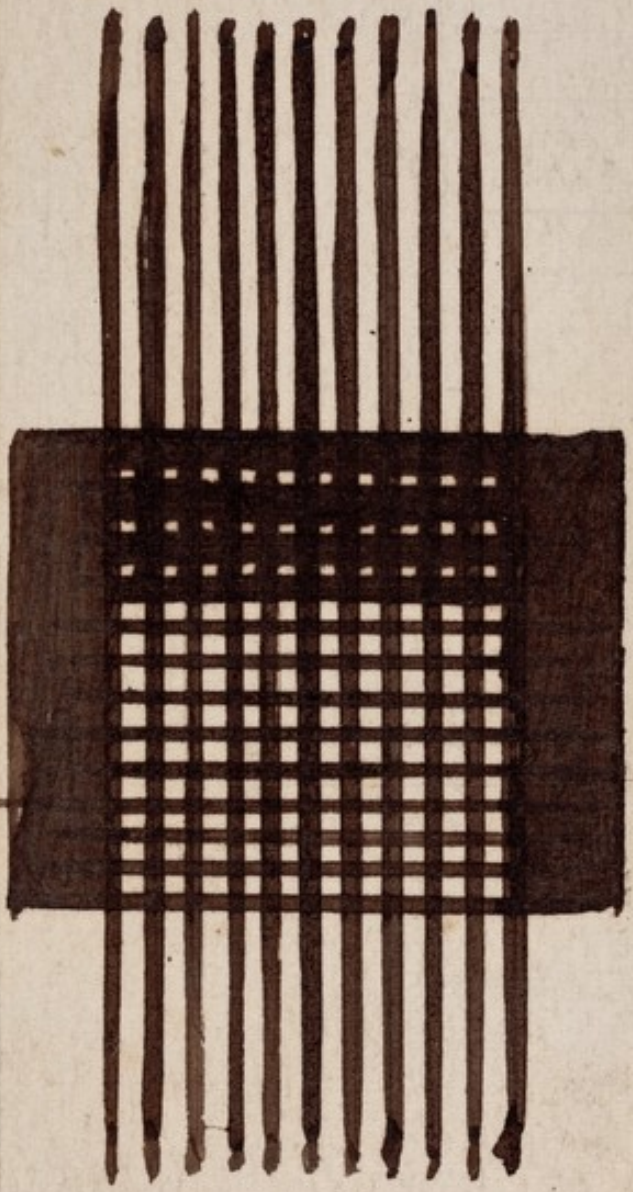
Fig 10

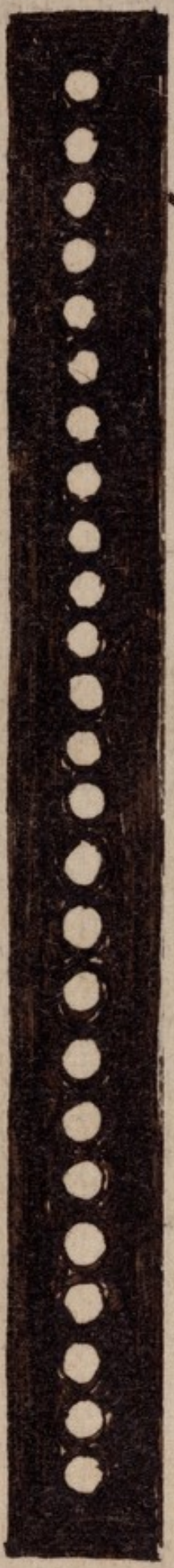


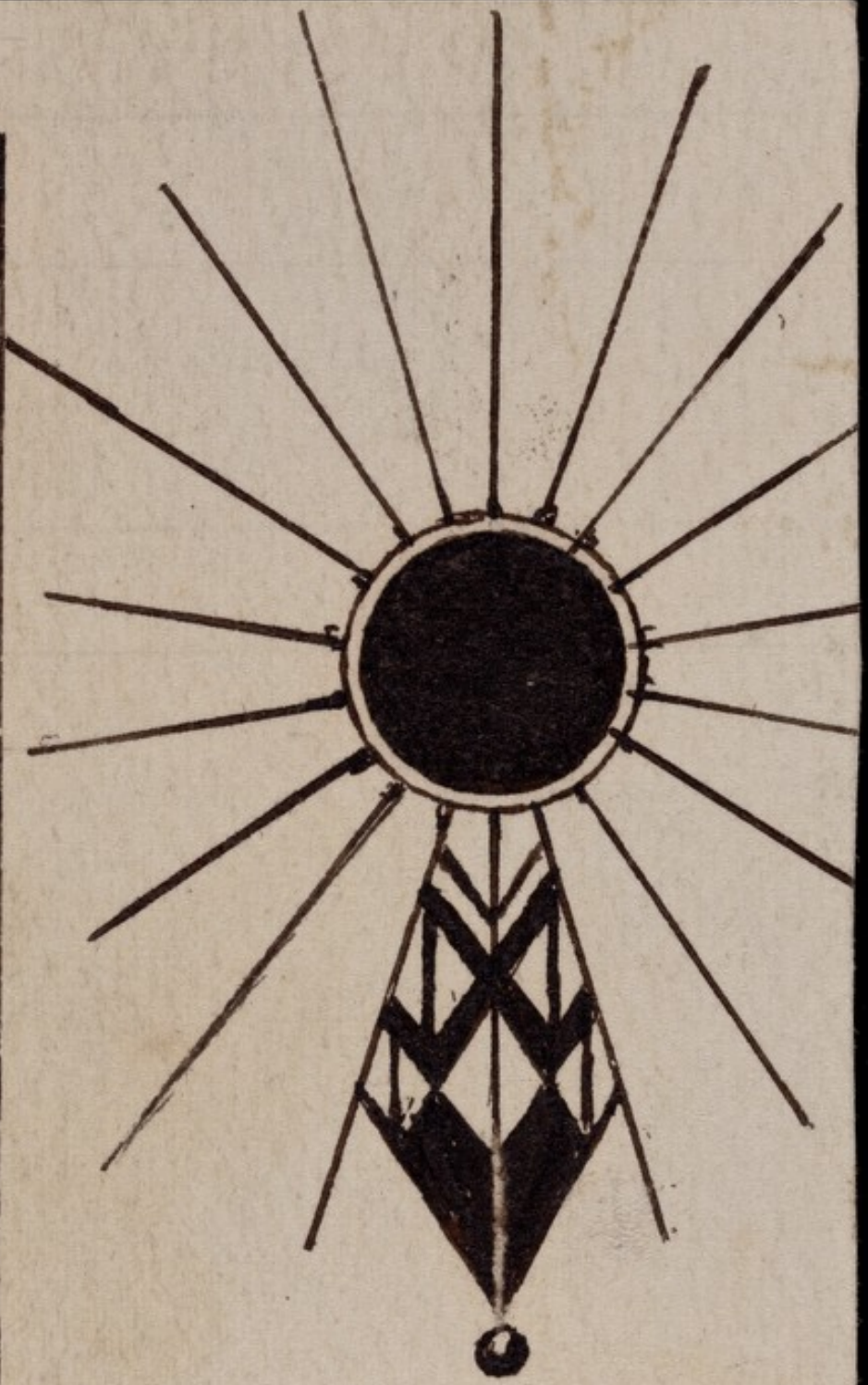
The same effect is seen at a glance by taking
lines instead of dots. & even with
a very low power the
image will be seen
to reach the margin in advance
vance of the object. The passage
of the image therefore over the area
of the object right and left will be easily understood.

