

DIARIA BRITANNICA;
OR, THE
BRITISH DIARY:
AN
ALMANACK,
FOR THE
Year of OUR LORD 1793.

BEING THE FIRST AFTER
BISSEXTILE, or LEAP-YEAR.

CONTAINING,
A VARIETY of useful and entertaining MATTER in
ARTS and SCIENCES:
Calculated for the Improvement of the CURIOUS.

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

By *J. COTES* and *G. TAYLOR.*

The Sixth Almanack published of this Kind.

That d'vine mist'ry, and a hist'ry, written in ASIA,
Was finished (now to be read) in great BRITANNICA;
Sweet blessed Isle, where truth doth smile, and still while time remain
Perfist in truth, ye BRITISH YOUTH, true wisdom to obtain,
For Sinai's Mount, that baneful fount, the source of all our woe,
Do rule the earth, and e'ery breath—nay, all things here below.
This mighty mount, reason's great fount, of science, art, and skill,
All that delight in science bright, may come and drink their fill;
The mount is dry, don't satisfy, tho' reason drinks to fore,
At SION's mount, that flowing fount, drink once you'll thirst no more.
The first brought death upon the earth, great wars, wrath, jar, and strife,
But SION's MOUNT, that LOVING FOUNT, gives us eternal life.
Attain but this, you cannot miss, truly yourselves to know
Your origin, how born in sin—what fruits in EDEN grow.

BIRMINGHAM,
Printed and sold by *THOMAS PEARSON,*
AT THE WHOLESALE ALMANACK, STATIONARY, AND MEDICINE
WARFHOUSE IN THE HIGH-STREET, (*Price One Shilling*).

A TABLE of the MOON's southing, for Greenwich for the Year 1793.

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	2 46	3 30	2 15	3 37	4 27	5 6	6 28	7 41	8 50	9 24	10 19	10 23
2	3 30	4 16	3 04	3 25	5 25	6 56	7 17	8 31	9 47	10 9	11 3	11 14
3	4 13	5 2	3 49	5 29	6 21	7 46	8 7	9 20	10 32	10 51	11 49	0 a 5
4	4 56	5 51	4 40	6 26	7 15	8 36	8 56	10 9	11 17	11 35	0 a 37	1 0
5	5 41	6 43	5 33	7 23	8 8	9 25	9 45	10 56	0 a 1	0 a 19	1 28	1 58
6	6 27	7 38	6 29	8 19	9 0	10 15	10 35	11 43	0 44	1 4	2 21	2 55
7	7 15	8 36	7 27	9 15	9 51	11 5	11 25	0 a 28	1 28	1 50	3 16	3 52
8	8 7	9 36	8 25	10 9	10 42	11 55	0 a 13	1 13	2 1	2 39	4 12	4 47
9	9 3	10 37	9 23	11 2	11 32	0 a 46	1 0	1 56	2 56	3 35	5 8	5 40
10	10 2	11 39	10 22	11 54	0 a 23	1 35	1 46	2 39	3 43	4 23	6 46	6 31
11	11 3	0 a 37	11 19	0 a 47	1 15	2 23	2 31	3 21	4 32	5 17	6 58	7 21
12	0 a 5	1 33	0 a 15	1 39	2 6	3 10	3 14	4 5	5 24	6 13	7 51	8 11
13	1 6	2 26	1 8	2 30	3 56	3 56	4 57	5 16	6 18	7 10	8 43	9 2
14	2 4	3 18	1 13	2 13	4 45	4 40	5 39	7 16	8 7	9 35	9 53	
15	2 59	4 8	2 52	4 12	5 33	5 23	6 30	8 15	9 2	10 27	10 45	
16	3 52	4 57	3 43	5 15	6 19	6 56	8 7	24 9	13 9	57 11	19 11	37
17	4 42	5 46	4 33	5 49	6 48	7 33	8 46	9 21	10 11	10 52	morn	morn
18	5 30	6 35	5 23	6 36	7 48	8 33	9 46	10 22	11 9	11 46	0 12	0 29
19	6 18	7 24	6 12	7 22	8 31	9 20	10 22	11 9	morn	morn	1 6	1 20
20	7 6	8 12	7 0	8 7	9 15	10 9	11 37	12 20	0 5	0 40	1 59	2 10
21	7 53	8 59	7 47	8 51	9 0	10 3	11 37	morn	1 0	1 33	2 51	2 57
22	8 41	9 46	8 34	9 35	9 47	11 0	11 38	0 21	1 54	2 27	3 41	3 43
23	9 29	10 32	9 20	10 20	10 36	11 59	morn	1 18	2 48	3 20	4 30	4 27
24	10 17	11 17	10 5	11 7	11 28	morn	1 39	2 13	3 41	4 12	5 16	5 9
25	11 4	morn	10 49	11 55	morn	1 6	1 38	3 6	4 33	5 3	6 0	5 51
26	11 50	0 1	11 33	morn	0 23	2 0	3 35	5 8	6 25	5 53	6 43	5 33
27	morn	0 45	morn	0 45	1 2	2 58	3 29	4 50	6 15	6 40	7 26	7 16
28	0 35	1 30	0 19	1 38	2 19	3 54	4 21	5 41	7 4	7 25	8 9	3 1
29	1 20		1 6	2 33	3 18	4 47	5 11	6 32	7 52	8 9	52 8	48
30	2 3		1 54	3 30	4 5	5 39	6 17	7 22	8 39	8 53	9 37	9 39
31	2 45		2 44		5 12		6 51	8 11	9 36		10 33	

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

	A.	A.	A.	A.	A.	M.	M.	M.	M.	M.	M.	A.
1	8 43	6 31	4 43	2 50	0 59	10 56	8 52	6 48	4 52	3 5	1 8	11 0
7	8 17	6 8	4 20	2 28	0 36	10 32	8 28	6 25	4 30	2 43	0 45	10 34
13	7 51	5 44	3 59	2 6	0 12	10 7	8 3	6 2	4 9	2 21	0 20	10 8
19	7 25	5 20	3 37	1 44	11 48	9 42	7 39	5 40	3 48	1 58	11 51	9 42
25	7 0	4 58	3 15	1 21	11 21	9 17	7 15	5 18	3 27	1 36	11 26	9 15

<i>Use of the Tables. To find the Time of High Water.</i>						<i>No. of Stars.</i>		<i>h. a. 7</i>	<i>* f. d. a.</i>
EXAM. On Jan. 1st Moon souths at						2 46 m.		Aldebaran	0 40 7 29
Add for N. and F. Moon for London						2 30		Capella	1 26
<i>Time of High Water at London</i>						4 16 m.		Betelgeuse	2 8 6 41
Add for next Low Water						5 49		Sirius	3 14 37
<i>Low Water at London, Jan. 1st. morn.</i>						10 5 m.		Alphord	5 42 5 24
Ex. 1.) On Jan. 1, Seven Stars souths at						8 43 p.m.		Regulus	6 21 7 11
Semidiurnal arc. subtract and add						8 17		Upp. point.	7 15
Seven Stars rises Jan. 1st at						0 26 p.m.		Vire. spike	9 39 5 12
Seven Stars f ts next morning Jan. 2,						5 0 m.		Arcturus	10 20 7 55
Ex. 2.) Seven Stars souths Jan. 1st						8 43 a.		Antarus	12 41 3 34
Sirius souths after the Seven Stars						3 1		Algethi	13 30 7 21
Sirius south Jan. 1st afternoon						11 44 a.		Lyra	14 52
Semidiurnal arc subtract and add						4 37		Atair	16 4 46 46
Sirius rises Jan. 1st afternoon						7 7 a.		Fomalhaut	19 8 2 52
Sirius sets Jan. 2d morning						4 21 m.		Pole star	21 13
								Almach	22 16
								Algol	23 19
								Algenib	23 34

JANUARY hath XXXI Days.

L	W	H	f	2n	♂	f	♀	♂	n
1	0.45	2.33	0.56	1	9	1	48	2	40
13	0.45	2.29	0.57	1	5	1	30	2	49
25	0.45	2.26	0.58	1	0	0	59	0	51

Full Moon 27 day, 4 mer.

D	♂	♀	h	g	u	m	♂	♀	♂	♀	♂	♀	♂	♀
1	21	12	1	18	16	33	3	51	10	55	11	30	18	34
7	21	16	1	30	17	0	7	39	20	30	15	59	18	15
13	21	21	1	43	17	28	11	28	0	85	14	57	17	56
19	21	25	1	50	17	56	15	16	9	41	8	54	17	37
25	21	30	2	9	18	24	19	3	19	18	29	15	17	18

M	D	Festival Days.	Aspects & Weat.	☉	☽	♂	♀	♂	♀	☿	♊	♋	♌	♍	♎	♏	♐	♑	♒	♓
M	D			Ω	Ω	♈	♈	♈	♈	♈	♈	♈	♈	♈	♈	♈	♈	♈	♈	♈
1	T	Circumfion	☉ ☽ ♀	11	23	25	24	12	17	18	26	43	1	40	10	58	8	34		
2	W	♂ fet 6.4on.	Windy with snow.	12	23	25	24	13	19	10	8 ^m	35	0	45	7	40	9	36		
3	T	♀ fet 8.12n.		13	23	25	24	14	20	9	20	35	0	45	4	2	10	39		
4	F	Sir Isaac N.		14	23	25	24	14	21	7	2	47	1	23	0	10	11	44		
5	S	Old Chr. d.	8 ♂ ♀	15	23	25	24	15	22	6	15	17	2	25	3	47	Morn			
6	F	2 S.aft.Ch.	☐ ♀ ♀	16	23	25	25	16	23	5	28	7	3	22	7	40	0	48		
7	M	♂ fet 1. 4m	Epiph.	17	23	25	25	17	25	4	11	m	26	4	9	1	19	1	57	
8	T	Lucian	(* ♂ ♀	18	23	25	25	17	26	4	25	14	4	44	14	30	3	11		
9	W	4 ri. 3. 36 m	Cold rain.	19	23	25	25	18	27	3	9	f	32	5	3	16	55	4	23	
10	T	♀ fet 7. 3 i n	☉ ☽ ♀	20	22	25	25	19	28	3	24	17	5	3	18	18	5	31		
11	F	Cl. fast 8' 41"	variable	21	22	25	25	20	29	2	c	b	23	4	4	18	26	6	35	
12	S	Old N.yrs.d	turbulent	22	22	25	26	21	X	D	24	40	4	0	17	16	D fets			
13	F	Sun.aft.Ep.	* ent	23	22	25	26	21	2	2	9	w	58	3	2	4	51	5	57	
14	M	Hil.C.T.b	* ♂ ♂	24	22	25	26	22	3	3	25	4	1	51	11	26	7	14		
15	T	[Ox. T.b.	* ♂ ♂	25	22	25	26	23	4	3	9	x	51	0	34	7	22	8	35	
16	W	♀ fet 7. 48 r	☐ ☉ ♀	26	22	25	26	24	5	3	24	14	0	44	2	58	9	50		
17	T	Old Twel.d.	* ☉ ♀	27	22	25	26	25	7	4	8	v	9	1	5	r	n28	r	4	
18	F	Q. birth d.	* ♂ ♀	28	22	25	27	25	8	5	21	39	3	c	5	40	Morn			
19	S	♂ fet 0.24 m	(♂) h	22	22	25	27	26	9	5	4	8	45	3	5	9	28	0	14	
20	F	2S.aft.Eph.	☐ ♀ ♀	1	22	25	27	27	10	6	17	31	4	3	12	44	1	21		
21	M	Agnes tret.	weather for the most part.	2	22	25	27	28	11	7	0	II	0	4	57	15	20	2	26	
22	T	Vincent		3	22	25	27	29	13	8	2	15	5	6	17	12	3	26		
23	W	Hil. T. beg.		4	22	25	27	29	14	9	24	22	5	6	18	15	4	23		
24	T	♀ fet 8.11 n.		5	22	26	28	X	15	10	c	a	21	4	49	18	29	5	14	
25	F	Co. St. Paul	Rain about	6	22	26	28	1	16	11	18	15	4	21	17	55	6	0		
26	S	4 ri. 3. 56 m		7	22	26	28	2	17	12	c	Ω	6	3	41	16	33	6	39	
27	F	Septuages.	Pr. A.	8	22	26	28	2	19	13	11	56	2	52	14	29	D rif.			
28	M	2 ret.	[Fr.b.	9	22	26	28	3	20	14	23	46	1	55	11	48	6	a18		
29	T	♀ fet 8.24 m	☉ ☽ ♂	10	22	26	28	4	21	15	5	m	39	0	52	8	38	7	19	
30	W	K. Ch. I.M.	these days.	11	22	26	28	5	22	17	17	37	0	n3	5	6	8	21		
31	T	Pheaf. sh. e.		12	22	26	28	6	23	18	20	42	1	18	1	10	9	25		

D	D. L beg.	Sun rife	Sun fet.	D. L. ends	leng. of D.	Day inc.	Declination.													
							⊙	f.	h	n	h	n	h	f.	♂	f.	♀	f	♂	f
1	5 56	8 2	35 ³	6 4	7 56	0 6	22	57	14	29	7	27	17	57	18	11	17	14	20	18
7	5 51	7 57	4 3	6 9	3 6	0 16	22	57	14	33	7	30	18	12	16	46	14	45	20	3
13	5 46	7 51	4 9	6 14	3 18	0 28	21	21	14	37	7	35	18	26	15	14	12	3	20	37
19	5 40	7 43	4 16	6 20	3 32	0 42	20	10	14	41	7	42	18	38	13	37	9	10	21	20
25	5 34	7 35	4 25	6 26	3 50	1 0	18	46	14	46	7	50	18	49	11	56	6	9	22	8

VENUS will be an evening star till May 27, then a morning star to the year's end.
JUPITER is a morning star till May 17, then an evening star till December 4,
then a morning star again to the end of the year.

