The LADIES' *Diary:*

OR

WOMAN'S ALMANACK,

For the Year of our LORD 1803;

Being the Seventh after BISSEXTILE, or LEAP-YEAR,

Containing New Improvements in ARTS and SCIENCES,
And many Entertaining PARTICULARS:
Deſigned for the *Uſe* and *Diverſion* of the

FAIR-SEX.

The Hundredth ALMANACK Publiſhed of this Kind.

VIRTUE and SENSE, with FEMALE-SOFTNESS join'd,
(ALL that ſubdues and captivates Mankind!)
In BRITAIN's Matchleſs FAIR reſplendent ſhine;
THEY rule LOVE's Empire by a Right Divine:
Juſtly their Charms the aſtoniſh'd World admires,
Whom *Royal* CHARLOTTE's bright Example fires.

LONDON,

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[Price ſtitched, SEVENTEEN-PENCE.]

Y. of Christ.	Ys. since.
1600 King Charles I. born	203
1603 Q. Eliz. died, K. Ja. succ.	200
1603 A great Plague in London	200
1605 Popish Gun-powder Plot	198
1616 Shakspeare the poet died	187
1625 K. James died, Cha. I. succ.	178
1641 Bloody Irish massacre -	162
1642 Sir I. Newton born, Dec. 25	161
1649 K. Charles I. beheaded	154
1658 Oliver Cromwell died -	145
1660 K. Charles II. restored	143
1662 Royal Society instituted	141
1665 Died of the plague 68,586	138
1666 Great fire in London -	137
1666 War against Denmark decl.	137
1667 Peace with Hol. Fr. & Den.	136
1672 War against Holland decl.	131
1672 Halfpence & Farth. coined	131
1674 Peace with Holland procl.	129
1679 Habeas Corpus act passed	124
1685 K. Cha. II. died, Ja. II. succ.	118
1688 Prince of Orange landed	115
1688 K. James II. abdicated	115
1689 Wm. and Mary crowned	114
1693 Hackney coaches established	110
1702 K. Wm. died, Q. Ann succ.	101
1702 War against France declared	101
1707 England & Scotland united	96
1713 Peace with France procl.	90

Y. of Christ.	Ys. since.
1714 Q. Ann died, K. Geo. I. succ.	89
1715 Rebellion in the north -	88
1716 A very great frost -	87
1726 Sir Isaac Newton died -	77
1727 K. Geo. I. died, Geo. II. succ.	76
1739 War against Spain declared	64
1739 A very great frost -	64
1743 A great comet appeared	60
1744 War against France declared	59
1745 Rebellion in Scotland -	58
1748 A general peace -	55
1750 Westminster bridge finished	53
1752 Date and Calendar altered	51
1756 War against France declared	47
1760 K. Geo. II. died, G. III. succ.	43
1762 American philos. soc. instit.	41
1762 War against Spain declared	41
1763 Peace with France & Spain	40
1765 Otaheite discovered -	38
1770 Blackfriars bridge finished	33
1772 A revolution in Denmark	31
1772 A revolution in Sweden	31
1775 War against America begun	28
1776 America declared independent	27
1778 French treaty with America	25
1778 War against France begun	25
1779 War against Spain begun	24
1780 War against Holland begun	23
1783 A general peace -	20

BIRTH-DAYS, [N. S.] and YEARS, of the ROYAL FAMILY of GREAT BRITAIN.

KING GEORGE III. June 4,	1738
Prince of Wales, August 12,	1762
Duke of York, August 16,	1763
Duke of Clarence, Aug. 21,	1765
Duchess of Wirtem. Sept. 29,	1766
Duke of Kent, Nov. 2, -	1767
Prs. Augusta Sophia, Nov. 8,	1768
Prs. Elizabeth, May 22, -	1770
Duke of Cumberland, June 5,	1771
Duke of Sussex, Jan. 27, -	1773
Duke of Cambridge, Feb. 24,	1774
Princess Mary, April 25, -	1776
Princess Sophia, Nov. 3, -	1777
Princess Amelia, Aug. 7, -	1783
Queen Charlotte, May 19, -	1744
Duchess of Brunsw. Aug. 11,	1737
Duke of Gloucester, Nov. 25,	1743
Princess of Wales, May 17,	1768
Duchess of York, May 7,	1767
Prs. Charlotte of Wales, Jan. 7,	1796

YEARS of BIRTHS of the Principal SOVEREIGN PRINCES of EUROPE.

Victor Emanuel K. of Sardinia -	
Alexander, Emperor of Russia	1777
Maria, Queen of Portugal -	1734
Frederic V. King of Prussia,	1770
Gustavus IV. King of Sweden,	1778
Francis II. Emp. Germ. -	1767
Charles, IV. King of Spain,	1748
Christian VII. K. of Denmark,	1749
Ferdinand IV. King of Sicily,	1751
Selim III. Grand Seignor -	1761
Pius VII. Pope - -	1742
Bonaparte, consul of France	1769

Full Moon, 7th, 9m. past 1 night.
Last Quarter, 15th, 52m. past 2 morn.
New Moon, 23d, 59m. past 9 morn.
First Quarter, 30th, 1m. past 2 morn.

1	S	Circumcision			8	53	55	23	3	4	0 m	45	W 9
2	B	2 Sunday after Christmas				54	56	22	39	2	1	1	10
3	M					53	57		54	3	34	1	11
4	Tu					53	57		48	4	58	1	12
5	W					52	58		42	6	17	1	13
6	Th	Epiphany. *Twelfth-day. Old*				51	59		35	7	21	1	14
7	F	[*Christmas Day*			0	4	0		28	☽ rises			F
8	S	*Lucian*			7	59	1		20	4	25	1	16
9	B	1 Sunday after Epiphany				58	2		12	5	39	1	17
10	M	*Plough Monday*				57	3		4	6	54	1	18
11	Tu					56	4	21	55	8	0	1	19
12	W	[*New-Y. day*				55	5		46	9	16	1	20
13	Th	*Hilary.* Cam. Per. *b. Old*				54	6		36	10	24	1	21
14	F	☉ ☽ Term begins				53	7		26	11	34	1	22
15	S					52	8		15	morn.		1	23
16	B	2 Sunday after Epiphany				51	9		4	0	46	1	24
17	M				7	49	11	20	53	1	59	1	25
18	Tu	Queen Char. birthday kept				48	12		41	3	17	1	26
19	W	[*Prisca. Old Twelfth Day*				47	13		29	4	35	1	27
20	Th	*Fabian*				45	15		16	5	48	1	28
21	F	*Agnes*				44	16		3	6	49	1	29
22	S	*Vincent*				42	18	19	58	7	35	1	30
23	B	3 Sunday after Epiphany				41	19		36	☽ sets		1	N
24	M	Hilary Term begins				40	20		22	5	54	1	2
25	Tu	Conversion of St. Paul				38	22		7	7	24	1	3
26	W					37	23	18	53	8	52	1	4
27	Th	Du. of Sussex born 1773				35	25		37	10	20	1	5
28	F					33	27		22	11	47		6
29	S					32	28		6	morn.		1	7
30	B	4 S. af. Epiph: K. Ch. I. mar.				30	30	17	50	1	13	1	8
31	M					28	32		34	2	39	1	9

Days	D. of D.	Day Inc.	D. breaks.	Tw. ends	Sun East	Cl. bef. S.	7 Stars	So.
1	7 56	0 6	6 0	6 8	4 41	3 41	8 a	44
6	58	24	58	2	43	6 9		22
11	8 8	24	54	6	46	8 6		0
16	18	34	49	11	49	9 58	7	39
21	32	48	44	16	53	11 34		18
26	46	1 21	38	22	58	12 51	6	58

Full Moon, 6th, 37m. past 4 aftern.
Last Quarter, 14th, 44m. past 9 aftern.
New Moon, 21st, 5m. past 9 aftern.
First Quarter, 28th, 47m. past noon.

Sun enters ♓ 19d. 1h. 2m.

M D	W D	Sundays, Holidays, &c.	Sun rises	Sun sets	Sun's decl.	☽ rises & sets	☽'s Age
1	Tu		7 27	4 33	17 S 17	3 m 57	10
2	W	Purif. or Candlemas day	25	35	0	5 6	11
3	Th	*Blaise*	23	37	16 42	5 50	12
4	F		22	38	25	6 38	13
5	S	*Agatha*	20	40	7	7 4	14
6	B	Septuagesima Sunday	18	42	15 40	☽ rises	F
7	M		16	44	30	5 a 46	16
8	Tu		14	46	11	6 57	17
9	W		13	47	14 52	8 6	18
10	Th		11	49	33	9 15	19
11	F		9	51	14	10 25	20
12	S	Hilary Term ends	7	53	13 54	11 39	21
13	B	Sexagesima Sunday	5	55	34	morn	22
14	M	*Valentine: Old Candl. day*	3	57	14	0 53	23
15	Tu		1	59	12 54	2 10	24
16	W		0 S	0	33	3 25	25
17	Th		6 58	2	12	4 32	26
18	F		56	4	11 51	5 22	27
19	S		54	6	30	6 0	28
20	B	Quinq. or Shrove Sunday	52	8	9	6 27	29
21	M	*Camb. Q. divides noon*	50	10	10 47	☽ sets	N
22	Tu	Shrove Tuesday	48	13	25	6 a 21	2
23	W	Ash Wednesday	46	14	4	7 51	3
24	Th	St. Matthias: D. of Cambri.	44	16	9 42	9 22	4
25	F	[born 1774	42	18	19	10 53	5
26	S		40	20	8 57	morn	6
27	B	Quadra. or 1 Sun. in Lent	38	22	35	0 21	7
28	M		36	24	12	1 46	8

Days	L. of D.	Day Inc.	D. breaks	Tw. ends	Sun East	Cl. bef. S.	♈ Stars So.
1	9 6	1 22	5 31	6 29	5 4	13 56	6 a 33
6	24	40	24	37	9	14 27	11
11	42	58	16	45	14	38	5 58
16	10 0	2 16	7	54	20	39	33
21	20	36	4 58	7 3	26	4	14
26	40	56	49	12	32	33 21	4 49

Full Moon, 8th, 22m. past 11 morn.
Last Quarter, 16th, 59m. past 12 noon.
New Moon, 23d. 55m. past 6 morn.
First Quarter, 30th, 44m. past 1 morn.

Sun enters ♈ 21d. 1h. 20m.

1	Tu	*David*	6	34	5	26	7	2	49	2	m	58	9
2	W	Ember Week *Chad*		32		28			27	3		58	10
3	Th			30		30			4	4		42	11
4	F			28		32		1	42	5		31	12
5	S			27		33			18	5		34	13
6	B	2 Sunday in Lent		25		35	5		55	5		50	14
7	M	*Perpetua*		23		37			31	6		2	15
8	Tu			21		39			8	☽ rises			F
9	W			19		41	4		45	7	a	7	17
10	Th			17		43			21	8		18	18
11	F			15		45	3		58	9		30	19
12	S	*Gregory*		13		47			34	10		45	20
13	B	3 Sunday in Lent		11		49			11	morn			21
14	M			9		51	2		47	0		1	22
15	Tu			7		53			24	1		14	23
16	W			5		55			0	2		22	24
17	Th	*St. Patrick*		3		57	1		36	3		19	25
18	F	*Edward King of W. Sax.*		1		59			12	4		2	26
19	S		5	59	6	1	0		49	4		32	27
20	B	4th or Midlent Sunday		57		3			25	4		54	28
21	M	*Benedict*		55		5			1	5		12	29
22	Tu			53		7	0	n	22	5		28	30
23	W			51		9			46	☽ sets			N
24	Th			49		11	1		10	8	a	24	2
25	F	Annunciation: or Lady Day		47		13			33	9		59	3
26	S			45		15			57	11		29	4
27	B	5 Sunday in Lent		43		17	2		20	morn			5
28	M			41		19			44	0		51	6
29	Tu			39		21	3		7	1		59	7
30	W			37		23			31	2		48	8
31	Th			35		25			54	3		23	9

Days	L. of Du.	Day inc.	D. breaks	T.W. ends	Sun East	Cl. bef. S.	7 Stars So.
1	10 52	3 8	4 44	7 17	5 36	12′ 49″	4 a 44
6	11 10	26	32	29	42	11 44	26
11	39	46	22	40	48	10 28	8
16	50	4 6	12	50	55	9 4	3 49
21	12 10	26	2	8 1	6 2	7 34	31
26	30	46	3 50	13	7	6 4	13

Full Moon, 7th, 24m. past 5 morn.	Sun enters ♉
Last Quarter, 14 h, 22m. past 12 night.	20d. 13h. 57m.
New Moon, 21st. 41m. past 3 aftern.	
First Quarter, 28th, 47m. past 4 aftern.	

1	F	Cam. Ter. ends	33	6 27	4n 17	3 m 46	10
2	S	Oxf. Term ends	31	29	40	4 5	11
3	B	6th, or Palm Sunday	29	31	3	4 18	12
4	M	*Ambrose* [*Richard*	27	33	5 26	4 31	13
5	Tu		25	35	49	4 42	14
6	W	*Old Lady Day*	23	37	6 12	4 51	15
7	Th	*Maundy Thursday*	21	39	35	☽ rises	F
8	F	Good Friday	19	41	57	8 a 38	17
9	S		17	43	7 20	9 57	18
10	B	Easter Day	16	44	42	11 12	19
11	M	Easter Monday	14	46	8 4	morn	20
12	Tu	Easter Tuesday	12	48	26	0 22	21
13	W		10	50	48	1 22	22
14	Th		8	52	9 10	2 8	23
15	F		6	54	31	2 41	24
16	S		4	56	53	3 5	25
17	B	1 Sun. af. Easter or Low S.	2	58	10 14	3 23	26
18	M		0	7 0	35	3 40	27
19	Tu	*Alphege*	4 58	2	56	3 53	28
20	W	Ox. & Ca. Term begin	57	3	11 17	4 9	29
21	Th		55	5	38	☽ sets	N
22	F		53	7	58	8 a 49	2
23	S	St. George	51	9	12 18	10 28	3
24	B	2 Sunday after Easter	49	11	38	11 48	4
25	M	St. Mark: Prs. Ma. b. 1776	47	13	58	morn	5
26	Tu		45	15	13 18	0 47	6
27	W	Easter Term begins	44	16	37	1 27	7
28	Th		42	18	56	1 55	8
29	F		40	20	14 15	2 16	9
30	S		38	22	34	2 32	10

Day	L. of D.	Day Inc.	D. breaks	Tw. ends	Sun East	Cl. bef. S.	7 Stars So.
1	12 54	5 10	3 33	8 28	6 15	4 12	2 a 51
6	13 4	30	21	40	21	2 14	33
11	32	48	6	55	27	1 15	14
16	53	6 8	2 54	9 7	33	0 a 18	1 56
21	14 10	26	40	21	39	1 13	37
26	30	46	25	37	44	2 12	18

Full Moon, 6th, 14m. past 9 night.
Last Quarter, 14th, 20m. past 8 morn.
New Moon, 20th, 58m. past 11 night.
First Quarter, 28th, 23m. past 9 morn.

Sun enters ♊ 21d. 14h. 24m.

1	B	3 S.af.Eaſt: St.Philip & Ja.	4	37	7	23	14	52	2	m	44	11
2	M			35		25	15	10	2		55	12
3	Tu	*Invention of the Croſs*		33		27		28	3		5	13
4	W			31		29		46	3		17	14
5	Th			30		30	16	4	3		28	15
6	F	*John Ev. ante Port. Lat.*		28		32		21	☽	rises		16
7	S	Dukeſs of York born 1767		26		34		38	9	a	2	17
8	B	4 Sunday after Eaſter		25		35		54	10		17	18
9	M			23		37	17	11	11		21	19
10	Tu			21		39		27	morn			20
11	W			20		40		42	0		1	21
12	Th			18		42		58	0		47	22
13	F	*Old Mayday*		17		43	18	13	1		14	23
14	S			15		45		28	1		32	24
15	B	5th or Rogation Sunday		14		46		42	1		48	25
16	M			12		48		57	2		2	26
17	Tu	Princeſs of Wales b. 1768		11		49	19	11	2		16	27
18	W			9		51		24	2		32	28
19	Th	Ascen. Holy Thur: Q.Ch.b.		8		52		37	2		49	29
20	F	[*Dunſtan*		7		53		50	☽	ſets		N
21	S			5		55		3	9	a	24	2
22	B	Sun.af.Aſcenſ: Prs.Eliz.b.		4		56	20	15	10		32	3
23	M	Eaſter Term ends		3		57		27	11		23	4
24	Tu			2		59		39	11		57	5
25	W			0	8	0		50	morn			6
26	Th	Oxf. T. ends. *Auguſtin*	3	59		1	21	1	0		20	7
27	F	*Venerable Bede*		58		2		11	0		38	8
28	S			52		3		21	0		51	9
29	B	Whit-Sun: King Ch. II. re.		56		4		31	1		3	10
30	M	Whit-Monday		55		5		41	1		13	11
31	Tu	Whit-Tueſday		54		6		50	1		23	12

Days	L. of D.		Day Inc.		D.breaks		Tw. ends		Sun East		Cl. aſt. S.		7 Stars So	
1	14	46	7	2	2	7	9	55	6	50	2	59	0	a 59
6	15	4		20	1	52	10	10		55	3	33		40
11		20		36		30		33	7	0		53		21
16		36		52		7		56		4		59		1
21		50	8	6	0	32	11	38		8		49	11	m 42
26	16	2		18	No real Night					12		26		22

Full Moon, 5th, 24m. past 10 morn.
Last Quarter, 12th, 49m past 1 aftern.
New Moon, 19th, 46m, past 8 morn.
First Quarter. 27th, 4 m. past 2 morn.

