

Fitzwilliam Notebook

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pret 8^d

Nabed Efyhik,
Wfnzo Cpmkfe

<3r>

[\[Editorial Note 1\]](#)

Before Whitsunday 1662.

Vsing the word (God) openly	1
Eating an apple at Thy house	2
Making a feather while on Thy day	3
Denying that I made it.	4
Making a mousetrap on Thy day	5
Contriving of the chimes on Thy day	6
Squirting water on Thy day	7
Making pies on Sunday night	8
Swimming in a kimnel on Thy day	9
Putting a pin in Iohn Keys hat on Thy day to pick him.	10
Carelessly hearing and committing many sermons	11
Refusing to go to the close at my mothers command.	12
Threatning my father and mother Smith to burne them and the house over them	13
Wishing death and hoping it to some	14
Striking many	15
Having uncleane thoughts words and actions and dreamese.	16
Stealing cherry cobs from Eduard Storer	17

Denying that I did so	18
Denying a crossbow to my mother and grandmother though I knew of it	19
Setting my heart on money learning pleasure more than Thee	20
A relapse	21
A relapse	22
A breaking again of my covenant renewed in the Lords Supper.	23
Punching my sister	24
Robbing my mothers box of plums and sugar	25
Calling Dorothy Rose a jade	26
Glutiny in my sickness.	27
Peevishness with my mother.	28
With my sister.	29
Falling out with the servants	30
Divers commissions of alle my duties	31
Idle discourse on Thy day and at other times	32
Not turning nearer to Thee for my affections	33
Not living according to my belief	34
Not loving Thee for Thy self.	35
Not loving Thee for Thy goodness to us	36
Not desiring Thy ordinances	38
Not long {longing} for Thee in {illeg}	39

<3v>

40	Fearing man above Thee
41	Vsing unlawful means to bring us out of distresses
42	Caring for worldly things more than God
43	Not craving a blessing from God on our honest endeavors.
44	Missing chapel.
45	Beating Arthur Storer.
46	Peevishness at Master Clarks for a piece of bread and butter.
47	Striving to cheat with a brass halfe crowne.
48	Twisting a cord on Sunday morning
49	Reading the history of the Christian champions on Sunday

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Since Whitsunday 1662

1. Glutony
2. Glutony
3. Vsing Wilfords towel to spare my own
- 4 Negligence at the chapel.
- 5 Sermons at Saint Marys (4)
- 6 Lying about a louse
- 7 Denying my chamberfellow of the knowledge of him that took him for a sot.
- 8 Neglecting to pray 3
- 9 Helping Pettit to make his water watch at 12 of the clock on Saturday night

<5r>

1665

Received 10 ^{li} May 23 ^d whereof I gave my Tutor 5 ^{li}	—————	5 . 0 . 0
Remaining in my hands since the last Quarter	—————	<u>3 . 8 . 4</u>
	In all —	8 . 8 . 4.
Paid Iohn the Taylor	—————	2 . 0 . 0.
Paid Master Bychiner	—————	0 . 3 . 6.
To Caverly	—————	0 . 1 . 0.
To my Laundresse	—————	0 . 0 . 6.
To my Bedmaker	—————	0 . 5 . 0.
A paire of Gloves	—————	0 . 2 . 0
A paire of Stockings	—————	0 . 5 . 4
A hatband	—————	0 . 2 . 0.
Paid Goodwife Powell for my Laundresse	—————	0 . 5 . 0.
Given more to my Tutor	—————	5 . 0 . 0
My Iourney to Cambridge Mar 20.		<u>0 . 6 . 6.</u>
	In all	<u>8 . 10 . 10.</u>
Lent Master Newton	—————	<u>0 . 18 . 0</u>

March 25 1666.

Lent Wilford	——X——	0 . 1 . 0.
To the Poore on the fast	—————	0 . 1 . 0.

To Master Babintons: Wom, 6 ^d . Porter 6 ^d	—————	0 . 1 . 0.
Spent with Rubbins 4 ^d .	—————	0 . 0 . 4
Lent to Sir Herring	—————	1 . 6 . 0.
Lent to Sir Drake	—————	1 . 0 . 0.
Payd my Laundresse	—————	0 . 5 . 6.
ffor a paire of shoos	—————	0 . 4 . 0.
Caverly	—————	0 . 0 . 4.

