PAPIER-HANDLUNG

Dr. Josef Stefan 1) I.

Ausgewählte Capitel aus der Optik und Wärmelehre.

II. S. 91 M Smoluchowski

F. POLLY, IV. KAROLINENG. 23.

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Doppelbrech. [illegible] Kalksp. [illegible] Erasmus Bartholinus

[illegible] Hugghens [illegible]

[illegible]

[illegible] + — const

[illegible]

[illegible] ordentl. [illegible]

[illegible]

[illegible] const [illegible]

Hugghens [illegible]

[illegible] Emissionsth. [illegible]

[illegible]

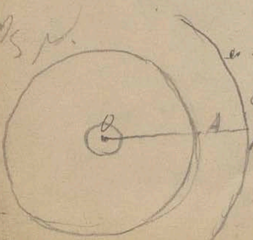
[illegible]

[illegible] Hyp. [illegible]

[illegible] B. [illegible]

[illegible]

[illegible]



const = gew. [illegible]

$\frac{AA'}{t}$ = [illegible]

[illegible]

$c \cdot \tau$ [illegible]

$AA' =$) $=$ [illegible] $= \lambda$ ([illegible])

[illegible]

[illegible]

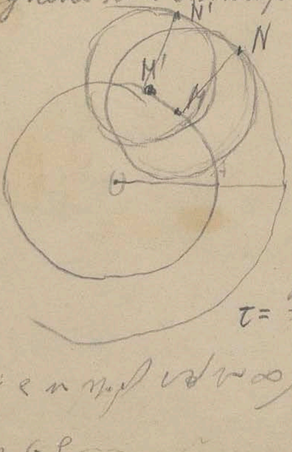
[illegible]

[illegible]

[illegible] (Dispersion)

[illegible] Disp. [illegible]

Huyghens'sches Princip



[illegible]

[illegible]

[illegible]

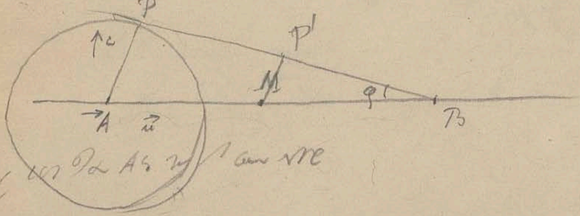
AA' [illegible]

$\tau = \frac{AA'}{c}$

[illegible]

[illegible]

… MM' … Elementar…



… AB …

$r : r' = AB : MB$

$AP : MP' = AB : MB$

$\sin \varphi = \frac{AP}{AB} = \frac{c}{u}$

… […]

… AB …

$0 < u < c$ … Constr. … sin → 1

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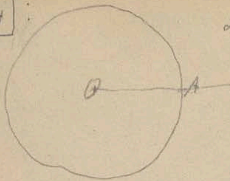
[illegible]

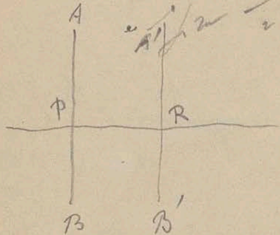


[illegible]

[illegible]

[illegible] Huyghens [illegible] Refl. [illegible]

[illegible]



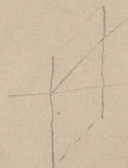
$\frac{PR}{t}$ = [illegible]

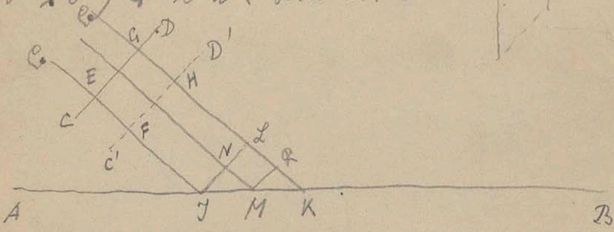
[illegible]

[illegible] Normale

[illegible]

[illegible] verst. [illegible]





AB [illegible]

$t_1 = \frac{LK}{c}$ $t = \frac{MN}{c}$

[illegible]

[illegible]

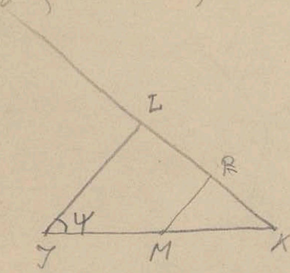
[illegible]

[illegible] constr. [illegible] Med. [illegible]

[illegible] RK

[illegible] M [illegible] constr. [illegible]

[illegible] R. L K [illegible] J



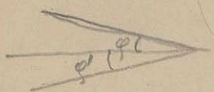
$$\frac{RK}{c} = t$$

[illegible] redmm

$$c't = \frac{c' RK}{c}$$

[illegible] J [illegible] K

[illegible]



$\sin\varphi = \frac{c}{u}$ $c =$ [illegible]

$\sin\varphi' = \frac{c'}{u}$ $c' =$ ——— [illegible] red.

$\sin\varphi : \sin\varphi' = c : c'$ [illegible] sin-const.

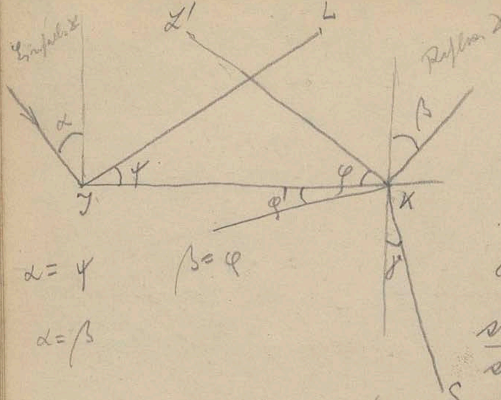
$JK = t_1 u$

$LK = c t_1$

$\frac{JK}{LK} = \frac{u}{c}$ $\frac{LK}{JK} = \frac{c}{u} = \sin\psi$

$\sin\psi = \sin\varphi$ [[illegible] R [illegible] L [illegible]]

[illegible] Refl. I:



$\alpha = \psi$ $\beta = \varphi$ $\gamma = \varphi'$

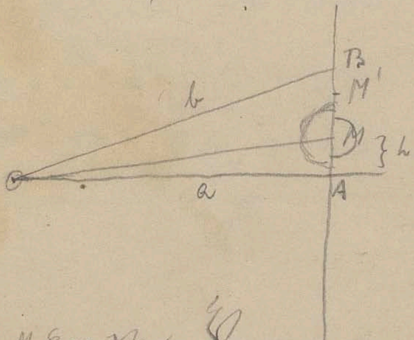
$\alpha = \beta$

$$\frac{\sin\alpha}{\sin\gamma} = \frac{c}{c'}$$

[illegible]

[illegible]

[illegible]



[illegible]

$$t = \frac{OB - OM}{c} \qquad r = c't = \frac{c'}{c}\left[OB - OM\right]$$

$$r = OB - OM \qquad \frac{c'}{c} = \mu$$

$$(x-a)^2+(y-h)^2=\mu^2\left(b-\sqrt{a^2+h^2}\right)^2$$

[illegible] $\mu=1$

$$(x-a)^2+(y-h')^2=\mu^2\left(b-\sqrt{a^2+h'^2}\right)^2$$

[illegible] $\mu=\frac{c'}{c}$

$$h'=h+dh$$

[illegible]

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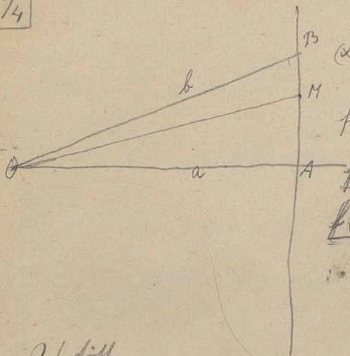
[illegible] $\mu=1$

$$(x-a)^2+(y-h)^2=\mu^2\left(b-\sqrt{a^2+h^2}\right)^2$$

$$(x-a)^2+(y-h')^2=\mu^2\left(b-\sqrt{a^2+h'^2}\right)^2$$



$f(x,h)$

$f(x,h')$

$$\frac{f(x,h')-f(x,h)}{h'-h}=\frac{\partial f}{\partial h}$$

[illegible] h diff

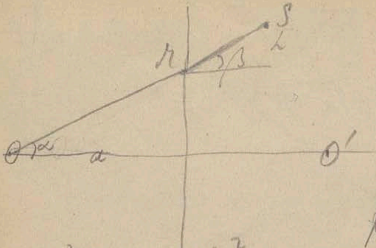
$$-2(y-h)=-2\mu^2\left(b-\sqrt{a^2+h^2}\right)\frac{h}{\sqrt{a^2+h^2}}$$

$$y-h=\mu^2\frac{\left(b-\sqrt{h^2+a^2}\right)h}{\sqrt{h^2+a^2}}$$

[illegible]

$$\left.\begin{aligned}(x-a)^2+(y-h)^2&=\mu^2\left(b-\sqrt{a^2+h^2}\right)^2\\ y-h&=\mu^2\frac{\left(b-\sqrt{a^2+h^2}\right)h}{\sqrt{a^2+h^2}}\end{aligned}\right\}$$

$$\frac{(y-h)^2}{(x-a)^2+(y-h)^2}=\frac{\mu^2h^2}{a^2+h^2}$$



$MS = \sqrt{(x-a)^2 + (y-h)^2}$

$MS = \ldots$

$OM = \ldots$

$\sin^2\beta = \mu^2 \sin^2\alpha$

$\sin\beta = \mu \sin\alpha$

$\sin\beta = \frac{c'}{c} \sin\alpha$

$\frac{\sin\alpha}{\sin\beta} = \frac{c}{c'}$ } [illegible]

$(y-h) = \frac{\mu^2 b h}{\sqrt{a^2+h^2}} - \mu^2 h$ [illegible]

[illegible]

[illegible]:

$y = \frac{bh}{\sqrt{a^2+h^2}}$ $y^2(a^2+h^2) = b^2h^2$

$h = \frac{ay}{\sqrt{b^2-y^2}}$

$\sqrt{a^2+h^2} = \frac{bh}{y}$

$= \frac{ab}{\sqrt{b^2-y^2}}$

$(x-d)^2 + \left(y - \frac{ay}{\sqrt{b^2-y^2}}\right)^2 = \left(b - \frac{ab}{\sqrt{b^2-y^2}}\right)^2$ [illegible]

$$b^2\left(1-\frac{a}{\sqrt{b^2-y^2}}\right)^2 - y^2\left(1-\frac{a}{\sqrt{b^2-y^2}}\right)^2 = (x-a)^2$$

$$(b^2-y^2)\left(1-\frac{a}{\sqrt{b^2-y^2}}\right)^2 =$$

$$\left(\sqrt{b^2-y^2}-a\right)^2 =$$

$$x-a = \pm\left(\sqrt{b^2-y^2}-a\right)$$

2 Curven [illegible]

$$x-a = \sqrt{b^2-y^2}-a$$

$$x = \sqrt{b^2-y^2}$$

$x^2+y^2=b^2$ [illegible] O [illegible] 2R. OB

[illegible]

[illegible]

$$x-a = -\sqrt{b^2-y^2}+a$$

$$x-2a = -\sqrt{b^2-y^2}$$

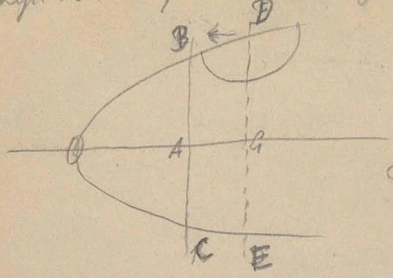
$(x-2a)^2+y^2=b^2$ [illegible] $+2a$ [illegible] O'.

[illegible]

O' = [illegible] O

[illegible]

Refl. [illegible] parabolischen [illegible]



[illegible]

[illegible]

[illegible]

E – [illegible]

$OA = a$

$OG = g$

$AB = b$

$GD = h$

Param $= p$

$$b^2 = 2pa$$

$$h^2 = 2pg$$

$$(x-g)^2 + (y-h)^2 = (g-a)^2$$

$$-2(x-g)\,dg - 2(y-h)\,dh = 2(g-a)\,dg$$

$$(x-g) + (y-h)\frac{dh}{dg} = a-g$$

[illegible]

$$h\frac{dh}{dg} = p$$

$$(x-g) + (y-h)\frac{p}{h} = a-g$$

$$x + \frac{py}{h} - p = a$$

$$h = \frac{py}{a+p-x}$$

$$x^2 - 2gx + y^2 - 2hy + h^2 = a^2 - 2ag$$

$$x^2 + 2(a+p-x)g - 2hy + y^2 = a^2$$

$$x^2 + 2(a+p-x)\frac{h^2}{2p} - 2hy + y^2 = a^2$$

$$x^2+y^2 + p\frac{y^2}{a+p-x} - \frac{2y^2p}{a+p-x} = a^2$$

$$x^2(a+p-x) + y^2(a+x) = a^2(a+p-x)$$

$$x^2(a-x) + y^2(a-x) - a^2(a-x) - (a^2-x^2)p = 0$$

$a-x=0$

$x=a$

[illegible]

22/4 $(x-a)=0$

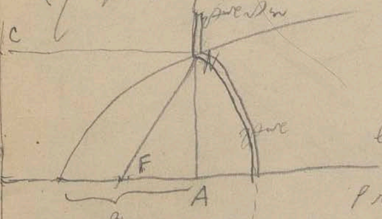
$$(x^2+y^2-a^2) - pa - px = 0$$

$$+\frac{p^2}{4} \quad -\frac{p^2}{4}$$

[illegible]

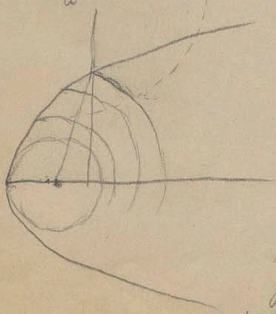
$$\left(x-\frac{p}{2}\right)^2+y^2-\left(a+\frac{p}{2}\right)^2 = 0$$

[illegible] $a+\frac{p}{2}$



$$FN = CN = a+\frac{p}{2}$$

[illegible]



$$\left(x-\frac{p}{2}\right)^2+y^2 = \left(a+\frac{p}{2}\right)^2$$

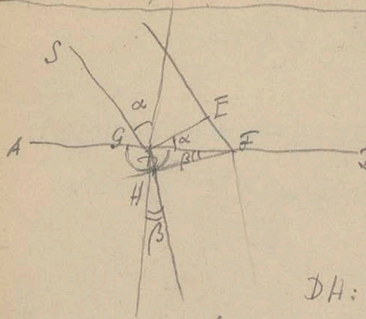
[illegible] $a=$ [illegible]

$a=0$ [illegible] $R=\frac{p}{2}$

[illegible] $R=0$ [illegible] $a=-\frac{p}{2}$ [illegible]

[illegible] directrix [illegible]

[illegible]



$DG : EF = c' : c$

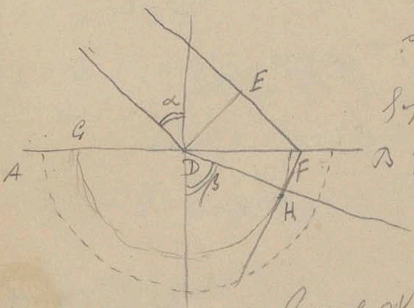
$EF = DF \sin\alpha$

$DH = DF \sin\beta$

$DH : EF = \sin\beta : \sin\alpha = c' : c$

[illegible] $c' < c$

[illegible] $c' > c$



[illegible] F

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] $\sin\alpha \frac{c'}{c} = 1$

[illegible] [totale Reflexion]

[illegible] $R = DF$

$DG = DF \frac{c'}{c}$

$DG = DF = EF \frac{c'}{c}$

$DF = DF \sin\alpha \frac{c'}{c}$

$1 = \sin\alpha \frac{c'}{c}$ [illegible]

$\sin\alpha : \sin\beta = \frac{c}{c'}$ [illegible]

$\sin\beta = \frac{c'}{c}\sin\alpha$ [illegible] > 1

[illegible] Kalkspath

[illegible]

[illegible]

[illegible] ordentliche [illegible]

[illegible] Huyghens [illegible]

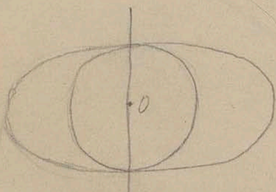
[illegible]

[illegible] Rot. Ell.

[illegible] Rot. Ellen

[illegible] kristallogr. [illegible]

[illegible]



[illegible] 15 : 17

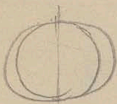
[illegible] constr. [illegible] Ell. constr.;

[illegible] Ell. [illegible]

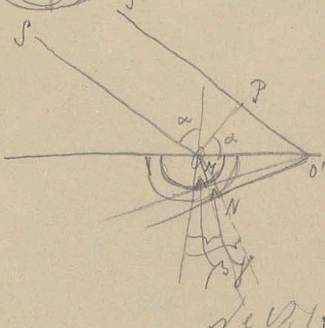
[illegible] ⊥ [illegible]

23/4 [illegible]

[illegible]



[illegible]



$O'M$ [illegible] $O'N$ [illegible]

[illegible] $\perp$

$OM : O'P = \frac{o}{c}$ $o =$ [illegible]

$ON : O'P = \frac{e}{c}$ $e =$ [illegible]

[illegible]

$OM = OO' \sin\beta$

$ON = OO' \sin\gamma$

$O'P = OO' \sin\alpha$

$\frac{\sin\beta}{\sin\alpha} = \frac{o}{c}$ $\frac{\sin\alpha}{\sin\beta} = \frac{c}{o}$

$\frac{\sin\gamma}{\sin\alpha} = \frac{e}{c}$ $\frac{\sin\alpha}{\sin\gamma} = \frac{c}{e}$

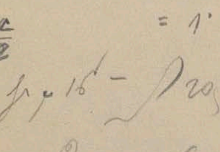
[illegible]

$\frac{c}{o}$ [illegible] Na [illegible] $= 1.658$

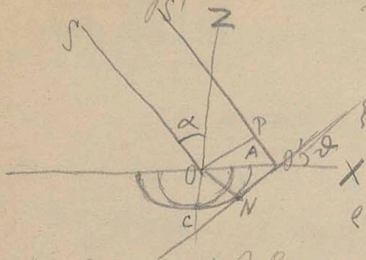
$\frac{c}{e}$ $= 1.487$

[illegible] 16 [illegible]

[illegible]



2. [illegible]



[illegible]

$O'N = $ [illegible]

[illegible] ON [illegible] $O'N$ [illegible]

[illegible]

[illegible]

$$\frac{x^2}{OA^2} + \frac{z^2}{OC^2} = 1$$

$$OA : O'P = e : c$$

$$OA = \frac{O'P \cdot e}{c} \qquad OC = \frac{O'P \cdot o}{c}$$

[illegible] N

$$\frac{x\,\xi}{OA^2} + \frac{z\,\zeta}{OC^2} = 1 \quad \Big| \; x, z$$ [illegible]

$$O' : \; \xi = OO' \qquad \zeta = 0$$

$$\frac{x \cdot OO'}{OA^2} = 1$$

$$x = \frac{OA^2}{OO'} =$$ [illegible] N

$$z = -OC\sqrt{1 - \frac{x^2}{OA^2}}$$

[illegible]

[illegible] x

$$\frac{x}{OA^2} + \frac{z}{OC^2}\frac{dz}{dx} = 0$$

$$\frac{dz}{dx} = -\frac{OC^2}{OA^2} \cdot \frac{x}{z}$$

$$\operatorname{tg} \vartheta = -\frac{OC^2}{OA^2} \cdot \frac{x}{z}$$

$$= +\frac{OC^2}{OA^2} \frac{\frac{OA^2}{OO'}}{OC\sqrt{1 - \frac{x^2}{OA^2}}} = \frac{OC}{OO'} \frac{1}{\sqrt{1 - \frac{OA^2}{OO'^2}}} =$$

$$\operatorname{tg}\vartheta = \frac{OC}{\sqrt{OO'^2 - OA^2}} = \frac{OC}{\sqrt{\frac{O'P^2}{\sin^2\alpha} - OA^2}} = \frac{OC\sin\alpha}{O'P\sqrt{1-\sin^2\alpha\left(\frac{OA}{O'P}\right)^2}}$$

$$= \frac{O\sin\alpha}{c\sqrt{1-\sin^2\alpha\,\frac{e^2}{c^2}}} = \frac{O\sin\alpha}{\sqrt{c^2-e^2\sin^2\alpha}}$$

[illegible] $O'P =$ [illegible]

$$\operatorname{tg}\vartheta = \frac{O\sin\alpha}{\sqrt{c^2-e^2\sin^2\alpha}}$$

$\frac{e}{c} =$ [illegible]

$\frac{e}{c} =$ [illegible]

$$\operatorname{tg}^2\vartheta\,(c^2-e^2\sin^2\alpha) = O^2\sin^2\alpha$$

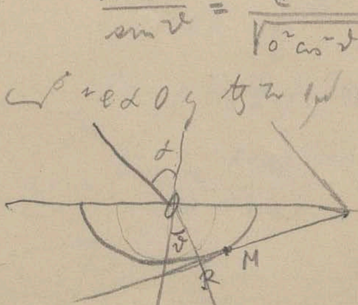
$$c^2\operatorname{tg}^2\vartheta = (O^2+e^2\operatorname{tg}^2\vartheta)\sin^2\alpha$$

$$c^2\sin^2\vartheta = (O^2\cos^2\vartheta + e^2\sin^2\vartheta)\sin^2\alpha$$

$$\sin\alpha = \frac{c\sin\vartheta}{\sqrt{O^2\cos^2\vartheta + c^2\sin^2\vartheta}}$$

$$\frac{\sin\alpha}{\sin\vartheta} = \frac{c}{\sqrt{O^2\cos^2\vartheta + e^2\sin^2\vartheta}}$$

[illegible] Persp.



$OR = OO'\sin\vartheta$

[illegible] Nernst-var. [illegible] R. N.

$n = \sqrt{o^2 \cos^2 \vartheta + e^2 \sin^2 \vartheta}$

[illegible]!