Sun enters ♋ 21d. 23h. 2m.

1	W	Ember Week	*Nicomede*	3	53	8	7	21	58	1 m	35	13
2	Th				52		8	22	7	1	48	14
3	F				51		9		14	2	5	15
4	S	King George III. b. 1738			50		10		22	2	27	16
5	B	Trinity Sun: D. of Cum. b.			49		11		29	D rises		F
6	M		[*Boniface*		49		11		36	10 a	5	18
7	Tu				48		12		42	10	46	19
8	W	Hil. Term begins			47		13		48	11	16	20
9	Th	Corpus Christi			47		13		53	11	36	21
10	F	Trinity Term begins			46		14		58	11	53	22
11	S	St. Barnabas			45		15	23	3	morn.		23
12	B	1 Sunday after Trinity			45		15		7	0	6	24
13	M				44		16		11	0	19	25
14	Tu				44		16		15	0	32	26
15	W				44		16		18	0	48	27
16	Th				44		16		21	1	8	28
17	F	*Alban*			43		17		23	1	34	29
18	S								25	2	10	30
19	B	2 Sunday after Trinity							26	D sets		N
20	M	*Tranſ. Edw. King of W.*							27	9 a	48	2
21	Tu	Longeſt Day							28	10	17	3
22	W								28	10	37	4
23	Th								28	10	52	5
24	F	Nativity of St. John Baptiſt							27	11	3	6
25	S		[Midſ. Day		43		17		26	11	14	7
26	B	3 Sunday after Trinity			44		16		25	11	24	8
27	M				44		16		23	11	36	9
28	Tu				44		16		20	11	49	10
29	W	St. Peter: Trin. Term e.			44		16		18	morn		11
30	Tu				45		15		15	0	3	12

Longeſt Day at Lond. is 16h. 34m. 45ſec. allowing 9m. 16ſec. for refraction.

Days	L. of D.	Day Inc.	D.breaks	Tw. ends	Sun East	Cl. aft. S.	7 Stars So.
1	16 14	8 30			7 15	2 43	10 m 57
6	22	38	No real night, but		18	1 56	37
11	30	46	conſtant day		19	1	17
16	32	48	or twilight.		20	obe. 1	9 58
21	34	50			21	6	35
26	22	odec. 2			20	2 10	15

Full Moon, 4th, 19m. past 9 aftern.
Last Quarter, 11 h, 10m. past 6 aftern.
New Moon, 18th, 16m. past 7 aftern.
First Quarter, 26 h, 50m. past 7 aftern.

Sun enters ♌ 23d. 9h. 53m.

1	F		3	45	8	15	23	11	0	23	13
2	S	*Visitation V.M.* [Dogdays b.		46		14		7	0	51	14
3	B	4 Sunday after Trinity		46		14		3	1	33	15
4	M	*Transl. of St. Martin*		47		13	22	58	☽ rises		F
5	Tu	Cambridge Commencem.		48		12		53	9	a 9	17
6	W	Old Midsummer day		48		12		48	9	35	18
7	Th	*Thomas à Becket*		49		11		42	9	52	19
8	F	Cam. Term ends		50		10		35	10	8	20
9	S			51		9		29	10	21	21
10	B	5 Sunday after Trinity		51		9		22	10	34	22
11	M	Oxford Act		52		8		14	10	48	23
12	Tu			53		7		6	11	6	24
13	W			54		6	21	58	11	32	25
14	Th			55		5		49	morn		26
15	F	*Swithin*		56		4		40	0	3	27
16	S	Oxf. Term ends		58		2		31	0	47	28
17	B	6 Sunday after Trinity		59		1		21	1	47	29
18	M		4	0		0		11	☽ sets		N
19	Tu			1	7	5		1	8	a 36	2
20	W	*Margaret*		2		58	20	50	8	52	3
21	Th			4		56		39	9	7	4
22	F	*Mary Magdalen*		5		55		27	9	17	5
23	S			6		54		15	9	29	6
24	B	7 Sunday after Trinity		7		53		3	9	38	7
25	M	St. James		9		51	19	51	9	49	8
26	T	*Anne*		10		50		38	10	4	9
27	W			12		48		25	10	21	10
28	Th			13		47		11	10	45	11
29	F			15		45	18	57	11	21	12
30	S			16		44		43	morn		13
31	B	8 Sunday after Trinity		18		42		29	0	11	14

Days	L. of D.	Day decr.	D breaks	Tw. ends	Sun East	Cl. bef. S.	7 Stars So.
1	16 30	0 4			7 19	3 12	8 m 54
6	21	10			18	4 7	34
11	16	28	No real Night		15	54	13
16	4	30			13	5 31	7 53
21	15 52	42			9	55	33
26	40	54	0 44	11 14	5	6 6	13

Full Moon. 3d, 46m. paſt 6 morn.
Laſt Quarter, 9th, 0m. paſt 11 night.
New Moon, 17th, 19m. paſt 8 morn.
First Quarter, 25th, 15m. paſt noon.

Sun enters ♍ 23d. 16h. 17m.

1	M	Lammas Day	4	19	7	41	18	n 14	1 m	17	15
2	Tu			21		39	17	59	2	38	16
3	W			22		38		44	☽ rises		F
4	Th			24		36		28	8 a	13	18
5	F			26		34		12	8	27	19
6	S	*Transfiguration* [*Name of Je.*		27		33	16	56	8	40	20
7	B	9 Sun. a. Trin. Prs. Ame. b.		29		31		39	8	36	21
8	M			30		29		23	9	12	22
9	Tu			32		28		6	9	35	23
10	W	*Laurence* [Dog Da. e.		34		26	15	48	10	4	24
11	Th	Ducheſs of Brunſwic born		36		24		31	10	43	25
12	F	Prince of Wales born 1762		37		23		13	11	38	26
13	S	Old Lammas Day		39		21	14	55	morn		27
14	B	10 Sunday after Trinity		41		19		37	0	48	28
15	M	*Aſſumption V. Mary*		43		17		19	2	4	29
16	Tu	Duke of York born 1763		45		15		0	3	22	30
17	W	☉ eclipſed viſible		46		14	13	41	☽ ſets		N
18	Th			48		12		22	7 a	22	2
19	F			50		10		2	7	37	3
20	S			52		8	12	43	7	49	4
21	B	11 S. af. Trin: D. of Cla. b		54		6		23	8	1	5
22	M			55		5		3	8	14	6
23	Tu			57		3	11	43	8	30	7
24	W	St. Bartholomew		59		1		23	8	50	8
25	Th		5	1	6	59		2	9	20	9
26	F			3		57	10	41	10	3	10
27	S			5		55		20	10	59	11
28	B	12 Sunday after Trinity		7		53	9	59	morn		12
29	M	*S. Baptiſt beh.* [*Auguſtine*		9		51		38	0	14	13
30	Tu			10		50		17	1	40	14
31	W			12		48	8	55	3	9	15

Days	L. of D.		Day dec.		D. breaks		Tw. ends		Sun East		Cl. bef. S.		7 Stars	Sc
1	15	22	1	12	1	22	10	35	7	0	5	59	6 m	49
6		6		28		42		15	6	54		36		30
11	14	48		46	2	0	9	57		50	4	58		11
16		30	2	4		18		40		45		8	5	52
21		12		22		33		25		39	3	4		33
26	13	54		40		48		10		34	1	48		15

Full Moon,	1st. 31m. past 3	after n.	
Last Quarter,	8th, 54m. past 5	morn.	
New Moon,	15th, 56m. past 11	night.	Sun enters ♎
First Quarter,	24th, 28th. past 3	morn.	23d. 12h. 50m.
Full Moon	30 h. 11m. past 12	night.	

1	F	*Giles*	5	14	6	46	8	34	D rises F
2	F	London burnt 1666		16		44		12	6 a 52 17
3	S			18		42	7	50	7 7 18
4	B	13 Sunday after Trinity		20		40		28	7 25 19
5	M			22		38		6	8 46 20
6	Tu			24		36	6	44	8 12 21
7	W	*Enurchus*		26		34		21	8 50 22
8	Th	*Nativity of the V. M.*		28		32	5	59	9 41 23
9	F			30		30		36	10 55 24
10	S			32		28		14	morn 25
11	B	14 Sunday after Trinity		33		26	4	51	0 1 26
12	M			35		25		28	1 18 27
13	Tu			37		23		5	2 38 28
14	W	*Holy Cross*		39		21	3	42	3 48 29
15	Th			41		19		19	D sets N
16	F			43		17	2	56	6 a 6 2
17	S	*Lambert*		45		15		33	6 18 3
18	B	15 Sunday after Trinity		47		13		9	6 30 4
19	M			49		11	1	46	6 45 5
20	Tu			51		9		23	7 3 6
21	W	St. Matthew: Ember Week		53		7	0	59	7 31 7
22	Th	King Geo. III. crowned		55		5		36	8 7 8
23	F			57		3		13	8 57 9
24	S			59		1	0	81	0 2 10
25	B	16 Sunday after Trinity	6	1	5	59		34	11 40 11
26	M	*Cyprian: Old Holy Rood*		3		57		58	morn 12
27	Tu			5		55	4	21	0 44 13
28	W			7		53		45	2 15 14
29	Th	St. Michael: Dus. Wirt. b.		9		51		8	3 44 15
30	F	*Jerome*		11		49	2	39	D rises F

Days	L. of D.	Day dec.	D. breaks	Tw. ends	Sun Rast	Cl. aft. S.	7 Stars 6c
1	13 32	3 2	3 5	8 54	6 27	0 3	4 m 53
6	12: 22	19		40	21	1 34	55
11	12 52	42	32	27	14	3 15	17
16	13 34	4 0	43	16	8	4 59	3 59
21	14	20	54	3	2	6 43	42
26	11 54	40	4 5	7 54	5 56	8 27	24

Last Quarter, 7th, 12m. past 4 aftern.
New Moon, 15th, 22m. past 5 aftern.
First Quarter, 23d, 1m. past 5 aftern.
Full Moon, 30th, 18m. past 9 morn.

Sun enters ♏ 23d. 20h. 53m.

1	S	*Remigius*	6	13	5	47	2	55	5	a	38	17
2	B	17 Sunday after Trinity		15		45	3	18	5		56	18
3	M			17		43		41	6		22	19
4	Tu			19		41	4	5	6		57	20
5	W			21		39		28	7		44	21
6	Th	*Faith*		23		37		51	8		46	22
7	F			25		35	5	14	9		59	23
8	S			27		33		37	11		15	24
9	B	18 Sunday after Trinity		28		32	6	0		morn		25
10	M	Ord. & Ca. Te. b. [*Denys*		30		30		23	0		33	26
11	Tu	Old Michaelmas Day		32		28		46	1		47	27
12	W			34		26	7	9	2		59	28
13	Th	*Transf. K. Edw. Con.*		36		24		31	4		9	29
14	F			38		22		54	5		19	30
15	S			40		20	8	16	☽		sets	N
16	B	19 Sunday after Trinity		42		18		38	5	a	0	2
17	M	*Ethelreda*		44		16	9	1	5		18	3
18	Tu	St. Luke		46		14		23	5		41	4
19	W			48		12		45	6		16	5
20	Th			50		10	10	6	7		0	6
21	F			52		8		28	7		59	7
22	S			54		6		49	☽		☍	8
23	B	20 Sunday after Trinity		55		5	11	11	10		30	9
24	M	[*Crispin*		57		3		32	11		54	10
25	Tu	King George III. accession		59		1		53		morn		11
26	W	King George III. procla.	7	1	4	59	12	14	1		20	12
27	Th			3		57		34	2		47	13
28	F	St. Simon and Jude		5		55		54	4		17	14
29	S			7		53	13	15	5		46	15
30	B	21 Sunday after Trinity		9		51		35	☽		rises	F
31	M			10		50		23	4	a	57	17

Days	L. of D.	Day dec.	D. breaks	Tw. ends	Sun East	Cl. aft. S.	7 Stars So.
1	11 34	5 0	4 17	7 42	5 50	10′ 6″	3 m 6
6	14	20	28	31	44	11 39	2 48
11	10 56	38	38	21	37	13 1	89
16	36	58	48	11	31	14 12	10
21	16	6 18	57	2	25	15 8	1 52
26	9 58	36	5 6	6 52	19	48	31

Last Quarter, 6th, 39m. past 6 morn.
New Moon, 14th, 25m. past 11 morn.
First Quarter, 22d, 29m. past 4 morn.
Full Moon, 28th, 25m. past 7 aftern.

Sun enters ♐ 22d. 17h. 11m.

1	Tu	All Saints	7	12	4	48	14	3	14	5	a	39	18
2	W	Duke of Kent b. *All Souls*		14		46		33		6		37	19
3	Th	Prs. Sophia born 1777		16		44		52		7		45	20
4	F	King William landed		18		42	15	11		9		8	21
5	S	Powder Plot 1605		19		41		30		10		23	22
6	B	22. Sunday after Trinity		21		39		48		11		39	23
7	M	[*Leonard.* Mich. Te. b.		23		37	16	6		morn			24
8	Tu	Prs. Aug. Sophia b. 1768		24		36		24		0		52	25
9	W	Lord Mayor's Day at Lon.		26		34		41		2		2	26
10	Th			28		32		59		3		11	27
11	F	*Martin*		30		30	17	16		4		21	28
12	S			31		29		32		5		31	29
13	B	23 Sunday after Trinity		33		27		49		6		42	30
14	M	[*Britius*		34		26	18	5	☽	sets			N
15	Tu	*Machutus*		36		24		20	4	a	18		2
16	W			37		23		36	5		0		3
17	Th	*Hugh Bp. of Lincoln*		39		22		51	5		54		4
18	F			40		20	19	6	7		3		5
19	S			42		18		20	8		19		6
20	B	24 Sunday after Trinity		43		17		34	9		39		7
21	M	[*Edmund*		45		15		48	11		1		8
22	Tu	*Cæcilia*		46		14	20	1	morn				9
23	W	*Clement: Old Mart. day*		47		13		14	0		23		10
24	Th			49		11		27	1		46		11
25	F	Duke of Glouc. ster born		50		10		39	3		12		12
26	S	[*Catherine*		51		9		51	4		41		13
27	B	Advent Sunday		52		8	21	2	6		13		14
28	M	Michaelmas Term ends		54		6		13	☽	rises			F
29	Tu	St. Andrew		55		5		24	4	a	12		16
30	W			56		4		34	5		17		17

Days	L. of D.	Day dec.	D. breaks	Tw. ends	Sun East	Cl. aft. S.	7 Stars So.
1	9 36	6 58	5 15	6 44	5 13	16′ 14″	1 m 10
6	18	7 16	22	37	7	13	0 50
11	0	34	29	30	2	15 51	30
16	8 46	48	35	24	4 57	7	9
21	30	8 4	42	18	53	14 3	11 a 44
26	18	16	48	12	49	12 39	23

Last Quarter, 6th, 4m. bef. 1 morn.	Sun enters Capricorn 22d. 5h. 36m.
New Moon, 14 h. 56m. past 4 morn.	
First Quarter, 21st, 52m. past 1 aftern.	
Full Moon, 28th, 10m. past 7 morn.	

1	Th		7 57	4 3	21 S 44	6 a 36	18
2	F		58	2	53	7 44	19
3	S		59	1	22 2	9 [illegible]	20
4	B	2 Sunday in Advent	8 0	0	11	10 40	21
5	M		1	3 59	19	11 42	22
6	Tu	*Nicholas*	2	58	27	morn	23
7	W		2	58	34	0 5[illegible]	24
8	Th	*Conception of V. Mary*	3	57	41	2 [illegible]	25
9	F		4	56	47	3 10	26
10	S		4	56	53	4 2[illegible]	27
11	B	3 Sunday in Advent	5	55	58	5 34	28
12	M		5	55	23 3	6 45	29
13	Tu	*Lucy*	6	54	8	7 52	30
14	W	Ember Week	6	54	12	D sets	N
15	Th		7	53	16	4 a 42	2
16	F	Cam. T. e. O. *Sapientia*	7	53	19	5 57	3
17	S	Oxf. Term ends	7	53	21	7 18	4
18	B	4 Sunday in Advent	8	52	24	8 38	5
19	M				25	10 0	6
20	Tu				27	11 21	7
21	W	St. Thomas: Shortest Day			28	morn	8
22	Th				28	0 43	9
23	F				28	2 8	10
24	S				27	3 35	11
25	B	Christmas Day			26	5 4	12
26	M	St. Stephen	7	53	25	6 27	13
27	Tu	St. John, Ev.	7	53	23	7 41	14
28	W	Innocents	7	53	20	D rises	F
29	Th		6	54	17	5 a 15	16
30	F		6	54	14	6 36	17
31	S	*Silvester*	5	55	10	7 55	18

Shortest Day at Lond. is 7h. 44m. 17sec. allowing 9m. 5sec. for refraction.

Days	L. of D.	Day dec.	D. breaks	Tw. ends	Sun East	Cl. aft. S.	Stars South
1	8 6	8 28	5 54	6 6	4 46	10' 56"	11 a 2
6	7 56	38	57	3	43	8 57	10 40
11	50	44	58	2	41	6 44	18
16	46	48	59	1	40	4 21	9 56
21	44	50	6 0	0	39	1 53	34
26	46	0 inc. 2	5 59	1	40	ob. 37	12

CHRONOLOGICAL NOTES, &c. in 1803.

Dominical Letter	B,	Roman Indiction	6	Easter Day	April 10
Golden Number	18	Septuage. Sun.	Feb. 6	Ascension Day,	May 19
Epact	7	Shrove Sunday	Feb. 20	Whit-Sunday	May 29
Cycle of the Sun	20	Lent begins	Feb. 23	Advent-Sun.	Nov. 27

ECLIPSES, &c.

