

*DIARIA BRITANNICA:*  
OR, THE  
**BRITISH DIARY:**  
AN  
*ALMANACK,*  
FOR THE  
Year of OUR LORD 1796.  
BEING  
*BISSEXTILE, OR LEAP YEAR.*

CONTAINING,  
A VARIETY of useful and entertaining MATTER in  
ARTS and SCIENCES:

Calculated for the Improvement of the **BRITISH YOUTH.**

ALSO AN  
**EPHEMERIS,**

Wherein are contained the Heliocentric and Geocentric Places  
of the Planets, accurately calculated.

By **JOHN COTES & PATRICK HALL.**

The Ninth Almanack published of this Kind.



You Muses nine shew forth your learned lore,  
To **BRITISH YOUTH**, all scientific store  
Of profound knowledge, teaching them to know,  
Wisdom's true fount, where arts and science flow;  
For learned works a monument will raise,  
Be doubly crown'd with laurels and with bays.

**BIRMINGHAM,**

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AND WHITROW, JEWRY-STREET, LONDON. (*Price One Shilling.*)

## Chronological Notes for the Year 1796.

Julian Period 6509	Dominical Letters CB	Easter Day March 27
World's Creation 5752	Epaēt — — 20	Whit Sunday May 15
Roman Indiction 14	Numb. of Direction 15	Trinity Sund. May 22
Solar Cycle — 13	Septuagesima S. Jan. 24	Advent Sund. Nov. 27
Lunar Cycle, or G.n. 11	Shrove Sund. Feb. 7	Millennium Years 145

## Astronomical Characters used in this Diary.

Aries ♈	Virgo ♍	Aquarius ♒	Mars ♂	N. Node ☊
Taurus ♉	Libra ♎	Pisces ♓	Venus ♀	S. Node ☋
Gemini ♊	Scorpio ♏	G. Sidus ♂	Mercury ☿	Earth ☷
Cancer ♋	Sagittary ♐	Saturn ♄	Sun ☉	Part. For. ⊕
Leo ♌	Capricorn ♐	Jupiter ♃	Moon ☾	

♂ Conjunction

\* Sextile, when 2 signs distant

□ Quartile, when 3 signs distant

△ Trine, when 4 signs distant

Q Quintile, when 5 signs distant

8 Opposition, when 6 signs distant.

## Of the Four Quarters of the Year.

Spring Qu. begins March 19, 8h. 420.	Autumn Q. bc. Sept. 22, 8h. 29m. m
Summer Qu. beg. June 20, 6h. 36a.	Winter Qu. bc. Dec. 21, 1h. 7m. mo.

## ECLIPSES for the YEAR 1796.

IN the course of this year there will be four Eclipses; three of the Sun, and one of the Moon, being all invisible to our Isle of Great Britain. They will happen in the following order:—

I. Is an invisible Eclipse of the Sun, on Sunday the 10th day of January; the conjunction at 6h. 5m. in the morning, in longitude  $\text{v} 19^{\circ} 50'$  the Moon's latitude  $\text{o} 45''$  north; the Sun will be centrally eclipsed on the meridian at 6h. 5m. in longitude  $88^{\circ} 46'$  east, and latitude 21 degrees south.

II. Is of the Sun, invisible, on Monday the 4th day of July; the conjunction at 1h. 1m. in longitude  $\text{z} 13^{\circ} 31'$  Moon's latitude  $14^{\circ} 45''$  north; the Sun will be centrally eclipsed on the meridian at 10h. 59m. in longitude west  $164^{\circ} 46'$  and latitude north  $36\frac{1}{2}^{\circ}$ .

III. Is of the Moon, also invisible on Wednesday the 14th day of December; the beginning at 1h. 18m. 30s. past noon; middle at 2h. 21m. and the end at 3h. 34m. afternoon. Digits eclipsed are  $6^{\circ} 1'$  on the Moon's north limb.

IV. The last is likewise an invisible Eclipse of the Sun, on Thursday the 29th day of December; the conjunction at 5h. 59m. in the morning, in longitude  $\text{v} 8^{\circ} 22'$  and the Moon's latitude south  $36^{\circ} 30'$  the Sun will be centrally eclipsed on the meridian, at 5h. 54m. in longitude  $91^{\circ} 30'$  east, and latitude  $65^{\circ} 31'$  south.

Likewise on Friday the 21st day of October, Saturn will be hid by the Moon's southern limb. The immersion at 1h. 21m. emersion at 2h. 14m. in the morning.

*An Ex. to find the Planets places Jan. 1.*

Look into the calendar, and table of minutes for Jan. 1, and you will find  
 $\text{z}$  in  $\text{v}$  7de. 59m.  $\text{h}$  in  $\text{II}$  7de. 54m.  $\text{u}$  in  $\text{=}$  1ode. 54m.  $\text{o}$  in  $\text{II}$  4de. 58m.  $\text{p}$  in  $\text{v}$  29de. 47m. &c.

A TABLE of the MOON's southing for the Year 1796.

M	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
D	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	5m27	6 2	5 26	6 41	7 8	8 12	8 29	10 13	11 59	0a 25	1 27	1 40
2	6 9	6 46	6 13	7 31	7 57	9 2	9 26	11 16	0a 5	1 11	2 14	2 29
3	6 51	7 32	7 18	8 22	8 45	9 54	10 26	0a 16	1 38	1 57	3 3	3 18
4	7 33	8 19	7 51	9 12	9 35	10 5	11 30	1 13	2 25	2 43	3 52	4 6
5	8 15	9 8	8 42	10 2	10 25	11 51	0a 35	2 6	3 11	3 30	4 41	4 52
6	8 59	9 58	9 33	10 52	11 17	0a 54	1 37	2 55	3 56	4 18	5 30	5 37
7	9 45	10 49	10 24	11 42	1a 13	1 58	2 35	3 42	4 42	5 6	6 18	6 21
8	10 33	11 40	11 15	0a 34	1 11	3 3	3 29	4 27	5 29	5 55	7 5	7 6
9	11 22	0a 31	0a 5	1 28	2 13	3 59	4 18	5 11	6 17	6 45	7 57	7 51
10	0a 12	1 20	0 55	2 24	3 15	4 53	5 5	5 56	7 5	7 35	8 37	8 39
11	1 2	2 9	1 45	3 22	4 17	5 43	6 49	6 41	7 58	8 23	9 24	9 29
12	1 52	2 57	2 36	4 21	5 16	6 30	7 32	7 28	8 45	9 11	10 12	10 24
13	2 41	3 46	3 29	5 22	6 11	7 14	8 15	8 16	9 35	9 59	11 2	11 23
14	3 29	4 36	4 25	6 21	7 27	8 57	9 59	5 10	10 42	10 46	11 56	morn
15	4 16	5 29	5 22	7 18	8 39	9 58	10 55	11 12	11 34	morn	0	16
16	5 3	6 24	6 20	8 11	9 35	10 22	11 31	10 45	morn	morn	0	31
17	5 52	7 21	7 19	9 19	10 18	11 10	12 20	11 34	0	0	1 54	2 35
18	6 43	8 20	8 17	10 48	11 10	12 52	11 9	morn	0	47	1 16	3 34
19	7 37	9 19	9 13	11 33	12 44	11 39	11 59	0 23	1 35	2 11	3 59	4 30
20	8 34	10 18	10 6	11 17	11 28	morn	morn	1 10	2 25	3 4	5 5	21
21	9 34	11 14	10 56	morn	morn	0 28	0 48	1 56	3 16	4 9	5 55	8
22	10 35	morn	11 43	0 0	0 13	1 17	1 36	2 43	4 10	5 9	6 47	53
23	11 36	0 7	morn	0 44	1 6	2 6	2 23	3 30	5 8	6 9	7 35	36
24	morn	0 57	0 29	1 29	1 47	2 55	3 9	4 19	6 8	7 7	8 21	20
25	0 35	1 44	1 13	2 15	2 36	3 42	3 55	5 11	7 8	8 19	9 5	4
26	1 30	2 29	1 57	3 23	3 44	4 28	4 41	6 8	8 8	9 52	10 49	49
27	2 21	3 13	2 42	3 50	4 14	5 14	5 29	7 49	9 59	10 40	11 33	36
28	3 8	3 57	3 27	4 40	5 36	6 0	6 19	8 59	10 59	11 26	12 18	24
29	3 53	4 41	4 13	5 30	6 56	7 47	8 12	9 6	10 50	11 11	0a 4	12
30	4 36	5 16	5 16	6 10	7 37	8 37	9 10	6 11	11 39	11 56	0 52	1
31	5 19	5 51	5 51	7 24	8 24	9 10	10 11	4	0a 41	0	1	ad

A TABLE of the Seven Stars southing, or Times when they pass the Meridian.

D	A.	A.	A.	A.	A.	M.	M.	M.	M.	M.	M.	A.
1	8 45	6 32	4 40	2 47	0 56	10 53	8 50	6 45	4 49	3 21	1 5	57
7	8 18	6 8	4 17	2 25	0 33	10 28	8 25	6 22	4 28	3 4	0 42	31
13	7 52	5 44	3 55	2 30	0 9	10 4	8 0	5 59	4 6	2 18	0 17	4
19	7 26	5 21	3 31	1 41	11 45	9 39	7 36	5 37	3 45	1 55	11 48	38
25	7 14	5 8	3 12	1 18	11 21	9 13	7 12	5 15	3 23	1 12	11 23	31

Use of the Tables. To find the Time of High Water. No. of Stars. 1. a 7. 1. d. a.

Exam. On Jan. 1st Moon souths at	5 27 m.	Aldebaran	0 45	7 20
Add for N. and F. Moon for London	2 30	Capella	1 26	
Time of High Water at London	7 57 m.	Beteigeuse	2 8	6 42
Add for next Low Water	5 49	Alphard	5 42	5 24
Time of Low Water at London,	1 46 a.	Regulus	6 21	7 11
Ex. 1.) On Jan. 1, Seven Stars souths at	8 45 a.	Upp. point.	7 15	
Semidiurnal arc. subtra& and add	8 17	Virg. spike	9 30	5 12
Seven Stars rises Jan. 1st at	0 28 a.	Arcturus	10 16	7 55
Seven Stars sets next morning Jan. 2,	5 2 m.	Antarus	12 41	3 34
Ex. 2.) Seven Stars souths Jan. 1 at	8 45 a.	Algethi	13 38	7 21
Sirius souths after the Seven Stars	3 1	Lyra	14 52	
Sirius south Jan. 1st afternoon	11 46 a.	Atair	16 4	6 46
Semidiurnal arc subtra& and add	4 37	Fomalhaut	19 8	2 52
Sirius rises Jan. 1st afternoon	7 9 a.	Pole star	21 12	
Sirius sets Jan. 2d morning	4 23 m.	Almack	22 16	
		Algol	23 15	
		Algenib	23 37	



# A TABLE of MINUTES, or the Residue of the Planets' Places.

M	January.						February.						March.						April.					
	D	h	m	s	°	′	D	h	m	s	°	′	D	h	m	s	°	′	D	h	m	s	°	′
1	59	54	54	58	47	12	5	45	7	44	2	7	51	15	2	3	2	19	38	21	59	45	5	2
3	57	47	20	9	17	20	0	44	36	50	53	36	46	21	30	2	28	16	34	32	24	29	25	25
5	55	40	47	19	47	29	55	43	4	56	21	59	41	27	58	0	53	21	30	44	49	12	45	56
7	52	34	14	29	17	40	50	43	33	2	50	15	35	33	26	58	18	42	27	5	13	54	4	36
9	49	28	41	39	47	53	45	43	1	7	18	20	30	40	54	55	42	25	24	8	37	34	23	23
11	46	22	9	49	17	8	4	44	30	12	46	11	25	47	2	51	7	34	21	20	1	12	41	17
13	43	16	37	58	47	24	35	46	59	16	14	39	40	54	48	47	32	7	18	30	14	48	59	18
15	40	11	5	7	16	43	30	48	27	20	42	40	15	2	16	41	56	5	15	44	47	22	16	26
17	36	6	33	16	46	4	25	50	56	24	9	9	10	10	43	35	20	27	12	57	10	55	32	40
19	32	2	25	15	26	20	53	25	27	36	2	5	18	10	28	43	9	10	10	33	27	49	2	
21	28	58	30	33	45	51	14	56	53	29	3	16	1	27	37	19	6	10	8	23	55	57	4	31
23	24	55	58	41	14	19	9	59	22	31	29	49	56	36	3	10	28	30	6	30	17	24	19	5
25	20	52	26	4	43	48	4	3	51	32	57	46	52	46	29	0	50	2	4	50	38	48	33	47
27	16	50	55	57	12	18	59	7	19	33	23	3	48	56	55	48	12	46	3	4	58	9	47	36
29	12	48	23	4	42	49	54	12	48	35	19	19	44	6	21	36	34	47	2	18	18	29	0	31

M	May.						June.						July.						August.					
	D	h	m	s	°	′	D	h	m	s	°	′	D	h	m	s	°	′	D	h	m	s	°	′
1	1	32	38	49	12	33	1	26	41	25	48	4	8	18	7	43	40	12	42	53	37	12	22	31
3	1	46	57	6	22	42	14	42	51	56	38	45	13	51	7	16	30	5	49	6	25	31	4	29
5	0	1	16	19	31	53	16	58	1	25	25	14	18	47	6	50	14	50	56	18	13	54	54	45
7	59	16	36	27	40	14	19	14	11	52	10	30	23	2	4	26	52	34	3	30	1	23	42	17
9	59	36	55	35	48	34	21	29	19	18	51	32	29	16	2	5	22	23	10	42	48	54	32	1
11	59	55	13	39	56	56	25	44	2	42	31	20	35	31	58	48	42	20	18	53	34	26	23	53
13	59	13	29	39	1	17	28	0	35	4	9	55	41	46	53	34	53	30	25	4	20	0	15	51
15	0	29	45	36	5	34	32	15	41	26	44	14	47	0	48	23	57	58	32	15	6	37	11	53
17	0	45	1	32	9	16	36	31	47	48	14	14	53	14	42	16	56	46	39	25	51	17	19	55
19	1	1	16	25	12	50	40	47	52	10	38	58	59	28	36	15	32	56	47	35	36	59	45	57
21	2	16	31	15	12	45	44	2	56	31	57	24	6	42	28	15	10	30	55	45	21	43	20	56
23	3	31	45	2	11	30	48	18	0	52	15	33	12	56	20	16	36	28	2	55	6	29	57	51
25	4	45	59	45	10	4	53	33	3	16	32	22	18	9	12	24	53	48	10	4	51	16	36	41
27	6	59	11	25	5	27	58	48	5	45	42	54	25	22	2	36	1	32	17	13	35	5	24	26
29	8	11	23	3	59	38	3	3	7	22	44	10	32	35	52	50	2	39	25	22	19	56	30	7

M	September.						October.						November.						December.					
	D	h	m	s	°	′	D	h	m	s	°	′	D	h	m	s	°	′	D	h	m	s	°	′
1	37	34	55	18	5	29	27	47	26	40	30	44	0	21	15	58	13	21	50	29	7	10	32	44
3	44	41	39	14	36	58	53	48	16	54	14	0	5	16	16	21	25	26	52	20	21	36	55	48
5	51	48	23	12	11	21	40	48	6	8	0	6	9	11	19	44	37	15	54	20	35	3	18	52
7	59	56	8	11	50	41	46	49	58	24	49	1	13	5	23	8	50	48	55	0	49	30	41	57
9	7	2	53	12	36	57	53	49	50	40	41	44	17	59	28	32	5	7	56	51	4	56	5	3
11	15	8	38	14	32	6	0	49	42	56	35	16	21	52	33	56	20	6	57	41	2	23	29	9
13	22	14	23	18	38	13	6	49	36	14	30	27	25	44	39	20	36	36	57	31	36	50	53	15
15	29	19	8	23	49	15	13	48	30	32	27	16	29	37	47	44	53	32	57	21	53	17	18	22
17	37	24	54	29	2	12	19	47	26	50	26	41	33	30	54	9	11	50	57	11	11	44	43	30
19	44	29	40	37	17	5	25	45	22	10	28	36	36	22	2	35	29	20	57	1	29	11	8	39
21	52	33	27	44	37	52	31	43	20	30	31	59	39	14	11	0	48	0	57	51	47	38	33	49
23	59	57	14	52	3	37	37	40	18	50	35	42	42	5	21	26	8	49	57	41	7	5	59	59
25	6	0	1	3	36	19	43	36	16	12	42	54	44	56	31	52	28	43	56	31	27	32	25	10
27	13	19	49	14	12	54	48	32	15	13	50	37	46	47	42	18	49	41	55	21	47	59	52	22
29	20	45	37	26	50	22	53	28	14	55	58	1	48	38	55	44	10	41	54	11	9	26	18	36

D	h	f	h	f	h	f
1	0	47	1	48	0	41
13	0	48	1	45	0	42
25	0	48	1	42	0	42
Last Quarter, 2 day, 1 morn.						
New Moon, 10 day, 6 morn.						
First Quarter, 17 day, 5 aftern.						
Full Moon, 24 day, 10 morn.						
Last Quarter, 31 day, 9 night.						

## Heliocentric Longitude.

D	h	f	h	f	h	f	h	f	h	f	h	f
1	5	23	11	18	16	29	1	51	25	43	13	38
7	5	27	11	32	17	0	4	33	5	13	0	9
13	5	32	11	45	17	32	7	15	14	44	17	33
19	5	36	11	59	18	4	9	59	24	16	6	33
25	5	41	12	12	18	36	12	43	3	14	28	41

M	W	Festival Days.	Alp. & weath.	D	rises.	D	h	f	h	f	h	f	h	f	D	dec north
D	D															
1	F	Circumcil.	☐ ☿ h	Morn	n	7	7	10	4	29	2	10	54	4	44	2 48
2	S	h fo. 9. 31 n	Snow,	0	0	5	7	11	5	3	11	56	17	4	15 50	
3	C	2 S. aft. Chr.	☿ ☿ ☿	1	7	5	7	11	6	2	5	12	57	29	9	6 18
4	M	☿ fo. 3. 31 m	☐ ☿ ☿	2	11	5	7	11	6	3	6	13	58	11 m	5	10 28
5	T		* ☿ ☿	3	15	1	7	11	7	4	8	14	59	22	56	14 14
6	W	Epiphany	* ☿ ☿	4	20	4	7	12	7	6	10	16	0	4	46	17 25
7	T	h fo. 9. 9 n	☐ h ☿	5	24	3	7	12	8	7	11	17	1	16	37	19 53
8	F	Lucian	[☐ ☿ ☿	6	21	2	7	12	9	8	13	18	3	28	34	21 31
9	S	Cl. fast 7. 34	or cold	D	fets	1	7	12	9	9	14	19	4	10	38	22 11
10	C	1 S. aft. Eph.	rain.	4	19	1	7	12	10	11	16	20	5	22	51	21 47
11	M	Plo. Mond.	☿ ☿	5	12	1	7	13	10	12	18	21	6	5	15	20 20
12	T	☿ set 6. 1 n	☿ ☿	6	28	2	7	13	11	13	19	22	7	17	51	17 52
13	W	Hil. C. T. b.	More	7	38	3	7	13	11	14	21	23	9	0	40	14 29
14	T	Ox. T. beg.	mild.	8	50	4	7	13	12	16	23	24	10	13	41	10 21
15	F	Cl. fl. 9. 5	☿ ☿ ☿	10	3	5	7	14	13	17	24	25	11	26	58	5 41
16	S		Turbu-	11	27	5	7	14	13	18	26	26	12	10	29	0 39
17	C	2 S. aft. Eph.	☐ ☿ ☿	Morn	5	7	7	14	14	19	23	27	13	24	16	4 31
18	M	Qu. birth d.	☐ ☿ ☿	0	34	5	7	14	14	21	29	28	14	8	18	9 32
19	T	h fo. 8. 15 n	☐ ☿ ☿	1	51	1	7	15	15	22	3	29	15	22	35	14 7
20	W	Fabian I ret.	☐ ☿ ☿	3	11	1	7	15	15	23	3	3	16	7	11	17 57
21	T	Agnes	☐ ☿ ☿	4	28	3	7	15	16	24	4	1	17	21	39	20 41
22	F	Vincent	☐ h ☿	5	41	1	7	15	17	26	6	2	18	6	18	22 4
23	S	Hil. T. beg.	[☐ ☿ ☿	6	44	n	7	15	17	27	8	3	19	20	55	21 55
24	C	Sept. Sund.	☐ ☿ ☿	7	36	1	7	16	18	28	10	4	20	5	12	20 10
25	M	Co. St. Pau	☐ ☿ ☿	D	ris.	3	7	16	18	29	11	5	21	19	33	17 27
26	T	☿ set 6. 44	☐ ☿ ☿	5	54	4	7	16	19	30	13	6	22	3	12	13 38
27	W	Pr. A. Fr. b	☐ ☿ ☿	7	11	4	7	16	19	31	15	7	23	16	55	9 14
28	T	[2. return	☐ ☿ ☿	8	23	5	7	17	20	3	17	8	24	0	1	4 32
29	F	Cl. fast 13. 34	☐ ☿ ☿	9	35	5	7	17	21	4	18	9	25	12	45	0 14
30	S	K. Ch. I. M	☐ ☿ ☿	10	41	5	7	17	21	5	20	10	26	25	10	4 52
31	C	Sexa. Sund	8 ☿ ☿	11	40	5	7	17	22	7	22	11	27	7	18	0 13