D	D.L beg.	Sun rise	Sun set.	D. L. ends	long. of D.	Day inc.	Declination.							
							⊙ f.	♿ n	♂ n	♀ f.	♂ f.	♀ f.	♿ f.	
1	5 26	7 24	4 36	6 34	9 12	1 22	16 52	14 53	8 0	19 1	9 52	2 32	22 14	
7	5 17	7 13	4 47	6 43	9 34	1 44	15 3	14 58	8 10	19 9	8 3	on 36	21 34	
13	5 7	7 2	4 58	6 53	9 56	2 0	13 5	15 2	8 22	19 17	6 11	3 44	20 38	
19	4 56	6 51	5 9	7 4	10 18	2 28	10 59	15 7	8 34	19 22	4 18	6 49	17 55	
25	4 45	6 39	5 21	7 15	10 42	2 52	8 48	15 12	8 47	19 26	2 24	9 48	14 54	

[illegible]

D	D. L. beg.	Sun rise	Sun set.	D. L. ends	eng. of D.	Day inc.	Declination.																			
							⊙	n	h	n	h	n	24 f.	♂	n	♀	n	♂	n							
1	3	30	530	530	3	30	13	0	5	10	4	50	15	34	10	13	19	27	3	23	23	31	13	39		
7	3	15	510	641	8	45	13	22	5	32	7	7	15	36	10	29	19	23	10	5	24	57	16	35		
13	2	53	5	7	6	53	9	2	13	46	9	19	15	37	10	45	19	17	11	44	26	5	17	41		
19	2	40	4	55	7	5	9	20	14	10	6	20	11	26	15	38	11	0	19	13	18	26	54	16	48	
25	2	21	4	44	7	16	0	30	14	32	6	42	13	26	15	30	11	16	19	3	14	47	27	22	14	23

Geocentric Latitude.

M A Y hath XXXI Days.

L	W	n	h	f.	U	n	δ	n	♀	n	♂	f.
1	0	44	2	12	1	6	0	2	4	55	0	43
13	0	43	2	12	1	5	0	n6	3	50	3	7
25	0	43	2	12	1	4	0	13	1	44	3	23

Last Quart. 3 day, 4 morn.

New Moon 10 day, 4 mor.

First Quart. 18 day, 1 mor.

Full Moon 25 day, 4 aft.

Heliocentric Longitude.

D	W	n	h	δ	U	n	♂	♀	♂	♀	♂	♀	♂	♀
1	22	45	5	35	25	50	16	33	24	40	23	9	12	13
7	22	50	5	48	26	18	19	54	4	19	9	49	11	54
13	22	54	6	1	26	46	23	11	13	55	26	21	11	35
19	22	59	6	14	27	14	26	26	23	30	13	29	11	16
25	23	4	5	26	27	42	29	40	3	4	2	3	10	56

M	W	Festival Days.	Aspects & Wea.	☉	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
1	W	St. Ph. & Jas.	Season-	11	19	6	20	14	14	2	19	18	4	7
2	T	4 seu. 1. 6m	able at	12	19	6	28	15	14	1	3	27	3	16
3	F	In. of the C.	the be-	13	19	6	28	15	15	1	17	35	2	12
4	S	♀ fet 10. 55n	ginning	14	19	6	28	16	15	0	1	43	1	1
5	F	5 S. aft. East.	then	15	19	6	28	17	15	0	15	48	of 14	5
6	M	4 ret. St John	A. P. L	16	19	6	28	18	15	0	29	40	1	28
7	T	4 fo. 0. 44m	showers	17	19	6	28	18	15	0	13	45	2	36
8	W	Cl. flo. 3. 49	☉ ♂	18	19	7	28	19	15	0	27	33	3	34
9	T	A. d. Holy T	☉ ♂	19	19	7	28	20	15	0	11	8	10	4
10	F	5 return	♂ ♂	20	19	7	28	20	14	0	24	34	4	48
11	S	♀ fet 10. 19n	♂ ♀	21	19	7	27	21	14	0	7	11	4	5
12	F	1 S. aft. Afc.	and	22	19	7	27	22	14	0	20	31	4	59
13	M	Easter T. en.	thunder	23	19	7	27	23	14	1	3	25	3	43
14	T	4 fo. 0. 13m		24	19	7	27	23	14	1	15	20	4	13
15	W	Cl. flo. 3. 58		25	19	7	27	24	13	1	27	23	3	33
16	T	Oxf. T. ends	Wind	25	19	8	27	25	13	2	9	17	2	44
17	F	♀ fets 9. 39n	8 ☉ ♀	26	19	8	27	26	12	2	21	7	1	46
18	S	[Dunstan	and	27	19	8	27	26	12	3	2	56	0	47
19	F	Whit Sun.	QCh. b	28	19	8	26	27	11	4	14	52	on 16	6
20	M	Whit Mon.	showers	29	19	8	26	28	11	5	26	59	1	20
21	T	Whit Tuef.		11	19	8	26	28	10	5	9	22	2	21
22	W	Prs. Eliz. b.	CTdm	1	19	8	26	29	10	6	22	5	3	16
23	T	[Em. We.	to the	2	19	8	26	11	9	7	5	11	4	3
24	F	Cl. flo. 3. 31.	♂ ♀	3	19	9	26	0	9	8	18	40	4	38
25	S	♀ fet 8. 34n	end.	4	20	9	26	1	8	9	2	4	30	4
26	F	Trinity Su.	I ret.	5	20	9	25	2	7	11	16	39	4	59
27	M	[Au. I. ABp	CVBe.	6	20	9	25	3	7	12	1	0	4	43
28	T	4 fo. 11. 15n	(♂ ☉ ♀)	7	20	9	25	3	6	13	15	27	4	8
29	W			8	20	9	25	4	6	14	29	55	3	17
30	T	Cl. flo. 2. 50	♂ ♂ ♀	9	20	9	25	5	5	16	14	18	2	14
31	F	Trin. T. beg		10	20	9	25	5	4	17	28	34	1	3

D	D. L.	Sun beg.	Sun rise	D. L.	leng. of D.	Day inc.	Declination.											
							☉	n	W	n	h	n	U	f.	♂	n	♀	n
1	2	1	434	7 26	9 50	14 52	7	2	15	18	15	38	11	31	18	54	16	10
7	1	41	424	7 36	10 10	15 12	7	22	17	1	15	37	11	46	18	45	17	29
13	1	12	414	7 46	10 48	15 32	7	42	18	34	15	35	12	1	18	35	18	41
19	0	38	4	5 755	11 22	15 50	8	0	19	56	15	33	12	14	18	25	19	46
25	all	3 58	8 2	Dav	16 4	8 14	21	5	15	30	12	28	13	15	20	44	23	28

JUNE hath XXX Days.

Heliocentric Longitude.

D	♂	♀	h	g	u	m	♂	h	♀	♀	♀	♀	♀	♀	♀
1	23	9	6	41	28	15	3	24	14	11	26	50	10	34	
7	23	13	6	54	28	43	0	33	23	42	22	✕	11	10	15
13	23	18	7	7	29	11	9	41	3	12	22	♀	34	9	56
19	23	23	7	20	29	39	12	41	12	41	27	♂	59	9	37
25	23	27	7	33	0	♂	15	49	22	10	5	♂	42	9	18

Last Quarter 30 day, 3 aftern.

D	D. L. beg.	Sun rise	Sun set.	D. L. ends	Length of D.	Day inc.	Declination.											
							⊙ n	♈ n	♉ n	♊ n	♋ n	♌ n	♍ n	♎ n	♏ n	♐ n	♑ n	♒ n
1	all	350	310	Day	16 20	3 30	22 10	15 27	12 43	18 5	21 43	21 6	14 48					
7		345	315		16 30	3 40	22 50	15 24	12 55	17 56	22 25	19 11	18 0					
13		344	316		16 32	3 42	23 16	15 20	13 7	17 48	23 1	17 42	21 7					
19		343	317		16 34	3 44	23 27	15 15	13 18	17 41	23 28	16 45	23 33					
25		343	317		16 34	3 44	23 24	15 9	13 28	17 35	23 46	16 24	24 30					

JULY hath XXXI Days.

D	♂ n	h l.	4 l.	♂ n	♀ l.	♀ n
1	0 42	2 17	0 57	0 35	4 9	1 46
13	0 42	2 20	0 54	0 41	4 19	1 32
25	0 42	2 22	0 51	0 48	4 0	0 4

New Moon 8 day, 5 mor.

First Quart. 16 day, 9 mor.

Full Moon 23 day, 7 mor

Laft Quart. 20 day, 11 night

Heliocentric Longitude.

[illegible]

M	W	Festival	Aspects	☉	☿	♈	♉	♊	♋	♌	♍	♎	♏	☽	lat	de.	☽	
D	D	Days.	& Wea.	☾	♊	♋	♌	♍	♎	♏	♐	♑	♒	☾	☾	north	rules.	
1	M	Cam. Com.	Brisk	9	21	13	22	27	1	17	20	58	3	30	4	57	0 8	
2	T	Vifit. V. M.	♂ ♀ ♀	10	21	13	22	27	2	19	48	21	4	16	8	58	0 35	
3	W	♀ ri. 3. 28 m	△ ♀ ♀	11	21	13	22	28	2	21	17	30	4	47	12	28	1 5	
4	T	T. St. Mart.	♂ ♀ ♀	12	21	13	22	29	3	23	0	115	5	4	15	10	1 37	
5	F	Old Midf. d.	C. T. e.	13	21	13	22	29	3	25	13	8	5	4	17	22	2 14	
6	S	♂ fo. 8. 15 n	gales of	14	21	13	22	☾	4	27	25	38	4	51	18	33	2 52	
7	F	6 S. aft Tr.	wind,	15	21	13	22	1	4	29	7	☾58	4	23	18	51	3 36	
8	M	Oxford Aft	rain.	16	21	13	22	1	5	☾	20	7	3	44	18	15	☽ fet	
9	T	Cl. fast 4' 47"	♂ ♀ ♀	17	21	18	22	2	5	3	2	☾	7	2	56	16	51	8a31
10	W	♀ ri. 1. 27 m	♂ ♀ ☿	18	21	13	22	3	6	4	14	0	2	0	14	44	9 3	
11	T	♂ ri. 0. 3 m	* ♀ ♀	19	21	13	22	3	7	6	25	48	0	59	12	0	9 31	
12	F	♂ fo. 7. 50 n	.	20	22	13	22	4	7	8	7	☾34	on	4	8	48	9 55	
13	S	Oxf. T. ends	.	21	22	14	22	5	8	10	19	23	1	8	5	15	10 21	
14	F	7 S. aft. Tr.	☐ ☿ ♀	22	22	14	22	5	9	11	1	☾17	2	9	1	28	10 44	
15	M	Swithin	☐ ☉ ♀	23	22	14	22	6	9	13	13	23	3	6	2f	26	11 7	
16	T	♀ ri. 1. 11 m	.	24	22	14	22	7	10	15	25	45	3	55	6	19	11 33	
17	W	♂ ri. 11. 26 n	.	25	22	14	22	7	11	16	8	☾128	4	34	10	1	Morn	
18	T	Cl. fast 5. 47	♂ ♀ ♀	26	22	14	D	8	12	18	21	36	5	0	13	20	0 0	
19	F	♂ fet 11. 55 n	Windy,	27	22	14	22	9	12	19	5	♂12	5	11	16	5	0 32	
20	S	Margaret	♂ ☿ ♀	28	22	14	22	9	13	21	19	16	5	4	17	59	1 15	
21	F	8 S. aft. Tr.	☐ ♀ ♀	29	22	14	22	10	14	22	3	☾46	4	37	18	47	2 4	
22	M	Magdalen	with	20	22	14	22	11	15	24	18	37	3	51	18	21	3 4	
23	T	♀ fet 8. 55 n	rain &	☾	32	14	22	11	16	25	3	☾41	2	49	16	36	☽ rif	
24	W	Mag. Col. E.	thunder	1	22	14	22	12	16	27	18	50	1	34	13	42	8 37	
25	T	St. James	.	2	22	14	22	13	17	28	3	☾51	0	13	9	53	9 12	
26	F	St. Ann	MVM	3	22	14	22	13	18	29	18	42	1	f. 7	5	30	9 42	
27	S	Cl. fast 6. 3	.	4	22	14	22	14	19	☾	3	☾	12	2	22	0	54	10 11
28	F	9 S. aft. Tr.	.	5	22	14	22	15	20	2	17	20	3	26	3n	38	10 37	
29	M	♀ ri. 0. 53 m	.	6	23	15	22	15	21	3	1	8	5	4	17	7	51	11 6
30	T	♂ fet 11. on	♂ ♀ ♀	7	23	15	22	16	22	4	14	27	4	51	11	33	11 33	
31	W	♂ ri. 10. 57 n	* ☿ ♀	8	23	15	22	17	23	5	27	29	5	10	14	35	Morn	

D	D. L. beg.	Sun rife	Sun fet.	D. L. ends	leng. of D.	Day dec.	Declination.													
							⊙	n	♈	n	♊	n	♈	f.	♈	n	♋	n	♌	n
1		3 44	3 16		16 32	0 2	23	5	15	2	13	36	17	31	24	1	16	28	24	5
7	all	3 48	3 12	Day	16 24	0 10	22	32	14	55	13	44	17	28	24	6	16	52	22	6
13		3 53	3 7		16 14	0 20	21	46	14	49	13	51	17	27	24	3	17	29	19	11
19		3 56	3 1		16 2	0 32	20	45	14	42	13	58	17	28	23	53	18	12	15	44
25		0 51	4 8		7 52	11 9	15 51	0 50	19	32	14	35	14	3	17	30	23	35	18	56

AUGUST hath XXXI Days.

D	♂ n	h f.	♀ n	♂ n	♀ f.	♂ f.
1	0 42	2 23	0 49	0 51	3 39	1 8
13	0 42	2 23	0 47	0 57	2 55	3 20
25	0 42	2 29	0 44	1 2	2 3	4 33

Heliocentric Longitude.