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Payd Iohn Falkoner	—————	0 . 11 . 6.
A paire of shoestrings	—————	0 . 0 . 8.
Payd my Bedmaker		0 . 5 . 0.
Dew from Iohn Euans	—————	0 . 1 . 10.

Euans

The summe of my expences		1 . 10 . 4.
+		<u>8 . 10 . 10</u>
In all		10 . 1 . 2
Dew to mee	—————	3 . 5 . 10
More from Master Guy	—————	0 . 10 . 0
<u>Lent In all</u>	<u>=====</u>	<u>3 . 15 . 10.</u>

1666.

Received 10 ^{li} March 20 th	—————	10 . 0 . 0
Remaining in my <u>hands</u>	—————	<u>8 . 8 . 4.</u>
In all		<u>18 . 8 . 4</u>
Expences & what I lent deducted the rest is	—————	4 . 11 . 4.
1667 Apr 22 Received		10 - 0 - 0
In my hands besid debts		<u>14 - 11 - 4^d</u>
My Iourney to Cambridg		0 - 6 - 6.
Two paire of shoos	—————	0 - 8 - 0
dying & mending		0 -
		0 -
Lath & Table	—————	0 - 15 - 0

Iron worke for it	0 - 9 - 0
<6v>	
Drills, Gravers, a Hone & Hammer & a Mandrill	0 . 5 . 0
A Magnet	———— 0 .16 . 0
Compasses	———— 0 . 3 . 6
Glass bubbles	———— 0 . 4 . 0
Chappell Clarke	———— 0 . 2 . 6
My Bachelors Act	———— 0 .17 . 6.
At the Taverne severall other times &c	———— 1 . 0 . 0
Spent on My Couz Ayscough	0 .12 . 6..
On other Acquaintance	———— 0 -10 : 0
Shoos	———— 0 . 4 . 0
Cloth 2 yards & buckles for a Vest.	2 . 0 . 0
ffor Woosted Prunella 8 ^{yds} $\frac{1}{2}$.	1 . 5 . 6
ffor the lining 4 ^{yds}	———— 0 . 9 . 4
Philosophicall Intelligences	0 . 9 . 6.
the Hystory of the Royall Ssoc:	0 . 7 . 0.
To Goodwife Powell	———— 0 . 7 . 6
To my Laundresse	———— 0 . 8 . 6
To Caverly	———— 0 . 1 . 6
To the Glasier	———— 0 . 1 . 0
New fire cheeks & pointing the chamber & windows	———— 0 . 1 . 6
Gunters book & sector &c to Dominus ffox	0 . 5 . 0
Letters, wyer, files, boats,	———— 0 . 2 . 6.
ffor a ffellows key	———— 0 . 1 . 0
To the Taylor Octob 29. 1667.	———— 2 .13 . 0
To the Taylor. Iune 10. 1667	———— 1 . 3 .10
For keeping Christmas	———— 0 . 5 . 0
Lost at cards {twice}	0 .15 . 0
<7r>	
At the Taverne twice	———— 0 . 3 . 6.
6 $\frac{1}{2}$ sacks of coales, carriage & sedge	———— 0 .11 . 0

Shoos & mending	————	0 . 4 . 10.
Two paire of Gloves	————	0 . 5 . 0
with Master Lusmore, Hautrey, Salter		0 . 3 . 6
Received of my Tutor which I lent Perkins		0 . 10 . 0

I went into the Countrey December 4th 1667.

I returned to Cambridg Feb 12. 1667.

Received of my Mother	————	<u>30 . 0 . 0</u>
My Iourney	————	0 . 7 . 6
ffor my degree to the Colledg		5 . 10 . 0
To the Proctor	————	2 . 0 . 0
ffor 3 Prismes	————	0 . 3 . 0
4 ounces of Putty	————	0 . 1 . 4
To the Painter	————	0 . 3 . 0
To the Ioyner	————	1 . 1 . 8
Lent to Dominus Wickins	——X——	
To the shoe maker	————	0 . 5 . 0
Bacons Miscelanys	————	0 . 1 . 6
Expences caused by my Degre		0 . 15 . 0