D	D. L	Sun beg.	Sun rise	D. L	leng. of D.	Day inc.	Declination.	☐	f.	h	n	h	n	f.	☐	f.	☐	f.	☐	f.
1	5	56	8	2	3	58	6	4	7	56	0	6	23	1	9	19	19	53	18	11
7	5	51	7	57	4	3	6	9	8	6	0	16	22	23	9	22	19	51	17	48
13	5	47	7	52	4	8	6	13	3	16	0	26	21	29	9	26	19	49	17	25
19	5	41	7	44	4	16	6	19	8	32	0	42	20	20	9	30	19	48	17	1
25	5	34	7	36	4	24	6	26	8	48	0	58	18	57	9	35	19	43	16	39

Geocentric Latitude.							
D	h	f.	u	f.	u	f.	u
1	0 48	1 41	0 43	1 51	1 27	1 27	
13	0 48	1 37	0 44	0 59	1 8	on 47	
25	0 48	1 34	0 45	0 51	0 40	3 29	

**FEBRUARY hath XXIX Days.**

Heliocentric Longitude.													
D	h	u	h	u	h	u	h	u	h	u	h	u	h
1	5	47	12	28	19	13	15	57	14	57	28	35	18 56
7	5	51	12	41	19	45	18	43	24	32	08	10	18 18
13	5	56	12	54	20	17	21	31	48	7	6	11	17 40
19	6	1	13	8	20	49	24	20	13	43	14	6	
25	6	6	13	21	21	27	11	23	21	18	9	9	

**New Moon** 8 day, 11 night  
**First Quart.** 16 day, 2 morn  
**Full Moon** 22 day, 11 night.

M	W	Festival Days.	Asp. & weath.	D rites.	D	h	u	h	u	h	u	h	u	D	D de.
D	D														outh
1	M	h fo. 6.20n	Cold	Morn	n	7	6	18	22	8	24	12	27	19	16 13 9
2	T	<b>Cand. Day</b>	drifling rain.	2	0	4	7	6	18	23	9	25	13	28	1 7 16 32
3	W	3 ret. Blas.		3	4	3	7	6	18	23	10	27	14	29	12 56 19 14
4	T	<b>Collop Th</b>	Wind, & turbulent,	4	5	2	6	6	18	24	12	29	15	30	24 49 21 9
5	F	Agatha		5	2	1	6	6	19	24	13	X	16	31	6 49 22 6
6	S	♀ sets 7.14n		5	53	f	6	D	19	25	14	2	17	32	19 0 22 2
7	C	<b>Quin.Sh.S.</b>	8 8 8	6	30	1	6	6	19	26	15	4	18	32	1 26 20 53
8	M	[4 return	□ h 8	D set	2	6	6	19	26	17	5	19	33	14	6 18 40
9	T	<b>Shrove Tu.</b>	6 0 2	5a20	3	6	6	20	27	18	7	20	34	27	3 15 28
10	W	<b>Ash Wedef.</b>	□ 8 8	6	33	4	6	6	20	27	19	8	21	34	10 X 16 11 27
11	T	h fo. 6.40n	with snow or	7	48	5	6	6	20	28	20	10	22	35	23 43 6 47
12	F	Hil.Te.end		9	2	5	6	6	20	28	22	11	23	36	7 22 1 44
13	S	♀ sets 7.35n		10	20	5	6	6	20	29	23	12	24	36	21 12 3n28
14	C	<b>1 S. in Lent</b>	Valent	11	36	5	6	6	21	29	24	13	25	37	5 8 9 8 33
15	M	CamT.d.m	rain	Morn	5	6	6	21	f	25	14	26	37	19	13 13 13
16	T	♂ ri. 1.34m	♂ D h	0	55	4	6	6	21	0	26	15	27	38	3 20 17 10
17	W	<b>Ember We.</b>		2	13	3	6	6	21	1	28	16	28	38	17 31 20 9
18	T	h fo. 0.25m	to the end.	3	25	2	6	6	22	1	29	16	29	39	1 26 42 21 53
19	F	♀ sets 7.56n		4	30	n	6	6	22	2	30	17	0	X 39	15 53 22 12
20	S	Clo.fast 14.6		5	26	1	6	6	22	2	1	17	1	40	0 21 6
21	C	<b>2 S. in Lent</b>	Δ 8 8	6	8	2	6	6	22	3	3	R	2	40	14 1 18 42
22	M		□ 0 8	D rise	3	6	6	23	4	4	17	3	40	27	51 15 15
23	T		* h 8	6	0	4	6	6	23	4	5	16	4	41	11 27 11 2
24	W	<b>St.Mat.PFb</b>	8 0 8	7	15	5	6	7	23	5	6	16	5	41	24 47 6 22
25	T	h fo. 5.47n	□ 8 8	8	24	5	6	7	23	5	7	15	6	41	7 49 1 31
26	F		□ 0 h	9	33	5	6	7	24	6	9	15	7	41	20 31 3 17
27	S		8 h 8	10	41	5	5	7	24	6	10	14	8	41	2 56 7 50
28	C	<b>3 S. in Lent</b>	6 0 8	11	49	5	5	7	24	7	11	13	9	42	15 6 11 59
29	M			Morn	4	5	7	24	7	12	12	10	42	27	4 15 37

**VENUS** is an evening star till August 5, then a morning star to the year's end.  
**JUPITER** is an evening star till February 8, then a morning star till August 30, then an evening star to the end of the year.

D	D.L		Sun	Sun	D. L.		leng.	Day	Declination.												
	beg.	rife	set.	ends	of D.	inc.			⊙	f.	h	n	h	n	u	f.	♂	f.	♀	f.	♂
1	5	26	7 24	4 36	6	34	9 12	1 22	17	5	940	19	49	16	6	17	25	9	46	14	52
7	5	18	7 14	4 46	6	42	9 32	1 42	15	17	945	19	50	15	39	18	16	6	48	10	28
13	5	8	7 3	4 57	6	52	9 54	2 4	13	20	951	19	52	15	12	19	3	3	44	6	6
19	1	57	6 52	5 8	7	3	10 16	2 26	11	15	957	19	55	14	45	19	46	0	36	3	0
25	1	46	6 40	5 20	7	14	10 40	2 50	9	4	10 3	19	58	14	17	20	24	2	33	2	24



MARCH hath XXXI Days.

MARCH hath XXXI Days.									
Heliocentric Longitude.									
D	h	m	s	h	m	s	h	m	s
1	0	49	1	33	0	45	0	48	0
13	0	48	1	30	0	47	0	36	0
25	0	48	1	28	0	48	0	22	0
<p> <b>Last Quarter,</b> 1 day, 6 night,  <b>New Moon,</b> 9 day, 1 afternoon  <b>First Quarter</b> 16 day, 9 morn.  <b>Full Moon,</b> 23 day, 1 aftern.  <b>Last Quarter,</b> 31 day, 2 after. </p>									

M	D	Festival Days.	Afp. & weath.	D riles.	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	D 11	D 12	D 13	D 14	D 15	D 16	D 17	D 18	D 19	D 20	D 21	D 22	D 23	D 24	D 25	D 26	D 27	D 28	D 29	D 30	D 31	D de. louth
1	T	David	Windy,	0 51	n	5	7	25	8	14	11	11	42	8	55	18	34																			
2	W	Chad	with	1 54	2	5	7	25	8	15	10	12	42	20	44	20	45																			
3	T	Cl. fast 12.2	rain,	2 54	1	5	7	25	9	16	9	13	42	25	37	22	2																			
4	F	♀ fet 8. 4 n	□ 4 ♀	3 48	1	5	7	25	9	17	8	14	42	14	38	22	19																			
5	S		hail, & fleet.	4 36	1	5	7	25	10	18	7	15	42	26	53	21	32																			
6	B	S. in Lent		5 14	2	5	7	26	10	20	6	16	42	9	26	19	40																			
7	M	Perpetua	8 ♀ ♀	5 51	3	5	7	26	10	21	5	17	42	22	19	16	47																			
8	T	h fou. 5.4 n		6 22	4	5	7	26	11	22	5	18	42	5	34	12	57																			
9	W			D fets	4	5	7	26	11	23	4	19	42	19	9	8	22																			
10	T	♂ ri. 1. q m	More	6a51	5	5	7	27	12	24	3	20	42	3	3	3	16																			
11	F	Cl. fast 10.1	♂ D ♀	8 9	5	5	7	27	12	26	3	21	41	17	11	2n	5																			
12	S	Gregory M.	* 4 ♀	9 29	5	5	7	27	13	27	3	22	41	1	8	27	7	23																		
13	B	S. in Lent	mild.	10 50	4	5	7	27	13	28	3	23	41	15	47	12	19																			
14	M	h 10.10.47 n	♂ D h	Morn	4	5	7	28	14	29	D	24	41	0	11	5	16	33																		
15	T			0 9	3	5	8	28	14	8	3	25	40	14	18	19	47																			
16	W	♀ fet 9.23 n	Windy,	1 22	2	5	8	28	15	2	3	26	40	28	25	21	48																			
17	T	St. Patrick	* ♀ ♀	2 31	n	5	8	28	15	3	3	27	39	12	24	22	27																			
18	F	Ed. K.W.S.	△ ♀ ♀	3 29	1	5	8	28	16	4	3	28	39	26	15	21	42																			
19	S	Jof. HVM.	O.T.c	4 14	2	5	8	29	16	5	4	29	38	9	25	19	39																			
20	B	S. in Lent	8 ♀ ♀	4 53	3	5	8	29	16	6	4	0	38	23	32	16	31																			
21	M	Benedict.	with	5 22	1	5	8	29	17	8	5	1	37	6	25	12	33																			
22	T	Cl. fast 6.46	rain or	5 48	4	4	8	29	17	9	5	2	37	20	10	8	1																			
23	W	h fet 0.16 n	Q ⊙ ♀	D ri.	5	4	8	29	18	10	6	3	36	3	21	3	12																			
24	T	Maundy	fleet.	7 22	5	4	8	0	18	11	7	4	35	15	68	1	40																			
25	F	Good Frid.	L. Day	8 32	5	4	8	0	19	12	8	5	35	28	31	6	23																			
26	S	♀ fet 9.57 n	More	9 40	5	4	8	0	19	14	8	6	34	10	51	10	45																			
27	B	Easter day	mild	10 46	4	4	8	0	19	15	9	7	33	22	57	14	38																			
28	M	Easter Mon	* ⊙ h	11 50	3	4	9	1	20	16	10	8	32	4	54	17	53																			
29	T	Easter Tue	at the	Morn	2	4	9	1	20	17	11	9	31	16	44	20	22																			
30	W	Easter Wed	end.	0 51	1	4	9	1	20	18	12	10	31	28	32	21	57																			
31	T			1 44	0	4	9	1	21	19	13	11	30	10	52	22	35																			

D	D. L.		Sun set.	D. L.	leng. of D.	Day inc.	Declination.											
	beg.	rise					⊙ f.	☿	n	h	n	♄ f.	♃ f.	♀ n	♁ f.			
1	4 36	631	529	7 24	1058	3 8	7 11	10	8	20	1	13 54	20 53	5 9	3 56			
7	4 25	620	540	7 35	1120	3 30	4 52	10	13	20	5	13 26	21 25	8 12	6 48			
13	4 13	6 8	552	7 47	1144	3 54	2 31	10	18	20	10	12 59	21 53	11 9	9 3			
19	3 59	555	6 5	8 1	1210	4 20	0 9	10	23	20	15	12 31	22 17	13 57	9 59			
25	3 47	543	6 17	8 13	1234	4 44	2 13	10	28	20	21	12 4	22 39	16 33	9 3			

1.	h	n	h	l.	41.	♂	n	♀	n	♂	f	
1	0	48	1	26	0	49	0	11	1	17	2	2
13	0	48	1	24	0	51	0	10	1	55	2	36
25	0	47	1	22	0	54	0	38	2	27	1	54

**New Moon** 8 day, midnight  
**First Quart.** 14 day, 4 after.  
**Full Moon** 22 day, 3 morn.  
**Last Quart.** 30 day, 8 morn.

M	W	Festival days.	Alp & D weath. rises.	D	M	n	h	l	4	δ	♀	n	♂	n	♂	♀	n	♂	♀	n	♂
1	F	All Fools d.	Q ♂ ♀	2	39	f	4	9	1	21	21	15	12	29	22	24	22	11			
2	S	♀ fet 10. 24n	Mild at the be-	3	24	2	4	9	2	22	22	16	13	28	4	39	20	43			
3	B	1 S. aft. East	♂ D 24	4	30	3	4	9	2	22	23	17	14	27	17	13	18	12			
4	M	St. Ambrose	♂ D 24	4	57	4	4	9	2	22	24	18	15	26	0	X	11	14	44		
5	T	♂ rise 0. 31m	ginning with	5	22	4	4	9	2	23	25	19	16	25	13	34	10	24			
6	W	Ox. & Ca. t. b	cooling	5	44	5	4	9	3	23	26	21	17	24	27	23	5	25			
7	T	clo. fa. 1 55	showers	7	15	5	4	10	3	23	28	22	18	23	11	V	36	on 0			
8	F	♀ fet 10. 4on		8	37	5	4	10	3	24	20	23	19	21	26	8	5	31			
9	S			8	37	5	4	10	3	24	20	23	19	21	26	8	5	31			
10	B	2 S. aft. East	♂ D ♀	10	14	4	4	10	3	24	1	26	21	19	25	36	15	30			
11	M	1 return	[□ 2 ♀	11	20	3	4	10	4	25	2	28	22	18	10	11	17	19	12		
12	T		□ 2 ♀	Morn	2	4	4	10	4	25	3	20	23	16	24	48	21	40			
13	W	Easter Te. b	8 2 ♀	0	33	n	4	10	4	25	4	V	24	15	9	5	4	22	41		
14	T	cl. with fun		1	35	1	4	10	4	26	6	2	25	14	23	5	22	14			
15	F	h f. 10. 53n	Q 2 ♀	2	25	2	4	10	4	26	7	4	26	12	6	5	20	27			
16	S		of rain.	3	43	4	4	10	4	26	8	6	27	11	20	20	17	32			
17	B	3 S. aft. East		3	36	4	4	10	5	26	9	7	28	10	3	2	13	45			
18	M	2 return	♂ h ♀	4	24	4	4	11	5	27	10	9	29	8	16	40	9	23			
19	T	Alphege		4	25	5	4	11	5	27	11	11	0	8	29	32	4	39			
20	W		* ♀ ♀	4	46	5	4	11	5	27	12	12	1	5	12	13	of. 13				
21	T	h f. 10. 35n		5	45	5	4	11	5	27	14	14	2	3	24	43	5	0			
22	F	♀ f. 11. 22n	D rise.	5	4	11	6	28	15	16	3	2	7	m	3	9	31				
23	S	St. George	□ ⊙ 2 ♀	8	41	4	4	11	6	28	16	18	4	0	19	12	13	37			
24	B	4 S. af. East	[Δ ⊙ 2 ♀	9	50	3	4	11	6	28	17	19	4	58	1	12	17	7			
25	M	St. M. Prs Mo	* ⊙ 24	10	52	3	4	11	6	28	18	21	5	56	13	4	19	53			
26	T	[3 return	♂ D ♂	11	47	2	4	11	6	2	19	23	6	55	24	53	21	47			
27	W		Plea-	Morn	1	4	12	6	29	20	25	7	53	6	4	22	45				
28	T	clo. fl. 2. 40	the end.	0	41	1	4	12	7	29	21	27	8	51	18	32	22	41			
29	F			1	26	2	4	12	7	29	23	29	9	40	0	31	21	34			
30	S			2	63	3	4	12	7	29	24	8	10	47	12	45	19	27			

D	D. L.	Sun beg.	Sun rise	D. L.	eng. of D.	Day inc.	Declination.																		
							⊙	n	h	n	h	n	4	f.	♂	f.	♀	n	♂	f.					
1	3	29	52	63	8	31	13	2	5	12	4	56	10	34	20	28	11	33	23	1	19	17	7	48	
7	3	14	51	64	8	46	13	24	5	34	7	13	10	37	20	34	11	7	23	18	21	19	5	12	
13	2	57	5	65	9	3	13	4	5	58	9	25	10	40	20	40	10	42	23	34	23	2	1	52	
19	2	39	45	7	5	9	21	14	10	3	20	11	31	10	43	20	46	10	18	23	50	24	24	2	n 9
25	2	21	44	7	6	0	30	14	32	5	42	13	31	10	46	20	53	9	55	24	6	25	24	6	44



Geocentric Latitude.

MAY hath XXXI Days.

D	M	n	h	f.	41.	♂	1.	♀	n	♂	f.	
1	0	47	1	21	0	55	0	55	2	39	1	7
13	0	47	1	19	0	58	1	33	2	52	1	55
25	0	46	1	18	1	1	2	18	2	47	2	9

**New Moon** 7 day, 9 morn.  
**First Quart.** 13 day, midni.  
**Full Moon**, 21 day, 7 after.  
**Last Quart.** 29 day, 10 nig.

Heliocentric Longitude.												
D	M	n	h	II	4	♈	♉	♊	♋	♌	♍	♎
1	16	57	15	49	27	13	0	9	10	13	8	36
7	7	2	16	2	27	45	3	19	19	56	11	8
13	7	6	16	16	28	17	6	32	29	41	19	11
19	7	11	16	29	28	50	9	47	9	23	26	3
25	7	16	16	43	29	22	13	4	19	4	28	24

M	W	Festival Days.	Alp. & weath.	D	rises.	D	h	II	4	♈	♀	♊	♋	♌	♍	♎	Dec fourth
1	B	5 S. aft. East.	Δ ♀ ♀	2	36	1	4	12	7	29	25	3	11	46	25	17	16 21
2	M	[St. Ph. & Jas]	♂ ♀ ♀	3	3	4	4	12	7	29	26	5	12	44	8	13	12 23
3	T	4 return	✕ ♀ ♀	3	28	5	4	12	7	27	7	13	42	21	36	7	42
4	W	♀ set 11.43n	Show-	3	51	5	4	12	8	0	28	9	14	40	5	28	2 28
5	T	As. J. H. Th.	□ ♂ ♀	4	14	5	4	13	8	0	29	11	15	38	19	47	3n 4
6	F	John Eyan.	ers and	♂ sets	5	4	4	13	8	0	28	14	16	36	4	8	8 35
7	S	Duts. Yorkb	♂ ☉ ♀	7	40	4	3	13	8	0	1	16	17	34	19	28	13 42
8	B	1 S. af. Af. d.	brisk	9	13	3	3	13	8	0	2	18	18	32	4	11	18 0
9	M	Easter T. en	* ♀ ♀	10	20	2	3	13	8	0	3	20	19	30	19	35	21 6
10	T	♀ set 11.50n	♂ ♀ ♀	11	31	1	D	13	9	0	4	22	20	28	4	26	22 43
11	W	4 ris. 2.6 m	gales of	Mornn	3	13	9	0	5	24	21	25	13	50	13	50	22 45
12	T	Oxf. T. ends	wind;	0	26	1	3	13	9	R	6	27	22	23	3	12	21 17
13	F	♂ ri. 10.53n		1	11	2	3	14	9	0	8	29	23	21	17	2	18 34
14	S	Clo. fl. 3.5	Δ ♀ ♀	1	45	3	4	14	9	0	9	11	24	19	0	23	14 55
15	B	Whit Sund.	□ ♀ ♀	2	11	4	4	14	9	0	10	3	25	17	13	41	10 36
16	M	Whit Mon.	Show-	2	35	5	4	14	9	0	11	5	26	14	26	34	5 55
17	T	Whit Tues.	ers and	2	55	5	4	14	10	0	12	7	27	12	9	12	1 4
18	W	[Prs. Wal. b	perhaps	3	13	5	4	14	10	0	13	9	28	10	21	38	3f 45
19	T	Qu. Char. b.	Dunf.	3	33	5	4	14	10	0	14	11	29	7	3	m	8 21
20	F	♀ l. 11.43n	Q ☉ ♂	3	52	5	4	14	10	0	15	13	0	11	5	16	12 35
21	S	C. T. d. m.	D rif.	4	4	15	10	0	16	15	1	3	27	50	16	16	16 16
22		Trinity Su.	Prs. El	8	42	4	4	15	10	0	17	17	2	0	9	f	19 17
23	M	1 return	♂ ♀ ♂	9	42	3	4	15	10	f	18	19	2	53	21	41	21 28
24	T	♂ rif. 10.10n		10	36	2	4	15	10	29	19	21	3	55	3	20	22 43
25	W	Ox. T. beg.	thun-	11	24	1	4	15	10	29	20	23	4	53	15	18	22 58
26	T	Augustin	der	Mornf	4	15	11	29	21	24	5	50	27	11	22	10	
27	F	Trin. T. b.	toward	0	51	1	4	15	11	29	22	26	6	48	9	13	20 20
28	S	[Ven. Bede	the end.	0	30	2	4	15	11	29	23	28	7	45	21	28	17 34
29	B	1 S. aft. Tr.	8 ♂ ♀	1	8	3	4	16	11	29	23	20	8	43	3	50	13 56
30	M	2 return		1	32	4	4	16	11	28	24	25	9	40	16	52	9 34
31	T	Clo. fl. 2.30	□ ☉ ♀	1	52	5	4	16	11	28	25	2	10	38	0	11	4 38

D	D. L.	Sun beg.	Sun rise	Sun set.	D. L.	eng. of D.	Day inc.	Declination.														
								⊙	n	h	n	h	n	4	f.	♈	f.	♀	n	♊	n	
1	2	0	433	727	10	0	14 54	7 4	15	23	10	47	20	59	9	34	24	23	20	1	11	40
7	1	50	423	737	10	10	15 14	7 24	17	5	10	47	21	6	9	14	24	41	26	15	16	36
13	1	11	414	746	10	49	15 32	7 42	18	38	10	47	21	12	8	55	25	1	26	5	20	55
19	0	38	4 5	755	11	22	15 50	8 0	19	59	10	46	21	18	8	39	25	23	25	31	23	57
25	all	35 <sup>R</sup>	8 2	Day	16	4	3 14		21	8	10	44	21	23	8	24	25	46	24	42	25	7

Geocentric Latitude.														JUNE hath XXX Days.																
D	h	n	h	1.	2	1.	3	1.	2	3	2	3	2	3	Heliocentric Longitude.															
D	h	n	h	1.	2	1.	3	1.	2	3	2	3	2	3	D	h	n	h	1.	2	1.	3	1.	2	3	2	3	2	3	
1	0	46	1	17	1	3	2	46	2	33	2	3			1	7	21	16	58	0	0	16	56	0	20	29	11	12	32	
13	0	45	1	17	1	6	3	32	1	50	0	26			7	7	26	17	12	0	32	20	17	9	58	20	55	11	54	
25	0	45	1	16	1	10	4	8	0	33	2	32			13	7	30	17	25	1	4	23	40	19	33	9	15	11	16	
															19	7	35	17	39	1	36	27	6	29	7	27	9			
															25	7	40	17	52	2	9	0	53	32	8	40	13	44		
New Moon 5 day, 4 after.																														
First Quart. 12 day, 10 morn																														
Full Moon 20 day, 10 morn																														
Last Quart. 28 day, 8 morn																														





Geocentric Latitude.

