THE UNIVERSAL FORCE OF TIME

Free Fall — the Dual-Dimensional Chain, G1 and G2

There is no force of gravity. The fall of a stone is hydrogen's light read in degrees and divided by the day — and the same value is the speed of light, the sidereal day and the turning of the Earth

Stephen Daubney · The Daubney Foundation · 2026 · Rev 4

Tau (T) is the living fabric of time itself — the sole substance of which all physical reality is composed. It is generated by the Sun, as by every star for its own system, and flows outward in the form of the DNA double helix, creating matter, which it deposits at nodal points — the planets — and creating life. Every particle, force, wavelength and conscious experience is a structured configuration of T-flow. The conservation law dΣT = 0 governs all change: T is never created or destroyed at a node, only redistributed.

FREE FALL, NUMBER FIRST

9.817477042468

= hydrogen's Balmer-β 486 nm ÷ the veil 57.2957795131 ÷ the day 864 (25π/8) — the G1 face

G2 = **9.818362093947** (× the G-bond step) · × 2400 = **23564.0690254726** = 23 h 56 m 04.069 s · $G1^2$ × 864 × 3600 = light **299,789,233.683**

ABSTRACT

There is no force of gravity. Drop a stone and it does not fall because the Earth pulls it; it falls because it is reading time. The number every school calls the acceleration due to gravity is, in the Universal Force of Time, **the correction T adds to a rotation that comes in short of a full day** — and it can be read, digit for digit, off a line of light from the hydrogen atom. This paper sets out that reading and shows that free fall lives on two registers at once, G1 and G2, and is read two ways on each: as a flow rate, and as the value a surface instrument records.

The work is built number first, with each lattice form placed behind its number. The anchor is

- **free fall, G1 = 9.817477042468104 m/s² (25π/8)** — hydrogen's Balmer-β line, 486 nm, divided by the veil and by the day, 864.

From that anchor the paper:

- shows that the same free fall, squared and carried through the clock of a day, **864 × 3600**, is the **speed of light on the G1 register, 299,789,233.683 m/s ($2^3 \cdot 3^5 \cdot 5^6 \cdot \pi^2$)** — fall and light are one value read in two dimensions of time;
- shows that the gear between the wavelength and the fall, **486 nm ÷ free fall, is 495.0355349930 (7776/(5π))**, the blue/cyan boundary of the spectrum, carrying **7776, one quarter of the ground-state spin-orbit year 31104**;
- sets out the **flow-rate pair**, **G1 9.817477042468** and **G2 9.818362093947 (25π/8 × the G-bond step)**, one full G-bond step apart, and with it the **G2 speed of light 299,816,259.863**;
- sets out the **surface pair**, **G1 9.805487562539** and **G2 9.805929537889**, reached through a square root and therefore **half a G-bond step apart**, and explains why the half step appears there and not in the flow-rate pair;
- shows that **the G2 free fall × 2400 is the sidereal day, 23564.0690254726 (7500π × the G-bond step)**, read on the clock as **23 h 56 m 04.069 s** — free fall is the gear between the solar day and the sidereal day;

- carries the G1 free fall on to the **Earth's rotation speed 465.0941502045 m/s (15π³)**, the **Earth–Sun distance 93,018,830.04 miles (3·10⁶·π³)**, the **equatorial radius 6,378,039.56 m (7.5π² × the sidereal day)** and the **G1 orbital year 365.2840913775 days (15π⁴/4)**;
- reads the atmosphere's layers as lattice nodes, with the **thermopause at 625 km (5⁴)** opening a chain to the Earth–Sun distance, the helical turn, the A-DNA pitch, the **G2 speed of light** and the **sidereal day**;
- and corrects the earlier versions, which put the G2 free fall on the half step and benchmarked the sidereal day against a figure off the lattice.

It closes with what stands, what is open, the conditions that would break it, and an appendix from which every number can be rebuilt. Every figure has been recomputed from its lattice form at thirty digits or more, π carried as a symbol.

THE FORMULAS OF THIS PAPER, NUMBER FIRST

Every result in this paper is carried by one of the formulas below, each written with the number first and the lattice form in brackets behind. Each is worked in full in the part named beside it.