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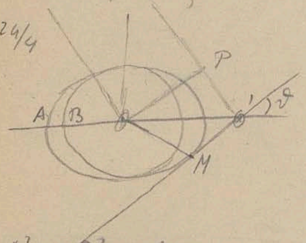


$O'P = c$

$OB = o$

$OA = e$

$OO' = \frac{e}{\sin\alpha}$

$\frac{x^2}{e^2} + \frac{z^2}{o^2} = 1$

$\xi = OO' \quad \zeta = 0$

$\frac{x\,\xi}{e^2} + \frac{z\,\zeta}{o^2} = 1$

$\frac{x\,OO'}{e^2} = 1$

$x = \frac{e^2}{OO'} = \frac{e^2 \sin\alpha}{c}$

$z = -o\sqrt{1 - \frac{x^2}{e^2}} = -o\sqrt{1 - \frac{e^2 \sin^2\alpha}{c^2}} = -\frac{o}{c}\sqrt{c^2 - e^2 \sin^2\alpha}$

$\frac{x}{e^2} + \frac{z}{o^2}\frac{dz}{dx} = 0$

$\frac{dz}{dx} = \operatorname{tg}\vartheta = -\frac{o^2 x}{e^2 z} = \frac{o^2}{e^2}\frac{\frac{e^2}{c}\sin\alpha \; c}{o\sqrt{c^2 - e^2\sin^2\alpha}} =$

$= \frac{o \sin\alpha}{\sqrt{c^2 - e^2 \sin^2\alpha}}$

$\operatorname{tg}^2\vartheta\,(c^2 - e^2 \sin^2\alpha) = o^2 \sin^2\alpha$

$c^2 \operatorname{tg}^2\vartheta = (e^2 \operatorname{tg}^2\vartheta + o^2)\sin^2\alpha$

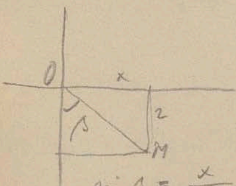
$$c^2\sin^2\vartheta = (e^2\sin^2\vartheta + a^2\cos^2\vartheta)\sin^2\alpha$$

$$\frac{\sin\alpha}{\sin\vartheta} = \frac{c}{\sqrt{a^2\cos^2\vartheta + e^2\sin^2\vartheta}}$$

[illegible]

$$OM^2 = x^2 + z^2 = e^4\frac{\sin^2\alpha}{c^2} + \frac{a^2(c^2 - e^2\sin^2\alpha)}{c^2}$$

$$= \frac{a^2c^2 + (e^4 - a^2e^2)\sin^2\alpha}{c^2} = RV^2$$



$$\sin\beta = \frac{x}{OM}$$

$$\sin\beta = \frac{e^2\sin\alpha}{c} \frac{c}{\sqrt{a^2c^2 + (e^4 - a^2e^2)\sin^2\alpha}}$$

$$\frac{\sin\alpha}{\sin\beta} = \frac{\sqrt{a^2c^2 + (e^4 - a^2e^2)\sin^2\alpha}}{e^2}$$

[illegible] $f(\beta)$ [illegible]

$$\sin^2\beta = \frac{e^4\sin^2\alpha}{a^2c^2 + (e^4 - a^2e^2)\sin^2\alpha}$$

$$\sin^2\beta\, a^2c^2 + (e^4 - a^2e^2)\sin^2\alpha\sin^2\beta = e^4\sin^2\alpha$$

$$\sin^2\beta\, a^2c^2 = \sin^2\alpha\left[e^4 - e^4\sin^2\beta + a^2e^2\sin^2\beta\right]$$

$$\sin^2\beta\,\frac{a^2c^2}{e^2} = \sin^2\alpha\left[e^2\cos^2\beta + a^2\sin^2\beta\right]$$

$$\frac{\sin\alpha}{\sin\beta} = \frac{ac}{e\sqrt{e^2\cos^2\beta + a^2\sin^2\beta}}$$

[illegible]

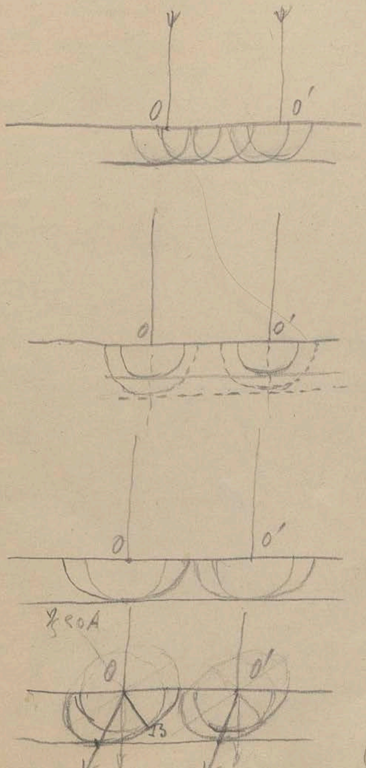
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]


O
O'
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O'
O
O'
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O'
13

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

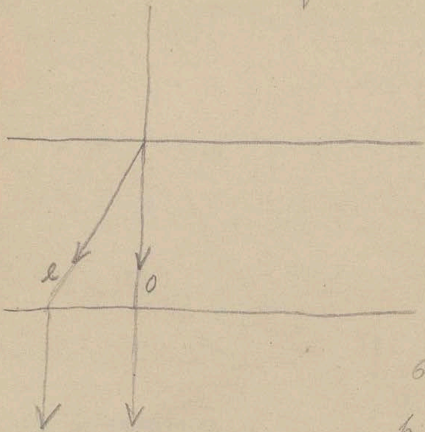
[illegible]

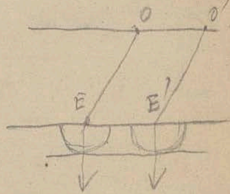
[illegible]

[illegible]

[illegible]

[illegible] Kord. [illegible]



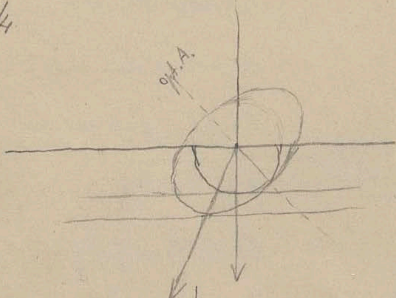


[illegible]

[illegible] opt. Axe

[illegible]

28/4



[illegible]

[illegible] Cylin[illegible]

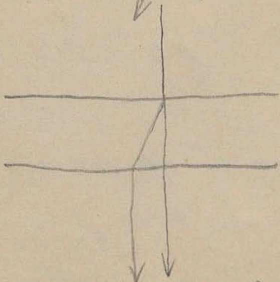
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

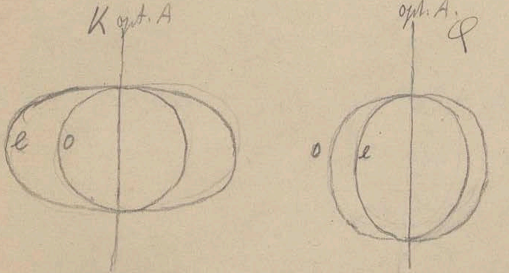


Erasmus Bartholinus 1669.

[illegible]

[illegible]

[illegible] [Quarz]



(negat. Kr.) | (positive Kr.)

Bitterspath, Korund, Saphir | Eis

	D linie o.	e
Quarz	1·544	1·553
Kalksp.	1·658	1·487

zB. [illegible] K. [illegible] Spectra [illegible]

Huygens [illegible]

[illegible]

[illegible]

[illegible] opt. A. [illegible]

[illegible] 90° [illegible]

[illegible]

[illegible] 45° [illegible]

[illegible]

Malus [illegible] photometer [illegible]

[illegible]

[illegible] 2 [illegible] $\cos^2\varphi$; [illegible] 2ten $\sin^2\varphi$.

[illegible]

[illegible] 2 $\cos^2\varphi$ – $\sin^2\varphi$:

[illegible]

[illegible]

[illegible] Fresnel [illegible] refl. [illegible] Malus [illegible]

[illegible] refl. [illegible]

[illegible] K.

[illegible] refl. [illegible]

[illegible] cca 56° [illegible] Brewster

[illegible] $\operatorname{tg}\alpha =$ [illegible]

[illegible] $\operatorname{tg} 56° = \frac{3}{2}$.

[illegible] polarisirtes [illegible] Polarisationswinkel.

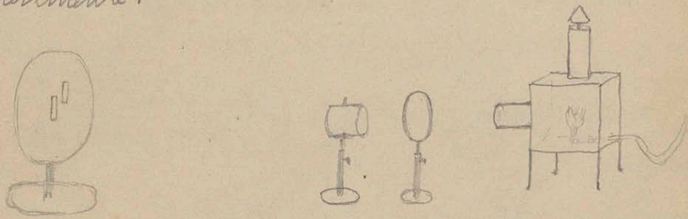
[illegible] refl. [illegible]

[illegible] pol. [illegible]

[illegible]

[illegible] opt. Axe horiz. [illegible]

Experimente:



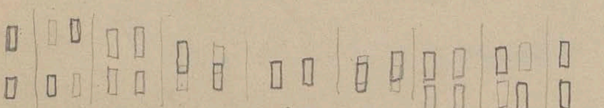
[illegible] vert. [illegible]

[illegible]

0° 45° 90° 135° 180° 225° 270° 315° 360°

[illegible] opt. Axe ⊥ [illegible] 2 [illegible]

[illegible] [[illegible]]; [illegible] 4 [illegible], [illegible] 45° [illegible] etc.

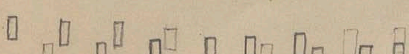


0° 45° 90° 135° 180°

[illegible] Pol. X [illegible] hor. [illegible]

[illegible] [[illegible] opt. A. v.] [illegible]

[illegible] 45° [illegible] etc.



0° 45° 90° 135° 180° etc. [illegible]

Fresnel [illegible]

[illegible] [1 longit. [illegible] transv.]

[illegible]

[illegible] ellipse [illegible] etc., polar. [illegible]

[illegible] [[illegible] Polar.].

[illegible]

~~[illegible] refl. [illegible]~~ [illegible] refl. [illegible] 2.

[illegible] Fresnel [illegible] comp. [illegible] refl. [illegible]

(vert.) [illegible]

[illegible] opt. Axe [illegible]

[illegible] Fresnel' [illegible] refl. [illegible]

[illegible]

[illegible] photom. [illegible] etc. [illegible]

[illegible] transv. [illegible]

[illegible]

[illegible] Hydrod. [illegible] long. [illegible]

[illegible]

[illegible]

[illegible]

[illegible] Maxwell, [illegible] elektr. Phänom. [illegible]

[illegible] elektrisch [illegible]

[illegible]  [illegible]

[illegible] period. [illegible]

[illegible] polar. [illegible]

30/4. Experimente [Spectra von polaris. Licht].

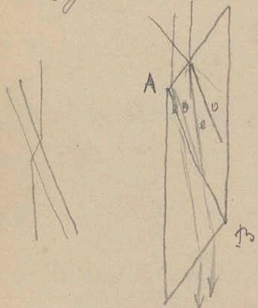
[illegible] 2 [illegible]

[illegible] 2. [illegible]

[illegible] Polarisirer: [illegible]

[illegible] Pol. Z. [illegible]

[illegible] Nicol'sche Prisma [illegible]



[illegible]

[illegible]

[illegible] refl. [illegible]

[illegible] refl. [illegible]

[illegible]

[illegible] (Canada-Balsam).

[illegible] Turmalin, [illegible]

[illegible] dichroitischen [illegible]

[illegible] A ||

[illegible] ⊥ [illegible] opt. A. [illegible]

|| [illegible] opt. [illegible] pol. [illegible]

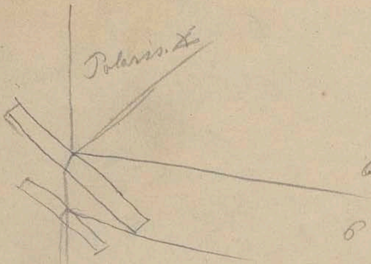
opt. A. [illegible] vert. [illegible]

[illegible] compl. [illegible] || opt. Axe [illegible]

[illegible] opt. Axe [illegible] opt. Axe ⊥ [illegible]

[illegible]

[illegible]



[illegible] refl. [illegible]

[illegible]

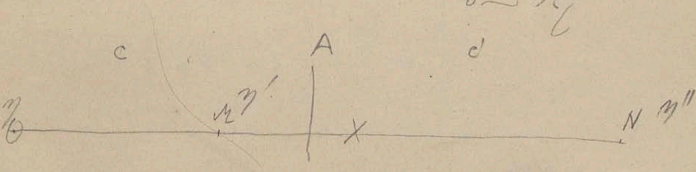
[illegible] pol. [illegible]

[illegible]

[illegible] Absorpt. [illegible] Refl.

[illegible]

5/5



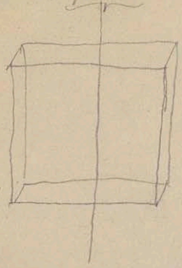
$$\eta = a \sin \frac{2\pi t}{\tau}$$

$$\eta' = a \sin \frac{2\pi}{\tau}\left[t - \frac{OM}{c}\right]$$ [illegible]

$$\eta'' = a \sin \frac{2\pi}{\tau}\left[t - \frac{OA}{c} - \frac{AN}{c'}\right]$$ [illegible] Ampl. [illegible]

[illegible] 2 [illegible]

[illegible] Red. [illegible] Refl. [illegible]



$$\sigma = a \sin \frac{2\pi t}{\tau}$$

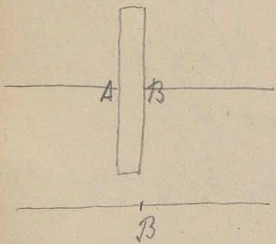
$$\sigma' = \overset{\rho}{a} \sin \frac{2\pi}{\tau}\left[t - \frac{OA}{c}\right]$$

$$\sigma'' = \overset{\rho\rho'}{a} \sin \frac{2\pi}{\tau}\left[t - \frac{OA}{c} - \frac{AB}{c'}\right]$$

[illegible]

[illegible]

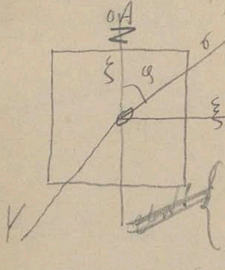
[illegible]



[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

$$a' \sin \frac{2\pi}{\tau}\left(t - \frac{\delta}{o}\right)$$

$$a'' \sin \frac{2\pi}{\tau}\left(t - \frac{\delta}{e}\right)$$

$$\sigma = a \sin \frac{2\pi}{\tau} t$$

$$\xi = a \sin\varphi \sin \frac{2\pi}{\tau} t \qquad \zeta = a \cos\varphi \sin \frac{2\pi}{\tau} t$$

[illegible] $\frac{\xi}{\zeta} = \operatorname{tg}\varphi$] $\xi = a \sin\varphi \sin \frac{2\pi}{\tau}\left(t - \frac{\Delta}{o}\right)$

$$\zeta = a \cos\varphi \sin \frac{2\pi}{\tau}\left(t - \frac{\Delta}{e}\right)$$

$$\xi = a \sin\varphi \sin \frac{2\pi}{\tau}\left(t - \frac{\Delta}{o} - \frac{\Delta}{c}\right)$$

$$\zeta = \text{-----------} \left(t - \frac{\Delta}{e} - \frac{\Delta}{c}\right)$$

[illegible] $\frac{\xi}{\zeta} = \operatorname{tg}\varphi$ et [illegible].

$$\xi = a \overset{\sin\varphi}{} \sin \frac{2\pi}{\tau}\left[t - \frac{\Delta}{e} - \left(\frac{\Delta}{o} - \frac{\Delta}{e}\right)\right]$$

$$\frac{2\pi}{\tau}\left(t - \frac{\Delta}{e}\right) = \psi \qquad \xi = a \sin\varphi \sin(\psi - \varepsilon)$$

$$\frac{2\pi}{\tau}\left(\frac{\Delta}{o} - \frac{\Delta}{e}\right) = \varepsilon \qquad \zeta = a \cos\varphi \sin\psi$$

$$\xi = a \sin\varphi \sin\psi \cos\varepsilon - a \sin\varphi \cos\psi \sin\varepsilon$$

$$= \operatorname{tg}\varphi \cdot \zeta \cos\varepsilon - a \sin\varphi \sin\varepsilon \cos\psi$$

$$\left(\operatorname{tg}\varphi \cos\varepsilon \cdot \zeta - \xi\right)^2 = a^2 \sin^2\varphi \sin^2\varepsilon \left(1 - \frac{\zeta^2}{a^2 \cos^2\varphi}\right)$$

[illegible]

– Ellipse

[illegible] – Ellipse

[illegible] $\frac{a}{c}$ [illegible]

[illegible] Ellipse [illegible]

[illegible] ellipt. pol. [illegible]

z.B. $\varphi = 45^\circ$

$\operatorname{tg}\varphi = 1 \qquad (\cos\varepsilon . \zeta - \xi)^2 = \frac{a^2}{2}\,\sin^2\varepsilon - \zeta^2 \sin^2\varepsilon$

$\sin^2\varphi = \frac{1}{2} \qquad \cos^2\varepsilon . \zeta^2 - 2\xi\zeta\cos\varepsilon + \xi^2 = \frac{a^2}{2}\sin^2\varepsilon - \zeta^2\sin^2\varepsilon$

$\cos^2\varphi = \frac{1}{2}$

$$\xi^2 + \zeta^2 - 2\xi\zeta\cos\varepsilon = \frac{a^2}{2}\sin^2\varepsilon$$

[illegible] $\varepsilon = \frac{\pi}{2}$ [illegible] $\frac{3\pi}{2}$ $\frac{5\pi}{2}$

$\sin^2\varepsilon = 1$

$\cos\varepsilon = 0$

$\xi^2 + \zeta^2 = \frac{a^2}{2}$ [illegible] circular pol. Licht

$\xi = a \sin\varphi \cos\psi$

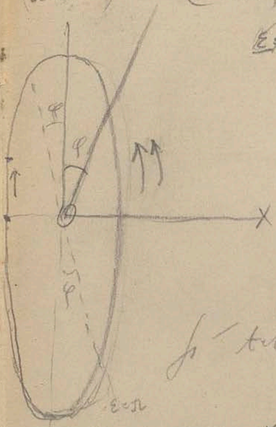
$\zeta = a \cos\varphi \sin\psi$

$\varepsilon = \frac{\pi}{2}$

$\left(\frac{\xi}{a \sin\varphi}\right)^2 + \left(\frac{\zeta}{a\cos\varphi}\right)^2 = 1$ [illegible]

$\varepsilon = \frac{\pi}{2}$ $\varphi = 45^\circ$ [illegible]

[illegible] [[illegible] ellipt.]



$\varepsilon = \frac{3\pi}{2}$

$\xi = a \sin\varphi \cos\psi$

$\zeta = a \cos\varphi \sin\psi$

[illegible]

[illegible] ellipt. [illegible]

$\varepsilon = \frac{5\pi}{2}$ [illegible] $\varepsilon = \frac{\pi}{2}$ 1 5 9 ~

$\varepsilon = \frac{7\pi}{2}$ [illegible] $\varepsilon = \frac{3\pi}{2}$ 3 7 11 ~

$\varepsilon = 0$

$\varepsilon = \pi$ $\xi = -a \sin\varphi \sin\psi$

$\zeta = a \cos\varphi \sin\psi$

$\frac{\xi}{\zeta} = -\operatorname{tg}\varphi$ [illegible]

[illegible] 2φ [illegible]

[illegible]

$\varepsilon = 2\pi \qquad \xi = a \sin\varphi \sin\psi \qquad \zeta = a \cos\varphi \sin\psi$

$\frac{\xi}{\zeta} = \operatorname{tg}\varphi$ [illegible]

[illegible]

$\pi \quad 3\pi \quad 5\pi \; \dots$

$2\pi \quad 4\pi \quad 6\pi \; \dots$

[illegible]

$$\varepsilon = \frac{2\pi}{\tau}\left(\frac{\Delta}{o} - \frac{\Delta}{e}\right)$$

$$\varepsilon = \frac{2\pi\Delta}{c\tau}\left(\frac{c}{o} - \frac{c}{e}\right) = \frac{2\pi\Delta}{\lambda}\left(n_o - n_e\right)$$

[illegible]

$$\varepsilon = \frac{\pi}{2} = \frac{2\pi}{\lambda}\Delta\left(n_o - n_e\right)$$

$$\Delta = \frac{\lambda}{4}\frac{1}{n_o - n_e}$$

$n_o - n_e < 1$ [illegible]

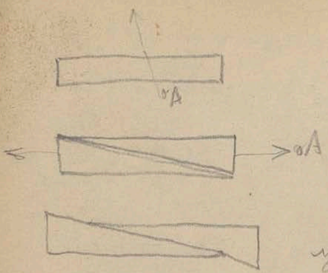
[illegible]

[illegible]

[illegible]

[illegible]

[illegible] 311 [illegible]



[illegible]

[illegible] Compensator [illegible] Babinet; [illegible]

[illegible] Comp. [illegible]

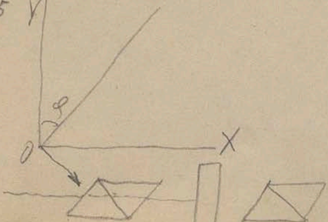
[illegible] ell. pol. [illegible]

Ellip. [illegible] Nicol [illegible] comp. [illegible]

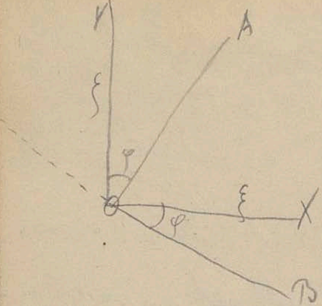
[illegible]

[illegible] Refl. [illegible]

8/5



[illegible] hor. [illegible] vert. [illegible]



$\xi = a \sin\varphi \sin(\psi - \varepsilon)$

$\zeta = a \cos\varphi \sin\psi$

[illegible]

$\xi\cos\varphi - \zeta\sin\varphi$

$a \sin\varphi\cos\varphi [\sin(\psi - \varepsilon) - \sin\psi]$

[illegible] sin. [illegible] $\varepsilon = 0$ [[illegible]]

$\varepsilon = 2\pi$ [illegible] sin. [illegible] $\varepsilon = \pi, 3\pi, 5\pi$ —

$\varepsilon = 4\pi$ ← [illegible] ε [illegible] $\varepsilon =$

$\varepsilon = 2N\pi$ [illegible]

$\varepsilon = \frac{2\pi}{\tau}\Delta\left(\frac{1}{0} - \frac{1}{e}\right) = \pm 2N\pi$

$\Delta = \frac{\lambda N}{n_0 - n_e}$

$\frac{\Delta}{\lambda}\left(\frac{c}{0} - \frac{c}{e}\right) = \pm N$

$\frac{\Delta}{\lambda}(n_0 - n_e) = \pm N$

[illegible] homog. [illegible]

[illegible] N [illegible]

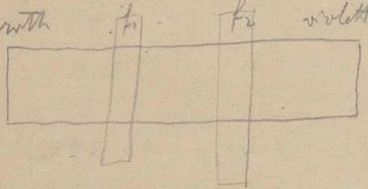
[illegible] spectr. [illegible]

[illegible]

[illegible] $N = 0, \pm 1$, [illegible]

[illegible]

[illegible] roth [illegible]



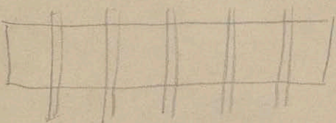
[illegible]

[illegible] compil. [illegible]

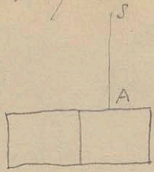
[illegible] compl. [illegible]

[illegible] cca 9, 10

[illegible]



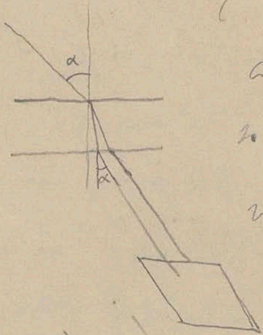
12/5 [illegible] ‖ [illegible] A [illegible] ⊥ [illegible] A [illegible]



[illegible]

[illegible]

[illegible] vert. [illegible]

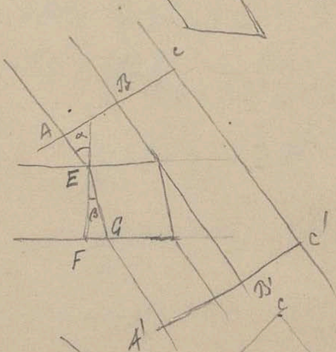


[illegible]

[illegible]

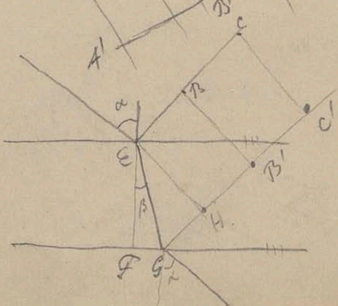
[illegible] comp. [illegible]

[illegible] Nicol.