THERE will be only two eclipses this year, and both of the Sun; but only one of them will be visible in these parts.

I. FEBRUARY 21, the Sun is eclipsed, invisible here, being after Sunset, viz. about 9h 5m in the evening.

II. AUGUST 17, the Sun is eclipsed, and visible here, as below. The eclipse begins at 5h 55m in the morning; the middle at 6h 42m; and the eclipse ends at 7h 31m; the digits eclipsed being 2° 12'.

VENUS is a morning star till October 14; then an evening star to the end.

JUPITER is a morning star till March 22; then an evening star till October 10; and then a morning star for the rest of the year.

ANSWERS to the ENIGMAS.

1 Cork	6 18th Century	*Supplement Enigmas.*			
2 Penknife	7 Pin	1 Secret	5 Silence		
3 Water	8 Gaiters	2 Son	6 Weather-cock		
4 Sound	9 Net	3 Stone	7 Mod-ity		
5 Letter A	Pr. Kiss.	4 Oyster	*Pr.* Shadow.		

Answers *to the* Prize Enigma.

1. *By Louisa Anonymous, of Bath.*

Dear Lady Di, your mystic prize
I read, and try'd to guess;
At last I saw before my eyes
The lover's tender *Kiss*.

May he, to whom the prize is due,
In wedlock taste its blessing;
And may his wife to him be true;
Both lov'd, and both caressing.

2. *By Miss Eliza Cartwright.*

How bashful the swains,
Who take so much pains,
To the Diary enigmas to send,
So long to defer
What we wish'd to appear;
But Woolston at last is our friend.

It has oft puzzled me,
What the reason cou'd be,
That for so many years they should
For indeed Lady Di, [miss;
I will not deny,
That we long have expected a *Kiss*.

3. *By Clara, of Cley, Norfolk.*

After long absence that lovers meet,
The balmy *Kiss*, what gift so sweet!
And oh what pity it shou'd be

So oft a traitor as we see.
Had I my mind, it ne'er shou'd prove
The pledge of ought but friend or love.

4. *On a Kiss: by Miss Helena Curwen, of Workington.*

Tend'rest pledge of soft affection,
Emblem of our future bliss;
Dear-st tie of young connexion,
Child of love—delicious *Kiss*.

Why so fleeting are thy pleasures?
Lost the moment they are won;

Scarcely we possess thy treasures,
Till they suddenly are gone.

Yet go; for wherefore shou'd I sigh,
Since on my Anna's lip I see,
With sprightly heart, and rapt'rous eye
A thousand full as sweet as thee.

Cou'd I but copy Woolston's lays;
(That friend to Lady Di)
I'd sing more copiously thy praise;
Now 'tis with fear I try.

5. *To Fortune: by Mr. W. Butterman, of Dronfield.*

Imperious fortune, tell me why
You've look'd of late so very shy,
And thwarted all I do?
Is it because I scorn your powers
And spend with Di my leisure hours,
Good madam tell me true?

Shou'd we together shortly meet,
I mean your ladyship to treat;
Refuse me not the bliss!
And you shall have what e'er you want;
At least, what I have pow'r to grant,
And, when we part, a *Kiss*.

6. *Love, Fraud, Friendship: by Mary H.*

When lips by love and friendship join,
Virtue herself may taste the bliss.

But, oh! when fraud the heart ensnare,
Empoison'd is the baleful *Kiss*.

7. *Damon and Phillis: by Mr. G. H. Isitt, of Stanion.*

Will Phillis be mine, Damon cried,
As enraptur'd he stole the sweet *Kiss*;
Shall to morrow make Phillis a bride?
Be candid, and answer, why yes.
The charmer a while hung her head,
But took not the question amiss;

At length she consented to wed,
And Damon again snatch'd a *Kiss*.
Then soon to the church they repair,
In order to heighten their bliss; [fair,
There the shepherd is bless'd with his
And soon she repays him each *Kiss*.

8. *By Mrs. Blanch Lean, Ludgvan, near Merazion.*

How vain and frail are worldly joys!
They fly like Dia's phantom *Kys*.

Did we attend to reason's voice,
She call to more exalted bliss.

9. *To Lady Diaria: by Miss H. Meggitt.*

With joy I've oft your prizes read,
But none with greater joy than this;

In which, your bard, from vulgar eyes,
Has veil'd so dark, love's pledge, a *Kiss*.

10. *The Double Wager: by Mrs. C. Sydney.*

Strephon laid a *Kiss* with Chloe,
That the prize she cou'd not guess.

Chloe laid a *Kiss* with Strephon,
That the riddle was a *Kiss*.

11. *The Reconciling Kiss: by Mr. T. Wilson, formerly Wilos Hostman.*

When two fond lovers disagree;
How exquisite the bliss,

From that sweet pledge of harmony,
A reconciling *Kiss*.

Other separate and ingenious answers to the Prize Enigma, beside those inserted in the Supplement, were given by the following ladies and gentlemen; viz. Adoniaste, Anna, Aurelio, Automith, E. B, T. Baker, G. R. Barlow, P. Barlow, Barbylius, J. Bayley, Geo. Biggs, Edw. Birch, Tho. Bode, Wm. Boothe, E. C, J. C, J. Cairns, Calpurnia, Ann Clapison, John Cockbill, John Constantine, Tho. Croudace, Damon, John Day, J, Dent, D. Dixon, H. Dixon, Edwin, Mary Etty, J. Farrow, Jas. Ford, Wm. Francis, Mrs. Furnass, Miriam Godson, P. Gowe, S. H, Geo. Harley, J. Hawkes, Ja. Henthorn, Tho. Haynes, Tho. Hindmarsh, Wm. Hinds, Jacobus, J. Johnson, S. Jones, John Irwin, S. Isaacson, Juvenis, T. Keeton, Da. Lewis, John Liddell, T. Linley, J. Luckwood, A. M, W. Maddick, H. W. Maprè, John Midforth, Minimus, Chs. Owen, Parthenia, Philander, Tho. Phillips, Rob. Procter, E. R, G. Ray, Geo. Rennison, Isaac Restless, Rev. Ben. Richardson, Mrs. Richardson, Polly Riddler, Da. Roberts, Wm. Robinson, Alex. Rowe, W. Saint, John Schofield, Serina, Rd. Shittitoe, Kitt Short, Wm. Singleton, Sam. Sherritt, E. Smith, Isaac Smith, Master Smith, Wm. Smith, Wm. Spencer, J. Squance, Wm. Sutcliffe, Symbonious, Miss A. T, Geo. Tiver, P. Thomson, I. Trenbolme, Rd. Trewavas, X. V, W. Watkins, T. Weedon, John Wise, T. Wigley, Wintoniensis, F. N. Y, &c.

General Answers *to the* Enigmas.

1. *On the Enigmas: by Mr. R. Dutton, Kingsley.*

Davus's *Cork*'s done to a tittle;
Day's *Penknife* also doth excel;
Of Dutton's *Water* I'll say little;
J. G. has play'd his *music* well;
Isitt his letter *A* has veil'd;
And Mrs. Lean the *Cent'ry past*;
Smart has his *Pin*, with wit conceal'd;
And Weedon's *Gaiters* are in taste;
Wells's *Net* entangles, all confess;
And Woolston's *Kiss* charms like his verse.

2. *To Lady Di: by Mr. I. Farrow.*

Hail, fair maid, all praise be thine;
Long may'st thou in Britain shine,
With graces still becoming:
Altho' thou'rt in thy 100*th year*,
No spot nor wrinkle do'h appear,
But ever fresh and blooming.

For each new year, fresh beauties rise,
To charm the sense, and please the eyes,
On *Cork*, *Penknife*, or *Gaiters*;
Thy fame, be it extended more,
From sea to sea, from shore to shore;
Nor *Net* in troubled *Waters*.

The balmy *Kiss*, the subtil flame,
Extend their pow'rs o'er all the frame;
A genial warmth diffuses.
Thy laurel'd brows, thy flowing heights,
May rival Pindar's lofty flights,
Thou fifter of the muses.

I've *noted* long thy growing name,
Thy modest, chaste, thy glowing fame;
Each year adds to thy graces;
As old ones drop, new vot'ries rise,
Ambitious all to gain the prize,
With quick, but gentle paces.

3. *To Master A. M.: by Mrs. Mary H.*

Dear *Ai* M. to the *Water*'s side,
Bring quick thy fishing *Net*;
And *Gaiters* may be well applied,
To guard from cold and wet.
No *Sounds* in air do rain presage,
To interrupt our bliss;
With *Penknife* well the *Cork* prepare;
Thy fish will gain a *Kiss*.
Returning home, I'll buy some *Pins*,
Upon the village green,
At that smart shop we have not dealt,
Nor since *Lost Cen'try* seen.

4. *Rural Pleasures: by Mr. G. H. Isitt.*

Of ev'nings, when the sultry sun
Beneath the west has set,
When clear the murm'ring *Waters* run,
I traverse with my *Net*.

And gently place it in the brook,
A scaly fry to catch;
Or, with my angle, line and book,
The nodding *Cork* I watch.

But when stern winter locks the plains
Within his cold embrace,
And binds the stream in icy chains,
My *Gaiters* on I lace:

Then with my dog and gun I go
To beat the fields around;
Regardless of the driving snow,
Or tempest's hollow *Sound*.

Such sports as these let me enjoy;
And when return'd at night,
Con o'er th' enigs in Lady Di,
Or eke an answer write.

A *Kiss*, or *Penknife*, send the fair,
Or praise the late clos'd *Cen'try*:
Possess'd of these, I shall not care
A *Pin* for titled gentry.

5. *The Generous Pedlar: by Mr. Tho. Keeton, Market-Deeping.*

Altho' unknown to you, friend Smart,
Thou surely hast an honest heart;
Therefore my muse her tribute pays
To you, who merits all our praise;
To you, whose sweet engaging lines,
In which or wit or learning shines;
But pause, perhaps I may offend,
Both Lady Di—and Dia's friend;
Therefore with *Pins* and *Gaiters* neat,
And *Penknives* new and quite complete,
I'll travel all the country round;
There, often to the music's *Sound*,
I'll make the lasses dance and sing;
And when the bottles *Cork*'d they bring,
I'll give them *Nets* to boil their greens,
With care interpret all their dreams;
I'll give them *Kisses* for their swains,
To ease them of their lovesick pains.
But now I fear I shall be out;
Oh, no! the letter *A* no doubt,
With *Cen'try lost*, and *Water* clear,
Will tell the whole for present year.

6. *The Same: by Mrs. Blanch Lean, of Ludgvan.*

*A*nother year has circled round,
And Di a *Century* has seen;
Yet still in her new charms are found,
And pleasing still her air and mien.
How diff'rent is poor mortals fate!
They here enjoy a shorter date;
Though now with pleasure some can sing
Of *Cork*, *Net*, *Penknife*, or such toys,
Death will at length the summons bring,
How vain and frail are worldly joys.
As *Waters* down the channels run,
Eager to find their parent sea;
So we, ere life's short thread is spun,
Are hast'ning to eternity.
Soon, soon alas! priz'd beauty fades,
And soon disease, or age invades,
Soon fails our bark on life's swift stream,
And all our boasts of mortal bliss
Fade like the mem'ry of a dream,
They fly like Dia's phantom *Kiss*.
But there's a place above the skies,
Where angels and archangels sing,
Their hymns of praise for ever rise
To heav'n's supreme eternal king:
What *Sounds* seraphic in that sphere,
Shall burst upon our ravish'd ear!
Not Hybla, *deck'd* in all its sweets,
Nor Tempe's vales and boasted joys
Can vie with our last blest retreat,
If we attend to reason's voice.

7. *By the Rev. Benjamin Richardson, Fewston, near Ripon.*

Water, *Century*, *Sound*, or air,
A Cork and *Penknife* I declare,
Solve six enigs this year:
Then *Gaiters*, *Pin*, and *Net*, I see,
A *Kiss* to them united be,
Make all the rest appear.

8. *To Mr. Rob. Richardson: by Mr. Da. Roberts.*

Dear Richardson, 'tis long ago,
Since Lacy, Lugg, or Doctor Co,
Eland or you have made inquiry,
For your good friends in Lady Di'ry.
Then why so strange? she's still the same,
And still her works are works of fame.
Methinks I hear you thus exclaim,
Why sure the man is much to blame,
'Thus to accuse us of neglect,
'As that to Di we want respect;
'Poor Conundrum has long been dead,
'And yew and laurel mark his bed;
'And so is Lugg, his long lost mate,
'But kept apart by adverse fate;
'Eland and Lacy both are mute,
'Tho' why they're so I'll not dispute:

'But sure on me no blame you'll lay,
'Since, when ingulph'd in Quib'ron bay,
'I sent my mite to Dia's shrine;
'Had you done so, were your case mine?'
Dear sir, I do not mean to chide
You, nor yet your witty bride;
But rather hail your safe return,
To deck with bays Conundrum's urn;
Long may you tread Diarian plains,
And gain the laurel for your pains;
Writing sweet verses at your leisure,
(The smallest scrap will give us pleasure)
On *Cork*, *Nets*, *Penknife Waters*, *Pins*,
Last Century, *Gaiters*, or such things;
An *A*, or *Sound*, or friendly *Kiss*;
'Twill please, sir, madam, master, miss.

9. *Ode to Humour: by Mr. Tho. R. Smart, Leicester.*

O thou, the lass with squinting eye,
With dimpled cheek, and mouth awry,
Queen of the smirking race;
In party-colour'd garment dress't,
O let me clasp thee to my breast
And *Kiss* thy merry face.

Come with thy irresistless pow'rs,
And ward my future happy hours
From meagre Care's chill blast;
O teach thy vot'ry how to charm
The breast with lively feelings warm,
Like bards of *Centuries past*.

Be mine the arms thy Foote cou'd wield,
To pierce the stately ass-skin shield,
That gravity calls his;
To whom ev'n Johnson's pomp gave way,
Once thy attractions made him gay,
And loos'd his iron phiz.

Not lamp dry'd wisdom I request,
Be mine the pow'rs thy Sterne possest,
Whatever he ser eye on,
Caught in his *Net*, with solemn *gait*,
How stern the follies stalk'd in state!
Like Mackender's old lion.

Cork hearted nymph, 'tis thine to give
Such talents as in Pindar live,
Sans doute thy chiefest pride is;
To purge the phlegm from out the age,
New pills we buy on each new page,
A reason clear quid rides?

Eyewatery fancies suit me not,
They fit not to my face gad wot!
To say they did, were lying;
It matters not to me one *Pin*,
So I enjoy my fav'rite grin,
And shoot my prey while flying.

Keen *Penknife* wit and thou be mine,
To make life's dreary valley shine,
Then o'er her thorns I brush light;
With fiddling drive gray Care along,
And chant full oft thy fav'rite song,
'The little farthing rush-light.'

Hither, sweet lassie, hie thy ways,
Add salt and pepper to my lays,
And then thy breath shall float 'em;
Rais'd high in air, the *Sound* may reach
Thy sons, and draw a smile from each,
At Coventry and Gotham.

Then, whether long or short my race,
I'll wear throughout a laughing face,
And when the business ends,
Thy remnants which I leave behind
May please the partners of my mind,
And entertain their friends.

10. *To Fortune, on Receiving the Prize Diaries: by Miss Isabella Smith, of Close House.*

Fair, mighty goddess, just and wise,
To be forgot was no surprize,
Considering thou art blind;
But by what compass thou didst steer,
To ask at present I'll forbear,
And kneel for being kind.

Long did the *teapot*'s grumbling maud
Predict a blank in sullen mood
Last Century I'm sure;
The *Cork*'s contents were turned in huff,
But turn'd in vain, for no such stuff
Cou'd thy fam'd gifts secure.

No *Gaiter'd* gipsies, inmates sure
Of thine, did pass my parlour door,
Before their skill was try'd;
Pins, *Nets*, and pillows upside down,
And Kisses sweet in high renown,
But every good deny'd.

Till *Sound*ing fame, on pinions fair,
Quick darting thro' the limpid air,
Threw off the *deep* disguise;
Proclaimed (O the noisy fellow)
My mistress, dearest Isabella,
Presents you with the prize.

11. *By Mr. T. Wigley, of Berrington, near Shrewsbury.*

A, *Cork*, *Penknife*, *Water*, *Sound*,
Five o' th' enigmas do expound;
The 18*th Cen'try*'s one confest;
Pin, *Gaiters*, *Net*, and *Kiss*, the rest.

12. *The Fatal Catastrophe: by Mr. Thomas Wilson, formerly Wilos Hostman.*

What happiness once I possess'd,
When Eliza was loving and true,
The pain was unknown to my breast,
That so much depresses me now.

I've bounded like *Cork* o'er the road,
Without either *Gaiters* or boots,
That led to my charmer's abode,
The grave of my tort'ring doubts.

And when I had reach'd the bless'd place,
What raptures of exquisite bliss
To see the sweet smile on her face,
And from her receive the fond *Kiss*.

Like *music* her *voice* seem'd to me,
The words flow'd so sweet from her tongue;
Her manner was gentle and free;
Her person was charming and young.

A Century thus might have pass'd,
And seem but a short winter's day;
But the flame was too ardent to last,
It languish'd lamented away.

No more I'll my passion disclose
To Eliza, no longer she's mine;
Nor love-breathing *sonnets* compose,
For her who inspir'd each line.

Thus being reduc'd to despair,
Without any hopes of relief;
No longer my torment I'll bear,
My *Penknife* shall finish my grief.

Then adieu to this tort'ring pain,
That robs me of life by degrees,
No more shall my tears flow in vain,
In death my poor heart shall find ease.