AUGUST hath XXXI Days.

D	h	l.	4	5	6	7	8
1	0	44	1	16	1	20	4
13	0	44	1	16	1	23	4
25	0	44	1	16	1	25	3

Heliocentric Longitude.

D	h	l.	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	8	9	19	15	5	28	22	34	7	13	0	29	9	18																
7	8	13	19	29	6	1	26	15	16	43	6	11	49	8	40															
13	8	18	19	43	6	33	29	56	26	12	14	21	8	2																
19	8	23	19	56	7	6	3	40	5	42	18	27																		
25	8	28	20	9	7	38	7	24	15	13	16	29																		

**New Moon** 3 day, 7 morn.  
**First Quart.** 10 day, noon  
**Full Moon** 18 day, 3 aftern.  
**Last Quar.** 25 day, 10 night

M	W	Festival Days.	Alp. weath.	D. riles.	D. h	l	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
D	D				h	l	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	
1	M	Lammas	♂ D ♀	1 57	n	6	23	11	18	16	21	9	49	15	18	23	0																	
2	T	♂ fo. 8. 14n	Q ☉ 4	2 57	2	6	24	11	18	15	22	10	47	0	Ω	7	21	15																
3	W		♂ D ♀	3 57	3	6	24	11	18	15	24	11	44	14	51	19	13																	
4	T	4 rif. 8. 29n	Show-	4 32	4	6	24	11	18	14	26	12	42	29	21	15	23																	
5	F		♂ ☉ ♀	5 57	5	6	24	11	18	13	27	13	39	13	31	10	46																	
6	S	Tr. of GOD	then	6 13	5	7	24	11	19	13	29	14	37	27	17	5	44																	
7	B	11 S. aft. T.	name	7 40	5	7	24	11	19	12	Ω	15	35	10	38	0	34																	
8	M	Cl. fast 5. 10	of Jef.	8 59	5	7	24	10	19	12	3	16	32	23	34	4	27																	
9	T		ers and	9 20	5	7	24	10	19	11	5	17	30	6	8	9	9																	
10	W	St. Lawren.	Q 4 ♀	10 43	4	7	24	10	20	10	6	18	27	18	23	13	23																	
11	T	Pr. Br. 8. 14n	♂ ♀ ♀	11 9	3	7	24	10	20	10	8	19	25	0	4	17	0																	
12	F	Pr. Wales	♂ D ♂	11 39	2	7	24	10	20	9	10	20	23	12	17	19	52																	
13	S	4 rif. 7. 52n	thun-	12 18	1	7	25	10	21	0	12	21	20	24	5	21	53																	
14	B	12 S. aft. T.	der. with-	13 18	1	7	25	10	21	8	14	22	18	5	54	22	56																	
15	M	Al. B. V. M.	variable	14 3	1	7	25	10	21	8	16	23	16	17	4	22	57																	
16	T	D. York be	wea-	15 56	2	7	25	9	21	7	18	24	13	29	50	21	54																	
17	W		Δ ♀ ♀	16 56	3	7	25	9	22	7	20	25	11	12	4	19	40																	
18	T	Cl. fast 3. 21	[* ☉ ♀	17 3	4	7	25	9	22	7	22	26	9	24	31	16	46																	
19	F	♂ fo. 7. 31n	♂ D 4	18 3	4	7	25	9	22	6	24	27	7	7	11	12	53																	
20	S	♀ ri. 3. 19m	[* h ♀	19 24	5	7	25	9	23	6	26	28	4	20	6	8	22																	
21	B	13 S. aft. T.	♂ ☉ ♀	20 46	5	7	25	9	23	6	28	29	2	3	14	3	23																	
22	M	[D. Clar. b.	ther.	21 6	5	7	25	9	24	6	30	30	16	35	1	50																		
23	T		toward	22 29	5	8	25	9	24	5	2	0	58	0	8	7	2																	
24	W	St. Barthol.	Thun-	23 53	4	8	26	8	24	5	4	1	56	13	51	11	58																	
25	T	4 rif. 7. 5n	der and	24 24	3	8	26	8	25	5	6	2	54	27	44	16	21																	
26	F	♀ ri. 2. 49n	♂ ♀ ♀	25 3	2	8	26	8	25	5	8	3	52	11	11	19	52																	
27	S		8 h ♂	26 51	1	8	26	8	26	D	10	4	50	25	59	22	13																	
28	B	14 S. aft. T.	8 ♀ 4	27 Morn	n	8	26	8	26	5	12	5	48	10	18	23	9																	
29	M	St. John be	rain.	28 50	1	8	26	8	26	5	14	6	46	24	42	22	32																	
30	T	Cl. with sun	♂ ☉ ♀	29 2	1	8	26	8	27	5	15	7	44	9	Ω	8	20	26																
31	W		[8 ☉ 4	30 18	3	8	27	8	27	5	17	8	42	23	30	17	4																	

D	D. L.	Sun beg.	Sun rise	Sun fet.	D. L.	leng. of D.	Day dec.	Declination.	☉	n	h	n	4	f.	♂	l.	♀	n	♀	n
1	1	26	420	740	10	34	15 20	1 18	17	48	9	44	22	4	8	27	27	20	9	32
7	1	52	429	731	10	8	15 21	1 36	16	11	9	37	22	6	8	42	27	20	9	46
13	2	11	439	721	9	49	14 42	1 56	14	24	9	29	22	7	8	59	27	20	10	21
19	2	31	450	710	9	29	14 20	2 18	12	29	9	20	22	8	9	16	27	19	11	6
25	2	48	5	1650	9	12	13 53	2 40	10	27	9	11	22	9	9	34	27	17	11	51

SEPTEMBER hath XXX Days.

SEPTEMBER hath XXX Days.									
Heliocentric Longitude.									
D	☿	♈	♉	♊	♋	♌	♍	♎	♏
1	044	1	17	1	25	3	43	6	24
13	044	1	17	1	25	5	24	4	40
25	044	1	18	1	25	3	4	2	56
<p><b>New Moon</b> 1 day, 4 aftern.</p> <p><b>First Quart.</b> 9 day, 6 morn.</p> <p><b>Full Moon</b> 17 day, 4 morn</p> <p><b>Last Quart.</b> 24 day, 4 morn.</p>									

**New Moon** 1 day, 4 aftern.

First Quart. 9 day, 6 morn.

**Full Moon** 17 day, 4 morn

Last Quart. 24 day, 4 morn.

[illegible]

D	D L.		Sun	Sun	D.L.		leng.	Day	Declination.																
	beg.	rife	set.	ends	of D.	dec.			⊙	n	h	n	h	n	u	f.	♂	f.	♀	n	♂	n			
1	3	8	514	646	8	52	1332	3	6	7	57	9	1	22	9	955	27	11	12	34	5	11			
7	3	25	526	634	8	35	13	8	3	30	5	43	8	53	22	8	10	13	27	2	12	53	0	34	
13	3	4	537	623	8	20	1246	3	52	3	26	8	46	22	9	1030	26	48	13	6	3	53			
19	3	51	549	611	8	6	1222	4	16	1	7	8	38	22	9	1045	26	29	12	56	8	2			
25	4	5	6	6	7	55	12	0	4	38	1	f. 14	8	29	22	9	1050	26	4	12	25	11	48		

OCTOBER hath XXXI Days.

Heliocentric Longitude.									
D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	13
25	9	16	22	26	13	9	15	58	22

D	M	W	Th	F	S	S	S	S	S
1	8	57	21	32	10	59	0	45	14
7	9	2	21	46	11	31	4	34	23
13	9	6	21	59	12	4	8	22	3
19	9	11	22	13	12	36	12	11	

D	D. L.	Sun beg.	Sun rise	Sun sets	D. L.	leng. of D.	Day dec.	Declination.													
								☉	f	☿	n	♈	n	♉	f	♊	f	♋	n	♌	f
1	4	14	6 12	5 48	7 46	11 36	5 2														
7	4	29	6 24	5 31	7 31	11 12	5 26	334		8 20	22	9	11 12	25	32	11 40	15	4			
								553		8 13	22	8	11 22	24	55	10 35	17	40			
13	4	42	6 36	5 24	7 18	10 48	5 50	8 9		8 7	22	8	11 29	24	10	9 12	19	16			
19	4	53	6 47	5 13	7 7	10 26	6 12	10 21		8 0	22	8	11 33	23	18	7 33	19	22			
25	5	3	6 58	5 2	6 57	10 4	6 34	12 28		7 53	22	7	11 39	22	19	5 46	17	9			



Geocentric Latitude.

NOVEMBER hath XXX Days.

D	h	m	h	l	h	l	h	l	h	l
1	0	45	1	20	1	19	2	3	0	56
13	0	45	1	20	1	17	1	44	1	41
25	0	46	1	19	1	14	1	26	2	51

Heliocentric Longitude.

D	h	m	h	l	h	l	h	l	h	l	h	l	h	l	h	l	h	l
1	9	21	22	42	13	47	20	23	4	6	24	26	4	26				
7	9	26	22	55	14	20	24	9	13	49	25	7	3	48				
13	9	30	23	9	14	53	27	55	23	33	7	18	46	3	9			
19	9	35	23	22	15	25	1	39	3	18	8	10						
25	9	40	23	36	16	58	5	22	13	3	3	6						

First Quart. 7 day, 10 night  
 Full Moon 15 day, 3 morn.  
 Last Quart. 21 day, 7 night  
 New Moon 29 day, 11 mor.

M	W	Festival Days.	Asp. & weath.	D	h	m	h	l	h	l	h	l	h	l	h	l	h	l
1	T	All Saints	Δ 24 ♀	5	56	n	12	27	3	4	24	3	9	40	0	6	17	28
2	W	All Souls. Pr	Edw. 5	6	25	2	12	27	3	5	25	2	10	40	12	12	20	29
3	T	Prs. Soph. b.	1 ret.	7	2	1	12	27	3	6	26	1	11	50	24	8	22	33
4	F	Revo. 1688	* ☉ ☿	7	47	f	12	27	3	7	27	0	12	50	5	57	23	37
5	S	Powd. Plot	□ ☿ ♀	8	37	1	12	27	3	7	28	1	13	50	17	43	23	37
6	B	24 S. aft. T.	♂ ☽ ♂	9	35	2	12	27	3	8	29	29	14	50	29	31	22	33
7	M	Mic. T. beg.	Cold	10	40	3	12	27	3	9	1	D	15	51	11	26	20	28
8	T	♀ ri. 3.5 m	♂ ☽ 24	11	49	4	12	27	3	9	1	20	16	51	23	34	17	28
9	W	L. M. D. L.	Q 24 ♀	Morn	5	12	26		3	10	3	m	17	52	5	59	13	37
10	T	24 f. 7.16 n	rain.	0	58	5	12	26	3	11	4	0	18	52	18	46	9	3
11	F	St. Martin.		2	11	5	12	26	3	11	5	1	19	52	1	59	3	57
12	S	2 return	Brisk winds,	3	26	5	12	26	3	12	6	1	20	53	15	38	1	31
13	B	25 S. aft. T.	♂ fet. 10.15 n	Δ 24 ♀	6	4	12	26	3	13	7	2	21	53	29	43	7	4
14	M	♂ fet. 10.15 n	Δ 24 ♀	6	4	12	26		3	14	8	3	22	54	14	8	11	25
15	T	Machutus	and	D	ri. 3	12	26		3	14	9	4	23	54	28	54	17	9
16	W	♀ ri. 3.21 m	♂ ☽ h	5	50	2	12	26	3	15	11	5	24	55	13	46	20	51
17	T	Hu. Bi. Lin.		6	40	n	12	26	3	16	12	6	25	56	28	39	23	8
18	F	3 return	showers	7	40	1	12	26	3	16	13	8	26	56	13	25	23	48
19	S	Clo. flo. 14.8	of rain.	8	51	2	12	26	4	17	14	9	27	57	27	58	22	49
20	B	26 S. aft. T.	and	10	7	3	12	26	4	18	15	10	28	57	12	15	20	22
21	M		* ☿ ♀	11	25	4	12	26	4	19	16	12	29	58	26	14	16	46
22	T	24 fo. 6.30 n	perhaps	Morn	5	12	26		4	19	17	13	0	59	9	55	12	20
23	W	St. Clement		0	39	5	12	26	4	20	19	14	2	0	23	18	7	24
24	T		□ ☉ 24	1	54	5	12	26	4	21	20	16	3	0	6	25	2	14
25	F	D. Gloster b	Δ ♂ ♀	3	55	5	12	25	4	21	21	17	4	1	19	16	2	5
26	S	♀ ri. 3.46 m	thun-	4	15	5	12	25	4	22	22	19	5	2	1	55	7	54
27		Advent Su.	der.	5	25	4	12	25	4	23	23	20	6	3	14	21	12	28
28	M	Mic. Te. en.	Δ h ♀	6	33	3	12	25	4	24	24	22	7	4	26	37	16	28
29	T	Clo. fl. 11.3	Rain to	D	fets	2	12	25	4	24	26	23	8	5	8	43	19	45
30	W	St. Andrew	Δ h ♂	4	54	1	12	25	5	25	27	25	9	6	20	41	22	8
			the end.															

D	D. L.	Sun beg.	Sun rise	Sun set.	D. L.	leng. of D.	Day dec.	Declination.	☉ f.	☿ n	h n	24 f.	♂ f.	♀ n	♂ f.	♀ n
1	5	15	7 11	440	6 45	9 38	7 0	1446	7 45	22	7 11	33	21	2	3 12	12 13
7	5	24	7 21	439	6 36	9 18	7 20	1636	7 41	22	6 11	29	19	49	0 56	9 36
13	5	31	7 31	429	6 29	9 58	7 40	1816	7 37	22	6 11	22	18	30	1 28	10 10
19	5	38	7 40	420	6 22	8 40	7 58	1943	7 33	22	5 11	13	17	5	3 57	12 37
25	5	44	7 49	411	6 16	8 22	8 16	2058	7 30	22	5 11	1	15	35	6 26	15 40

D	M	n	h	l.	4	1.	3	f.	2	n	5	n
1	0	46	1	19	1	13	1	18	2	11	0	50
13	0	47	1	18	1	11	1	12	11	0	53	4
25	0	47	1	17	1	9	0	46	1	58	1	39

First Quart. 7 day, 4 altern.  
**Full Moon** 14 day, 2 altern.  
 Last Quart. 21 day, 6 mor.  
**New Moon** 29 day, 6 mor.

Heliocentric Longitude.

D	M	n	h	l.	4	1.	3	f.	2	n	5	n
1	9	44	23	49	16	31	9	3	22	49	24	25
7	9	48	24	3	17	4	12	43	21	35	13	0
13	9	53	24	16	17	36	16	22	12	20	0	7
19	9	58	24	30	18	9	19	59	22	5	16	39
25	10	3	24	43	18	42	23	34	1	48	3	20

M	W	Festival Days.	Asp. & weath.	D	D	M	h	l.	4	1.	3	f.	2	n	5	n	D	D	Dec
D	D			fets.		M	h	l.	4	1.	3	f.	2	n	5	n			fouth
1	T	δ f. 10. 14 n	□ δ ♀	5a36		12	25	5	26	28	26	10	7	2	32	23	31		
2	F		Windy,	6 23	1	12	25	5	26	29	28	11	8	14	20	23	49		
3	S	4 fo. 5. 47. n	□ ⊙ ☿	7 19	2	12	25	5	27	11	29	12	9	29	6	23	5		
4	B	2 Su. in Adv.	with	8 20	3	12	25	5	28	2	1	13	10	7	55	21	19		
5	M	clo. fl. 8' 38"	δ D δ	9 25	4	12	25	5	29	3	2	14	11	19	50	18	37		
6	T	Nicholas	δ D 4	10 33	5	12	25	5	29	4	4	15	12	1	56	15	4		
7	W	♀ rif. 4. 9 m	□ 4 ♀	11 44	5	12	25	5	30	5	5	16	13	14	18	10	50		
8	T	Co. B. V. M.	Δ 4 ♀	Morn	5	12	24	5	1	6	7	17	14	27	0	6	1		
9	F		fnow or	0 54	5	12	24	6	1	8	0	18	15	10	6	0	48		
10	S			2 8	5	12	24	6	2	9	10	19	16	23	39	4	37		
11	B	3 Su. in Adv.	□ ☿ ♀	3 26	4	12	24	6	3	10	12	20	17	7	39	10	1		
12	M	clo. fl. 5' 28"	rain.	4 45	3	12	24	6	4	11	13	21	18	22	7	15	3		
13	T	Lucy		6 7	2	12	24	6	4	12	15	22	19	6	56	19	18		
14	W		δ D h	D rif. 1	12	24	6	5	14	16	23	20	22	1	22	20			
15	T	4 fet 10. 14 n		5a12	n	12	24	6	6	15	18	24	21	7	513	23	4		
16	F	O. S. C. T. e	δ h δ	6 21	2	12	24	7	7	16	19	25	22	22	21	23	27		
17	S	Oxf. Te. en		7 35	3	12	24	7	7	17	21	26	23	7	517	21	27		
18	B	4 Su. in Adv.	Wind,	8 55	4	12	24	7	8	18	23	27	24	21	54	18	5		
19	M	♀ rif. 4. 37 m	8 h ♀	10 16	5	12	24	7	9	20	24	28	25	6	52	9	13	4	
20	T		with	11 32	5	12	23	7	9	21	26	29	27	19	58	8	45		
21	W	St. Thomas	rain or	Morn	5	12	23	7	10	22	27	30	28	3	22	4	31		
22	T		fnow;	0 43	5	12	23	7	11	23	28	1	29	16	24	1	43		
23	F	clo. with fun	mild to	1 54	5	12	23	8	12	24	29	2	30	29	6	6	45		
24	S	δ fet 10. 10 n		3 44	12	23	8	12	26	2	3	31	11	31	11	25			
25	B	Christm. da	δ ⊙ ♀	4 12	3	12	23	8	13	27	4	4	32	23	43	15	33		
26	M	St. Stephen	the end.	5 19	2	12	23	8	14	28	5	5	34	5	46	19	0		
27	T	St. John		6 24	1	12	23	8	14	29	7	6	35	17	41	21	36		
28	W	Innocents	* 4 ♀	7 25	1	12	23	8	15	1	8	7	36	29	31	23	15		
29	T	clo. f. 2 56"	* ⊙ 4	D fets	1	12	23	9	16	2	10	8	37	11	5	19	23	51	
30	F		Δ ☿ ♀	4a50	2	12	23	9	17	3	12	9	38	23	9	23	23		
31	S	Silvester		5 58	3	12	23	9	17	4	13	10	40	4	57	21	52		

Declination.