[illegible] A [illegible] A' [illegible]

[illegible] B-B' [illegible]



$$\frac{\mathfrak{E}S}{u} - \frac{BB'}{c} = \vartheta$$

$$\vartheta = \frac{\mathfrak{E}S}{u} - \frac{\mathfrak{E}H}{c} =$$

$$= \frac{\mathfrak{E}F}{u\cos\beta} - \frac{\mathfrak{E}S\cos(\alpha-\beta)}{c} = \frac{\mathfrak{E}F}{u\cos\beta} - \frac{\mathfrak{E}F\cos(\alpha-\beta)}{\cos\beta\, c}$$

$$\vartheta = \mathfrak{E}F\left[\frac{1}{u\cos\beta} - \frac{\cos\alpha\cos\beta + \sin\alpha\sin\beta}{c\cos\beta}\right]$$

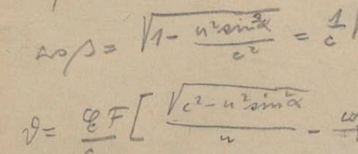
$$\frac{\sin\alpha}{\sin\beta} = \frac{c}{u} \qquad \sin\alpha = \frac{c\sin\beta}{u}$$

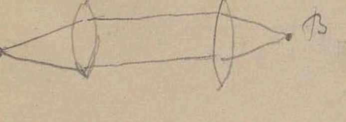
$$\vartheta = \mathfrak{E}F\left[\frac{1}{u\cos\beta} - \frac{\cos\alpha}{c} - \frac{\sin^2\beta}{u\cos\beta}\right] = \mathfrak{E}F\left[\frac{\cos\beta}{u} - \frac{\cos\alpha}{c}\right]$$

$$\sin\beta = u\frac{\sin\alpha}{c}$$

$$\cos\beta = \sqrt{1 - \frac{u^2\sin^2\alpha}{c^2}} = \frac{1}{c}\sqrt{c^2 - u^2\sin^2\alpha}$$

$$\vartheta = \frac{\mathfrak{E}F}{c}\left[\frac{\sqrt{c^2 - u^2\sin^2\alpha}}{u} - \cos\alpha\right] =$$





[illegible]
[illegible]
[illegible]
[illegible] $\frac{1}{100}$ mm

[illegible] 100 [illegible], Roth 200, Violett [illegible]

[illegible]

[illegible] Prisma [illegible]

[illegible]

[illegible]

[illegible]

$$\vartheta_o = \frac{\mathfrak{E}F}{c}\left[\frac{\sqrt{c^2-o^2\sin^2\alpha}}{o} - \cos\alpha\right]$$

$\vartheta_e =$ [illegible]

[illegible]

$$\vartheta = \mathfrak{E}F\left(\frac{\cos\beta}{u} - \frac{\cos\alpha}{c}\right) = \frac{\mathfrak{E}F}{c}\left(\cos\beta\,\frac{c}{u} - \cos\alpha\right) =$$

$$= \frac{\mathfrak{E}F}{c}\left(\frac{\sin\alpha\cos\beta}{\sin\vartheta} - \cos\alpha\right) = \frac{\mathfrak{E}F}{c}\left(\frac{\sin\alpha}{\operatorname{tg}\vartheta} - \cos\alpha\right)$$

5 Vorl.

$$\operatorname{tg}\vartheta = \frac{o\sin\alpha}{\sqrt{c^2-e^2\sin^2\alpha}} \qquad \Theta_e = \frac{\mathfrak{E}F}{c}\left(\frac{\sqrt{c^2-e^2\sin^2\alpha}}{o} - \cos\alpha\right)$$

$$\Theta_o - \Theta_e = \frac{\mathfrak{E}F}{oc}\left[\sqrt{c^2-o^2\sin^2\alpha} - \sqrt{c^2-e^2\sin^2\alpha}\right]$$

[illegible]

$$\Theta_o - \Theta_e = \frac{\mathfrak{E}F}{o.c}\, c\left[1 - \frac{o^2}{2c^2}\sin^2\alpha - 1 + \frac{e^2}{2c^2}\sin^2\alpha\right] =$$

$$= \frac{\mathfrak{E}F}{2oc^2}\left[e^2 - o^2\right]\sin^2\alpha$$

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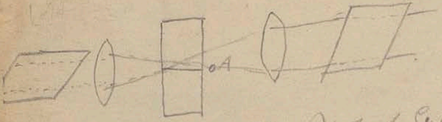
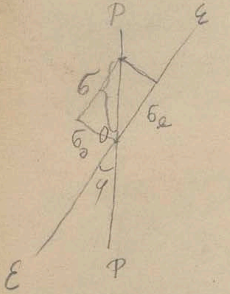


[illegible]

PP [illegible] Pol. [illegible]

EE [illegible] oA. [illegible]

[illegible]



$$\sigma = a \sin\frac{2\pi}{\tau} t$$

$$\sigma_o = \sigma \sin\varphi \qquad \sigma_e = \sigma\cos\varphi$$

$$\sigma'_o = a \sin\varphi \sin\frac{2\pi}{\tau}(t - \varepsilon_o)$$

$$\sigma'_e = a \cos\varphi \sin\frac{2\pi}{\tau}(t - \varepsilon_e)$$

$\varepsilon_o =$ [illegible]

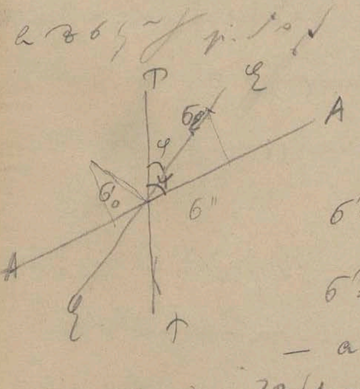
$$\theta_o - \theta_e = \varepsilon_o - \varepsilon_e$$

[illegible]

AA [illegible]

[illegible] AA.

Comp. [illegible]



$$\sigma'' = \sigma'_e \cos(\psi - \varphi) - \sigma'_o \sin(\psi-\varphi)$$

$$\sigma'' = a\cos\varphi\cos(\psi-\varphi)\sin\frac{2\pi}{\tau}(t - \varepsilon_e)$$

$$- a \sin\varphi \sin(\psi-\varphi)\sin\frac{2\pi}{\tau}(t-\varepsilon_o)$$

$$= a\cos\varphi\cos(\psi-\varphi)\sin\frac{2\pi}{\tau}(t - \varepsilon_o + \varepsilon_o - \varepsilon_e) - a\sin\varphi\sin(\psi-\varphi)\sin\frac{2\pi}{\tau}(t-\varepsilon_o)$$

$\frac{2\pi}{\tau}(t-\varepsilon_0) = u$

$\frac{2\pi}{\tau}(\varepsilon_0-\varepsilon_e) = \delta$

$\sigma'' = a\cos\varphi\cos(\psi-\varphi)\sin(u+\delta) - a\sin\varphi\sin(\psi-\varphi)\sin u$

$= [\underbrace{a\cos\varphi\cos(\psi-\varphi)\cos\delta - a\sin\varphi\sin(\psi-\varphi)}_{A\cos v}]\sin u +$

$+ \underbrace{a\cos\varphi\cos(\psi-\varphi)\sin\delta}_{A\sin v}\cos u$

$= A\cos v\sin u + A\sin v\cos u$

$= A\sin(u+v)$

$a\cos\varphi\cos(\psi-\varphi)\cos\delta - a\sin\varphi\sin(\psi-\varphi) = A\cos v$

$a\cos\varphi\cos(\psi-\varphi)\sin\delta = A\sin v$

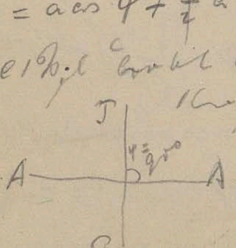
$A^2 = a^2\cos^2\varphi\cos^2(\psi-\varphi) - 2a^2\sin\varphi\cos\varphi\sin(\psi-\varphi)\cos(\psi-\varphi)\cos\delta$

$+ a^2\sin^2\varphi\sin^2(\psi-\varphi) - 2a^2\cos\varphi\cos(\psi-\varphi)\sin\varphi\sin(\psi-\varphi)$

$+ 2a^2\cos\varphi\cos(\psi-\varphi)\sin\varphi\sin(\psi-\varphi) =$

$= a^2\cos^2\psi + \frac{1}{4}a^2\sin 2\varphi\sin 2(\psi-\varphi)\sin^2\frac{\delta}{2}$ ...

[illegible] $A = 0$



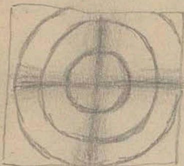
[illegible] $A^2 = a^2\sin^2 2\varphi\sin^2\frac{\delta}{2}$

$\sin 2\varphi = 0$ [illegible]

[illegible] Vert. [illegible]

[illegible]

[illegible]



$\varphi = 45^\circ \quad A^2 = a^2 \sin^2 \frac{\delta}{2}$

[illegible] $= 0$ ~

$$\delta = \frac{2\pi}{\tau}(\varepsilon_0 - \varepsilon_e)$$

$$= \frac{2\pi}{\tau}(\theta_0 - \theta_e)$$

$$= 2\pi \frac{\varepsilon F}{o\, c_{\pi}\tau}\left(\sqrt{c^2 - o^2 \sin^2\alpha} - \sqrt{c^2 - e^2 \sin^2\alpha}\right)$$

$$\frac{\delta}{2} = \frac{\pi \varepsilon F}{o\lambda}\left(\sqrt{c^2 - o^2 \sin^2\alpha} - \sqrt{c^2 - e^2 \sin^2\alpha}\right)$$

[illegible] $\frac{\delta}{2} = 0, \pi, 2\pi, 3\pi, \ldots$

[illegible]

[illegible]

$\alpha = 2\pi$ [illegible]

....

[illegible] $\frac{\delta}{2} = n\pi$ [illegible] $A = 0$

[illegible]

[illegible]

[illegible]

[illegible]

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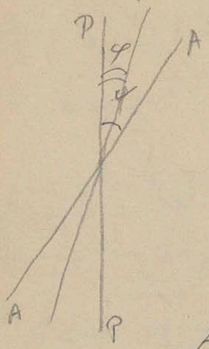
$$A^2 = a^2\cos^2\psi + a^2\sin 2\varphi \sin 2(\psi-\varphi)\sin^2\frac{\delta}{2}$$



$\psi = 90°$

$$A_1^2 = a^2\sin^2\varphi\sin^2\frac{\delta}{2}$$

$\psi = 0$ An. ς Pol. ∥

$$A_2^2 = a^2 - a^2\sin^2\varphi\sin^2\frac{\delta}{2}$$

$$A_1^2 + A_2^2 = a^2$$

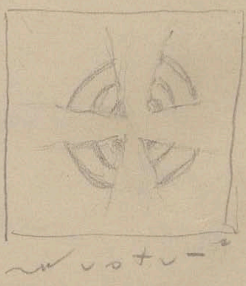
[illegible]

[illegible] a^2 [illegible] N. a. etc. [illegible]

[illegible] complem [illegible]

[illegible] etc.

$\varphi = 0$
$= \frac{\pi}{2}$ | $A_2^2 = a^2$



A_2^2 ~ hom. a $\sin^2\frac{\delta}{2}$ ~ [illegible]

[illegible] — = 0 [illegible]

[illegible] $\sin^2\frac{\delta}{2}$, [illegible]

[illegible] circ. p. [illegible]

$$\xi = a \sin \frac{2\pi t}{\tau}$$

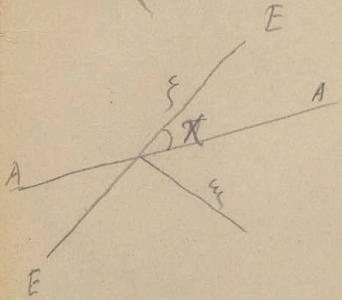
$$\zeta = a \cos \frac{2\pi t}{\tau}$$

[illegible]

[illegible]

2 Comp. [illegible]

[illegible]



$$\xi = a \sin \frac{2\pi t}{\tau}$$

$$\zeta = a \cos \frac{2\pi t}{\tau}$$

$$\xi = a \sin \frac{2\pi}{\tau}\left(t - \varepsilon_o\right)$$

$$\zeta = a \cos \frac{2\pi}{\tau}\left(t - \varepsilon_e\right) = a \cos \frac{2\pi}{\tau}\left[t - \varepsilon_o + (\varepsilon_o - \varepsilon_e)\right]$$

$$\frac{2\pi}{\tau}\left(t - \varepsilon_o\right) = u \qquad \frac{2\pi}{\tau}\left(\varepsilon_o - \varepsilon_e\right) = \delta$$

$$\xi = a \sin u \qquad \zeta = a \cos(u + \delta)$$

$$\sigma = \zeta \cos \chi + \xi \sin \chi$$

$$\sigma = a \cos \chi \cos(u + \delta) + a \sin \chi \sin u$$

$$= \underbrace{a \cos \chi \cos \delta}\, \cos u + \underbrace{(a \sin \chi - a \cos \chi \sin \delta)}\, \sin u$$

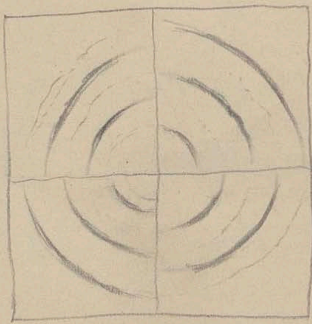
$$A^2 = a^2 \cos^2 \chi \cos^2 \delta + a^2 \sin^2 \chi + a^2 \cos^2 \chi \sin^2 \delta - 2a^2 \sin \chi \cos \chi \sin \delta$$

$$= a^2 - a^2 \sin 2\chi \sin \delta$$

[illegible] AA hor. [illegible]

1 $\chi = 0$ [illegible] A^2 [illegible] max. $= a^2$ [illegible] } [illegible]

$\chi = 90°$ " [illegible]



$\delta = \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}$

$\sin\delta = +1$ [illegible]

[illegible] $\sin 2\chi$ +

[illegible] χ [illegible] 0 – 90

II Qu. $\sin 2\chi$ –

Nic.

[illegible] 45° } [illegible]

[illegible] K.

Anal.

[illegible] Circul. [illegible]

1/4 Undulationsglimmer [illegible]

[illegible]

[illegible] $\sin\delta$ + v – [illegible]

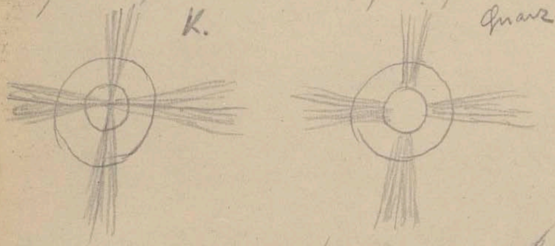
[illegible]

[illegible]

[illegible] Quarz [illegible] K.

[illegible]

[illegible]

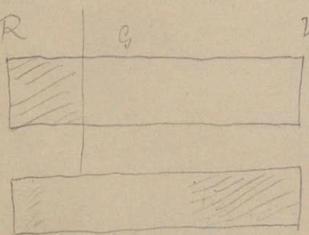


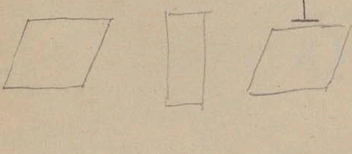
[illegible] Nic. [illegible]

[illegible] AA [illegible]

15/5 [illegible]

[illegible]





[illegible]

[illegible]

[illegible] N [illegible]

[illegible]

[illegible] Polit. [illegible]

1mm = 170 [illegible]

[illegible] 1mm 20°.

[illegible] No. [illegible] $21\frac{2}{3}°$, 1mm [illegible].

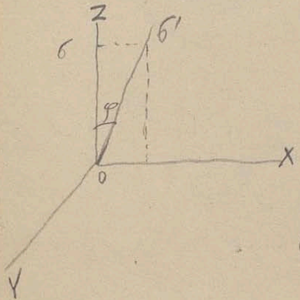
[illegible] Sp. [illegible] N. [illegible]

[illegible] Sp. [illegible] rothen [illegible] blau. [illegible]

[illegible]

[illegible] ζ.

[illegible]



$$\sigma = a \sin \frac{2\pi t}{\tau}$$

$$\sigma = a \sin \frac{2\pi}{\tau}\left(t - \frac{y}{u}\right)$$

$\sigma' =$ [illegible] ζ

$$\varphi = k y$$

$$\xi = \sigma' \sin\varphi \qquad \zeta = \sigma' \cos\varphi$$

$$\xi = a \sin\varphi \sin\frac{2\pi}{\tau}\left(t - \frac{y}{u}\right)$$

$$\zeta = a \cos\varphi \sin\frac{2\pi}{\tau}\left(t - \frac{y}{u}\right)$$

$$= a \sin ky \sin\frac{2\pi}{\tau}\left(t - \frac{y}{u}\right)$$

$$\xi = \overset{\xi_1}{\frac{a}{2} \cos\frac{2\pi}{\tau}\left(t - \frac{y}{u} - \frac{k\tau}{2\pi} y\right)} - \overset{\xi_2}{\frac{a}{2} \cos\frac{2\pi}{\tau}\left(t - \frac{y}{u} + \frac{k\tau}{2\pi} y\right)}$$

([illegible] Fresnel)

$$\zeta = a \cos ky \sin\frac{2\pi}{\tau}\left(t - \frac{y}{u}\right) =$$

$$\xi = \frac{a}{2}\sin\frac{2\pi}{\tau}\Big(t - \overset{\xi_1}{\frac{y}{u}} + \frac{k\tau}{2\pi}y\Big) + \frac{a}{2}\sin\frac{2\pi}{\tau}\Big(t - \overset{\xi_2}{\frac{y}{u}} - \frac{k\tau y}{2\pi}\Big)$$

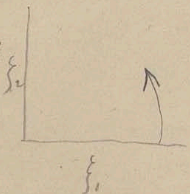
[illegible] ξ_1 [illegible] ξ_2 [illegible]

$$\xi_1^2 + \xi_2^2 = \frac{a^2}{4}$$

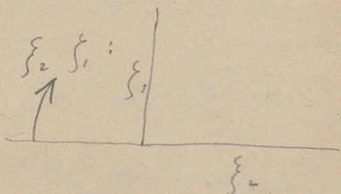
ξ_2 [illegible] ξ_1 [illegible]

$$\xi_2^2 + \xi_1^2 = \frac{a^2}{4}$$ [illegible]

$\xi_1\ \xi_2$:



$\xi_2\ \xi_1$:



[illegible] ξ_2 + ...

[illegible] circ. [illegible] circ. [illegible]

[illegible] trig. Transf.)

$$\xi_1 = \frac{a}{2}\cos\frac{2\pi}{\tau}\Big(t - y\underbrace{\Big[\frac{1}{u} + \frac{k\tau}{2\pi}\Big]}_{=\frac{1}{l}}\Big) = \frac{a}{2}\cos\frac{2\pi}{\tau}\Big(t - \frac{y}{l}\Big)$$

$$\xi_2 = \frac{a}{2}\sin\frac{2\pi}{\tau}\Big(t - \frac{y}{l}\Big)$$ [illegible]

[illegible]

$$\xi_2 = -\frac{a}{2}\cos\frac{2\pi}{\tau}\Big(t - y\underbrace{\Big\{\frac{1}{u} - \frac{k\tau}{2\pi}\Big\}}_{\frac{1}{r}}\Big)$$

$$\xi_2 = -\frac{a}{2}\cos\frac{2\pi}{\tau}\Big(t - \frac{y}{r}\Big) \quad\Big|\quad \xi_1 = \frac{a}{2}\sin\frac{2\pi}{\tau}\Big(t - \frac{y}{r}\Big)$$

[illegible] circ. [illegible]

$\frac{k\tau}{kn} = \frac{1}{e} - \frac{1}{r}$ [illegible]

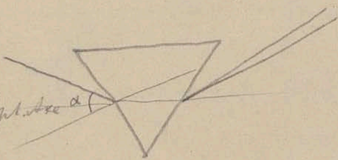
[illegible] circ. [illegible] circ.