13. *The Accomplished Fisher: by Coriander.*

Who arm'd at all points as a fisher wou'd be,
Let him give just a moment's attention to me.—
First choose a good *Cork*, then a *Penknife* produce, 1, 2
And soon a neat float will be fit for your use:
The depth of the *Water* be certain to *Sound*, 3, 4
Or *A Century*'s labour in vain will be found. 5, 6
A slice of cold meat in a napkin pray *Pin*; 7
'Twill serve to amuse when the game is but thin.

'Gainst damps in your feet, I wou'd *Gaiters* advise; 8
A landing *Net* serves to secure your gay prize. 9
Thus equipt, I should think of success you can't miss,
And spouse will your labours reward with a *Kiss*. 10

14. *The True Friend: by the Rev. W. F.*

For the friend who, like *echo*, is honest and true, 4
I'd un*Cork* my last bottle, and spend my last shilling: 1
Could a *Cent'ry* of years be allow'd as my due, 6
To make for his welfare each day I'd be willing.

Who as *Water* will change, or in friendship's un*Sound*, 3, 4
As a *Net* they'll ensnare, when you trust they'll betray; 9
They're as ice to the feet with frost *fandals* unbound; 8
And sad is the fate of so slippery a way.

When, ye fair ones, the choice of a husband you'd make,
As your *A*, B and C, with this caution begin; 5
Who numbers will *Kiss*, and deceive, is a rake, *Pr.*
Unworthy your notice, as a *Penknife* or *Pin*. 2, 7

15. *Ode to Peace: by Mrs. Furnass, Ponteland.*

O! lovely maid, adorn'd with ev'ry grace,
We *Kiss* thy rising ray,—await thy beam *Pr.*
And feel the power of thy diffusive beam,
Auspiciously transfusing o'er the face
A smile of heavenly race. 5

Not cruel strife's destructive rage now reigns,
Nor madding trumpets *Sound* the din of war, 4
Nor hostile banners waving from afar
Provoke to fight:—but other joy yet deigns
To gild Britannia's plains.

Yes, stripp'd of foes, *Last Century* yields her sway, 6
And bids her sister rise with genial wing,
Triumphantly to crown the milder spring,
With gentle zephyrs ush'ring in the day,
To banish cares away.

Come! bring my *Gaiters*, and yon *Net*work band, 8, 9
For Albion's gain we'll peaceful days proclaim,
And blow the joyful taper into flame;
With hearts as light as *Cork* we'll dance,—not stand, 1
For plenty fills the land.

To thee, O meek-ey'd maid, belongs this hour,
That bids the *Water* flow from *teapot* free, or *Knife*. 3, 2
And grants the produce of the *Pine* and tree: 7
See! tempests fled;—on ev'ry side there's pow'r
To cull the choicest flow'r.

16. *Ode to the Finer Feelings: by Mr. Rob. Sanderson, Coventry.*

Gentry with silken nerves, that thrill so keen,
Who always tremble at each tale of woe,
Companions troublesome enough I ween, *k.* 1
To us poor mortal wights who toil below;

Say, shall my muse of whim, in serious strain,
For once attempt to sound your wond'rous praise, 4
You who have given me oft exquisite *Pain*, 7
And thrown a cloud upon my brightest days. 5

On me your influence often wou'd you try,
Thro' the rough course of ev'ry chequer'd *year*, 6
And rob this heart of many a heavy sigh,
And oft these eyes of many a briny tear:

When some poor caitiff ask'd, and ask'd in vain,
At fortune's minion's proud and stately gate,
A short reprieve from hunger, cold, and *rain*, 3
And dogs instead have clear'd the loaded plate:

Or when Injustice has, with all his might,
On humble *Honesty* let fall his hand, 9
Or Malice, to some unsuspicious wight,
Has giv'n of Infamy the hated brand:

Or when some purse-proud puppy I have seen, *k.* 2
On modest Merit once contemptuous scowl,
Heav'ns! you have then exerted pow'rs so keen, *ifs.* 10
That have to madness harrow'd up my soul.

But now, as Winter, with relentless pow'r,
Twice fifteen times has desolation hurl'd,
Since when my mother, in a *painful* hour, *of Gaiters.* 8
Made me a present of this curious world:

So hackney'd long, in that same world's rough ways,
No more devotion shall I pay to you;
Let cold indifference claim my future praise;
To finer feelings let me bid adieu.

Other ingenious answers to the Enigmas, beside those inserted in the Supplement, were given by the following ladies and gentlemen, viz. Admirate, Ann Appleton, Aurelio, Automath, E. B, G. R. Barlow, J. Bayley, Wm. Booth, J. Brookbank, Wm. Butterman, J. Cairns, J. Cavill, T. Clarus, J. Constantine, Helena Curwen, P. S. Dale, J. Day, D. Dixon, H. Dixon, Edw. England, J. Ewbank, Ann F—tt, Wm. Francis, Ja. Ford, Miriam Godson, Geo. Harley, Tho. Harman, J. Heaton, Ja. Henthorn, T. Heynes, T. Hindmarsh, T. Hollidge, J. Johnson, S. Jones, J. Irwin, T. Keeton, P. Leeming, Da. Lewis, J. Liddell, T. Liddell, T. Linley, W. Maddick, I. Midforth, Tho. Morley, R. Parker, Parthenia, Sarah Porritt, R. Proctor, J. Restless, J. Richardson, Wm. Robinson, Alex. Rowe, J. Scotney, J. Smith, Wm. Smith, Wm. Sutcliffe, P. Thomson, Geo. Tiver, I. Trenbolme, C. Trewavas, Wm. Watkins, X. V, &c.

ANSWERS *to the* REBUSES *and* CHARADES.

Rebuſes.		*Charades.*	
Diary.	*Sup.*	*Diary.*	*Suppl.*
1 Pap	1 Daventry	1 Freeſtone	1 Adamant
2 Vernon	2 Barren	2 Snuffbox	2 Earring
3 Truth	3 Bread	3 Hillman	3 Poſthorſe
4 Oliver	4 Ewbank	4 Bridegroom	4 Pocketbook

1. *The Rebuſes and Charades anſwered by Aurio.*

In *Vernon*'s verſes *Truth* we find,
In every word and line combin'd.
Cou'd I like her ſuch truths impart,
Perhaps I might aſide friend Smart
Be doom'd to ſhare a trifling part.

On *Hillman*, *Snuffbox*, or *Freeſtone*,
I'd write to pleaſe the ladies tone;
Like *Bridegroom* on the bridal morn,
I'd patient wait the quick return
When *Olives* crown the virtuous bride,
And Mirth and Bacchus chief preſide.

2. *Praiſe of Phillis: by Mr. T. Clarus, of Cambridge.*

The charms of my Phillis are rare,
Her beauty and wit all adore;
No *Vernon*, tho' ſprightly and fair,
Can bleſs her fond *Oliver* more.

Draw near her, and gaze for awhile,
Behold the ſweet bloſſom of youth;
Her looks ſpeak a heart void of guile,
Her heart the ſoft dictates of *Truth*.

'Tis ſhe who can ſooth all my woe,
Whoſe ſmiles ev'ry boſom can calm,
Whoſe lips, ſoft as *Pap*, can beſtow
Divine conſolation and balm.

3. *The Same: by Coriander.*

Jackſon I find is pleas'd with *Pap*,
And G. Iſitt with *Vernon*, [lap,
Dame *Truth* ſits ſnug in Rimmer's
Smart's tho't's friend *Oliver* turn on.

In *Freeſtone* next ſhines G. H. I.
Lean's *Snuffbox* takes no wide room,
For *Hillman*'s fate I heave a ſigh,
And Orville means a *Bridegroom*.

4. *Mr. Smart, to Mr. Sanderſon: occaſioned by his Second Addreſs to Fortune.*

Well my dear Bob, I ſee forſooth,
You've kept your word in very *Truth*,
Not like a changeling odling;
But as you promis'd tun'd your lays,
This crack-brain'd deity to praiſe,
This goddeſs or this godling.

I'm horribly afraid you're catch'd,
And count your chicks ere they be hatch'd,
At leaſt before you ſee 'um;
To ſhout before the victory's won,
Nay ere the battle is begun,
On truſt to ſing tedeum.

I ſpeak for both myſelf and you,
I'm half convinc'd 'twill never do,
Still ſomething elſe is wanting;
Whether ſhe ſee, or whether blind,
Our lodgings ſhe will never find,
Or liſten to our canting.

On *Freeſtone* ſculls her gifts ſhe drops,
In ſhow'rs as thick as Kentiſh hops,
Or boys from trees ſhake apples;
But where's the wight with ſenſe one grain,
A guinea e'er from her did gain,
To eaſe life's Corniſh grapples?

For aught I know, in days of yore,
She might her cornucopia pour,
When Greece cou'd ſhow her nibblers;
But how the dev'l can we expect
She will give more than her—neglect
To two ragg'd half-ſtarv'd ſcribblers.

What matter your desires to her?
Tho' words be cheap, as you aver,
As fiddles are to burn;
She don't regard your pray'rs my chap,
Sends *Bridegroom*, *Hillman*, *Snuffbox*,
Like those we had last turn. [*Pap*,

Then like two proud, though shirtless bards,
Bid her at pleasure deal her cards,
While we both gay and droll ever,
Always prepar'd to meet her frown,
And give her, whether up or down,
A Roland for her *Oliver*.

But shou'd she grant you what you sing,
Won by the oddness of the thing,
And send you ten pounds plenteous;
I hope she'll act all right and fair,
And let me like a brother share,
I'll take mine out in twenties.

5. *To the Editor: by Mr. John Smith, Alton Park.*

Good doctor, I will try once more,
And do the best I can, sir,
Each rebus and charade explore,
And send to you the answer.

Pap, *Vernon*, *Truth*, and *Hillman*,
Are part, if right I've guess'd;
Then *Bridegroom*, *Oliver*, *Freestone*,
With *Snuffbox* tell the rest.

6. *The Bee: by Mr. W. W. Wardley, of Chesham.*

Ah! why, unweary'd on the wing,
Persists the bee in ceaseless toil?
Why rifle all the sweets of spring?
And why forbear to taste the spoil?

Full well she knows, the time will come,
When Plenty, with exhausted horn,
Amid the winter's horrid gloom,
Shall wander pensive and forlorn.

So wisely, ere bleak tempests roar,
Or Flora quit the fading scene,
She labours to provide a store;
Nor loiters while the sky's serene.

Yet while she toils her hoard to swell,
She falls, alas! a hapless prey!
See ruffian hands invade her cell,
And bear her little all away.

The merchant thus neglects his ease,
And fearless, in pursuit of gold,
Tempts every danger of the seas, [cold.
Nor dreads th' extremes of heat and

But when, to gain his native land,
His bark he launches on the wave,
She's captur'd by a lawless band! [save.
Nor pray'rs nor tears his wealth can

Other ingenious answers to the Rebuses and Charades, beside those inserted in the Supplement, were also given by the following ladies and gentlemen, viz. Automath, E. B, G. R. Barlow, P. Barlow, J. Bayley, J. Cairns, J. Cavill, Helena Curwen, J. Day, Ra. Dutton, J. Ewbank, Ann F—tt, I. Farrow, Ja. Ford, J. Heaton, Ja. Heathorn, Tho. Hynes, Jacobus, Da. Lewis, J. Liddell, Tho. Liddell, W. Maddick, E. R, Geo. Tiver, Eliza Tomkey, C. Trewavas, Wm. Watkins, &c.

Answers *to the* Queries.

Query, I. *answered, by Jacobus of Norwich.*

When liquor is once set in motion in a wine glass, a very slight additional cause will make it fly over the top. Because the glass being conical, the diameter of the surface of the liquor will be increased by every undulation, and a fresh force added to the momentum of the fluid by every stroke of the tobacco pipe.

The Same answered, by Mr. John Irwin.

When the glass is put into a vibratory motion, by either striking or rubbing it, the motion is communicated on all sides to the fluid, which is thus impelled toward the centre, where the opposite motions cause it to clash and fly up with violence. By trying the experiment, I found that the quicker the pipe was drawn along the edge of the glass, the quicker and stronger were the vibrations, so as to cause the fluid to squirt out of the glass. But by drawing the pipe a little slower along the edge of the glass, the vibrations are not so strong, and the agitation of the water is diminished, so as only to rise up the glass, without going over.

QUERY II. *answered, by Mr. Alex. Rowe, Reginnis.*

"Faith, Hope, and Charity, are virtues great;
Add Prudence to them, and the set's complete."

QUERY III. *answered, by Mr. David Lewis, Belmond.*

Some old maids are remarked to be fond of parrots, dogs, apes, &c. when they have been slighted by, or disappointed of the first object of their affection. This saying is founded on the opinion, that we retain the same passions and propensities in a future state of existence, which we have had in this.

QUERY IV. *answered, by the Rev. I. Furnost, Ponteland.*

The custom of putting off the hat, as a mark of respect, probably originated in addressing the Deity; and from thence transferred to all superiors.

NEW ENIGMAS.

I. ENIGMA (853) *by Miss Ann Appleton, York.*

Your servant N——*, lo! now she's come,
Strike up the tabor, pipe and drum;
Strike up I say, for now the muse
Well pleas'd, cherubic themes pursues;
A welcome friend demands the strains,
A friend that smiles o'er Albion's plains.
Shou'd fortune give a crabbed mate,
And blast your joys with strife and hate,
What broken plates, and houshold jars
Attend you in domestic wars:
Poor mortals! for I scorn to dwell
Mid discord foul, and broils of hell:
From heav'nly climes my birth I trace,
And 'twere not heav'n if I'd no place.
Know I'm a friend—content's my sire;
But fly where envy darts her fire.
When strife's among the nation's hurl'd,
You'll say I'm banish'd from the world.
Guilt, stand aloof, nor come thou near,
Where I my milder standard rear.
Now bullies fill your heart and ears
With tumult, din, and panic fears;
But soon they'll yield to grisly death,
When I shall stop their noisy breath.

* *A friend.*

II. ENIGMA (854) *by Jacobus, of Norwich.*

In thunder clad, in strength array'd,
Not as a grasshopper afraid,
Behold I come, in black or gray,
To bring you home, or bear away.
When Pharaoh and his mighty host
Were in the sea o'erthrown and lost,
Me too, with him, the briny wave
O'erwhelm'd, and prov'd a watry grave.

Of varying shape I am, and worth,
Of noble or ignoble birth,
I till the ground, or grace the plain
Where many a gallant warrior's slain;
To meet the battle's rage I fly,
And vict'ry bring, or nobly die.

Yet for these deeds I'm chain'd and led
To yonder hut, where straw's my bed:
But this to my remembrance brings
The time I honour'd was by kings;
Nay, in exchange for me, 'tis said,
A king, his realm once offer made.

III. Enigma (855) *by Mr. Rob. Richardson, London.*

Loose, on wild nature's trembling strings,
When fancy skims around,
And fairy joys, on flimsy wings,
Spread whims, around! around!
Permit a theme, unspoke before
In fairy form t'advance,
Advance itself on Britain's shore,
And join Diarian dance.

You connoisseurs who long have strove
To gain a niche in Dia's grove,
Will wonder at my name;
I worship all that worship me,
And, or on land or on the sea,
Still bootless is my fame.

He who first display'd my pride,
Remains for ever undescry'd,
A weighty weight was he;
And, whether, or on land or shore
His merit claims a gen'ral store
Of grateful memory.

The Hebrew tribe admire my form,
Drury and Covent Garden storm,
In opposition's day;
When, true or false, my case appears
On finger prominent, or ears,
And gather up a fray.

Yet, true it is, from mother earth
I first deriv'd my vagrant birth,
And show'd my countless eyes;
I ransack'd ocean, ransack'd trade,
Colonial settlements I made,
And, Spain be-smelt the prize.

Golconda boasts its countless mines,
Where inexhausted beauty shines,
(My parent-charm is there!)
Thro' all my forms, thro' all my shapes,
My visive form for ever apes
The eye of British fair.

Boys in the streets of London town,
(Where carts and horses do not own)
Full to the public eye
Expose my charms, in harmony,
Advance, return, then pocket me,
And off to school they fly.

Scotia has shown my beauteous face,
The world has sung fair Scotia's grace,
In bringing me to sight;
But charms decay, and friends depart,
The scavenger has not a heart
To hold me up to light.

More might be said, if you cou'd see
In shop yclept 'British museum,' 'em,
(Were people there to show it;)
But varying times have knock'd me down,
From papal to republic crown,
And, to their ways I owe it,

That, now no gard'ner owns my place,
When, by his spade, before his face,
My pigmy children rise;
He, like a jewel in swine's snout,
Kicks all the fragments round about,
And thus my honour dies.

IV. Enigma (856) *by Miss A. T. Tabernacle Walk.*

Dread war is o'er, with horrid train,
And peace and plenty smile again,
Britons the blessing own;
May peace and plenty ever smile,
And favour fair Britannia's isle,
Thro' ages yet to come.

Behold in mystic guise appears
A thing well known to all for years,
Whose voice is plain and loud;
Who, when he speaks, forthwith he sends
Offensive breath, that far extends,
And gloomy as a cloud.

When war breaks forth, with dire alarms,
And martial drum loud calls to arms,
The nation to secure;
Firm in his country's cause, and bold,
Excessive heat, or piercing cold
Alike he doth endure.

But these bleft times will still his noise,
The happy peace will stop his voice,
Save at the private call:
No more we hear the dying groan,
No longer see the widow moan,
Nor orphan's tear to fall.

See the refulgent god of day
Dart from the east his lucid ray,
And gild the early dawn:
The early lark extends his wing,
The feather'd tribe elated sing,
And music hails the morn.

Thro' fields of ether see him ride,
With firm companions by his side,
The innocent to slay;
From place to place they wand'ring rove,
O'er verdant, meads, and thro' the grove;
Then homeward bring their prey.