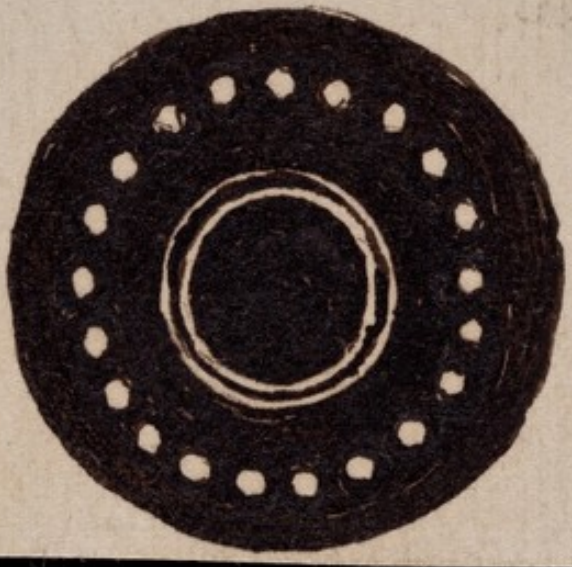

Horizontal mention
or outwards
overlap towards the temple

L 97/10

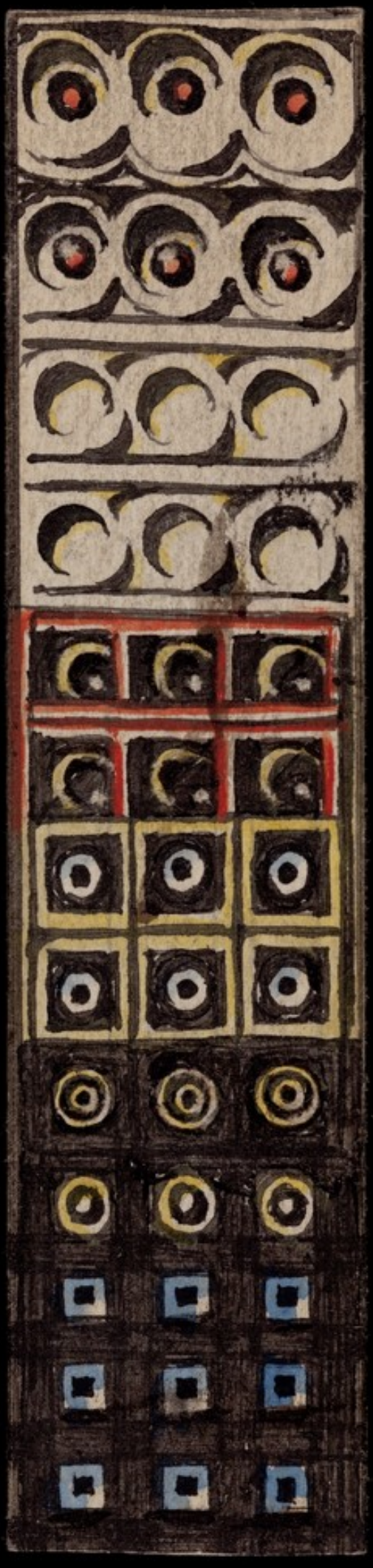




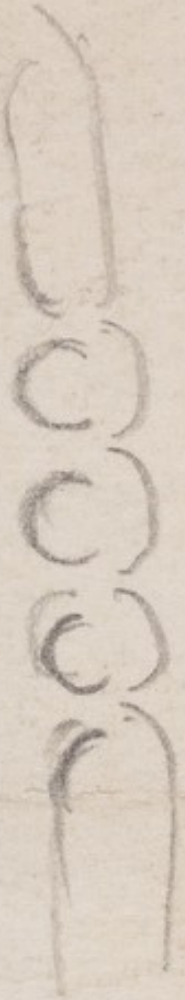


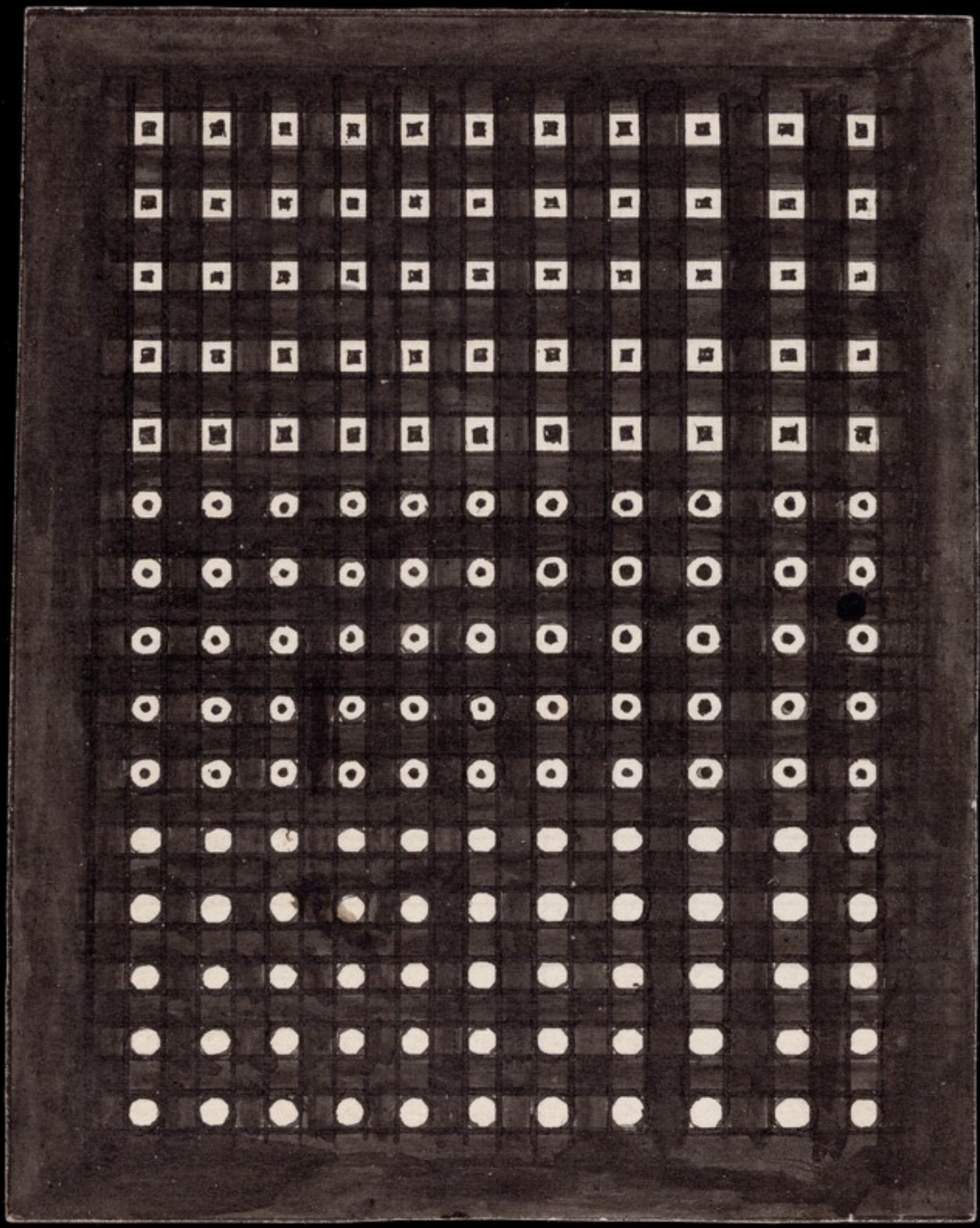


Right. — Left

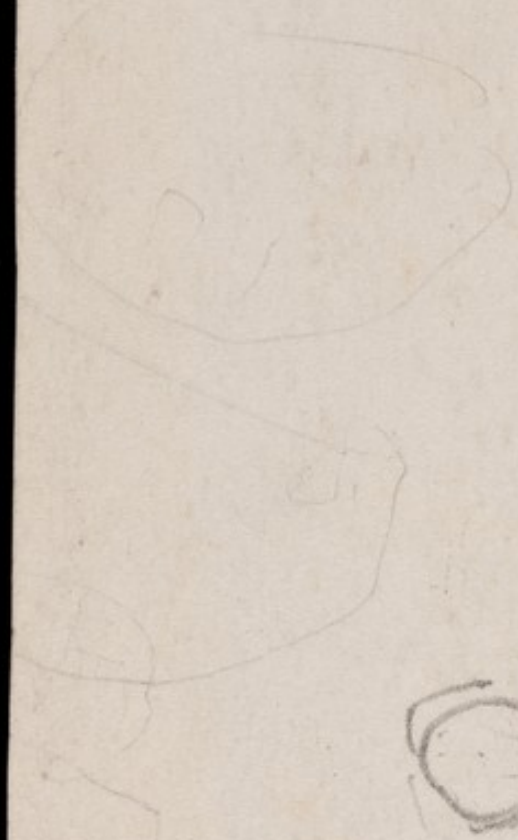


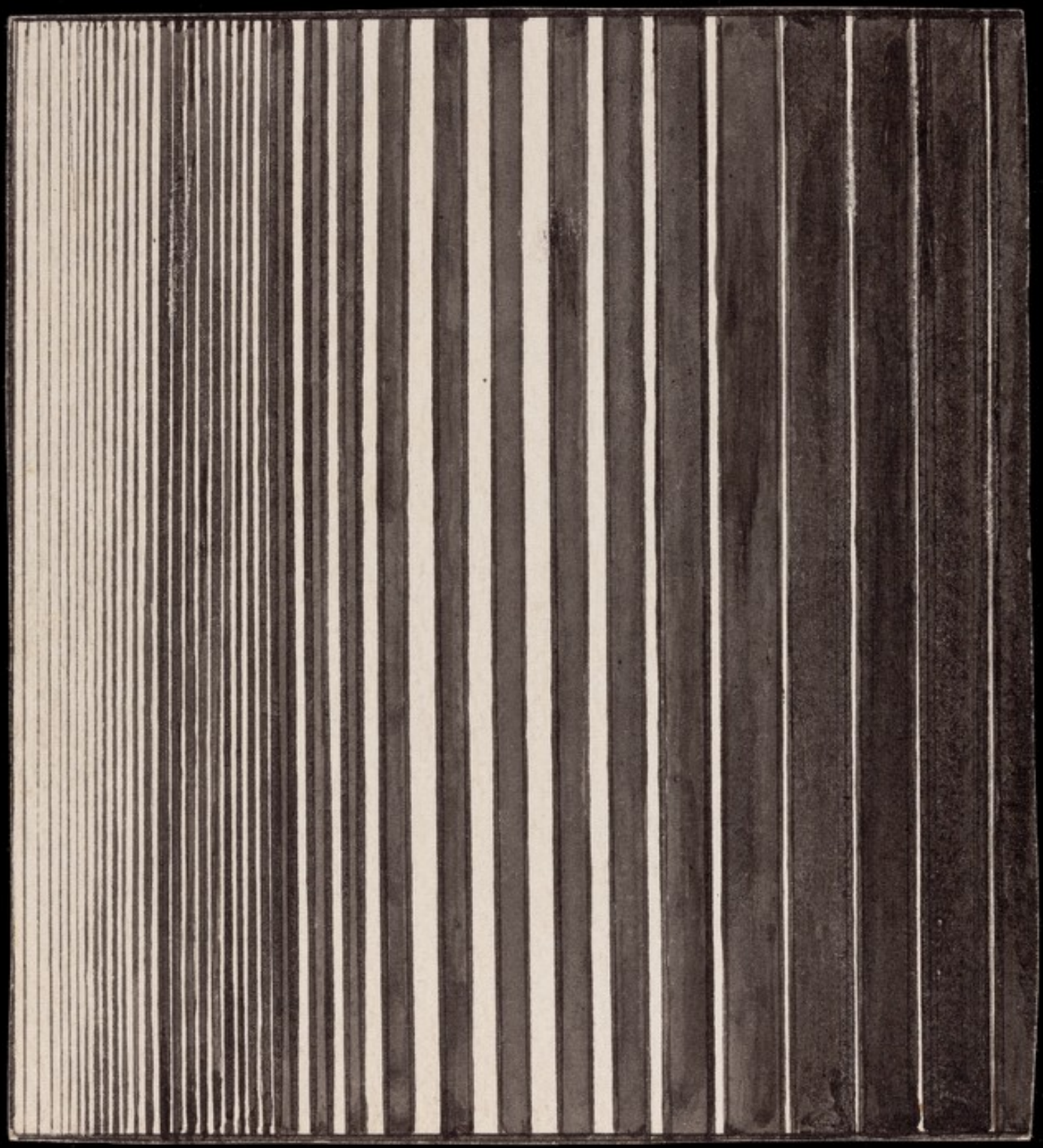
L 97/14





L 97/15

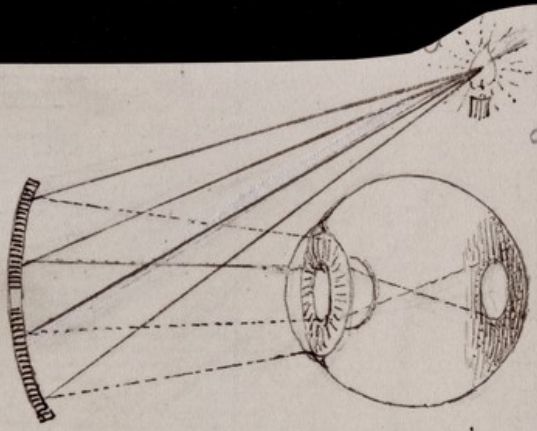




Myopie

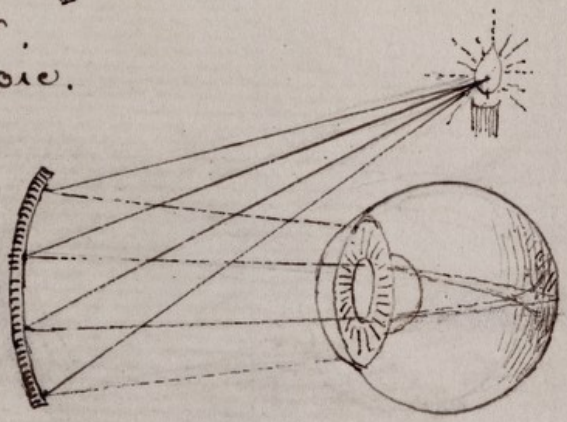
L 97/16

1



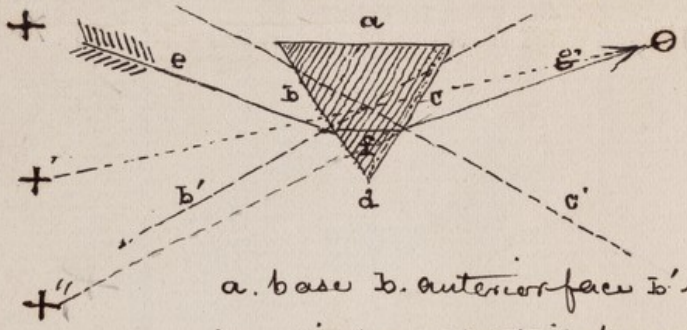
Emmetropie or
Hypermetropie.

2



Refracting properties of the prism.

Fig. 119.



a. base b. anterior face b' perpendicular. c posterior face c' perpendicular. d. edge of prism. e. incident ray of light. E refracted ray & E emerging ray. + an Object O the eye +' position of image.

+ Object.
+' Referred image with Strabismus.
+'' Position of image the eye being normal

Refer to the figure in the surfaces of the refracting (mediums are parallel. instead of convergent as in the triangular prism.

L 97/18

Fig. 24.

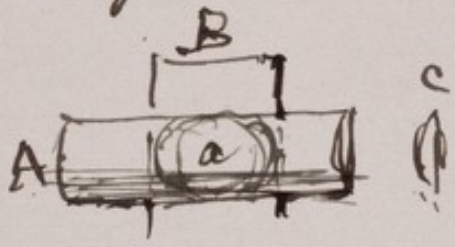
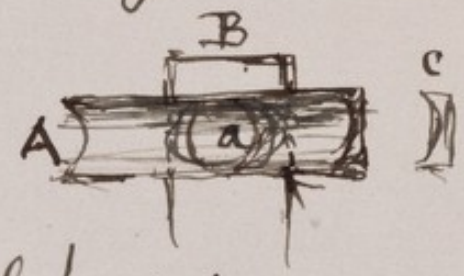


Fig. 25.



Bicylindrical Lenses.

Biconvex.

Fig. . A, anterior segment; B, posterior segment; C, Vertical section; D, Transverse section; a, cutting of a biconvex bi-cylindrical lens.