> **FORMULA F1** **FREE FALL FROM HYDROGEN'S LIGHT** **Part One**
> 486,000 pm / 57.29577951308232 / 864 = 9.817477042468104 (5²·π/2³) g1, G1
>
> **FORMULA F2** **THE CONNECTOR** **Part One**
> 486 / 9.817477042468104 = 49.50355349930312 -> 495.0355349930 (7776/(5π))
>
> **FORMULA F3** **FALL IS LIGHT** **Part Two**
> 9.817477042468104² x 864 x 3600 = 299,789,233.6830893 (2³·3⁵·5⁶·π²) c, G1
>
> **FORMULA F4** **THE FLOW-RATE PAIR, ONE FULL STEP** **Part Three**
> G2 = 9.817477042468104 x 1.000090150603356 = 9.818362093946918
> c, G2 = g1 x g2 x 3,110,400 = 299,816,259.8633855
>
> **FORMULA F5** **THE SURFACE PAIR, HALF A STEP** **Part Three**
> G1 9.805487562539485 (100·√(5⁵·π³/(2⁹·3⁹))) G2 x √(1.000090150603356) = 9.805929537888606
>
> **FORMULA F6** **FREE FALL TURNS THE SOLAR DAY INTO THE SIDEREAL DAY** **Part Four**
> 9.818362093946918 x 2400 = 23564.0690254726 (7500π x the G-bond step) -> 23 h 56 m 04.069 s
>
> **FORMULA F7** **FROM THE FALL TO THE TURNING EARTH** **Part Five**
> 9.817477042468104 x 24 x (2π)² = 9301.883004089946 (300π³)
> / 2 = 4650.941502044973 -> 465.0941502044973 m/s (15π³) 300π³ x 10⁴ = 93,018,830.04 miles
>
> **FORMULA F8** **THE EARTH'S RADIUS AND YEAR** **Part Five**
> 465.0941502044973 x 86164.0690254726 s = 40,074,404.4616 m circumference / 2π = 6,378,039.5615 m
> 465.0941502044973 x π/4 = 365.2840913775091 (15π⁴/4) the G1 orbital year

THE TERMS THIS PAPER USES

An address. Every value in this framework is a product of powers of 2, 3, 5 and π, and nothing else. That product is the value's address. A number that needs any other prime — 7, 11, 17 — is not on the lattice.

The π-degree. The degree of an address is the power of π it carries, and the degree says what kind of thing the value is. An even degree is a **room** — a state, a thing that sits; it pairs, like a pair of circles. An odd degree is a **road** — a transport, a thing that carries; it is the unpaired circle. A half degree is a **door** — a source, which squares to a whole address.

A register. A register is a level at which T is read — the celestial register of the Sun and planets, the atomic register of the proton and electron, the biological register of DNA. The names G0, G1 and G2 mark neighbouring registers. **The G-bond step** is the smallest structural step between adjacent faces of one value, **1.000090150603356201 (5¹⁰/(2⁴·3⁹·π³))** — the amount by which a G1 face is multiplied to give its G2 face.

The free decade. Moving a value by a power of ten costs nothing on the lattice, because ten is two times five: the move shifts twos and fives together and changes nothing else. That is why 9.817477… and 98.17477… are one address, and why 486 nm and 486,000 pm are the same line.

The veil. The veil is 180/π = 57.29577951308232, the number that turns radians into degrees.

The day, 864. 864 is the day: 86,400 seconds in a day, written at its decade. It is the ground state of the DNA helix.

The helical turn. A turn is one revolution of the helix. The helical turn is the step from one revolution to the next, **1.004693930041152263 ($5^6/(2^6 \cdot 3^5)$)**.

The 612 step and the 703 step. The 612 step is helium divided by four, **1.000612842467910952 ($2^9 \cdot 3^5 \cdot \pi/5^8$)**; the 703 step is the span of hydrogen's ionisation faces end to end, **1.000703048319385397 ($800/(81 \cdot \pi^2)$)**. They are named so that the reader meets the family of small steps of which the G-bond step is the smallest.

Free fall. Free fall is not the acceleration of a body pulled by a force; it is the correction that tops a rotation up to a full day, one value with the speed of light read in a different unit of time: **9.817477042468104 ($5^2 \cdot \pi/2^3$)**.