D	男	女	男	女	男	女	男	女	男	女	男	女
1	23	50	3	53	3	3	4	6	20	45	4	27
7	24	19	6	3	31	6	58	0	17	20	56	7
13	24	6	19	3	59	9	49	9	50	7	53	4
19	24	10	9	32	4	28	12	38	19	24	25	47
25	24	15	9	45	4	56	15	26	28	58	15	50

First Quart. 14 day, 9 night

Full Moon 21 day, 3 aft.

Left Quart. 28 day, 9 mor.

M	D	Festivals Days.	Aspects & Wea.	☉	☿	♈	♊	♋	♀	♌	♍	♎	♏	♐	♑	♒	♓
1	T	Lammas	Bristle	9	23	15	22	17	23	6	10	14	5	13	16	50	0 12
2	F	Cl. fast 5'.47	♂ D ♀	10	23	15	22	18	24	7	22	43	5	1	18	15	0 51
3	S	♀ rif. 1.55m	gales	11	23	15	22	19	25	8	4	59	4	35	18	40	1 31
4	F	10 S.aft. Tr.	♂ D ♂	12	23	15	22	19	26	9	17	5	3	58	18	26	2 21
5	M	♂ ri. 10.29n	of wind.	13	23	15	22	20	27	10	29	4	3	10	17	16	3 15
6	T	Tr. of God,		14	23	15	22	21	23	11	10	Ω	56	2	14	15	21
7	W	then name	☐ ☉ ♀	15	23	15	22	21	29	12	22	45	1	13	12	48	7a34
8	T	of Jesus	Δ ♄ ♂	16	23	15	22	22	☿	12	4	☿	31	0	8	9	44
9	F	Cl. fast 5'.3	Rain	17	23	15	22	23	1	13	16	19	on	57	6	17	8 26
10	S	St. Lawren.	and thunder	18	23	15	22	23	2	14	23	10	2	0	2	34	8 50
11	F	11 S.aft. Tr.	PBrub	19	23	15	22	24	3	14	10	☿	7	2	53	1f	17
12	M	Pr. Wales b.		20	23	15	23	24	4	15	22	16	3	49	5	8	9 37
13	T	♀ ri. 0.52m	Δ ♀ ♀	21	23	15	23	25	5	15	4	m	38	1	31	8	49
14	W	♂ ri. 9.56n		22	24	15	23	26	6	15	17	19	5	1	12	13	10 36
15	T	Af. B.V.M.	♂ D ♄	22	24	15	23	26	7	16	0	♀	23	5	16	15	0 11
16	F	Du. York b.		23	24	15	23	27	8	16	13	51	5	14	17	17	11 55
17	S	♄ set 10.6 n		24	24	15	23	28	9	R	27	47	4	55	18	31	Morn
18	F	12 S.aft. Tr.		25	24	15	23	28	10	16	12	☿	8	4	17	18	30
19	M	♀ rif. 0.56m	Windy	26	24	15	23	29	11	16	26	54	3	21	17	31	1 51
20	T	B.G.sh.beg.	Δ ♀ ♀	27	24	15	23	Ω	12	16	11	☿	56	0	15	9	3 3
21	W	Du. Clar. b.	with	28	24	15	23	0	13	15	27	8	0	40	11	43	Drile
22	T	Cl. fast 2'.26	* ♀ ♀	29	24	15	23	1	14	15	12	X	19	of	35	7	20
23	F	♂ rif. 9.23n	* ♀ ♀	☿	24	15	23	2	15	14	27	21	1	5t	2	50	7 43
24	S	St. Barthol.	showers	1	24	15	24	2	16	14	12	☿	5	3	8	in	54
25	F	13 S.aft. Tr.		2	24	15	24	3	17	13	26	26	4	5	6	24	9 12
26	M	♀ rise 1.4m	♂ D ♀	3	24	15	24	3	19	12	10	8	21	4	47	10	24
27	T	♄ set 9.31 n		4	24	15	24	4	20	11	23	49	5	11	13	43	10 18
28	W	St. Aultin		5	24	R	24	5	21	10	6	☿	53	5	18	16	15
29	T	St. John be-		6	24	15	24	5	22	9	19	34	5	9	17	55	11 38
30	F	headed		7	25	15	24	6	23	9	1	☿	57	4	46	18	41

D	D. L.		Sun	Sun	D. L.	eng.	Day	Declination.														
	beg.	rise	set.	ends	of D.	lec	☉	n	♈	n	♉	n	♊	f.	♋	n	♌	n	♍	n		
1	1 23	1 18	7 42	10 37	15 24	1 10	17	53	14	27	14	8	17	35	23	7	19	41	7	59		
7	1 50	4 23	7 32	10 10	15 4	1 30	16	10	14	20	14	11	17	41	22	35	20	10	4	53		
13	2 9	4 38	7 22	9 51	14 44	1 50	14	29	14	13	14	12	17	49	31	59	20	26	2	35		
19	2 30	4 49	7 11	9 30	14 22	2 12	12	35	14	5	14	13	17	58	21	15	20	28	1	32		
25	2 47	5 0	7 0	9 13	14 0	2 34	10	33	13	57	13	13	13	8	20	27	20	13	2	19		

SEPTEMBER hath XXX Days.

Heliocentric Longitude.[illegible]

M D	Festival Days.	Aspects & Wea.	☉	☿	♈	♉	♊	♋	♌	♍	♎	♏	♐	♑	♒	♓	plan.	dec.	☾
M D			☉	☿	♈	♉	♊	♋	♌	♍	♎	♏	♐	♑	♒	♓	lon.	north	rises.
1	F 14 S. aft. Tr.	Giles	9	25	15	24	7	25	7	26	4	3	25	17	37	1	16		
2	M Lond. burnt	♂ ☉ ♂	10	25	15	25	8	26	6	7	56	2	30	15	53	2	13		
3	T ♀ rif. 1. 18m	☐ ☿ ♀	11	25	15	25	9	27	5	19	43	1	30	13	30	3	11		
4	W ♀ rif. 8. 29n	♂ ☉ ♀	12	25	15	25	9	28	4	1	30	0	25	10	33	4	1		
5	T 4 fet 9. 0 n	Wind	13	25	15	25	10	29	4	13	19	on	40	7	11			D fets	
6	F Cl. flow 2'. 2	and rain.	14	25	15	25	10	30	3	25	11	1	44	3	31	7	a		
7	S Enurchus		15	25	15	25	11	2	3	7	10	2	44	of	20	7	25		
8	F 15 S. aft. Tr.	N BVM	16	25	15	25	12	3	2	19	17	3	38	4	12	7	49		
9	M ♂ rif. 2. 6m		17	25	15	25	12	4	D	1	34	4	22	7	56	8	15		
10	T ♀ rif. 1. 32m	♂ ☉ ♀	18	25	15	26	13	5	2	14	3	4	54	11	23	8	45		
11	W ♀ rif. 8. 14n	Rain	19	25	15	26	14	6	2	26	48	5	13	14	23	9	18		
12	T 4 fet 8. 39n	and	20	25	15	26	14	7	3	9	51	5	16	16	44	9	57		
13	F Cl. flo. 4. 26	☐ ♀ ♂	21	25	15	26	15	8	3	23	14	5	2	18	15	10	44		
14	S Holy Crois	thunder	22	25	15	26	15	9	4	6	50	4	32	18	46	11	43		
15	F 16 S. aft. Tr.	B. H.	23	25	15	26	16	11	5	21	6	3	44	18	8		Morn		
16	M ♀ rif. 7. 58n		24	26	15	27	17	12	6	5	35	2	40	16	18	0	50		
17	T Lambert	Cold	24	26	15	27	17	13	7	20	21	1	25	13	22	2	2		
18	W Em. Week	☐ ♀ ♀	25	26	15	27	18	14	8	5	20	0	3	9	30	3	16		
19	T ♂ ri. 2. 12m	rain.	26	26	15	27	19	15	9	20	25	if	19	5	1		D rif.		
20	F ♀ ri. 1. 57m		27	26	15	27	19	16	10	5	25	2	36	0	13	6	a 48		
21	S St. Matt.		28	26	15	27	20	17	12	20	14	3	40	4	n 30	7	19		
22	F 17 S. aft. Tr.	Δ ♀ ♀	29	26	15	27	20	19	13	4	42	4	30	8	52	7	51		
23	M [K. G. III. c	Windy	30	26	15	28	21	20	15	18	45	5	1	12	35	8	25		
24	T ♂ rif. 2. 5m	with	1	26	15	28	22	21	17	2	21	5	14	15	31	9	1		
25	W ♀ ri. 2. 12m	♂ ♂ ♀	2	26	15	28	22	22	18	15	31	5	10	17	32	9	43		
26	T St. Cyprian	showers	3	26	15	28	23	23	20	28	15	4	51	18	37	10	30		
27	F ♀ rif. 7. 16n	of rain.	4	26	14	28	24	24	22	10	38	4	18	18	45				

D	D.L.		Sun	Sun	D.L.	long.	Day	Declination.																		
	beg.	rife	fet.	ends	of D.	dec.		⊙	n	h	n	h	n	u	f.	♂	n	♀	n	♀	n					
1	3	8	5	14	6	46	8	52	13	32	3	2	8	3	13	49	14	11	18	20	19	25	19	34	5	33
7	3	23	5	25	6	35	8	37	13	10	3	24	5	49	13	42	14	8	18	32	18	39	18	39	8	41
13	3	40	5	37	6	23	8	20	12	46	3	48	3	32	13	35	14	5	18	45	17	23	17	26	10	8
16	3	54	5	49	6	11	8	6	12	22	4	12	1	13	13	27	14	0	18	59	15	56	15	56	9	9
25	4	5	6	0	6	0	7	55	12	0	4	34	1	f.	7	13	20	13	54	19	14	14	8	14	8	6

OCTOBER hath XXXI Days.

Heliocentric Longitude.

New Moon 5 day, 5 morn.
First Quart. 12 day, 5 night
Full Moon 19 day, 9 morn.
Last Quart. 26 day, 6 night

D	D. L. beg.	Sun rife	Sun fets	D. L. ends	leng. of D.	Day dec.	Declination.											
							☉ f.	☿ n	♈ n	♉ n	♊ f.	♋ n	♀ n	♌ n	♍ n	♎ n	♏ n	♐ n
1	4 16	6 12	5 48	7 44	11 36	4 58	3 28	13 15	13 48	19 28	13 56	12 6	1 58					
7	4 29	6 24	5 36	7 31	11 12	5 22	5 47	13 9	13 41	19 42	12 41	9 40	2 35					
13	4 41	6 35	5 25	7 19	10 50	5 44	8 3	13 4	13 33	19 57	11 25	7 22	7 6					
19	4 53	6 47	5 13	7 7	10 26	6 8	10 15	12 59	13 25	20 12	10 7	4 46	11 21					
25	5 4	6 50	5 16	6 56	10 2	6 30	12 22	12 54	13 16	22 27	8 48	2 3	15 12					

D. L.	Sun beg.	Sun rise	Sun set.	D. L. ends	eng. of D.	Day dec.	Declination.											
							⊙ f.	W n	h n	U f.	♂ n	♀ f.	♂ n	♀ f.	♂ n	♀ f.		
5	15	7 11	4 49	6 45	9 38	6 56	14 41	12 50	13 7	20 43	7 15	1 13	19 5					
5	24	7 21	4 39	6 36	9 18	7 16	16 31	12 47	12 58	20 58	5 55	4 2	21 51					
5	31	7 31	4 29	6 29	8 58	7 36	18 11	12 44	12 50	21 11	4 35	6 50	23 56					
5	37	7 40	4 20	6 23	8 40	7 54	19 40	12 43	12 42	21 24	3 15	9 33	25 17					
5	44	7 40	4 11	6 16	8 22	8 12	20 55	12 42	12 34	21 36	1 55	12 9	25 48					

DECEMBER hath XXXI Days.

Heliocentric Longitude.

New Moon 3 day, 11 mor.
First Quart. 10 day, 8 mor.
Full Moon 17 day, 11 mor.
Last Quart. 25 day, 1 after.

D	D. L. beg.	Sun rise	Sun set.	D. L. ends	Eng. of D.	Day dec.	Declination.													
							☉	f.	h	n	h	n	M	f.	♂	n	♀	f.	♂	f.
1	5.42	7 55	4 5	6 11	8 10	8 24	21	57	12	41	12 28	21 48	0	36	14	35	25	27		
7	5.54	8 04	4 0	6 6	8 0	8 34	22	43	12	41	12 32	21 59	of.	40	16	49	24	17		
13	5.57	8 3	3 57	6 3	7 54	8 40	23	13	12	42	12 17	22 9	1	55	18	47	22	23		
19	5.58	8 5	3 55	6 2	7 50	8 44	23	27	12	44	12 14	22 18	3	7	20	27	20	33		
25	5.58	8 5	3 55	6 2	7 50	8 44	23	24	12	12	12 12	22 27	4	16	21	45	19	47		

A TABLE of Minutes, or the Residue of the Planets Places.