[illegible]

[illegible]

[illegible]

Fresnal [illegible]



opt. Axe ∥ 16°

[illegible]

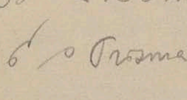
[illegible] opt. Axe

[illegible]

[illegible] circ. [illegible] circ. [illegible]

[illegible] Axe [illegible]

[illegible] Prisma. 3 [illegible]

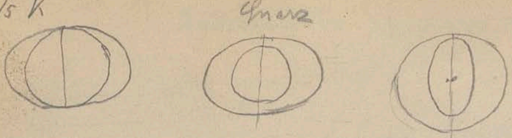


[illegible]

[illegible]

[illegible]

21/5 K



circular pol. [illegible]

[illegible] Elliptizität [illegible]

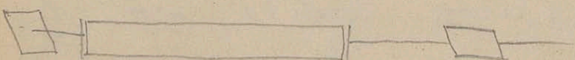
[illegible]

Rensch [illegible] constr. [illegible]

Pol. [illegible]

[illegible]

z.B. [illegible]



[illegible]

[illegible]

[illegible]

[illegible] prop. [illegible]

[illegible] rechts, [illegible] links.

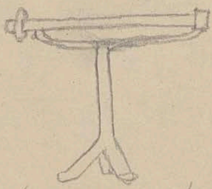
[illegible] z.B. Terpentinöl [illegible]

[illegible] Var. [illegible]

[illegible]

(Saccharimeter)

[illegible] Pol. apparat Mitscherlich



[illegible]

[illegible]

[illegible]

[illegible] sensible [illegible]

[illegible]

[illegible]

[illegible] [[illegible] compens.

[illegible] sensible F.]. [illegible]

[illegible] Spectr. [illegible]

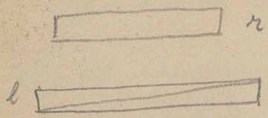
[illegible] Soleil; [illegible]

[illegible] Subst. [illegible] Quarz compens. [illegible]

[illegible] Babinet'sche Compens.

216 [illegible]

[illegible]



[illegible]

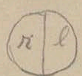
[illegible] Soleil [illegible]

[illegible] [cca 7.5 mm [illegible]]

[illegible] 1mm [illegible] 240 [illegible] 7.5mm

= 180 [illegible] Pol. [illegible] int. [illegible] 180°; [illegible]

[illegible] int. [illegible]

[illegible] sens. [illegible] 

[illegible]

[illegible]

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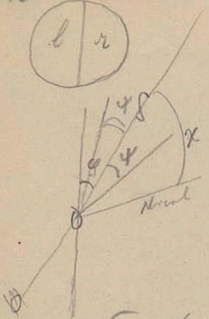


[illegible]

[illegible] χ [illegible]

[illegible] Nicol [illegible] χ [illegible]

$$b \cos(\chi-\psi) = a \sin\left(\frac{2\pi t}{\tau} - \frac{x}{c}\right)$$

$$a \cos(\chi-\psi)$$

$$J_r = a^2\cos^2(\chi-\psi)$$

$$J_l = a^2\cos^2(\chi+\psi)$$ [illegible]

[illegible] $\chi = 90^\circ$, 180°, 0° $J_r = a^2\cos^2\psi = J_l$

[illegible] Nicol [illegible]

[illegible] Nic. [illegible]

[illegible] N. [illegible]

[illegible] sens. [illegible] N [illegible]

gelb.gr.

Polariskop [illegible] pol. [illegible]

[illegible] K. [illegible] N. [illegible]

[illegible] polar. [illegible]

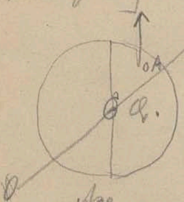
[illegible] 90° [illegible] refl. [illegible]

[illegible] Saccharimeter: Halb Schatten S. [illegible]

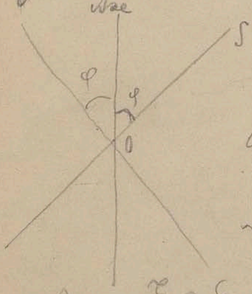
S. à pénombres [illegible] Laurent

[illegible]

[illegible]



[illegible] S [illegible] ½ [illegible]



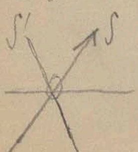
[illegible]

[illegible] ½ [illegible]

[illegible]

[illegible] OS [illegible]

[illegible]



[illegible]

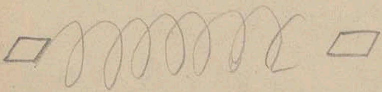
[illegible] Halbkr. [illegible]

[illegible] intens. [illegible]

[illegible]

[illegible] Faraday [illegible] magn. [illegible] elektrodyn.

[illegible]



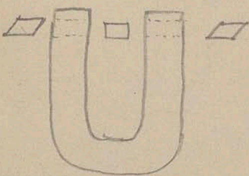
[illegible]

[illegible] (203. [illegible]

[illegible]

[illegible]

Faraday [illegible]



[illegible]

203. [illegible]

[illegible]

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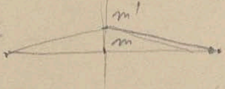
Fresnel [illegible]

[illegible]

[illegible]

$m\frac{d^2s}{dt^2} = -a^2 s$ [illegible]

[illegible]  [illegible] Elast. [illegible]

[illegible] $-a^2$ [illegible] Periode

[illegible]

$a^2 s\,ds =$ [illegible]

$$\int_0^{ON} a^2 s\,ds = \frac{a^2 s^2}{2}\Big|_0^{ON} = \frac{a^2 6^2}{2} \qquad ON = 6$$

[illegible]

6 [illegible] Red. 6

$A = \frac{a^2 6^2}{2}$ [illegible]

$6^2 = \xi^2 + \eta^2 + \zeta^2 = \frac{2A}{a^2}$ [illegible] ⊥

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] Ellipsoid. Coordinaten [illegible]

$a^2\xi^2 + b^2\eta^2 + c^2\zeta^2 = 2A$ [illegible]

$=1$

[illegible]

$dA = p\,d\sigma$

$P = \frac{dA}{d\sigma}$ $a^2\xi = \frac{dA}{d\xi}$ [illegible]

$\xi = 1$ $= a^2$ Elast. [illegible] X

$b^2\eta = \frac{dA}{d\eta}$ $b^2 =$ Elast [illegible] Y

$c^2\zeta = \frac{dA}{d\zeta}$ c^2 Z

[illegible]

$\frac{dA}{d\sigma} = a^2\xi\frac{d\xi}{d\sigma} + b^2\eta\frac{d\eta}{d\sigma} + c^2\zeta\frac{d\zeta}{d\sigma}$

cos ∠ [illegible] f, g, h

$\xi = f\sigma$ $\qquad \frac{d\xi}{d\sigma} = f$

$\eta = g\sigma$ $\qquad \frac{d\eta}{d\sigma} = g$

$\zeta = h\sigma$ $\qquad \frac{d\zeta}{d\sigma} = h$

$(a^2f^2 + b^2g^2 + c^2h^2)\sigma = \frac{dA}{d\sigma}$ } [illegible] ‖RV

$\sigma = 1$ |

( ) = Parallelelasticität = P

$P = a^2f^2 + b^2g^2 + c^2h^2$

$= a^2f \cdot f + b^2g \cdot g + c^2h \cdot h$

$X = a^2f$
$Y = b^2g$
$Z = c^2h$ } compon. [illegible]

$Xf + Yh + Zg = P$

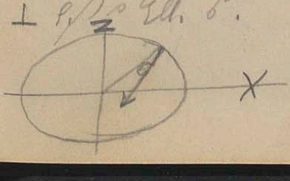
[illegible] $X^2 + Y^2 + Z^2 = a^4f^2 + b^4g^2 + c^4h^2 = T^2$

= totale Elasticit.

[illegible]

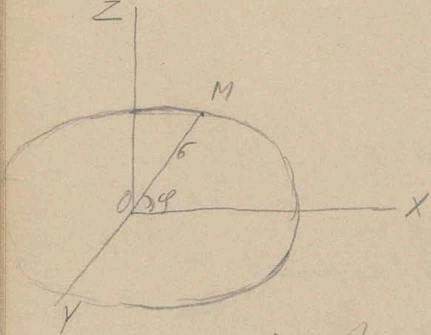
[illegible] Elli. [illegible]

⊥ [illegible] Elli. [illegible] [illegible] RV [illegible]



[illegible]

[illegible] Ellips.



[illegible]

$$\frac{\xi^2}{\frac{1}{a^2}} + \frac{\zeta^2}{\frac{1}{c^2}} = 1$$

[illegible] : $\frac{1}{a}, \frac{1}{c}$

[illegible] M [illegible]

$$m\frac{d^2\xi}{dt^2} = -a^2\xi \qquad \xi = \sigma\cos\varphi$$

$$m\frac{d^2\zeta}{dt^2} = -c^2\zeta \qquad \zeta = \sigma\sin\varphi$$

$$\xi = A\sin\frac{2\pi}{\tau}t \qquad m\frac{4\pi^2}{\tau^2} = a^2$$

$$\zeta = C\sin\frac{2\pi}{\tau'}t \qquad m\frac{4\pi^2}{\tau'^2} = c^2$$

[illegible] 2 comp. [illegible]

[illegible]

[illegible] Z [illegible] X [illegible]

[illegible]

[illegible] stabile [illegible]

[illegible] Ellips. [illegible] Ell. [illegible]

[illegible]

[illegible] stabile, [illegible]

[illegible]

[illegible]

[illegible]

[illegible] 2 Comp.

[illegible]

[illegible] Ell. [illegible] Ellipse

[illegible]

[illegible] comp. [illegible]

[illegible] Ell. [illegible]

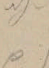
[illegible]

[illegible] 2 st. [illegible]

[illegible]

[illegible] compon.

[illegible]



[illegible] vert.

[illegible]

[illegible] comp. [illegible] Elast. [illegible] Ell. [illegible]

$T^2 = \cancel{X^2 + Y^2 + Z^2}$ [illegible]

$X = a^2 f$

$Y = b^2 g$

$Z = c^2 h$

[illegible] Ell. $\perp$ [illegible]

[illegible] laterale Comp.

$\rho \gamma = P$ [illegible]

$\rho f = N$ $\perp\perp$

$\rho \rho^x = L$

[illegible] stab. [illegible] $L = 0$

[illegible] N [illegible] cos. [illegible] $\measuredangle$ [illegible] N [illegible] $l, m, n.$

$l^2 + m^2 + n^2 = 1$

$\underbrace{fl + gm + hn = 0}_{N \perp}$

$Pf + Nl = X$

$a^2 f = Pf + Nl$

$(a^2 - P) f = Nl$

$\frac{l}{a^2 - P} = \frac{f}{N}$

$\frac{m}{b^2 - P} = \frac{g}{N}$

$\frac{n}{c^2 - P} = \frac{h}{N}$

l, m, n

$\underbrace{\frac{l^2}{a^2 - P} + \frac{m^2}{b^2 - P} + \frac{n^2}{c^2 - P} = 0}$

P quadr. [illegible] 2 [illegible] P

2 stab. [illegible]

[illegible] Ell. [illegible] – Ell.; [illegible]
[illegible] Ellipse.

263. $l^2(b^2-P)(c^2-P)+m^2(a^2-P)(c^2-P)+n^2(a^2-P)(b^2-P)=0$

263. [illegible] Ellips. [illegible]

$a=b$

[illegible] $a^2-P=0$ – [illegible]

$P=a^2$ [illegible] Ell. [illegible] $=a$ [illegible]

[illegible] Seg. [illegible]

$$l^2(c^2-P)+m^2(c^2-P)+n^2(a^2-P)=0$$

$$(1-n^2)(c^2-P)+n^2(a^2-P)=0$$

[illegible]

symmetr. [illegible]

$$c^2-P-n^2c^2+\cancel{n^2P}+a^2n^2-\cancel{n^2P}=0$$

$$P=n^2a^2+(1-n^2)c^2$$

[illegible]

$n=\cos\vartheta$

$1-n^2=\sin^2\vartheta$

$$P=a^2\cos^2\vartheta+c^2\sin^2\vartheta$$

[illegible]

$$n=\sqrt{a^2\cos^2\vartheta+c^2\sin^2\vartheta}$$

[illegible] $a=0$, $c=e$, [illegible] comp. [illegible] Ell. e^2 [illegible]

[illegible]

[illegible] Ellips.

$$a^2(\xi^2+\eta^2)+c^2\zeta^2=1$$

$$b^2(\xi^2+\eta^2)+c^2\zeta^2=1$$

$$\frac{\xi^2+\eta^2}{\frac{1}{b^2}}+\frac{\zeta^2}{\frac{1}{c^2}}=1$$ [illegible] Ell. [illegible] Hyp. < 0 [illegible]

[illegible] rec. [illegible]

[illegible] Ell. [illegible] Ell.

2ζ [illegible] $\perp$ [illegible] stab. [illegible] 2 comp.

[illegible] $\underline{0}$ [illegible] $a\cos^2\vartheta+c^2\sin^2\vartheta$

2/6 Experimentsdrev.

3/6 $a^2\xi^2 + b^2\eta^2 + c^2\zeta^2 = 1$ [illegible] Ellipso.

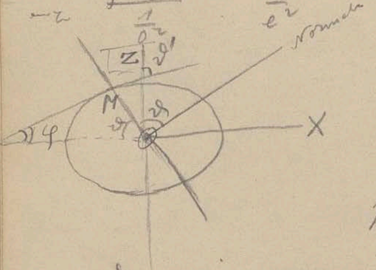
[illegible] Ell.

$a = b = o$

$c = e$

$o^2(\xi^2 + \eta^2) + e^2\zeta^2 = 1$

$$\frac{\xi^2+\eta^2}{\frac{1}{o^2}} + \frac{\zeta^2}{\frac{1}{e^2}} = 1$$



[illegible] cos. l m n

$$\frac{l^2}{a^2-p} + \frac{m^2}{b^2-p} + \frac{n^2}{c^2-p} = 0$$

$$p = o^2\cos^2\vartheta + e^2\sin^2\vartheta$$

$n = \cos\vartheta$

$u^2 = o^2\cos^2\vartheta + e^2\sin^2\vartheta$ ~~[illegible]~~

$u^2 = p$

constr. [illegible] Ell. [illegible] $\frac{1}{o}$ [illegible] $\frac{1}{e}$; [illegible] Ell. [illegible] ✓

[illegible] Ell. [illegible] ; [illegible]

[illegible] ⊥

[illegible] Achs. [illegible] O [illegible]

[illegible] ∡ ϑ [illegible].

$o^2\xi^2 + \eta^2\zeta^2 = 1$ [illegible] Ell.

$\xi = OM\cos\vartheta$ $\zeta = OM\sin\vartheta$

$OM^2[o^2\cos^2\vartheta + e^2\sin^2\vartheta] = 1$

$$\frac{1}{OM^2} = o^2\cos^2\vartheta + e^2\sin^2\vartheta$$

[illegible] $u^2 \neq \frac{1}{OM^2}$ [illegible]

[illegible]

$$o^2 \xi + \eta^2 \zeta \frac{d\zeta}{d\xi} = 0$$

$$\frac{d\zeta}{d\xi} = -\frac{o^2 \xi}{\eta^2 \zeta} = \operatorname{tg} \varphi$$

$$\vartheta' + \varphi = 90^0$$

$$\operatorname{ctg} \vartheta' = -\frac{o^2}{\eta^2} \cdot \frac{\xi}{\zeta} = -\frac{o^2}{\eta^2} \cdot \frac{-OM \cos \vartheta}{-OM \sin \vartheta} =$$

$$= \frac{o^2}{\eta^2} \operatorname{ctg} \vartheta$$

$$\operatorname{tg} \vartheta' = \frac{\eta^2}{o^2} \operatorname{tg} \vartheta$$ [illegible] ϑ' [illegible] $\measuredangle$ [illegible] M [illegible] Z [illegible]

[illegible] $\measuredangle \vartheta'$ [illegible] tg [illegible]

[illegible] tg [illegible] M.

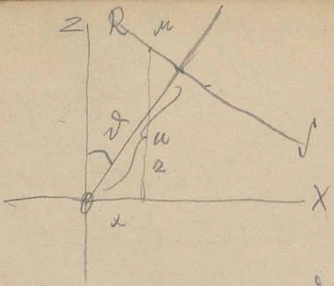
[illegible] Ell. [illegible] tg [illegible]

[illegible] Ell. [illegible] Huyghens [illegible]

[illegible] RV [illegible]

[illegible] tg [illegible]

[illegible] Huyghens Ell. [illegible]



[illegible] $\perp$ [illegible] Curve [illegible] $\perp$?

[illegible] RS: $x \sin\vartheta + z\cos\vartheta = u$ [illegible] const. [illegible]

[illegible]: $x\cos\vartheta - z\sin\vartheta = \frac{du}{d\vartheta}$ $\left[\frac{du}{d\vartheta} = 0\right.$ [illegible]$\left.\right]$

$$u\frac{du}{d\vartheta} = -o^2\cos\vartheta\sin\vartheta + e^2\sin\vartheta\cos\vartheta$$

$$= (e^2 - o^2)\sin\vartheta\cos\vartheta$$

~~$u(x\cos\vartheta$~~

$$u(x\sin\vartheta + z\cos\vartheta) = (o^2\cos^2\vartheta + e^2\sin^2\vartheta)$$

$$u(x\cos\vartheta - z\sin\vartheta) = e^2\sin\vartheta\cos\vartheta - o^2\sin\vartheta\cos\vartheta$$

$$ux = e^2\sin\vartheta$$

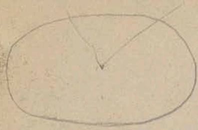
$$uz = o^2\cos\vartheta$$

$$\frac{x}{e} = \frac{e\sin\vartheta}{u}$$

$$\frac{z}{o} = \frac{o\cos\vartheta}{u}$$

$$\frac{x^2}{e^2} + \frac{z^2}{o^2} = \frac{e^2\sin^2\vartheta + o^2\cos^2\vartheta}{u^2} = 1$$

[illegible] Huygh. Ellipsoid ϑ [illegible] e [illegible] o



[illegible] Huygh. [illegible]

[illegible]

[illegible] Ell. [illegible] 3.ß Ell. [illegible]

[illegible] Huygh. [illegible]

[illegible] 3.ß Ell. [illegible] Ell. [illegible]

stab. [illegible]

$$\begin{matrix} \sin\vartheta & \cos\vartheta \\ \cos\vartheta & -\sin\vartheta \end{matrix}$$

[illegible]

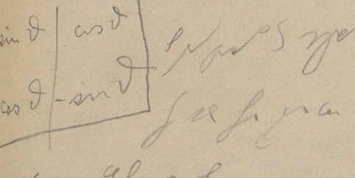
[illegible] Ell. [illegible]

[illegible] 3.ß Ell. [illegible] 0 [illegible]

[illegible] 2 [illegible]: a = [illegible], b = [illegible]

[illegible] OD [illegible] = OY

[illegible] OY OD [illegible]



[illegible] Ell. [illegible]

stabile [illegible] D'

[illegible] 1 [illegible] 2 [illegible]

[illegible] 2 [illegible]

[illegible] opt. [illegible]

[illegible] 1 [illegible] 2 opt. [illegible].

Ell. = [illegible] 3. [illegible] Ell.

< [illegible] Norm. [illegible]

[illegible]

[illegible] [conische Refraction].

4/6 Comp. e Sch. ∥ Coord. A X Y Z

$X = a^2 f \qquad Y = b^2 g \qquad Z = c^2 h \qquad P = Xf + Yg + Zh$

$\overline{P} = a^2 f^2 + b^2 g^2 + c^2 h^2 = u^2$ [illegible] Normal[illegible]

$N = Xl + Ym + Zn$ Normalcomp. [illegible]

[illegible] laterale Comp. [illegible]

$X = Pf + Nl = a^2 f = u^2 f + Nl$

$f = \frac{Nl}{a^2 - u^2}$ [illegible]

$fl + gm + hn = 0$

$g = \frac{Nm}{b^2 - u^2}$ $\qquad \frac{Nl^2}{a^2-u^2} + \frac{Nm^2}{b^2-u^2} + \frac{Nn^2}{c^2-u^2} = 0$

$h = \frac{Nn}{c^2 - u^2}$

$\frac{l^2}{a^2-u^2} + \frac{m^2}{b^2-u^2} + \frac{n^2}{c^2-u^2} = 0$ [illegible]

[illegible]

[illegible] $\perp N$.

[illegible]: $lx + my + nz = u$ [illegible]

[illegible] etc. [illegible]

[illegible]

[illegible]: $x\,dl + y\,dm + z\,dn = \frac{\partial u}{\partial l} dl + \frac{\partial u}{\partial m} dm + \frac{\partial u}{\partial n} dn$

$l\,m\,n$ [illegible]

$l^2 + m^2 + n^2 = 1$

$l\,dl + m\,dm + n\,dn = 0 \quad | \lambda +$

[illegible] dl dm [illegible] dm [illegible] dn [illegible]

[illegible] etc.

[illegible]

$$\left[x - \frac{\partial u}{\partial l} + \alpha l\right] dl + \left[y - \frac{\partial u}{\partial m} + \alpha m\right] dm + \left[z - \frac{\partial u}{\partial n} + \alpha n\right] dn = 0$$

[illegible] $dl = 0$

$$x = \frac{\partial u}{\partial l} - \alpha l \quad \Big| \quad y = \frac{\partial u}{\partial m} - \alpha m \quad \Big| \quad z = \frac{\partial u}{\partial n} - \alpha n$$

[illegible] u, α, l, m, n [illegible] lmn [illegible] 3.