The radial mass. A radial mass is a mass spread over a radius rather than held at a point; dividing a node mass by 9375 turns it into a radius.

Why a value can be carried from one kind of quantity to another. An energy is a count of T, and the unit is a choice of clock: a joule is energy counted in seconds, a kilojoule per mole the same energy counted in minutes, an electron-volt the same energy in the spin-orbit register. A length, an angle, a time and a number of base pairs can likewise be one count read at different registers.

How the numbers were checked. No value in this paper was found by a search, so no statistical test is needed to judge it. A p-value answers the question "how often would I see a landing this close if the thing were not real?"; a control is a set of decoys built to resemble the real values, run through the same search to find out how often chance alone lands; a standard deviation is the typical distance of a measurement from its mean, the spread of the ruler. Each matters when a result is found by looking. Every result here is an exact identity worked from its address, forwards and backwards.

PART ONE — FREE FALL, READ OFF THE LIGHT OF HYDROGEN

What falling really is

Hold a stone at arm's length and let it go. It drops. Every child learns to call the thing that brings it down "gravity", and every physics class turns that feeling into a number: near the Earth's surface a falling body gains speed at a little under ten metres a second, every second. Science treats that number as a brute fact of the planet — measured to many decimal places, never derived. Why that number and not another, the standard picture cannot say. It is how strong the Earth's pull happens to be.

The Universal Force of Time gives a different account, and with it a derivation. There is no pull. There is one substance, T — time itself — generated by the Sun and flowing outward in the form of the DNA double helix, depositing matter at the planets. A body on the Earth's surface sits in that flow. The Earth turns, and its turn, measured against the stars, comes in short of a full day. **Free fall is the correction T adds to complete the turn.** What a falling stone shows us is not a force acting on it but the rate at which time tops the planet's rotation up to a whole day. The rest of this paper is the arithmetic of that claim.

The derivation

The hydrogen atom, when its electron settles from the fourth shell to the second, gives out a blue-green line, the Balmer-β line. On the lattice its wavelength is a pure number of twos, threes and fives: **486 nm, which is 486,000 picometres ($2^4 \cdot 3^5 \cdot 5^3$)**. Perform two divisions. Divide by the veil, 180/π, which turns the radians science works in back into the degrees the universe runs on. Then divide by 864, the day — the 86,400 seconds of a day written at its decade, and the ground state of the DNA helix.

```
FORMULA F1     FREE FALL FROM HYDROGEN'S LIGHT
    486,000 pm                                ( 2⁴·3⁵·5³ )        the Balmer-β line
    / 57.29577951308232                        ( 180/π )           the veil
    / 864                                      ( 2⁵·3³ )           the day
    =  9.817477042468104 m/s²                  ( 5²·π/2³ )         free fall on the G1 register

    and backwards, with no π at all:   486,000  =  25 x 180 x 108,   108 = 864/8
```

The free fall at the Earth's surface is hydrogen's blue line, read in degrees and divided by the day. It is not fitted and not measured; it is the same address seen through two gears. The identity even runs backwards as a statement in whole numbers: 486,000 is 25 times 180 times 108, with the 180 carrying the veil and the 108 carrying the day.