July.										August.										September.										October.										November.										December.									
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩										
1	58	20	5	34	12	40	25	34	11	11	22	48	58	47	25	7	43	49	46	29	9	38	18	33	5	33	8	28	49	46	7	22	51	33	11	28	55	16	33	1	49																		
2	55	29	11	31	52	7	29	31	14	14	25	27	53	49	23	11	46	3	23	35	13	43	52	43	40	6	49	5	33	6	28	49	46	7	22	51	33	11	28	55	16	33	2	49															
3	52	32	16	28	32	36	31	28	18	16	28	7	49	49	21	14	46	11	42	23	42	55	39	51	43	20	10	9	33	9	18	15	56	35	24	53	33	3	55	1	46	39	10																
4	49	35	21	25	13	6	31	26	21	19	31	46	46	40	18	22	44	19	39	48	38	41	58	36	2	20	10	9	33	9	18	15	56	35	24	53	33	3	55	1	46	39	11																
5	47	38	26	22	53	37	29	24	25	21	34	25	42	40	18	22	44	17	54	0	40	1	32	13	57	21	25	34	11	13	28	31	49	54	53	3	0	9	34	1	0	46	39	12															
6	44	41	31	20	53	9	26	21	29	24	37	4	39	30	16	25	43	35	55	0	29	40	4	28	24	33	32	11	12	8	41	6	3	24	55	33	56	22	7	16	13	0	46	39	13														
7	41	44	36	18	14	42	22	19	33	26	41	43	37	16	14	29	42	33	33	7	4	39	7	24	35	9	43	57	14	3	54	41	17	54	56	32	53	36	40	31	17	46	39	14															
8	38	47	45	14	54	7	16	16	17	37	28	45	22	36	13	33	41	51	14	47	38	10	20	46	46	54	42	35	15	58	7	16	31	23	57	32	49	49	13	46	10	19	46	39	15														
9	35	51	45	14	34	54	7	14	41	30	49	1	35	39	9	40	38	8	27	28	44	37	16	12	8	59	17	11	36	18	48	33	26	59	20	59	32	43	16	18	16	19	46	39	16														
10	33	54	49	12	15	23	55	12	45	32	53	40	34	15	6	47	35	24	42	43	18	36	21	4	31	12	40	38	37	20	38	59	36	27	15	2	31	37	43	23	46	42	46	39	17														
11	30	58	54	11	55	4	42	9	49	34	57	19	33	47	6	47	35	24	57	59	15	36	25	55	55	4	1	16	42	38	23	24	39	19	9	32	5	30	28	24	59	31	46	49	46	39	18												
12	27	1	58	10	35	46	28	7	52	36	1	58	32	16	6	47	35	24	57	59	15	36	25	55	55	4	1	16	42	38	23	24	39	19	9	32	5	30	28	24	59	31	46	49	46	39	19												
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Chronological Notes for the Year 1793.

The Julian period	- - 6506	Septuagesima Sunday	Jan. 27
Roman Indiction	- - 11	Shrove Sunday	Feb. 10
Solar cycle	- - 10	Easter Day	March 31
Golden number	- - 8	Whit Sunday	May 19
Dominical letter	- - F	Trinity Sunday	May 26
Epact	- - 17	Advent Sunday	Dec. 1
Number of Direction	- - 10	Years of the Millennium	142

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, when planets are in the same sign, D. M. &c.				
* Sextile, when 2 signs dist.		Δ Trine, when 4 signs dist.		
□ Quartile, when 3 signs dist.		♁ Opposition, when 6 signs dist.		

Of the Four Quarters of the Year.

Spring Qu. b. Mar. 20, 3h. 8' m. Autumn Q. b. Sept. 22, 2h. 58' af.
Summer Q. b. June 21, 1h. 10' m. Winter Q. b. Dec. 21, 7h. 29' m.

ECLIPSES.

IN the course of this year, there will happen four eclipses, two of the sun, and two of the moon, according to the following order:
I. February 25th, moon eclipsed, and visible at night, as follows

	h.				h.		
Beginning at night	9	23	46		9	19	53
Middle	-	-	10 45 16	The same from	10	43	54
End of the Eclipse	12	6	31	M. S. tables.	12	7	59
Digits eclipsed	-	6°	0 c		6°	8	57

On the moon's north limb.

II. March 12, near 6 in the morning, the sun is eclipsed invisible.

III. August 21, near 3 afternoon, the moon is eclipsed invisible.

IV. September 5, the sun is eclipsed visible in Great Britain.

	D. h.				The moon makes the first impression on the solar disk of 29° 30' from the ☉ vertex on the right.
Beginning Sept.	5	9	37	0 morn.	
Middle	-	0	11	8 43	
End	-	0	0	44 13 aftn.	
Digits eclipsed	0	9	28	on ☉ n. limb.	

An Exam. for July 1st. To find the ☉ and Planets Places.

Look into the calendar, and table of minutes for July 1st. and you will find the ☉ in ♊ 9° 58'; ♋ in ♏ 21° 26'; ♌ in ♈ 13° 5', &c.

Answers to the ENIGMAS, REBUSES, CHARADES, &c.

<i>Enigmas.</i>	<i>Charades.</i>	<i>Rebuses.</i>
I. Barley or malt liquor.	I. Anthem.	I. Scuthwell.
II. Leather-bag.	II. Cloth-yard.	II. Noon.
III. Friendship.	III. Game-cock.	III. Nobody.
IV. Letter O.	IV. Mayor.	IV. John Salter.
V. Celibacy or single-life.	V. Sea-mark.	
VI. or Prize. Line.	VI. Bank-bill.	
	VII. Ashore.	

Answers to the PRIZE ENIGMA.

1. *Zema on seeing the Portrait of his deceased Wife, by Mr. John Fildes, Liverpool.*

Thou faint resemblance of my once belov'd!
 Image of her my soul held dear on earth,
 And hopes to meet hereafter! The sight of thee,
 To my distracted fancy strait recalls,
 That fatal hour in which I lost my Anna!
 As on my breast, one eve she did recline
 Her lovely head, and talk'd with me of love;
 Death in one moment snatch'd her from my arms,
 And I then lost my peace of mind for ever!
 Earth now has got no blessing worth my care;
 And I through life shall mourn my hapless fate,
 Of misery's sons the most forlorn and wretched!

2. *By Autodidactus, Laxton.*

Some place their bliss in pleasures gay,
 And epicurean delights:
 Swiftly their moments glide away,
 Whilst they perform their festive rites.
 Ambition fires the haughty mind;
 Proud Cæsar can't an equal bear:
 He seeks for what he cannot find,
 Contentment ne'er inhabits here.
 The summum bonum of old gripe
 Is plac'd in heaps of shining ore;
 Meanly he feeds on oxen tripe,
 And lives a life that's truly poor.

But

But your Diary *lines* doth lead
To nobler joys, and crowns more bright,
And teaches us in paths to tread,
Which lead to purest realms of light.

3. *By Mr. T. Smith, Melton-Mowbray.*

To find out the Prize, which is hid in disguise;
Long time I've exerted my skill;
Both early and late, it has puzzled my pate,
And oft exercised my quill. *Alluding to a line.*
Till chancing to rove, one morn thro' the grove,
Where the feather'd songsters were join'd
In harmony sweet, to form nature compleat;
It suddenly came in my mind.

4. *Address to Mr. Fildes, by Thomas Nield.*

A *line* my dear Fildes was the answer I sent,
To the Enigma that you had so wittily pen'd;
And if it was right, as it seem'd in each case,
I beg'd Mr. Printer to give it a place.

5. *Address to the British Youth, by Mr. Hall.*

Ye British youth; mark well the truth, in scientific *line*,
That you in Di. abstruse things try, that you in it may shine,
Fair science wrought, with profound thought, requireth no disguise;
Therefore pray mind, the truth to find; that you may win the prize.

6. *By Mr. John Brown, Whittington, near Chesterfield.*

Go humble *lines* and plead in my defence;
Arm your request with my obedience;
Gain but acceptance, my joy will abound,
To find my answer with your liking crown'd.

7. *By Mr. John Cartledge, Chesterfield.*

"The *lines* are fall'n divinely wise,
Our heritage is good indeed;"
Our noblest pow'rs then exercise,
To praise that hand that doth us feed.

8. By *Innocentius, Chesterfield.*

Kind Sir if I do right divine,
I think your myltic theme is *line*.

Answers were also given by Messrs. Atwin, Allwood, Boden, Bosworth, Bower, Brassar, Brooks, Burgin, Buxton, Car-wilben, Cator, Clare, Clark, Eaton, Elms, Enson, Fletcher, Flint, Fox, Gedling, Greenlees, Hanford, Hunter, Houghton, Haywood, Jason, King, Kite, Langley, Laughton, Mathews, Milward, Millington, Mason, Newton, Peat, Salter, Stevenson, Savage, Slack, Turton, Tatham, Trueman, Wyld, and Young.

General ANSWERS to the ENIGMAS.

1. By *Mr. Thomas Greenlees, Bookseller, Rochdale.*

Friendship, sweet cordial of this life,	Enig. 3.
That lessens ev'ry care,	
Guide <i>Anna</i> thro' this world of strife,	Reb. 2.
In chastity sincere.	
The <i>line</i> of life may she pursue,	Prize. Enig. 5. single-life.
That will her best prepare,	
Her actions past for to review ;	
If brought before a <i>may'r</i> .	Ch. 4.
And when to <i>Southwell</i> church she goes,	Reb. 1.
May <i>Salter</i> meet her there,	R. 4.
An <i>anthem</i> then to her propose ;	Ch. 1.
For to delight the ear.	
<i>Nobody</i> else I'd have unite,	R. 3.
For that would ill agree,	
Their voices are so near alike,	E. 4.
A discord there would be.	
So now their hands let's freely join,	
And to the <i>mark</i> repair,	Ch. 5. a sea-mark.
In yonder <i>yard</i> pray see the <i>sign</i> ,	Ch. 2. cloth-yard.
It's noted for good <i>beer</i> .	E. 1. barley.
Where we our spirits may relieve,	
With plenty of good <i>sack</i> ;	E. 2.
Or good <i>rum-punch</i> I do believe,	Ch. 3.
Will do as well as that.	
Now to conclude the reck'ning call,	
We need not to delay,	
A good <i>bank-bill</i> will pay for all,	Ch. 6.
To <i>Greenland</i> let's away.	

2. *Arlo*

2. *Arlo and Alma*, by J. Fildes, *Liverpool*.

Fair Alma was a wealthy nymph,
And liv'd beside the Dee ;
For beauty, and for innocence,
Few were so fam'd as she.
Young Arlo was a shepherd swain,
Who did near Alma dwell ;
For virtue, truth, and inward worth,
Not one did him excel.
Those two each other dearly lov'd, 4.
But Alma's haughty fire ;
One far more rich than Arlo was,
For Alma did require.
The gallant youth, when this he found,
Opprest with grief and pain,
To India went, in hopes he there,
A fortune soon might gain.
He took his leave, and strove to hide
The sorrows of his heart :
But when poor Alma saw him go,
It cut her to the heart.
Alone, quite pale, she walk'd & wept, 1.
Within the rural shade,
Where she and Arlo, vows of love,
And friendship, oft had made. 3.

The youth had but one year been gone,
Before the father died ;
For flesh is grass, and death delights
To humble human pride.
The weeping maid put sackcloth on, 2.
And mourn'd her father dead ;
Who ere his death, gave his consent,
That she should Arlo wed. [Prize.
To whom these lines she after wrote.
—My father is no more!
And soon I hope thou wilt return,
To this thy native shore.
Thou needst not now for riches toil ;
My wealth shall all be thine ;
I hope thou wilt not love it less,
For having once been mine.—
When Arlo had the letter read,
He homeward quickly came ;
O'erjoy'd to think that he so soon,
Should wed the lovely dame.
The day he did return, they both
Forsook a single life ; 5.
He now a tender husband is,
And she a loving wife.

3. *The Toper*, by Mr. Tho. Nield, *Howarden*.

The Toper's glad in company to be,
With one who loves to swig good ale like he, 1.
On friendship sits, and chats the live long day, 3.
Of virgin's chase, and tell the pranks they play, 4. 5.
Gives ample scoff to all he thinks is true,
Reclaims the idle, and heads the madding crew ;
Makes war with France, while thus by faction rent,
And gives them cause their folly to repent ;
Seizes their crown, and straight ascends the throne,
With sword and fire, makes all the land to groan ;
Draws forth his lines, and chalks the table o'er, 6.
And fix the ships in order near the shore.
Thus acts the toper, while the landlord leers,
Assents with nods, and his long story hears,
Till ere anon, the toper's run ashore ;
His money's spent—landlord will trust no more ;
His bags quite empty, and his land all sold— 2.
Himself now routed, and his story told.

4. *The Disconsolate Lover*, by Mr. Lumas Brassar, *Headfellgates*.

Adieu! to Southwell, whither shall I roam, 1. R.
Since Anna's false, no peace for me remains ; 2. R.

<i>Nobody e'er can sooth my troubled mind,</i>	3 R.
For rankling discord there in triumph reigns.	
<i>Anthems</i> alas! tho' by <i>John Salter</i> sung,	1 C. 4 R.
Cannot compose my agitated mind;	
<i>Bank-notes</i> to me are trash, mere useless things,	6 C.
Since Anna's false! no comfort can I find.	
Just as a ship toss'd on the raging main,	
Without <i>sea-mark</i> to direct her way;	5 C.
So floats my soul on life's tempestuous sea;	
Why have I liv'd to see this fatal day.	4 E.
Oft have I dress'd a may-pole for my fair,	
With <i>ribbons</i> waving in the fanning breeze;	2 C.
In hopes the priest should one day join our hands;	3 E.
Officiously I did her strive to please.	
Dress'd in her <i>sack</i> , how comely was my dear;	2 E.
Her line of life how did my soul approve;	Prize.
A <i>single life</i> was irksome unto me;	5 E.
My hopes concentr'd in my turtle-dove.	
But, now alas! these hopes I must forego,	
For the false fair, will not her promise keep.	
Soon as the <i>game-cock</i> ushers in the morn,	3 C.
I am resolv'd! to take the lover's leap.	

5. *The enlightened African's Soliloquy, by Autodidactus.*

From dearest <i>friendship</i> and connexions torn	3.
I am—to vile Barbarians sold;	
Who treat me with great cruelty and scorn,	
All for to fill their <i>bags</i> with gold.	2.
My aged parents I no more must see,	
My brothers, nor my sisters dear;	
My loving bride they've thrown into the sea,	
And nought, O nought my heart can cheer.	4.
From rising to the setting day, I sweat,	
And labour more than any beast;	
Yet no refreshing <i>liquors</i> do I get,	1.
To sooth my weary'd limbs to rest.	
But see, a pleasant glimm'ring light appear	
Portentous from the Gallic shore;	
The cry of liberty, methinks, I hear,	
The reign of slavery is o'er.	
Thanks to our friends in Gaul and Britain's isle;	
Who to blest freedom pav'd the way;	
May <i>virgin purity</i> upon them smile,	5.
And heaven largely them repay.	