V. Enigma (857) *by Mr. Wm. Watkins, Heddon-on-the Wall.*

Long tow'ring in the sylvan wood,
My high aspiring parent stood,
Nor fear'd revolving time;
Till cruel man, with many a scar,
With him essay'd unequal war,
And slew him in his prime.

Tho' beauty, symmetry and grace,
You might in ev'ry feature trace,
While Flora deck'd the spray;
Bereft of ev'ry pristine shape,
The Ethiop now in hue I ape,
And smile at parting day.

Were you to know the pangs I feel,
The ardent flame, the pointed steel,
The ghastly cuts I bear;
Doubtless each soft relenting soul,
Would shed some pity o'er my dole,
And drop a briny tear.

But ev'ry breast is callous grown;
For me no left remorse is shown,
Nor sympathising care;
Altho' when Boreas' chilling blast
Does hold the liquid current fast,
I warm the ambient air.

For you, ye fair, almost divine,
Brilliant in your chambers shine,
Upon the hearth, or plain;
When, prostrate at your feet I lie,
Nay for you breathe my last, and die,
And turn to earth again.

Submissive to the last extreme;
Yet know I make the war dogs scream,
And fiercely face the foe;
And where embattled armies lead,
I often make the warrior bleed,
And strike the fatal blow.

VI. Enigma (858) *by Mr. John Bayley, Schoolmaster, Middleton.*

Ladies, pray deign to look on me,
The truest emblem of humility.
But if a pedigree can add a grace,
I before man my origin can trace;
For I became flesh, sinews, skin, and bone,
Before our grannam Eve was ever known.
But now I fleet before each blust'ring wind;
To change of place am greatly too inclin'd.
Mortals! to banish pride, behold in me,
The very period of mortality.

VII. Enigma (859) *by Mr. W. Butterman, Dronfield.*

Ye British fair, in these united isles,
Where every virtue reigns, and freedom smiles,
You know my worth, are conscious of my pow'rs,
And often with me spend your vacant hours,—

In ev'ry land throughout creation's ſpace,
If commerce thrive, my valu'd worth you'll trace;
From India's ſhores, where burning ſands appear,
To climes far north of your own hemiſphere.—
I'm juſtly deem'd the poet's boſom friend,
For on my aid his faireſt hopes depend:
Shut up with him in ſome ſnug garret high,
I ſpend my days without one ſingle ſigh:
Indeed my friendſhip's reckon'd ſo ſincere,
That every age and ſex my name revere.—
Ye lovely fair! whoſe ſoft enchanting ſmiles,
With ſweeteſt harmony, each care beguiles,
Shou'd you at Hymen's holy ſhrine appear,
You ſurely would expect to find me there;
For, if what cuſtom dictates, you hold true,
I'm introduc'd, to ſanction what you do.
Some ſay I am an ambidextrous knave,
And love to ſerve the vile, as well as brave:
But you who know the juſtice of my cauſe,
And ſay intrinſic worth deſerves applauſe,
Will own my merit, and deſpiſe that elf,
Who ſtrives to make me viler than himſelf.

VIII. Enigma (860) *by Mr. John Day, Stggleſthorne.*

Ye bards of Di, go ſearch creation round,
And all the ſecret myſteries profound,
Then tell me, is there ought that you can find,
So lovely as myſelf—ſo good and kind.
To trace my pedigree,—I took my riſe
From grandſire Adam, when in Paradiſe,
And have exiſted ever ſince that time,
Among the wiſe and good in ev'ry clime.
Tho' ſhort's my life, I ſtill am yet alive,
And all things living now I may ſurvive.
Milton diſcours'd of me, and thus confeſs'd,
"Of all God's works, I was the laſt and beſt."
This may be true, while ſome aſſert they can
Prove that I'm made, and am the work of man.
But I'm not found in ev'y place the ſame;
Nor always good, nor equal goodneſs claim.
Happy for me, I by the truly wiſe
Am always lov'd, and what they greatly prize.
As different climes produce this bleſſing rare,
So 'mong the Britons 'tis their choiceſt care,
To make me lovely from my very birth;
Hence we enjoy the greateſt bliſs on earth.
Diarians all, among you too I ſhine,
Each year I greet you with my ſongs divine.
And you, ye bards, if e'er you wiſh to ſhare
The loves and graces of the virtuous fair,
Know that in me all loves and graces meet,
Yea, all you can deſire that's good or ſweet.

IX. Enigma (861) *by Mr. O. G. Gregory*, Cambridge.*

For once, deareſt ladies, in myſtical ſtrains,
I dare to approach your Diarian plains:
And O! that in inſtance like this I were bleſt,
With the muſe that inſpir'd Smart, Woolſton, or Weſt!
Then my verſes ſhould onward in harmony flow,
And cauſe your ſweet boſoms with rapture to glow.
But fruitleſs the wiſh: for in truth I may ſay,
That the muſe, long neglected, has now flown away;
And tho' I invoke her again and again,
O deplorable caſe! my intreaties are vain.
Tho' Calliope forſakes me, I'm urg'd on by you, [view.
And now will my hero preſent to your
When God ſpoke to being this beautiful world,
And the wandering planets in motion were hurl'd;
When the unweildy clods into action burſt forth,
And the earth team'd with creatures from ſouth to the north,
I then was not known; nor with Adam was I,
When his ſpirit ethereal was ſent from on high:
But ſpeedily after I firſt did appear,
And ſince that have I toil'd for you all the long year:
And long as the globe ſhall turn on the pole,
And ſeaſon o'er ſeaſon in harmony roll,
In each clime of the earth ſhall my reſidence be,
And I be devoted fair lady to thee.
Yet ſtill, in ſome meaſure, you'll pity my caſe, [a place.
For in regions above I muſt ne'er find
But, one conſolation wou'd for me remain, [tain.
Could I but your favour for ever re-
Yet, ſtrange and myſterious as it may ſeem, [ing eſteem,
Tho' perhaps you'll profeſs for me laſt-
And declare your ſolicitous wiſhes for me [me oft flee.
Alas! when you have me, you from
Or ſometimes, inſtead of promoting my eaſe,
And ſtriving to give me both honour and peace,
A mark of diſhonour you'll ſtamp on my brow, [I know.
Diſgraceful and cumbrous as too well
But wherefore this treatment?—you ſay I defame,
And filch, from each lady I meet, her good name:
And thus, to revenge defamation you're led,
To wreak your dire anger upon my poor head.
But O! faireſt emblem of beauty and joy, [wou'd deſtroy;
Believe not that I e'er your fame
Regard not the rumours that fix upon me
The fell accuſation of baſe calumny.
For indeed, my dear ladies, 'tis eaſy to ſhow, [on you;
That my very exiſtence depends up-
And I truſt you will often be ready to own [dently ſhone;
That my zeal for your good has reſplen-
That for your ſakes alone I'm yet oft young and gay, [gray.
Tho' ages ago my hairs were grown
Then come, ye fair daughters of Britain's bleſt iſle,
Come ſwiftly, and ſhed on your ſervant a ſmile;
Give new proofs of your conſtancy, virtue and pow'r,
And deign to make happy my life thro' each hour.
Unveil me, and make me whate'er you wou'd have,
For indeed I ſhall gladly be—ought but your ſlave.

* *Author of the new ingenious Treatiſe on Aſtronomy.*

X, Or Prize Enigma (862) *by Mr. Tho. R. Smart, Leicester.*

[*Whoever answers it before February* 1, *has a chance for eight Diaries.*]

Once more, dear Di, the slowly rolling year,
Has brought thy long'd for natal minute near:
Rous'd at the thought, the muse, who dormant long,
Nor twice six moons has form'd one simple song,
Restrings with ardent zeal the rustic lyre,
Feels rapt'rous hope, and kindling fond desire.
O may success as erst the effort crown,
Nor thy fair daughters on the trifle frown!—
From times remote—but what can time avail?
Be useful worth the basis of the tale;
On that proud pillar let me take my stand,
From thence my fame, from thence respect command;
Nor beauteous shape, nor polish'd figure boast;
External beauty charms one sense at most.
For, know ye fair, tho' beauty please the eye,
Merit forbids that beauty e'er to die;
From thence our British maids derive their claim,
"And give to immortality a name."—
Drawn from the mine, of substance real, I prove
A metaphor in prudence and in love:
Should Strephon, favour'd youth, his tale impart
Of tender love, and charm your beating heart;
Should kindling passions fan the fond desire,
And equal love confess an equal fire,
Then, doubly then, my unreal merits prize,
Nor lose the guard where all your treasure lies!
Of matter made, tho' not like yours the same,
Far, far more lasting than the mortal frame;
Your fragile forms the winter's cold destroys,
Not years of frost my harden'd frame annoys;
In piercing heat weak man his breath resigns,
The fire I brave, the furnace but refines;
From this my shape, my stubborn nature gain,
To pleasure dead, insensible to pain;
A lifeless engine in the weakest hand,
Can proudest tow'rs and strongest forts command:
Possess'd of me, the nightly robbers spoil
The hard earn'd treasures of long years of toil:
Me once resign'd, the hapless city falls,
The conqueror plants his standard on the walls;
Tho' troops of heroes bleed—of no avail!
I force the way when thund'ring cannons fail.
But what are these?—mortality's vain boast,
The thrice crown'd conqueror and his bloody host,
The pest of ancient and of modern times,
High heaven's dread vengeance for a nation's crimes.——
When at the last dread day the mountains nod,
And nature shrinks before her coming God,
There, while the ethereal trumpets solemn sound,
Born by an angel's hand shall I be found;

Immortal then—a grand, an awful truſt,
When all creation turns to primal duſt!
While my dread guardians voice in thunders tell,
I lead the way to pierce profoundeſt hell!
Here let us pauſe, and contemplate the ſcene.
Are theſe the deeds of one that's weak and mean?
Yes—ſurely yes—I weak and mean appear,
And but ennobled by the truſt I bear:
Till then I every art and ſcience tend,
The wiſe man's bleſſing, and the good man's friend.
Then ladies, as I am before your eyes,
Uſe me with cunning, and obtain the prize.

NEW REBUSES, CHARADES, *and* QUERIES.

I. REBUS, *by Mr. John Bayley, Schoolmaſter, Middleton.*

A man of old for matchleſs ſtrength renown'd,
A ſhrub in India's diſtant climate found;
An Engliſh king who magna charta ſign'd,
A noble paſſion of the tend'reſt kind;
A beaſt for ſtrength and courage much renown'd,
King of the woods and ſavage race is own'd:
Th' initials join'd, a Di'ry fair will ſhow,
Grac'd with all virtues heaven can beſtow.

II. REBUS, *by Mr. John Day, Sigglesthorne.*

The head of a muſe,
And what you muſt uſe,
If you wiſh in the Di'ry to ſhine;
A feminine bird,
Of vowels the third,
And the Heart of our lady benign.

Theſe properly join'd,
You quickly will find
A conſtant Diarian fair,
Whom few do excel,
This truth I can tell,
And a maiden of virtues moſt rare.

III. REBUS, *by Mr. G. H. Iſett, Stanion.*

Dear ladies, firſt behead a Jew,
Then take what tempted mother Eve,
Next he who erſt a brother ſlew,
If the Scriptures we believe,
The initial of a bird of night,
And what next wanting is I ſwear,

Three fourths of what gives great delight,
If freely granted by the fair;
Theſe letters ſurely will diſplay
A much eſteem'd Diarian bard,
Whoſe brilliant wit, and poliſh'd lay,
May juſtly claim the fair's regard.

IV. REBUS, *by the Rev. Samuel Oliver, Whaplode.*

What's felt when you're wounded, and ſaid when you're witty;
A common expreſſion for gay and for pretty;
Will name you a poet, in this rhyming age,
The glory and pride of Diaria's page.

I. CHARADE, *by Mr. W. Clark, Cams' Hall.*

My firſt, attentive, to the heart convey'd
What am'rous Strephon to his Daphne ſaid.
My lofty next is form'd as faſhions rage,
To hide defects of nature in old age.

Connected, you a dangerous insect see,
That wou'd within my first injurious be.

II. CHARADE, *by Mr. David Lewis, Knaresborough.*

My servile first with low submission bows;
My gainful second to each port is spread;
My whole is known where Gambia's torrent flows,
With thousand curses on its horrid head.

III. CHARADE, *by Mr. John Liddell, Hatfield.*

When roaring billows dash the troubled main,
The drooping tar calls for my first in vain;
My next oft hears his cries but cannot save
The sinking sailor from his wat'ry grave:
My whole, as Moses tells, to man was giv'n,
The first, the chief of blessings under heav'n.

IV. CHARADE, *by Miss C. Mortimer.*

My first doth trace the mazy dance,
When belles, to grace my next, advance.
My whole's a joy to rustic swains
And oft a prize young Colin gains.

I. QUERY, *by Mr. John Bayley, Schoolmaster, Middleton.*

It is said to be a new-discovered fact, that though the rays of solar heat pass freely through glass, and are as hot after their passage through as before it; yet it is quite the reverse with culinary or common fire heat, which is absolutely stopped by glass. Is this true; and, if so, how is it to be accounted for?

II. QUERY, *by Mr. John Bryan, Gravesend.*

Quere the origin of the point of honour, and the pernicious custom of deciding trivial disputes by duels.

III. QUERY, *by Mr. Peter Steele Dale, Liverpool.*

What is the reason that the eggs of wild fowls are commonly spotted; whereas those of tame or domestic fowls are generally white?

IV. QUERY, *by the Rev. J. Furnass, Ponteland.*

Rooms are said to be unhealthy, the walls of which have been lately white-washed. Can any philosophical reason be given for such assertion?

*** *It is again requested, that all letters be sent within the limited time, so as to come to hand before the end of April, otherwise they cannot be used, and post-paid, or franked, or they will not be received; and that the several compositions be made as short as may be, with propriety; but the solutions for the Prize Enigma and Prize Question must come to hand before Feb.* 1, *to entitle them to a chance for the prizes. And, along with all new Questions, Enigmas, Rebusses, and Charades, their answers must be sent.—The letters from Messrs. J. Adams, B. Clypole, Wm. Cross, Tho. Croudace, Rob. Surtees, and the Rev. W. Wright, coming too late to hand, could not be used.*

PRINTED for the COMPANY of STATIONERS,
By *M. Bruton*, St. John's Square, Clerkenwell.

MATHEMATICAL QUESTIONS ANSWERED.

I. QUEST. (1089), *anſ. by Maſter John Golding, at Mr. Gregory's Academy, Cambridge.*

Put x for the pendulum's length in inches, and alſo its number of vibrations in a minute; the length of the ſecond's pendulum being $39\frac{1}{8}$ inches. Then, the number of vibrations being inverſely proportional to the ſquare of the lengths, as $\sqrt{x} : \sqrt{39\frac{1}{8}} :: 60 : x$; hence, multiplying extremes and means, $x\sqrt{x} = 60\sqrt{39\frac{1}{8}}$; and, by ſquaring, $x^3 = 3600 \times 39\frac{1}{8} = 140850$; theref. $x = \sqrt[3]{140850} = 52{\cdot}02982$ inches, the length required.

The ſame, by Mr J. H. Hearding, Adderbury School.

The lengths of pendulums are to one another reciprocally as the ſquares of their vibrations made in the ſame time: therefore, putting x for the length required, $x : 39\frac{1}{8} :: 60^2 : x^2$; hence, $x^3 = 60^2 \times 39\frac{1}{8} = 140850$, and $x = \sqrt[3]{140850} = 52{\cdot}02982$ inches.

The ſame, by Mr Jos Kaye, Aldmonbury.

It is demonſtrated by mathematician's (Hutton's Courſe of Mathematics vol. 2, p. 174, &c) that the times of vibrations of pendulums are as the ſquare root of their lengths; or the number of vibrations in a given time reciprocally as the ſquare root of their lengths. Let $x =$ the number of vibrations in a minute, and alſo the length; then $x^2 : 60^2 :: 39\frac{1}{8} : x$; hence $x^3 = 60^2 \times 39\frac{1}{8} = 140850$, and $x = \sqrt[3]{140850} = 52{\cdot}03$, the required length and number of vibrations in a minute.

The ſame, by Mr. Alexander Rowe, Reginnis.

Let x denote the pendulum's length. Then, by Dr. Hutton's Courſe, vol. 2, pa. 176, as $\sqrt{x} : \sqrt{39\frac{1}{8}} :: 60 : x$; mult. extremes and means, $x\sqrt{x} = 60\sqrt{39\frac{1}{8}}$; ſquaring, $x^3 = 60^2 \times 39\frac{1}{8}$; hence, $\sqrt{60^2 \times 39\frac{1}{8}} = 52{\cdot}02982$ inches $= 4{\cdot}335818$ feet, as required.

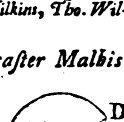
The ſame, by Mr John Kelkirk, Newcaſtle.

Put $x =$ length of the pendulum. Then, by Dr. Hutton's Courſe, vol. 2, pa. 176, as $\sqrt{x} : \sqrt{39\frac{1}{8}} :: 60 : x$; hence $x = 52{\cdot}02982$ inches, the length of the pendulum required.

Nearly in the ſame Manner was the ſolution given by Meſſrs. Sa. Baker, Banniſter, P. Barlow, John Barron, Sam. Bates, Tho. Boole, Jos. Brewer, Thomas James Briant, John Brian, William Burdon, Wm. Butterman, Ja. Campbell, Jno. Campbell, John Carr, John Cavill, J. Chantry, J. B. Chivers, Cleron, John Coben, J. Collins, Tho. Cook, Tho. Croſby, Wm Eaton, Tho. Eley, Edw. England, J. Ewbank, J. Foreſt, Wm Francis Franks, J. Furnaſs, Joſ. Garſide, Joſ. Gillins, O. G. Gregory, Iſa.