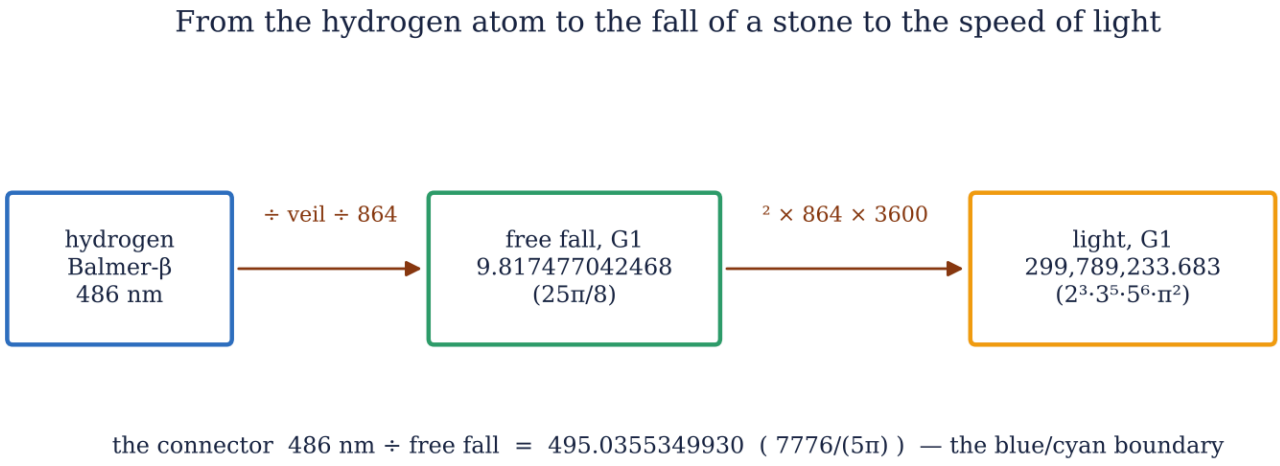


Figure 1 — From the hydrogen atom to the fall of a stone to the speed of light. Balmer-β ÷ the veil ÷ 864 is the G1 free fall, 25π/8; squared and carried through the clock of a day it is the G1 speed of light. The connector between the line and the fall is 7776/(5π).

The connector, and the quarter year

Divide the wavelength by the free fall and the result is the gear that turns a length into a rate.

```
FORMULA F2     THE CONNECTOR
    486  /  9.817477042468104   =   49.50355349930312        ->   495.0355349930 at its decade   ( 7776/(5π) )

    7776  =  6⁵  =  31104 / 4          31104  =  864 x 360 at its decade, the ground-state spin-orbit year
```

The connector is 7776 over five π — the boundary between blue and cyan in the spectrum. The 7776 inside it is six to the fifth, and it is one quarter of the ground-state spin-orbit year: the day, 864, carried round the 360 degrees of a circle, gives 311,040, and a quarter of it is 77,760. So the gear that turns hydrogen's light into the fall of a stone carries a quarter of the year of the helix's ground state inside it. The same 7776 closes the companion paper on fine structure, Mercury and DNA, where the pitch of the reading helix times hydrogen's twenty-one centimetre line comes to it exactly. One number keeps returning because it is one structure being read.

PART TWO — FALL IS LIGHT

One value in two dimensions of time

Square the free fall and carry it through the clock of a day — the 864 of the day and the 3600 seconds of the hour.

```
FORMULA F3     FALL IS LIGHT
    9.817477042468104²                        =   96.38286001...         ( 5⁴·π²/2⁶ )
    x 864 x 3600                              ( 2⁹·3⁵·5² )            the clock of a day
    =  299,789,233.6830893 m/s                ( 2³·3⁵·5⁶·π² )         the speed of light on the G1 register

    equivalently   free fall  =  √( light / 3,110,400 ),     3,110,400 = 360 x 864 x 10 = 2⁹·3⁵·5²
```

The speed of light is the free fall read in another dimension of time. This is not two quantities that happen to be numerically related. It is one reading of the G1 register: free fall is that reading per second; light is the same reading carried up into the dimension of the year, where it appears as a spin-orbit speed. The 864 × 3600 is not arithmetic done to the free fall to make it land on light. It is the gear between the dimension of the second and the dimension of the year.

That is why there is no separate force holding you to the ground. The value that brings a dropped stone down and the value that light travels at are one value of time, read at two depths. A body falling and a beam of light crossing a room are doing the same thing — reading T — on two scales of the clock.

Why the divisor is pure

The divisor 3,110,400 is three hundred and sixty times the day times ten: $2^9 \cdot 3^5 \cdot 5^2$, with no π. All the π in the speed of light comes from the free fall itself, squared — the π of 25π/8 taken twice. The circle that the free fall carries once, light carries twice. A per-second reading has one turn of the circle in it; a reading in the dimension of the year has two.