$\frac{\partial u}{\partial l}$ etc.:

$$\frac{l}{a^2 - u^2} + \frac{l^2}{(a^2-u^2)^2}\, u \frac{\partial u}{\partial l} + \frac{m^2}{(b^2-u^2)^2}\, u \frac{\partial u}{\partial l} + \frac{n^2}{(c^2-u^2)^2}\, u \frac{\partial u}{\partial l} = 0$$

$$f^2 + g^2 + h^2 = 1 = N^2 \left[\frac{l^2}{(a^2-u^2)^2} + \frac{m^2}{(b^2-u^2)^2} + \frac{n^2}{(c^2-u^2)^2}\right]$$

$$\frac{l}{a^2-u^2} + \frac{1}{N^2}\, u \frac{\partial u}{\partial l} = 0$$

$$\frac{\partial u}{\partial l} = - \frac{N^2 l}{u(a^2-u^2)} = - \frac{Nf}{u}$$

$$\frac{\partial u}{\partial m} = - \frac{N^2 m}{u(b^2-u^2)} = - \frac{Ng}{u}$$

$$\frac{\partial u}{\partial n} = - \frac{N^2 n}{u(c^2-u^2)} = - \frac{Nh}{u}$$

$$l \frac{\partial u}{\partial l} + m \frac{\partial u}{\partial m} + n \frac{\partial u}{\partial n} = - \frac{N}{u} \underbrace{\left[fl + gm + hn\right]}_{=0}$$

$$x = \frac{\partial u}{\partial l} - \alpha l \;\Big|^{l} \quad y = \frac{\partial u}{\partial m} - \alpha m \;\Big|^{m} \quad z = \frac{\partial u}{\partial n} - \alpha n \;\Big|^{n}$$

$=0$

$$lx + my + nz = - \alpha = u \qquad \alpha = -u$$

$$x = lu + \frac{\partial u}{\partial l} \qquad y = mu + \frac{\partial u}{\partial m} \qquad z = nu + \frac{\partial u}{\partial n}$$

$$x = lu - \frac{Nf}{u} \Big|_{a^2 f} \qquad y = mu - \frac{Ng}{u} \Big|_{b^2 g} \qquad z = nu - \frac{Nh}{u} \Big|_{c^2 h}$$

$$a^2fx + b^2gy + c^2hz = u\left[a^2fl + b^2gm + c^2hn\right] - \frac{N}{u}\left[a^2f^2 + b^2g^2 + c^2h^2\right]$$

Ampère Gl.

$$= uN - \frac{N}{u}u^2 = 0$$

$x\,y\,z$ = Coord. [illegible] RN.;

[illegible] cos. [illegible] RN. Ampère

[illegible] Elast.

[illegible] mult. $f\ g\ h$

$$fx + gy + hz = -\frac{N}{u}$$ = cos ∡ [illegible] RN [illegible]

[illegible]:

$$x^2+y^2+z^2 = r^2 = u^2 + \frac{N^2}{u^2} ~~+0~~$$

RV

$$\frac{N^2}{u^2} = r^2 - u^2$$

$$x = lu - \frac{N^2 l}{u(a^2-u^2)} = lu\left[1 - \frac{r^2-u^2}{a^2-u^2}\right] = lu\,\frac{a^2-r^2}{a^2-u^2}$$

$$\frac{x}{a^2-r^2} = \frac{lu}{a^2-u^2} \;\Big|\; \frac{y}{b^2-r^2} = \frac{mu}{b^2-u^2} \;\Big|\; \frac{z}{c^2-r^2} = \frac{nu}{c^2-u^2}$$

$$= \frac{fu}{N} \Big|\, a^2x \qquad = \frac{gu}{N} \Big|\, b^2y \qquad = \frac{hu}{N} \Big|\, c^2z$$

$$\frac{a^2x^2}{a^2-r^2} + \frac{b^2y^2}{b^2-r^2} + \frac{c^2z^2}{c^2-r^2} = \frac{u}{N}\left[a^2fx + b^2gy + c^2hz\right]$$

$= 0$ = [illegible] Ampère

[illegible] mult. x, y, z

$$\frac{x^2}{a^2-r^2} + \frac{y^2}{b^2-r^2} + \frac{z^2}{c^2-r^2} = \frac{u}{N}\left[fx + gy + hz\right] = -1$$

[illegible] Fresnel / [illegible]; [illegible] Ampère [illegible] Freund's Hyp. [illegible] complete [illegible]

[illegible] 4 [illegible]

[illegible] 2 [illegible]

[illegible] 2 [illegible] Ellis [illegible]

[illegible]

Scripta universit.

PAPIER-HANDLUNG

Dr. Josef Stefan 43 II.

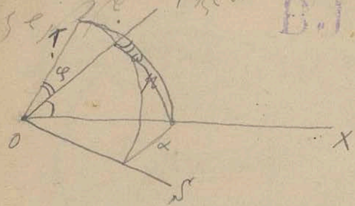
Ausgewählte Capitel aus der Optik und Wärmelehre.

II. S. 91. M Smoluchowski

F. POLLY, IV. KAROLINENG. 23.

 [illegible]

[illegible] $OT = $ [illegible]



$$\sphericalangle TOS = 90^\circ$$

$$\sphericalangle TOX = t$$

$$\cos\alpha = \sin t \cos\omega$$

$$\cos p = f$$

$$\cos p = \cos\varphi \cos t + \sin\varphi \sin t \cos\omega$$

$$\frac{\cos p - \cos\varphi \cos t}{\sin\varphi} = \sin t \cos\omega = \cos\alpha$$

$$P = T\cos\varphi$$

$$N = T\sin\varphi$$

$$X = T\cos t = a^2 f$$

$$\cos\alpha = \frac{f - \frac{P}{T}\frac{a^2 f}{T}}{\frac{N}{T}} =$$

$$= f\,\frac{T^2 - Pa^2}{NT}$$

$$P = u^2$$

$$\frac{x}{r} = f\,\frac{T^2 - Pa^2}{NT}$$

$$u = r\cos\varphi = \frac{rP}{T} = \frac{ru^2}{T}$$

$$T = ru$$

$$\frac{x}{r} = f\,\frac{r^2u^2 - a^2u^2}{NT}$$

$$\frac{x}{(r^2 - a^2)} = \frac{f r u^2}{NT}$$

$$\frac{y}{r^2 - b^2} = \frac{g r u^2}{NT}$$

$$\frac{z}{r^2 - c^2} = \frac{h r u^2}{NT}$$

$a^2 x$

$b^2 y$

$c^2 z$

$$= \frac{ru^2}{NT}\Big[\underbrace{a^2 f x + b^2 \cdots}_{=0}\Big]$$

$$\frac{a^2x^2}{r^2 - a^2} + \cdots = 0$$

$$\frac{a^2x^2}{a^2-r^2}+\frac{b^2y^2}{b^2-r^2}+\frac{c^2z^2}{c^2-r^2}=0$$ $=0$

$$a^2x^2[b^2-r^2][c^2-r^2]+b^2y^2[c^2-r^2][a^2-r^2]+c^2z^2[a^2-r^2][b^2-r^2]$$

[illegible] $a=b$ [illegible] Ell.

$a^2-r^2=0$ [illegible] $R=a$

$$a^2x^2(c^2-r^2)+a^2y^2(c^2-r^2)+c^2z^2(a^2-r^2)=0$$

$$a^2c^2(x^2+y^2)-r^2(a^2x^2+a^2y^2+c^2z^2)+a^2c^2z^2=0$$

$+a^2c^2z^2=0$

$a^2c^2r^2-a^2c^2z^2$ —

$$(a^2c^2-a^2x^2-a^2y^2-c^2z^2)\cancel{r^2}=0$$

$$1=\frac{x^2+y^2}{c^2}+\frac{z^2}{a^2}$$ = [illegible] Ellipsoid

Huyghens'sche Ell.

[illegible] $a=b$ [illegible]

[illegible] Ell.

[illegible] $x=0$

$$b^2y^2(c^2-r^2)(a^2-r^2)+c^2z^2(a^2-r^2)(b^2-r^2)=0$$

$a^2-r^2=0$ [illegible] $r=a$

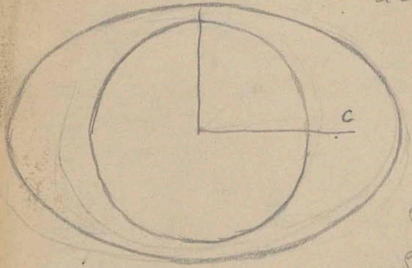
$$b^2y^2(c^2-r^2)+c^2z^2(b^2-r^2)=0$$

$$b^2c^2\underbrace{(y^2+z^2)}_{r^2}-r^2b^2y^2-c^2z^2r^2=0$$

$$b^2c^2-b^2y^2-c^2z^2=0$$

$1 = \frac{y^2}{c^2} + \frac{x^2}{b^2}$ – Ellipse

[illegible]



[illegible]

[illegible] $= \underline{0}$

[illegible] $= \underline{c}$

XYZ $z = 0$

$a^2x^2(b^2-r^2)(c^2-r^2) + b^2y^2(c^2-r^2)(a^2-r^2) = 0$

$c^2 - r^2 = 0$ [illegible] $= c$

$a^2b^2x^2 - r^2(a^2x^2 + b^2y^2) + a^2b^2y^2 = 0$

$a^2b^2 = a^2x^2 + b^2y^2$

$1 = \frac{x^2}{b^2} + \frac{y^2}{a^2}$

[illegible] $\underline{0}$ [illegible]

XZ $y = 0$

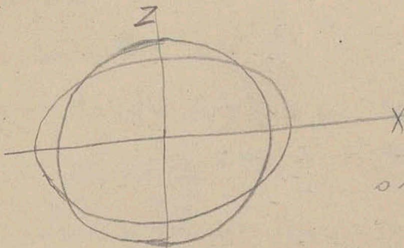
$a^2x^2(b^2-r^2)(c^2-r^2) + c^2z^2(a^2-r^2)(b^2-r^2) = 0$

$b^2 - r^2 = 0$ ⌒

$$a^2x^2(c^2-r^2)+c^2z^2(a^2-x^2)=0$$

$$a^2c^2r^2-r^2(a^2x^2+c^2z^2)=0$$

$$1 \quad = \frac{x^2}{c^2}+\frac{z^2}{a^2} \quad =0$$



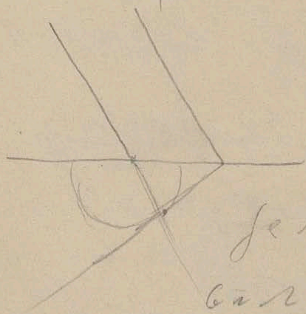
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



2 [illegible]

[illegible]

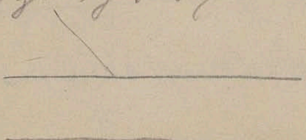
[illegible]

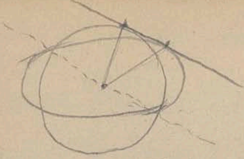
[illegible] Cylinder [illegible]

conische Refraction [illegible]

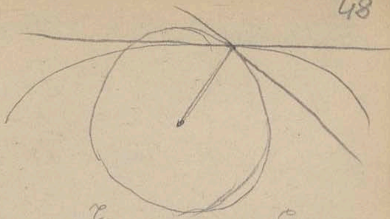
[illegible] Hamilton [illegible]

Lloyd [illegible] Aragonit [illegible]



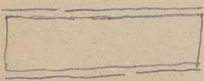


innere conische Refr.



[illegible]

[illegible] : äussere conische Refraction



Arragonit [illegible]

[illegible]

[illegible]

[illegible] Ellipse [illegible]

[illegible] Theorie [illegible] Elast. [illegible]

[illegible]

Mechanische Wärmetheorie.

[illegible]

[illegible] R. Maiyer 1842 [illegible]

[illegible]

[illegible]

[illegible]

[illegible] – Compression [illegible]

[illegible] capacität [illegible]

[illegible] temp. [illegible] temp.

1809 [illegible] Rumford [illegible]

[illegible] cap.

[illegible]

[illegible].

R. M. [illegible] aequiv.

[illegible] Compr. [illegible]

[pneum. [illegible]]. [illegible]

[illegible].

[illegible]

[illegible]

[illegible] cap. [illegible]

[illegible] const. [illegible]

[illegible] const. Volumen

[illegible] $C : c = 1{\cdot}4$

[illegible]

Newton [illegible] theor. [illegible] 0° 270 m [illegible]

332 m [illegible]; Laplace [illegible]

[illegible] le temps

[illegible]

[illegible]

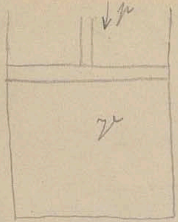
[illegible] $\sqrt{1{\cdot}4}$

Mayer [illegible] const. [illegible] Vol. [illegible]

[illegible]

[illegible]

10/6



$\sim p$ [illegible] 80

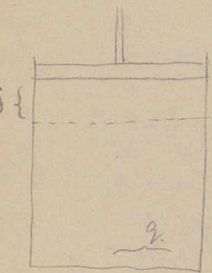
$v = 770 \text{ cm}^3$

[illegible]

c [illegible] c. Vol.

[illegible]

C [illegible] c. [illegible]



$\alpha = 0.00366$

[illegible] Coeff.

$\checkmark = q p \delta = p q \delta$

[illegible] Vol.

$q\delta = v \cdot \alpha$

$\checkmark = p v \alpha$

[illegible] C − c [illegible] ✓

$C - c =$

$C = 0.239$

$\frac{C}{c} = 1.4$

$c = 0.239 : 1.4 = 0.1707$

1 Atm = 1.033 kg/cm²

$p = 76 \cdot 13.59$

```
 8154
  9513
 1.03284
```

$pv = 1.033 \cdot 770$

```
 7231
  7231
 795410
```

$p v_2 = 795 \cdot 4 \cdot 10 \cdot 0{\cdot}00366$

238623
477246
477246

2911·2006

1195
0·171

2911

$C - c = 0{\cdot}239 - \frac{0{\cdot}239}{1{\cdot}4} = 0{\cdot}068$

[illegible] 0·068
√ 2911 : 0·068 = 42800 = √ [illegible] 1
000 [illegible]
491
550

[illegible] 1cm [illegible]

42500 [illegible] 425 gr. m [illegible]

[illegible] kg [illegible]

[illegible] 1 kg [illegible]

[illegible]

[illegible] 1. [illegible] 2. [illegible]

[illegible]

[illegible]

[illegible]

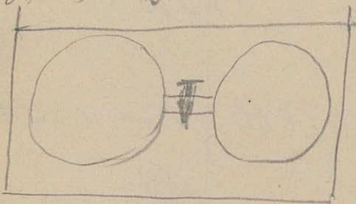
[illegible]

[illegible]

[illegible]

[illegible] Gay-Lussac

[illegible] Joule



[illegible] temp [illegible]

[illegible]

[illegible] temp [illegible]

[illegible] Vol [illegible]

[illegible]

[illegible]

[illegible]

[illegible] temp

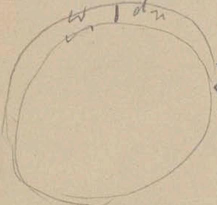
$$dQ = c\,dt + \frac{dL}{42500} = c\,dt + \frac{dL}{J}$$

$$\frac{1}{J} = A \qquad = c\,dt + A\,dL$$

A = calorisches [illegible]
[illegible]
[illegible]:

$$dQ = c\,dt + dL$$

[illegible]



$$\sum p\,w\,dn = dL$$

$$p \sum w\,dn = dL$$

$$dL = p\,dV$$

$$\sum w\,dn = dV$$

$$dQ = c\,dt + A\,p\,dV$$

11/6 $pv = p_0 v_0 (1+\alpha t)$ [illegible]

$vp = p_0 v_0 (1+\alpha t)$

$t_1)$ $v_1 p_1 = p_0 v_0 (1+\alpha t_1)$

$$\frac{pv}{p_1 v_1} = \frac{1+\alpha t}{1+\alpha t_1}$$

$\alpha = 0{\cdot}00366$

$$\frac{1}{\alpha} = 273$$

$$pv = p_0 v_0 \alpha \left(\frac{1}{\alpha} + t\right)$$ | [illegible]

$t + 273 = T$ = [illegible] temp. | 273 [illegible]

$$pv = \underbrace{p_0 v_0 \alpha}_{R} T$$

$pv = RT$ [illegible] Mariotte [illegible] Gay Lussac

$R = p_0 v_0 \alpha = 1033 . 770 . 0{\cdot}00366$ [illegible]

~~$\alpha = 0{\cdot}00366$~~

$pv = RT \qquad T = 273 + t$

$$dT = dt$$

$dQ = c\,dT + Ap\,dv \qquad 1).$

[illegible] $p\,Q\,t$

$p\,dv + v\,dp = R\,dT$

$dQ = c\,dT + AR\,dT - Av\,dp$

$= (c + AR)\,dT - Av\,dp \qquad 2).$

$$dQ = \frac{c\,p\,dv + c\,v\,dp}{R} + A\,p\,dv$$

$$= \frac{(AR + c)\,p\,dv + c\,v\,dp}{R} \qquad 3).$$

[illegible]

1). $dQ = c\,dt$

$$\frac{dQ}{dt} = c \qquad = \text{sp. [illegible] const. vol.}$$

2). [illegible]

$$dQ = (c + AR)\,dt$$

$$\frac{dQ}{dt} = c + AR = \text{sp. [illegible] temp. [illegible]}$$

sp. [illegible]

$$C = c + AR$$

$$C - c = AR = A\,p_0 v_0 \alpha$$ [illegible] Mayer's

$$J = \frac{p_0 v_0 \alpha}{C - c} \qquad A = \frac{1}{J} = \frac{C - c}{p_0 v_0 \alpha}$$

[illegible]

[illegible] sp. [illegible]

1). $dQ = c\,dT + A\,p\,dv$ [illegible]

$$\frac{dQ}{T} = \frac{c\,dT}{T} + \frac{A\,p\,dv}{T} = \frac{c\,dT}{T} + \frac{AR}{v}\,dv$$

$$= c\, d \log T + AR\, d \log v$$

$$= d[c \log T + AR \log v]$$

$c \log T + AR \log v$ T = integr. [illegible]

$$\frac{dQ}{T} = d\left[\log(T^c v^{AR})\right]$$

$$= d \log(T^c v^{C-c}) \quad \text{I.}$$

2). $dQ = (c+AR)\, dT - A v\, dp$

$$\frac{dQ}{T} = (c+AR)\frac{dT}{T} - \underbrace{\frac{A v\, dp}{T}}_{\frac{pv}{R} dp}$$

$$= (c+AR)\frac{dT}{T} - \frac{AR\, dp}{p}$$

$$= C \frac{dT}{T} - \frac{(C-c)\, dp}{p}$$

$$\frac{dQ}{T} = d \log\left(\frac{T^C}{p^{C-c}}\right) \quad \text{II}$$

3). $dQ = \frac{C p\, dv + c v\, dp}{R}$

$$\frac{dQ}{T} = \frac{C p\, dv + c v\, dp}{pv} = C\frac{dv}{v} + c\frac{dp}{p}$$

$RT =$

$$= d \log(v^C \cdot p^c) \quad \text{III}$$

[illegible] Vol. [illegible]

? temp. [illegible]

$dQ = 0$ [illegible] adiabatisch

$$d \log T^c v^{C-c} = 0$$

$$\log T^c v^{C-c} = \log k$$

$$T^c v^{C-c} = k$$

T_0, v_0 | $$T_0^c v_0^{C-c} = k$$

[illegible]

$$\left(\frac{T}{T_0}\right)^c = \left(\frac{v_0}{v}\right)^{C-c}$$

$$\frac{T}{T_0} = \left(\frac{v_0}{v}\right)^{\frac{C}{c}-1} \qquad C/c = 1.4$$

$$= \left(\frac{v_0}{v}\right)^{0.4}$$

[illegible] Vol. compr. [illegible]:

$$v = \frac{v_0}{2}$$

$$\frac{T}{T_0} = 2^{0.4} = 1.3 \qquad T = T_0 \cdot 1.3$$

[illegible] $T_0 = 273$ $\qquad T = 273 \cdot 1.3$

819

3549 = 355

$t = 82°$

[illegible] 100.

[illegible] Compr. [illegible] $\frac{1}{100}$ [illegible] t. [illegible] 2000°

12/6

$\frac{dQ}{T} = d \log(v^C p^c)$ [illegible] adiat. [illegible]

$dQ = 0$

$0 = d \log(v^C p^c)$

$v^C p^c = \text{const.} = v_1^C p_1^c$

$\frac{p^c}{p_1^c} = \frac{v_1^C}{v^C}$ $\left(\frac{p}{p_1}\right) = \left(\frac{v_1}{v}\right)^{\frac{C}{c}}$ ← 1·4 | [illegible]

[illegible] $= 1$ [illegible] 1·4

$v\varrho = 1$ $\frac{p}{p_1} = \left(\frac{\varrho}{\varrho_1}\right)^{\frac{C}{c}} = \left(\frac{\varrho}{\varrho_1}\right)^k$

$v_1\varrho_1 = 1$

[illegible]

[illegible]

$\varrho = \varrho_1 (1+\sigma)$ $\sigma =$ [illegible]

$\frac{p}{p_1} = (1+\sigma)^k = 1 + k\sigma$ [illegible]

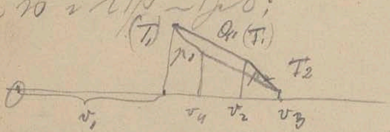
$\frac{p-p_1}{p_1} = k\sigma$ [illegible] $k=1$

[illegible] $\sqrt{\frac{p_1}{\varrho_1}}$ [illegible] $\sqrt{\frac{p_1}{\varrho_1} \cdot k}$

[illegible] Laplace [illegible]

Sadi Carnot [ocher [illegible] (80]

[illegible]



[illegible]

[illegible]

[illegible]

$Q_1 =$ [illegible] $= A\int_{v_1}^{v_2} p\,dv$

$pv = RT$

$= ART_1 \int_{v_1}^{v_2} \frac{dv}{v} =$

$= ART_1 \log\left(\frac{v_2}{v_1}\right)$

[illegible]

[illegible] A [illegible]

[illegible]

[illegible]

[illegible] $v_1 - v_2$ c

[illegible] c. $(T_1 - T_2)$

$c(T_1 - T_2) =$ [illegible]

$\frac{Q_1}{A}$ [illegible] $+ \frac{c(T_1 - T_2)}{A} =$ [illegible]

[illegible]

[illegible] compr. [illegible] Vol. [illegible]

[illegible] temp. T_2 [illegible]

[illegible]

[illegible] temp. T_2 [illegible]

[illegible]

$Q_2 =$ [illegible] $\int^{v_4}$ [illegible]

$$Q_2 = A\int_{v_3}^{v_4} p\,dv = ART_2\int_{v_3}^{v_4}\frac{dv}{v}$$

$$= ART_2 \log\frac{v_4}{v_3} =$$ [illegible]

[illegible] Q_2 neg. [illegible]

$Q_2' =$ [illegible] $= ART_2 \log\frac{v_3}{v_4}$ [illegible] v_4 [illegible]

[illegible]

[illegible] temp.

