

| MOON'S PHASES.      | D. | Toronto. |     | Quebec. |     | Twilight or Daylight begins and ends at— |       |           |       |           |       |           |       |           |       |       |       |
|---------------------|----|----------|-----|---------|-----|------------------------------------------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-------|-------|
|                     |    |          |     |         |     | Toronto.                                 |       | Halifax.  |       | Montreal. |       | Fredrick. |       | Quebec.   |       |       |       |
|                     |    |          |     |         |     | Beg. End.                                |       | Beg. End. |       | Beg. End. |       | Beg. End. |       | Beg. End. |       |       |       |
|                     |    |          |     |         |     | A. M.                                    | P. M. | A. M.     | P. M. | A. M.     | P. M. | A. M.     | P. M. | A. M.     | P. M. | A. M. | P. M. |
| ● First Quarter ... |    | h m      | h m | h m     | h m |                                          |       |           |       |           |       |           |       |           |       |       |       |
| ● Full Moon .....   |    | h m      | h m | h m     | h m |                                          |       |           |       |           |       |           |       |           |       |       |       |
| ● Last Quarter ...  |    | h m      | h m | h m     | h m |                                          |       |           |       |           |       |           |       |           |       |       |       |
| ● New Moon .....    |    | h m      | h m | h m     | h m |                                          |       |           |       |           |       |           |       |           |       |       |       |
| ● Apogee .....      |    | h m      | h m | h m     | h m |                                          |       |           |       |           |       |           |       |           |       |       |       |
| ● Perigee .....     |    | h m      | h m | h m     | h m |                                          |       |           |       |           |       |           |       |           |       |       |       |

Ephemeris of the Planets, &c.

| Day Mo. | Venus South Even. | Mars South Even. | Jup't'r South Morn. | Saturn South Morn. | Sun's Longtude. | Sun's Right Ascen. | Venus Right Ascen. | Mars Right Ascen. | Jup't'r Right Ascen. | Saturn Right Ascen. | Venus Decl. North. | Mars Decl. South. | Jup't'r Decl. North. | Saturn Decl. North. |
|---------|-------------------|------------------|---------------------|--------------------|-----------------|--------------------|--------------------|-------------------|----------------------|---------------------|--------------------|-------------------|----------------------|---------------------|
|         | h m               | h m              | h m                 | h m                | ° ' "           | h m                | h m                | h m               | h m                  | h m                 | ° ' "              | ° ' "             | ° ' "                | ° ' "               |
| 1 ...   | 0 46              | 4 23             | 1 41                | 8 7                | 159 21          | 10 43              | 11 30              | 15 8              | 0 29                 | 6 51                | 4 43               | 18 56             | 1 25                 | 22 17               |
| 7 ...   | 0 49              | 4 16             | 1 21                | 7 45               | 165 13          | 11 6               | 11 57              | 15 24             | 0 27                 | 6 53                | 4 40               | 20 0              | 1 8                  | 22 15               |
| 13 ...  | 0 53              | 4 8              | 0 59                | 7 24               | 171 31          | 11 27              | 12 21              | 15 41             | 0 24                 | 6 55                | 4 21               | 21 0              | 0 50                 | 22 12               |
| 19 ...  | 0 56              | 4 2              | 0 28                | 7 2                | 176 55          | 11 49              | 12 51              | 15 58             | 0 21                 | 6 57                | 4 29               | 21 54             | 0 31                 | 22 10               |
| 25 ...  | 1 0               | 3 56             | Even.               | 6 40               | 182 48          | 12 10              | 13 19              | 16 15             | 0 18                 | 6 58                | 7 30               | 22 43             | 12 22                | 8                   |
| 30 ...  | 1 3               | 3 51             | 11 36               | 6 21               | 187 43          | 12 28              | 13 42              | 16 30             | 0 16                 | 6 59                | 9 57               | 23 18             | 8 4                  | 22 7                |