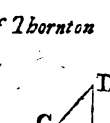
Isa Gumley, Hen. Hann, Tho. Harman, John Hawkes, Richard Helme, T. Hewitt, Hen. Hunter, Sam. Jones, P. Leeming, Hen. Lightbown, J. Lockwood, Wm Maddocks, Tho. Morley, Tho. Myres, Rd Nield, Charles Pritty, M. O. Riordan, Da. Robarts, Jona. Roch, Hen. Rocktree, Sabine, John Scholfield, Tho Scurr, John Skewes, Edward Smith, John Smith, Spencer, W. Spencer, Tho. Squire, Wm Stackhouse, Wm Sutcliffe, P. Thompson, Tho. Towan, Hen. Wade, Wm Watkins, Wm Wilkins, Tho. Wilson, Wm Wilson, Wm Wright, &c.

II. QUEST. (1090) *anſ. by Mr Wm Burdon, Acaſter Malbis.*



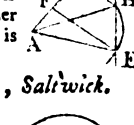
On the given baſe A B deſcribe (by prob. 14 Dr. Hutton's Geom.) a ſegment of a circle A D B capable of containing an angle equal to half the given vertical angle; from A apply A D = the given ſum of the ſides: biſect B D with the perp. C E, meeting A D in C; join B C, then A B C will be the required triangle.——For, the triangles B E C, D E C being equal in all reſpects, B C = C D; theref. A C + C B = A C + C D = A D, and ∠ A C B = C D B + C B D = 2 C D B = the given vertical angle by conſtruction.

The ſame, by the Rev. Mr Ewbank, Vicar of Thornton Steward.



Draw A D = the given ſum of the ſides, and D B E making the ∠ D = half the given vertical angle: with centre A, and radius the given baſe, deſcribe an arc cutting D E in B and E: draw B C or E F to make with D E an angle = ∠ D, and the thing is done. For either A B C or A E F may be the triangle required, as is evident.

The ſame, by Mr Henry Hann, Schoolmaſter, Saltwick.



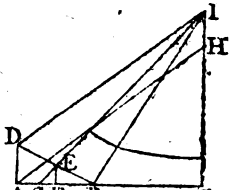
On the given baſe A B deſcribe the circular ſegment A C B to contain the given angle, and alſo A D B to contain half the ſame angle; take A D equal to the ſum of the given ſides, and join B C, ſo ſhall A B C be the triangle required.—For join B D. Then ∠ C = ∠ B + ∠ D = 2 ∠ D by conſtruction; theref. ∠ B = ∠ D, and C B = C D; conſeq. A C + C B = A C + C D the ſum of the ſides.

Note.—This prob. is conſtructed in Simpſon's Algebra, pa. 315; and it is alſo ſolved algebraically in Sir I. Newton's Arith. pa. 110, 2d edit.

Ingenious anſwers were alſo given by Meſſrs Baker, Barlow, Barron, Bates, Bewley, Brewer, Briant, Bryan, Butterman, Campbell, Cavill, Chantry, Chimers, Coben, Collins, Croſby, Eaton, England, Foreſt, Francis, Furnaſs, Gawthrop, Gittins, Gregory, Hawkes, Hearding, Hunter, Jones, King, Leeming, Lightbown, Lockwood, Maddocks, Morley, Myres, Nield, Pritty, O'Riordan, Robarts, Rowe, Scholfield, Scurr, Selkirk, Skewes, Smith, Spencer, Squire, Thompſon, Towan, Wade, Watkins, Wm Wilſon, Wright, &c.

III. QUEST.

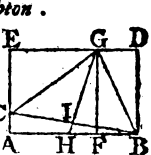
III. Quest. (1091), *anſ. by Mr W. Butterman, Dronfield.*



Conſtr. On the given baſe A C = 20, erect the perps. C I and A D = 4; take A B = 8, and join B D, which biſect in E with the perp. G E I; then will C I be the height of the building, B I the length and firſt poſition of the ladder, and A H the ſecond poſition of the ſame, if H I be taken = A D = 4.—For, joining D I E, then A H = and parallel to D I, becauſe A D = and parallel to H I; alſo B I = D I becauſe E I biſects B D perpendicularly; therefore A H = B I.

Calcul. Let fall the perp. E F, which will be = ½ A D; and, E being a right angle, the two triangles B F E, G F E are equiangular, theref. F B : F E :: F E : F G = 1; and again by ſim. tri. as G F : F E :: G C : C I = 34 the height of the building: then B I = √ (B C² + C I²) = √ (12² + 17²) = √1300 = 36·0555 the length of the ladder.

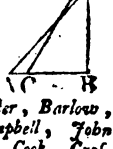
The ſame by Mr John Cavill, Beighton.



Conſtr. In the line A B, take A F = 20, and B F = 12, alſo A C perp. A B and = 4, join B C, which biſect by the perp. H I G, meeting the perp. F G in G; draw B G, G C; then will F G be the height of the houſe, and G B or G C the length of the ladder.—For, completing the rectangle A B D E, becauſe C I = B I, and I is a right angle, theref. G B = G C = the length of the ladder, becauſe A C = the given diff. made in the height by moving the ladder; alſo F G = B D the building's height, and C E the leſs height, A C being the given difference.

Calcul. By ſim. tri. as A B : B C :: B I : B H = 16½; then F H = B H − B F = 16½ − 12 = 4½; and again by ſim. tri. as A C : A B :: F H : F G = 34 the height of the building, alſo C E = 30, laſtly, C G = √ (C E² + G E²) = √ (30² + 20²) = √1300 = 36·055513 the length of the ladder.

The ſame, by Mr Edward Birch, Schoolmaſter, Caſtle Donnington.

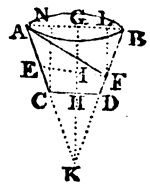


In the annexed figure A B = 20, C B = 12, D E = 4, A E or C D the ladder, and B D the height of the houſe. Put *x* = A E or C D the ladder, and *y* = B D; then $x^2 = 12^2 + y^2$, and $x^2 = 20^2 + (y-4)^2$; theref. $12^2 + y^2 = 20^2 + y^2 - 8y + 16$; hence $8y = 20^2 - 12^2 - 4^2 = 272$; conſeq. $y = 34$, and $x = \sqrt{1300} = 36.0555$ as required.

Ingenious anſwers were alſo given by Meſſrs. Baker, Banniſter, Barlow, Barron, Bates, Boole, Brewer, Bryan, Burdon, Ja. Campbell, John Campbell, Chantry, Chivers, Cleron, Coben, Cole, Collins, Cook, Croſby, Eaton, England, Ewbank, Forreſt, Francis, Franks, Furnaſs, Garſide, Gittins, Golding, Gildſtone, Gregory, Gumley, Hann, Heline, Harman,

Harman, Hawkes, Hearding, Hewitt, Hunter, Jones, Kaye, King, Leeming, Lightbown, Lockwood, Maddocks, Morley, Myers, Nield, Pritty, Purfell, O'Riordan, Robarts, Roch, Rocktree, Rowe, Sabine, Sebolfield, Scurr, Selkirk, Skewes, Smith, Spencer, Squire, Sutcliffe, Swainson, Towan, Thompson, Wade, Watkins, Wilkins, Wilson, Wright, &c.

IV. QUEST. (1092), *anf. by Mr. W. Butterman, Dronfield.*



Draw the lines as in the annexed fig. where A B D C denotes the veſſel, and A B K the cone completed, alſo A F the furface of the liquor when it is juſt one half exhaufted, F being the ſuppoſed mark on the ſide, ſo that the content of the ungula A B F may be juſt equal to that of A C D F. Now, by Hutton's Menſuration pa. 174, as $AFK^2 : AFB^2 :: AB^3 : EF^3$; hence $EF = 3.5884$; then, by ſim. tri. as $BG : GK :: BL : LF = 4.2348$; hence $BF = \sqrt{BL^2 + LD^2} = 4.2932$ inches, the diſtance required.

The ſame, by Mr Joſeph Gittins, Whitechapel.

Let A B D C repreſent the copper, where A B is the greater given diameter, C D the leſs, and G H or L D the given depth; alſo let A F denote the ſurface of the liquor when its loweſt edge juſt touched the required mark at F. Draw E F parallel to C D; continue the ſides A C and B D till they meet at K, completing the cone A B K, of which A B D C is a fruſtum, the whole axis being G K. Now, by ſim. tri. A N : A G :: N C : G K. Find the ſolidity of A B F, the half of the fruſtrum A B D C, by the 6th prob. pa. 188 in the Menſur. 2d edit. for which put s; as alſo the content of the whole cone A B K, for which put S; then the diff. S—s will be the content of the oblique cone A F K. Then, by Cor. 4 pa. 288 Menſur $S^2 : (S-s)^2 :: AB^3 : EF^3 :: BK^3 : FK^3$; hence $BF = BK - FK = 4.2932$ inches, the diſtance of the mark along the ſide below the top of the veſſel, as required.

This queſtion was alſo anſwered by Meſſrs Barlow, Bates, Brewer, Burdon, Campbell, Cavill, Chantry, Collins, Cook, Croſby, Eaton, Ewbank, Foreſt, Francis, Furnaſs, Gregory, Hann, Hawkes, Hearding, Hefford, Helme, Hunter, Jones, Leeming, Lightbown, Lockwood, Maddocks, Morley, Nield, Pritty, O'Riordan, Roch, Rocktree, Rowe, Scurr, Selkirk, Skewes, Smith, Squire, Sutcliffe, Thompſon, Towan, Watkins Wright, &c.

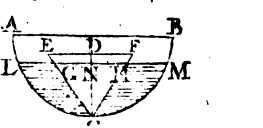
V. QUEST. (1093), *anf by Mr. Tho Cook, Broughton.*

When the axis of the cone is raiſed by the water to an upright poſition, the weight of the water diſplaced will be equal to the whole weight of the cone; and, by hydroſtatics, the content of the cone is to the content of the part immerſed, as the ſpecific gravities of water and oak. Therefore, 16704 n being the content of the whole cone, (n being $= .2618$), we have $1000 : 925 :: 16704\,n : 15451\frac{1}{5}\,n$ the content of the part under water; alſo the altitudes of ſimilar cones are as the cube root of their ſolidities, theref. as $\sqrt[3]{1000} : \sqrt[3]{925} :: 29 : \frac{29}{10}\sqrt[3]{925} = 28.25607$ the

depth

depth of the water, or the verſed ſine of the ſpherical ſegment: then, $28{\cdot}25607^2 \times {\cdot}5236 \times (60 \times 3 - 28{\cdot}25607 \times 2) = 51623{\cdot}496$ the content of the whole ſegment, from which taking 4045·124 the content of the cone under water, leaves 47578·373 the number of cubic inches, which being divided by 282, gives 168·717 the number of gallons required.

The ſame, by Mr. P. Leeming, Horſforth.



Let A C B be the veſſel, E C F the cone, and L M the ſurface of the water. Then $24^2 \times {\cdot}2618 \times 29 = 4373{\cdot}107$ inches the ſolidity of the cone; and 1000 : 925 :: 4373·107 : 4045·124 the cubic inches of a cone of water equal in weight to the oaken cone, or the ſolid content of the cone G C H; then, by ſim. cones, as cone E C F : cone G C H :: D C^3 : N C^3 = 22559·825, hence N C = 28·256 the depth of the water; then, by the property of the circle, L N = 29·9492, and by menſur. $(3\,L\,N^2 + C\,N^2) \times C\,N \times {\cdot}5236 = 51623{\cdot}29944$ the ſolidity of the ſegment L C M, from which taking the cone G C H, the remainder will be 47578 inches = 168·7169 gallons, to be poured in.

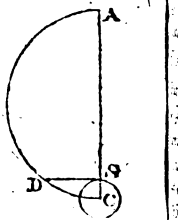
Some ingenious reflections on the motions of the cone in the water were added by Mr. Gregory to his ſolution, which we are ſorry there is not room to inſert.

Ingenius ſolutions were alſo given by Meſſrs. Baker, Barlow, Barron, Boole, Burdon, Buttermann, Campbell, Cavill, Gvantry, Collins, Crosby, Eaton, Eley, Ewbank, Francis, Furnaſs, Gawtbrop, Gittins, Hawkes, Hearding, Helme, Jones, Lightbown, Lockwood, Maddocks, Morley, Myres, Nield, Pritty, Robarts, Roch, Rockiree, Rowe, Scurr, Skewes, Squire, Swainſon, Terry, Towan, Watkins, Wade, Wright, &c.

VI. Question (1094), *anſwered by Mr. O. G. Gregory, Cambridge.*

In a former letter I ſpoke pretty much at large on the ſubject of this queſtion, and the various ſolutions which have been given of it. It does not appear neceſſary to repeat all thoſe particulars again. I ſhall juſt obſerve here, that Mr. Thorp, in his Commentary on Newton's Principia, pa. 193, makes the time in the example of the moon's falling to the earth, to be 4 da. 19h. 55½ m. reckoning the earth as a point. In Mr. Whiſton's Mathematical Philoſophy, pa. 72, the time is ſtated at 4 da. 20 h. In Dr. Hutton's Conics and Select Exerciſes, pa. 183, and in his Courſe, vol. 2, pa. 337, the time is 4 da. 19 h. 46 m. 46 ſec. accounting the earth's radius 3965 miles, and the moon's diſtance 60 times that radius. The problem is diſcuſſed very clearly, though popularly, in Baxter's Matho, vol. 2, pa. 306, 308; but he has not calculated for this particular example.

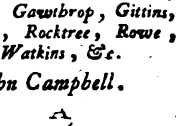
The same. by Mr. Tho. Towan, Redruth.



Put $r =$ C S the earth's radius, $a =$ C A the height above the earth's centre, $t =$ the time of falling through A S, and $g = 16\frac{1}{12}$ feet; then, in Dr. Hutton's Mathematics, vol. 2, pa. 337, we have the following theorem, $t = \frac{1}{2}\sqrt{\frac{a}{g}} \times \frac{AD + DS}{SC}$ for the time of descent to the earth's surface at S.——In the case of a body's falling from the height of the moon; $r = 3965$ miles, $a = 60\,r$, and $t = 416806$ sec. $= 4$ da. 19 h. 46 m. 46 sec. the time of falling from the moon to the earth.

This question was also answered by Messrs. Briant, Burdon, Butterman, Collins, Crosby, Eaton, Francis, Furnass, Garside, Gawthrop, Gittins, Hawkes, Lockwood, Maddocks, Morley, O Riordan, Rocktree, Rowe, Scurr, Smith, Skewes, Wm Stackhouse, Swanwick, Watkins, &c.

VII. Quest. (1095), *answ. by Mr. John Campbell.*



The spaces moved over by the point Q, in the 1st, 2d, 3d, 4th, &c seconds, form the arithmetical progression 1, 5, 9, 13, &c feet, the common difference being 4. If x denote the number of its terms, or the time in motion; then $4(x-1)+1 = 4x-3$ will be the last term, to which add the first term 1, gives $4x-2$ the sum of the extremes; then $\frac{1}{2}x(4x-2) = 2x^2-x$ is the whole sum of the series $=$ the line or distance B Q passed over. In the same time x the distance C P passed over by the uniform motion is $6x$, conseq B P $= 400 - 6x = a - 6x$, putting $a = 400$. Let Q D be perp. B P, and put s and $c =$ sine and cosine $\angle$ B (44°); then, by trigon. $1 : BQ :: s : DQ = s(2x^2-x) :: c : BD = c(2x^2-x)$; hence, D P $=$ B P $-$ B D $= a - 6x - c(2x^2-x) = a - 2cx^2 - x(6-c) = a - 2cx^2 - dx$, putting $d = 6-c$; then $PQ^2 = PD^2 + DQ^2 = (a - 2cx^2 - dx)^2 + s^2(2x^2-x)^2$; the fluxion of this put $= 0$, the resulting equation in numbers will be $16x^3 + 39.7925x^2 - 2245.1515x = 4224.528$; hence, by Dr. Hutton's easy approximation in his Course of Maths. vol. 1, find $x = 11.588$ seconds, the time required. Then B Q $= 2x^2 - x = 256.935$; D Q $= 178.479$; B D $= 184.82$; D P $= 145.658$; Q P $= 230.3712$ feet.

Ingenious answers were also given by Messrs. Barron, Brewer, Burdan, Carr, Cavill, Chantry, Collins, Crosby, Eaton, Furnass, Gittins, Hann, Hawkes, Hearding, Jones, Lancaster, Morley, Nield, Pritty, Rocktree, Rowe, Skewes, Smith, Squire, Swainson, Watkins, White, Wright, &c.

VIII. Quest. (1096) *answ. by Mr Joseph Brewer, Preston.*

It is shewn by the writers on Fluxions, that a pyramid is the greatest, when its altitude is $\frac{1}{3}$ the given slant side drawn into $\sqrt{3}$, and the side of its square base $\frac{2}{3}$ the slant side drawn into $\sqrt{6}$; theref. $40\sqrt{3} = 69.28203$ is the altitude, and $80\sqrt{6} = 195.9591794$ is the side of the base

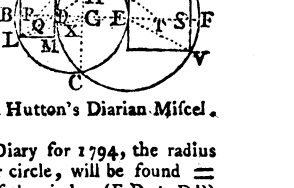
base, conseq. $80^2 \times 6 \times 40\sqrt{3} \div 3 = 80^3\sqrt{3}$ feet, $960^3\sqrt{3}$ inches the solid content, this divided by 150, the cubic inches in a brick, gives $64 \times 96 \times 960\sqrt{3} = 10216051\frac{1}{3}$ nearly, is the number of bricks required.

The same, by Mr Alex. Rowe, Reginnis, near Penzance.