PART THREE — TWO REGISTERS, TWO READINGS

The G-bond step

The T-field is organised into registers, nested one inside another, and a value read at the boundary between two of them carries two faces. The step between neighbouring faces is the same everywhere in the theory — the G-bond step — and it separates the solar day from the sidereal one, Mercury's G1 year from its G2 year, and the two faces of every constant that sits between registers.

```
THE G-BOND STEP
    1.000090150603356201        ( 5¹⁰/(2⁴·3⁹·π³) )         90.1506 in a million
```

The flow-rate pair: one full step

Carry the G1 free fall up one G-bond step and you have the free fall of the G2 register — the register of the space above the surface, of the stars and the sidereal day.

```
FORMULA F4     THE FLOW-RATE PAIR, ONE FULL STEP
    free fall, G1      9.817477042468104               ( 5²·π/2³ )
    free fall, G2      9.818362093946918               ( 5²·π/2³ x 5¹⁰/(2⁴·3⁹·π³) )      one full step up

    light, G1          299,789,233.6830893             ( g1 x g1 x 3,110,400 )
    light, G2          299,816,259.8633855             ( g1 x g2 x 3,110,400 )             one full step up
```

The two flow-rate faces of free fall are exactly one G-bond step apart, and so are the two faces of light. Notice how the G2 speed of light is built: not as the G2 free fall squared, which would climb two steps, but as the G1 free fall times the G2 free fall — one foot on each register. Light on the G2 register is the free fall of the surface met by the free fall of the space above it.

The standard speed of light sits between these two rungs. It is neither, because it is read across the boundary between them: an instrument on the surface receiving light from the sky. That is why the framework does not chase it. Each rung is an exact address; the figure in the tables is a reading taken with one foot on each.

The surface pair: half a step

There is a second way to read free fall: the value a surface instrument records. It is reached by a chain that runs through the Earth's rotation and the mile, and the chain ends in a square root.

```
FORMULA F5     THE SURFACE PAIR, HALF A STEP
    15π³  x  4  x  3125/1944  /  360  /  864    =   0.009614758633911654     ( 5⁵·π³/(2⁹·3⁹) )
    √ ( ... )  x  100                           =   9.805487562539485        surface free fall, G1

    x √( 1.000090150603356 )                    =   9.805929537888606        surface free fall, G2
    the step between them                       =   1.000045074285832        45.0743 in a million, half a step
```

The chain begins with the Earth's rotation speed on the G1 register, 465.0941502 m/s ($15\pi^3$), carries it four times through the mile — the gear 3125/1944 between the kilometre and the mile — and divides it by the degrees of a circle and by the day. What comes out is a square: the surface free fall is its square root. **Because the surface value is reached through a square root, the G-bond step enters it halved.** The two surface faces sit 45.0743 in a million apart, exactly half of the 90.1506 that separates the flow-rate faces.

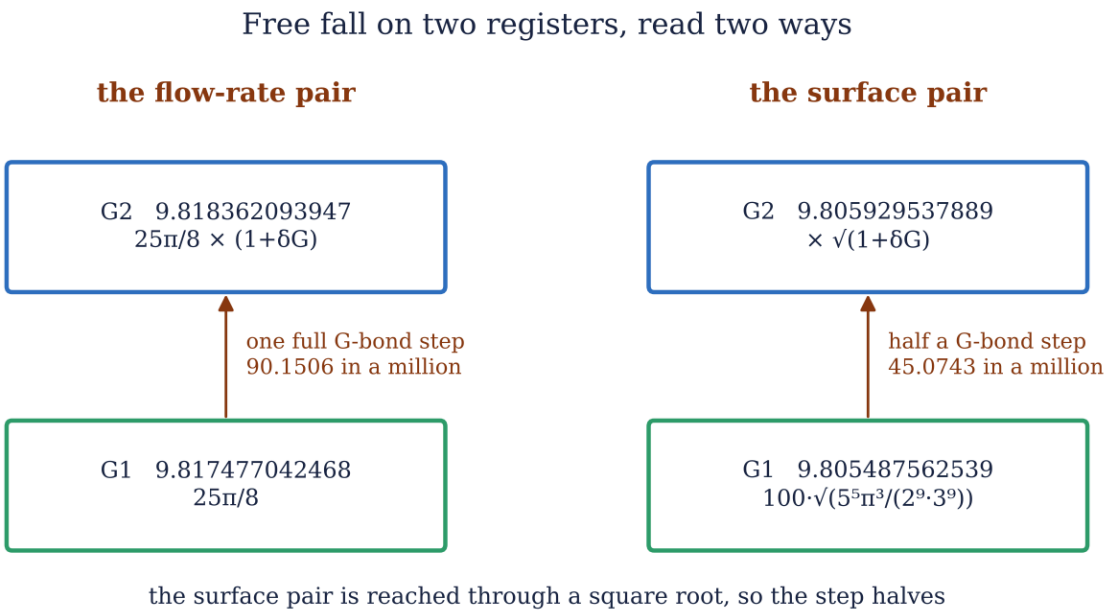


Figure 2 — Free fall on two registers, read two ways. The flow-rate faces, 25π/8 and 25π/8 × the G-bond step, are one full step apart. The surface faces are reached through a square root, so the same step enters them halved: 45.0743 in a million.