D	D. L.	Sun beg.	Sun rise	Sun set.	D. L.	leng. ends	Day of D.	Day dec.	⊙	f.	h	n	h	n	4	f.	δ	f.	♀	f.	♀	f.
1	5	49	7 55	4 5	6	11	8	10	8	28	21	59	7	27	22	4	10	47	14	1	8	56
7	5	53	7 59	4 16	7	8	2	8	36	22	45	7	26	22	4	10	30	12	23	11	20	21
13	5	57	8 3	3 57	6	3	7	54	8	44	23	15	7	25	22	3	10	12	10	42	13	38
19	5	59	8 5	3 55	6	1	7	50	8	48	23	27	7	25	22	2	9	51	8	58	15	46
25	5	50	8 5	3 55	6	1	7	50	8	48	23	23	7	26	22	2	9	20	7	11	17	41

Answers to the Enigmas, Rebuses, Charades, &c.

Enigmas,		Rebuses,	Charades,
I. An Oak,	VI. Newspaper,	I. British Diary,	I. Carwithen,
II. A Saw,	VII. A Pen,	II. Elliott,	II. Schoolmaster,
III. Pair of Shoes,	VIII. A Particle	III. Love,	III. Handcuffs,
IV. Luxury,	IX. A Post.	IV. George Wilde,	IV. Necklace,
V. British Diary,		V. Milton,	V. Silk worm,
		VI. A Nest.	VI. Tippet,
			VII. Sweetheart.

Paradox,—A Monosyllable.

ANSWERS TO THE PRIZE ENIGMA,

1. By Mr. Thomas Fox, Norton.

Diarian friends, of each degree, [me, And shew to our posterity,  
Come take your *Post*, and join with Our names plac'd in this Diary,  
Let each employ his talent right, That they the same may carry on,  
To give the rising age delight; When life is past, and we are gone.

2. By the Reverend J. Shackleton, Thornton, Yorkshire.

Admit a friend to with you good success,—  
Prevent it, Heaven, that *Di'ries* e'er should cease!  
O may attempts t'improve and entertain,  
So long continue countenance to gain,  
That time and *Diaries* may alike remain.

3. Address to the Authors, by Autodidactus Ramptoniensis.

From your fam'd *Diary* much pleasure I receive,  
Without it should be almost lost;  
The same to you, with equal profit may it give,  
And may you long maintain your *Post*.

4. By Mr. Joseph Woollen, Schoolmaster, Smalley, Derbyshire,

Your *Di'ry's* my pleasure, when I am at leisure,  
Quite alone, by my own fire side;  
And many an hour have exerted my power,  
Before I can matters decide.  
Tho' but little I do—yet I hope it is true,  
And will be perused by most;  
I like nothing better, than send you a letter,  
Against first of May by the *Post*.

5. By Mr. John Fildes, Schoolmaster, in Liverpool.

But short indeed is this our life below,  
Which oft embitter'd is with grief and woe;  
These Heaven sends in mercy and in love,  
To turn our thoughts to better things above.  
Then let us while on earth still act our parts,  
With minds contented, and with grateful hearts;  
Let works of charity by us be done,  
And may we all believe in Christ the Son!  
That when before his judgment seat we stand,  
We may obtain a *Post* at God's right hand.

6. By Mr. John Carwithen, Ripley, Derbyshire.

How checker'd are our days upon this stage,  
From highest *Post* of honour, to the page:



To-day our prospects all are bright and clear,  
 To-morrow clouded, all is dark and drear.  
 We see no further than the present date,  
 'Tis Providence directs the wheel of fate;  
 And tho' a blank may seemingly appear,  
 Each movement proves the ways of God are clear.

7. By Mr. Richard Savage, Cranfield, Bedfordshire.

Kind authors of the *British Diary*,  
 Permit a youthful hand his skill to try,  
 Who anxious strove to find the mystic clue,  
 To solve the prize, and bring the *Post* in view.

Other ingenious and separate answers were given by Messrs. Kemp, Brown, Stevenson, Danis, Ward, Simpson, Wilos, Hostman, Shipfides, &c. y. z. Caf. Broomwott, Cowley, Sutton, Era. Slingstone, and J. Savage.

## GENERAL ANSWERS TO THE ENIGMAS.

1. By Mr. Joseph Woollen, Schoolmaster.

When the *Post* had brought down new *Diaries* from town,  
 I Saw them at sign of the Oak;  
*A Particle, Shoes, Pen, Luxury, News,*  
 I perus'd while my pipe I did smoke.

2 By Mr. Thomas Fox, Norton.

I met George Wild the other day,	<i>Carruthen, Schoolmaster, and Pen,</i>
And courteously to him did say,	<i>A Necklace, Tippet, Saw, and then,</i>
Pray Sir have you the <i>Di'ry</i> seen,	<i>A Silkworm, Handcuffs, pair of Shoes,</i>
The <i>British Diary</i> I mean?	<i>A Sweetheart, Luxury, and News;</i>
Where Elliott, Milton, Nest, and Love,	These grace the <i>Di'ry</i> , as you'll find,
Stand like Oak <i>Posts</i> within the grove;	If to peruse it you're inclin'd.

3. On Spring, By Mr. John Savage, Norton, Northamptonshire.

Once more the balmy gales of spring,	<i>Newspaper Pen'd in mystic shades,</i>
Waft o'er this fruitful isle,	And bards of spirit sing.
Once more the tuneful warblers sing,	How pleasant in the early morn,
Once more the valleys smile.	Soon as the sun doth rise,
Perch'd on the spreading Oak again,	And soaring larks o'er waving corn,
The thrush her song resumes;	Thro' <i>Atoms</i> swiftly flies;
And flow'rets decorate the plain,	Then how delightful 'tis to rove,
Shedding their rich perfumes.	Befide the limpid rill;
Again the streams meandering flow	Or thro' the shady silvan grove,
Along the verdant mead;	Or climb the tow'ring hill.
Where late we Saw the drifted snow.	While all around on every side,
All o'er her surface spread.	Omnipotence we view,
At eve's approach how sweet to stray	Who still for mortals doth provide,
With <i>Shoes</i> all damp with dew;	Both food and raiment too.
While the <i>Luxur'ant</i> valleys gay,	O may we then with fervent zeal,
Wave as the zephyrs blew.	And true humility;
O how shall I on <i>Dia's</i> page	Praise thee O gracious Lord, who still
Paint the delightful spring,	Doth all our wants supply.

4. A Choice, By Mr. W. Shipfides, Normanton on the Wolds.

Indulgent Heaven would all my thoughts befriend,  
 And I might chuse how I my time would spend:  
 No superb mansions raised high in air,  
 Like towering Oaks, should ever be my care.  
 No *Post* nor pow'r I crave amongst the great,  
 Being but *Atoms* of a happy state;

1 Enigma  
 Prize  
 8 Enigma

But far from these, near some *Luxuriant* plain,  
Where Love and Harmony alternate reign.

4 Enigma

Where nature's works sublime like *British Di*,  
Delight the soul, and charm th'astonish'd eye,  
A lonely cot I chuse, not proudly great,  
Nor yet too meanly low,—but comely neat.

5 Enigma

With a fit competence, for to supply  
My homely board, and *Pens* and *Paper* buy;  
And *Shoes* and raiment requisite to wear,  
Regale a friend, and sooth each *Sawing* care.

7 6 Enigma

3 Enigma

2 Enigma

And for to smoothe the rugged path of life,  
And make me more complete, I'd have a wife;  
Gracful in person, virtuously inclined,  
In manners affable, of wit refin'd.

In such a state methinks I then could prove,  
The height of pleasure, and the sweets of love;  
Nor envy the vain pomp wealth does afford,  
But chearful wait the summons of the Lord.

5. By Mr. John Fildes, Schoolmaster, in Liverpool.

Edward and Sally, or The Happy Discovery.

Beneath an *Oak* while Edward sat,  
One pleasant morn in May,  
To hear the lark and linnet sing,  
And watch the lambskins play.  
In a *Luxur*'ant field he *Saw*  
A fair one *Pensive* stand,  
Who something like a *Newspaper*,  
Held in her lovely hand.  
Which into pieces soon she tore,  
And threw it all around!  
Then with her *Shoes* she trampled it,  
To *Atoms* on the ground.  
Surpriz'd at this uncommon sight,  
He *Posted* to the place,

And there was overjoy'd to see,  
His *Sweetheart* Sally's face.  
Some one to her the letter sent,  
Which she just then had torn;  
To tell her, Edward meant to wed,  
Another nymph next morn.  
But he convinc'd her it was false,  
Then said I'll wedded be,  
To-morrow morning, pretty maid,  
If you will marry me.  
She gave consent, and he at church,  
Sweet Sally made his own,  
And in the *British Diary*,  
I hope you'll make it known.

6. The wandering Lover, By Wilos Hostman.

As by a shady *Oak* I sat,  
Reading the *British Di*,  
A man without a *Shoe* I *Saw*,  
Who unto me drew nigh.  
As he approached near to me,  
I asked him his name,  
And what it was he seem'd to seek,  
And why he hither came?  
Distress'd *Carwithen* is my name,  
A *Schoolmaster* am I,  
*Miss Elliott* is the maid I seek,  
The maid for whom I sigh.

Without *Necklace* she's *Posted* off,  
And from her father's gone;  
Because he would not let her have,  
The man she'd fix'd upon.  
Not *Lux*'ry, but with *Milton's* muse,  
Like *Atoms* spread her fame,  
And with a lover's lively *Pen*,  
Immortalize her name.  
Now should I not my *Sweetheart* find,  
Nor *News* of her return;  
But like a *Bird* robb'd of her *Nest*,  
I will her absence mourn.

7. By Mr. Benjamin Kemp, Farnfield.

Advice to a young Lady.

Dear Sylvia why vain of your beauty, ah! why,  
That frail sickle child of an hour;  
Youth flees like an *Atom*, or *Post* passing by,  
And beauty will fade like a flower.

Can *Luxury* display'd from the *Tippet* to *Shoe*,  
 The *Necklace* so gaudy and vain;  
 Or all the profusion the *Silkworm* bestows,  
 Give ease in the moment of pain?  
 Ah! place no dependance on grandeur and pride,  
 'Tis delusion and vanity all;  
 Yon *Oak*, whose gay branches extend far and wide,  
 This night by the *Hand-Saw* may fall.  
 In the choice of a *Sweetheart*, let *Love* be your guide,  
 To no fopling or fool be a wife;  
 Ho *Nest Milton*, who doth at the *New Shoe* reside,  
 Tho' humble, may bless you thro' life.  
 Let the fam'd *British Diary* your *Schoolmaster* be,  
 Read *Carwithen*, *Elliott*, and *Wilde*;  
 From the *Pen* of philosophy candid and free,  
 Flow precepts instructive and mild.  
 Should you *Hand cuff* aside this advice of your friend,  
 And *Nosyllable* please that is said;  
 Yet know 'twas design'd for a far better end,—  
 To improve and instruct a young maid.

Other ingenious answers were given by Mess. *Carwithen*, *Brown*, *Danis*,  
*Autodidactus*, *Cowley*, *Sutton*, *Rover*, *Lock*, and *Singletoniensis*.

## ANSWERS to the REBUSSES & CHARADES.

### 1. By *Autodidactus Ramptoniensis*.

As I return'd from *Retford* fair at night,  
 Two maidens, *Hand-in-hand* I overtook; alluding to *Handcuffs*  
 And was extremely pleased at the sight,  
 So neat and spruce like *Silkworm* one did look.  
 A *Necklace Tippet* did adorn the fair,  
 While she was fresh and blooming in her teens;  
 We talk'd of marriage pleasure, and its care,  
 Of *Sweetheart*, and of courtship's blissful scenes.  
 Now should it be our happy lot to wed,  
 I hope *Carwithen*, *Elliot*, and *George Wilde*,  
 Will grace our nuptials— they shall be well fed,  
 And drink clear English nectar, stout and mild.  
 With *British Diary* will them entertain,  
*Schoolmaster Milton* too, if they approve;  
 At night find them a *Nest*, quite snug, tho' plain,  
 While we enjoy the sweets of lawful *Love*.

### 2. By Mr. John Fildes, Schoolmaster, of Liverpool.

<p>The <i>British Diary</i> each year,          Grows more and more esteem'd,          By men of science and true wit,          It is unmatchless deem'd.          But few with <i>handcuffs</i> are in love,          The <i>silkworm</i> spins its nest;</p>	<p>With <i>tippets</i> and with <i>necklaces</i>          Young <i>sweethearts</i> oft are drest.  <i>George Wilde</i> and <i>Carwithen</i> are bards          Like <i>Milton</i> known to fame;          And <i>Elliott</i> as a <i>schoolmaster</i>,          Has gained a lasting name.</p>
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### 3. An Ode to Peace, By Mr. John Carwithen.

Come lovely Peace and bless again this isle,  
 Expand thy wings, let trade and commerce smile;  
 Stretch forth thy fostering arm from shore to shore,  
 Take war's rude *handcuffs* from th' industrious poor.



Let *Wilde* and *Elliott* grace the *British* Di,  
And strive that hard *John Milton* to outvie;  
Give to *Carwithen* time thy praise to sound,  
Thy heav'n-born name t' distant lands resound.

Contentment, peace, and plenty here below,  
The greatest blessings heaven can bestow;  
Whilst war's rude hand our pleasures all destroy,  
And robs the mother of her darling boy.

The maid deplores her *sweetheart's* loss in vain,  
And to the *schoolmaster* pours forth her strain,  
In *monosyllables* his loss bewail.

And prays the winds to fill his tardy sail.

That she again may clasp him to her breast,  
And like a *silkworm* fill his absent nest;  
No longer then may she his loss deplore,  
Come Peace! let *Amathea's* horn run o'er.

From thy abundance deck each roseate fair,  
May she a spangled *necklace tippet* wear;  
And *Ceres* with her yellow hand prepare,  
Auspicious crown the harvest ev'ry year.

Other ingenious and separate answers were given by Messrs. Kemp, Brown, Danis, Wilos Hostman, Simpson, Evans, Fox, x. y. z, John Savage, Sutton, Erasmus Slingstone, Rover, and Amorythum.

## ANSWERS TO THE QUERIES.

### 1. By Mr. Benjamin Kemp, Farnsfield.

The meaning of the text seems fully explained in the 13th St. John, v. 22; the sense seems to run thus,—You would not be so much in fault as you now are, if you erred ignorantly; but it is a far greater sin to condemn the known will of God, than to be ignorant of it.—But now you say, we see; now you put on the form of sanctity, and shake not off your original transgression; you therefore stand more clearly and inexcusably convicted of it.

*Autodidactus* saith,

Our blessed Saviour here may probably mean, that had they been born blind, as the man he had just restored to sight, they would not have had the means of acquiring so perfect a knowledge of himself, as the promised Messiah, as now they had, and consequently would have met with compassion rather than resentment; but now, their blindness and ignorance were wilful, as they had both seen and hated both him and his father.

The same was also answered by Mr. John Carwithen.

### 2. By Mr. John Brown, of Wittington.

There are many sins that are great, yet pardonable, and are not unto death; for Christ himself hath said, that all manner of sin and blasphemy shall be forgiven unto men, except it be the sin against the Holy Ghost. Now this sin against the Holy Ghost, is that sin which St. John calls here the sin unto death; not because that sin deserves death alone, for so does all sin deserve death temporal, for the wages of sin, even all sin, is death; but this sin against the Holy Ghost is called the sin unto death, because it binds a man over to eternal death, without a possibility of recovery.—And be that commits this sin there is no hopes of mercy, no hopes of pardon, for such an one we are forbidden to pray.

Similar answers also by *Autodidactus*, *Olinthus*, *Gil. G.* & *Mr. Kemp*.

*The same by Mr. John Carwithen.*

The sin that is not unto death, is the infirmities of the flesh, which St. Paul saith are manifest; they are those that offend the laws of the nation where we dwell, for which there are temporal punishments allotted according to the nature of the offence, and consequently a sin against man, or the wounding of our conscience, and not imputed as sin against God. For, as our first parents could not withstand the wiles of the serpent, and fell to rise again in more exalted state, not having power to withstand; the punishment was not inflicted eternally, but for a season, and the imbecility of nature has existed ever since the original sin. So was nature's law written in the heart, to the accusing or excusing for that which I do, I allow not; for what I would do, that do I not, but what I hate, that I do. These are the deeds of the flesh, warring of all the seed of Abraham, and unto them it is not imputed as sin. Those are the people St. John calls brethren, and adviseth every one to admonish a brother when he seeth him offend the law; for he saith all unrighteousness is sin, that is, it woundeth the conscience of all those that are born of God, for whosoever is born of God sinneth not, for his seed is in him. But those that are born of this world or the devil, are wicked, for his seed remaineth in him; those are the people whom Christ calleth the children of disobedience, cursed children, the barren tree, a generation of vipers, &c. whose deeds are evil, and offend both God and man; reserved in chains of darkness for that great and notable day, when every seed springeth up in its own likeness. Therefore St. John saith, we need not pray for the sin that is unto death, for it cannot be averted; because the Lord hath sworn that this generation should not enter into his rest; therefore prayer can be of no avail.—For heaven and earth shall pass away, but my word shall not pass away, saith the Lord.

3. *By Mr. Benjamin Kemp, Farnsfield.*

Judges, 5 ch. 20 v. *The stars in their courses fought against Sisera.* That is, they, in their several stations (like soldiers ranged in battle) as the host of God, with their influence raising the storms and horrible tempests, conspired altogether with earthly creatures, to work the ruin of Sisera and his army. By this kind of rhetorical expression, Deborah shews, that not only the Israelites, but the Lord himself, both from heaven and earth, by all means and creatures. *Autodidactus* thinks, no more is meant than the glittering light of the stars lengthened the day of battle, while Israel were avenged on on their enemies. *Dr. Sharv* thinks the stars fought against Sisera, by bringing abundance of rain, that Kishon became so high and rapid as to sweep away the host of Sisera in attempting to ford it.

*The same by Mr. John Brown.*

*The stars in their courses fought against Sisera.* Not by sword or spear; not by thunder or lightning; but by those fatal and malevolent influences wherewith Sisera and his host were marked from their birth, and draws together by the operations of their influence, to partake in one common destruction in the same day, that their influences may fall by due course of nature, at such exact periods, as to effect the punishment of the wicked, and of God's declared enemies, such as was Sisera, when their abominations call forth the judgments of an injured Deity, by which the purposes of God, and all the events of this life, are uniformly brought to pass.

The same was also answered by Mr. John Carwithen.

## I. ENIGMA (70) by X. Y. Z.

Permit a friend unto the fair,  
In British Diary to appear;  
Not having any fear or doubt,  
But quickly you will find me out.  
In earth or sea I may be found,  
In mountains or in marshy ground;  
Tho' only seen once in a year,  
By you I every day appear,  
In Asia and Africa,  
In Charlestown in America. [made,  
Without me peace had ne'er been

The soldiers ne'er implore my aid;  
I'm serviceable to the state,  
And help to make the truly great.  
To parliaments I am a friend,  
But lo! the traitor I attend;  
I'm with the maid when she—but  
hold,  
Too much I have already told;  
For before this I make no doubt,  
But you have found your servant  
out.

II. ENIGMA (80) by Mr. John  
Diarian bards attentive be,  
And deign a-while to think on me;  
I am your true and faithful friend,  
And unto all do comfort lend.  
The weary traveller I give,  
Refreshment, which he doth receive;  
And am of use from king to clown,

Smith, Alton Park, Staffordshire.  
For all will my assistance own.  
In me the sick do find relief,  
And for a-while forget their grief;  
I soothe the lab'ring soul to rest,  
And lull the minds of the distressed.  
Then wits of enigmatic fame,  
From these few hints declare my name

III. ENIGMA (81) by Mr. John  
You enigmatic bards attend,  
I ev'ry one of you befriend;  
Likewise in British Di'ry reign,  
And upon ev'ry leaf I'm seen;  
And in a letter clear in sight,  
I'm often seen in black and white.  
In country and in kingdom found,  
In city, and the world all round;  
In markets too I always be,  
'Mongst ev'ry trader you may see;  
And when the Judge comes with his  
train,

Thompson, Coulston Bassett.  
I'm seen with him upon the plain;  
And when a jury he doth call,  
There I am seen with great & small.  
With lords and commons I appear,  
With kings, and queens, and servi-  
If I a beggar chance to meet, [teer;  
I'm seen with him at head and feet;  
And in the ships upon the seas,  
There I'm known to rest at ease.  
When you are by yourself at leisure,  
My little theme unfold with plea-  
sure.

