Early Excersies in Latin and Mathematics

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My first ~~x~~ verses, On Mr Downes

Interea Derry Downes denuntia horrida multa
Galtonis in scholam quâ semper Hartley gubernat
Sic ait hairachio ~~yalor~~ pater non legere possent
Non ego scribere vel nequeunt ~~accipiunt~~ sapienter erunt ne
Sed si ~~cum~~ illi miserabile audio sonum
Vicinis scholæ subertam nunc puellarum
Atque homines locabam semper speculandique causâ
Ut me dixerunt x aliquam sit male moratam
~~Sedebam nunc schola videri~~ juxta ~~ante~~ ~~fenestram~~
Sed nunc propter eos ~~non~~ culpam invenio possum
At mihi non objex quia possum fingere culpas
Fingere pudet mihi non, sed nunc cognita vero
Sedebam nunc schola videri juxta fenestram
Dixero funniferam fumorum atque caminum
At ~~nunc~~ sed incedam nunc scholam ~~Galtonem~~ incepere quidem
Fumosam at potest non mutato esse camino
~~Igitur~~ non habeo Galtonem increpere causam
Dixero non aliquot quanquam ceterum ~~odi~~ juxta et odi

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Francis Galton

found in his Room

26 Jan. 1835

f. 25

Interea Derry Downes denuntiat horrida multa

Galtonis in scholam, quâ ~~ut vox~~ semper Hartley gubernat

~~Sic ait non siram ~~literas~~ parochiae natos~~

Sic aut parochiae natos pratior non legere possent

~~Ne sapientes filius~~

Nosse ego scribere aut sapientes filius mihi fiunt

Sed sex ~~nunc~~ cum illis miserabile audio sonum

Nunc puellarum scholae vicinis illud ~~Hiram~~ subvertons

~~Ut~~ Illas ~~dicas~~ locam semper spectant ~~neq~~ que causâ

~~Ut qu dicerent aliquam se ~~fecebunt~~ male moratam~~

~~Contra pene~~

Solebam nunc scholae videri ante fenestram

Heu mihi ~~contra~~ propter eos culpam invenio possum

At mihi non abjice quae possum fingere culpa

Fingere pudet mihi non ars nunc cognita ~~vera~~ certa

Dixero non aliquot quamquam sed adhuc usque eternum

Dicero pinnipedum famosum usque ~~caminum~~ caminum

Ac nunc quodam Galtonem increpere scholam

Famosam at potest non mutato esse cambio

Igitur non habeo Galtonem increpere causam

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f.2v

Francis Galton
found in his Room
26 Jan.y 1835 —

f. 3r

Let $x = 1$

& $y = 1$

then $x - y = 0$

$\therefore x^2 - y^2 = 0$

$\therefore \dfrac{x^2 - y^2}{x - y} = \dfrac{0}{0}$

but $\dfrac{x^2 - y^2}{x - y} = x + y = 2$

f. 3v

Francis Galton
Decem^r 1836

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Rental to Xmas 183

Jones, now Hall Hopkins	Arrears 6.11.6	Rent 6.

Homogeneous Products

In Algebra the dimension of any qty is its index thus $a, a^2, a^3 \ldots a^n$ are of 1, 2, 3, & n dimension. The dimn of a product is the sum of the dimensions of the component facts thus ab ab^2 a^3b^2c $a^n b^m c^p$ are of 2 3 6, n+m+p dimension.

The dimn of a quotient is dim n of numerator – the dimn of denomr thus $\frac{a^2}{b}$ $\frac{a^2b^3}{c}$ $\frac{ab}{c^2}$ $\frac{a}{bc^5}$ $\frac{a^m}{b^n c^p}$ are of 1, 4, 0, −3 & m−n−p dimns

Algebraic quantities are said to be homogeneous when their dims are the same thus a^3, a^2b, ab^2, b^3 are homog being of 3 dimn. The no of ~~homog~~ homog products of 2 dimn wh can be formed of (n) things is $\frac{n \cdot n+1}{1 \cdot 2}$

For suppose the n quantities to be

a, b, c, d, e, f -- k

Let ea quanty be xly into itself & of that qty & all the quas the oper will be as follows

a(a + a + b + c + -- + k
b(b + a + b + c --- + k
c(c + a + b + c --- + k
-----
k(k + a + b + c -- + k)