Fig. . Biconcave. A Anterior segment; B posterior segment; C. Vertical section; D, transverse section; a, cutting of a biconcave bi-cylindrical lens.

Fig. 26.

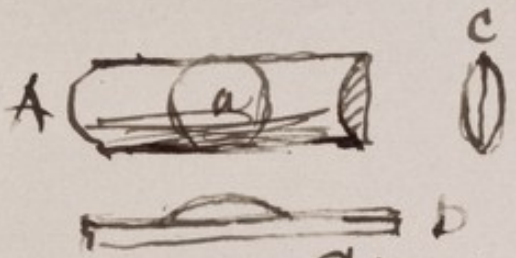
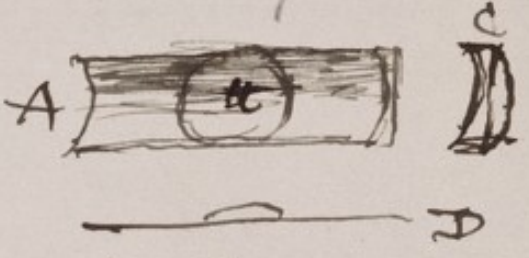


Fig. 27.



Sphero-cylindrical Lenses

Fig. . Sphero-convex.
A, Plano-convex segment of cylinder; a, cutting to which a spherical convex lens of equal diameter is applied; C, vertical section; D, transverse section.

Fig. . Sphero-concave.
A, Plano-concave segment of cylinder; a, cutting to which a spherical convex lens of equal diameter is applied; C, vertical section; D, transverse section.

£97/19

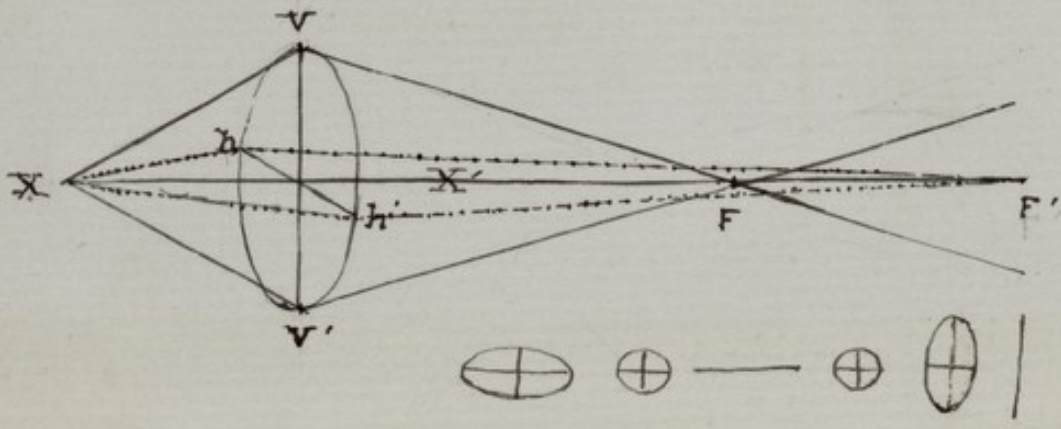
On Her Majesty's Service.

Astigmatism

Sketches not required.

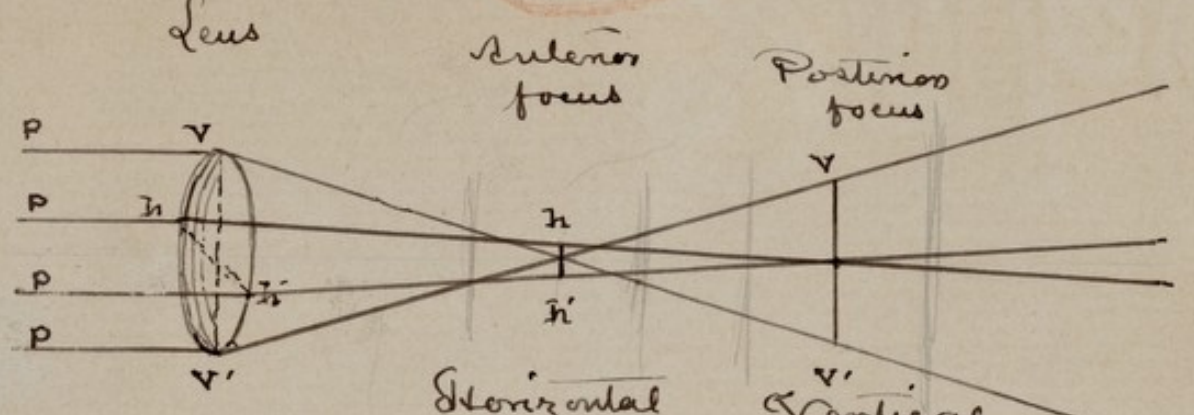
Astigmatism.

Chauvel Fig 143, P. 369.



V.V' Vertical Meridian. h.h' Horizontal Meridian of refracting surface, the curvature of the former being greater than that of the latter
X X' the principal axis. x. Point of light.
F. Focal distance of Vertical Meridian
F'. do do of the horizontal meridian, the former shown by continuous and the latter by dotted lines. Between F. & F' the space is named the "focal interval".

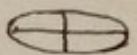
(A)



P. P. P. P.

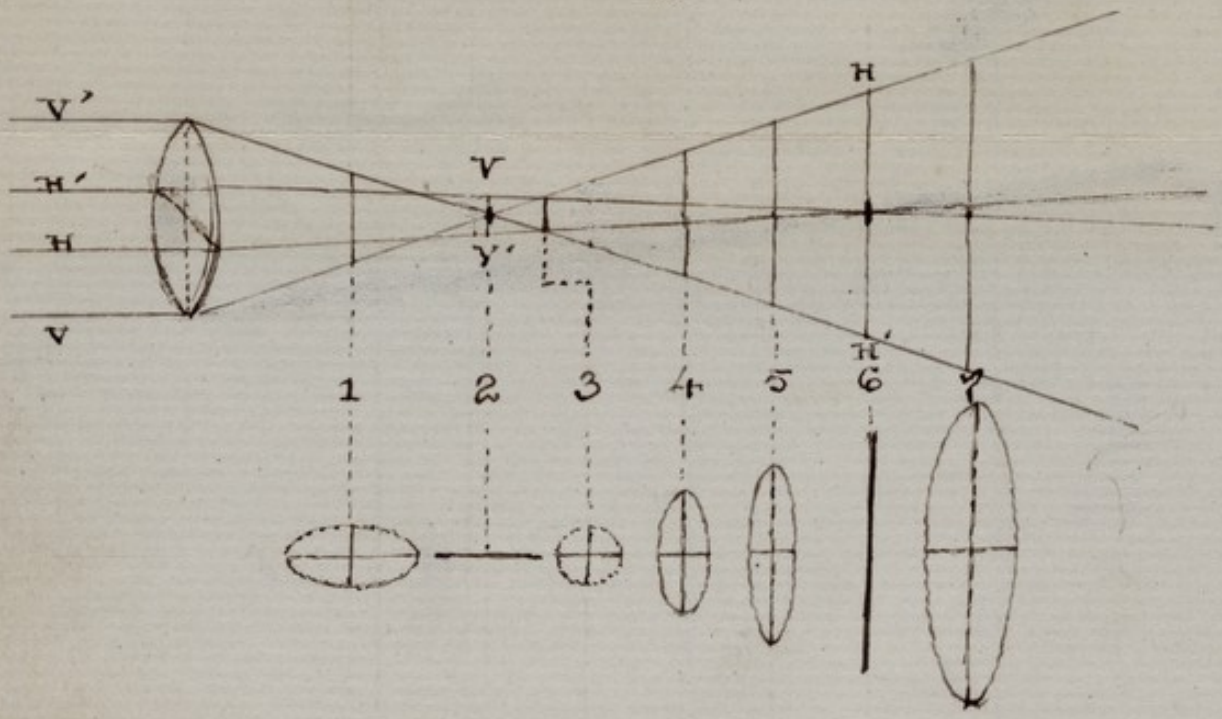
Parallel rays from distant object. V V' Vertical & h. h' Horizontal Meridian

Horizontal diffusion Horizontal rays not-yet united.