| Day of Month. | Day of Week. | Calendar for Upper Canada and Nova Scotia. |      |           |       |            |      | Calendar for Lower Canada and New Brunswick. |      |           |       |            |      | DEPARTMENT FOR ALL OF UPPER AND LOWER CANADA. |                      |                |             |                       |                       |                          |    |       |       |
|---------------|--------------|--------------------------------------------|------|-----------|-------|------------|------|----------------------------------------------|------|-----------|-------|------------|------|-----------------------------------------------|----------------------|----------------|-------------|-----------------------|-----------------------|--------------------------|----|-------|-------|
|               |              | Sun Rises.                                 |      | Sun Sets. |       | Moon Sets. |      | Sun Rises.                                   |      | Sun Sets. |       | Moon Sets. |      | Pole Star in Meridian Morning.                | Shadow at Noon Mark. | Mn's Age Noon. | Moon South. | Moon's Place at Noon. | Moon's Place at P. M. | Sun's Declination South. |    |       |       |
|               |              | h                                          | m    | h         | m     | h          | m    | h                                            | m    | h         | m     | h          | m    | h                                             | m                    | s              | h           | m                     | s                     | °                        | '  | ''    |       |
| 1             | Mond.        | 245                                        | 23 6 | 37        | 7 39  | 5 35       | 7 39 | 2 24                                         | 39   | 11 59     | 41    | 2 2        | 1 35 | 2 24                                          | 39                   | 11 59          | 41          | 2 2                   | 1 35                  | 7                        | 8  | 3 24  |       |
| 2             | Tuesd.       | 246                                        | 24 6 | 35        | 7 55  | 5 32       | 7 53 | 2 20                                         | 43   | 11 59     | 22    | 3 2        | 2 14 | 2 20                                          | 43                   | 11 59          | 22          | 3 2                   | 2 14                  | 19                       | 7  | 41 27 |       |
| 3             | Wed.         | 247                                        | 25 6 | 33        | 8 17  | 5 28       | 8 13 | 2 16                                         | 48   | 11 59     | 3     | 4 2        | 2 53 | 2 16                                          | 48                   | 11 59          | 3           | 4 2                   | 2 53                  | 17                       | 7  | 19 22 |       |
| 4             | Thur.        | 248                                        | 26 6 | 31        | 8 35  | 5 26       | 8 28 | 2 12                                         | 53   | 11 58     | 43    | 5 2        | 3 35 | 2 12                                          | 53                   | 11 58          | 43          | 5 2                   | 3 35                  | 13                       | 6  | 57 10 |       |
| 5             | Friday       | 249                                        | 27 6 | 30        | 9 0   | 5 31       | 8 27 | 2 8                                          | 57   | 11 58     | 23    | 6 2        | 4 20 | 2 8                                           | 57                   | 11 58          | 23          | 6 2                   | 4 20                  | 25                       | 6  | 34 53 |       |
| 6             | Satur.       | 250                                        | 28 6 | 28        | 9 31  | 5 26       | 9 21 | 2 5                                          | 2 11 | 58        | 3     | 7 2        | 5 9  | 2 5                                           | 2 11                 | 58             | 3           | 7 2                   | 5 9                   | 7                        | 6  | 12 28 |       |
| 7             | SUND.        | 251                                        | 30 6 | 26        | 10 13 | 5 33       | 23   | 0                                            | 2    | 1 6       | 11 57 | 43         | 8 2  | 6 1                                           | 0                    | 1              | 11 57       | 43                    | 8 2                   | 6 1                      | 19 | 5     | 49 57 |
| 8             | Mond.        | 252                                        | 31 6 | 24        | 11 6  | 5 34       | 22   | 11 54                                        | 1 57 | 11        | 57    | 23         | 9 2  | 6 57                                          | 1 57                 | 11             | 57          | 23                    | 9 2                   | 2                        | 5  | 27 21 |       |