Put the slant side 120 feet $= a$, and the altitude $= 3x$, then $2\sqrt{a^2 - 9x^2}$ = the length of a side of the base; hence, $4a^2 - 36x^2$ is the area of the base, and $4a^2x - 36x^3$ is the solidity, a maximum. The fluxion of which being made $= 0$, and reduced, gives $x = \frac{1}{9}a\sqrt{3}$. Hence, $3x = \frac{1}{3}a\sqrt{3} = 69.282$ &c. is the altitude, and $\frac{2}{3}a\sqrt{6} = 195.959$ &c. the side of the base. Also the solidity in feet is $.886810 = 1532407680$ cubic inches, which divided by 150 $(= 10 \times 5 \times 3)$ gives $10216051\frac{1}{3}$, the number of bricks required to build the pyramid.

Ingenious answers were also given by Messrs. Baker, Barlow, Barron, Bates, Boole, Briant, Burdon, Campbell, Cavill, Chantry, Chivers, Collins, Cook, Crosby, Eaton, Ewbank, Forest, Francis, Furnass, Gawthrop, Gittins, Hann, Harman, Hawkes, Hearding, Helm, Jones, Lightbourn, Lockwood, Maddocks, Morley, Myres, Nield, O'Riordan, Roberts, Rocktree, Scurr, Selkirk, Smith, Swainson, Terry, Towan, Wade, Watkins and Mr Gregory, whose ingenious geometrical disquisitions on this problem we are obliged reluctantly to omit.

IX. Quest. (1097) *ans. by Mr Wm Burdon, Acaster Malbis.*



Constr. Join A C, cutting D F passing thro' the centres of the circles in G; make G H $= \frac{1}{2}$ D G, and produce H G till it meet the circumf. in L; draw L K perp. B D; then will L M N K evidently be the square inscribed in the lune A B C D A. In the same manner may the greatest square be inscribed within the other lune.——N. B. The method of inscribing a square within A D C E A is given at quest. 394 Hutton's Diarian Miscel. vol. 3.

Calcul. From the anf. to quest. 964 Ladies Diary for 1794, the radius E D, to cut off half the given area of the other circle, will be found $= 11.387167$. And, by a well known property of the circle, $(E D + DP) \times (BD - DP) = P K^2 = \frac{1}{4} D P^2$, which gives $D P = 7.653978$, the side of the square L M N K. Again, $BE : ED :: ED : EG = 5.713122$, and by 47 Euclid 1, $AQ = \sqrt{GQ^2 + ED^2} - EG^2 = 12.840834$, the distance of the centre of the square from the horn A or C. And nearly in the same manner the side of the square inscribed within the lune A E C F A is found $= \frac{2}{5} E D\sqrt{5} = 10.363935$, and the distance of its centre from A or C, $= 15.188468$; whence the distance between the centres of the squares is 20.595123.

The same, by Mr Gregory, the Proposer.

It is now pretty well known, or at least may be learned from Martin's Magazine for July 1762, pa. 898, and the Ladies Diary 1794, pa. 42, that

B E : D F :: 1 : 1·15873, under the conditions expressed in the question; hence E F or E D = 11·5873, and B D = 20—E D = 8·4127.

Let P K or P Q be denoted by x; then, by the nature of the circle, as E P : P K :: P K : P B, or as $11{\cdot}5873 + 2x : x :: x : 8{\cdot}4127 - 2x$, hence, multiplying extremes and means &c. $x^2 + 1{\cdot}26984x = 19{\cdot}436095742$, and $x = 3{\cdot}825934 =$ P K = Q D. After a method nearly similar might R S be found by a *simple* equation. But it may be otherwise found by considering that as Q R S = S E, and E is the centre, the angle V E F is such that its cosine is double its sine, and theref. its sine is $\frac{1}{5}\sqrt{5}$, and answers to about 26° 33′ $\frac{11}{12}$; hence, as radius 1 : $\frac{1}{5}\sqrt{5}$ :: E V = E F : E S = $11{\cdot}5873 \times \frac{1}{5}\sqrt{5} = 5{\cdot}18199988$ or 5·182 very nearly = S T or T E. We therefore readily find Q T = Q D + D E + E T = 20·595234, the distance between the centres of the two inscribed squares.

Now it may be easily demonstrated that B F — D E : D E :: F G — G E (or F E) : G E, that is 20 : $11{\cdot}5873 :: 11{\cdot}5873 : 6{\cdot}71325$ = G E; then B E — G E = 13·28675 = B G, and G A or G C = $\sqrt{\text{B G} \times \text{G E}} = 9{\cdot}44443$. Again, D G = D E — G E = 4·87405; theref. G Q = Q D + D G = 8·099984, also G T = G E + E T = 11·89525. Lastly, $\sqrt{2\,\text{G}^2 + \text{G A}^2} = 12{\cdot}840735 =$ A Q, and $\sqrt{\text{G T}^2 + \text{G A}^2} = 15{\cdot}188522 =$ A T, the distances sought.

Other ingenious answers to this question were given by Messrs. Butterman, Campbell, Covill, Chantry, Eaton, Furnass, Lockwood, Rocktree, Scurr, Smith, Watkins, Wright, &c.

X. Quest. (1098), *ans. by Mr P. Barlow, Shipdham.*

Let N = 240, $n = 1\frac{2}{9}$, $v = 10$, $g = 16\frac{1}{12}$ feet, $p = 3{\cdot}1416$, and x the diameter of the ball in feet. Then, by Dr. Hutton's Course of Maths. vol. 2, pa. 354, $\frac{1}{6}pnx^3$ (N—n) is the force by which the ball is urged, and $\frac{pnv^2x^2}{32g}$ the resistance it meets with; which are equal when the velocity becomes uniform; theref. $\frac{1}{6}px^3(\text{N} - n) = \frac{pnv^2x^2}{32g}$; hence $x = \frac{3nv^2}{16g(\text{N}-n)} = {\cdot}0059673$ of a foot, or $\frac{1}{14}$ of an inch very nearly; the diameter of the ball.

The same, by Mr John Barron, Spilsby.

Put N = 240, $n = 1\frac{2}{9}$, $v = 10$ feet, $g = 16\frac{1}{12}$ feet, $p = 3{\cdot}1416$, and x = the ball's diameter. Then, by Dr. Hutton's Course, vol. 2, p 354) $\frac{1}{6}px^3$ (N—n) is the force or weight by which the ball is urged, and $pnv^2x^2 \div 32g$ is the resistance it meets with; but these being equal by the quest. reduction gives $x = 3nv^2 \div 16g(\text{N}-n) = {\cdot}0059673$ of a foot, the diam. of the ball required.

The Same, by Mr. Wm Francis, jun. Academy, Maidenhead.

Put x for the cork's diam. $g = 16\frac{1}{12}$, N = 240, $n = 1\frac{2}{9}$, Then, by Dr. Hutton's Course, vol. 2, pa. 354, $\sqrt{(49 \times \frac{1}{9}x \times \frac{\text{N}-n}{x})} = 10$.

Hence,

Hence, $64\frac{1}{2} \times \frac{4}{3}x \times 238\frac{7}{9} \div 1\frac{2}{9} = 10^2$, or $x = .00596735$ foot, the cork's diameter.

The ſame, by the Rev. J. Furnaſs, Ponteland.

Let $x =$ the globe's diameter, $N = 240$, $n = 1\frac{2}{9}$, $v = 10$ feet, $g = 16\frac{1}{12}$, and $p = 3.1416$; but $N - n$ is the relative gravity of the globe in the fluid. Then, by the Select Exerciſes or the Courſe, $\frac{1}{6} p x^3 (N - n)$ is the weight by which it is urged, and $p n v^2 x^2 \div 32 g$ is the reſiſtance, conſeq. $\frac{1}{6} p x^3 (N - n) = p n v^2 x^2 \div 32 g$ when the velocity becomes uniform; hence, $x = 3 n v^2 \div 16 g (N - n) = .00596734$ of a foot, is the diameter of the cork.

Ingenious ſolutions were alſo given by Meſſrs Baker, Brewer, Burdon, Batterman, Cavill, Chantry, Chivers, Collins, Croſby, Eadon, Gawthrop, Gregory, Hawkes, Hearding, Henry, Lockwood, Macdonald, Maddocks, Morley, Robarts, Roch, Rowe, Scurr, Skewes, Stuckbouje, Terry, Towan, Watkins, Wright, &c.

XI. Quest. (1099) *anſwered by the Propoſer.*

Theorem 1. If d be any number, then $\sqrt{d^2 + d + 1)^2 \times \overline{d + 1)^2 + d + 2)^2} \pm d + 1)^2 \times 4}$ will be two ſquares, whoſe roots are $2d^2 + 4d + 3$, and $2d^2 + 4d + 1$.

Theorem 2. If a and b be any two numbers; then $\sqrt{a^2 + b^2)^2 \pm a + b \times a - b \times 4ab}$ will be two ſquares, the roots being $a^2 \pm 2ab - b^2$.

The number 13 is compoſed of two ſquares, $4 + 9$, whoſe roots are 2 and $2 + 1$; if therefore we make $d = 2$, the firſt theorem gives the two ſquares $13 \times 25 + 36$ and $13 \times 25 - 36$.

Let $c = 13$, $t^2 = 25$, $s^2 = 36$; and put ct^2 for a, and s^2 for b in the ſecond theorem; then $\sqrt{c^2 t^4 + s^4)^2 \pm c t^2 + s^2 \times c t^2 - s^2)} \times 4 c t^2 s^2$ will be two ſquares. But $c^2 t^4 - s^4 \times 4 s^2 t^2$ will be a ſquare number, becauſe $c^2 t^4 - s^4$ (the product of two ſquare numbers) is a ſquare; and conſeq. $\frac{\overline{c^2 t^4 + s^4)^2}}{c^2 t^4 - s^4 \times 4 t^2 s^2} = 30\frac{16456241}{27558400}$ is a ſquare number, and is *that* required (n^2); for $\frac{\overline{c^2 t^4 + s^4)^2}}{c^2 t^4 - s^4 \times 4 t^2 s^2} \pm c =$

$\frac{\overline{c^2 t^4 + s^4)^2 \pm c^2 t^4 - s^4 \times 4 c t^2 s^2}}{c^2 t^4 - s^4 \times 4 t^2 s^2}$ where the numerator is the two ſquares as before.

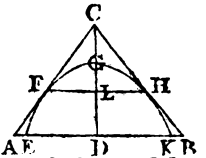
Hence it appears that the queſtion will always admit of an anſwer when the given number *plus* and *minus* a ſquare, are both ſquares. If the given number is the difference of two ſquares, whoſe ſum is a ſquare, the anſwer may be found by means of the ſecond theorem only.

This queſtion is in Lucas de Burgo's *Summa de Arithmetica &c. an.* 1494. The anſwer is given without the proceſs. We find two or three other queſtions of the ſame kind, but the author has omitted the inveſtigations, except in a particular and very obvious *caſe*. His anſwers however were probably

bably obtained by means of a table of *congrous numbers and squares* (as he calls them): these numbers are such that the latter *plus* and *minus* the former, are both squares: they are readily found by the second theorem above; thus, if $a = 2$, $b = 1$; then 24 and 25 are his first pair; for 25 ± 24 are both squares. If $a = 3$, $b = 2$; then 120 and 169 are two others; &c.

True answers to this curious question were given by Messrs. Collins, Henry, and Mr. O'Riordann. Some gentlemen refer, for methods of solution, to the algebras of Emerson and Euler.

XII. QUEST. (1100), *answered by Mr Wm Burdon, Acaster Malbis.*



The parabolic conoid E F G H K, inscribed in the cone A B C, is the greatest when the subtangent C L is $= \frac{2}{3}$ C D, by the Schol. to prop. 19 Simpson on the Max. et Min. Now, by cor. 2 prop. 5, pa. 105 Dr. Hutton's Conic Sect. L G $=$ G C $= \frac{1}{3}$ C D, theref. G D $= \frac{2}{3}$ C D the height of the paraboloid. By sim. tri. C D : A D :: C L : L F $= \frac{2}{3}$ A D; and, by prop. 1, pa. 98 Conics, $\surd$ G L : $\surd$ G D :: F L : E D $= \frac{1}{3}$ A D $\surd 2$. the radius of the conoid's base.

Schol. The solidity of the cone, is to that of its greatest inscribed paraboloid as 9 is to 8.

The same, by Mr J. Chantry, Boston.

Let A B $= b$, C D $= a$, C G $= x$, G D $= a - x$, F L $= y$; then, by the properties of the parabol. G L $= x$, and $x : y^2 :: a - x : (a y^2 - x y^2) \div x =$ D E^2; and, by sim. tri. $a : \frac{1}{2} b :: 2x : b x \div a = y$; this substituted for y, gives $(a b^2 x - b^2 x^2) \div a^2 =$ D E^2. Then, the solidity of the conoid $= (a b^2 x - b^2 x^2) \times 3{\cdot}1416 \times (a - x) \div 2 a^2$ a max. or $a^2 x - 2 a x^2 + x^3$ a max. this in flux. and reduced, gives $x = \frac{1}{3} a$, conseq. D G $= \frac{2}{3} a = \frac{2}{3}$ C D, or the height of the conoid is $\frac{2}{3}$ of that of the cone.

The same, by Mr Wm Eaton, jun. Sutton on the Hill.

Put C D $= a$, A D $= b$, and $x =$ C G $=$ G L by the nature of the parabola; by sim. tri. $a : b :: 2x : 2 b x \div a =$ F L $= cx$, putting $c = 2 b \div a$; and by the parab. $x : c^2 x^2 :: a - x : a c^2 x - c^2 x^2 =$ D E^2; hence the content is $3{\cdot}1416 \times (a c^2 x - c^2 x^2) \times \frac{1}{2} (a - x)$ a max. this in fluxions &c. gives $x = \frac{1}{3} a$; theref. D G $= \frac{2}{3}$ C D, when the conoid is the greatest.

The same, by Mr. Gregory, Cambridge.

Let A B C represent a section through the axis C D of the cone, and E F G H B of the paraboloid; we have given the diam. A B $= 2c$ and C D $= a$. Put D G $= x$; then G L $= a - x =$ C G (by theor. 5 on the parabola Hutton's Conics), theref. C L $= 2a - 2x$. By sim. tri. C D : A D :: C L : F L, that is $a : c :: 2a - 2x : \frac{c}{a} \times (2a - 2x)$, and by the nature of the parab. (Hutton's Theor. 1) G L : G D :: F L^2 : D F^2

$D E^2$, that is, $a - x : x :: \frac{c^2}{a^2}(2a - 2x)^2 : \frac{c^2}{a^2}(4ax - 4x^2) =$ $D E^2$. When the paraboloid is the greateſt, $D E^2 \times D G$ is a max. that is $\frac{c^2}{a^2}(4ax - 4x^2) \times x$; or (dropping $\frac{4c^2}{a^2}$ which is conſtant) $ax^2 - x^3$ is a max. this in fluxions, &c. gives $x = \frac{2}{3}a$, or $G D = \frac{2}{3} C D$ whatever the diam. A B may be.

Remark. Since a paraboloid is half a cylinder of equal baſe and altitude; the content of the greateſt inſcribed paraboloid becomes $\frac{8}{27} a p c^2$, putting $p = 3.1416$. And it has been proved by various writers, that the greateſt cylinder in a cone, is that whoſe altitude is $\frac{1}{3}$, and diam. of the baſe $\frac{2}{3}$, thoſe of the cone, and conſeq. its ſolidity $(\frac{2}{3} c)^2 \times \frac{1}{3} a \times p = \frac{4}{27} a p c^2$. Hence it appears that the greateſt paraboloid is juſt double the greateſt cylinder, in the ſame cone.

Ingenious anſwers were alſo given by Meſſrs. Barlow, Brewer, Cavill, Chivers, Collins, Crosby, Ewbank, Furnaſs, Hann, Hawkes, Hearding, Henry, Hunter, Morley, O'Riordan, Rocktree, Rowe, Scurr, Skewes, Smith, Terry, Watkins, &c.

XIII. Question (1101), *anſ. by Mr. John Carr, the Propoſer.*

To enter fully into the nature of the ſeries, $\epsilon(1 - B \cos. \beta z - C \cos \gamma z - D \cos. \delta z$ &c.), which Mr. Simpſon aſſumes for the reciprocal of the moon's diſtance from the earth's centre, would require more room than can be allotted to it in the Diary. I ſhall therefore briefly anſwer it in the following manner.

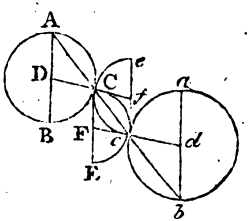
In the aſſumed ſeries, the quantities ϵ, B, C, D, β, γ, δ, &c. are all ſuppoſed to be conſtant quantities; it follows therefore, that when z returns to any given magnitude, the reciprocal of the diſtance, and conſeq. the diſtance of itſelf, will *always* return to a correſponding given magnitude: but this is impoſſible, on account of the motion of the apoge, if z be meant to expreſs the angular diſtance of the moon from a fixed point, which ſhe is ſuppoſed to depart from; and if z be ſuppoſed to expreſs the angular diſtance of the moon from the apoge, then it will have a different value from the z uſed in finding the fluxionary equation of the orbit in the preceding part of the work. Thoſe two therefore having different values cannot be properly incorporated as if they had one and the ſame value, as is actually done in the ſubſequent part of the work.

On the former ſuppoſition therefore the aſſumed ſeries can expreſs the reciprocal of the diſtance only for one periodical revolution; and on the latter ſuppoſition the whole of the ſubſequent work muſt be erroneous.