[illegible] $T_1 - T$ [illegible] $= \frac{c(T_1 - T_2)}{A}$

$\log(T)^c v^{C-c} = C$ [illegible] Vol. [illegible] effic. [illegible]

$$T_2^c\, v_4^{C-c} = T_1^c\, v_1^{C-c}$$

[illegible] v_4 [illegible]

[illegible] Carnot [illegible]

[illegible]

[illegible] $T_1 T_2 T_3$ [illegible] $T_1 T_4 T_3$ [illegible]

[illegible]

[illegible]

[illegible] Q_1 [illegible] T_1 [illegible] Q_2 [illegible] T_2

[illegible]

Carnot [illegible]

[illegible]

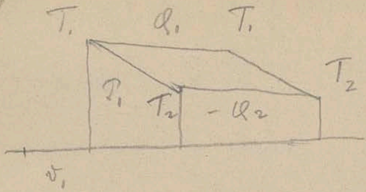
[illegible]

[illegible] $Q_1 = Q_2$ [illegible]

[illegible]

[illegible]

16/1



$\int p\,dv =$ ✓ $=$ [illegible]

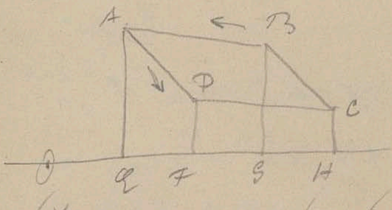
[illegible] ✓ $=$ [illegible]

Q_1 [illegible] Q_2 [illegible]

$Q_1 - Q_2 =$

$L = J(Q_1 - Q_2)$

[illegible]:



[illegible]

✓ [illegible]

[illegible]

[illegible]

[illegible]

$dQ_1 = T_1\, d \log T_1^{c} v^{C-c}$

$Q_1 = T_1 \int$

$= T_1 \left(\log T_1^{c} v_2^{C-c} - \log T_1^{c} v_1^{C-c}\right)$

$= T_1 \log \left(\frac{v_2}{v_1}\right)^{c-c}$

[illegible]

[illegible] $\frac{dQ}{T}$ [illegible]

[illegible]

$$\int \frac{dQ}{T} = 0$$

$\frac{1}{T_1} \int dQ$. [illegible] $AB = \frac{Q_1}{T_1}$

[illegible] $BC \quad = 0$

[illegible] CD: T const. $\quad \frac{1}{T_2} \int dQ = \frac{-Q_2}{T_2}$

Q_2 = [illegible]

$DA \quad — \quad = 0$

$$\frac{Q_1}{T_1} - \frac{Q_2}{T_2} = 0$$

[illegible]

$$\frac{Q_1}{T_1} = \frac{Q_2}{T_2} = \frac{Q_1 - Q_2}{T_1 - T_2}$$

$$\frac{Q_1 - Q_2}{T_1 - T_2} = \frac{Q_1}{T_1}$$

[illegible]

$$\frac{Q_1 - Q_2}{Q_1} = \frac{T_1 - T_2}{T_1}$$

= [illegible]

[illegible]

ökonomischen [illegible]

$$\frac{Q_1 - Q_2}{Q_1} = 1 - \frac{T_2}{T_1}$$ [illegible]

$-273°$ [illegible]

[illegible] $\frac{T_2}{T_1}$ [illegible] T_1 [illegible] T_2

[illegible] Joule [illegible]

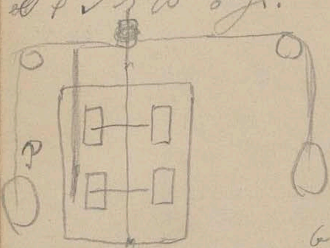
[illegible]

[illegible]

[illegible] Ag [illegible] H_2O [illegible]

[illegible]

[illegible]



[illegible]

[illegible] Temp. [illegible]

[illegible]

[illegible]

[illegible] temp. [illegible]

[illegible] [[illegible]]

[illegible]

[illegible] 2 [illegible] Energie.

$U =$ [illegible] Energie

$dQ = dU + A\,dL$ [dL [illegible]]

[illegible]

$dL = p\,dv$ [illegible] vol., temp.

$dQ = dU + A p\,dv$ [illegible]

$U = f(v, T, p)$ $p = \varphi(v, T)$

$U = F(v, T)$ [illegible]

[illegible] Energie [illegible]

dU [illegible]

$dQ - A p\,dv$ [illegible] 2 [illegible] integr. [illegible]

[illegible] $= 0$ [illegible]

[illegible]:

$dQ = C\,dT + A p\,dv$

$\int dQ = \int (C\,dT + A p\,dv)$ [illegible] int. [illegible]

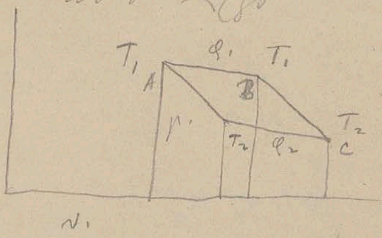
$= CT + \int A p\,dv$

$\int dQ - A p\,dv = CT$ [illegible]

$\frac{dQ}{T} =$ [illegible]

Carnot [illegible]

[illegible]



$$m = \frac{Q_1 - Q_2}{Q_1} = \frac{T_1 - T_2}{T_1}$$

[illegible]

[illegible]

Q_1' [illegible]

[illegible] Carnot [illegible]

$Q_1' - Q_2$ $\qquad m' = \frac{Q_1' - Q_2'}{Q_1'}$

Q_2 [illegible]

[illegible]

[illegible]

$Q_1 - Q_2 = Q_1' - Q_2$

[illegible] $Q_1' > Q_1$ [illegible] $Q_2' > Q_2$

[illegible]

Carnot [illegible]

[illegible] $m' = m$

$$\frac{Q_1' - Q_2'}{Q_1'} = m = \frac{T_1 - T_2}{T_1} \qquad 1 - \frac{Q_2'}{Q_1'} = 1 - \frac{T_2}{T_1}$$

$$\frac{Q_2'}{T_2} = \frac{Q_1'}{T_1}$$

[illegible] Carnot [illegible]

[illegible]

Clausius [illegible]

[illegible]

[illegible]

[illegible]

[illegible] 2k [illegible] 50° [illegible] oper. 1k [illegible] 100° [illegible]

1k [illegible] 0° [illegible]

[illegible] $\int \frac{dQ}{T}$ — = 0 [illegible] II [illegible]

$dQ - A\,dL = $ [illegible] du

$\frac{dQ}{T}$ = [illegible] dS $\quad S$ = Entropie

[illegible] Energie [illegible]

[illegible] A [illegible]

[illegible]

$dQ = \alpha\, dT + \beta\, dv$

$dQ - Ap\, dv = \alpha\, dT + (\beta - Ap)\, dv = du =$ [illegible]

[illegible]

$\frac{d\alpha}{dv} = \frac{d\beta}{dT} - A\frac{dp}{dT}$ [illegible]

$\frac{dQ}{T} = \frac{\alpha\, dT}{T} + \frac{\beta\, dv}{T} \qquad \frac{d\frac{\alpha}{T}}{dv} = \frac{d\frac{\beta}{T}}{dT}$

$\frac{1}{T}\frac{d\alpha}{dv} = \frac{1}{T}\frac{d\beta}{dT} - \frac{\beta}{T^2}$

$\frac{d\alpha}{dr} = \frac{d\beta}{dt} - \frac{\beta}{T}$ 2).

$\beta = A I \frac{dp}{dt}$ [illegible]

[illegible] β —

18/1

$$dQ = \alpha\, dT + \beta\, dv$$

$$dU = \alpha\, dT + \beta\, dv - A p\, dv = \alpha\, dT + (\beta - A p)\, dv$$

$$= \frac{\partial F}{\partial T} dT + \frac{\partial F}{\partial v} dv$$

$$\frac{\partial^2 F}{\partial T \partial v} = \frac{\partial^2 F}{\partial v \partial T}$$ [illegible]

$$\frac{\partial \alpha}{\partial v} = \frac{\partial \beta}{\partial T} - A \frac{\partial p}{\partial T}$$

$$\frac{dQ}{T} =$$ [illegible] $$= \frac{\alpha}{T} dT + \frac{\beta}{T} dv$$

$$\frac{d}{dv}\left(\frac{\alpha}{T}\right) = \frac{d}{dT}\left(\frac{\beta}{T}\right)$$

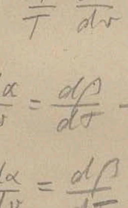
$$\frac{1}{T}\frac{d\alpha}{dv} = \frac{1}{T}\frac{d\beta}{dT} - \frac{\beta}{T^2}$$

$$\left.\begin{aligned} \frac{d\alpha}{dv} &= \frac{d\beta}{dT} - A\frac{dp}{dT} \\ \frac{d\alpha}{dv} &= \frac{d\beta}{dT} - \frac{\beta}{T} \end{aligned}\right\}$$

$$\beta = A T \frac{dp}{dT}$$

Bsp.

[illegible]



[illegible] 216 [illegible]

[illegible] co = 16

x [illegible] 1 − x [illegible] co

u = sp. Vol. [illegible] $\qquad v = xu + (1-x)u'$

u' = - - - - [illegible] [illegible] temp.

[illegible] Vol. [illegible]

[illegible]

= latente Dampf [illegible]

dx [illegible] [illegible]

$$dQ = \beta\, dv = A\, l\, dx$$ [illegible]

$$dv = dx . u - dx\, u'$$ [illegible]

$$dv = (u-u')\, dx$$ [illegible]

$$\beta(u-u')\, dx = l\, dx$$ [illegible]

$$l = \beta(u-u')$$ [illegible]

$$= AT \frac{dp}{dT}(u-u')$$ [illegible]

[illegible] Regnault [illegible]

$$l + ct = 605{\cdot}5 + 0{\cdot}305\, t$$ } [illegible] 100 [illegible]

c = sp. [illegible] $t = 1$

$$l = 605{\cdot}5 + 0{\cdot}305\, t - t$$

$$= 605{\cdot}5 - 0{\cdot}695\, t$$ [illegible]

[illegible]

[illegible] temp. [illegible] $l = 0$ [illegible]

[illegible] [kritische temp.]

[illegible]

$t = 100°$ | 605·5
69·5
$l =$ 536·0

$\frac{dp}{dt}$ [illegible]

[illegible] Atmosph.

[illegible]

95°	633·7 mm
100°	760
105°	906·4

$$\frac{272{\cdot}7}{10} = 27{\cdot}27$$

$p = 1$ [illegible]

$$\frac{dp}{dt} : p = 27{\cdot}27 : 760$$

$$\frac{dp}{dt} = \frac{27{\cdot}27 \cdot p}{760} = \frac{27{\cdot}27}{760} \cdot 1033$$

$$u - u' = \frac{l}{AT\frac{dp}{dt}} = \frac{536}{\frac{1}{42500} \; 373 \; \frac{27{\cdot}27}{760} \cdot 1{\cdot}033}$$

$$= \frac{536 \cdot 42500 \cdot 760}{373 \cdot 27{\cdot}27 \cdot 1{\cdot}033}$$

2·729165
4·628389
2·880814
10·238368
7·
3·216874

2·571709
1·435685
3·014100
7·021494

$u - u' = 1648 = 1$ [illegible]

[illegible] 0° [illegible] 7076 [illegible]

[illegible] 100° 707·[1 + α100]

[illegible] 100°

1·366 · 770

9562
9562

105·182 . 105·2 = Vol. [illegible]

[illegible] 100° [illegible]

2·022016 0·638 = [illegible]
3·216875

0·805141 −1

1 [illegible] Avogadro [illegible] temp. [illegible] Vol.

[illegible] molec. [illegible] 20

[illegible] molec.

[illegible] O 16 × [illegible] H

O [illegible] O H N [illegible]

H_2O 2
16
18

1 [illegible] molec. 18 [illegible] O = 32

$\frac{9}{16}$ $\frac{9}{14}$

21 O + 79 N

$\frac{21 . 32 + 79 . 28}{100} = \frac{4}{100}$ 168
553
721

2884

28·84

$\frac{18}{28·84}$

1·255272
1·459995
0·795277 −1

0·624 [illegible]
0·638 [illegible]

[illegible]

[illegible]

[illegible]

[illegible] 100° 1650 [illegible] 1650 cm

[illegible] $\frac{1650 \cdot 1033}{42500}$ [illegible]

1600
495
495
1704450 : 42500 = 40

536 = [illegible]
40
496 [illegible]

[illegible]

[illegible]

[illegible]

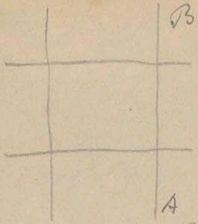
496 · 425 gcm = [illegible]

200000 m

[illegible]

[illegible]

[illegible] Capillar[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

$u = \text{Vol.}$ [illegible]

$l - p.u.A = r$ [illegible]

[illegible]

$l = AT\frac{dp}{dT}(u-u')$ $\quad l =$ [illegible] $+$

$u-u'$ [illegible] $+$

$pu = r'T$ [illegible]

$u = \frac{r'T}{p} = u - u'$ (u' [illegible])

$$l = AT\frac{dp}{dT}\frac{r'T}{p} = Ar'T^2\frac{dp}{dT}\frac{1}{p}$$

$$l = 605{\cdot}5 \quad - 0{\cdot}695\,t$$

$$l = 605{\cdot}5 - 0{\cdot}695(T - 273)$$

$$+800 - \tfrac{7}{10} T$$

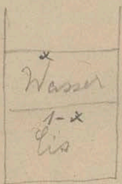
$$\frac{800}{T^2} - 0{\cdot}7\,T = A r' \frac{dp}{dT}\frac{1}{p} = A r' \frac{d(\lg p)}{dT}$$

$$-\frac{800}{T} - 0{\cdot}7 \lg T = A r' \lg p + C$$

[illegible]

[illegible] emp [illegible]

[illegible]:



$$dQ = \alpha\, dT + \beta\, dv$$

t const. [illegible] $dT = 0$ [illegible]

$$dQ = \beta\, dv$$

$$v = (1-x) u' + x u$$

$$dv = dx\,(u - u')$$

$$dQ = \beta\, dx\,(u-u')$$

$$\lambda\, dx = \beta\, dx\,(u-u')$$

$$\lambda = \beta\,(u-u')$$ $\lambda =$ [illegible]

$$\lambda = A T \frac{dp}{dT}(u-u')$$

$\frac{dp}{dT}$ [illegible] 0°

$$\frac{dp}{dT} = -\frac{\lambda}{AT(u-u')}$$ u' [illegible] $u = 1$ $u' = 1{\cdot}1$

$$\frac{dp}{dT} = -\frac{\lambda}{AT\ 0{\cdot}1}$$ [illegible]

[illegible]

$\lambda = 80$

$T = 273$

$$\frac{dp}{dT} = -\frac{80}{42500 . 273 . 0{\cdot}1} = \frac{-8}{425 . 273}$$

$$\frac{dT}{dp} = -\frac{425 . 273}{8}$$ [illegible]

$$\frac{dp}{dT} = -\frac{80 . 42500}{273 . 0{\cdot}1} =$$

$$\frac{dT}{dp} = -\frac{27{\cdot}3}{3400000}$$ [illegible] Atm.

$$dT = -\frac{27{\cdot}3}{34 . 10^5} . dp = -\frac{27{\cdot}3 . 1033}{}$$

$$\begin{array}{r} 273 \\ 819 \\ 819 \\ \hline 282009 \end{array}$$

$$dT = -\frac{28 . 10^3}{34 . 10^{5}}$$

$< -0{\cdot}01$

[illegible] 1 Atm [illegible]

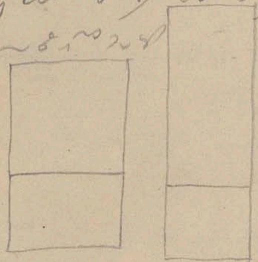
$\frac{1}{100}$ 0

[illegible]

$$\frac{d\alpha}{dv} = \frac{d\beta}{dT} - \frac{\beta}{T} \qquad \beta = \frac{l}{u - u'}$$

[illegible]

[illegible]



[illegible]

$$\alpha = v\left(\frac{d\beta}{dT} - \frac{\beta}{T}\right) + \text{Const.}$$

[illegible] $= u'$ [illegible] $\alpha =$ [illegible] cap. $= c$

$$c = u'\left(\frac{d\beta}{dT} - \frac{\beta}{T}\right) + \text{Const.}$$

$$\alpha = c + \left(\frac{d\beta}{dT} - \frac{\beta}{T}\right)(v - u')$$

$$v = (1 - x)u' + xu$$

$$v - u' = x(u - u')$$

$$\alpha = c + (u - u')x\left(\frac{d\beta}{dT} - \frac{\beta}{T}\right)$$

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$$dV = \left[(1-x)\frac{du'}{dt} + x\frac{du}{dt}\right]dt + (u-u')\,dx$$

$$\alpha\left[(1-x)\frac{du'}{dt} + x\frac{du}{dt}\right]dt + \beta\left[(1-x)\frac{du'}{dt} + x\frac{du}{dt}\right]dV = 0$$

$$\alpha\left[dV - (u-u')\,dx\right] + \beta\left[(1-x)\frac{du'}{dt} + x\frac{du}{dt}\right]dV = 0$$

$$\left[\alpha + \beta(1-x)\frac{du'}{dt} + \beta x\frac{du}{dt}\right]dV = \alpha(u-u')\,dx$$

$$\left[c + \frac{d\beta}{dt}x(u-u') - \frac{\beta}{t}x(u-u') + \beta\frac{du'}{dt} - x\beta\frac{du'}{dt} + x\beta\frac{du}{dt}\right]dV = \alpha(u-u')\,dx$$

$$L = \beta(u-u')$$

$$\left\{c + x\frac{d}{dt}\left[\beta(u-u')\right] - x\frac{\beta(u-u')}{T} + \beta\frac{du'}{dt}\right\}dV = \alpha(u-u')\,dx$$

$$\left\{c + x\frac{dL}{dt} - \frac{xL}{T} + \beta\frac{du'}{dt}\right\}dV = \alpha(u-u')\,dx$$

[illegible]

$$L = 605.5 - 0.695\,t$$

$$\frac{dL}{dt} = -0.695$$

zB. $t = 100$ $T = 373$ $536 : 373 = 1{,}435$

163

14 64

$\{1 + x \cdot 0{,}695 - x \cdot \frac{536}{373} \cdot 1{,}435\}\, dv$

$= \alpha(u - u')\, dx$

[illegible]

[illegible] $x = 1$

$1 - 0{,}695 - 1{,}435$ [illegible]

[illegible]

[illegible]

[illegible]

[illegible] condens. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] cond. zB. Stand, etc.

zB. Äther

$c + \frac{dL}{dT} - \frac{L}{T}$ [illegible] + [illegible]

[illegible] temp.

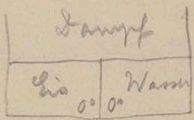
$l = \beta (u - u')$

$l = \underline{AT} \frac{dp}{dt} (u - u')$

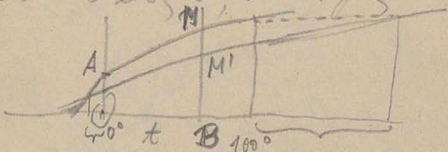
[illegible]

$\frac{dp}{dt} = \frac{l}{AT(u-u')}$ [illegible]

[illegible]



[illegible]



OA = [illegible] BM [illegible] BM' [illegible]

[illegible]

[illegible]

[illegible]

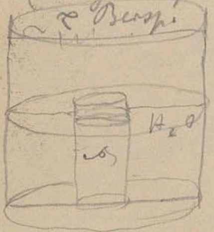
[illegible]

[illegible]

[illegible]

[illegible]

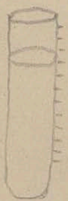
[illegible] (kryoskop. Meth. v. Raoult).



[illegible]

[illegible]

[illegible] H_2SO_4



[illegible]

[illegible] ---

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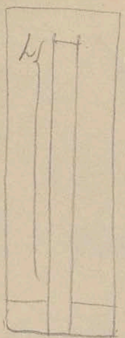
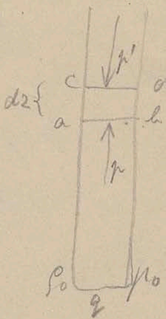
[illegible] ?





$$q\,dz\,.\,\rho$$

$$pq - p'q - q\,dz\,\rho\,.\,g = 0$$

$$p = f(z)$$

$$p' = f(z+dz) = f(z) + \frac{\partial p}{\partial z}dz$$

$$-\frac{\partial p}{\partial z}dz - dz\,\rho\, g = 0$$

$$\frac{\partial p}{\partial z} + \rho g = 0$$

[illegible]

$$\frac{p}{\rho} = \frac{p_0}{\rho_0}$$

$$\rho = \frac{\rho_0}{p_0}p$$

$$\frac{\partial p}{\partial z} + \frac{g\rho_0}{p_0}p = 0$$

$$\frac{1}{p}\frac{\partial p}{\partial z} + g\frac{\rho_0}{p_0} = 0$$

$$\frac{\partial p}{p} + g\frac{\rho_0}{p_0}\partial z = 0$$

$$d\log p + \frac{g\rho_0}{p_0}dz = 0$$

$$\log p + \frac{g\rho_0}{p_0}z = \text{konst.}$$

$z = 0 \quad | \; p = p_0 \; |$

$\log p_0 \pm \text{const.}$

$\log p + \frac{g \rho_0}{p_0} z = \log p_0$

$\log \frac{p_0}{p} = \frac{g \rho_0}{p_0} z$ [illegible] barom[illegible]

$z = \frac{p_0}{g \rho_0} \log \frac{p_0}{p}$

[illegible] $= p_1$

$\log \frac{p_0}{p_1} = \frac{g \rho_0}{p_0} h$ [illegible]

[illegible]

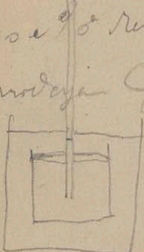
[illegible]

[illegible] Pfeffer

[illegible] Membranen [illegible]

[illegible] Membr. [illegible] chem. [illegible]

Ferrocyan [illegible]

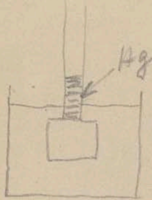


[illegible] 100 H_2O [illegible]

[illegible] Membran [illegible] H_2O [illegible]

[illegible]

[illegible] $\frac{2}{100}$ [illegible] etc.