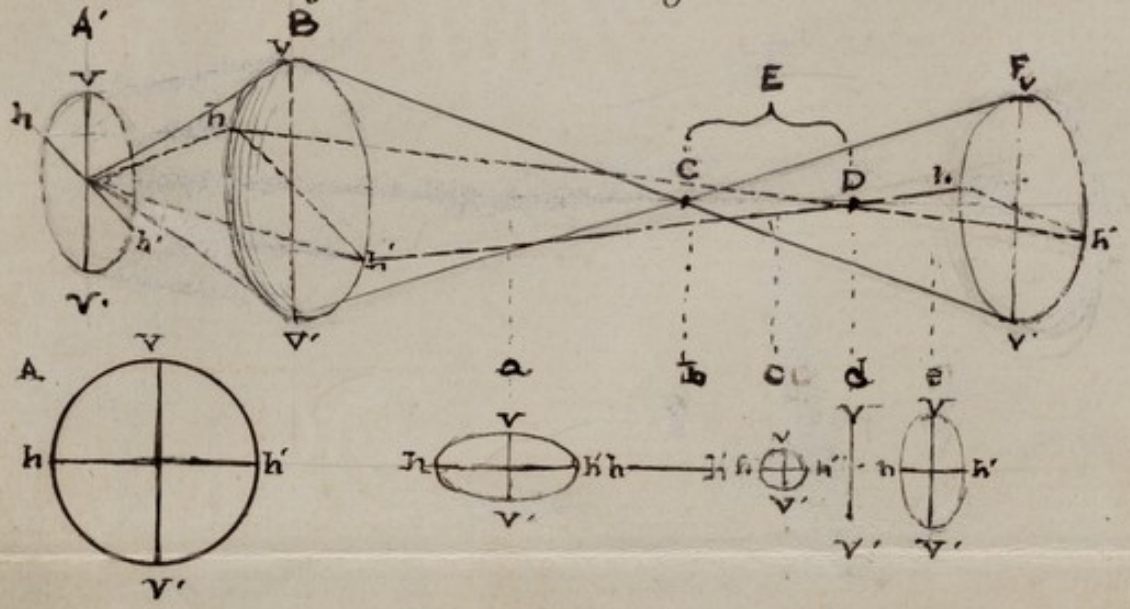


Vertical diffusion Vertical rays crossed.

(Cantridge)



Regular Astigmatism.



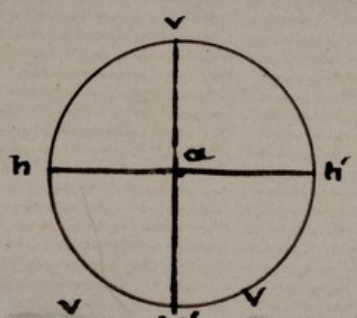
A Object:- two cross lines to represent the vertical (V.V') and horizontal (h h') meridians of the eye. A' The same foreshortened in Diagram.

B Refracting Medium (astigmatic). rays from the central part of the figure only shewn.

C. Anterior focus corresponding with the horizontal line. D Posterior focus for vertical line. E. Focal interval. F further Anterior focus of the rays.

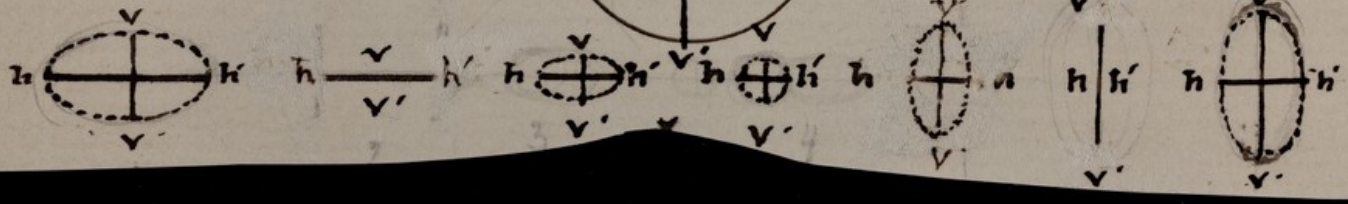
a.b.c.d.e. Transverse sections at the points indicated.

(Fig 150)



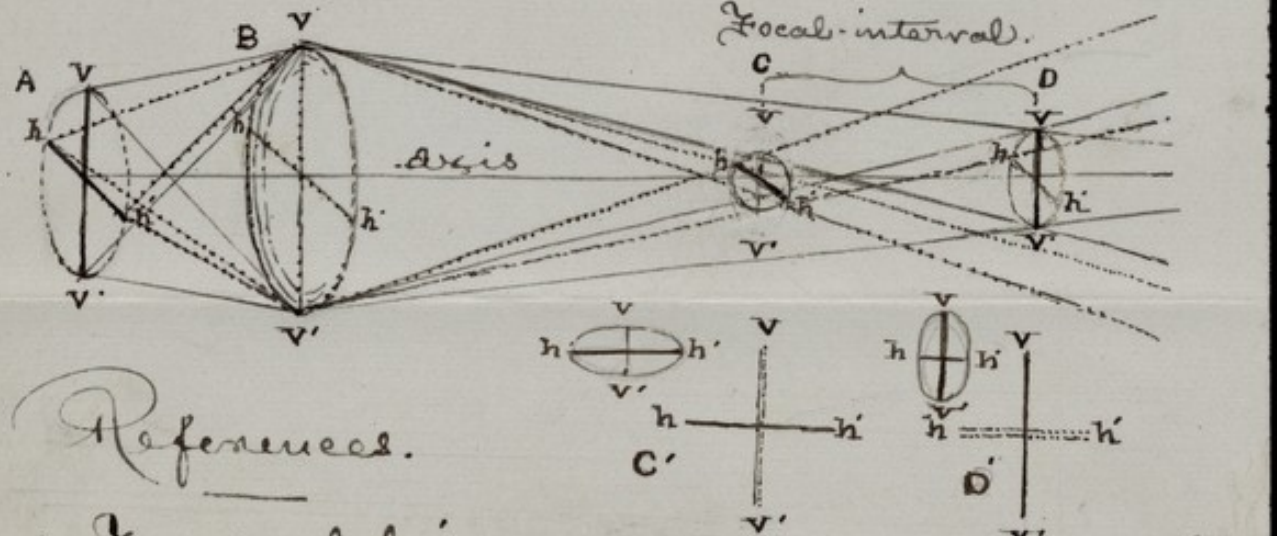
(B)

(Fig 151)



Astigmatism.

Fig. ( ).



References.

A. Two cross lines, supposed to at right angles, but slightly foreshortened, in front of —
B. The refracting medium, with greater vertical than horizontal curvature.
C. Focal distance for the horizontal lines with
C' the corresponding spectrum below.
D. Focal distance for the vertical line with
D' the corresponding spectrum below.
V.V' Vertical meredian. h.h' Horizontal meridian.

L 97/21

Objects can only be seen correctly through the centre, not laterally.

Objects can be seen more correctly in all directions; if the eye were in the centre of a hollow sphere, it would see objects in all directions perpendicularly to the surface. the more nearly a glass before the eye approaches such a sphere, the more nearly will the visual line be ⊥r. to all its parts, & the more clear will be lateral vision of objects. Convex glasses should therefore have the form of menisci instead of biconvex — concave glasses, the form of concavo-convex, instead of biconcave.

E. In each instance ought to have been kept about ½ an inch from the surface of the lens — the distance at which a spectacle should be from the front of the eye i.e. 13 mm

L 97/22

Scale of $\frac{1}{4}$" to 1"

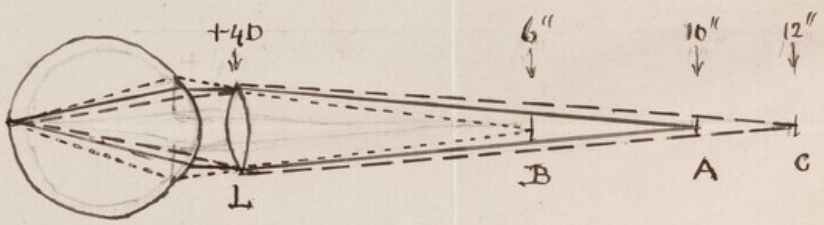
Use of a +4D lens in testing refractive power of Eye —

Distance from cornea to lens double what it would be in practice & Diameter of +4D lens exaggerated — See Footnote on p. 42

I have altered the Diagram in the footnote in some particulars, but this illustration will stand good

Fig: .

Action of Convex 4D lens, placed in front of the eye, on rays of light proceeding from objects at various distances from the lens.



Rays from A, distance of principal focus, after passing through L, fall on eye as parallel rays. ——

Rays from B, distance short of principal focus, fall on eye as divergent rays, - - - - -

Rays from C. beyond distance of principal focus, fall on eye as convergent rays — — — — —

9 : 11 :
17 : 8

27

1

Dose 3ss - 3j dil.