IV. ENIGMA (82) by John  
I'm oft produc'd by Borean rage,  
When elemental war doth wage;  
Whose fury makes the oaks to bend,  
While tempest o'er the plain descend.  
When th' rage is o'er, and wind so  
bleak,  
And the ethereal sky doth streak;  
When cheerful Sol withdraws his ray.  
And trembling lights illum the way.  
'Tis then that I receive my birth,  
And fix'd throughout the spacious  
earth;

Savage, Norton, near Towcester.  
Oft made a widow of a wife;  
Parents, oft mourn their children  
dead,  
And ev'ry hope with them is fled;  
Altho' such dreadful things are done,  
The fault is certainly their own;  
'Tis true I'm never known to kill,  
Nor blood I'm never known to spill.  
'Twas folly, chance, or fate, depend,  
Brought them untimely to their end.  
I'm condescending as to be,  
Tro'd under foot of low degree;  
Yet not confin'd to Albion's shore,  
I'm seen where foaming billows roar;  
With fury fly before the storm,  
While sailors view my dismal form;  
For if I light upon the ship,  
They're often bury'd in the deep;  
Regardless of their piercing cries,  
Exulting mount towards the skies;  
Undaunted skim the raging main,  
Still mixt with element again;  
For ever lost to human eye.  
Ingenious bards my name desery.

Where my parent marks her career,  
Attending all sharp and severe.  
Some with regret my face behold,  
Others revere me more than gold;  
Who strives my healthful charms to  
share, [reer;  
And fearless mounts with swift ca-  
Be cautious, O ye youthful train,  
Oft fatal prove, tho' entertain;  
Thousands by me are mangled,  
Perhaps with broken bones in bed;  
Thousands by me have lost their life,



## V. ENIGMA (83) by Mr. John Jackson, Bilston.

Diarian bards attend while I pour-	Beside yon antient hoary gothic
tray;	hall,
The mazy windings of my infant	Where creeping ivy tops the moul-
When winter courts with winds	d'ring wall; [jovial choir;
tempestuous howl,	[pole; Where oft the sportsman join'd the
Th' icy embraces of the northern	And roar'd his echoes round the
When o'er the waste where trackless	kitchen fire; [dress'd,
deserts lie,	[eye; Where rustic glee in vacant gestures
The weary pilgrim darts a wishful	Welcom'd the hourless stranger for
When hope forsakes him at the close	his quest:
of day,	[on the way. Lo! there I stand a silent monument
I prove his friend, and guide him	Of mirth departed rustic content.
For me the fair in anxious bodings	When war's fell blasts the sight of
wait,	[stin'd fate; anguish swell, [mal knell;
And thro' my aid receive their de-	And howl departing commerce's dis-
I now bear each fond motion of the	When o'er the fields rise mountains
soul	[pole. of the slain, [the plain;
That wafts a sigh from Indies to the	And floods of gore red waving o'er
To all mankind my services I lend,	I stand the foremost in the bloody
And every station owns me for their	flight, [rific might;
friend;	[ful eye, And dares the power of death's ter-
The merchant views me with a wish	The daring hero to the combat raise,
While pleasing fancies tune his heart	and crown his brows with laurels
to joy.	and with bays.

## VI. ENIGMA (84) by Benjamin Kemp, Farnsfield.

Let others boast their dignity and	And oft suspended hang from night
birth,	[worth; to morn;
And high exalt their property and	Or in some pound perchance con-
I boast not high descent, my birth	fin'd all day, [astray.
was mean,	[green, Like Dobson's beast that aptly goes
My parent wander'd on the verdant	Yet why in plaintive epithets delight,
'Till man forth brought him from	Since I the weeping statute of a night,
the rural plain,	[fatal stain: Oft gain preferment, tho' ignobly
And shed his harmless blood, ah!	born, [adorn;
Hid in oblivion beth the theme unsung,	To wait at court, the palace too-
A parent slaughter'd, and his off-	Kings, lords, and commons, o'er th'
spring hung;	affairs of state, [to wait;
How thousands dauntless dy'd by	Will own my influence—deign on me
steel and fire,	[mangled fire. Yet not high circles only I befriend,
Who with new birth inspir'd my	My generous aid to all mankind I
Whom, as if vengeful of his stream-	send: [dear I guide,
ing gore,	The weary'd wight, thro' labyrinth
Did mutilated parts to life restore.	Or stand expiring at Clarinda's side.
These scenes remov'd, lo! quickly I	But ah! ingratitude, detested name,
appear,	[I wear; When dire consumption seizes on my
Forc'd by the rod to take the dress	frame;
Tho' often cloath'd, yet naked and	Succeeded by some hapless brother I,
forlorn,	Exhausted and unpitied fall and die.

## VII. ENIGMA (85) by Mr. John Carwithen.

A Jewish name please to transpose,	Transpose again, and you will see,
A lady's head-dress will disclose,	What's full of all activity;
Which now is wore, and quite in	And surely you will find my name,
The appellation for a rogue.	[vegue, To think upon our greatest bane.

VIII. ENIGMA (86) by Mr. W. *Shipsides, Normanton on the Wolds.*

Ye British bards with wreaths of laurels crown'd, [renown'd;	A transient joy at best, or empty name;
For wisdom, and for learning, much Whose mystic thoughts, in sublime language teem, [esteem;	Then wisdom learn, and solid joys you'll find, [mind;
And claim at once attention and Grant me excuse, nor deem me bold- ly rude, [trude.	Sweet attribute unto a polish'd For she instructs, and teaches man to know,
If I, in mystic robes, should here in- In ancient days, I scarcely then was known, [grown,	That all is vanity on earth below; True to my office, faithful to my trust, [just;
But now so common and profuse I'm The country throughout I do abound, And oft'times may on barren sands be found;	I oft obstruct the pious and the Yet exercise my power with legal right, [light.
And tho' I cannot boast of rank or state, [and great;	And in the path of duty take de- Then oh! ye stubborn, and ye thoughtless youth, [truth:
I've oft been notic'd by the rich And such my services are now on earth. [power and worth;	Observe this precept, and give ear to To serve you at your call there's none more free, [on me;
That kings and nobles own my And mighty chiefs, high fam'd for feats in war, [bar.	Than I, yet oft your curses throw But for what reason say, ye men of sense, [offence.
Submissively oft stand before my And surely now I may some honour claim, [fame;	Since I ne'er gave to man the least O base ingratitude! for favours past, You vile insulting language on me cast.
Since I'm promoted to a post of And noble principles my actions guide, [bribe.	On my support some daily do de- pend, [a friend;
For I was never known to take a But ah! what's known now, with her dazzling train,	Yet few there are that own me as And so ungrateful is the heart of man, [can.
	That oft to shun me he does all he

IX. ENIGMA (87) by Mr. Daniel Sheridan.

The smiling spring, the newly blof- som'd spray, [tle's lay;	And often grac'd her fair impartial hand.
The budding bushes, and the thros- The vernal season ever fair & young, At once invites my enigmatic song.	E'en now above the cumb'rous fleecy clouds, [with gods;
When bounding stags thro' shady forests rove, [grove;	I dwell, enroll'd, with heroes and When blust'ring prigs, and simp'ring nymphs resort, [court;
Fly o'er the plains, or frolic in the Companion of their steps I may be seen, [mien.	To the loud garret of fam'd Thalia's When their vile throats all harmo- ny destroys, [noise.
And proudly aiding their majestic But ah! when I to man my aid im- part, [tortur'd heart;	'Tis I support them in their gothic When loud applause with ardent transport fill'd, [pic field;
What earthly balm can soothe his Wealth, love, and friendship court his mind in vain, [pain.	The martial champions of th' olym- When fix'd aloft, the hero guides the rein, [smoking plain;
Death, only death, can mitigate his In Saturn's reign, when justice dwelt with man, [gan,	And swiftly glides around the 'Tis I that rule the rapid Chonot's course, [ing horse;
Ere vile corruption and deceit be- I bow'd obsequious to her high com- mand,	And kept its union with the foam- When lovely spring revisits earth again,

And decks with chearful green, the lonely plain;  
 I fondly stray along meandering streams, [frisking lambs  
 And range the meadows with the O'er lakes where swans their snow white plumage lave, [waves;  
 I dance supinely on the trembling I help to ripen gay Pomona's stores, When o'er the vast atlantic Phebus goes, [soft repose;  
 And oft repose within her clust'ring bow'rs, [fers. And leaves this wearied world to  
 Or rest on sweets of aromatic flow- When Philomel to pensive woods  
 To shun my glance young Stella complain, [tive strain;  
 turns her head, [friendly shade; And mournful Echo joins the plain-  
 And hides her blushes in some I trembling stand on some high  
 From pregnant dust those buzzing western hill, [well.  
 tribes I rear, [of air. To bid this fav'rite isle a kind fare-  
 "That sport and flutter in the fields But hill, and dale, field, grove, and  
 Thro' chrystal Ether's lucid tracks flowery lawn, [dawn.  
 I pierce, Expecting smile to cheer the breezy

X. ENIGMA (88) by *Mr. John Carwithen.*

Wars dread alarm spreads terror far and near, [rear;  
 Awakes confusion in the front and The messenger of fate I move along, [laws maintain;  
 And drown the clamour of the martial song: Their prowess prove, and ancient  
 Terrific speed my course across the attend, [his friend;  
 field, [to yield A circle drawn, where each appoints  
 Where each embattl'd hero's forc'd To aid him in the contest should he  
 To my superior strength; o'er all fail, [assail  
 pervade; Then with determin'd vigour each  
 And ne'er capitulate or retrogade, His opponent, while I'm borne to  
 By circuitous march, but onward and fro, [to know;  
 soar, [plore; And who's possess'd of me, each wants  
 Nor at my horrid acts do ne'er de- For those that to my resting place  
 But justice deal alike throughout the convey,  
 earth, [faith; Triumphant the laurels bear away,  
 Though not possess'd of never-failing Unto his love, his valour all impart,  
 Yet mouldering mountains some- With sparkling eyes the prest him  
 times I remove, [love; to her heart;  
 Intruder am on friendly scenes of Praising, with smiles, his great he-  
 Tho' I in friendly circles often join, roic deeds, [feeds;  
 With festive sport and mirth always While others idly on my surface  
 combine; Various spending each chequer'd  
 For see me now where active youths hour, [pow'r,  
 resort, [sport; Regardless of my vast extensive  
 Upon the fertile green affording And crop my sweets—consider not  
 To each spectator, who with merry my bane, [same;  
 glee, My size unequal, shape always the  
 Anxious m' various evolutions see; F'r unto trade and play am both  
 Rebounding o'er the plain like un- confign'd, [may me find;  
 curb'd steed, [er speed; And with each thrifty dame you  
 Perhaps, with equal force, and great And to each town of fashion I re-  
 Yet here my rustic gambols do not fort,  
 end, Now see me at the avenues at court;



Where I'm attended by my lord and grace,	[the place	My great extent, and o'er the ocean soar'd,
And all the charming ladies near		To gain applause, and memorate their name,
Here fashion reigns with her atten- dant pride,		[they came, And luckily did return from whence Without accomplishing the grand design,
And sweet simplicity is laid aside ;		[ern clime ;
For the pedant's agglomerated rule.		Yet me they saw in north and south- For o'er each bursting surge I light- ly bound,
Taught to each pretty miss in board- ing school :		[world around.
Yet no beginning to my form you trace ;	[race ;	And hourly speed my course the In heav'n's arched vault. I have a place,
Nor end was ever found by human		And am an ornament in ev'ry face.
Though circumnavigators have ex- plor'd		

XI. ENIGMA (89) by *Autodidactus Ramptoniensis*.

Dear gents and Dia.'s friends, both		A prisoner then am made, and fast
learn'd and wise,	[pise,	confin'd,
My multifarious form do not de-		[mankind ;
Nor laugh, nor grin, at my odd ap- pearance,	[bearance.	And pressed down with burdens by But thanks to my kind stars, now raise my voice,
Till my use you know I beg for-		[joice, While hearty fellows over me re- And gently touch'd by some fair magic wand,
A little dapper fellow now I am,		[to expand.
And highly priz'd both by dad and mam ;		Cause youthful hearts with love for Was long since wedded to a fly-flow dame,
A trusty servant next, that ne'er complains,	[tongue nor brains ;	[great fame.
Good reason why, I've neither		And have, by necromancy, gain'd And tho' my name you may think a disgrace,
Have a wide mouth, and as the fates decreed,	[to feed.	I am the parent of a fruitful race.
On skin and bones I'm daily doom'd		My first attends brave knights and heroes bold,
Behold m' next, amaz'd, my trans- migration,	[m' station ;	fops' gold ;
My frame most curious, and so snug		My next is wise, and picks up milk- My third his younger brother leads astray,
And tho' no fidler, e'er to me should play,	[day.	[all day ;
Jig round from rising to the setting		My next is savage—skulks in holes His birth and parentage my sixth disdains
Of an amphib'us race I am, no doubt,	[me out ;	[than brains.
For from the miry deep you drag But in your mirth and glee cast me away,		My last has got by far more tongue Have had three more, but not seen them of late,
Yet follow after laughing, ah, ha, ha.		[death's gate.
How hard's my fate ! what reason to complain,	[main ;	Suppose they're dead, or weeping at But stop—I shall not introduce them here,
I'm forc'd to fly across the raging		[next year. Therefore adieu, my friend, till the

XII. PRIZE ENIGMA (90) by *Mr John Fildes, Schoolmaster*.

When lawless tyranny her head uprears,  
And stern oppression in a land appears ;  
To check their progress, if men rise in arms,  
And with loud drums and trumpets sound alarms—  
I take my station in the martial throng,  
And lend assistance to redress each wrong ;  
My head I raise, then strike the fatal blow ;  
That hurls destruction on each haughty foe.  
Soon human blood's seen smoking on the plain,  
And on the ground lies heaps of warriors slain ;

Whose mangled limbs a heart of stone might move,  
 But cannot mine, for I dread battles love.  
 Nay, such a harden'd cruel wretch am I,  
 Like wicked Cain, my brother I destroy.  
 With thieves and robbers company I keep,  
 And go with them by night while others sleep,  
 To plunder houses, honest men to cheat,  
 And acts commit too shocking to relate;  
 But am no foe to honesty 'tis clear,  
 For in the scales of justice I appear.  
 Great are my feats in battles, but when peace,  
 With smiles returns, and wars and tumults cease,  
 To scenes of mirth and feasting I retire,  
 And get caress'd by ev'ry country 'quire;  
 Yet at a joke I'm never known to laugh,  
 Nor ever eat, but oft good liquor quaff.  
 You'll find me too in an exalted state;  
 Where four attendants on me always wait;  
 But then like spies they watch my motions well,  
 For if I stir an inch they quickly tell.  
 Thus strange may seem, but 'tis my fate forsooth,  
 To be suspected, tho' a friend to truth.  
 I'm upright too—alike serve all mankind,  
 And bold as brags, yet fickle as the wind.  
 It sometimes happens ere I breathe my last,  
 Like Joseph, I into some pit am cast;  
 Like him, I'm by my brethren hated too,  
 And when ensnar'd, if I for freedom sue,  
 Tho' once my eloquence was such, you know,  
 I soon could cause the pearly tears to flow—  
 My plaintive cries and pleadings now prove vain,  
 And I for life a captive must remain.  
 In summer, when the sun great power displays,  
 And on our vallies darts his friendly rays;  
 When nymphs and swains to shun the noontide heat,  
 Within some harbour find a cool retreat;  
 I'm likewise seen amidst a numerous train,  
 But then quite short and fleeting is my reign;  
 For when the eastern sky begins to lower,  
 And thunders loud foretel a coming show'r,  
 I haste for shelter till the storm is o'er,  
 And then you view me in that form no more,

### NEW REBUSES.

#### I. REBUS, by Mr. John Smith, Alton Park, Staffordshire.

The goddess of youth, and the organ of sight,  
 An edible root, and the source of pure light;  
 A part of the face, and the thigh of a hog,  
 A large bird of prey, and a favourite dog.  
 The initials, when join'd, will bring to your view,  
 An astronomer's name that is rival'd by few.

#### II. REBUS, by Mr. Thomas Fox, of Norton.

One of th' infernal judges take,	With him, who did with crafty force,
And he who coaches first did make;	Deceive them with the wooden horse,
The giant with one hundred hands;	Th' initials join'd, will straight appear,
And one that wasted Trojan lands.	A thing that pleases all the year.

III. REBUS, *by the Reverend J. Shackleton, Thornton, Yorkshire.*

One sixth of what comforts a labourer at night,  
When join'd with an adverb, will furnish what's white,  
Which seldom is welcome : come late, or come soon,  
The world always wishes it speedily gone.

IV. REBUS, *by Mr. John Savage, Norton, near Towcester.*

He who to Jesse's son was kind, | Will name a learn'd ingenious bard,  
And half a fragrant shrub when join'd, | Whose verses claim our best regard.

V. REBUS, *by Autodidactus, Ramptoniensis.*

To the whole of a curse, add one fourth of a King,  
Three seventh of a breach, hereunto you must bring ;  
Then a fifth of Joe Tyburn's badged relation,  
Oft shew a great rogue, as any i'th' nation.

VI. REBUS, *by Mr. John Carwithen.*

To a negative, join the one fourth of a tie,  
Which always is us'd when Hymen is nigh ;  
Three fourths of what all experience in trade,  
Tho' e'er so firm the contract it is made.  
These right connected, will shew to your view,  
Th' name of a bard that's outrivall'd by few.

VII. REBUS, *by Olinthus Gilbert Gregory.*

First place some letters full in view,	But if one half of them be ta'en,
A thing on which we rest to shew ;	There would be fifty more remain ;
Then take two thirds of them away,	From all take letters five by theft,
There's one and fifty left I say.	And then you'll find there's nothing left.

NEW CHARADES.

I. CHARADE, *by Mr. William Shippides, Normanton on the Wolds.*

Grant me my first, in the redeemer's love,  
O heaven ! and I no more e'er wish to prove ;  
Behold my next on yonder craggy steep,  
Where fullen waves in rude confusion sweep.  
My whole has been esteemed much of late,  
And oft is aim'd at by the rich and great.

II. CHARADE, *by Mr. John Carwithen.*

Young Harry to Mary my first did present,  
In return of my second, he was well content ;  
My whole would displease the chaste wives of this time,  
Tho' Sarah gave me, and ne'er thought it a crime.

III. CHARADE, *by Mr. John Savage, Norton, near Towcester.*

Hark my first how loudly roaring,	When the spring with all her treasures
When rude Æolus rends the grove ;	Visits Albion's fruitful Isle ;
To fond parents how endearing,	Then my whole dispensing pleasures
How my next doth win their love.	Makes each hill and valley smile.

IV. CHARADE, *by Mr. Benjamin Kemp, Farnsfield.*

My first is trampled in the mire,	My whole attends at the levee,
Yet bears our gracious Queen ;	The masquerade and ball ;
My second's rich as Great Mogul,	Ladies your humble servant he
Yet as a beggar mean.	Obedient at your call.

V. CHARADE, *by Mr. John Smith, Alton Park, Staffordshire.*

My first's a passage o'er my second, as quickly you will find ;  
My whole is by most people reckon'd, a wealthy trading town.



VI. CHARADE, by Mr. John Jackson, *Bilston*.

My first's a pledge of mutual love, my next its emblem fair,  
My whole delighted, seeks the grove, or cuts the liquid air.

## VII. CHARADE, by Mr. James Frost.

My first lives by plunder its known, which robs my whole of its store,  
My second insuareth my first, while m'whole makes my first be no more.

## VIII. CHARADE, by Mr. Daniel Sheridan.

My first the creation sustains,	Ah! Laura my whole to deny,
In unity friendship and peace;	Was cruel of you to your slave
Around my gay second the swains	This poor heart that lov'd none beside
I learn they will eagerly press.	Will shortly find rest in the grave.

## I. QUERY, by Mr. Robert Carlisle.

In hens, geese, and other tame birds hatching their young, the little animal in embryo at the time it should come forth into the world is frequently kept a prisoner and deprived of its life by means of the surface, or some part of the surface of its body being cemented to the shell; required a remedy for the preservation of the young.

II. QUERY, by Mr. John Jackson, *Bilston*.

What is the best antidote for a despairing Lover?

## III. QUERY, by Mr. Benjamin Kemp.

What is the meaning of the prophet Hosea, when he says,  
Ephraim is a cake not turned, see Chap. 7th, Verse 8th.?

## IV. QUERY, by Mr. Thomas Varley, Schoolmaster, in Warley.


How are we to understand the words of our Lord mentioned in the last Chap. of the First Book of Kings, v. 23.?

## V. QUERY, by Mr. John Carwithen.

How can we account for the Justice, and mercy, of God, in requiring the blood of all the prophets, of one generation; see *LUKE*, ch. II, v. 49, 50, 51.?