[illegible] Hg [illegible]

[illegible]

osmotischer [illegible]

[illegible]

[illegible]

[illegible] Membrane [illegible]

[illegible]

[illegible]

vant'Hoff [illegible]

[illegible]

[illegible]

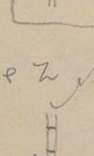
[illegible]

[illegible]

[illegible]

[illegible]

[illegible] [[illegible] W. Thomson]



Capillarit.

[illegible]

[illegible]

$g =$ [illegible]

[illegible]

Hdg

[illegible]: [illegible] $= 0$

$$2\pi r\,dh \cdot H - \pi r^2\,dh\,\rho g h = 0$$

$$0 = 2H - \rho g h r$$

$$h = \underbrace{\frac{1}{\rho g}}_{\text{sp. 1}} \frac{2H}{r}$$ [illegible]

[illegible]

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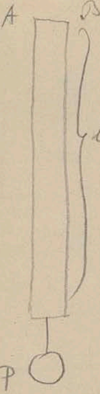


[illegible]

$$dQ = \alpha\, dT + \beta\, dP$$

[illegible]

$P\,dl$ [illegible]

$$dQ + AP\,dl = \text{[illegible]}\; D = du$$

$$\alpha\, dT + \beta\, dP + AP\,dl = du$$ [illegible]

$$dl = \frac{\partial l}{\partial T} dT + \frac{\partial l}{\partial p} dP$$

$$\alpha\, dT + \beta\, dP + AP \frac{\partial l}{\partial T} dT + AP \frac{\partial l}{\partial P} dP = du$$

$$\left[\alpha + AP\frac{\partial l}{\partial T}\right] dT + \left[\beta + AP\frac{\partial l}{\partial P}\right] dP = du$$

[illegible] $$\frac{\partial \alpha}{\partial P} + A\frac{\partial l}{\partial T} + AP\frac{\partial^2 l}{\partial P \partial T} = \frac{\partial \beta}{\partial T} + AP\frac{\partial^2 l}{\partial P \partial T}$$

[illegible] srovn

$$\frac{\partial \alpha}{\partial P} = \frac{\partial \beta}{\partial T} - A\frac{\partial l}{\partial T}$$

[illegible] $$\frac{dQ}{T} = \frac{\alpha}{T} dT + \frac{\beta}{T} dP = dS$$

$$\frac{1}{T}\frac{\partial\alpha}{\partial P} = \frac{1}{T}\frac{\partial\beta}{\partial T} - \frac{\beta}{T^2}$$

$$\frac{\partial\alpha}{\partial P} = \frac{\partial\beta}{\partial T} - \frac{\beta}{T}$$

$$\frac{\beta}{T} = AT\frac{dl}{dT}$$

[illegible]

$$dQ = 0$$

$$\alpha\, dT + \beta\, dP = 0$$

$$\alpha\, dT + AT\frac{dl}{dT}\, dP = 0$$

$$dT = -\frac{AT}{\alpha}\frac{dl}{dT}\, dP$$

α = [illegible] cap. [illegible] [[illegible]] =+ [illegible]

$$\frac{dl}{dT} = \frac{[illegible]}{[illegible]}$$

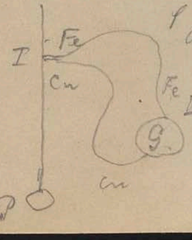
[illegible] l_0, [illegible] $l_0(1+\lambda t)$

$$\frac{dl}{dT} = l_0\lambda \qquad \lambda = \frac{1}{l_0}\frac{dl}{dT}$$ [illegible] λ +

[illegible]

[illegible] A [illegible]; [illegible] Edlund [illegible]

[illegible]



[illegible] thermoel. [illegible]

[illegible]

[illegible]

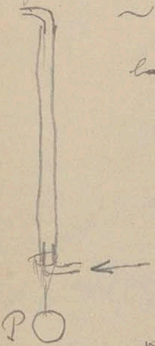
[illegible] Kautschuk [illegible]

[illegible]

[illegible]

[illegible] $\frac{dl}{dT}$ [illegible]

[illegible]



[illegible] Kautschuk [illegible]

[illegible]

[illegible] Transf. [illegible]

$$\alpha dT + \beta dP + APdl = du$$

$$\alpha dT + \beta dP + APdl + AldP - AldP = du$$

$$\alpha dT + \beta dP - AldP = du - Ad(Pl)$$

[illegible]: $\frac{d\alpha}{dP} = \frac{d\beta}{dT} - A\frac{dl}{dT}$

[illegible]

$$dq = \alpha dT + \beta dy + \gamma dz$$

$$dL = a dT + b dy + c dz$$

$$dq - AdL = du$$

$$\frac{dq}{T} = dS$$

$$(\alpha - A a)dx + (\beta - A b)dy + (\gamma - A c)dz = du$$

$$\left.\begin{aligned}
\frac{d\alpha}{dy} - A\frac{da}{dy} &= \frac{d\beta}{dx} - A\frac{db}{dx} \\
\frac{d\alpha}{dz} - A\frac{da}{dz} &= \frac{d\gamma}{dx} - A\frac{dc}{dx} \\
\frac{d\beta}{dz} - A\frac{db}{dz} &= \frac{d\gamma}{dy} - A\frac{dc}{dy}
\end{aligned}\right\} \quad I$$

$\alpha = h$
$\beta = $ [illegible]

$$\left.\begin{aligned}
\frac{d\alpha}{dy} &= \frac{d\beta}{dx} - \frac{\beta}{T} \\
\frac{d\alpha}{dz} &= \frac{d\gamma}{dx} - \frac{\gamma}{T}
\end{aligned}\right\} \quad II$$

$$\frac{d\beta}{dz} = \frac{d\gamma}{dy}$$

$$\frac{\beta}{T} = A\left(\frac{db}{dx} - \frac{da}{dy}\right)$$

$$\frac{\gamma}{T} = A\left(\frac{dc}{dx} - \frac{da}{dz}\right)$$

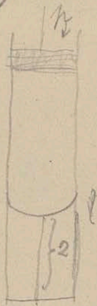
$$\frac{db}{dz} = \frac{dc}{dy}$$ [illegible] ~ Coord. xyz [illegible]

[illegible] ~ e : —

[illegible] e $b\,dy + c\,dz$ ~ [illegible]

[illegible] / f [illegible] / f

26/6 [illegible] Capillar[illegible]



$t, v,$ [illegible] H

$H dg =$ [illegible]

[illegible]

$$dQ = \alpha\, dT + \beta\, dv + \gamma\, dH$$

$p\,dv =$ [illegible]

$p\,dv - H dg$

[illegible]

$$du = dQ - A[p\,dv - H dg]$$

$$= dQ - A[p\,dv - H dg - g\,dH + g\,dH]$$

$$du + A\,d(gH) = dQ - A p\,dv - A g\,dH$$

$$= \alpha\, dT + (\beta - Ap)\,dv + (\gamma - Ag)\,dH$$

[illegible] D

$$\frac{d\beta}{dH} - A\frac{dp}{dH} = \frac{d\gamma}{dv} - A\frac{dg}{dv}$$

$$\frac{dQ}{T} = dS \quad \therefore \frac{d\beta}{dH} = \frac{d\gamma}{dv}$$

$$\frac{dp}{dH} = \frac{dg}{dv}$$

$g = (2+r)2\pi r$ [[illegible]]

$dg = 2\pi r\, dz$ [[illegible]]

[illegible]

x 1.5 of $(1-x)$ w

$$v = (1-x)u' + xu$$

$$(1-x)u' = \pi r^2 z + \pi z^3 - \frac{2\pi r^3}{3}$$

$$-u'dx = \pi r^2 dz$$

$$dg = -\frac{2u'dx}{r} \qquad dv = (u-u')dx$$

v const. Temp. / v & H variabel / [illegible]

$$\frac{dg}{dv} = -\frac{2u'}{(u-u')r}$$

$$\frac{dp}{dH} = -\frac{2u'}{(u-u')r}$$

[illegible] H / [illegible] T

$$p = -\frac{2u'}{(u-u')r} H + \text{const}$$

$r = \infty$ $p = \text{const}$ = [illegible]

[illegible] $\frac{2u'}{(u-u')r}$

$$h = \frac{2H}{sr} \qquad s = \frac{1}{u'}$$

$$= \frac{2u'H}{r}$$

~~[illegible]~~ $u' = \sigma$ [illegible]

$$p = -\frac{h}{u} + \text{const}$$

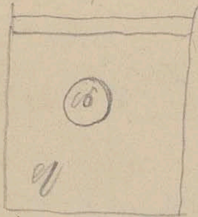
$$\frac{1}{u} = sp. \; [illegible] = \sigma$$

$$= -h\sigma + \text{const}$$

$h\sigma =$ [illegible]

[illegible]

[illegible]



[illegible]

[illegible]

$= H\,dO$

[illegible] const [illegible] p [illegible] p

$$dQ = \alpha\,dT + \beta\,dv + \gamma\,dH$$

$$du = dQ - Ap\,dv + AH\,dO - AO\,dH + AO\,dH$$

[illegible] dO [illegible]

$$du + A\,d(OH) = dQ - Ap\,dv + AO\,dH$$

$$\frac{dp}{dH} = -\frac{dO}{dv}$$ [illegible] O

[illegible]

$$O = 4\pi r^2 \qquad dO = 8\pi r\,dr$$

$$(1-x)u' = \frac{4\pi r^3}{3} \qquad -u'\,dx = 4\pi r^2\,dr$$

$$v = (1-x)u' + xu \qquad dr = -\frac{u'\,dx}{4\pi r^2}$$

$$dv = (u-u')\,dx \qquad dO = -\frac{2u'\,dx}{r}$$

$$\frac{dO}{dv} = -\frac{2u'}{(u-u')r}$$

$$\frac{dr}{dH} = \frac{2u'}{(u-u')r}$$

$$p = \frac{2u'H}{(u-u')r} + \text{const}$$ [illegible]

[illegible]

[illegible]

[illegible]

$$dQ = \alpha\, dT + \beta\, dv + \gamma\, dS$$

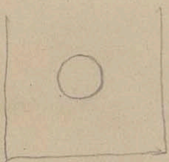
[illegible] indep. [illegible]

[illegible]

$$s = \pi r^2$$

$$\pi = \frac{s}{r^2}$$

$$d\pi = \frac{ds}{r^2} - \frac{2s}{r^3}\, dr$$



[illegible] elektr. [illegible]

e = Elektr. [illegible]

$$dQ = \alpha\, dT + \beta\, dv + \gamma\, dE$$

[illegible]

Potential $= \frac{e^2}{2r} = W$

$$dW = -\frac{e^2}{2r^2}\, dr$$ [illegible] Pot. [illegible] R. [illegible]

$$du = dQ + A p\, dv + \underbrace{\frac{e^2 A}{2r^2}\, dr + A\,\frac{e\, de}{r} + A\,\frac{e\, de}{r}}_{d\,A\left(\frac{e^2}{2r}\right)}$$

$$du + A\,d\left(\frac{\Phi^2}{2r}\right) = d\Phi - Ap\,dv + A\frac{\Phi\,d\Phi}{r}$$

$$\frac{dp}{d\Phi} = -\frac{d\left(\frac{\Phi}{r}\right)}{dv} = \frac{\Phi}{r^2}\frac{dr}{dv}$$ $\Phi =$ [illegible]

$$(1-x)\,u' = \frac{4\pi r^3}{3}$$

$$4\pi r^2\,dr = -u'\,dx$$

$$dv = (u-u')\,dx$$

$$\frac{dr}{dv} = -\frac{u'}{4\pi r^2 (u-u')}$$

$$\frac{dp}{d\Phi} = -\frac{\Phi u'}{4\pi r^4 (u-u')}$$

$$p = -\frac{\Phi^2 u'}{8\pi r^4 (u-u')} + \text{const}$$

const. = [illegible]

[illegible] electr.

[illegible] electr. [illegible]

[illegible]

[illegible]

[illegible]

[illegible] Vol. [illegible]

[illegible]

30/6 Kinetische – Dynamische theorie der Gase.

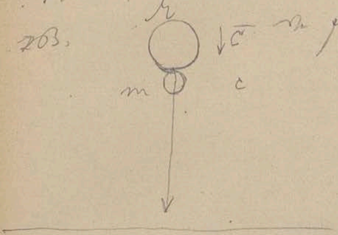
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



[illegible] : $MC = mc$

[illegible]

[illegible]

$u = c + gt = 0$

$t = \frac{c}{g}$ [illegible]

[illegible] $t' = \frac{h}{c}$ [illegible]

[illegible]

[illegible] $2t = 2t'$

$\frac{C}{g} = \frac{h}{c}$ $\quad C = \frac{gh}{c}$ $\quad M\frac{gh}{c} = mc$

$$Mg = \frac{mc^2}{h}$$

$P = \frac{mc^2}{h}$ [illegible]

[illegible]

[illegible]

$P = \frac{mc^2}{h}$ [illegible]

$P = mc \cdot \frac{c}{h}$ [illegible]

[illegible] $= \vartheta$

$\vartheta = \frac{2h}{c}$

$\frac{c}{h} = \frac{2}{\vartheta}$ $P = \frac{2mc}{\vartheta}$ [illegible] $= \frac{1}{\vartheta}$

$= 2\,2mc =$ $2\times$ [illegible]

[illegible]

$=$ [illegible] $= /$

[illegible]

$c_1 = c + gt'$ $t = \frac{c}{g}$

$\frac{c_1 - c}{g} = t'$ $2t = 2t'$ $\frac{C}{g} = \frac{c_1 - c}{g}$

$C = c_1 - c$

$M(c_1 - c) = mc$

$M(c_1^2 - c^2) = mc(c_1 + c) = M\,2gh =$

$Mg = \frac{mc(c_1 + c)}{2h}$

$$P = \frac{mc(c_1+c)}{2h}$$

$$\frac{c+c_1}{2} = v \; [illegible]$$

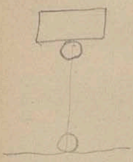
$$4h = (c+c_1)\vartheta$$

$$\frac{c+c_1}{4h} = \frac{1}{\vartheta}$$

$\vartheta =$ [illegible]

$$P = \frac{2mc}{\vartheta}$$

[illegible] Pressure [illegible] central [illegible]



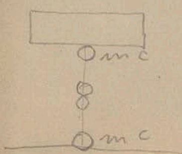
[illegible]

$$P_1 = \frac{2mc_1}{\vartheta} = \frac{mc_1(c+c_1)}{2h}$$

$$P_1 - P = \frac{mc_1^2 - mc^2}{2h} = \frac{m(c_1^2-c^2)}{2h} = mg$$

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

$H = h + d$ $h = H - d$

$\frac{H}{2} = h' + d$ ~~$h' = \frac{H}{2} - d$~~ $h' = \frac{H}{2} - d$ [illegible]

[illegible] = [illegible]

[illegible] $= \frac{mc^2}{h} \times$ [illegible]

[illegible] Bh

$P = \frac{mc^2}{h} \cdot N$ [illegible]

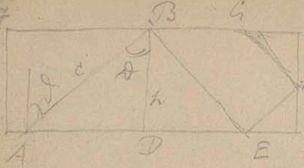
$= \frac{P}{B} = p = N \frac{mc^2}{Bh}$ $p = \frac{Nmc^2}{v}$

$pv = Nmc^2$ } Mariotte [illegible] mc^2 [illegible]

[illegible] T

[illegible] Daniel Bernoulli [illegible]

1/7



ω H [illegible] F [illegible] c $c\cos\vartheta$ [illegible]

$2mc\cos\vartheta$ [illegible]

[illegible]

[illegible] $FH = FG$ [illegible]

$$t = \frac{BE}{c} + \frac{EG}{c} = \frac{2BE}{c} \qquad h = BE\cos\vartheta$$

$$BE = \frac{h}{\cos\vartheta} \quad \Big| = \frac{2h}{c\cos\vartheta} \qquad z = \frac{c\cos\vartheta}{2h}$$

$$z \cdot 2mc\cos\vartheta = P = \frac{mc^2\cos^2\vartheta}{h}$$ [illegible]

[illegible]

[illegible] ϑ, [illegible] $n\ \vartheta$ $\quad n_1\ \vartheta_1$

$$\frac{mc^2\cos^2\vartheta}{h} + \frac{mc^2\cos^2\vartheta_1}{h} \qquad \frac{n\,mc^2\cos^2\vartheta + n_1\,mc^2\cos^2\vartheta_1}{h}$$

[illegible]

[illegible] $\vartheta,\ \vartheta + \Delta\vartheta$ [illegible]

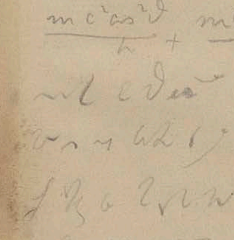
[illegible]

[illegible]

[illegible] dO [illegible] n [illegible] N

[illegible]

$$n : N = dO : O = dO : 4\pi$$



$$2\pi\sin\vartheta \cdot d\vartheta = [illegible]$$

$$n = \frac{N 2\pi\sin\vartheta\, d\vartheta}{4\pi} = \frac{\sin\vartheta\, d\vartheta\, N}{2}$$

$$\Sigma n = \frac{N}{2}\int_0^{\pi}\sin\vartheta\, d\vartheta = \frac{N}{2}\Big[-\cos\vartheta\Big]_0^{\pi} = N$$

$\frac{mc^2\cos^2\vartheta}{h}$ [illegible] $\frac{mc^2\cos^2\vartheta}{h}$

$$\Sigma = \frac{\Sigma mc^2}{2h}\cos^2\vartheta \sin\vartheta\, d\vartheta\, N\Big|_0^{\pi/2} = -\frac{Nmc^2}{2h}\,\frac{\cos^3\vartheta}{3}\Big|_0^{\pi/2}$$

$$= \frac{Nmc^2}{3h}$$ [illegible] Clausius [illegible]

[illegible] 3 [illegible]

[illegible] 3 [illegible] 3 [illegible] Rosing [illegible]

[illegible] w = vert. comp.

$\frac{mc^2\cos^2\vartheta}{h}$ [illegible] $= \frac{mw^2}{h}$

$$P = \Sigma\frac{mw^2}{h} \quad [illegible] \quad P = Bp$$

$$p = \frac{\Sigma mw^2}{Bh} = \frac{1}{Bh}\Sigma mw^2 = \frac{1}{v}\Sigma mw^2.$$

[illegible] vertical. $p = \frac{1}{v}\Sigma mu^2$ [illegible] X [illegible]

$$p = \frac{1}{v}\Sigma mv^2 \perp Y$$

$$3p = \frac{1}{v}\Sigma(mu^2 + mv^2 + mw^2) = \frac{1}{v}\Sigma mc^2 \quad p = \frac{1}{3}\Sigma$$

[illegible]

$$p = \frac{\frac{1}{3}\Sigma mc^2}{v}$$ [illegible]

[illegible]

$$pV = \frac{2}{3}\Sigma m\frac{c^2}{2} = \frac{2}{3}$$ [illegible]

[illegible]

[illegible] $\Sigma mc^2 = Nmc^2$

$$pV = \frac{1}{3}Nmc^2$$ Nm = [illegible] cm^3

$p = 1033\ gr \quad v = 1$

$N m = \frac{1}{770} g \quad c = \sqrt{\frac{3 p v}{N m}} =$

$p = 1033 g$ 20 ... 85 ...

c · 1cm³ es 20 ...

$c = \sqrt{3 . 1033 . 980 . 6 . 770}$

$= 48.500\ cm$

$= 485\ m$

PAPIER-HANDLUNG

Dr. Josef Stefan 77 III.

Ausgewählte Capitel aus der

Optik und Wärmelehre.

II. S. 91. M. Smoluchowski

F. POLLY, IV. KAROLINENG. 23.

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$pv = \frac{Nmc^2}{3}$ [illegible]

$pv = \frac{1}{3} \sum mc^2 = \frac{m}{3} \sum c^2$

$\left.\frac{Nm}{3} \frac{\sum c^2}{N}\right\}$ = [illegible]

$Pv = Nm\frac{c^2}{3} =$ [illegible] Vol.

[illegible]

$H : O = 1 : 16$ [illegible] $\frac{1}{10}$ [illegible]

[illegible] 16 [illegible]

$c\,i = \sqrt{16} = 4$ [illegible] $1:16$ $1:1/4$

[illegible] Molec. [illegible] 4 [illegible]

$\frac{mc^2}{2} =$ [illegible] T [illegible]

$\frac{m_1 c_1^2}{2}$ $\frac{mc^2}{2} = \frac{m_1 c_1^2}{2}$ [illegible]

[illegible]

$pv = \frac{N_1 m_1 c_1^2}{3}$ $pv = \frac{N_2 m_2 c_2^2}{3}$

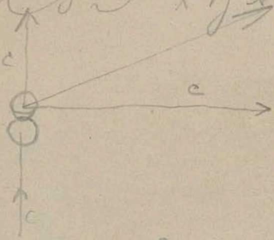
$T \# \int \alpha \frac{mc^2}{2} = \alpha \frac{m_1 c_1^2}{2} = \alpha \frac{m_2 c_2^2}{2}$

$N_1 = N_2$ } [illegible] Avogadros [illegible] Vol. [illegible]

[illegible] Molec.