So there are four free falls, not one, and they are not rivals. Two are flow rates — the rate at which T completes the turn on each register. Two are surface readings — what an instrument sitting on the ground records of those rates after the reading has passed through the mile and back. The figure in the textbooks sits among the surface readings, because it is a surface reading: one round trip of the conversion between the kilometre and the mile turns the flow rate into the 9.80s.

PART FOUR — FREE FALL IS THE GEAR BETWEEN TWO DAYS

The day that comes in short

Measured against the Sun, the Earth turns once in twenty-four hours. Measured against the stars, it turns in less: the sidereal day, read on the clock, is **23 hours 56 minutes 4.069 seconds**. The turn stops short. In the Universal Force of Time that shortfall is what free fall makes up.

```
FORMULA F6     FREE FALL TURNS THE SOLAR DAY INTO THE SIDEREAL DAY
    free fall, G2      9.818362093946918
    x 2400             ( 24 x 100, the day )
    =  23564.0690254726                        ( 7500π x 5¹⁰/(2⁴·3⁹·π³) )

    read on the clock:   23 : 56 : 04.069      =   86,164.0690254726 seconds

    and on the G1 register:   9.817477042468104  x  2400   =   7500π   exactly
```

The G2 free fall, multiplied by the day, is the sidereal day — and the digits read straight off as the clock: twenty-three, fifty-six, oh-four point oh-six-nine. The number is not converted to hours and minutes; it already is the clock reading. On the G1 register the same multiplication gives 7500π with no step, the sidereal value without the G-bond correction; on the G2 register it gives the sidereal day as it is observed, the step included. Both the sidereal day and its free fall live on the G2 register, and each carries the step once.

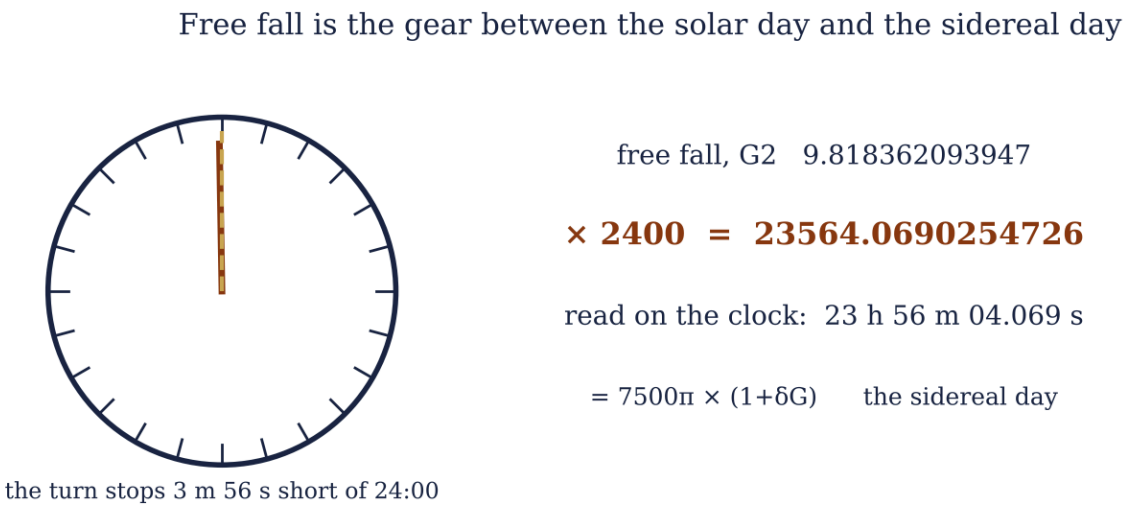


Figure 3 — **Free fall is the gear between the solar day and the sidereal day.** The G2 free fall × 2400 is 23564.0690254726, read on the clock as 23 h 56 m 04.069 s — the turn the Earth makes against the stars, short of twenty-four hours.