6. By Mr. Thomas Smith, of Melton-Mowbray.

Pr. A line.

Since others write for thirst of fame,
That they may bays, and laurels claim;
Let me not pass unheeded by;
Muse lend thy aid thy efforts try;
Remember too amongst the rest,
The shortest answer pleaseth best
So to begin let me not fail,
To answer three, *sack*, O, and *ale*,
Ye British sons, I would advise,
To make *friendship* your only prize,
And form your nature in your youth,
To follow *innocence* and truth.

Many other ingenious answers to the Enigmas, were given by Messrs. Atwin, Alwood, Bosworth, Boden, Bower, Brown, Clark, Carwithen, Clare, Eaton, Enson, Fletcher, Flint, Fox, Savage, Stevenson, Wm. Salter, Tatham, Tompson, Truman, Turton, White, Wattrall, Watkins, Wilson, and Wyld.

ANSWERS to the REBUSES and CHARADES.

1. By Mr. Wm. Salter, Bilston.

If I to *Southwell* chance to go,
And there should meet with *Swift* of *Stow*,
With charming *Anna* by his side;
By *Hymen* made his loving bride;
The bells a merry peal should ring,
And choristers an *anthem* sing;
The ale-cask too should hollow sound,
While mirth and music skip'd around;
No-body should a banquet lack,
The *mayor*, the *parson*, or friend *Jack*:
The tars their *sea-marks* too would thum,
And come *ashore* to share the fun;
Thus would we roll in merriment,
'Till ev'ry *bank-bill* there was spent,
Then homeward bend with *measur'd* pace,
Like sportsman from the jovial chase,
'I here to recount how happy we
Were wrapt in blissful harmony.

2. *Acrostic on the — by Mr. John Fildes.*

Beside Southwell church, in a street known to fame,
 Resides a fair maid and Miss Noon is her name:
 If *nobody* yet has engag'd her for life,
 They say learn'd John Salter does wish her his wife.
 In singing of *anthems*, her skill is well known;
 She has both a shop and a *cloth-yard* her own.
 He brisk as a *game-cock*, ere long means to ride,
 Drest like a new *mayor*, to make her his bride.
 I think he a *sea-mark* again will not pass,
 As he has both cash and *bank-bills* for the last:
 Remaining *ashore*, though he something may lack,
 You'll find in his cellar a *case* of good sack.

Anagram.

3. *By Mr. Thomas Fox, Norton.*

Fair Anna dwells in Southwell town,
Nobody can deny;
 John Salter is of great renown,
 When Swift of Stow's not by.
 In singing of an *anthem* grave,
 No *game-cock* is more clear;

A *cloth-yard* measures ev'ry slave,
 As witness my lord *mayor*.
 To spur him on to greater fame,
 Join him in wedlocks band,
 With good *bank-bills* and lovely dame,
 He'll like a *sea-mark* stand.

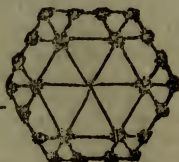
We are truly sorry that room will not admit of the very ingenious answers by Messrs. Autodidactus, Brown, Buxton, Innocentious, Nield, Savage, Stevenson, and others.

Paradox, answered by Mr. T. Smith.

The trees you see in order planted;
 I hope this is the plan you wanted.

ALSO,

Answers were given by Messrs. Buxton, Ferdinando, and Savage.



ANSWERS to the QUERIES.

1. *Answered by Mr. James Ashton, of Harrington, near Liverpool.*

King Richard the Second, came to the crown of England, in the year 1377; and in the year 1397, the English ladies began to wear high head-dresses, with long train gowns, and to ride on side-saddles, after the example of the princess Ann, of Bohemia, Richard's first wife, who brought that fashion into this country; before which time the ladies used to ride astride their horses, like men. See *Raymond's History of England*.

Answers were also given by Messrs. Braffer, Fildes, Innocentious, and Smith.

2. Answered by Collis Etoceto.

This alludes to the promised Messiah, whom they could not receive, but through faith; yet, as they thereby obtained a good report, the heavenly Canaan would be their perpetual inheritance.

Messrs. Ashtqn, Cartledge, Carwithen, and Smith, also gave answers.

3. By Collis Etoceto.

By an humble walk before him, is our Father glorified; and that we bear much fruit. Mic. vi. 8. John xv. 8.

It is not very differently answered by Messrs. Autodidactus, Savage, and Vergilius. But Mr. John Carwithen says, it is impossible for the creature to bring any glory unto the Creator, who is himself all power and glory.

4. By Mr. John Cartledge, of Chesterfield.

Let the false swearer have recourse to the ninth Commandment, to know the consequence of a false oath, and in order that he may know the consequence of breaking a commandment, let him read the 27 ch. of Deut. which also refers to Gal. iii. 10.

Like answers are given by Messrs. Autodidactus, Barns, and Johnson. Mr. Carwithen says, a false oath is death eternal. *Virgilius* also answered it.

NEW ENIGMAS.

I. ENIGMA (53) By John Savage, of Coventry.

'Tis I that keep the thief in jail,	Reverse my name, you then may see
Or I that set him free;	On me the verdant grafs;
Were't not for me how oft he'd steal,	The waving corn behold on me,
You seldom safe would be;	O'er me you often pass.

II. ENIGMA (54) By Mr. William Swift, of Stow.

Both male and female me befriend,
 For I'm of greater pow'r than love;
 Tho' earthly born, I earth transcend,
 For I'm a blessing from above.
 Ye fair with me receive and bless,
 The surest pledge of all success;
 Detr'd by all, us'd right by few:—
 Disprais'd all, I'm wish'd by you.

III. ENIGMA (55) *By Mr. T. Greenlees, Bookseller, Rochdale.*

Ye British bards who're fam'd so wise,
 Pray turn you round and cast your eyes;
 Where sadness reigns and dire distress,
 And ghastly looks poor souls oppress:
 There I frequent mostly you'll find,
 Sad to relate some thousands bind;
 Whose guilty hands have broke the laws,
 And thousands more without a cause.
 But justice now Britain pervades,
 And drives away such dirty knaves,
 As wou'd the rights of man invade,
 In carrying on a cursed trade;
 Wherein they have recourse to me,
 In binding down to slavery,
 Poor Afric's sons most cruelly!
 As to my shape its multifarious,—
 Produ'd by Vulcan's most mysterious,
 Thoughts of working things so various.
 I'm often hung by squares and rings,
 An ornament most meet for kings:
 But not confin'd to them alone,
 Sometimes I grace the fop and clown;
 Below their waste in wreathes of gold;
 And silver too as I've been told.
 Sometimes nine inches long or more,
 Perhaps you'll say to half a score:
 But not contented still with this,
 Coxcombs have something yet amiss;
 A useless knob at th' end or more,
 Must reach below the half a score;
 To shew that they are men of parts,
 When they attempt fair ladies hearts;
 And wou'd them captivate with puff;
 But modest dames mind no such stuff:
 They value most the man sincere,
 So pray adieu 'till the next year.

IV. ENIGMA (56) *By Mr. Wm. Salter, jun. of Bilston.*

Tho' fam'd histor'ans say in ancient times,
 That men were prais'd for perpetrating crimes,
 (I blackest die, and in their annals tell,
 Great heroes deeds, and how they bravely fell;
 Tho' caverns they explore, huge rocks descry,
 Which erst were hid from mortals prying eye;

Tho'

Tho' e'er so far their per'grinations been,
 Or e'er so strange the wonders they have seen:
 In my excursions I am not behind,
 To know one country I at all confin'd;
 In Greenland where cold winter potent reigns,
 In eastern climes, on Asia's burning plains,
 In ev'ry part of this terraq'ous round,
 Where mortals dwell there I'm most surely found.
 In sev'ral parts a courtly train I wear,
 Kings, lords, and pleb'ans in my suit appear.
 If, to Vauxhall you chance to make a tow'r,
 T'amuse yourselves, and spend a leisure hour,
 There I attend to please each welcome guest,
 And animate the passions of the breast;
 In comic, tragic, love-sick, clownish parts,
 Equal alike to me are all those arts,
 With what an eclat then I grace the stage,
 And your attention with delight engage.
 When Hawk, or Russell, on old Neptune's bed,
 Their rapid coursers to the carnage led,
 Darting destruction, fell despair and woe,
 With horrid clanger on the trembling foe;
 I lay not dormant, but the victors bore,
 And spread their deeds o'er all the British shore.
 When in the grove or sad sequester'd vale,
 Where fanning zephyrs breathe a gentle gale,
 Unhappy Strephon languishing complains;
 I speak his woes in melancholy strains;
 Or if perchance to take the evening air,
 The happy lover leads his charming fair,
 Where birds in concert sweetest notes prepare; }
 In me his am'rous flame conveyance find,
 In dulcet numbers on each gust of wind;
 From hence ye riddling wits well known to fame,
 Unto th' enquiring world explore my name.

V. ENIGMA (57) *By Autodidactus.*

Be cautious, O ye charming fair,
 When in my presence you appear,
 Lest that my smiles should pierce your heart,
 And leave therein a venom'd dart,
 Which time alone, can never cure,
 Nor greatest fortitude endure.
 In youth and beauty I abound;
 My charms do seldom fail to wound;
 Lovely my countenance and mein;
 My cloathing white, and red, and green;

All hues which captivate the eye,
 And finest lawns and silks outvie.
 Like to some noble king, I'm crown'd,
 And welcom'd in by dulcet sound;
 With lofty poles they me befriend,
 And youth and beauty me attend;
 The nymphs and swains around do play,
 To hail my first, my native day.
 In my presence, how many sigh,
 And pant, and breathe their reasons why,
 Who are at other times most coy.
 Tell what I am ye lovely fair,
 And of my dang'rous spells beware.

}

VI. ENIGMA (58) *By Mr. J. Carwithen, of the Navy, Plymouth.*

Attend me at the levees of the great,
 Where I am clad with splendid robes of state;
 I take th' chair when man's rights are debated;
 All profound arguments by me are stated.
 I was th' apple on the tree of knowledge;
 Now reign predominant at court and college.
 I lead the wisest prince on earth astray,
 And do conduct the helm by land and sea.
 All airy fancy from me daily spring,
 The thief I aid, and unto sorrow bring.
 I regulate the instrumental lyre,
 And fill the raptur'd saint with false desire.
 I courted am by prelate, knave, and cowl,
 Where I'm not master, man is deem'd a fool;
 Yet where I rule, there's no true happiness;
 Tho' all in some degree, my power possess;
 Where I am master nothing's perfect wrought,
 Without my aid, no art, nor science taught.
 To bring my name more clear unto your view,
 Look upon th' breast-plate of a rabbi jew.

VII. ENIGMA (59) *By Mr. Thomas Nield, of Howarden.*

My station's fixt, and marked out the ground,
 And gazing multitudes are standing round;
 When lo! I come, their loud exulting joy
 Breaks thro' the clouds, and echoes in the sky:
 Tho' I no whit elated by their joy,
 With angry look, and haughty air move by;
 While each in kind submission to my grace,
 Move to the right and left, and give me place;

Tho'

Tho' honor'd thus, by high and low degree,
 Pain long from pleasure, seldom e'er is free;
 Just so with me, for in that num'rous throng,
 A potent enemy, both stout, and strong,
 Seizes my person, and shakes me till I cry,
 E'en to the pity of some standers by:
 Foul deed! and barbarous! unpolitely too
 Attack a friend who ne'er to him was foe;
 Now from him free, let him my fury share---
 The ingrate flies! and cuts the liquid air;
 The laughing multitude, by nature's laws,
 Extols the feat, and gives me loud applause;
 But lo! again, one of the self-same kind,
 Of a more rude, and an ungrateful mind,
 Attacks me straight, e'er I my honours know,
 Or thought of means, to ward against the blow;
 I bow'd my head, with rev'rence to the ground;
 And heard loud laughs, dissipating round;
 Not to my honour this, but to my shame,
 Which did my very soul with rage inflame;
 Now rous'd to fury, by that mean foul deed,
 I on my enemy, rush'd in full speed:
 There dead he lies, by resentment slain;
 Loud sounds applause---my honour I regain;
 From bounds set free, now seek the peaceful plain. }

VIII. OR, PRIZE ENIGMA (60) *By Mr. J. Fildes, of Liverpool.*

Diarians you perhaps will think me rude,
 If in your company I here intrude
 Without apology; and if 'tis so,
 I that regard not, but must let you know;
 That in whatever place I wish to be,
 No one, except myself, can hinder me.
 When Eve in Eden did with Adam dwell,
 E'er from the state of innocence she fell;
 I was not known: but when the sons of men
 Began to live dishonestly, I then
 Was needful found, and always shall be so,
 While sinful mortals live on earth below.
 Mankind all own I useful am, yet still
 They do avoid me, and for ever will.
 If in my presence wicked men appear,
 I quickly strike their guilty hearts with fear.
 When dull you hate me, love me when I'm bright,
 And you may find me in a barn at night.

To measure time, erect I always stand;
 And to and fro I move at your command.
 I'm mostly near you, sometimes guard you too,
 But to your projects never can be true;
 For in whatever scheme I act a part,
 I nought but plague and trouble can impart:
 When things go right, I then am never known;
 If they go wrong, the fault is all my own.
 When e'er you see a barrel of good ale,
 To guard one end I'm never known to fail.
 I take my station near the kitchen fire,
 And you may sit in me if you require.
 Within the prison's solitary gloom,
 To be confin'd alas, is oft my doom.
 In winter sad and grievous is my lot,
 For I ere spring do oftentimes get shot:
 And ev'ry cheerful sportsman knows full well,
 That I near fields and lanes delight to dwell.
 I am no stranger to the ways of man;
 And oft to stop him I do all I can.
 Enough I've said: --from disappointment free,
 Long may you live, and never meet with me.