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Subscribing 6 ^d , Reading Græke.		0 . 5 . 10.
A bible binding	————	0 . 3 . 0.
Humphrey 1668	————	0 . 1 . 0.
18 yards of Tammy for my Master of Arts Goune		1 . 13 . 0
Lining — 3, 6	————	0 . 3 . 6.
Making that & turning my Bachelors Goune	————	1 . 0 . 6.
Received of Master Io: Herring		<u>0 . 10 . 0</u>
Payd my Laundresse	————	0 . 5 . 6.
Payd to Caverly	————	0 . 5 . 6.
Payd Goodwif Talbot from Feb 12 to Mar 25 1668		0 . 2 . 6
Payd to my Laundresse		0 . 2 . 6.
To the Porter	————	0 . 5 . 6.

ffor oranges 1667 for my sister	————	0 . 4 . 2.
Bedmaker & Laundresse		0 .10 . 0.
Shoemaker	————	0 . 5 . 8.
A Hatt	————	0 .19 . 0.
Taverne		0 .10 . 0.
Carpets of Neats Leather		0 .18 . 0
My part of A Couch.		0 .14 . 0. 1
Bowling Greene	————	0 .10 . 0
To Master Ieffreys for a Suit		3 . 6 . 0
A Tickin for a ffeatherbed.		1 .10 . 0
New ffeathers	————	0 . 8 . 0
A Hood	————	1 . 3 . 6.
Making &c of my last suit	————	1 .11 . 9
<8r>		
Dew to Iohn Hauxy	——X——	1 .10 . 0.
Spent in my Iourney to London		5 .10 . 0
As also 4 ^{li} 5 ^s more which my Mother gave mee in the Country		4 . 5 . 0
Received for Chamberrent		1 .11 . 0.
Received from my Mother		11 . 0 . 0.

I went to London on Wednesday Aug 5^t & returned to Cambridge on Munday Sept 28, 1668.

Bedmaker & Laundresse		0 . 4 . 0
Lent Dominus Wickins	——X——	0 .11 . 0
Lent Master Boucheret	——X——	0 . 5 . 0

Aprill 1669.

Lent to Master Wadsley	————	0 .14 . 0
16 yards of Stuffe for a suit		2 . 8 . 0
ffor making &c	————	1 .13 . 0

For turning a Cloth suit		1 .
		3 .
		3
		0 .
For shoe strings &c	—————	2 .
		0
		0
For Glasses in Cambridge		.14
		. 0
		0
For Glasses at London	—————	.15
		. 0
		2 .
For Aqua ffortis, sublimate, oyle {y} erbe, fine silver, Antimony, vinegar Spirit of Wine,		0 .
White lead, Allome Niter, Tartar, Salt of Tartar, ☿		0 .
		0 .
		0 .
A ffurnace	—————	8 .
		0
		0 .
A tin ffurnace	—————	7 .
		0
		0 .
Ioyner	—————	6 .
		0

<8v>

Theatrum Chemicum	—————	1 . 8 . 0
Lent Wardwel 3 ^s	—————	0 . 5 . 0
& to his wife 2 ^s		
Carriage of the oyle	—————	0 . .2 . 0
Payd I Stag	—————	0 .18 . 6
Payd the Chandler	—————	0 . 8 . 0
A Table cloth	—————	0 .10 . 0
Six Napkins	—————	0 . 6 . 0

<9v>

Friedadolff Lewys Langerhanss.

Carolus Gottlob de Theler

Georgius Bernhardus de Theler Equites ex Superiore Lusatia

Iohannes Christophorus Ritter Wurcenâ-Misnicus.

[Editorial Note 2]

<1r>

Sep. 25 1727
Not fit to be printed

T Pellet

<2r>

**Nova
Cubi Hæbræi Tabella**

[Editorial Note 3]

<3r>

Of right angled triangles.

h = hypotenusa.
b = basis.
c = Cathetus.
p = perpendicular.
hdc = diff: hypot & Cath
bdc = diff: basis & cathet:
bdh = difference basis & hyp{ot}
dsh = diff: seg: hypoten:
sh = segment: hypoten:
bh = greater seg hyp:
ch = lesse seg: hypot:

I. Any two leggs given to find the other

1. $bq + cq = hq.$

2 r: $hq - bq = c.$

3 r: $hq - cq = b$

Eucl. lib 1. pr: 47.

II the b. c. & h given to find p.

1. $\frac{b \times c}{h} = p$ Euclid 6 .8.

III c. h. p. given to find dsh.