*Remarks to Correspondents.*—Mr. D. Sheridan's letter (of Bilston) did not come to hand till October last, it contained ingenious answers to the 1, 4, 6, 7, 8, 9, 10, 12, 13, & 16 questions; and general answers to the Enigmas, Rebuses, Charades, &c. Also Mr. Jackson's letter (of Bilston) come to hand at the same time.

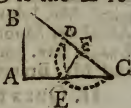
The Editors wish that gentlemen, in future, would write their mathematical and poetical pieces, &c. in such a manner that they may be separated from each other. And also intreat them to avoid writing their mathematical questions in poetry as much as possible. And likewise send answers to whatever they propose. They also with pleasure return thanks to all their kind contributors, still intreating them for a continuance of their valuable favours.

 *The Prizes have been determined by lot as follow.*—For the Prize Question, to Mr. James Ashton, of Harrington, near Liverpool, 8 Diaries; and for answering the greatest number of questions, to Mr. John Knowles, of Liverpool, 6 Diaries; 2d, for the Prize Enigma, to Erasmus Slingstone, 6 Diaries; 3d, for the General Answer to the Enigmas, to Singletoniensis and Mr. Benjamin Kemp, of Farnsfield, 6 Diaries each; 4th, for the General Answer to the Rebuses, Charades, &c. to Mr. John Carwithen, 6 Diaries;—all of whom will please to send for them to Mr. PEARSON, Printer, in Birmingham.

ANSWERS to the MATHEMATICAL QUESTIONS.

I. QUESTION (1112) answered by Mr. John Knowles, of Liverpool.

*Const.* On CD the given radius 1. describe a semicircle, apply  $FE = \frac{12}{25} \perp DC$ , join DE, from C through E draw AC, such that  $AC^3$  : given solid (480) ::  $CE^2$  : CD . ED. On A erect AB  $\perp$  AC to meet CD continued in B, and ABC is the  $\Delta$  required.

*Demon.* DE and EC are evidently the sine and cosine of  $\angle C$ , and DE . EC = DC . FE =  $\frac{12}{25}$  A  (conf.) Also, by conf.  $AC \times AC . CD \div CE \times AC . ED \div CE = 480$ . But by sim.  $\Delta$ 's AC . CD  $\div$  CE = CB, and AC . ED  $\div$  CE = AB  $\therefore$  AC . CB . AB = 480.

*Calc.* By the property of the circle DF . DC = DE<sup>2</sup>; whence, DF =  $\frac{16}{25}$ , FC =  $\frac{9}{25}$ , DE =  $\frac{4}{5}$ , EC =  $\frac{3}{5}$ ; and by conf. AC =  $\sqrt[3]{480}$ .  $CE^2 \div CD . ED = \sqrt[3]{216} = 6$ ; and, because CE, ED, and DC, are as 3, 4, and 5;  $\therefore$  AC, AB, and BC, are 6, 8, and 10; and the area = 24.

The same, by Wm. Burdon, Acafter Malbis, near York.

The square of the sine + the square of the cosine is always = to the square of the radius; and their rectangle in the present case is  $\frac{12}{25}$ , therefore from the square = 1, take twice the rectangle =  $\frac{24}{25}$ , and the square root of the diff. is the diff. of the sines =  $\frac{1}{5}$ . Again to the square of the radius 1 add twice the rectan. =  $\frac{24}{5}$ , and the square root of the rem. is the sum of the sines =  $\frac{7}{5}$ ; half the diff. added to, and subtr. from half the sum gives, 8, and 6 the nat. sines of the two angles: Hence  $\sqrt[3]{48} : \sqrt[3]{480} :: 1 : 10$  the hypotenuse, and the two legs are 6 and 8.

*Remark.* This prob. may easily be constructed from the 30th of Simpson's Alg. pa. 340, 5th edit.

Or thus by Mr. John Rowbottom, of West Hallam, Derbyshire.

If any two indefinite lines make a right  $\angle$  at A (see the above fig.) and there be taken AC = 3, AB = 4, and CB joined this  $\Delta$  will be sim. to the required one; for CB will be 5, and sine  $\angle C = \frac{4}{5}$ , and sine  $\angle B = \frac{3}{5} \therefore \frac{3}{5} \cdot \frac{4}{5} = \frac{12}{25}$  the 'given' rectangle by the ques, hence the sides are 6, 8, and 10, and the area = 24. W.W.R.

Otherwise by Mr. James Ashton, of Harrington:

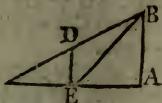
Put  $p$  = the given product. of the three sides = 480;  $r$  = the rect. of the sines =  $\frac{12}{25}$ ; and  $x$  = the hypo. then  $\frac{p}{x}$  = rectan. of the

the two legs = double the area; also, as 1 (R.) :  $x^2 :: r : rx^2$   
 = double the area  $\therefore rx^2 = \frac{p}{x}$ , and  $x^3 = \frac{p}{r} = 1000$ , whence  $x =$   
 10, and  $\frac{p}{2x} = 24 =$  the area, and the sides are 6, 8, and 10 re-  
 spectively.

True and ingenious Solutions were also given by Mr. Brookes, Amo Zythum the Proposer, Mr. Richard Elliot, Mr. Olinthus Gilbert Gregory, Mr. John Brown, Mr. James Stevenson, Mr. R. Simpson, Mr. Abraham Moore, junior, Mr. Thomas Varley, Mr. Thomas Simpson Evans, Mr. John Hawkes, Mr. W. Smith, Mr. William Eaton, junior, and Mr. Erasmus Slingstone.

## II. QUESTION (113) answered by Mr. Knowles, Liverpool.

*Construction.* Make CE to EA (the given line = 100) as 3 to 2, erect ED and AB  $\perp$  EA; make ED such that CE . ED may be = twice the given rectangle, and through C and D draw CB to meet AB in B, and DEAB is the trapezium required.—For by conf. CE : AE :: 3 : 2  $\therefore$  CE : CE + AE :: 3 : 5 :: ED : AB by sim.  $\Delta$ 's. Also EC . ED as req. by construction.—Calc. CE =  $\frac{3}{2}$  AE = 150, DE =  $2 \times$  given area  $\div$  CE =  $16\frac{2}{3}$ , AB =  $\frac{5}{3}$  ED =  $26\frac{8}{9}$ , and the area of the trapezium =  $\frac{1}{2}$  DE +  $\frac{1}{2}$  AB . EA =  $2151\frac{1}{2}$ .



*The same by Mr. Richard Elliot, of Liverpool.*

Let ABDE be the trapezoid, and the sides BD, AE produced to meet at C, forming the triangle ABC (see the above fig.) Then there is given the area of the triangle CDE = 1210, and the ratio of AB to DE; hence by similar triangles, as  $3^2 : 5^2 :: 1210 : 3361\frac{1}{9}$ , = area of  $\Delta$  ABC, and  $3361\frac{1}{9} - 1210 = 2151\frac{1}{2}$  = area of ABDE, as required.

Solutions to this question were also given by Juvencius the Proposer, Messrs. Brookes, Gregory, Stevenson, Simpson, Moore, junior, Wilos Hostman, Hawkes, Ashton, Woollin, Blackwell, Eaton, junior, and Langdon—Other answers were sent, but not right.

## III. QUESTION (114) answered by Mr. James Stevenson, Heath, near Chesterfield.

The Proposer says, this question was not properly proposed, owing to the omission of the words, "inscribed in a circle."—Let ABCD (conceive a fig. to be drawn) be the trapezium; put  $a = 100$ ,  $\sqrt{105}$ ,  $d = 5$ , and assume  $x + 1\frac{1}{2}d$ ,  $x + \frac{1}{2}d$ ,  $x - \frac{1}{2}d$ , and  $x - 1\frac{1}{2}d =$  AB, BC, CD, and DA, respectively; then per corol. 5, pa. 73, of Dr. Hutton's Mensuration, 1st edi. the square root of  $x + 1\frac{1}{2}d \cdot x + \frac{1}{2}d \cdot x - \frac{1}{2}d \cdot x - 1\frac{1}{2}d = a$ ; which squared and transposed gives  $x^4 - 2\frac{1}{2}d^2 x^2 = a^2 - \frac{9}{16}d^4$ ; solved by quadratics  $x = \sqrt{\frac{5}{4}d^2 + \sqrt{a^2 + d^4}} = 32\frac{1}{2}$  in this case; consequently the sides AB, BC, CD, and DA, are = 40, 35, 30, and 25 respectively.

The



The same by Casia Broomwell.

This quest. is not limited, unless two of the sides make a right  $\angle$ , or the trapezium can be inscribed in a circle; therefore, Let AEDB be the trapezium (see Mr. Knowles's fig. above) draw EB; EAB a right  $\angle$ , call ED,  $x$ ; EA,  $x+5$ ; AB,  $x+10$ ; and BD,  $x+15$ ; then  $EB = \sqrt{x^2 + 30x + 125}$ , and (by cor. 2, prop. 8, Emerson's Geo.) we have  $\frac{1}{4} \cdot \overline{BD + ED}^2 - EB^2 \times \frac{1}{4}$ .

$\overline{EB - BD - ED}^2 =$  the area of the  $\triangle EDB = \frac{\sqrt{x^2 + 30x + 125} \times x^2 - 2500}{2}$ ,

and  $\frac{x^2 + 15x + 50}{2} =$  area of the  $\triangle EBA$ , hence by question

$\frac{\sqrt{x^2 + 30x + 125} \times x^2 - 2500}{2} + \frac{x^2 + 15x + 50}{2} = 100\sqrt{105}$ : reduced

and brought into numbers is  $x^2 + 15x = 1000$ : solved  $x = 25$ , and the sides are 25, 30, 35, and 40. W.W.R.

True solutions were also given by Messrs. Elliot, Gregory, Bardou, Moore, Wilos, Hostman, Simpson, Evans, Hawkes, Ashton, Knowles, Blackwell, Eaton, Longton, Juveniensis, Littlewood, and Young.

IV. QUESTION (115) answered by Mr. John Knowles, Liverpool.

Put  $r$  = the longer arm,  $s$  = the shorter,  $x$  = the given weight,  $w$  = its counterpoise on  $r$ ;  $v$  its counterpoise on  $s$ . Then, per Mecha.  $xr = ws$ ; and  $vr = sx$ ; from the former  $x = \frac{ws}{r}$ ,  $r$

$= \frac{ws}{x}$ ,  $w = \frac{xs}{r}$ ,  $s = \frac{xr}{v}$ ; from the latter  $x = \frac{vr}{s}$ ,  $r = \frac{xs}{v}$ ,  $v = \frac{xs}{r}$ ,  $s$

$= \frac{vr}{x}$ . Consequently  $\frac{ws}{r} = \frac{vr}{s}$ ; hence  $w = \frac{vr^2}{s^2}$ ,  $s = \sqrt{\frac{vr^2}{w}}$ ,  $r =$

$\sqrt{\frac{ws^2}{v}}$ ,  $v = \frac{ws^2}{r^2}$ . Also,  $\frac{ws}{r} = \frac{xs}{v}$ ; hence,  $w = \frac{x^2}{v}$ ,  $v = \frac{x^2}{w}$ ,  $x$

$= \sqrt{wv}$ : By these general theorems many pretty questions may be solved.

Exam. Let  $x = 48$ ,  $r = 6\frac{6}{7}$ ,  $s = 5\frac{1}{7}$ ; then  $w = \frac{vr^2}{s^2} = 64$ , and  $v = \frac{x^2}{w} = 36$ . Answer.

Exam. 2d.  $w = 16$ ,  $v = 9$ ; then  $x = \sqrt{wv} = \sqrt{144} = 12$ , the true weight.—Otherwise. By Mecha.  $6\frac{6}{7} : 5\frac{1}{7} :: 48 : 36$  the counterpoise on the longer arm; and  $5\frac{1}{7} : 6\frac{6}{7} :: 48 : 64$  the counterpoise on the shorter arm.

The same by Mr. Brookes, of Leeds.

Weights suspended on a lever, must be reciprocally as the lengths of the arms, in the case of an equilibrium. Therefore  $6\frac{6}{7} : 48\text{lb.} :: 5\frac{1}{7} : 64\text{lb.} =$  what the goods weigh when suspended on the longer arm; also  $5\frac{1}{7} : 48\text{lb.} :: 6\frac{6}{7} : 36\text{lb.}$  when suspended on the shorter arm.

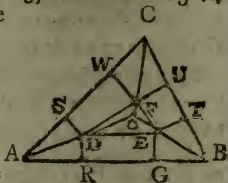
Or thus, by Mr. R. Simpson, of Bath.

Suppose AB the beam, and C the center of motion, or point about which the beam and scales turn. Then since the weights are reciprocally as the distance of their points of suspension from the center of gravity, it will be as  $5\frac{1}{7}$  (BC) :  $6\frac{6}{7}$  (AC) :: 48lb. the true weight of the goods :  $\frac{48 \times 6\frac{6}{7}}{5\frac{1}{7}} = \frac{48^2}{36} = 64$  lb. the weight of the goods when suspended at A, and as  $6\frac{6}{7}$  :  $5\frac{1}{7}$  :: 48 : 36lb. the weight of the goods when suspended at B.

Ingenious solutions were also given by Mess. Elliot, Gilbert Gregory, Burdon, Stevenfon, Varley, Hawkes, Ashton, Eaton, jun. Langdon, R. Sutton of Great Yarmouth, and John Rowbottom.

V. QUESTION (116) answered by Mr. John Rowbottom.

From the given points D, E, F, drop the  $\perp$ 's DR, DS, EG, ET, FW, FU; then in the given  $\triangle ABC$  are all the sides given to find the  $L$ 's; hence the  $L$  EBG =  $29^\circ. 57'$ .  $L$  DAR =  $23^\circ. 4'$ . and  $L$  FCW =  $36^\circ. 59'$ . from whence as EB = AD = FC = 6 by the ques. GE = ET = 2.9952, DR = DS = 2.3505, and FW = FU = 3.6099; also BG = BT = 5.1989; AR = AS = 5.5204; and CW = CU = 4.7925; hence GR = 9.2806; also UT and SW are found, then the space DRGE =  $\frac{RG}{2} \cdot KD + GE = 24.8061$ ; also ETUF = 16.5412, and WFS D = 22.9091; also the space GETB = GB. GE = 15.5719, CWFU = 17.3007; ASDR = 12.9758; then the triangle ABC — ASDETBA — TEFDSCT =  $\triangle DEF = 19.655$ . W.W. R.



The same answered by Mr. Olinthus Gilbert Gregory, Yaxley, Huntingdonshire.

From the sides given the angles are found to be  $73^\circ. 58'. 58''$ .  $59^\circ. 53'. 23''$ . and  $46^\circ. 7'. 39''$ . Mr. Emerson has demonstrated, that if lines bisecting the angles of a triangle be continued, they will meet in a point O (see the preceding fig.) within the triangle: Hence the angles at O are easily found, namely,  $L$  AOB =  $126^\circ. 59'. 29''$ .  $L$  BOC =  $199^\circ. 56'. 41\frac{1}{2}''$ . and  $L$  AOC =  $113^\circ. 3'. 49\frac{1}{2}''$ : by the help of these we discover BO = 12.49858, AO = 9.80728, and CO = 8.13796; from each of these take 6, and there remains EO = 6.49858, DO = 3.80728, and FO = 2.13796. Then  $EO \times OD \times \frac{1}{2}$  nat. sine of  $L$  AOB = 9.852, the area of the  $\triangle DOE$ ;  $EO \times OF \times \frac{1}{2}$  nat. sine of  $L$  COB = 6.019, the area of the  $\triangle FOE$ , and  $FO \times OD \times \frac{1}{2}$  nat. sine

LA

$\angle AOC = 3.744 = \text{area of } \triangle DOF$ ; consequently  $19.615$  their sum, is the area of the  $\triangle DEP$ . W. W. R.

This question was also answered by Messrs. Brookes, Elliot, Bardou, Stevenson, Varley, Hawkes, Ashton, Knowles, Eaton, Langdon, Munro, Juveniensis, Amo Zythum, Trueman, Blackburn, Woodhouse, Bradbury, Lock, Lovet, Rover, and Singleton.

VI. QUESTION (117) answered by Mr. Wm. Eaton, jun. Sutton o'th' Hill, Derbyshire.

Put  $s$  and  $c$  = the sine and cosine of half the sum of the arcs,  $x$  and  $y$  = sine and cosine of half their diff. then will  $sy + cx$  and  $cy - sx$  = sine and cosine of the greater arc;  $sy - cx$  and  $cy + sx$  = sine and cosine of the lesser; then per ques.  $3sy - 3cx = sy + cx \div cy - sx = \text{tang. of the greater arc}$   
 $\therefore y = \frac{3s - cx}{3x + s}$ ; and  $x^2 + y^2 = 1$  (rad.)<sup>2</sup> in which put the value of  $y$ , and reduced  $x = .2306$  = the sign of  $13^\circ. 20'$ .  $\therefore$  the greater arc =  $50^\circ. 50'$ . and the less  $24^\circ. 10'$ . as required.

The same answered by Mr. Ashton, of Harrington, the proposer.

Put  $t$  = tangent of  $15^\circ$ . and  $x$  = tang. of the greater arc, then  $\frac{1}{x}$  = its cotang. and  $\frac{x+t}{x} : 1 (R) :: \frac{1-tx}{x} : \frac{1-tx}{x+t}$  = tangent of the less arc; and (putting  $1+t^2 = s$ )  $\frac{\sqrt{s+sx^2}}{x+t}$  = its secant; then as sec. : tang. :: rad. : sine =  $\frac{1-tx}{\sqrt{s+sx^2}}$ ; hence, by the question

$3 - 3tx \div \sqrt{s+sx^2} = x \therefore sx^4 + s - 9t^2 \cdot x^2 - 18tx = 9$ ; which equation resolved,  $x = 1.2278643$  = tang. of  $50^\circ. 50'. 23\frac{1}{2}''$ . which taken from  $75^\circ$ . leaves  $24^\circ. 9'. 36\frac{1}{2}''$ . and the sine of this  $\times 3 = 1.2278649$ .

Otherwise, by Mr. John Rowbottom, of West Hallam.

Suppose the greater arc to be  $50^\circ. 50'$ . then the less is  $24^\circ. 10'$ . the tang. of the greater is  $1.2275786$ ;  $\frac{1}{3}$  of which is  $.4091928$ ; and the sine of the less is  $.4093923$ , and the error is  $.0001995$  too little. Again let the greater arc be  $50^\circ. 51'$ . its tang. is  $1.2283081$ ,  $\frac{1}{3}$  of which is  $.409436$ , and the sine of the less  $24^\circ. 9'$ . is  $.4091269$ ; the error is  $.0003091$  too big, then by trial and error  $1.2283081 - 1.2275786 \times .0001995 \div .0001995 + .0003091 = .0002881$ ; hence  $1.2275786 + .0002881 = 1.2278647$ , the tang. of  $50^\circ. 50'. 23''. 32'''$ . the greater arc; and  $24^\circ. 9'. 36''. 28'''$ . is the less. W. W. R.

Or, otherwise thus by Mr. Richard Elliot.

Let  $m$  = tang. of  $75^\circ$ . and put  $x$  = the required sine, radius 1; then  $3x$  = required tangent by the question, and by trigonometry



nometry  $\frac{m-3x}{3mx+1} = \frac{x}{\sqrt{1-x^2}}$ ; this equation reduced, &c.  $x = .40926 = \text{fine of } 24^\circ. 9\frac{1}{2}'$ . and this taken from  $75^\circ$ . the remainder  $= 50^\circ. 50\frac{1}{2}'$ . is the arc whose tangent  $= 3$  times the fine of  $24^\circ. 9\frac{1}{2}'$ .

Solutions were also given by Messrs. Brookes, Gregory, Burdon, Stevenson, Simpson, and Knowles.