NEW REBUSES, CHARADES, and QUERIES,

1. REBUS, *By Mr. German Buxton, of London.*

To a christian male-name, be pleas'd to add
 One-seventh of a month; from whence will be had
 Th' name of a country, in which 'tis maintain'd
 Th' English o'er th' French many vict'ries obtain'd.

2. REBUS, *By Innocentius, of Chesterfield.*

To four-sixths of a bird, add the reverse to new,
 And what God never made, will appear to your view.

3. REBUS, *By Mr. T. Smith, of Melton Mowbray.*

Say for what cause, I humbly you desire,
 Or what's the reason we to bed retire;
 Then say what ev'ry man in his station
 Is call'd upon to mind, throughout th' nation:

Three-eighths of this, to half the first when join'd,
A true solution you will surely find;
Of what dear sirs, you may soon discover;
'Tis not far off when you these lines look over.

4. REBUS. *By Mr. J. Fildes, Schoolmaster, in Liverpool.*

Two-fifths of a dress that of linen we make,
Two-fifths of a thing sometimes call'd a mistake,
One-third of what most people use when they write
Two-thirds of a day, and one fifth of a night:
A poet will make, in whose verses we find,
Sublimeness of thought, and a taste quite refin'd.

1. CHARADE, *By Mr. William Travis, of Sharw.*

My first, in hatters shops they use,
To shape a thing, to fit my second;
If this charade does you confuse,
You may with truth my whole be reckon'd.

2. CHARADE, *By Mr. German Buxton, London.*

My first is a slave and a dru'ge to mankind,
My next on yourself you may easily find;
When e'er the musician is asked a glee,
He has recourse to my whole, that is, to me.

3. CHARADE, *By Mr. P. Hall, Denby.*

My first's where innocent oft lie;	My whole is of the winged tribe;
Sometimes thro' th' air my next doth fly:	And on Terra, mostly abide.

4. CHARADE, *By Innocentius.*

For my first sailors often sigh
My next is where dead bodies lie;
My whole's a title in Germany.

}
}

1. QUERY, *By Mr. Lumas Brassar.*

The 2 Samuel chap. vi. ver. 7. And the anger of the Lord was kindled against Uzzah, and God smote him there for his error, &c. As Uzzah's intention in putting forth his hand seems to have been good; why did the Lord smite him?

2. QUERY,

2. QUERY, *By Mr. Thomas Greenlees, Rochdale.*

It is asserted, by Ebenezer Sibly, in his Dedication of Astrology, to the Free Masons, lately published (and which he says is a part of their official contemplation) that the Free Mason's Society is the most noble institution in the world. The same is also asserted by several other masonic publishers. Query, The truth of this assertion?

3. QUERY, *By Mr. John Brown, of Whittington.*

A man was born in the year 1755, Jan. 14, at 8h. 12m. afternoon, in latitude $53^{\circ} 8'$; what time of his age will the horoscope come to the square of Mars; and likewise to the body of part of fortune? He will be greatly obliged to any Diarian for a solution.

A PARADOX, *By John Savage, of Coventry.*

'Midst fields of blooming flow'rs I may be found;
Five letters fully will my name expound,
From which take one, you certainly will find,
That only two there will be left behind:
Fam'd artists, what I've here propos'd is true,
And hope next year 'twill be resolv'd by you.

The prizes for the solutions have been determined by lot as follows: For the prize-question, to Virtuoso 12 Diaries. 2d. For the prize-enigma, to Mr. Carwithen. 3d. For the general answer to the enigmas, to Mr. Allwood, and Mr. Fletcher, 6 Diaries each. 4th. For the general answer to the rebuses, charades, &c. to Mr. Clark. All of whom will please to send for them to Mr. PEARSON, Printer, in Birmingham.

All Letters for the use of this Diary, are desired to be directed thus: For, Cotes and Taylor, to be left with Mr. Joseph Peet, High-pavement, Nottingham (post paid) to come to hand before the first of May.

ANSWERS to the MATHEMATICAL QUESTIONS.

I. QUESTION (63) answered by Mr. Joseph Woollin, Smalley, Derbyshire, late pupil to Mr. P. Hall.

The given equation should have been $450 = 2\sqrt{x^3 - x^2 + 35x + 35} + x^2 + x$; whence by transposition and involution, $x^4 - 2x^3 - 895x^2 - 1040x = -202640$, solved $x = 17$ her age.

Mr. Wm. Swift, the proposer, also answered it.

II. QUESTION (64) answered by Mr. Wm. Travis, Shaw, near Rochdale, Lancashire.

Multiplying the second given equation by 3, it becomes $x^3 - y^3 - 1331 = 3x^2y - 3xy^2$, by transposition $x^3 - 3x^2y + 3xy^2 - y^3 = 1331$, the cube root of this last equation is $x - y = 11$: by transposition, the first given equation becomes $x^2 - y^2 = 671$; then, $\frac{x^2 - y^2}{x - y} = \frac{671}{11} = x + y = 61$, and $x + y$ added to $x - y = 2x = 72$; whence $x = 36$, and $y = 25$.

The same by Mr. Richard Elliott, of Liverpool.

Multiply the last given equation by 3, and $x^3 - y^3 - 1331 = 3xy \times \overline{x - y}$; divide by $x - y$; then $x^2 + xy + y^2 = \frac{1331}{x - y} = 3xy$, or $x^2 - 2xy + y^2 = \frac{1331}{x - y}$ by transposition, or $\overline{x - y}^3 = 1331$, and $x - y = \sqrt[3]{1331} = 11$, and $x = 11 + y$, which substituted for x in the first equation, we have $121 + 22y + y^2 - 671 = y^2$; hence $y = \frac{550}{22} = 25$, and $x = 11 + y = 36$.

The same by Mr. Thomas Booth, of Newark.

First $x^2 - y^2 = 671$, $x^3 - y^3 - 1331 = 3x^2y - 3xy^2$, by transposing and extracting the cube root of the last equation we get $x - y = 11$, this made divisor to the first, gives $x + y = 61$; hence $x = 36$, and $y = 25$.

Solutions to this question were also given by Messrs. Ashton, Alwood, Boden, Bower, Brooks, Buxton, Clark, Eaton, Fletcher, Flint, Greenlees, Haywood, Houghton, Hulland, Laughton, Marsden, Millington, Robert, Nicholson, Virgilius, Whiting, Woollin, and Youart. Mr. Samuel Beasfall also answered it.

III. QUESTION (65) by Mr. John Brooks, Leeds.

Take x = the length and y = the breadth, then per question $x + y = 880$, and $xy = 9680$: now if 4 times the last equation be taken from the square of the first, we obtain $x^2 - 2xy + y^2 = 735680$; whose root is $x - y = 857.7179$; hence $x = 868.85195$, and $y = 11.14105$.

The same by Wm. Vorley, Wellingborough.

In looking over the mathematical questions in your repository, I observe the third and fourth may be answered by the following general rule, for every right angled triangle (that is) If four times the area be taken from the square of the sum of the base and perpendicular, the remainder will be the square of the hypotenuse : and eight times the area from the same will leave the square of the difference of those sides : and again, if the said square (of the sum of the two legs) be taken from twice the square of the hypotenuse, this remainder will be the square of the difference of those legs. *Solution.*

If the long square be divided into two triangles, by a diagonal, their dimensions will be each one acre, or 160 poles, the sum of the other two legs in each = half a mile = 160 poles, then by the above, $160 \times 160 = 2560 - 160 \times 8 = 1280 = 24320$ the square of their difference, which root, added to the total, and divided by 2, gives 157.974354 the length, and 2.025645 the breadth.

Answers were given by Messrs. Alwood, Ashton, Beafall, Booth, Bower, Clark, Wm. Eaton, junior, Fletcher, Greenlees, Haywood, Hulland, Marsden, Millington, Robert Nicholson, Smith, Stevenson, Travis, Whiting, and Youart.

IV. QUESTION (66) by Mr. Samuel Beafall.

The sum of the sides of the parallelogram is a sufficient data for answering this question. Therefore rejecting the diagonal, we have $42 \times 4 + 50.2656$ (the area of a circle whose radius is 4 yards, and magnitude equal to the four quadrants at the corners) = 218.2656 yards, the content of the walk required.

The same answered by Mr. Jos. Woollin.

As the walk is to be 4 yards broad all round, its area will be $42 \times 4 + 8^2 \times .7854 = 218.2656$ yards. W. W. R.

Mr. James Ashton also answered it. Others received were not right.

V. QUES-

V. QUESTION (67) by Mr. John Youart, of Glazedale, near Whitby, Yorkshire.

It is evident by the question that the areas of the two rectangles will be 6 and 8, for the difference of no other cubes will be 296.

Now let x and y , be the length and breadth of the greater, and a and b , length and breadth of the lesser rectangle; then $x^2 = 20 - y^2$, and $a^2 = 20 - b^2$; also $x = \frac{8}{y}$, and $a = \frac{6}{b}$, put this value of a , in the foregoing equation, we get $\frac{36}{b^2} = 20 - b^2$, or $36 = 20b^2 - b^4$, reduced $b = \sqrt{18}$, or $\sqrt{2}$; hence the length $= 4.242$, and breadth 1.414 ; since the area of each equally exceeds the square of the end, it will be $ab - b^2 = xy - y^2$, or $xy - y^2 = 4$; put $\frac{8}{y}$ for x , we get $y = 2$ the breadth, and $x = 4$ the length of the other rectangle.

The same by Mr. Wm. Eaton, jun. Sutton o'th Hill.

It is clear from the nature of the question, that neither side is so much as the $\sqrt{20}$: if we take the area of one of the rectangles 8 the other is $\sqrt[3]{20^3 - 296} = 6$.

Put $x =$ the side of one of the rectangles, then will $\sqrt{20 - x^2} =$ its end, and $\sqrt{20 - x^2} \times x = 8$; therefore $20 - x^2 \times x^2 = 64$; whence $x = 4$ the side, and $\sqrt{20 - x^2} = 2$ the end. Again put $y =$ the side of the other rectangle, then will $\sqrt{20 - y^2} =$ its end, and $\sqrt{20 - y^2} \times y = 6$; whence $y = 4.242$, and $\sqrt{20 - y^2} = 1.414$ the length and breadth of the rectangle.

The same by Mr. Joseph Waters, the proposer.

Put the square of the common diagonal $= 20 = a$, $296 = b$, and the excess of each area above the square of its end $= n$, a quantity to be determined; then if x and y represent the greater and lesser sides of the greatest rectangle, we have $x^2 + y^2 = a$, and $xy - y^2 = n$, whose sum $xy + x^2 = a + n$, and the product of the two last equations, taken from their sum multiplied by xy , leaves $2x^2y^2 = axy + 2nxy - an - n^2$, which by transposition and division is reduced to the quadratic $x^2y^2 - \frac{a}{2} + n \times xy = -\frac{an + n^2}{2}$, in which if p be wrote

for $an + n^2$, we have the coefficient $\frac{a}{2} + n = \sqrt{\frac{a^2}{4} + p}$, and

the area $xy = \frac{\sqrt{\frac{a^2}{4} + p} + \sqrt{\frac{a^2}{4} - p}}{2}$. Again if w and z , be sup-

posed the greater and lesser sides of the least rectangle we have by the quest. $wz + z^2 = a$, and $wz - z^2 = n$, whose sum $wz + w^2 = a + n$, and the product of these two last equations, taken from their sum multiplied by wz , leaves $2w^2z^2 = awz + 2nwz - an - n^2$, which after reduction and substi-

tution as before, becomes $wz = \frac{\sqrt{\frac{a^2}{4} + p} - \sqrt{\frac{a^2}{4} - p}}{2}$, from

which it is evident, the only case of the difference of those two areas is when the greater $xy = \frac{\sqrt{\frac{a^2}{4} + p} + \sqrt{\frac{a^2}{4} - p}}{2}$, and lesser

$wz = \frac{\sqrt{\frac{a^2}{4} + p} - \sqrt{\frac{a^2}{4} - p}}{2}$, from which we have $xy - wz =$

$\sqrt{\frac{a^2}{4} - p}$, $x^2y^2 + wz^2 = \frac{a^2}{4}$, and $xywz = \frac{p}{12}$; the sum of the two latter multiplied by the former gives $x^3y^3 - w^3z^3 =$

$\frac{a^2}{4} + \frac{p}{2} \times \sqrt{\frac{a^2}{4} - p} = b$, which cleared of surd quantities, and transposed, becomes $p^3 + \frac{3a^2p^2}{4} = \frac{a^6}{16} - 4b^2$, from which p

is determined $= 96$, and $n = \sqrt{\frac{a^2}{4} + p} - \frac{a}{2} = 4$, and after transposing the former equations, and substituting for n , and the two areas their respective values in terms of a . and p . we

have $x = \sqrt{a + n - xy} = \sqrt{\frac{a + \sqrt{\frac{a^2}{4} + p} - \sqrt{\frac{a^2}{4} - p}}{2}}$,

$y = \sqrt{xy - n} = \sqrt{\frac{a - \sqrt{\frac{a^2}{4} + p} + \sqrt{\frac{a^2}{4} - p}}{2}}$, $w =$

$\sqrt{a + n - wz} = \sqrt{\frac{a + \sqrt{\frac{a^2}{4} + p} + \sqrt{\frac{a^2}{4} - p}}{2}}$, and $z = \sqrt{wz - n}$

$= \sqrt{\frac{a - \sqrt{\frac{a^2}{4} + p} - \sqrt{\frac{a^2}{4} - p}}{2}}$. Hence the greater rectan-

gle is 4 by 2 = 8, and the lesser $\sqrt{18}$ by $\sqrt{2} = 6$.

Messrs.