By this process we then have n rows and n+1 products of 2 dimns in each row ∴ there will be n·n+1 products. But a^2 will occur twice in the first line & will not appear in any other; ab will occur once in line beginning with (a) & once in begind with (b) & in no other & so on with all the others. Hence the no of homog prodts in ye oper is $\frac{n \cdot n+1}{1 \cdot 2}$

The no of homog prods of 3 dimns wh can be formed of (n) things is $\frac{n \cdot n+1 \cdot n+2}{1 \cdot 2 \cdot 3}$ For

(Turn over

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let each homog prodt of 2 dimns be $\times$ led by sum of the 2 quas wh form that prodt togr with the sum of all the quas the opn will be as follows

$aa(a+a+a+b+c+d \cdots +l)$

$ab(a+b+a+b+c+d \cdots +l)$

$ac(a+c+a+b+c+d \cdots +l)$

$bc(b+c+a+b+c+d \cdots +l)$

or by adding like quas

$aa(3a+b+c+ \cdots l)$

&c (&c)

we shall have $\therefore \frac{n \cdot n+1}{1 \cdot 2}$ rows & $n+2$ prods of 3 dims in ea row $\therefore$ the whole no of prods is $\frac{n \cdot n+1 \cdot n+2}{1 \cdot 2}$

But each product is found 3 times exactly for every prod is of the form a^3, a^2b or abc & a^3 occurs 3^{ce} in the first line & never again. The same must take place in every other product. Hence the no of prods of 3 dims $= \frac{1}{3}$ no of prods in operation $= \frac{n \cdot n-1 \cdot n-2}{1 \cdot 2 \cdot 3}$

The no of prods of z dimns wh can be formed of n quatis is $\frac{n \cdot n+1 \cdot n+2 \cdots n+z-2 \; n+z-1}{1 \cdot 2 \cdot 3 \cdots z-1 \cdot z}$

Suppose it true the the no of prodts of $z-1$ ~~prods~~ dimns which can be formed of n quas is

$$\frac{n \cdot n+1 \cdot n+2 \cdot n+3 \cdots n+z-2}{1 \cdot 2 \cdot 3 \cdots z-1}$$

Let ea prodt of $z-1$ dimns be $\times$ led with the sum of the $z-1$ quas wh form that prod together with all the quas

By this process we shall have $\frac{n.\overline{n-1}.\overline{n-2}\ldots\overline{n+r-2}}{1.2.3\ldots\overline{r-1}}$ rows so containing $n+r+1$ products $\therefore$ the whole no of products will be $\frac{n.\overline{n+1}.\overline{n+2}\ldots\overline{n+r-2}.\overline{n+r-1}}{1.2.3\ldots\overline{r-1}}$

Now each of the products of r dimens will be of the form $a^{\alpha}b^{\beta}c^{\gamma}\ldots l^{\lambda}$ where $\alpha+\beta+\gamma\ldots+\lambda=r$

This product will appear α times in the line

$a^{\alpha-1}b^{\beta}c^{\gamma}\ldots l^{\lambda}(\overline{\alpha-1}.a+\beta.b+c.\gamma+\ldots\lambda.l$
$+a+b+c+\ldots+l)$

& β times in line

$a^{\alpha}b^{\beta-1}c^{\gamma}\ldots l^{\lambda}\{\alpha a+\overline{\beta-1}.b+\gamma c+\ldots\lambda l$
$+a+b+c+\ldots+l)$

& c. &c &c

it is moreover evident that $a^{\alpha}b^{\beta}c^{\gamma}\ldots l^{\lambda}$ will not be found in any row of wh the prefixed factor contains powers of $a, b, c <$

$\alpha-1\ \beta-1\ \gamma-1$ &c

it appears that in the operⁿ each factor is repeated $\alpha+\beta+\gamma+\ldots+\lambda$ times or r times

$\therefore$ the no of products of r dimens $=\frac{1}{r}$ no of products in the operⁿ

$=n.\frac{\overline{n-1}.\overline{n-2}\ldots\overline{n+r-2}.\overline{n+r-1}}{1.2.3\ldots\overline{r-1}.r}$

Hence if yͤ theorem be true for products of $\overline{r-1}$ dimens it is also true for products of r dimens But it has been shown to be true for 2 & 3 dimens $\therefore$ it is true for 4 & 5 & so on for any value of r

F.54

Francis Galton

found among his things

Monday 23d July 1838

after he started upon his

journey—

Homogeneous Products

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Mr Francis Galton