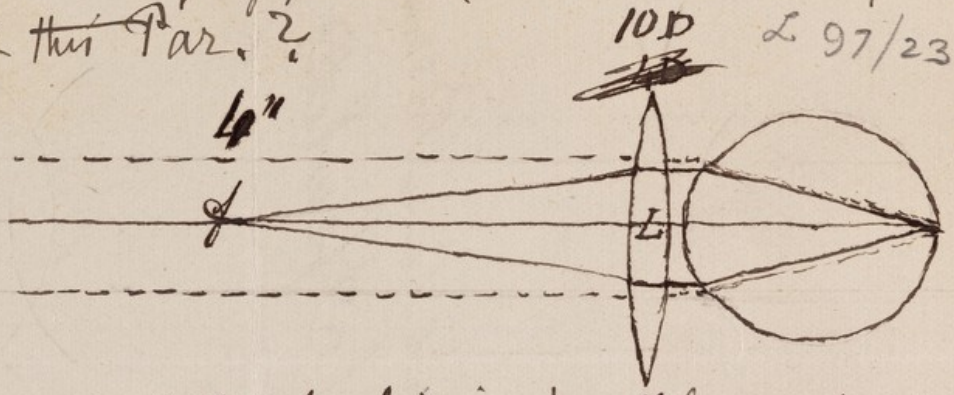
℞

Mist: Pepsini Co: c. Bismutho

(Hewletts)

See the first Par. at top of p. 83; would this be of use in illustration of this Par.?

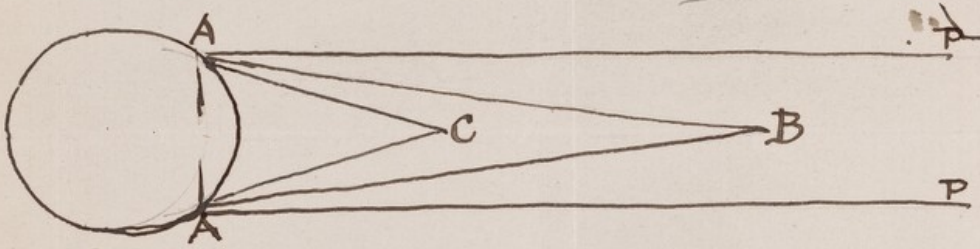
L 97/23



Emc. Eye in repose & adapted for bringing parallel rays to a focus on the retina. The $\frac{10}{4}$D lens, $\frac{1}{L}$, represents the amount of Acc. which must be exerted to enable the eye to see an object at 4 inches' distance.

The amount of Acc. exerted by the eye will accord with the divergency of the rays falling on the cornea

Demand for Accommodation, p. 81 Σ 97/24

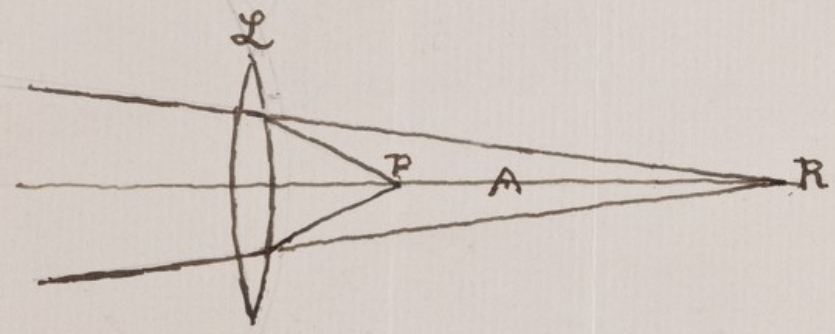


There being no

~~The~~ Angular difference between PAB, & BAC., the eye in transferring vision from an object B to another object placed at C will use the same amount of Acc. as in transferring vision from an object at infinite distance from which the parallel rays PP come to another object at B

L 97/25

Fig 3 See page 83

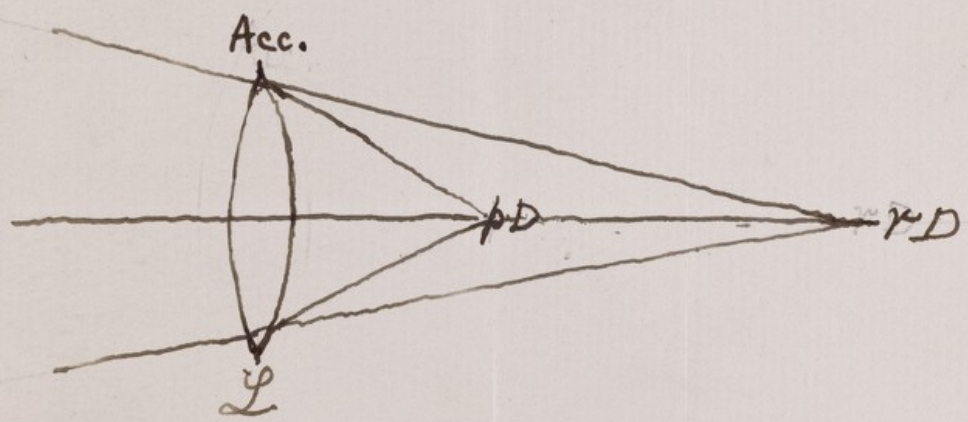


L. the lens whose focus is at A causes rays ~~issuing~~ falling on one of its surfaces issuing from P & to assume the direction in emerging from the other surface as if they had come from R. (See explanation in text)

I 97/26

Fig.

See page 04 of Manual

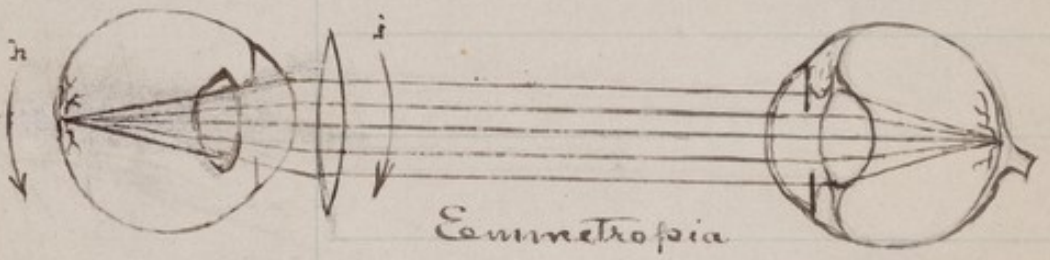


L. or Acc: = pD − rD. (See explanation in text)

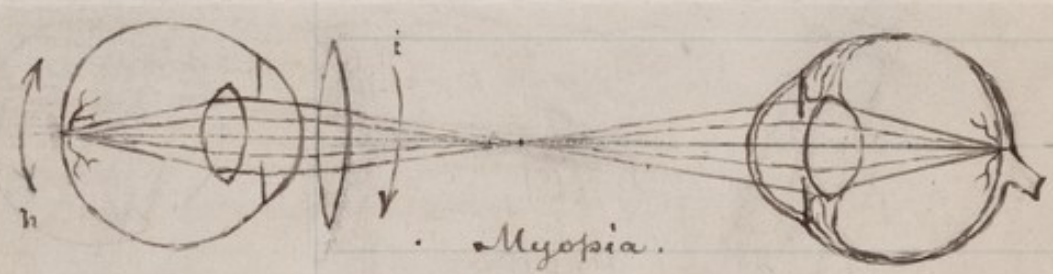
Z 97/27

Objective diagnosis.

Hypermetropia.



Emmetropia



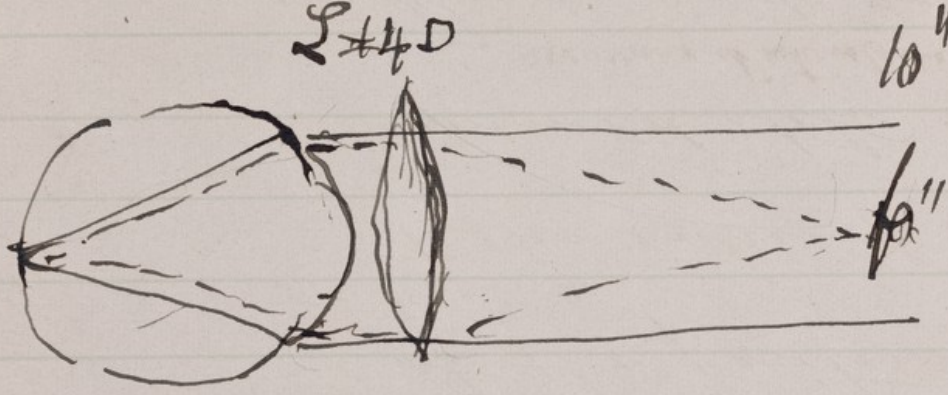
Myopia.

h movement of the head.

i movement of the image.

Showing reversion in the case of Myopia alone.

L 97/28



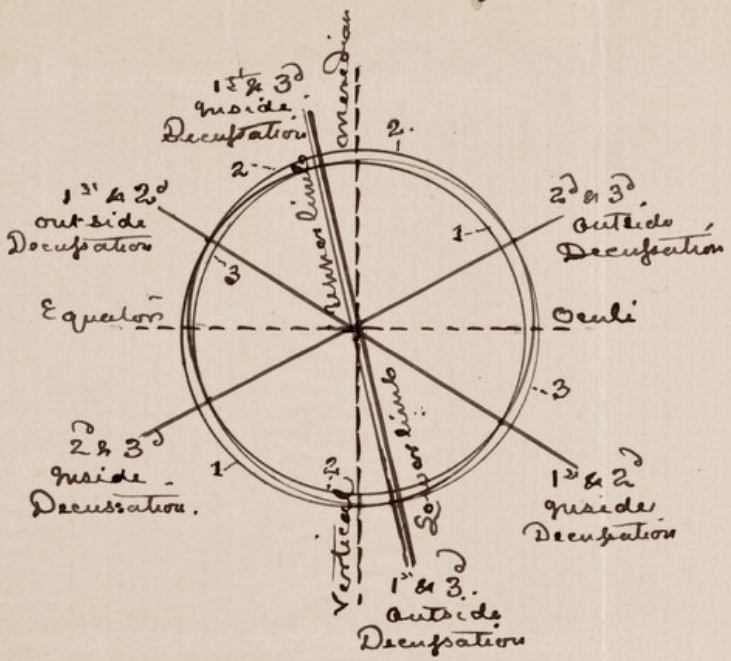
Emᵗ Eye. The 4D lens represents the amount of Ac. wᵗ would have been exerted by the eye to enable it to see an object at a Distance of 10"

Not change at

passage: the stomach
violently from the es
and if any contents es
of the peritoneum. U
to the extreme shock w
immediately after the
recurring at intervals subsequently,
blood, and great pain,
especially when the str

L 97/29

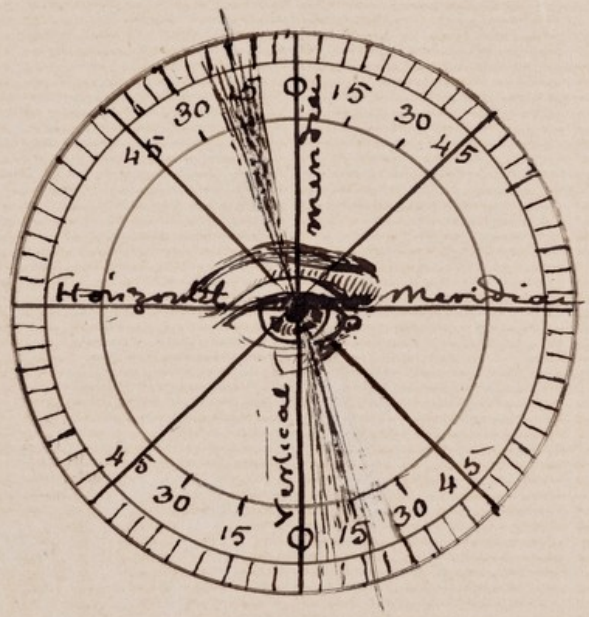
Applicable to the left Eye.