1. $H - 2r: bq - pq = dsh.$

IIII. b. p. h given to find dsh.

1. $2r: bq - pq: h = dsh.$

V. b. c. h given to find dsh.

1. $H - 2r: cq - Q: \frac{b \times c}{h} = dsh.$

2 $2r: bq - Q: \frac{b \times c}{h} + h = dsh.$

VI b.c or b. h or h. c given to find p:

$$1 \frac{b \times c}{r: bq + cq:} = p$$

$$2 \frac{b \times r: hq - bq:}{h} = p.$$

$$3 \frac{c \times r: hq - cq:}{h} = p$$

VII b. h. or c. h. or b. c given to find dsh.

<4r>

Theorem 1

As the difference twixt the base & cath (in rectang: triang:) is to the greater side:: so is the difference of the segment of the base; to the greater segment of the base & perpendicular.

Theorem 2.

As the difference twixt the base & cathetus to the less side:: so the diff of the segments of the base to the lesse segment of the base & perpendicular

Theorem 3^d.

base – Cathetus: hypotenusa:: :: greater segment: base - less seg base : base + Cathetus.

Theor. 4.

If within a circle be described an Ellipsis touching the Circle in 2 opposite points if the Diameter cut it at right angle in any points except the touch point yⁿ a line drawn fm either touch point perpendicular to the former diameter will bisect it & being produced will cut the circle in the other touch point & all the lines drawne twixt the circle & that line <4v> parallell to that diameter shall be divided by the Ellipsis so as one segment shall bee to the other as the segments of the semidiameter are to one another they being divided by the same Ellip: let ab bee equall to 10 pts. eb = 157979 = Periph: & priph - Rad: Rad:: Rad: db. db = 175, 1938394. de = 18,1142067

<5r>

To describe an ellipsis

Let fe & gc be two lines ef make right angles with gc. let a point be taken in bd as at a & let that point move along the line gc. & d the one end of the line db move on the line ef & the other end b shall describe the Ellipsis gbc. f.

Let c & a be two fixed points about which let a loose cord be put haveing both ends tyed together. as is signified by the 3 lines cb. ba. ac. Strech it out with another point as b. & keeping it so stretched out draw the point b about & it shall describe the Ellipsis bd. Chartesij Dioptr

Let the line ae be infinitely extended in it take the point o about the line oc shall turne at the point c in oc let the point c in the line ab be fastened & let a the end of the line ab move on the line ae & oc turning round, each point of the line ab betwixt ac will describe an Ellipsis whose transvers axis is equall to oc & parallell to ae but each point on the other side c describes Ellipsis whose right axis <5v> is equall to oc & parallell to ae

Extend de both ways take the lines ca & ab equall to one another fasten together at one end as at a. set the other end of ca at the point c in db. & let the other end of ab slide on db. yⁿ take a point in ab as o & turne ac about & it shall describe the ellipsis dgoe Shooten in lib. 2^d Cartesij Geometria:

Cut the cone abc so that the diam of the section ed produced cut the base of the triangle ac produced without the cone as at r & makes right angles with gh the base of the section

If eg be moved twixt the lines ed & gd. a point in it as (θ) shall describe an ellipsis whose semi-axis ad is equall to bd & semiaxis dc = eb

<6r>

If dc revolve about the center d. & to the other end b be fastend a triangle bca & db = ba = bc & the angle a moves on the line ad the other end c will describe the streight line cd & the angle cba = 2cda & a point in the line (ca) as (e) shall describe an Ellipsis ehg whose diam $2dh = 2dg = 2ec$ & the other diameter conjugated to it is od & $od = \sqrt{4db \times db - ec \times ec - 2ec \times ea}$ for op = ec. oq = ea. dp = 2db.

& if in the line bc be taken a point as s, it shall describe an ellipsis the one diam: being $2ab + 2bs$, the other diam = 2cs.

If o & a be the foci & cp = oa & ca = op = it there section in s shall describe an ellipsis

If ab = bc = ci = ai = if or greater y^n (if) & bh = fp & ac bisects the angles bai. bci. y^n if bh turne round the intersections of bh & ac shall describ{e} an Ellipsis. & hi & i are the foci.

<7r>

To describe a Parabola

Let bc fall perpendicular on ad & let c the one end there of move uppon ad a given line & if bc x k a given line be equall to ac x cd y^n shall b the other end of bc describe the Parabola afd.