[illegible]

[illegible] const [illegible]



[illegible]

$r^2 = 2c^2$

[illegible]

[illegible]

Maxwell [illegible]

x y z [illegible] 3 Comp. [illegible]

[illegible]

[illegible] xs xdx [illegible]

$= f(x)dx$ [illegible] Comp. [illegible]

[illegible] y — y+dy

$\phi(y)dy$ [illegible]

$= f(y)dy$

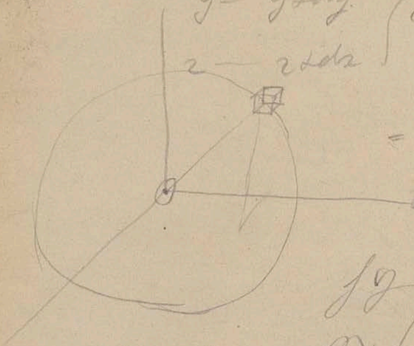
$f(z)dz$ [illegible]

$= f(x)\, f(y)\, f(z)\, dx\, dy\, dz$

[illegible] x — $x+dx$

y — $y+dy$ } [illegible]

z — $z+dz$



= [illegible]

[illegible] 

[illegible]

[illegible] x y z [illegible]

[illegible] $x^2+y^2+z^2$ [illegible]

[illegible]

$f(x) = \varphi(x^2)$

$\varphi(x^2)\,\varphi(y^2)\,\varphi(z^2)\,dx\,dy\,dz = \varphi[x^2+y^2+z^2]\,dx\,dy\,dz$

[illegible] φ [illegible]

[illegible] φ — Expon.

$\varphi(x^2) = e^{\lambda x^2}$

$\varphi(y^2) = e^{\lambda y^2}$

$\varphi(z^2) = e^{\lambda z^2}$ [illegible] $\varphi(x) = 1$ [illegible]

[illegible]

[illegible]

[illegible]

[illegible] $= -\alpha$ [illegible]

$f(x) = e^{-\alpha x^2}$

$f(x)\,dx = C\,e^{-\alpha x^2}\,dx$

[illegible] Constante a

[illegible]

[illegible]

[illegible]

[illegible] statistischen [illegible]

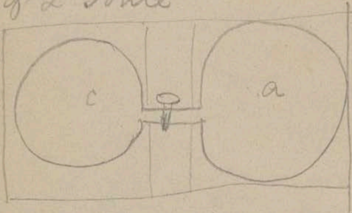
[illegible]

[illegible]

[illegible]

[illegible]

[illegible] Tonle



[illegible]

[illegible]

[illegible]

[illegible] 2 Cal. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

$$\left.\begin{matrix}\varphi(x^2)\,dx \\ \varphi(y^2)\,dy \\ \varphi(z^2)\,dz\end{matrix}\right\} \quad \varphi(x^2)\,\varphi(y^2)\,\varphi(z^2)\,dx\,dy\,dz$$

$$= F(x^2+y^2+z^2)\,dx\,dy\,dz$$

[illegible] x [illegible] x^2 [illegible] $x^2+y^2+z^2$

$$\underbrace{x^2+y^2+z^2}_{c^2} \qquad y_0 \qquad \begin{matrix}z\\0\end{matrix} \Big\} \text{[illegible]} = \varphi(0)$$

$$= F \text{ - - - } =$$

$$\varphi(x^2)\,\varphi(y^2)\,\varphi(z^2) = \varphi(x^2+y^2+z^2)\,\varphi(0)\,\varphi(0)$$

$$\varphi(x^2) = C\,e^{-ax^2}$$

C, a [illegible]

$$w = C^3 e^{-a(x^2+y^2+z^2)}\,dx\,dy\,dz \qquad \text{[illegible]} \ -\infty, +\infty \ = 1$$

$$1 = C^3 \iiint_{-\infty}^{+\infty} e^{-a(x^2+y^2+z^2)} = C^3 \int_{-\infty}^{+\infty} e^{-ax^2}\,dx \int_{-\infty}^{+\infty} e^{-ay^2}\,dy \int_{-\infty}^{+\infty} e^{-az^2}\,dz$$

$$\int_{-\infty}^{+\infty} e^{-ax^2}\,dx = \frac{\sqrt{\pi}}{\sqrt{a}} \qquad 1 = C^3\left(\frac{\pi}{a}\right)^{\frac{3}{2}}.$$

$$1 = C\sqrt{\frac{\pi}{a}} \qquad C = \sqrt{\frac{a}{\pi}}$$

[illegible]

[illegible] N [illegible]

$$dN = N\left(\frac{a}{\pi}\right)^{\frac{3}{2}} e^{-a(x^2+y^2+z^2)}\,dx\,dy\,dz$$

[illegible] x^2

$$\frac{\Sigma dN x^2}{N} = [illegible]\, x^2$$

$$= \left(\frac{a}{\pi}\right)^{\frac{3}{2}} \int_{-\infty}^{+\infty} e^{-ax^2} x^2 dx \int_{-\infty}^{+\infty} e^{-ay^2} dy \int_{-\infty}^{+\infty} e^{-az^2} dz =$$

$$= \left(\frac{a}{\pi}\right)^{\frac{3}{2}} \sqrt{\frac{\pi}{a}} \sqrt{\frac{\pi}{a}} \frac{\sqrt{\pi}}{2a^{\frac{3}{2}}} = \frac{1}{2a} = [illegible]\, x^2$$

[illegible] y^2 $\frac{\Sigma dN y^2}{N} = \frac{1}{2a}$ [illegible] z^2 $\frac{1}{2a}$

[illegible] $x^2+y^2+z^2 =$ [illegible] $c^2 = \frac{3}{2a} = \alpha$

[illegible] ^{2} [illegible]

$a = \frac{3}{2\alpha}$ [illegible] α

[illegible] $-\infty$ [illegible] $+\infty$ [illegible]

[illegible] Diff. [illegible] discrete [illegible]

[illegible] $\frac{1}{1000000}$ [illegible]

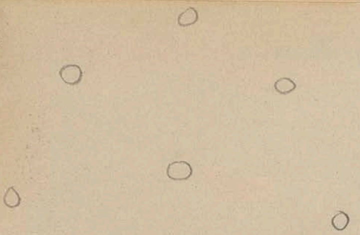
Sol. [illegible]

[illegible]

[illegible]

[illegible]

[illegible] = [illegible]



[illegible]

[illegible] $= \frac{[illegible]}{[illegible]}$

[illegible]

[illegible] 1 [illegible] Prisma [illegible]

[illegible] Vol. 1 [illegible]

$n \pi r^2 \xi =$ [illegible]

$\frac{1 - \overbrace{n \pi r^2}^{\alpha} \xi}{1} =$ [illegible]

[illegible] Prisma [illegible] $= (1-\alpha\xi)(1-\alpha\xi)$

$\underbrace{p\,\xi}_{x} \qquad (1-\alpha\xi)^p = (1 - \frac{\alpha x}{p})^p = e^{-\alpha x}$ lim

$W_x = e^{-\alpha x}$

$W_{x+dx} = e^{-\alpha(x+dx)} = e^{-\alpha x}(1 - \alpha\, dx)$

$W_x - W_{x+dx} = \alpha\, e^{-\alpha x} dx$

$\int_0^\infty \alpha e^{-\alpha x} dx \cdot x =$ [illegible] $\int -x\, d\, e^{-\alpha x} = -x e^{-\alpha x} + \int \underbrace{e^{-\alpha x} dx}$

$\Big|_0^\infty -x e^{-\alpha x} - \frac{e^{-\alpha x}}{\alpha}$

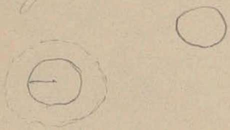
$= \frac{1}{\alpha}$ = [illegible] [[illegible] Clausius]

[illegible]

$$\lambda = \frac{1}{\alpha} = \frac{1}{n\pi r^2}$$ [illegible]

$$= \frac{1}{n\pi (r+r')^2}$$ [illegible]

[illegible]



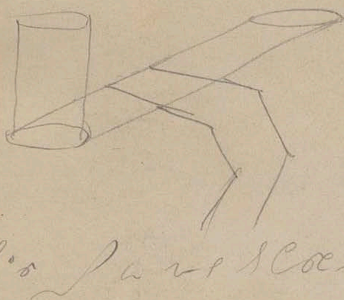
[illegible]

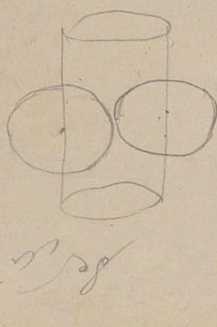
$r_1 + r_2 = s$

Cylinder $\pi s^2 c$ = [illegible]

$\pi s^2 c \qquad n \pi s^2 c$ [illegible] = [illegible]

$\frac{c}{n \pi s^2 c} = \lambda = \frac{1}{n \pi s^2}$ [illegible]





[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

$x_1 \mid x_2$ $\qquad (x_1-x_2)^2+(y_1-y_2)^2+(z_1-z_2)^2 =$ [illegible]

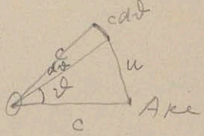
$y_1 \quad y_2$ $\qquad = u^2$

$z_1 \quad z_2$ $\qquad$ [illegible]

[illegible]

[illegible]

[illegible]



$$u^2 = c^2+c^2-2c^2\cos\vartheta$$

$$= 2c^2(1-\cos\vartheta)$$

$u =$ [illegible] ϑ [illegible]

[illegible]

$$\rho = \frac{\sum 2\pi c \sin\vartheta \cdot c\,d\vartheta \cdot u}{4\pi c^2} = \text{[illegible]}\ u$$

$$= \frac{1}{2}\sum u \sin\vartheta\, d\vartheta$$

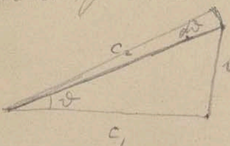
$$= \frac{1}{2}\int_0^{\pi} c\sqrt{2}\sqrt{1-\cos\vartheta}\,\sin\vartheta\, d\vartheta$$

$$= 4c \int_0^{\pi} \sin^2\frac{\vartheta}{2} \cos\frac{\vartheta}{2}\, d\frac{\vartheta}{2} = \frac{4c}{3} \sin^3\frac{\vartheta}{2} \Big|_0^{\pi} = \frac{4c}{3}$$

[illegible] $= \frac{4r}{3}$

$$\frac{4 N \pi s^2}{3} = \frac{1}{\lambda}$$ [illegible]

[illegible]:



[illegible]

$u =$ [illegible]

$$u_r^2 = c_1^2 + c_2^2 - 2c_1 c_2 \cos\vartheta$$

$$\frac{\sum 2\pi c_2 \sin\vartheta\, c_2\, d\vartheta \cdot u}{4\pi c_2^2} = \frac{1}{2} \int_0^{\pi} \sqrt{c_1^2 + c_2^2 - 2c_1 c_2 \cos\vartheta}\, \sin\vartheta\, d\vartheta$$

$$= \frac{1}{2c_1 c_2} \int_0^{\pi} d\left[c_1^2 + c_2^2 - 2c_1 c_2 \cos\vartheta\right]^{\frac{3}{2}} \cdot \frac{1}{3}$$

$$= \frac{1}{6c_1 c_2} \left[c_1^2 + c_2^2 - 2c_1 c_2 \cos\vartheta\right]^{\frac{3}{2}} \Big|_0^{\pi} =$$

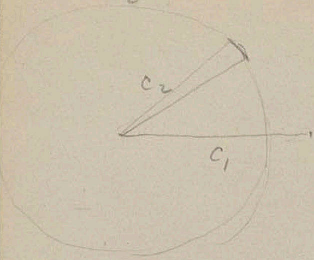
$c_2 - c_1$ [illegible] $c_1 - c_2$ [illegible]

$$= \frac{1}{6c_1 c_2} \left[(c_1 + c_2)^3 - (c_2 - c_1)^3\right]$$

$$= \frac{c_1^3 + 3c_1^2 c_2 + 3c_1 c_2^2 + c_2^3 - c_2^3 + 3c_2^2 c_1 - 3c_2 c_1^2 + c_1^3}{6c_1 c_2} \qquad c_2 > c_1$$

$$= \frac{6c_1 c_2^2 + 2c_1^3}{6c_1 c_2} =$$ [illegible]

$c_1 > c_2$



$$u = \frac{(c_1+c_2)^3 - (c_1-c_2)^3}{6c_1c_2} =$$

$$= \frac{2c_2^3 + 6c_1^2c_2}{6c_1c_2}$$

[illegible] 2 [illegible]

[illegible] c_2 [illegible]

8/7 [illegible] cap. [illegible] const. [illegible] const. Vol.

$$pv = \frac{Nmc^2}{3} = \frac{2}{3} \underbrace{N \frac{mc^2}{2}}_{\text{Energie}}$$

$$N \frac{mc^2}{2} = cT$$

[illegible]

$$p\,dv = \frac{2}{3} d\, N \frac{mc^2}{2}$$ (bei const.)

$$= \frac{2}{3} c\,dT$$

[illegible] Vol. [illegible]

$$C = c + \frac{2}{3} c$$

$$\frac{C}{c} = \frac{5}{3} = 1{,}666$$ [illegible]

[illegible] 1,4

[illegible]; Clausius [illegible]

[illegible] Molek. [illegible]

[illegible]; [illegible] rotierende [illegible]

[illegible] (e Mol.) [illegible]

[illegible] Co.

[illegible] H, O, N [illegible] Molek.

[illegible] 2 Atom [illegible]: H_2, O_2, N_2

[illegible] Molek. ∞; [illegible]

8 [illegible]

[illegible]

[illegible]

103. Rotationsell.

[illegible] Kyp. [illegible] LK [illegible]

[illegible] 3 [illegible] LK [illegible] X [illegible] Y, Z [illegible]

Rot. Ellips. [illegible] Rot. [illegible]

[illegible] 2 [illegible] 5

$$N m \frac{u^2}{2} + N m \frac{v^2}{2} + N m \frac{w^2}{2} \qquad u^2 + v^2 + w^2 = c^2$$

p q / R. Ell.

$$+ N a \frac{p^2}{2} + N b \frac{q^2}{2}$$ a = [illegible]

[illegible] 5 [illegible] const. [illegible]

$$p v = \frac{2}{3}\left[N m \frac{u^2}{2} + N m \frac{v^2}{2} + N m \frac{w^2}{2}\right]$$

$$= 2 N m \frac{u^2}{2}$$

const. Vol. 5

const. [illegible] 5 + 2 [illegible]

$$C : c = 7 : 5$$
$$= 1{,}4 : 1$$ [illegible]

[illegible]

[illegible] 2 [illegible]

---

3 [illegible] Ell.

[illegible] 6 [illegible]

6	c. Vol.
6+2	c. [illegible]

$$C : c = 8 : 6 = 4 : 3 = 1{,}3\dot{3}$$ [illegible] CO_2

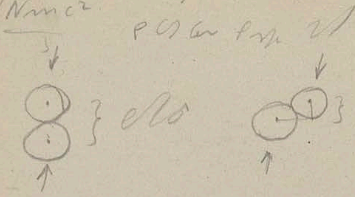
[[illegible] 6 [illegible]]

6 [illegible] R. Ell. [illegible] 16

[illegible] 16/6 [illegible]

[illegible]

[illegible]



[illegible]

compr. [illegible] compr. [illegible] Volum [illegible]

[illegible] $\frac{1}{1000}$ [illegible]

[illegible] $\frac{1}{100}$ [illegible] Corr. [illegible] $\frac{1}{10}$

[illegible] compr.

$$pv = RT$$

$$p > \frac{RT}{v} = \frac{RT}{v - \varepsilon}$$

9/7 [illegible]

[illegible]

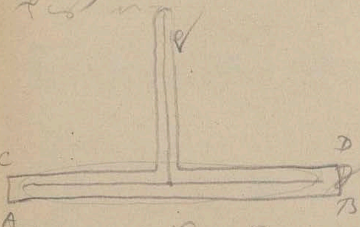
1. [illegible]

2). [illegible]

[illegible] Ampl. [illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible] ABCD

[illegible]

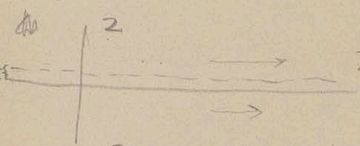
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



$-\mu \frac{du}{dz} =$ [illegible] coeff. $= R$

$R' = \left[R + \frac{dR}{dz}\,\varepsilon\right]$ [illegible]

[illegible] Hyp. [illegible]

[illegible] R [illegible]

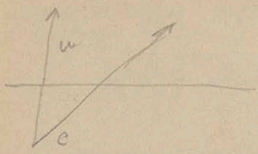
[illegible]

[illegible]

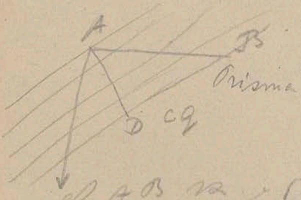
[illegible]

$R =$ [illegible]

[illegible]



[illegible]



[illegible] cq $q = 1$

[illegible] Norm.

[illegible] AB [illegible] AD

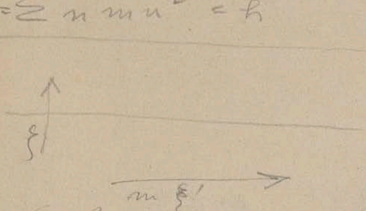
[illegible]

[illegible] $\cos\vartheta$ [illegible]

[illegible] $n m u^2$

[illegible]

$p = \sum n m u^2 = h$



$\sqrt{\frac{a}{\pi}}\, e^{-a\xi^2}\, d\xi$ = [illegible]

[illegible]

[illegible]

$m\xi'$ $\sum n \xi m \xi' = R$

[illegible]

ξ' [illegible]

$\xi' = \xi + u'$ [illegible]

[illegible]

$$u' = u - \frac{du}{dz} h$$ $h =$ [illegible]

$\xi' = \xi + u - \frac{du}{dz} h$

$R = \Sigma\, n m \zeta \left[\xi + u - \frac{du}{dz} h \right]$

$= \Sigma\, n m \xi \zeta + u \Sigma\, n m \zeta - \frac{du}{dz} \Sigma\, n m \zeta h$

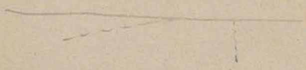
$\xi \zeta$

[illegible] $+ \xi$ [illegible]

[illegible] $\Sigma\, \xi \zeta = 0$ $\quad \Sigma\, \zeta = 0$

$R = -\frac{du}{dz} \Sigma\, n m \zeta h$

[illegible] h: [illegible]



$h : \lambda$ = [illegible] ζ : [illegible]

$h : \lambda = \zeta : c$

$h = \frac{\lambda \zeta}{c}$

$R = -\frac{du}{dz} \Sigma\, n m \frac{\lambda \zeta^2}{c} = -\frac{du}{dz} \frac{\lambda}{c} \underbrace{\Sigma\, n m \zeta^2}_{p}$

[illegible]

$R = -\frac{du}{dz} \frac{p \lambda}{c}$ $\qquad \mu = \frac{p \lambda}{c}$

$$p = \frac{nmc^2}{3}$$

$$\mu = \frac{Nmc^2}{3}\frac{\lambda}{c} = \frac{Nmc\lambda}{3}$$

$Nm =$ [illegible]

$$= \frac{\rho c \lambda}{3}$$

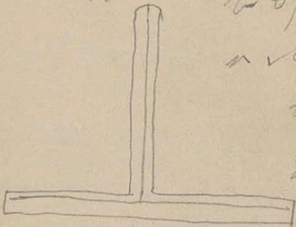
[illegible]

10/7 $\mu = \frac{g a c \lambda}{3}$ [illegible]

[illegible]

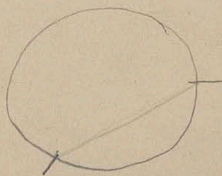
[illegible] Coeff. [illegible]

[illegible]



[illegible]

[illegible] 216 [illegible]

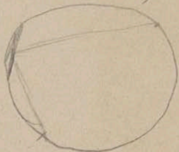


[illegible] Crookes ⊙

[illegible] Geisslersche [illegible]

[illegible]

[illegible]



[illegible]

[illegible] 4.ten Aggregat [illegible]

[illegible]

[illegible]

[illegible] Capill. II : 0·00017 cm, s, [illegible] cm^3 [illegible]

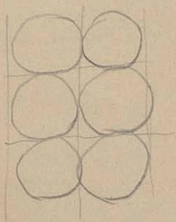
$\lambda = \frac{8}{10^6}$ cm $\quad \frac{4}{3} N \pi s^2 = \frac{1}{\lambda}$

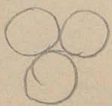
[illegible] $N\pi s^2$ [illegible] Mol. [illegible] 10^8 [illegible]

[illegible] Mol. [illegible]

Hypoth. [illegible] und [illegible] Mol. [illegible]

[illegible]





[illegible]

[illegible]

$N s^3$ = Vol.

$N s^3 = \frac{1}{770}$ [illegible] $= \infty$

$\frac{4}{3} \frac{\pi}{s} = \frac{\lambda}{770 \lambda}$ $\quad s = \frac{43}{10^9}$ [illegible] Loschmidt

$\frac{1}{s} = \frac{100 \cdot 10^7}{43}$ $\quad$ 20,000000 Mol. [illegible] 1cm [illegible]

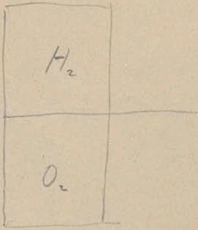
$N = 16 \cdot 10^{18}$ = 16 Trill. Mol.

[illegible] $\frac{1}{10^6}$ Vol. compr. [illegible]

[illegible]

[illegible] 16 Crookes [illegible]

Diffusion [illegible]



[illegible]

[illegible] Theorie [illegible]

$CO_2 \mid H_2$ $CO_2 \mid O_2$ $H_2 \mid O_2$

[illegible] 3 [illegible] 3 [illegible] H_2, O_2, CO_2

[illegible]

[illegible]

[illegible] Loschmidt [illegible]

[illegible] Maxwell [illegible]

Wärmeleitung.

[illegible]

[illegible]

[illegible] Maxwell [illegible] Theorie [illegible]

[illegible] 20000 [illegible] Cu

[illegible]

[illegible]

Σ [illegible] $\frac{mc^2}{2}$ [illegible] 120 [illegible]

[illegible]

[illegible]

110