The double line shews the meridian of the principal subjective ray in relation to true V.M.

Reg.

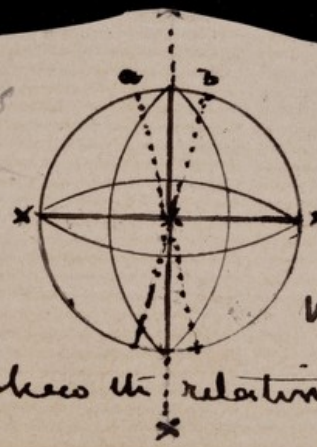
L 97/30



As apparent to the left eye.

After Donders
to be presented
to Hartridge

L 97/31 a

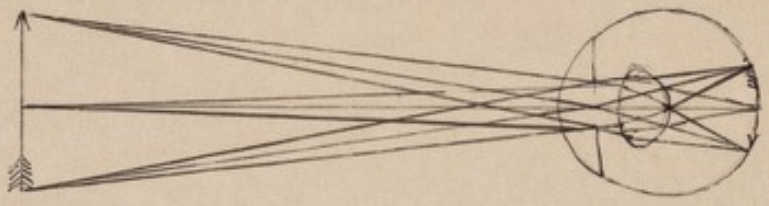


The dotted lines a a to shew respectively the oblique, & supplementary meridians of the right & the left eye

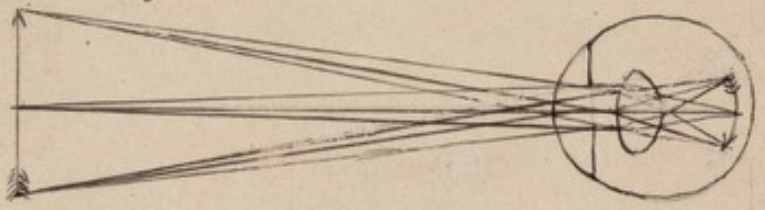
Corneal curvature. To shew the relative convexity of vertical & transverse meridians.

(Chapter II)

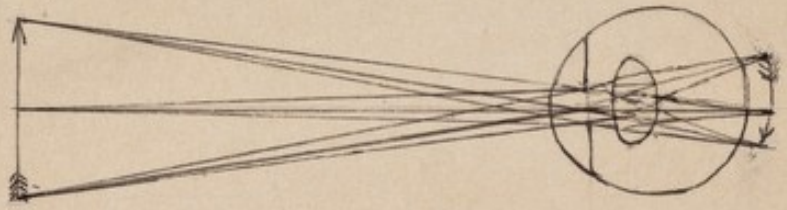
A Emmetropia. Image formed at the sentient-surface.

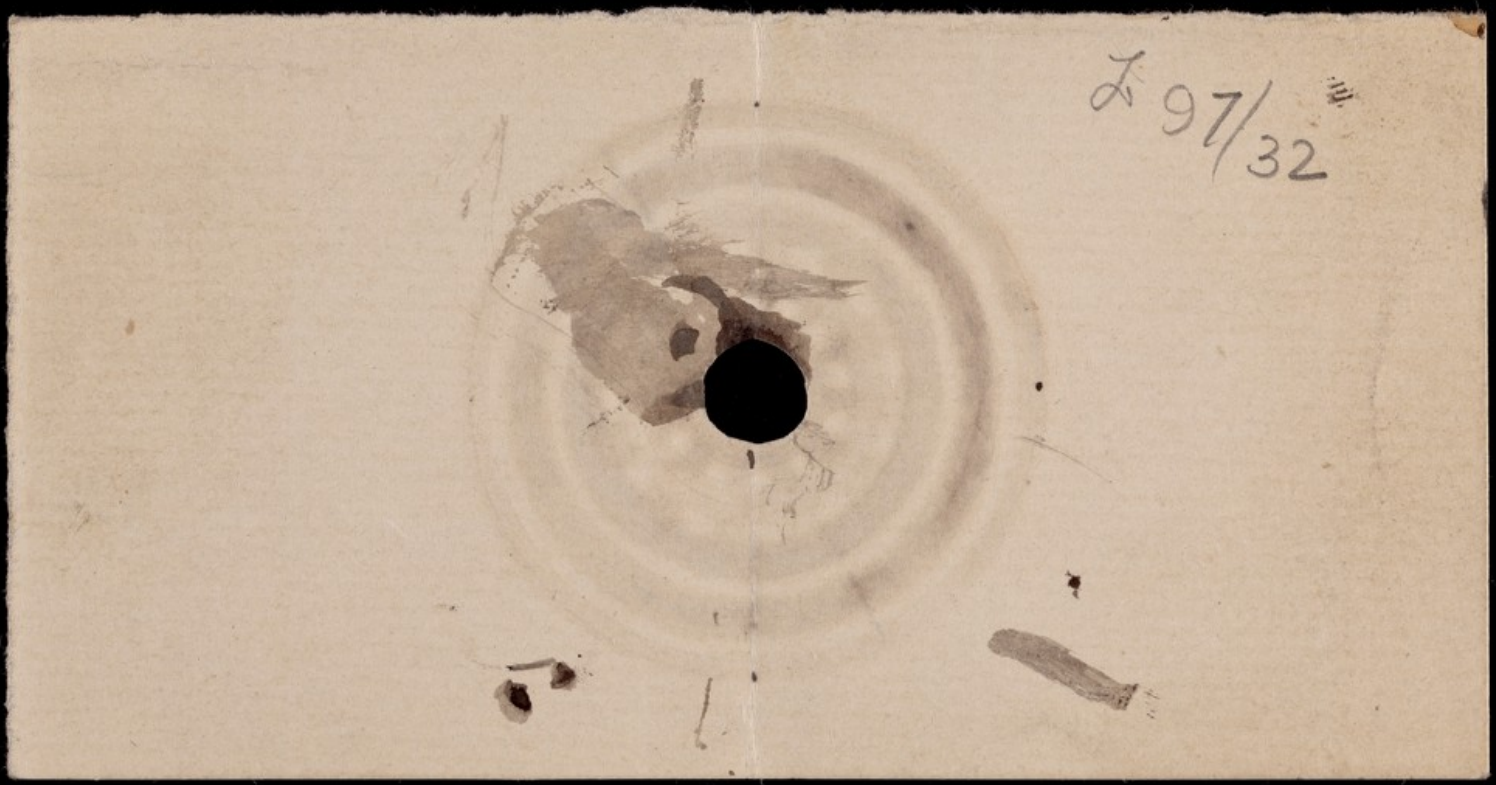


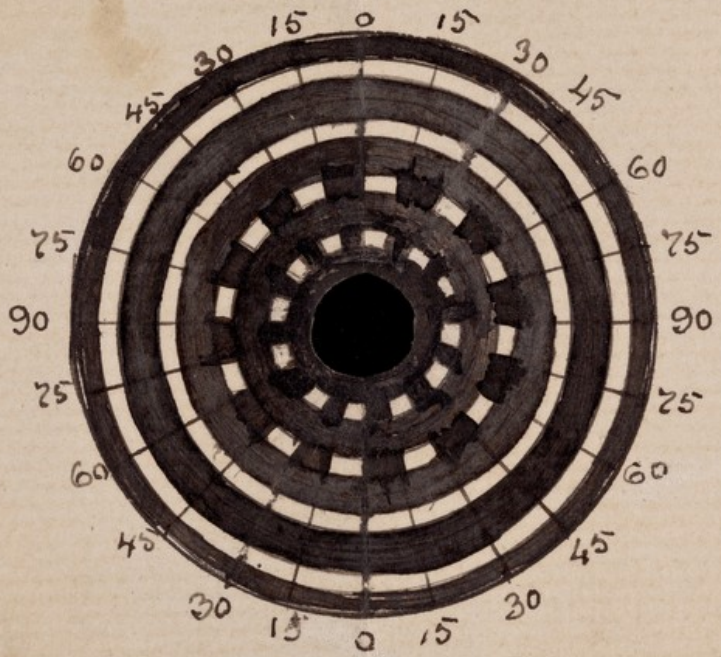
B. Myopia. Image formed in front of the sentient-surface.