VII. QUESTION (118) answered by *Casia Broomwott*.

If the 1st given equation be multiplied by  $y^{\frac{1}{3}} + z^{\frac{1}{2}}$ ; and divided by  $y^{\frac{5}{3}} + z^{\frac{5}{2}}$ , the quotient will be equal to the 2d given equation, that is,  $46431924 \times \frac{y^{\frac{1}{3}} + z^{\frac{1}{2}}}{y^{\frac{5}{3}} + z^{\frac{5}{2}}} = 28644$ , or  $y^{\frac{1}{3}} + z^{\frac{1}{2}} \times$

$1621 = y^{\frac{5}{3}} + z^{\frac{5}{2}}$ . But the 2d equa. is evidently  $= \frac{y^{\frac{1}{3}} + z^{\frac{1}{2}}}{5} \cdot \frac{y^{\frac{5}{3}} + z^{\frac{5}{2}}}{y^{\frac{1}{3}} + z^{\frac{1}{2}}} = 28644$ ; or  $y^{\frac{1}{3}} + z^{\frac{1}{2}} = \frac{143220}{1621} = y^{\frac{5}{3}} + z^{\frac{5}{2}} = 1621 \times y^{\frac{1}{3}} + z^{\frac{1}{2}}$ , therefore  $y^{\frac{1}{3}} + z^{\frac{1}{2}} = 1621 \times y^{\frac{1}{3}} + z^{\frac{1}{2}} = 143220$ ; solved  $y^{\frac{1}{3}} + z^{\frac{1}{2}} = 11$ , and  $y^{\frac{5}{3}} + z^{\frac{5}{2}} = 17831$ . Now there is given the sum 11, and the sum of the 5th powers 17831 of  $y^{\frac{1}{3}} + z^{\frac{1}{2}}$  to find  $y$  and  $z$ , which (by prob. 48, Simpson's Algebra)  $= 64$ , and 49. Substitute  $\sqrt[3]{64}$  and  $\sqrt{49}$  for  $\sqrt[3]{y}$  and  $\sqrt{z}$  in the third given equation, and it becomes  $\sqrt[3]{7+4}^3 + \sqrt[3]{7+8}^3 + \sqrt[3]{7+12}^3$ , &c. to  $x$  terms  $=$  (by Simpson's Alg. page 208)  $16x^4 + 144x^3 + 478x^2 + 693x = 1771856$ . (by quest.) solved  $x = 16$ . Hence his age is 16 years, 7 weeks, 2 days, 16 hours. W.W. R.

This question was also answered by Mr. John Rowbottom, the Proposer, in a curious manner. Some other Gentlemen sent solutions, but they do not agree with the above.

VIII. QUESTION (119) answered by *Mr. John Brookes*.

Put the content  $= 160$  gallons  $= 45120$  inches  $= a$ ,  $2 + 2\sqrt{2} = \text{double the tangent of } 67\frac{1}{2} \text{ degrees} = b$ ; and one side of the octagonal base  $= x$ , then  $bx^2 = \text{the area of the base}$ ; and  $\frac{a}{bx^2} = \text{the altitude}$ ; therefore the whole internal superficies will be expressed by  $bx^2 + \frac{8a}{bx}$ , which by the question is a minimum. Now if this expression be put into fluxions, and reduced, we get  $x = \frac{4a}{8z}^{\frac{1}{3}} = a \cdot 3 - 2\sqrt{2}^{\frac{1}{3}} = 19.782113$ ; the depth  $= \frac{ba^{\frac{1}{3}}}{16} = \frac{1}{2}$ .  $a \cdot 1 + \sqrt{2}^{\frac{1}{3}} = 23.8795$ , and the area of the base  $= 2 \cdot a^2 \cdot \sqrt{2 - 1}^{\frac{1}{3}} = 1389$ .

= 1889.517104. Now, put  $a$  = the altitude,  $b$  = the area of the base,  $m = 32\frac{1}{8}$  feet,  $n$  = the area of the aperture, and  $S = 5$  minutes = 300 seconds. Then by art. 1, Dr. Hutton's Miscellanea Mathematica  $\frac{2b\sqrt{a}}{n\sqrt{m}} = S$ ; hence  $n = \frac{2b\sqrt{a}}{S\sqrt{m}} = 3.133132$  inches, the area of the aperture, as required.

*The same answered by Mr. James Stevenson, the Proposer.*

First, put  $a = 160 \times 282$ ,  $c = 4.828427$  the factor for an octagon, and  $x$  = each internal side of the base; then  $c x^2$  = the area of the base; and  $\frac{a}{c x^2}$  = the altitude, or depth; also  $\frac{a}{c x^2} \times 8x = \frac{8a}{c x}$  = the area of the sides, and by the ques.  $c x^2 + \frac{8a}{c x} = a$  min. fluxed, &c.  $x = \sqrt[3]{\frac{4a}{c^2}} = 19.78211$ , and  $\frac{a}{c x^2} = 23.87912$  inches the depth. Secondly, put  $d$  = the depth,  $b = 1889.517$  the area of the base,  $t = 60 \times 5 = 300$  the second, the time of exhaustion  $m = 32\frac{1}{8}$  feet = 386 inches, and  $n$  = the required area of the aperture; then by reducing the theorem on pa. 5th of Dr. Hutton's Miscella. Mathematica. we have  $n = \frac{2b}{t} \sqrt{\frac{d}{m}} = 3.133105$  inches.

And nearly thus is the answer given by Messrs. R. Elliot, Gregory, Wm. Danis, A. Moore, jun. J. Hawkes, J. Ashton, Knowles, Munro, Juvenicenis, Lock, and Rover.

*The same otherwise answered by Mr. John Rowbottom, West Hallam.*

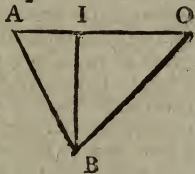
Let AOB represent  $\frac{1}{8}$  of the top of the vessel,  $BI = OI = x$ ,  $\frac{160.282}{8} = a$ ; then  $x\sqrt{2} = OB = OA$  and  $\frac{x^2}{\sqrt{2}} = \text{area AOB}$ ;

hence  $\frac{a\sqrt{2}}{x^2} = \text{depth of the vessel}$ , also

$AI^2 + BI^2 = AB = x\sqrt{4 - 2\sqrt{2}}$ , which

drawn into  $\frac{a\sqrt{2}}{x^2} = \frac{2a\sqrt{2 - \sqrt{2}}}{x} = \text{area of one of the sides}$ , to which adding  $2ABO$ ,

gives  $\frac{2a\sqrt{2 - \sqrt{2}} + x^3\sqrt{2}}{x} = \frac{1}{8}$  of the in-



ternal surface a minimum, fluxed, &c.  $x = \frac{a\sqrt{2 - \sqrt{2}}}{\sqrt{2}} \sqrt[3]{\frac{1}{3}} =$

14.50589, and the depth is 37.90577 inches, which call  $b$ , 193 inch. =  $d$ ;  $a$  = the area of the orifice,  $x$  = any variable height of the water above it; and  $c$  = area of the top of the vessel;

then by the laws of hydrostatics  $\frac{a\sqrt{2dx}}{c} = \text{the velocity of de-}$

scant along the axis of the vessel, by which dividing  $\frac{\dot{x}}{\dot{x}}$  gives  $\frac{-cx}{a\sqrt{2dx}} = t$ , the correct fluent of which when  $x=0$  is  $\frac{c}{2a}\sqrt{\frac{b}{2d}} =$

$t$ ; hence  $a = \frac{c}{t}\sqrt{\frac{2b}{d}} = 2.486$  inches the area of the aperture.  
W. W. R.

This ingenious young Gentleman finds the area of the aperture otherwise thus: By (prop. 69, Emerson's Mecha.) the time in which a cylinder of water whose base is  $a$ , and height  $b$ , will run out, is equal that in which a heavy body will fall through  $\frac{1}{2}b$ , if the vessel be always kept full, that is  $\sqrt{d}:1''::\sqrt{\frac{1}{2}b}:\sqrt{\frac{b}{2d}}$ ; then  $ab:\sqrt{\frac{b}{2d}}::bc:\frac{c}{a}\sqrt{\frac{b}{2d}}$  = the time the vessel will empty itself with the first velocity, which (by page 139, Emerson's Flux.) is  $=\frac{1}{2}t$ ; hence  $a = \frac{c}{t}\sqrt{\frac{2b}{d}}$ ; as before.

Mr. William Eaton, jun. also gave an answer.

IX. QUESTION (120) answered by Mr. Joseph Waters, of Graves Lane, the Proposer.

If any variable dividend answering the conditions of the question is put  $x$ , there is given by the property of simple division  $\frac{x-a}{n}$ , and  $\frac{x-b}{n+1}$  = whole numbers, and if the difference of these  $\left(\frac{x-a}{n} - \frac{x-b}{n+1} = \frac{x-na-a+nb}{nn+n}\right)$  is expounded by 0, 1, 2, 3, 4, &c. there arises  $x = n \times a - b + a, n \times n + 1 + a - b + a, n \times 2n + 2 + a - b + a, n \times 3n + 3 + a - b + a, n \times 4n + 4 + a - b + a$ , &c. the first of which  $(n \cdot a - b + a)$  is the value required. But although this method of solution brings out the true conclusion in a concise manner, it is not sufficiently comprehensive to be given alone, since there can be no reasoning from the data, whereby to determine, why the difference of the original quantities ought to be chose in preference to their sum, or the sum or difference of any multiples thereof, if not being assuredly known but by inspection or trial, that after deducting the quantity  $\frac{x-b}{n+1}$  from  $\frac{x-a}{n}$ , the coefficient of  $x$  would be reduced to unity, or the equation itself into a manageable form. In order therefore to confirm what is already delivered, assume  $\frac{x-b}{n+1} = v$ , and let the value of  $x$  thus found, be substituted in  $\frac{x-a}{n}$ ; moreover from the resulting equa.  $(v + \frac{v+b-a}{n} = \text{an integer})$  let the integral part  $(v)$  be rejected, and the remainder  $\left(\frac{v-a+b}{n}\right)$  put =



$w$ , so shall  $v$  be found  $=nw + a - b$ , and  $x (= \overline{n+1} \cdot v + b)$   
 $= n \times nw + w + a - b + a$ ; in which  $w$  may be equal to  
 nothing, or any whole number whatever.

Corollary. When  $b$  is supposed the greatest remainder,  $n \times$   
 $a - b + a$ , becomes negative, and will require correcting by the  
 addition of  $nn + n$ ; the least dividend on that supposition being  
 $n \cdot n + 1 + a - b + a$ ; agreeable to what is derived from the gene-  
 ral expression  $n \times nw + w + a - b + a$ ; when  $w = 1$ .

*The same answered by Mr. Joseph Woollin, of Smalley, near Derby.*

Let  $n$ ,  $a$ , and  $b$ , be  $= 3$ ,  $2$ , and  $1$ ; and  $x$  = the least whole  
 number; then  $\frac{x-2}{3}$ , and  $\frac{x-1}{4}$  = whole numbers by the ques.

put  $\frac{x-2}{3} = P$ , then  $x = 3P + 2$ , which value of  $x$  subtit. in  
 the other fraction, gives  $\frac{3P+1}{4}$  a wh. number, also  $\frac{4P}{4}$  a whole  
 num.  $\therefore \frac{4P}{4} - \frac{3P+1}{4} = \frac{P-1}{4}$  = whole num.  $= r$ ; hence  $P = 4$   
 $r + 1$ ; make  $r = 0$ , then  $P = 1$ , whence  $x = 5$  the whole num-  
 ber required.

*Or thus by Mr. Olinthus Gilbert Gregory, Yaxley.*

Let  $x$  be the number required, and let a whole number be  
 denoted by wh. then by the ques.  $\frac{x-a}{n}$  and  $\frac{x-b}{n+1}$  are each = wh.

By putting  $\frac{x-a}{n} = q$ , we shall have  $x = nq + a$ , which being  
 substituted for it in the second fraction gives  $\frac{na+a-b}{n+1}$  = wh. But  
 $\frac{nq+q}{n+1}$  is also = wh. Therefore  $\frac{nq+q}{n+1} - \frac{nq+a-b}{n+1} = \frac{q-a+b}{n+1}$  = wh.  
 which put  $= s$ , then  $q = n + 1 \cdot s + a - b$ ; and as the value of  
 $a - b$  is positive, we may put  $s = 0$ , then is  $q = a - b$ , and  $x =$   
 $nq + a = n \cdot a - b + a$ ; or the same conclusion might have been  
 derived from other principles.

For an example, let us suppose  $n = 14$ ,  $a$  and  $b = 6$  and  $3$  the  
 remainders; then  $n \cdot a - b + a = 14 \times 3 + 6 = 48$  the least  
 whole number, which divided by  $14$  has  $6$  remains, but divided  
 by  $15$  has  $3$  remains. Again, suppose  $n = 25$ ,  $a$  and  $b = 14$  and  
 $9$ ; then  $n \cdot a - b + a = 25 \times 5 + 14 = 139$ , the least whole num-  
 ber, which divided by  $25$  has  $14$  remains, but divided by  $26$  has  
 $9$  remains.

True and ingenious solutions were also given by Messrs. John Brookes,  
 Richard Elliot, Wm. Burdon, James Stevenson, R. Simpson, A. Moore,  
 John Hawkes, James Ashton, John Knowles, Wm. Eaton, jun. and  
 John Rowbottom.

**X. QUESTION (121)** answered by Mr. Wm. Marsden, Netherhurst, Derbyshire, the Proposer.

In every true octave is contained five tones, and two semitones, making in the whole 12 semitones, or half notes. Now let  $a = 12$ ,  $x =$  greater part, then will  $a - x =$  the lesser, and  $\overline{a-x}^2 \times x^4$ , or  $a^2 x^4 - 2 a x^5 + x^6 =$  a max. in fluxions  $4 a^2 x^3 \dot{x} - 10 a x^4 \dot{x} - 6 x^5 \dot{x} = 0$ , hence  $6 x^2 - 10 a x = -40 a$ , and  $x^2 - \frac{10 a x}{6} = -\frac{4 a}{6}$ ; put  $2 m = \frac{10 a}{6}$ , and  $n = -\frac{4 a}{6}$ , then  $x^2 - 2 m x = -n$ ; by compleating the square  $x^2 - 2 m x + m^2 = m^2 - n$ , and  $x = m \pm \sqrt{m^2 - n} = 8$ , which is the number of semitones, or half notes contained in a lesser sixth, whose ratio is 8 : 5; and  $a - x = 4$ , the number of semitones in a greater 3d, whose ratio is 5 : 4 answering the conditions of the ques. as required.

*The same answered by Mr. Brookes, of Leeds.*

Put  $a = 12$ , the number of half notes in an octave; and  $x =$  the greater interval; then  $a - x$  the less, and by the question  $x^4 \times \overline{a-x}^2$  is a maximum, which being put into fluxions and reduced, we obtain  $x = \frac{2}{3} a = 8$ , and  $a - x = \frac{a}{3} = 4$ . The ratio may be had from page 10, Smith's Harmoniacs.

*The same otherwise by Mr. James Ashton, Harrington, near Liverpool.*

If an octave be divided into half notes, there will be thirteen different sounds, or 12 semitones included. Put  $a = 12$ ,  $x =$  the greater interval, then  $a - x =$  the less; and, by the question  $\overline{a-x}^2 \times x^4 =$  a max. which put into fluxions, &c. gives  $x = 12$ , or 8; hence the greater interval contains 8 half notes, and the less 4; which is the diatonic scale, answering to  $\frac{5}{8}$  and  $\frac{4}{5}$  (the octave being  $\frac{1}{2}$ ) for  $\frac{5}{8} \times \frac{4}{5} = \frac{1}{2} =$  the octave; and the ratio of the lengths of the strings is 32 : 25.

*Note.* In the scale,  $\frac{5}{8}$  answers to the lesser 6th, and  $\frac{4}{5}$  the greater 3d.

*Or otherwise thus, by Mr. Richard Elliot, of Liverpool.*

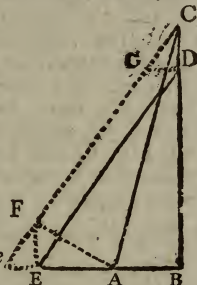
It is well known that a given line or quantity which is to be divided into two or more parts, such that their product may be a max. those parts will be in the ratio of their exponents; this being premised, the ques. in hand will be easily solved as follows: as 6 (= sum of the exponents); 12 (= semitones in an octave): :  $\left\{ \begin{array}{l} 2 : 4 \\ 4 : 8 \end{array} \right\} =$  semitones in the 1st part. } Hence, the two required intervals are the major, or sharp third; and the minor, or flat sixth.

Solutions to this question were also given by Messrs. R. Simpson, John Knowles, and John Rowbottom.

**XI. QUESTION**

XI. QUESTION (122) answered by Mr. James Ashton.

Construction. Draw the horizontal line  $EA = 8$  the given distance the ladder  $CA$  is removed from the edge of the moat at  $A$ ; at  $E$  erect the perp.  $EF = CD = 4$ , by the ques. then, with the radius 25, the ladder's length, and centres  $A$  and  $F$ , describe arcs cutting each other in the point  $C$ ; from  $C$  let fall a  $\perp$  to meet  $EA$  continued in  $B$ ; join  $AC$ , and make  $CD = EF = 4$ , and join  $ED$ ; then will  $AC$  and  $ED$  be the two positions of the ladder,  $AB$  the breadth of the moat, and  $BC$  the height of the wall. For, by continuing  $AE$  to  $e$ , and drawing  $DG$  parallel thereto,  $\angle DCG = \angle EF e$ , and these two triangles are equal in every respect, and similar to the triangle  $EDB$ ; also  $ED$  and  $FC$  are parallel to each other, and  $FC$  is = the length  $e$  = the length of the ladder by construction; but  $FC$  is =  $eG$ , and  $eG = ED$ , for  $E e G D$  is a parallelogram; therefore  $ED$  is the length of the ladder.



Calculation. Draw  $AF$ , which is  $= \sqrt{AE^2 + EF^2} = 2\sqrt{20}$ ; and the  $\triangle AFC$  is isosceles ( $AC$  and  $FC$  being each 25) and all the sides known, the  $\angle CAF (= \angle CFA)$  is found  $= 79^\circ.41'.42''$ . and the  $\angle EAF = 26^\circ.33'.54''$ . then their sum taken from  $180^\circ$ . leaves  $\angle CAB = 73^\circ.44'.24''$ . hence  $AC : \text{rad.} :: \sin \angle CAB : BC = 24 :: \cos \angle CAB : AB = 7$ .

Algebraical solutions were given by Messrs. J. Knowles, W. Eaton, jun. R. Sutton, Jas. Stevenson, and John Hawkes. It is also ingeniously constructed by Mr. John Fildes, the Proposer, and Messrs. John Brookes, R. Elliot, Wm. Burdon, R. Simpson, R. Hewert, Wm. Smith, and John Rowbottom, which we omit with much regret for want of room.

XII. QUESTION (123) answered by Mr. Joseph Saul, of Rochdale, the Proposer.

Per similar triangles, as  $AD : AB :: AB : AF$ ,  $D$  and  $AD - AF = DF$ : that is, as  $AC + CB : \sqrt{AC^2 - CB^2} :: \sqrt{AC^2 - CB^2} : AC^2 - CB^2 \div AC + CB = AC - CB$ , and  $AC + CB - B$   
 $AC - CB = 2BC$ . W.W.R.



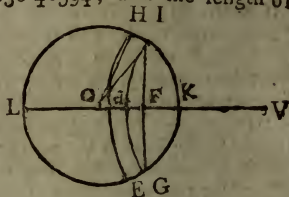
Ingenious answers to this question are also given by Messrs. John Brookes, R. Simpson, R. Elliot, W. Burdon, J. Ashton, J. Knowles, and W. Eaton, jun.

XIII. QUESTION (124) answered by Mr. James Ashton.

Let the circle  $EKHL$  represent the table, then the two ends of the glass, by its motion on the table, will perform concentric circles  $HE$ ,  $IG$ , of which the vertex  $V_1$  of the cone, when completed



pleted, will be the fixed centre. The diameter of the table being given, its circumference =  $138^{\circ}41'594$ ; and the length of the arc EKH being given, its length in degrees is also given =  $130^{\circ}.25'.32''$ . but the length of the glass (4) is a chord to the arc HI; hence as KO (= L  $22^{\circ}02'53$ ) : 1 (rad.) ::  $2(\frac{4}{2})$  :  $\cdot 0907872$  = nat. fine of  $5^{\circ}.12'.32''$ . which  $\times 4$  and subtr. from the former, leaves the arc GKI



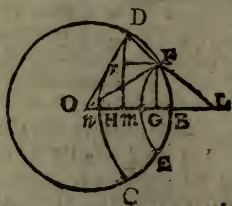
=  $109^{\circ}.35'.24''$ . then the arc IK, or  $\angle IOK = 54^{\circ}.47'.42''$ . then IO : 1 (rad.) :: fine  $\angle IOK$  : IF = 18. Now the circumf. of the bottom of the glass =  $6^{\circ}28'32$ , which  $\times 6 = 37^{\circ}6'992$  = the length of the arc IdG = a; put IF = 18 = c; then

by rule 4th, page 91, Hutton's Mensuration, 1st edit.  $\frac{3a+2c}{8} = 18^{\circ}6'372$  = the chord of half the arc = Id; hence  $\sqrt{ID^2 - IF^2}$  = the versed sine Fd =  $4^{\circ}8'3104$ , also  $\frac{ID^2}{FD} + FD \div 2 =$

$35^{\circ}9'4932$  = the radius of the circle = the perp. of the part wanting to complete the cone, and the slant height of the same =  $35^{\circ}9'632$ , to which add 4, the given slide, gives  $39^{\circ}9'632$ , the slant height of the whole, by which the diam. at the top is found =  $2^{\circ}22'236$ , and the perp. of the whole cone =  $39^{\circ}9'477$ ; and with these dimensions, the content of the whole cone =  $51^{\circ}6'565$ , and that of the part wanting =  $37^{\circ}6'461$ ; and the diff. = 14 cubic inches the content, then  $\frac{14 \times 4}{7} = 8$  pence, the value of the glass.