| 9             | Tuesd.       | 253                                        | 32 6 | 22        | Morn  | 5 35       | 19   | 12 0                                         | 1 53 | 15        | 11 57 | 2          | 10 2 | 7 56                                          | 1 53                 | 15             | 11 57       | 2                     | 10 2                  | 7 56                     | 16 | 5     | 4 39  |
| 10            | Wed.         | 254                                        | 33 6 | 20        | 11 5  | 5 36       | 18   | Morn                                         | 1 49 | 19        | 11 56 | 41         | 11 2 | 8 54                                          | 1 49                 | 19             | 11 56       | 41                    | 11 2                  | 8 54                     | 29 | 4     | 41 53 |
| 11            | Thur.        | 255                                        | 34 6 | 19        | 1 26  | 5 37       | 15   | 1 16                                         | 1 45 | 24        | 11 56 | 20         | 12 2 | 9 51                                          | 1 45                 | 24             | 11 56       | 20                    | 12 2                  | 9 51                     | 13 | 4     | 19 1  |
| 12            | Friday       | 256                                        | 35 6 | 17        | 2 46  | 5 39       | 13   | 2 38                                         | 1 41 | 29        | 11 55 | 59         | 13 2 | 10 46                                         | 1 41                 | 29             | 11 55       | 59                    | 13 2                  | 10 46                    | 28 | 3     | 56 6  |
| 13            | Satur.       | 257                                        | 37 6 | 15        | Rises | 5 40       | 12   | Rises                                        | 1 37 | 34        | 11 55 | 38         | 14 2 | 11 39                                         | 1 37                 | 34             | 11 55       | 38                    | 14 2                  | 11 39                    | 13 | 3     | 33 5  |
| 14            | SUND.        | 258                                        | 38 6 | 13        | 6 27  | 5 41       | 9    | 6 27                                         | 1 33 | 38        | 11 55 | 17         | 15 2 | Morn                                          | 1 33                 | 38             | 11 55       | 17                    | 15 2                  | Morn                     | 28 | 3     | 10 1  |
| 15            | Mond.        | 259                                        | 39 6 | 11        | 6 49  | 5 43       | 7    | 6 47                                         | 1 29 | 43        | 11 54 | 56         | 16 2 | 0 31                                          | 1 29                 | 43             | 11 54       | 56                    | 16 2                  | 0 31                     | 13 | 2     | 46 54 |
| 16            | Tuesd.       | 260                                        | 40 6 | 9         | 7 15  | 5 44       | 6    | 7 10                                         | 1 25 | 47        | 11 54 | 35         | 17 2 | 1 22                                          | 1 25                 | 47             | 11 54       | 35                    | 17 2                  | 1 22                     | 28 | 2     | 23 43 |
| 17            | Wed.         | 261                                        | 41 6 | 7         | 7 41  | 5 45       | 3    | 7 25                                         | 1 21 | 51        | 11 54 | 13         | 18 2 | 2 15                                          | 1 21                 | 51             | 11 54       | 13                    | 18 2                  | 2 15                     | 13 | 2     | 0 29  |
| 18            | Thur.        | 262                                        | 42 6 | 6         | 8 15  | 5 46       | 2    | 8 6                                          | 1 17 | 56        | 11 53 | 52         | 19 2 | 3 9                                           | 1 17                 | 56             | 11 53       | 52                    | 19 2                  | 3 9                      | 27 | 1     | 37 13 |
| 19            | Friday       | 263                                        | 44 6 | 4         | 8 57  | 5 48       | 0    | 8 45                                         | 1 14 | 0         | 11 53 | 31         | 20 2 | 4 6                                           | 1 14                 | 0              | 11 53       | 31                    | 20 2                  | 4 6                      | 12 | 1     | 13 54 |
| 20            | Satur.       | 264                                        | 45 6 | 2         | 9 47  | 5 49       | 57   | 9 35                                         | 1 10 | 5         | 11 53 | 19         | 21 2 | 5 5                                           | 1 10                 | 5              | 11 53       | 19                    | 21 2                  | 5 5                      | 25 | 0     | 50 34 |