C. Hypermetropia. Image formed behind the sentient-surface.




L 97/32


15
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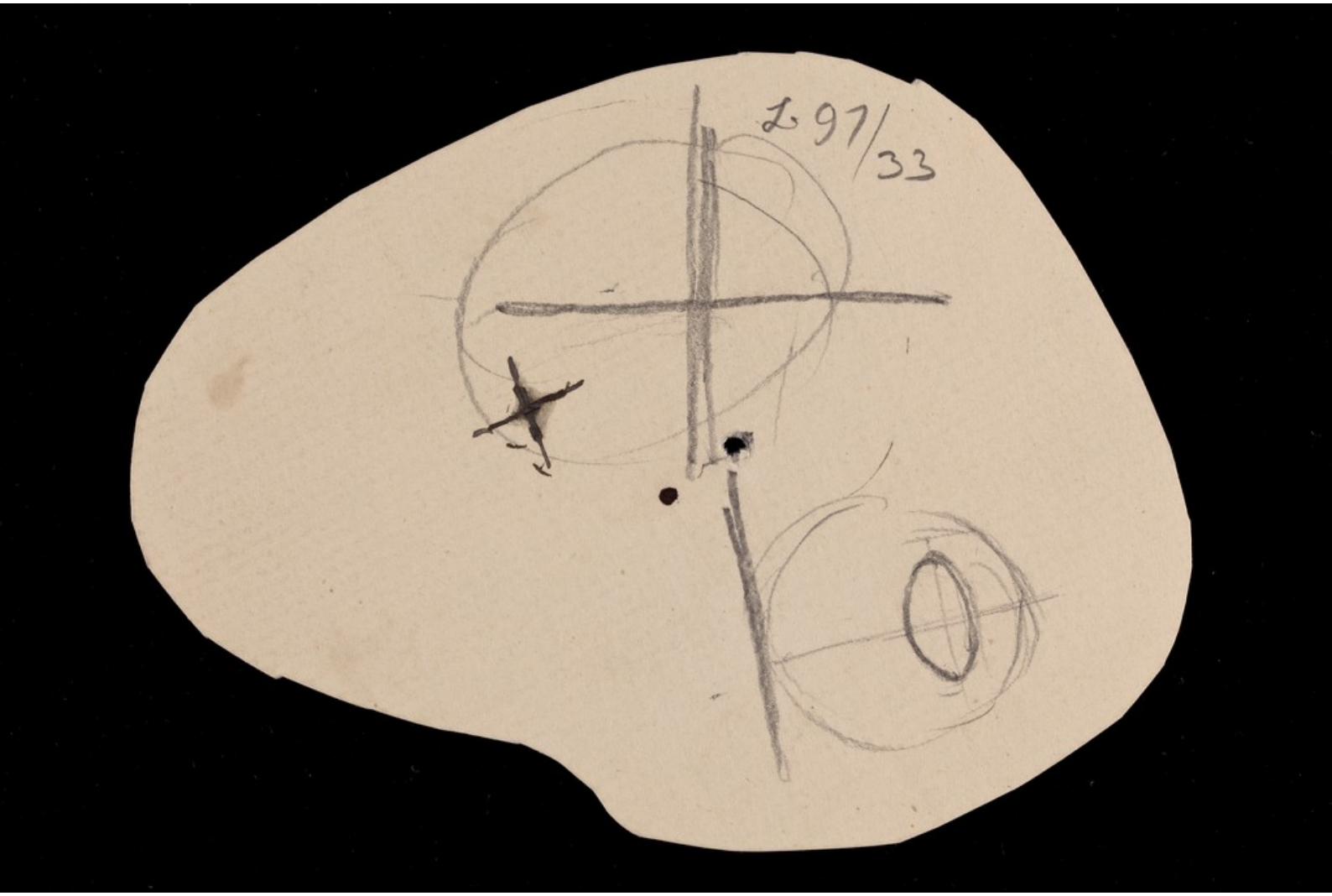
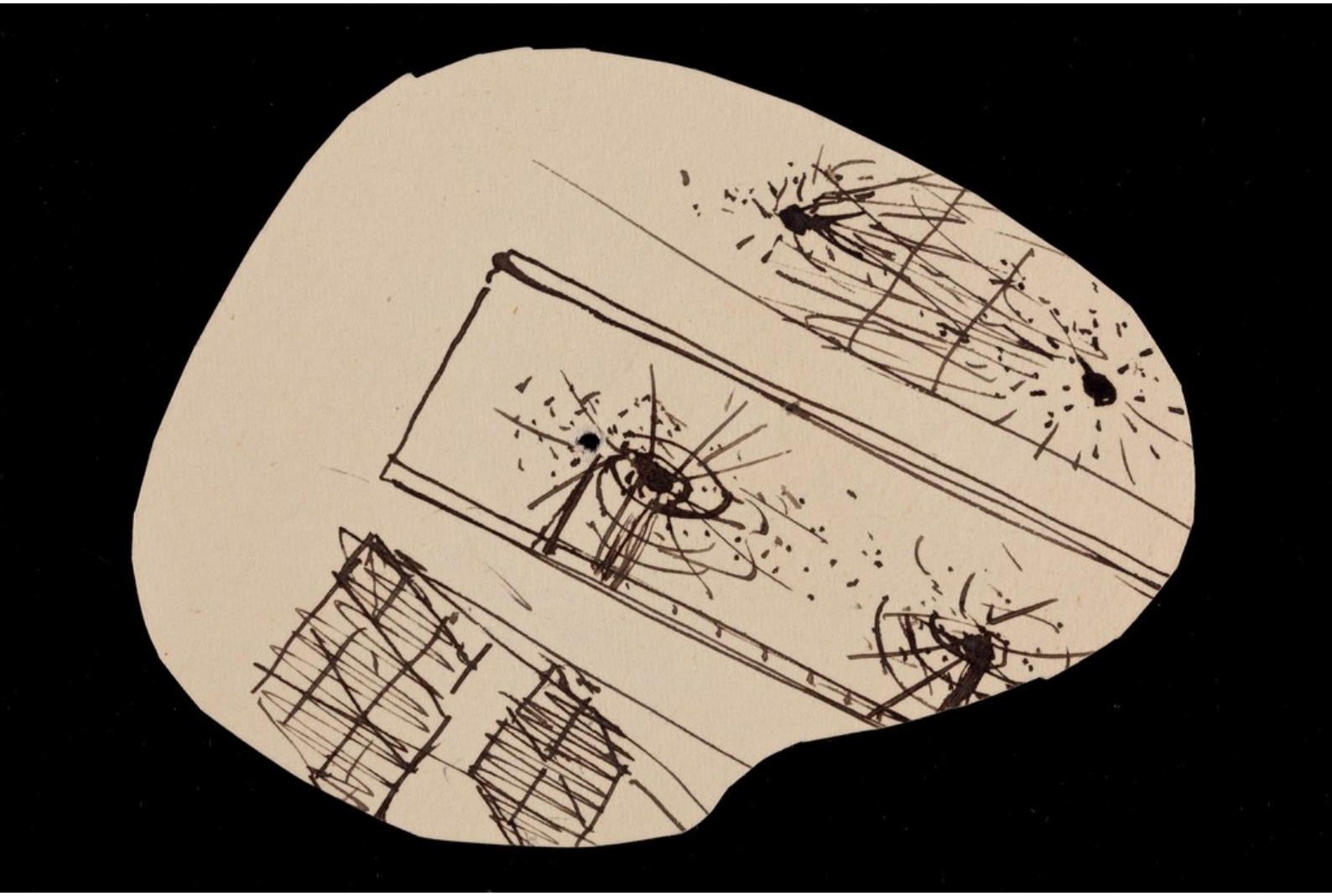
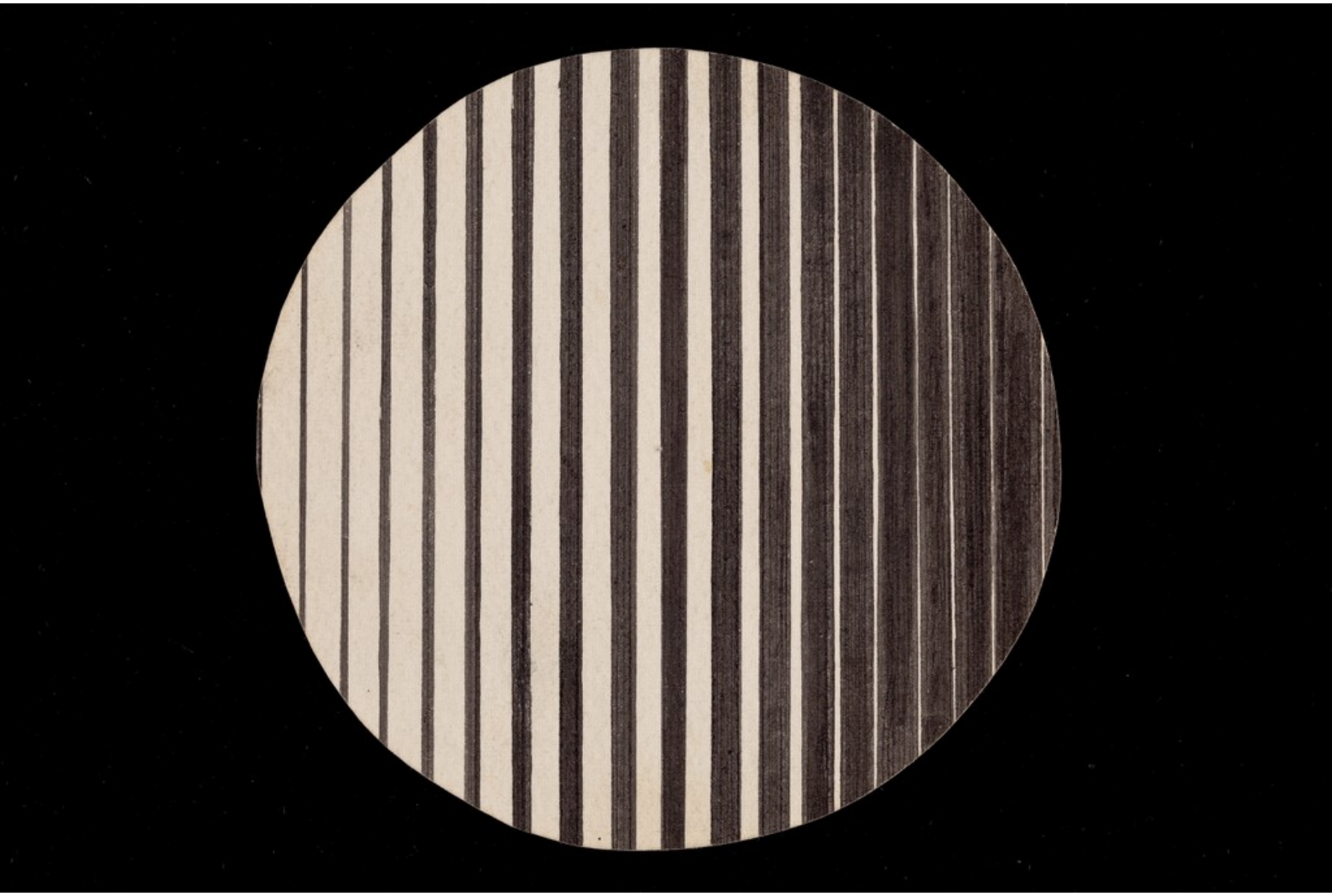
15