*The same answered by Mr. R. Simpson, Bath.*

Suppose ADFBECA to represent the table, O its centre, Cn D, and EmF the paths of the top and bottom of the glass respectively; and draw the other lines as per fig. Put  $d = 44^{\circ}0'5906$  inches the diam. of the table,  $l = 50^{\circ}14'7164$  inches the length of the arc DBC, and  $p = 3^{\circ}14'16$ . Then  $ap : l :: 360^{\circ} : 130^{\circ}.25'.32''$ . the degrees in the arc DBC, whose half  $65^{\circ}.12'.46'' = \angle DOB$ . Now in the right angled  $\triangle DOH$  are given the hyp. OD, and the  $\angle DOH$  to find the perp. DH = 20 inches; and in the  $\triangle DOF$  are given all the sides to find the  $\angle DOF = 10^{\circ}.25'.4''$ . hence  $\angle DOH - \angle DOF = \angle FOG = 54^{\circ}.47'.46''$ . then in the right angled  $\triangle FOG$  are given the hyp. and



the

the  $\angle$  FOG to find the perp.  $FG = 18$  inches. Again, the versed sines  $nH$  and  $mG$  are equal to each other; therefore as  $FG : Fm (= 18.8496 \text{ inches per ques.}) :: DH : \text{arc } Dn = 20.944 \text{ inches} = \text{three times the top circumference of the glass} \therefore \text{from which its diameter at top is easily found} = 2\frac{2}{3} \text{ inches. Lastly, we have given the diameters of the glass, and its flant height, and therefore its content is readily had} = 14 \text{ cubic inches, consequently } 14 \times \frac{4}{7} = \frac{56}{7} = 8 \text{ pence the price of the glass required.}$

Ingenious solutions were also given by Messrs. R. Elliot, John Brookes, Olinthus Gilbert Gregory, Thomas Simpson Evans, John Knowles, John Blackwell, Wm. Eaton, jun. and Robert Langdon.

XIV. QUESTION (125) answered by Mr. Brookes, of Leeds.

Put  $\frac{n-1}{abcd, \&c.} = s$ ; then the given fluxion becomes  $rsz^{n-2} \cdot z = rsz^{n-1}$ , and the fluent of the second part is  $= -s \times \text{hyp. log. of } z$ . Now in order to get the fluent of the first part, put  $z = v + 1$ ; then  $\dot{z} = \dot{v}$ , and  $rsz^{n-2} \dot{z} = \frac{rzn \dot{z}}{z^2} = \frac{rs \cdot (1+v)^n \times \dot{v}}{(1+v)^2} = rs \text{ drawn into } \frac{\dot{v}}{1+v} + \frac{n-2}{1+v} \cdot v \dot{v} + \frac{n-2}{2} \cdot v^2 \dot{v} + \frac{n-3}{2} \cdot v^3 \dot{v} + \frac{n-2}{2} \cdot \frac{n-3}{3} \cdot v^4 \dot{v}, \&c. \text{ and by taking the fluent of each term, we shall have } rs \text{ drawn into } v + \frac{n-2}{2} \cdot v^2 + \frac{n-2}{3} \cdot \frac{n-3}{2} \cdot v^3 + \frac{n-2}{4} \cdot \frac{n-3}{2} \cdot \frac{n-4}{3} \cdot v^4 + \frac{n-2}{5} \cdot \frac{n-3}{2} \cdot \frac{n-4}{3} \cdot \frac{n-5}{4} \cdot v^5, \&c. \text{ which series will terminate when } n \text{ is a whole positive number.}—\text{Now if we restore } z, \text{ the whole fluent will be } rs \text{ drawn into } -1 + z + \frac{n-2}{2} \cdot z - 1 + \frac{n-2}{3} \cdot \frac{n-3}{2} \cdot z - 1 + \frac{n-2}{4} \cdot \frac{n-3}{2} \cdot \frac{n-4}{3} \cdot z - 1 + \frac{n-2}{5} \cdot \frac{n-3}{2} \cdot \frac{n-4}{3} \cdot \frac{n-5}{4} \cdot z - 1, \&c. - s \times h. \log. z.$

Solutions to this question were also given by Messrs. J. Rowbottom, Knowles, and Elliot.

XV. QUESTION (126) answered by Casia Broomwott, the Proposer.

Let  $v, x, y$ , and  $z$ , represent the quantities of each sort;  $a, b, c, d$ , their respective prices per gallon, &c.  $f$ , the value or sum

given for the whole; and let  $\frac{m}{v^n} \cdot \frac{p}{x^q} \cdot \frac{r}{y^s} \cdot \frac{t}{z^u}$  be a max. then  $av + bx + cy + dz = f$ . Put both these expressions into fluxions,

then  $\frac{m}{v^n} \cdot \frac{p}{x^q} \cdot \frac{r}{y^s} \cdot \frac{t}{z^u} \cdot \frac{m-1}{v} \cdot \frac{p}{x^q} \cdot \frac{r}{y^s} \cdot \frac{t}{z^u} \cdot \frac{p-1}{x} \cdot \frac{m}{v^n} \cdot \frac{p}{x^q} \cdot \frac{r}{y^s} \cdot \frac{t}{z^u} \cdot \frac{r-1}{y} \cdot \frac{m}{v^n} \cdot \frac{p}{x^q} \cdot \frac{r}{y^s} \cdot \frac{t}{z^u} \cdot \frac{t-1}{z} = 0$ , and

$\dot{a}v + \dot{b}x + \dot{c}y + \dot{d}z = 0$ , make the terms wherein the same flux.  
is found equal, and  $\frac{\dot{p}}{q} v^{\frac{m}{n}} y^{\frac{r}{s}} z^{\frac{t}{u}} x^{\frac{p}{q}-1} \dot{x} = \dot{b}x, \frac{\dot{m}}{n} x^{\frac{p}{q}} y^{\frac{r}{s}} z^{\frac{t}{u}} v^{\frac{m}{n}-1} \dot{v}$

$\dot{v} = \dot{a}v, \frac{\dot{r}}{s} v^{\frac{m}{n}} x^{\frac{p}{q}} z^{\frac{t}{u}} y^{\frac{r}{s}-1} \dot{y} = \dot{c}y, \frac{\dot{t}}{u} v^{\frac{m}{n}} x^{\frac{p}{q}} y^{\frac{r}{s}} z^{\frac{t}{u}-1} \dot{z} = \dot{d}z;$

hence  $z^{\frac{t}{u}} = \frac{a}{\frac{\dot{p}}{n} x^{\frac{p}{q}} y^{\frac{r}{s}} v^{\frac{m}{n}-1}} = \frac{b}{\frac{\dot{m}}{q} v^{\frac{m}{n}} y^{\frac{r}{s}} x^{\frac{p}{q}-1}}, x^{\frac{p}{q}} = \frac{a}{\frac{\dot{m}}{n} y^{\frac{r}{s}} z^{\frac{t}{u}} v^{\frac{m}{n}-1}}$

$= \frac{d}{\frac{\dot{t}}{u} v^{\frac{m}{n}} y^{\frac{r}{s}} z^{\frac{t}{u}-1}} = \frac{c}{\frac{\dot{r}}{s} v^{\frac{m}{n}} z^{\frac{t}{u}} y^{\frac{r}{s}-1}}$  from which equations  $b x =$

$\frac{\dot{p}}{q} a v, c y = \frac{\dot{r}}{s} a v, d z = \frac{\dot{t}}{u} a v$ , substi. these values of  $b x, c y,$

$\dot{d}z$  in the equa.  $\dot{a}v + \dot{b}x + \dot{c}y + \dot{d}z = f$ , and you will obtain

$\dot{a}v + \frac{\dot{p}}{q} a v + \frac{\dot{r}}{s} a v + \frac{\dot{t}}{u} a v = f$ ; hence  $\dot{a}v = \frac{\frac{\dot{m}}{n} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}}, b x =$

$= \frac{\frac{\dot{p}}{q} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}}, c y = \frac{\frac{\dot{r}}{s} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}}, d z = \frac{\frac{\dot{t}}{u} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}}; \text{whence}$

by proportion as  $a : 1 :: \frac{\frac{\dot{m}}{n} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} : v = \frac{\frac{\dot{m}}{n} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} \cdot a$ ;

$b : 1 :: \frac{\frac{\dot{p}}{q} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} : x = \frac{\frac{\dot{p}}{q} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} \cdot b$ ;  $c : 1 :: \frac{\frac{\dot{r}}{s} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}}$

$: y = \frac{\frac{\dot{r}}{s} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} \cdot c$ ; and,  $d : 1 :: \frac{\frac{\dot{t}}{u} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} : z =$

$\frac{\frac{\dot{t}}{u} f}{\frac{\dot{m}}{n} + \frac{\dot{p}}{q} + \frac{\dot{r}}{s} + \frac{\dot{t}}{u}} \cdot d$ . W. W. R.

Mr. Knowles and Mr. Elliot answered this quest, nearly the same.



Otherwise, by Mr. John Brookes, of Leeds.

It is readily discovered from Mr. Stevenson's solution (see last year's Diary) that  $x = \frac{a}{10}$ ,  $y = \frac{a}{18}$ , and  $z = \frac{a}{48}$ ; therefore  $5x = \frac{a}{2}$ ,  $6y = \frac{a}{3}$ , and  $8z = \frac{a}{6}$ .—Now the quantities on each side these last equations express the price of each sort of wine in shillings; ( $a$  being = 7200s.) but those on the right hand are what the proposer has composed his theorem from, for  $\frac{a}{2}$  is evidently  $= \frac{3a}{3+2+1}$ ,  $\frac{a}{3} = \frac{2a}{3+2+1}$ , and  $\frac{a}{6} = \frac{a}{3+2+1}$ .

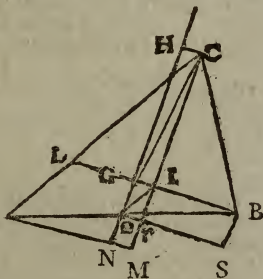
This ingenious gentleman says the same thing may be otherwise effected, thus, for it is well known that when any quantity is divided into parts, such, that the product of the powers of those parts is a max. the parts themselves will be in the direct ratio of the powers in the maximum.—Therefore, by the rule of Fellowship  $3+2+1 : a :: 3 : \frac{3a}{3+2+1} :: 2 : \frac{2a}{3+2+1} :: 1 : \frac{a}{3+2+1}$  the same as before. As for the other part of the rule, it is so evident that any further illustration seems unnecessary.

Mr. Ashton, of Harrington, gave a curious investigation; which we are obliged to omit, with regret, for want of room.

Mr. Eaton, jun. says this general rule is investigated, &c. in the Ladies Diary, 1748, by Mr. J. Turner. It was also answered by Mr. J. Stevenson, in a concise manner.

XVI. or Prize QUESTION (127) answered by Cassia Broomwott.

ABC is the given  $\Delta$ , D the middle of the base, DH the line drawn as by ques. CH, GB  $\perp$ 's falling thereon, join DG, and from C, draw CM  $\parallel$  DH; and let fall AM  $\perp$  thereon. The  $\angle$  HDB being by construction = comp.  $\frac{1}{2}$  ABC —  $\frac{1}{2}$  BAC it is evident  $\angle$  GBD =  $\frac{1}{2}$  diff. of the  $\angle$ 's at the base =  $\angle$  DAM, because GB is  $\parallel$  AM, hence  $\angle$  CAM =  $\angle$  GBC, for  $\angle$  CAB +  $2$  BAM =  $\angle$  ABC; also the  $\angle$ 's M and I are right  $\therefore$  the  $\Delta$ 's ACM, BCI are sim. hence AM : BI :: CM : CI; but AM = BG + CH, and CM = DH + DG, because of the  $\parallel$ 's, hence the prop. is BG + CH : BG — CH :: DH + DG : DH — DG  $\therefore$  BG . GD = DH . CH, or the  $\Delta$  DHC =  $\Delta$  BGD. Q. E. D.



The

*The same answered by Mr. John Brookes, of Leeds, the Proposer.*

Circumscribe the given triangle ABC, with the circle ACBE. Draw the diameter FDI perpen. to AB, and CF cutting BG in L; so shall CF be parallel to DH, and BLC a right angle. For by construction the  $\angle IDH = \text{half the diff. of the angles at the base} = \frac{1}{2} \angle ABC - \frac{1}{2} \angle BAC = \angle IFC$ . Again, because CF bisects the angle ACB, if AE be drawn perpendicular to CF, the triangles ACE, BCL, will be similar. Hence  $CE : CL :: AE : BL$ ; but  $CE = DH + DG$ , because  $DG = DM$ , which is evident from the parallellism of the lines AE, BG; therefore  $CL = DH - DG$ ,  $AE = BG + CH$ , and  $BL = BG - CH$ : Whence the proportion becomes  $DH + DG : DH - DG :: BG + CH : BG - CH$ ; and componendo et dividendo  $2 DH : 2 DG :: 2 BG + 2 CH : 2 BG - 2 CH$ ; or,  $DH : DG :: BG : CH$ : consequently the rectangle  $DG \cdot BG$ ; or, the triangle  $DHC =$  the triangle  $DGB$ . Q. E. D.



Ilgenuous answers were also given by Messrs. R. Simpson, R. Elliott, Wm. Davis, R. Carlisle, J. Ashton, John Knowles, and W. Eaton, jun.

## NEW QUESTIONS.

I. QUESTION (128) by Mr. Joseph Woollin, of Smalley, near Derby.

The value of  $x$  and  $y$  be pleas'd to show,  
By a simple equation from what's below.\*

$$\begin{aligned} \text{*Given } \frac{x^{\frac{5}{3}} - xy^{\frac{1}{2}} + yx^{\frac{2}{3}}}{121} - x &= \frac{y^{\frac{3}{2}}}{121} - y, \text{ and } \frac{x^{\frac{5}{4}} - y^{\frac{6}{5}} - yx^{\frac{1}{4}}}{49} - y \\ &= x - \frac{y^{\frac{1}{5}}x}{49} \end{aligned}$$

II. QUESTION (129) by Mr. J. Stevenson, of Heath, near Chesterfield.

Given the vertical angle equal to  $50^{\circ} 50'$ , and sum of the two including sides 100; to determine the triangle, when the biquadrate of half the difference of the said sides is equal to double the area.

III. QUESTION (130) by Mr. Thomas Simpson Evans, Teacher of the Mathematics, at the Grammar School, Odibam, Hants.

Two men, A and B, agreed for 2 shillings, to carry 2cwt. 2q. 12lb. of wheat 3 miles, on a pole 6 feet long. At their first setting out, the weight was 3 feet 4 inches from A; in which state, they carried it 6 furlongs, where resting, they changed places, the weight continuing in the same place,

place, and carried it  $1\frac{1}{4}$  mile farther, where resting again, the weight was by accident moved to 30 inches from B, in which situation it was carried the remainder of the way. How much of the money must each man receive, in proportion to his trouble?

IV. QUESTION (131) by *Mr. Joseph Woollin, of Smalley.*

A gentleman having a garden in form of an equilateral triangle, in the midst of which stands a conical pillar, the diameter of its base 4 feet, and solidity 100 feet, and from the summit of the solid to the angle of the garden is 20 yards.—Now he would be obliged to any young student to tell him the area of the cultivated part of the garden.

V. QUESTION (132) by *Mr. John Fildes, Schoolmaster, Liverpool.*

ABC is a triangular field right angled at B, the side AB being 154 yds. in which at D, 100 yards from A, stands a tree, and in the side BC there is another tree at E, 154 yds. from C; now if AE, DE, and DC be drawn, the angle ACD and AED will be equal: Required the area of the field.

VI. QUESTION (133) by *Mr. John Rowbottom, West-Hallam, Derbyshire.*

Four men, A, B, C, and D, undertook a bargain of work for  $26\frac{1}{2}l.$ —Now A could finish it himself in 4 months, B in 6, C in 9, and D in 12 months. But B began to work a certain time after A, and C and D both began together a certain time after B; when the work was finished, A received  $13l. 3s. 11\frac{1}{2}d.$  more than C, and B and D received betwixt them  $8l. 1s. 7\frac{7}{8}d.$  How long did A work before B began, and B before C and D began; what did each person receive for his work; and how long was it in finishing?

VII. QUESTION (134) by *Mr. John Knowles, of Liverpool.*

If from the point P, in the diameter AB of a circle continued, any line be drawn to cut the circle in C, and again in D, and DE be drawn  $\perp$  to AB, to cut the circle in E, and CE joined, then I say that CE will always cut the diam. AB in the same point G. Quere, a demonstration.

VIII. QUESTION (135) by *Mr. O. G. Gregory, Taxley, Huntingdonshire.*

If we admit that a musical chord, in length 20 inches, and weight 4.69097 grains, when stretched with a weight 8lbs. avoirdupois, will found the note C-sol-fa-ut; required the weigh of chords of the same length and tension, which shall found the ditone, diapente, and diapason to the above mentioned note.

IX. QUESTION (136) by *Mr. Joseph Waters, of Gravesend.*

To find three such cube numbers, that the product of any two of them being divided by the other, shall leave a cube number remaining.

X. QUESTION (137) by *Cassia Broomwott.*

I wish for a point† in a garden that's square,*	†by geom. only
To fix down a POST  , that if measured it were,	*side 160 yards
From thence to each corner, the square of each line,	Prize Enigma
When added together, this sum† shall define;	‡56400 yards
Likewise please to tell me, 'twill not be much pains,	
The area in yards each triangle contains,	
When two of the opposite lines shall explore,	
Exact the proportion, as five is to four.	

XI. QUESTION (138) by *Mr. J. Ashton, Harrington, near Liverpool.*

If the wall of a house be 30 feet high, and a spout be fixed at the top thereof, of  $2\frac{1}{2}$  feet in length from the wall; it is required to find the angle



gle it must make with the plane of the wall, so that the water may fall into a reservoir, on an horizontal plane, at 10 feet distance from the bottom of the wall.

XII. QUESTION (139) *by the same Gentleman.*

Given the ratio of the base to one of the sides of an isosceles  $\Delta$ , as 1 to  $r$ , and the area of its greatest inscribed ellipsis  $= a$ : It is required to find the dimensions of both, and give a demonstration of the process.

XIII. QUESTION (140) *by Mr. John Brookes, of Leeds.*

Let BZ be an indefinite perpendicular to a given line AB, to which from A, draw any line APC, and take the point P such, that AC multiplied by PC may be equal to  $AB^2$ .—Required the properties of the curve, which is the locus of P.—N. B. This question has been proposed before, but not publicly answered, that I know of.

XIV. QUESTION (141) *by Mr. John Knowles.*

Given the height of the eye, its distance from the picture, and the position of an original point, to find its perspective representation geometrically, without introducing the point of sight, or station point.

XV. QUESTION (142) *by Mr. R. Elliot, of Liverpool.*

The fluxion of the tangent of  $75^\circ$  is equal to twice the fluxion of the tangent of  $45^\circ$ . Required the investigation by a general theorem, that will exhibit the ratio of the fluxion of any tangent to that of its corresponding arc.

XVI. QUESTION (143) *by Mr. John Brookes.*

Given the difference of the sides, the difference of the segments of the base made by the perpendicular, and the radius of the inscribed circle to construct the triangle.

XVII. QUESTION (144) *by Mr. Richard Elliot.*

Suppose the length, breadth, and depth of a cistern to be 16 ( $x$ ) 12 ( $y$ ) and 20 ( $z$ ) feet respectively, and that there are 2 circular holes (each 1 inch in diameter) one placed in the bottom, the other in the side close to the bottom. Now if it was filled with water, and both holes open, in what time will the whole be exhausted, supposing the velocity equal that generated by gravity through the whole height above the apertures?

XVIII. Prize QUESTION (145) *by Cassia Broomwell.*

In the midst of a gentleman's garden that's square,†	†side 200 yds.
Is a circular fountain* of water that's clear;	*diam. 81 yds.
The gardener has orders a shrubbery to make,	†the walks are
From the pond to two walks‡, and the area to take¶,	parallel to the
But it puzzles him quite.—For in curvature space,	garden walls,
Not being acquainted.—So he begs it a place,	and distant
In your Di'ry of fame; and whoever unties	therefrom
This knot, with your leave, will be sure of the prize.	47.24771 yds.

¶ If right lines be drawn through A, the extremity of the diameter of the pond that is parallel to the walks, and from the points M, M, &c. where these lines cut the circum. tangents, be drawn to cut the diam. produced in T, T, &c. then if from T, T's be demitted upon the first mentioned lines cutting them at right angles in Q, Q, &c. these points Q, Q, &c. shall be in the fence of the shrubbery. He desires your ingenious correspondents to describe the fence, and give the area.

☞ All Letters for the Use of this Diary, are desired to be directed thus:—Cotes and Hall, to be left at Mr. Drewry's, Printer, in Derby (Post-paid) to come to Hand before the First of May.

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