| 21            | SUND.        | 265                                        | 46 6 | 0         | 10 46 | 5 51       | 55   | 10 34                                        | 1 6  | 9         | 11 52 | 49         | 22 2 | 6 4                                           | 1 6                  | 9              | 11 52       | 49                    | 22 2                  | 6 4                      | 8  | 0     | 27 11 |
| 22            | Mond.        | 266                                        | 47 5 | 58        | 11 50 | 5 52       | 53   | 11 40                                        | 1 2  | 13        | 11 52 | 28         | 23 2 | 7 2                                           | 1 2                  | 13             | 11 52       | 28                    | 23 2                  | 7 2                      | 21 | 0     | 3 48  |
| 23            | Tuesd.       | 267                                        | 48 5 | 56        | Morn  | 5 52       | 52   | Morn                                         | 0 58 | 18        | 11 52 | 7          | 24 2 | 7 56                                          | 0 58                 | 18             | 11 52       | 7                     | 24 2                  | 7 56                     | 4  | 8     | 19 37 |
| 24            | Wed.         | 268                                        | 49 5 | 54        | 53 5  | 5 54       | 50   | 45                                           | 0 54 | 22        | 11 51 | 47         | 25 2 | 8 46                                          | 0 54                 | 22             | 11 51       | 47                    | 25 2                  | 8 46                     | 16 | 0     | 43 2  |
| 25            | Thur.        | 269                                        | 50 5 | 52        | 2 35  | 5 56       | 48   | 1 56                                         | 0 50 | 27        | 11 51 | 26         | 26 2 | 9 32                                          | 0 50                 | 27             | 11 51       | 26                    | 26 2                  | 9 32                     | 29 | 1     | 6 28  |
| 26            | Friday       | 270                                        | 52 5 | 51        | 3 85  | 5 56       | 46   | 3 3                                          | 0 46 | 31        | 11 51 | 6          | 27 2 | 10 15                                         | 0 46                 | 31             | 11 51       | 6                     | 27 2                  | 10 15                    | 11 | 1     | 29 53 |
| 27            | Satur.       | 271                                        | 53 5 | 49        | 4 11  | 5 57       | 45   | 4 9                                          | 0 42 | 35        | 11 50 | 46         | 28 2 | 10 55                                         | 0 42                 | 35             | 11 50       | 46                    | 28 2                  | 10 55                    | 22 | 1     | 53 18 |
| 28            | SUND.        | 272                                        | 54 5 | 47        | Sets  | 5 59       | 43   | Sets                                         | 0 38 | 40        | 11 50 | 27         | 29 2 | 11 34                                         | 0 38                 | 40             | 11 50       | 27                    | 29 2                  | 11 34                    | 14 | 2     | 16 42 |
| 29            | Mond.        | 273                                        | 55 5 | 45        | 6 46  | 0 5        | 40   | 6 1                                          | 0 34 | 44        | 11 50 | 7          | 0 5  | Ev. 13                                        | 0 34                 | 44             | 11 50       | 7                     | 0 5                   | Ev. 13                   | 16 | 2     | 40 5  |
| 30            | Tuesd.       | 274                                        | 57 5 | 43        | 6 18  | 6 25       | 38   | 6 14                                         | 0 30 | 48        | 11 49 | 48         | 1 5  | 0 52                                          | 0 30                 | 48             | 11 49       | 48                    | 1 5                   | 0 52                     | 28 | 3     | 3 27  |

Prob. 65.—The sum of 6 numbers in arithmetical progression is 33, and the sum of their squares is 199. Required the numbers.

Prob. 66.—From a point in a square county to the corners, are 13, 27, 21, and 31.6385 miles. What is the size of the county?

Prob. 67.—With what velocity per second

must a ball be discharged in a vertical direction, that it may never return, the earth's radius being 3956.2 miles, no resisting medium being considered?

Prob. 68.—The radius of a circle is 100; what is the radius of 15 equal circles inscribed within it, tangent to it and to each other?