Draw ah perpendicular to ap. & ab from ah parallell to ap divid{e} bh into equall parts as bcdefgh. & divide ap into parts equall to the former as iklmnop. draw lines cros to each part of the lines ah & ap as cb. kc. ld. me. nf. & c with half of each line descri{bing} a circle as brc with $\frac{1}{2}$ cb. from bu in the poi{nt} cut by the diameters of the circle draw lines perpendicular to the diameter <7v> untill they reach the circle from whose diameter they are drawne as the lines pw, qx, ry, sz, t&, u+. Erect those lines perpendicular to the line bu as pϯ, qϯ, rϯ, sϯ, tϯ, uϯ. & by the end of those lines draw a line & it shall be a parabola . as bϯϯϯϯϯ

If abc be a cone: de (the diameter of the Section fgd) parallell to ac: & fg (the base thereof) cutting bc at right angles y^n is the section dfg a Parab

Make db perpendicular to ef on the center b let the right angled figure pbgh turne. Let gh move perpendicularly on ef ever intersecting ef & bh in one point y^n pbgh moveing rownd the intersections made twixt pg gh describe the parabola qbg.

<8r>

If ab = bd = do = ao is greater then ac & ac = cs the corner (a) fasten{ed} to the focus (a) . & the line de fastened to the corner d & moveing perpendicularly o{r} on sd & the line boe crossing the corners b & o. y^n the line boe & de at there intersections shall describe a Parab & the line boe always toucheth the Parabola in (e) & c

If (d) be the focus od = oe the ruler fc = to the thred fad & thred fastened to the ruler at f & to the focus d & the ruler move perpendicular to ce & parallell to de. y^n the parting of the thred from the ruler as at (a) shall describe a Parabola

<9r>

To describe an Hyperbole

Let fa fall on ag suppose at right angles let one end of the line lg move up & downe in the line fa & towards the other end let it cut the line ga in g. let mp keepe parallel to df haveing one end p moveing in the line fa but yet keeping an equall distance from l the end of gl. that is let the triangle npl be immutable. let y^n the lines mp & gl thus move to & fro & their intersections shall describe an Hyperbola. & the rectangle $de \times ea = ic \times cb = qo \times op$. Cartes Geom:

ffasten a pegg as at a & another as at b upon which let the line de be turned at the pin a fasten one end of a cord & the other at e the end of the line de. y^n streching the cord from a & e with the pin c turne de about & the pin c will slip towards e & describe $\frac{1}{2}$ the Hyper: oce

<9v>

{If} the rectangle twixt ad & db is equall to the rectangle twixt ae & ec {so} that each point c in the Hyperb: bc is found by makeing $ec = \frac{ad \times db}{ae}$ or $ae = \frac{ad \times db}{ec}$. also be $x \times ce = be \times da - db \times ec$

Cut the cone abc so that the diameter of the section er produced cuteth one side of the Cone bc produced as at d. the base thereof gh cutteth ac the base of the triang: abc at right angles.

If (of) touch the Hyperb: & (as) be its transverse diam: & (gb) keepe parallel to (eo) & (cag) always pass through (a). the vertex of the Hyperb. & (bc) be always in the line (fh) fastend to (gb) & equall to $fd = de = \frac{fh}{4}$. y^n the lines (agc) & (gb) moveing by their intersection shall describe an Hyperbola whose asymptotes are oea, fe; eb, eb, & wx is a right line conjugate to the transverse diameter (as.) viz: it is the right diameter

<10r>

If $dk = er$ be (latus transversum) & $de = kr$, be latus rectum y^n is $sd = sr = se = sk = sa = sx$. at (a) & (x) fasten 2 pins on which let the (acbp, xobq) revolve, & if $ac = ox = zi = dk = er$, & $co = ax$ y^n the intersection of the lines cabp, & qbox (when they move) shall describe a Hyperb whose focus is a, & the opposite Hyperbola (whose focus is x is described by the same lines after qbox, esk & cabp are parallell

If $de = dc = ex = cx$ is not lesse y^n $ix = az$ & 2 of their ends loose pind together at (e) & 2 at (c) on which 2 corners lyes the line (coe) two of their ends are loosely pinnd on the focus (x) the last two are pind on the line (adp) at (d) soe that the ruler adp being pinnd to the focus (a), $ad = zi$ y^n the intersections of the lines (adp, coe) describe the Hyperbola oiq. & after they are parallell they shall describe the opposite Hyperbola hzk.