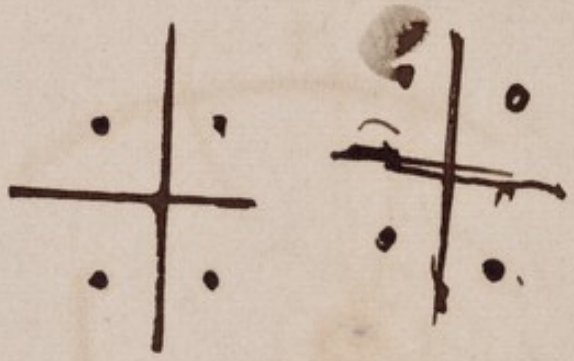

L 97/33




L 97/34



L. 97/36



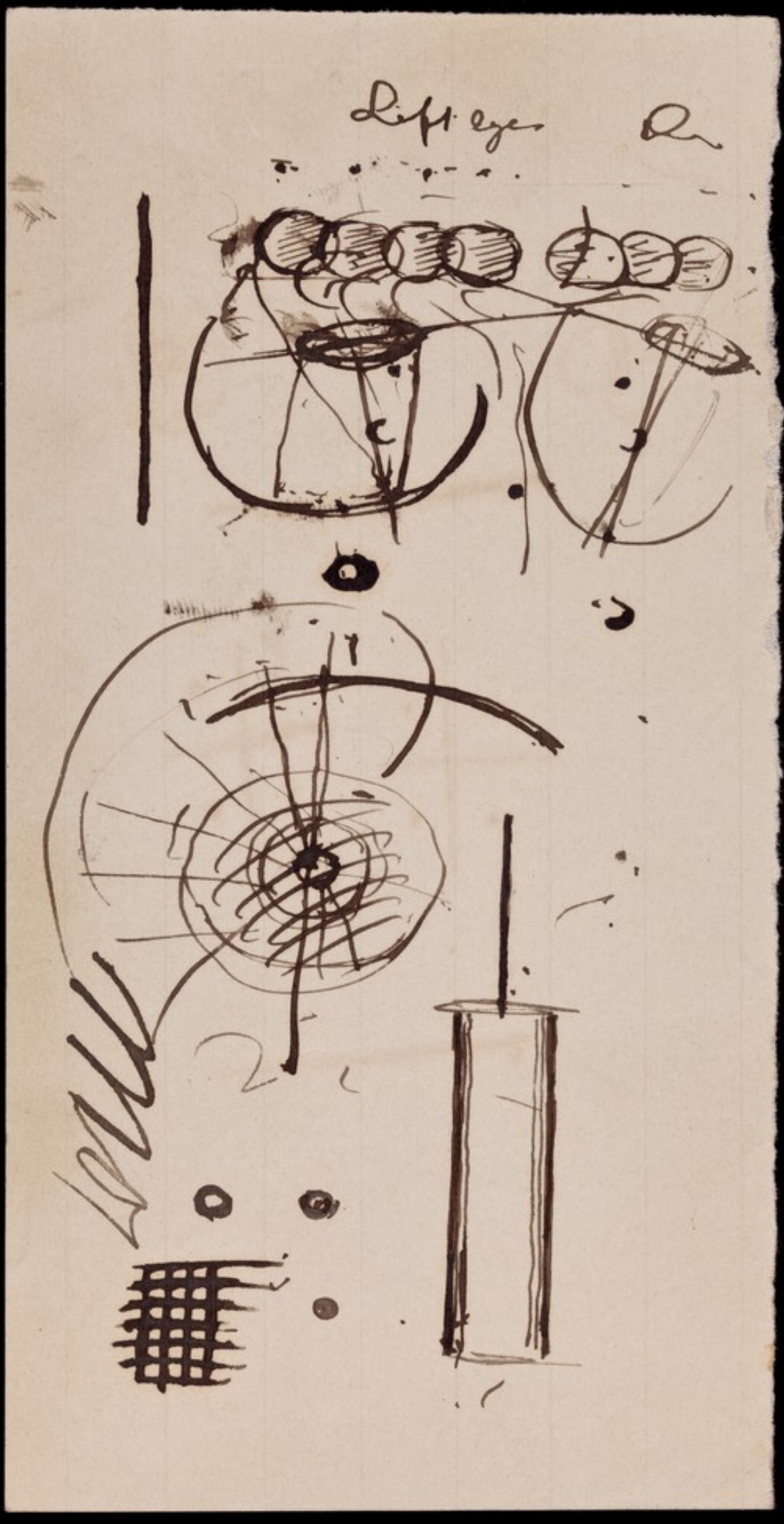
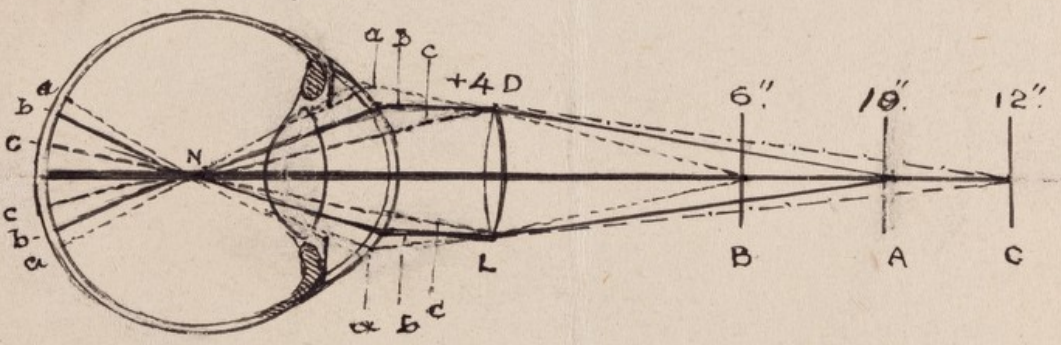

Left eye

Fig: L 97/37

Action of convex 4 D lens placed in front of the eye, on rays of light proceeding from objects at various distances from the lens.

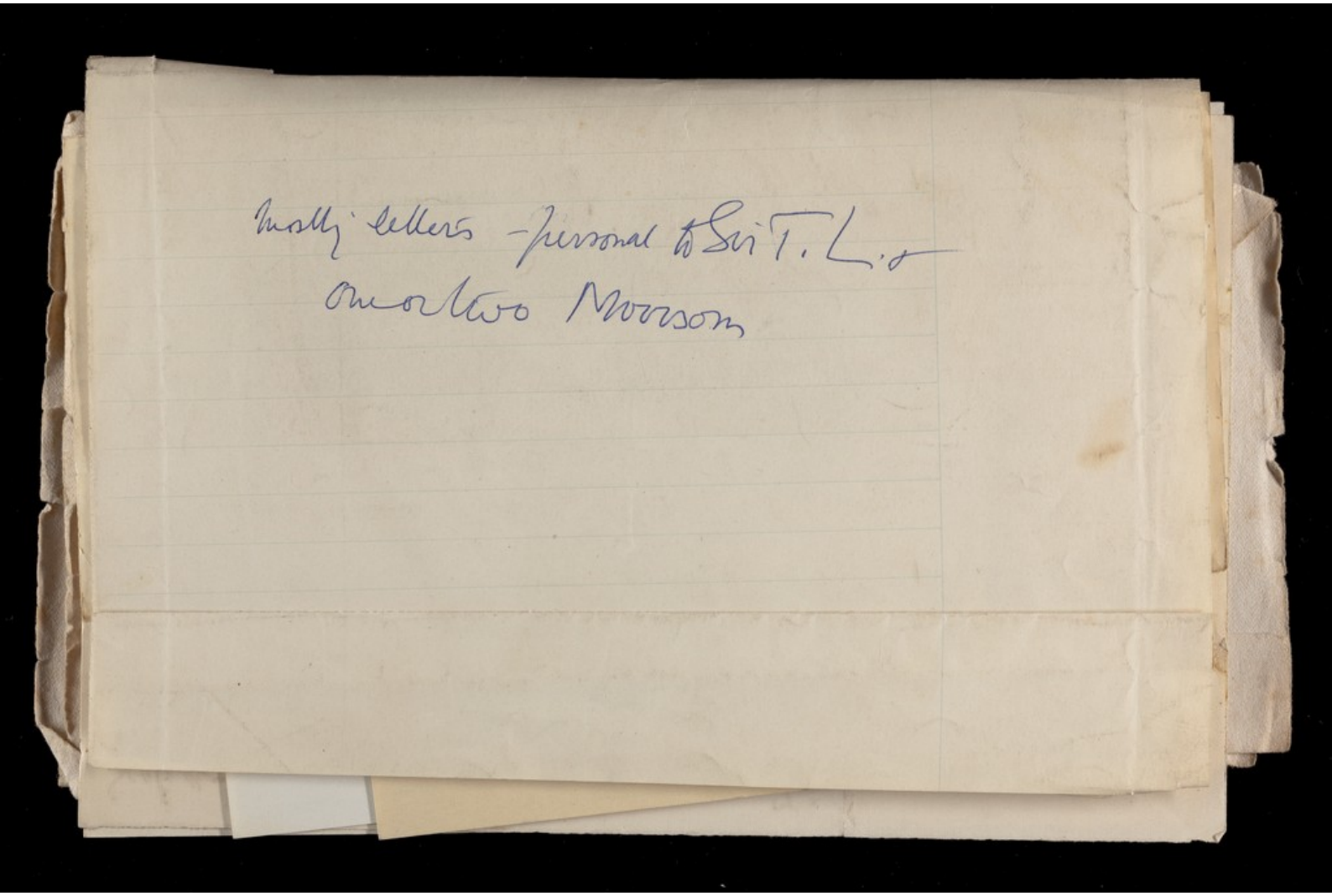


Rays from A, distance of principal focus, after passing through L, fall on the eye as parallel rays (b)

Rays from B, distance short of prin.l focus, fall on the eye as divergent rays (a).....

Rays from C. beyond distance of princ.l focus, fall on the eye as convergent rays (c). ---- N. Nodal point.

It strikes one that on a magnifying power of the biconvex lens would be shown by the 97/38
dotted extention of the diverging lines from F just as the convergency is shown by the extension of the converging lines to the anterior focus in the case of the Double concave lens. If not, rub out
925 M.


Mostly letters - personal to Sir T. L.
and two Morrisons