Messrs. Ashton, Brooks, Hulland, and Rob. Nicholson, also gave true answers.

VI. QUESTION (68) by Mr. John Brooks, Leeds.

Let A D B C be the generating ellipse, Q N M P the inscribed parallelogram and G I H E a section of the inscribed cube; and put A B = x , C D = y , $7077.888 = a^3$, and $790528 = b$; then by the known property of the ellipse $x : y :: y^2 : x$



$$= M N \text{ the latus rectum : also } x : \frac{y^2}{x} :: \frac{1}{2}x + \frac{1}{2}a \times \frac{1}{2}x - \frac{1}{2}a : \frac{x^2 - a^2}{4x^2} \times y^2$$

$$= \frac{a^2}{4} ; \text{ or, } x^2 y^2 - a^2 y^2 = a^2 x^2. \text{ Moreover } Q N = x^2 - y^2 ;$$

and therefore $M Q = x^2 - y^2 + \frac{y^4}{x^2}$; hence $x^4 - x^2 y^2 + y^4 = b$. Now put $x^2 + y^2 = m$, and $x^2 y^2 = n$; then the above found equations become $a^2 m = n$, and $m^2 - 3n = b$; therefore $m^2 - 3am = b$; hence $m = \frac{3a + \sqrt{4b + 9a^2}}{2} = s$, and $2\sqrt{n} = 2\sqrt{\frac{3a^3 + a^2\sqrt{4b + 9a^2}}{2}} = r$. Now $x^2 + 2xy + y^2 = s + r$, and $x^2 - 2xy + y^2 = s - r$; therefore $x = \frac{\sqrt{s+r} + \sqrt{s-r}}{2}$, and $y = \frac{\sqrt{s+r} - \sqrt{s-r}}{2}$; which is a general solution to the problem when the numbers are consistently proposed; but that is not the case here, for $\sqrt{s-r}$ is a negative quantity; consequently, no solution in this case can be given.

The same by Mr. Wm. Hulland, the proposer.

$$\text{Put } a = \frac{790528}{16} = 4940 = O H^2 \times O B^2, b = \frac{\sqrt[3]{7077.888}}{2} =$$

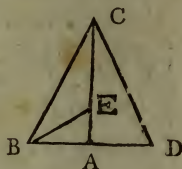
$9.6 = O F = F M$, $x = O B$, and $y = O C$; then $\frac{y^2}{x} = L H = \text{half the parameter, and } x^2 - y^2 = O L^2$; (see the preceding figure) also $x^2 - y^2 + \frac{y^4}{x^2} = O H^2 = \frac{a}{x^2}$, or $x^4 - x^2 y^2 + y^4 = a$; and by the nature of the ellipsis $x^2 : y^2 :: x^2 - b^2 : x^2 y^2 - \frac{1}{2} y^2$; therefore $\frac{x^2 y^2 - b^2 y^2}{x^2} = b^2$; (per quest.) also,

$x^2 y^2 = b^2 \times \overline{x^2 + y^2}$, and $3x^2 y^2 = 3b^2 \times \overline{x^2 + y^2}$; substitute this in the first equation, $\overline{x^2 + y^2}^2 - 3b^2 \times \overline{x^2 + y^2} = a$, and $x^2 + y^2 = \sqrt{a + \frac{9b^4}{4}} + \frac{3b^2}{2} = c$, $xy = \sqrt{b^2 c}$, $x + y = \sqrt{c + 2\sqrt{b^2 c}}$, and $x - y = \sqrt{c - 2\sqrt{b^2 c}}$; hence $2x = 32$, $2y = 24$, and the required solidity 9650.9952 inches.

Mr. James Ashton also answered it.

VII. QUESTION (69) by Mr. Tim. Simpson, of Papplewick, near Nottingham.

Put $a = 3.1416$, $b = 16\frac{1}{2}$, $c = 240$ feet the solidity of the cone, $x = AC$ the \perp altitude, and $y = AB$ the radius of the base; then will the center of gravity E , be distant from A , $\frac{3}{4}$; hence the plain $BE = \sqrt{x^2 + y^2}$, and the slant alt. $BC = \sqrt{x^2 + y^2}$.



By mechanics, $\sqrt{b} : 1'' :: \sqrt{x} : \sqrt{\frac{x}{b}}$ (the time in which a body would descend through AC) :: $\sqrt{\frac{x}{4}} : \sqrt{\frac{x}{4b}}$ (the time in which a body would descend through AE) also $AE : BE :: \sqrt{\frac{x}{4b} + \frac{4y^2}{bx}}$ (the time in which a body would descend down the plain EB) and $AC : BC :: \sqrt{\frac{x}{b}} : \sqrt{\frac{y^2}{bx} + \frac{x}{b}}$ (the time in which a body would descend through the slant alt. BC). By the question $\sqrt{\frac{x}{4b} + \frac{4y^2}{bx}} = \sqrt{\frac{y^2}{bx} + \frac{x}{b}}$ and $axy^2 = 3c$; hence by equating the values of x from the two last equations $2y = \frac{3c}{ay^2}$, hence $y = \sqrt[3]{\frac{3c}{2a}} = 4.8572$; therefore $x = 2\sqrt{\frac{3c}{2a}} = 9.7144$.

Cor. It appears that one body will descend freely down the slant side, in the same time as another will descend down a right line, drawn from the center of gravity to the circumference of the base; when the diameter of the base is equal to the perpendicular altitude.

Messrs. Ashton, Booth, Brooks, Wm. Eaton, jun. Hulland, and Whiting, also gave answers. We are truly sorry that our narrow limits will not admit of Mr. Richard Elliott's geometrical solution.

VIII. QUESTION (70) by —, the proposer, Philalethes, Claſſyeniſis.

$$100 : 100 \frac{2}{20} \left(\frac{2003}{20} \right) :: 2000 \times 91 d : 182273 \text{ Q's cost of } 2000$$

crowns ſent R to Paris, & $100 : 99 \frac{2}{3} \left(\frac{299}{3} \right) :: 2000 \times 93 d : 185380 d$

R's remittance ſent Q, whoſe difference is $3107 d = \text{Q's } 2 \text{ months gain}$, and 6 times which is $18642 d = \text{his year's gain at that rate}$; therefore $182273 d : 18642 d :: 100 :$

$\frac{1864200}{182273} = 10 \frac{41470}{182273} = \text{Q's gain per cent. per annum}$, the ſame as given by Clare.

Note. There are two errors in the Diary answer to this queſt. (1790) the firſt is Q's 3 crowns or 273 *d* he paid brokerage is not accounted for, and the ſecond error, R remits Q only 1997 crowns inſtead of 2000. Theſe errors contraſt each other, makes the answer near right.

Solutions to this queſtion were alſo given by Meſſrs. Aſhton, Brooks, Ferdinando, Hulland, Stevenſon, and Virgilious.

IX. QUESTION (71) by Mr. James Aſhton, Harrington.

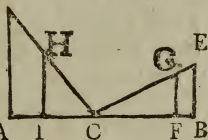
Put $a = AC = CB = 50$, $x = D$

BE the height of the lower houſe;

then $\sqrt{a^2 + x^2} = \text{the ſhorter ladder CE}$;

and $\sqrt{a^2 + x^2} : 1 :: x : \frac{x}{\sqrt{a^2 + x^2}} = \text{ſine}$

$\angle BCE$, and $\frac{x}{a} = \text{its tangent}$; then, A 1 C F B



per queſt. $2 : 3 :: \frac{x}{\sqrt{a^2 + x^2}} : \frac{3x}{2\sqrt{a^2 + x^2}} = \text{ſine } \angle ACD$, and

$\frac{\sqrt{4a^2 - 5x^2}}{2\sqrt{a^2 + x^2}} = \text{its coſine}$; but $\cos : \text{ſine} :: \text{rad.} : \text{tangent}$;

therefore $\text{tangent } \angle ACD = \frac{3x}{\sqrt{4a^2 - 5x^2}}$; then $7 : 4 ::$

$\frac{3x}{\sqrt{4a^2 - 5x^2}} : \frac{x}{a}$; therefore $\frac{12}{\sqrt{4a^2 - 5x^2}} = \frac{7}{a}$; whence $x = \sqrt{\frac{52}{245}}$

$= 23.023 = \text{height of the houſe B}$. Now $\frac{x \times 7}{a \times 4} \times 50 = 40.29$

feet, $= \text{the height of the houſe A}$, then $\sqrt{a^2 + x^2} = 55.046 \text{ feet}$
 $= \text{the ladder CE}$, the ladder $CD = 64.213 \text{ feet}$.

Answers were alſo given by Meſſrs. Robert Nicholſon, Eooth, Brooks, Eaton, jun. Elliott, Greenlees, Hornby, the propoſer, Hulland, Travis, Virgilious, and Whiting. Mr. Hall alſo answered it.

X. QUESTION (72) to no purpoſe.

XI. QUESTION (73) by Mr. Patrick Hall, of Denby.

Construction. Draw the indefinite line LM, on which erect the perp. BD, and equal the given \perp ; bisect it in W, and from the center W, with the radius WB, describe the circle BFV; make the $\angle WDS = \text{half the given vertical } \angle$; through the center W draw SWA, cutting LM in A; make the $\angle AWC = \text{the other given } \angle$ draw WC meeting LM in C; join AB and BC, then will ABC be the Δ required.

Demon. Make the $\angle DSV = \angle WSD$, draw SV, and join FV, then it is evident the $\angle WDS = \angle WSD$ (Euc. 5.1.) and $\angle FSD = \angle DSV$ (by construction); therefore the $\angle FSV$ equal the given vertical angle: also $FG = GV$ (Euc. 3. 3.) and the $\angle FWC = \text{the other given angle}$.

Calcula. The $\angle FSV$ being in a semicircle, is a right \angle ; in which are given all the \angle 's and the side FS, the $\angle FWG$, or $\angle GWC$ will from thence be known, then the sides of the triangle ABC will easily be determined.

Mr. John Brooks gave an elegant and general construction to this question.

Algebraical Solution by Mr. James Ashton, of Harrington.

Let the point N be the middle of the base, and put $p = BD$, then $\frac{p}{2} = DW$ (see the preceding figure) s and $c = \text{fine and cosine of the } \angle ABC$, then $c = \text{cosine of the sum of the angles BAC and BCA}$; m and $n = \text{fine and cosine of the } \angle AWC$, then $n = \text{cosine of the sum of the angles WAC and WCA}$; $v = \text{cos. of the diff. of the angles BCA, BAC, and } y = \text{cos. diff. of the angles WCA, WAC, then (by prop. 10. book 2.$

Emerson's Trig.) $v + c : s :: p : \frac{ps}{v+c} = \text{half the base, and } y - n :$

$m : \frac{p}{2} : \frac{mp}{2y-2n} = \text{half the base; whence } \frac{pm}{2y-2n} = \frac{ps}{v+c}$, and

$y = \frac{2ns + mc + m^2 v^2}{2s} = (\text{by substitution}) \frac{a + vm}{2s}$, and $y^2 = \frac{a^2 + 2amv + m^2 v^2}{4s^2}$. But (by prop. 9. aforesaid) $s : \sqrt{1-v^2}$

$:: \frac{2ps}{v+c} : \frac{2p\sqrt{1-v^2}}{v+c} = \text{the diff. of the segments} = 2ND;$

then, $\frac{p \sqrt{1-v^2}}{v+c} = ND$; also (corol. prop. 10.) $\sqrt{1-y^2} : m ::$

$\frac{p \sqrt{1-v}}{v+c} : \frac{p m \sqrt{1-v^2}}{v+c \sqrt{1-y^2}} = (\text{half the base}) \frac{ps}{v+c}$; whence $s \sqrt{1-y^2}$

$= m \sqrt{1-v^2}$, or $y^2 = \frac{s^2 - m^2 + m^2 v^2}{s^2} = (\text{as found above})$

$\frac{a^2 + 2 a m s + m^2 v^2}{4 s^2}$, which reduces to this quadratic, $3 m^2 v^2 - 2 a m v = 4 m^2 + a^2 - 4 s^2$.

Note, c and n must have the sign $+$ or $-$, as the respective coline is greater, or less than a quadrant.

The same by Mr. Wm. Hulland, of Newborough.

Put $2a = BD$, $b = \text{tang. } ABC$, $c = \text{tang. } AWC$, and $x = \text{tang. } ABD$ (see the preceding figure); then per trig. $\frac{b-x}{1+bx} = \text{tang. } DBC$, and $2x = \text{tang. } AWD$, $\frac{2b-2x}{1+bx} = \text{tang. } DWC$; also,

$\text{tang. } AWD + \text{DWC} = \frac{2bx^2 + 2b}{1-3bx+4x^2} = c$, per quest. and

$\frac{4c - 2b \times x^2 - 3b c x}{3bc + \sqrt{40bc - 10c^2 - 10b^2 + 9b^2 c^2}} = \text{the tang. of the angle}$

ABD , from hence, all the parts of the triangle are easily determined.

Messrs. Ferdinando, Robert Nicholson, and Whiting, also gave answers.

XII. QUESTION (74). This question is, I presume, the very same as Problem LIV. page 165, *Simpson's select Exercises*, where an elegant algebraical and geometrical solution may be seen. *Ferdinando*.

Solutions were given by Messrs. Ashton, Brooks, Hall, Hulland, and Whiting.

XIII. QUESTION (75) by *Ferdinando*.

The series here given, it is presumed, has been intended for

$\frac{1}{1.2.3. \&c. \text{ to } r} + \frac{1}{2.3...r+1} + \frac{1}{3.4...r+2}$, &c. if so, then

the following is the solution. Here the n th term is $\frac{1}{n n n ... n}$,

and $\frac{1}{n+1}$ th term or $S = \frac{1}{n n n ... n}$, whose integral is $S = -$

$\frac{1}{123r}$

$$\frac{1}{r-1.n.n.n.n} = (\text{because } n=1) - \frac{1}{r-1.n+1.n+2.n+r-1};$$

but, when $n=0$, S is $= -\frac{1}{r-1.1.2.n+r-1}$; therefore the cor-

rect integral is $S = \frac{1}{r-1.1.2.n+r-1} - \frac{1}{r-1.n+1.n+2.n+r-1}$;

and when n is infinite, S is $= \frac{1}{r-1.1.1.n+r-1} = \frac{1}{1.2.n+r-1}^2$.