The Asymptotes aq, an, & (m) point in the Hyperbola draw $mq \parallel an$. & $mn \parallel aq$. Then draw en at a venture & make $er = mc \parallel er$ & r shall bee a point in the Hyperbola

<10v>

If the position of the Asymptotes (ad) (ab) bee given & any point as (c) in the Hyperbola. then draw $ucbf \parallel ad$. $ud \parallel ab \parallel fg$ making $bf = bu = 4bc$. Then at a venter draw bewh, through the point b. & make $ak = fh = uw$ Or $dw = bk$ & from the point k draw ke, which shall touch the Hyperbola. in n, if $kn = ne$.

The foci (a, d) & (c) a point in one Hyerbo{la} given to describe them.

Draw ac, cd, from the given point c to the foci, y^n upon the center c with any radius ce describe the circle erf. soe that $ec = ef$. y^n with the Rad ae & df upon the centers a & d describe the circles hep fhp their points of intersection p, h, shall bee in the hyperbola. The intermediate distance twixt divers points thus found may bee completed by the helpe of tangent lines or circles or a steady hand.

<11r>

The properties of the Parabola

$ab = a$. $bc = b$. $ac = c$. $eb = d$. $ei = x$. $fi = y$. $b : c :: x : (ik) \frac{cx}{b}$. $a : c :: d : (es, \text{ or } il) \frac{cd}{a}$ whence $yy = \frac{ccd}{ab}x$. $ab : cc :: d : (en) \frac{ccd}{ab}$. $\frac{ccd}{ab} = r$. $rx = yy$. that is ne a given line multipling $ei = if$ square. Or breifly $a : c :: d : (es \text{ or } il) \frac{cd}{a}$. $b : c :: \frac{cd}{a} : (en) \frac{ccd}{ab} = r$ Ne is called latus rectum of Apollon & Parameter by Mydorgius. gh is its base ed its Diameter.

<11v>

ang $pbh = phg$. kg parallell to ac tangent no parallell to the tangent ac . $y^n nm = mo$. (2). $db \times bk = kg \times kg$.

$kg \times kg : nm \times nm :: db \times bk : db \times bm :: bk : bm$

<12r>

$a = \text{foco}$. $ac = \frac{1}{4}$ lateris recti. $ac = oc$. $ah = do$. sit (sh) Parallela ad. (dr) & (rh) contingat Parab: in h . & (dh) perpend: ad (dr) erit ang : $ahr = rhs$.

If $cs = sb$ & su parallell to ab y^n the triang $cea : cab :: l : 4$. & so it may be saide infinitely.

If ab & cd , are ordinately applyed the Parabola $ceadb$ is to the triangle cda as Eight to six. & $rf \times rf = rs \times re$. or, $re : rf :: rf : rs$.

If rs , is parallell to gx y^n are the 2 segments of Parabolas $gproxa = gcsqxa$) equall & $po = cq$. & if $ga = ax$ then the diameters ar as cut the line rs in its touch points.

<13r>

The properties of the Hyperbola

$rx + \frac{acxx}{bb} = yy$.

☞ $rx + \frac{r}{q}xx = yy$. for

$\frac{acq}{bb} = r$. & $\frac{ac}{bb} = \frac{r}{q}$.

$\{am\} = a$. $mb = b$. $mc = c$. $de = q$. $ei = x$. $di = q + x$ $fi = y$. $b : c :: q + x : (il) \frac{cq + cx}{b}$ $b : a :: x : (ik) \frac{ax}{b}$. $il \times ik = yy = \frac{cqax + caxx}{bb}$ $bb : ac :: q : (en) \frac{acq}{bb}(r)$. $bb : ac :: q : \frac{acq}{bb} :: x : (qpcron) \text{ or } \frac{acx}{bb}$. whenc $\frac{acqx + acxx}{bb} = rx + \frac{acxx}{bb} = pi \times ie = yy$

More breifly thus.

$b : c :: q : (es) \frac{cq}{b} : b : a :: \frac{cq}{b} : \frac{acq}{bb} (= r)$

de is called latus transversum & en latus rectum by Appolonius. but Parameter by Mydordgius.