There is ſomething ſimilar to this at pa. 162 of that performance; where, in order to expreſs the angular diſtance of the moon from the ſun in terms of z, (that the aſſumed forces may be compared with the time) the ſun and moon are ſuppoſed to depart from a given line, *at the ſame time*; and, in conſequence of that ſuppoſition, double the angular diſtance is ſuppoſed to be pz; where $p = 2(1 - m)$, and m the periodical time of the moon in parts of a year. But here again it is plain that pz can expreſs the double angular

angular distance of the moon from the sun only for one revolution; it cannot properly therefore be made the *constant* representative of that distance. It plainly appears then, from these considerations, that the whole of that ingenious, intricate, and elaborate performance, is limited to the ascertaining of the lunar orbit for one revolution of the moon only, from the time of her first departure from the fixed point she is supposed to be set off from, under the circumstances and restrictions mentioned, or understood, in the performance alluded to, and consequently the inference made by the ingenious author, at the close of that work, concerning the return of the equations to the same magnitude cannot be fairly deduced from any thing he has there done.

XIV. Question (1102), *anf. by J. G. the propofer.*



Let A B and *a b* be the vertical diameters of the two given circles A C B, *a c b*; join A B, cutting the two circles in C and *c*; then fhall the line C *c* be the line of quickeft defcent between the two circumferences.

Firft, from whatever point C, in the circle A C B, the body begins to defcend, the required line C *c* from that point when produced, muft pafs through the loweft point *b* of the other circle. For, through the point *c* draw the radius *d c*, produced to meet the vertical line C E in F: then becaufe of the parallels, the two triangles *b d c*, C F *c* are fimilar; and becaufe *d b* = *d c*, theref. F C = F *c*; confeq. a circle C *c* E, defcribed with the centre F and radius F C, will pafs through the point *c*, and be a tangent to the circle *a c b* at that point, and it is theref. the leaft circle, having its centre in the vertical C E and any where meeting the given circle *a c b*. But, by mechanics, the time of defcent down the chord C *c* is equal to the time in the diameter C E, which diameter being the leaft, the time in it and confeq. in C *c* is the leaft alfo.

In like manner, to whatever point *c*, in the lower circle, the body muft defcend, the line C *c* produced upwards, muft pafs thro' the higheft point A; this is proved in the fame way, by drawing D C *f* from the centre C to meet the vertical line *c f e* in *f*, and from the centre *f* defcribing the leaft or tangential circle *c* C *e*; then, again, the time in the chord C *c* is = the time in the diam. *e c*, which is the leaft as before.——Confeq. the line muft be drawn from the higheft point A to the loweft point *b*, to have the intercepted part C *c* paffed over in the fhorteft time.

This queftion was alfo anfwered by Meffrs. Buttermann, Furnafs, Kaye, Terry, and Watkins.

XV. *Or* Prize Question (1103), *anfwered by Amicus.*

Since every inferibed cone is the greateft poffible, its greateft inferibed cylinder muft alfo touch the folid in the fame circle parallel to the bafe. Let y = the radius of this circle; and s = the length of the correfponding cylinder, whofe folidity, being conftant, made = $4 p c^3$, which is therefore = $f y^2 s$, or $y^2 s = 4 c^3$; hence the curve is the fecond hyperbolism of the parabola, or Newton's 65th fpecies.

Alfo

Alſo $y^2 = \frac{4c^3}{s}$, and $y = 2\sqrt{\frac{c^3}{s}}$, and $y\dot{s} = 2\dot{s}\sqrt{\frac{c^3}{s}}$, the fluent $= 4c^{\frac{3}{2}}s^{\frac{1}{2}}$, or $4c^{\frac{3}{2}} \times (s^{\frac{1}{2}} - d^{\frac{1}{2}}) =$ the quadrature, where d is the valve of s at the point where the curve is ſuppoſed to begin.

And $p y^2 \dot{s} = \frac{4pc^3}{s}\dot{s}$, and $4pc^3 \times$ hyp. log. $\frac{s}{d}$ the cubature.

Again, $\dot{y} = -\frac{c^{\frac{3}{2}}}{s^{\frac{3}{2}}}\dot{s}$, and $\sqrt{(\dot{s}^2 + \dot{y}^2)} = \dot{s}\sqrt{(1 + \frac{c^3}{s^3}}$ the flux. of the rectifications, its fluent is $s\sqrt{(1 + \frac{c^3}{s^3}} +$ flu. of $\frac{3c^3}{2s^3\sqrt{(1+\frac{c^3}{s^3})}}\dot{s}$. Let

$1 + \frac{c}{s} = w$; $\frac{c}{s} = w - 1$; $s = \frac{c}{w-1}$; $\dot{s} = -\frac{\dot{w}c}{(w-1)^2}$; $\frac{3c^3}{2s^3\sqrt{(1+\frac{c^3}{s^3})}}\dot{s} = -\frac{3(w-1)^3 \cdot c}{(w-1)^2 \cdot 2\sqrt{1+(w-1)^3}}\dot{w} = -\frac{3c}{2}\cdot$

$\frac{w-1}{w^{\frac{1}{2}}\sqrt{3-3w+w^2}}\dot{w} = -\frac{3c}{2}\cdot\frac{w^{\frac{1}{2}} - w^{-\frac{1}{2}}}{\sqrt{3-3w+w^2}}\dot{w}$. This being compared with theorems 21 and 22, table 12 of Landen's Memoirs, $y = w$; $f = \frac{3}{2}$; $g = \sqrt{3}$; $x = \frac{1}{2} - w + \sqrt{3-3w+w^2}$;

$\frac{a^2-b^2}{2a} = \frac{3}{2}$; $\frac{a^2+b^2}{2a} = \sqrt{3}$; $a = \frac{3}{2} + \sqrt{3}$; $\frac{b^2}{a} = \sqrt{3} - \frac{3}{2}$; D P $= \sqrt{2}\,a\,w = \sqrt{w.(3+2\sqrt{3})}$: a e = area of the ellipſis adjoining to the conjugate axis, whoſe tranſvere axis $= 2\sqrt{a^2+b^2}$, and conjugate $= 2b$, or whoſe ſemitrans. $= \sqrt{a^2+b^2} = \sqrt{3} \times (\sqrt{\frac{3}{2}} + \sqrt{\frac{1}{2}})$, and ſemiconj. $= \frac{1}{2}\sqrt{2} = b$, abſciſſa $\sqrt{2}\sqrt{3}$. $\sqrt{a-x} = \sqrt{2\sqrt{3}}\cdot\sqrt{3+w-\sqrt{3-3w+w^2}}$, ordinate $b\sqrt{\frac{x}{a}} = \sqrt{\frac{x}{2-\frac{4}{3}\sqrt{3}}}$; A D = the arc of an hyperbola whoſe ſemitranverſe axis $= a$, ſemiconj. $= b$, tang. D P $= \sqrt{w(3+2\sqrt{3})}$, perp. CP $=$ $\sqrt{ax}$; fluent of $\frac{w^{-\frac{1}{2}}}{\sqrt{(3-3w+w^2}}\dot{w} = \frac{2\sqrt{2}\,a}{b^2} \times$ (a e $\times$ A D $-$ D P), and of $\frac{w^{\frac{1}{2}}}{\sqrt{3-3w+w^2}}\dot{w} = \frac{2\sqrt{2}\,a}{b^2} \times$ ($\frac{3}{2}$ a e $+ \sqrt{3}$. (AD $-$ D P) $+ \frac{b^2}{2a}$ D P); their diff. $= \frac{2\sqrt{2}\,a}{b^2} \times (-\frac{1}{2}$ a e $+ (1-\sqrt{3})$. (AD $-$ D P)

$-\mathrm{D\,P}) - \frac{b^{\frac{1}{2}}}{2a}\cdot \mathrm{D\,P})$ is the fluent of $\frac{w^{-\frac{1}{2}} - w^{\frac{1}{2}}}{\sqrt{(3 - 3w + w^{\frac{1}{2}})}}\dot{w}$. But at the beginning of the curve, when $s = d$ and $w = 1 + c \div d$, $\mathrm{D\,P} = \sqrt{(1 + \frac{c}{d})} \times (3 + 2\sqrt{3}) = \sqrt{\frac{a}{x}} \times \sqrt{\frac{1}{4} + 3x - x^{\frac{1}{2}}}$, or $(2 + \frac{2c}{d})x = \frac{1}{4} + 3x - x^{\frac{1}{2}}$, and $x = \frac{1}{2} - \frac{c}{d} + \sqrt{(1 - \frac{c}{d} + \frac{c^2}{d^2})}$. Let the value of $a\,e$ to this value of x be $= A$, that of $\mathrm{A\,D} = B$, and of $\mathrm{D\,P} = \sqrt{(2a \cdot \frac{d+c}{d})} = C$; then the corrected fluent of $\frac{w^{\frac{1}{2}} - w^{\frac{1}{2}}}{\sqrt{(3 - 3w + w^{\frac{1}{2}})}}\dot{w}$ is $\frac{2\sqrt{2a}}{b^{\frac{1}{2}}} \times \left(\frac{A - a\,e}{2} - \sqrt{3} - 1 \cdot \overline{\mathrm{A\,D} - \mathrm{D\,P} - B + C} - \frac{b^{\frac{1}{2}}}{2a}\overline{\mathrm{D\,P} - C}\right)$; and the required rectification $=$

$s\sqrt{(1 + \frac{c^3}{s^3}} - d\sqrt{(1 + \frac{c^3}{d^3}} + \frac{3c\sqrt{2a}}{b^{\frac{1}{2}}} \times \left(\frac{1}{2} \cdot \overline{A - a\,e} + 1 - \sqrt{3} \cdot \overline{\mathrm{A\,D} - B - \mathrm{D\,P} + C} - \frac{b^2}{2a} \cdot \overline{\mathrm{D\,P} - C}\right)$.

Again, the flux. of the superficies of the solid is $2py\sqrt{(\dot{y}^2 + \dot{s}^2)} = 4p\frac{\sqrt{c}}{s}\dot{s}\sqrt{(1 + \frac{c^3}{s^3})}$. Let $\frac{c}{s} = u$; then $\frac{c}{u} = s$; $\dot{s} = -\frac{c}{u^2}\dot{u}$; and $2py\sqrt{(\dot{y}^2 + \dot{s}^2)} = 4pc^2 \times -\dot{u}\sqrt{(1 + \frac{1}{u^3})}$, which fluxion being of the very same form as that for the rectification above, its fluent will be found in the very same manner.

Moreover, since $s = \frac{1}{3}$ of the altitude of the cone, and $y = \frac{2}{3}$ of the radius of the cone's base, its slant height $= \sqrt{9s^2 + \frac{9}{4}y^2} = \frac{3}{2}\sqrt{4s^2 + y^2} = 3\sqrt{(s^2 + \frac{c^3}{s})}$, which is a minimum when $2s = \frac{c^3}{s^2}$ or $s = \frac{c}{\sqrt[3]{2}}$, the slant height being then $= \frac{3c}{\sqrt[3]{2}}\sqrt{1 + 2} = \frac{3\sqrt{3}}{\sqrt[3]{2}}c$, which being given by the question, c is given, and consequ. all the rest.

Answers were also given by Messrs. Croudace, Furnass, Rocktree, Surtees, Terry, and Watkins.

NEW QUESTIONS.

I. Quest. (1104), *by Mr Henry Rocktree, Olive Park.*

Required a solution to a question 47 of Dr Hutton's translation of Montucla's Recreations, vol. 1, pa. 426; viz. 'An angle, and a point within it, being given; required the position of the line passing through the given point, when the rectangle of the sides of the angle cut off by it, towards the vertex, is the least possible.

IX. Quest.

II. Quest. (1105), *by Mr Wm Maddocks, Gravesend.*

A gentleman has in his garden a stone, in the form of an oblong spheroid, the transverse diameter of which is 100 inches, and the conjugate 70, which he is desirous of having made into the largest rolling stone that it will admit of; but the stone mason, being unskilled in mathematics, will be obliged to Lady Di. to inform him how much of the transverse diameter he must cut off from each end.

III. Quest. (1106), *by Mr Thos Squire, Baldock.*

The pike of Teneriffe lying in north lat. 28° 29′; now on Midsummer Day 1800, the sun was observed to rise 11 min. 28 $\frac{2}{5}$ sec. sooner on the summit of the mountain than on the plain below; on this observation it is required to compute the height of the mountain, allowing for the sun's semidiameter, refraction, and parallax; and taking the earth's diameter at 7964 miles.

IV. Quest. (1107), *by the Rev. J. Furnass, Ponteland.*

Two persons; A and B, found a square ingot of pure silver, being 40 inches in length, and 8 inches on each side, which they carried home between them, each extremity resting on their shoulders; and then agreed to share it in proportion to the weight or pressure sustained by each, the height of A's shoulder being 5 feet, and that of B's 4 feet; required the value of each man's share, at the rate of 5 shillings the ounce.

V. Quest. (1108), *by Mr Wm Eaton, jun. Sutton on the Hill.*

D, aged 66 years, is heir to an estate of L.120 per annum, at the decease of C, aged 73, if it should happen that C survives A and B, who are now in possession for their lives, and of the ages of 68 and 50. Now D wishes to part with his interest in the estate, for an annuity for his life; what ought this to be, allowing interest at 5 per cent, also supposing the decrements of life to be equal, and the extremity of old age 86.

VI. Quest. (1109), *by Mr Rd Smithson, Upleatham.*

There is a field C B D, limited by a curve C B, which is the involute of a circle, whose radii D C, D E form an angle C D E of 145 degrees; D C is equal 12 chains, and B E is a tangent to the generating circle, at right angles with D E; hence the length of the curve and area of the field are required.

VII. Quest. (1110), *by Mr Wm Francis, jun. Maidenhead.*

A clock maker having put a new pendulum to an old time-piece, found it gained 5 minutes in 12 hours; but after he had lengthened it 2 inches, it lost 5 seconds per hour: what ought to be the true length of the pendulum, and how often will it vibrate per minute.

VIII. Quest. (1111), *by Mr M. H. Murck.*

To find two numbers with these properties, that if unity be added to each, they shall be squares; also if unity be added to their sum or difference, they will make two other squares.

IX. Question (1112) *by Mr Wm Burdon, Acaster Malbis.*

A gentleman has a garden in the form of a parabola, the base or double ordinate of which is 10 feet, and the abscissa or height 200 feet. A straight walk, which goes obliquely across the garden, terminating in the curve on both sides, bisects the abscissa, and the length of the walk on the upper part, is to that

that on the lower, as 2 is to 3. Required the area of the two parts the garden is divided into by the said walk.

X. Question (1113), *by Mr Wm Cole, Colchester.*

In a plain triangle are given, the vertical angle, the base, and the sum of the perpendicular and one segment of the base a maximum; to construct the triangle.

XI. Quest. (1114), *by the Rev. Thos Scurr, Hexham.*

Required the dimensions of a cylindrical vessel, open at top, capable of containing 56400 cubic inches, so that it may be lined with lead of a given thickness at the least possible expence. Also the vessel being kept always full by a suppiying cork at the top, and two circular holes, each half an inch in diameter, being open in its perpendicular side, the one at a foot, the other two feet from the bottom; it is required to assign the distance to which the fluid from the holes will fall on the horizontal base, with the quantity of water discharged by each in 5 minutes, supposing the stream at the hole to be contracted to two thirds of the orifice.

XII. Quest. (1115), *by Mr Da. Henry, Preston, Lanc.*

Let A D and B D C represent two beams of timber, of given dimensions and quality, standing on a horizontal plane, at a given distance A B, and to lean against each other at D, but moveable about the lower ends A and B: it is required to determine their positions when in equilibrio.

XIII. Quest. (1116), *by Mr J. G.*

To find the position of the line of quickest descent from the circumference of one circle to that of another, the former circle lying wholly within the latter.

XIV. Quest. (1117) *by Mr O. G. Gregory, Cambridge.*

At Peterborough, in North latitude 52° 36' there is a flight of 20 steps which front the South, the breadth of each step being 12 inches, and the height of each 6 inches; and at the distance of 6 feet southward of the lowest step there is a pillar, the altitude of which is 32 feet: it is required to determine the length from the foot of the pillar to the extremity of its shadow, on Feb. the 4th, 1803, at 11 o'clock A. M. (the sun then shining), and to shew what portion of that length will be found on the steps.

XV. *or* Prize Question (1118), *by Amicus.*

[To be answered before Feb. 1.]

The prime number 13 has the following twelve remarkable properties: there is a rational square number, whose root I call No. 1, and if 13 be both added to, and subtracted from this square, the sum and difference will be two other rational square numbers whose roots I call No. 2 and No. 3; there is a square integer, whose root I call No. 4, and if this square be multiplied by 13, the product will be the area of a right angled plane triangle, whose sides are 3 integers, which I call Nos. 5, 6, and 7. The number 13 may be divided into two rational squares, whose roots I call No. 8 and No. 9, whose double rectangle is a square, whose root I call No. 10, and if this square be both added to, and subtracted from 13, there will thus be produced two other rational squares, whose roots I call No. 11 and No. 12. What are these twelve numbers?

*** *The Prizes for the several Solutions have been determined by Lot as follows: First, for the Prize Enigma to Miss Eliza Cartwright and Miss Helena Curwen, each 8 Diaries. 2d, For the General Answer to the Enigmas to Mr. Isaac Gumley and Miss Jane Norris, each 8 Diaries. 3d, For the Rebuses, Queries, &c. to Mr. T. Clarus and Mr. Alexander Keese, each 6 Diaries. 4th, For the Prize Question to Mr. John Surtees and Mr. Matt. Terry, each 10 Diaries. All of whom will please to send some person in London to call for them, on their account, at Stationer's Hall.*

††† *Letters for the use of the Diary to be directed thus,* "To the Author of the Ladies Diary, Stationer's Hall, London." *Which must be all Post paid or franked, otherwise they cannot be received; and the last of them to be sent, at the latest, before the end of April; but those with the solution to the Prize Enigma or Prize Question before Feb. 1. And, along with all New Questions, Enigmas, Rebuses, and Charades, their Answers must be sent.*

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