EXAMPLE. Suppose $r=4$, then the series becomes $\frac{1}{1.2.3.4} +$

$$\frac{1}{2.3.4.5} + \frac{1}{3.4.5.6}, \text{ \&c. whose sum, by our theorem, is } \frac{1}{1.2.3^2} = \frac{1}{18}.$$

Mr. Robert Carlisle, the Proposer, answered it.

XIV. QUESTION (76) by Mr. John Brooks, of Leeds.

Let ACB represent the middle of the circular walk, L and D the lamps, and put $PD=x$, $AP=a$, and $DL=b$; then $PL=x+b$,

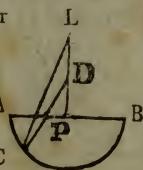
$CD = \sqrt{a^2 + x^2 + b^2}$. Now, because all forces diffused by the rectilineal effluvia of matter from a center, vary as the square of the distance from that center inversely, and the intensity is as the said distance drawn into the sine of the angle of incidence: by trig. $CD : \text{rad.} :: PD : s \angle PCD = \frac{x}{\sqrt{a^2 + x^2 + b^2}}$; also $CL : \text{rad.} :: PL : s \angle PCL = \frac{x+b}{\sqrt{a^2 + x^2 + b^2}}$.

Therefore the intensity of the particles of light at C will be expressed by $\frac{1}{x^2 + a^2} \times \frac{x}{\sqrt{a^2 + x^2 + b^2}} + \frac{1}{a^2 + x^2 + b^2} \times \frac{b+x}{\sqrt{a^2 + x^2 + b^2}}$
 $= \frac{x}{a^2 + x^2} + \frac{b+x}{a^2 + x^2 + b^2}$, which by the question is a

maximum. In fluxions $\frac{\dot{x} \cdot a^2 + x^2 \frac{3}{2} - 3x \dot{x} \cdot a^2 + x^2 \frac{1}{2} \cdot x}{a^2 + x^2} +$

$$\frac{\dot{x} \cdot a^2 + x^2 \frac{3}{2} - 3\dot{x} \cdot b + x^2 \cdot a^2 + b^2 \frac{1}{2}}{a^2 + b^2 + x^2} = 0. \text{ Hence,}$$

$$\frac{a^2 + x^2 \frac{3}{2} \times a^2 + b^2 + x^2 \frac{1}{2} + a^2 + x^2 \frac{1}{2} \times a^2 + x^2 + b^2 \frac{3}{2}}{a^2 + x^2 \frac{1}{2} \times a^2 + x^2 + b^2 \frac{1}{2} + 3 \times a^2 + x^2 \frac{1}{2} \times x + b^2 \frac{1}{2} \times x} = 3x^2$$



$\frac{x+y}{t^2-a^2} \cdot \frac{2ax-x^2}{x+2a^3} = \frac{2a-x}{x} \cdot \frac{x+y}{t^2-a^2}$, by above. Hence $y =$

$\frac{t^2-a^2}{t^2-a^2} \cdot \frac{2ax-x^2}{x+2a^3}$ the equation of the curve; in which, when

$x = \frac{2a^2}{t+a}$, $y = 2a \cdot \frac{t-a}{t+a}$ the greatest ordinate, found by equat-

ing the fluxion of $\frac{t^2-a^2}{t^2-a^2} \cdot \frac{2ax-x^2}{x+2a^3}$ to 0. The flux. of the

area $y \dot{x}$ is $= \frac{t^2-a^2}{t^2-a^2} \cdot \frac{2ax-x^2}{x+2a^3} \dot{x}$, and the correct fluent, when

$x = 2a$, is $2a^2 + \frac{4a^4}{t^2-a^2} - \frac{2a^4}{t^2-a^2} \times h.l. \frac{t^2}{a^2} =$ the area of

the whole curve AIB. Again, the fluxion of the solid $cy^2 \dot{x}$

is $= \frac{t^2-a^2}{t^2-a^2} \cdot \frac{2ax-x^2}{x+2a^3} \cdot 2cy \dot{x}$ whose correct fluent, when $x = 2$

a , is $8a^3c \times : \frac{1}{3} + \frac{4a^2}{m} + \frac{4a^4}{m^2} - \frac{2a^2}{m} + \frac{6a^4}{m^2} + \frac{4a^6}{m^3} \times h.$

$l. 1 + \frac{m}{a^2}$ for the whole solid AIB (where $m = t^2 - a^2$).

Answers were also received from Messrs. Brooks, James Nicholson, Virtuoso, and Whiting.

XVII. or PRIZE QUESTION, by Mr. Thomas Whiting, of Lambeth.

Put the diameter of the curve $AB = a$, the abscissa $CB = x$; the ordinate $CD = y$, and the area $BEDC^* = b$. (* curve EDG).

But as CD is a third proportional to the n th power of AB , and the n th power of $AB + G$

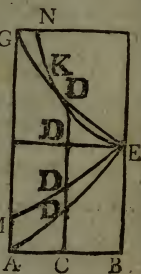
BC ; therefore $a^n : a+x^n :: a+x^n : \frac{a+x^{2n}}{a^n}$

$= CD = y$ the equation of the curve. The

fluxion of the area $y \dot{x} = \frac{a+x^{2n}}{a^n} \dot{x}$, the flu-

ent of which is $= \frac{a+x^{2n+1}}{a^n \cdot 2n+1}$; but after cor-M

rection, making the fluent $= 0$ when $x = 0$,



it becomes $\frac{(a+x)^{2n+1}}{a^n \cdot 2n+1} - \frac{a^{n+1}}{2n+1} =$ the area of the space
B E D C.

But to find the value of x when this space is equal to a given
quantity b ; we shall have $\frac{(a+x)^{2n+1}}{a^n \cdot 2n+1} - \frac{a^{n+1}}{2n+1} = b$. Hence

$$(a+x)^{2n+1} - a^{2n+1} - 2nba^n - ba^n = 0. \text{ And reduced}$$

$$x = \sqrt[2n+1]{a^{2n+1} + 2na^nb + a^nb - a^{2n+1}}, \text{ and } y = \sqrt[2n]{a^{2n+1} + 2na^nb + a^n}.$$

In these general values for
 x and y , if 1 be substituted for n they become $x = \sqrt[3]{a^3 + 3ab} - a$; $y = \sqrt[3]{a^3 + 3ab^2}$. These values of x and y when $a=9$,
and $b=64$ are 4.49384, and 20.23152 = C B, and C D.

Remark 1. When the curve begins to be generated at E, let
the value of n be what it will, its least ordinate B E is equal to
its diameter; and when its generation ceases at G, its greatest
ordinate A G = $2a^n$. The area of the whole curve B E G A
is to that of its circumscribing parallelogram, when $n=1$ as
 $2\frac{1}{3}$ to 4.

Remark 2. If C D be taken a third proportional to A Bⁿ, and
A B - C Bⁿ instead of A B + C Bⁿ the area B E D C = -
 $\frac{(a-x)^{2n+1}}{a^n \cdot 2n+1} + \frac{a^{n+1}}{2n+1}$, the lowest curve, differing from that
above found only in the change of signs: but, when $x=a$ the
first term = 0, and the area of the whole curve = $\frac{a^{n+1}}{2n+1}$; which
is to that of its circumscribing square as $\frac{a^{n+1}}{2n+1}$ to a^{2n} .

Remark 3. If C D be taken a third proportional to A B + B Cⁿ
and A Bⁿ, we shall have $a \pm x^n : a^n :: \frac{a^{2n}}{a \pm x^n} = y$ an equation
for two other curves, different from those already noticed;

when the upper sign takes place, it is the curve EDM; but when the under sign takes place, it is the curve EKN, which at first falls within the curve EDG, and intersects it at K, when $\frac{a+x^{2n}}{a^n} = \frac{a^{2n}}{a-x^n}$, and then infinitely proceeding AG produced is its asymptote.

Ingenious solutions were also given by Messrs. James Nicholson, Brooks, and Cook, the proposer. Virtuoso answered all the questions, except the 10th.

NEW QUESTIONS.

I. QUESTION (80) by *Collis, Etoceto*.

Required the area of a circle inscribed in a triangle, the sides of which are expounded by the following equations?

$$\begin{aligned}x^2 + y^2 &= z^2 \\x^2 y - 2z^2 &= 88 \\xy z &= 480.\end{aligned}$$

II. QUESTION (81) by *Mr. German Buxton, London*.

Two numbers, dear artists, I ask you to find,
By these two equations, hereunder subjoin'd?

$$\begin{aligned}x^2 + y \sqrt{xy} + x + x \sqrt{xy} + y + y^2 &= 662 = a \\x \sqrt{y} + x + y \sqrt{y} + y &= 100 = b.\end{aligned}$$

III. QUESTION (82) by *Mr. James Stevenson, of Heath, near Chesterfield*.

Given 160 inches the perimeter, and 1280 the difference of the squares of the length and breadth of the plate of a looking glass; it is framed with a frame of equal width, whose area and that of the glass are in the ratio of 11 to 24; required the length and breadth of the glass, and width of the frame?

IV. QUESTION (83) by *Mr. Wm. Hulland, of Newborough*.

The vertical angle of a plane triangle being $31^\circ 23'$, and the base 45 poles; to determine the triangle, when the square of the lesser of the two including sides is equal to double its area?

V. QUESTION (84) by *Ferdinando*.

Given one of the angles of a plane triangle, whose sides are in arithmetical progression, and the common difference of the sides; to construct the triangle?

VI. QUESTION (85) *by the same.*

Given the difference of the sides, the difference of the segments of the base made by a perpendicular from the vertical angle, and the line bisecting the base, of any plane triangle; to construct it?

VII. QUESTION (86) *by Mr. Joseph Waters, Graves-lane.*

It is required to determine the degrees in an arch, when the remaining part of the circumference may be divided into any number of equal arches, whose chords is to the chord of the required arch in a given proportion; and to find the diameter, when the number of equal arches are 4, the given proportion as 1 to .896, and the radius, together with the five chords, are the smallest possible in whole numbers?

VIII. QUESTION (87) *by Mr. James Ashton, Harrington.*

Being seated in my apartment, in the last autumn quarter, with a large horizontal table before me, and a window to the southward (it being in the forenoon) the sun shining clearly, I opened the window; and having an instrument in the form of a joiner's square, the perpendicular leg of which was 12 inches, I set it on the table, when it cast a shadow of 89.44 inches long: then marking the extreme point of the shadow with a pencil; the instrument continuing unmoved, precisely $2\frac{1}{2}$ hours after, I again measured the length of its shadow, and found it 33.5 inches, and marking its point as before, I found the distance of the summits, or extreme points of the two shadows 64.92 inches: from whence it is required to find the latitude of the place, the day of the month, and the hours when the shadows were measured?

IX. QUESTION (88) *by Mr. Wm. Marsden, Netherburst, near Hathersage, Derbyshire.*

A musical string let us take I desire,
And cause it to sound us the note alamire;
Its length twenty inches, and weight forty grains;
The tension to stretch it, is now what remains.
Suppose now a sharp with this string should be found,
What weight must be added, to give the true sound?

X. QUESTION (89) *by Mr. John Youart, Glazedale, near Whitby.*

Given the slant side of the frustum of a cone 50, and the lesser diameter 40; required the solidity, when the rectangle of the height, by half the difference of the diameters is a maximum?

XI. QUESTION (90) *by Mr. Patrick Hall, Denby.*

If a string 3 feet long, with a ball of one ounce at one end, was suspended at the other, and describe in its motion a conic-

cal surface : required the area of the cone formed by the string; when the periodical time multiplied by the central force is a maximum?

XII. QUESTION (91) by *Mr. James Nicholson, Newcastle.*

Given the three sides of a plane triangle 20, 30, and 40; required the shortest line which will divide it into two equal parts?

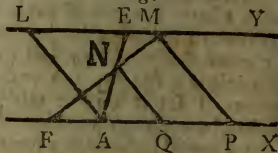
XIII. QUESTION (92) by *Ferdinando.*

Suppose two weights of 4lb. and 3lb. are connected by a cord going over a fixed pulley; to find the space descended by the greater weight, or ascended by the less, in the first second of time?

N. B. The first and third of my questions here proposed for solutions are not new; but have never (to my knowledge) been publicly answered.

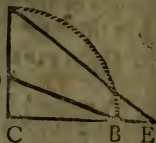
XIV. QUESTION (93) by *Mr. Thomas Whiting, Lambeth.*

Let AX , LY be two indefinite parallel right lines, and let equal parts AF , LE be set off in opposite directions from assumed points A , L , in the said lines: draw AE , and from any fixed point M taken any where in LY , draw MF . It is required to find the locus of the intersection of AE , and MF ?



XV. QUESTION (94) by *Mr. Joseph Waters, Graves-lane.*

From the extreme point A in a circular quadrant ABC , whose radius is unity, a body M is to move uniformly along the direction AE till it meets CB produced in E ; at which instant another body N (with an uniform celerity to that of M as 1 to 2.08) proceeds from a point D in the perpendicular CA (produced when necessary) directly to B ; it is required to determine the points D and E , when $DC + BE = .75$, and the whole time of motion from M leaving A , to N arriving at B , is a maximum?



XVI. or PRIZE QUESTION (95) by *Mr. John Brooks, Leeds.*

From a given point P it is required to draw two right lines PA , PB making a given angle APB , and meeting a right line and the periphery of a circle, both given in position, in A and B respectively; so that the ratio of PA to PB may be the greatest, or least possible?

F I N I S.