<13v>

$mn = pd = bq = q$. $fg = db = pq = p$ $nu = x$. $au = y$. $ha = ck = b$. $st = r$ (1) $q : r :: qx + xx : yy$. & $yy = rx + \frac{rxx}{q} = yy$. (2) $2by + bb :: \frac{1}{4} pp$. (3) $q : p :: p : r$. (4) $q : r :: qq : pp$. (5) $yy : qx + xx :: qq : pp$.

$pq = fg = db = axi \text{ secundo}$, & recto & diam rectæ

$pd = mn = qb = axi \text{ primo}$, transverso & lateri sive diametro transversæ.

$st = r = \text{Lateri recto}$.

<14r>

If $xt = p$. $sr = q : r = \text{Parameter}$ & $iry = a$. $eno = b$. $in = y$ $en = z$. $rn = x$.

Then if $p = q = r$ as in (a) : (a) is the simplest of all Hyperbola's, & y^n , $yy = xx + qx$. & if (q) is the same in both (a & b) & $(xt = p)$ is proper to (b) then $yy : zz :: qq : pp$. & therefore Hyperbolas are to one another as their right axis are supposing their transverse axes equal. viz $iryeon : eron :: in : en :: p : p$. therefore if (rs) is parallel to ao , & $ae = co$. y^n ($arextc = csoext$.) & if $at = te = cx = xo$ tr & xs (cutting rs in the touch points) are ordinately applied to the Diameters & bisect the Hyperbolas.

<14v>

If (o & a) are the foci & (u) a point in one of the Hyperb: s. then $au + ei = ou$ & if $as = ei = or$. y^n $us = uo$. & $rs = oa$ & (iu) bisecting the angle (ria.) it shall touch the Hyperb in u.

<15r>

The Properties of the Ellipsis

$rx - \frac{acxx}{bb} = yy$. that is

$rx - \frac{r}{q}xx = yy$ for

$\frac{acq}{bb} = r$ & $\frac{ac}{bb} = \frac{r}{q}$

$am = a$. $bm = b$. $cm = c$. $ed = q$. $ei = x$. $id = q - x$ $fi = y$. $en = r$

$b : c :: q - x : (ib) \frac{cq - cx}{b}$. $b : a :: x : (ik) \frac{ax}{b}$ $ki \times il = \frac{cqax - acxx}{bb} = fi \times fi = yy$

$bb : ac :: q : en = \frac{aqc}{bb} = r$. $bb : ac :: x : on = \frac{acx}{bb}$ wherefore $rx - (onx) = \frac{acxx}{bb} = yy$.

$Af = q = axi$ transo: sive primo : $ch = p$. $fg = r = lateri$ recto. $ad = x$ $df = q - x$. $dh = y$.

(1) $q : p :: p : r$. (2) $yy : xq - xx :: r : q$. therefore $3 yy = rx - \frac{rxx}{q}$ as before.

af is the first & transverse axis or side

ch is the second & right axis

fg is the Parameter or right side

<16r>

sit $p = qn$. $nc = no$. erit segmentum oeth ad segmentum cbd, ut cbd ad $gbhcd :: fh : ab :: (afbhcd)$ elipsis
{illeg} : (ahbg) circulum.

If the lines (pq, rs) are parallel & co the common axis of both the Ellipses y^n are the 2 Ellipses equal to one another, for $ax = be$. the conjugated diam: cut the touch points of pq , rs & parallels to these are also conjugated.

<16v>

If ab touch an Ellipsis & (o) & (x) be the foci y^n the angle $aco = bcx$. & if (ocx) be bisected by (cr) y^n $acr = bcr = \text{right angle}$

If $xu = ot = ys$. & uo bisected in a then $uac = oac =$ to a right angle.

If also $ut = ox$ & ut & xo be produced till they meete in h . the angle uho shall be bisected by the line acb .

[Editorial Note 1] This and the following two pages are written in Thomas Shelton's shorthand notation and were deciphered by R.S. Westfall in 'Short-Writing and the State of Newton's Conscience, 1662', Notes and Records of the Royal Society 18 (1963), 10-16.

[Editorial Note 2] The following material is written from the opposite end of the notebook.

[Editorial Note 3] There follows a table of Hebrew characters with Latin annotations.