This is why the framework calls free fall a correction rather than a force. A body standing on the ground does not feel a pull; it feels its node being topped up to a whole day. The weight in your feet is the difference between a turn against the stars and a turn against the Sun, applied every second.

PART FIVE — FROM THE FALL TO THE TURNING EARTH

If free fall were just a local property of the Earth, the story would end at the surface. It does not. The same value carries on, step by exact step, to the planet's speed, its distance from the Sun, its size and its year.

```
FORMULA F7     FROM THE FALL TO THE TURNING EARTH
    9.817477042468104  x  24  x  (2π)²          =   9301.883004089946       ( 300π³ )
    / 2                                  =   4650.941502044973       at its decade:
                                             465.0941502044973 m/s   ( 15π³ )     the rotation speed, G1
    9301.883004089946 x 10⁴              =   93,018,830.04 miles     ( 3·10⁶·π³ ) the Earth–Sun distance

FORMULA F8     THE EARTH'S RADIUS AND YEAR
    465.0941502044973 m/s  x  86,164.0690254726 s          =   40,074,404.4616 m     the circumference
    / 2π                                                   =   6,378,039.5615 m      the equatorial radius
                                                          =   7.5π² x the sidereal day
    465.0941502044973  x  π/4                             =   365.2840913775091  ( 15π⁴/4 )  the G1 year
```

The free fall, carried once round the day and twice round the circle and halved, is the speed at which the equator turns — and, at its decade, the distance to the Sun in miles. The speed belongs to the G1 register; the sidereal day belongs to the G2. Put them together — the G1 rotation speed times the G2 sidereal day in seconds — and their product is the circumference of the equator, 40,074,404.46 metres; divided by 2π it is the equatorial radius, 6,378,039.56 metres. This is the dual dimension read from where we stand: our feet on the G1 register, carrying the speed; the sky above on the G2 register, carrying the period. **The Earth's size is not the result of dust that happened to gather; it is the meeting of two registers of time.** And the same rotation speed, carried through a quarter of a circle, is the orbital year on the G1 register, 365.2840913775 days.

So one value, read off a line of hydrogen light, gives the fall of a stone, the speed of light, the sidereal day, the turning of the equator, the distance to the Sun, the size of the planet and the length of its year. Free fall is the dimensional connector between the quantum register and the celestial one.

PART SIX — FALLING THROUGH SHELLS

The textbook draws a falling body as tracing a smooth curve. The Universal Force of Time says the field the body falls through is built of shells — concentric levels of the lattice, each a thin surface at which the local rate takes a

slightly different value. A falling body passes through them as a helical descent, not a smooth glide.

We do not notice, because any ordinary measurement averages over a great many shells at once and records only their smooth mean — exactly as a coastline looks smooth from orbit and jagged up close. The discrete structure would show only in a very fine measurement bracketed by height. It is a prediction the theory is willing to make and to have tested.

The atmosphere as a ladder of nodes

If the field is built of shells, its larger boundaries should fall at lattice positions too. The atmosphere's recognised layers do.

```
THE ATMOSPHERE'S BOUNDARIES
    tropopause       12 km        ( 2²·3 )
    stratopause      50 km        ( 2·5² )
    mesopause        80 km        ( 2⁴·5 )
    Kármán line     100 km        ( 2²·5² )
    thermopause     625 km        ( 5⁴ )                          free fall x height = 5⁹π
    exobase         900 km        ( 2²·3²·5² = 180 x 5 )          the veil's 180 written into the sky
```

The span from the ground to the exobase is nine hundred kilometres — the veil's 180 carried up by five. The mesopause, left open in the earlier versions, is settled at eighty kilometres, two to the fourth times five. Read through the free fall the same ladder holds: free fall times height is a clean address at each boundary — the tropopause at 37,500π, the Kármán line at 312,500π. And the thermopause is settled at **625 kilometres, five to the fourth** — free fall times height 5⁹π, on the same ladder as the tropopause and the Kármán line.

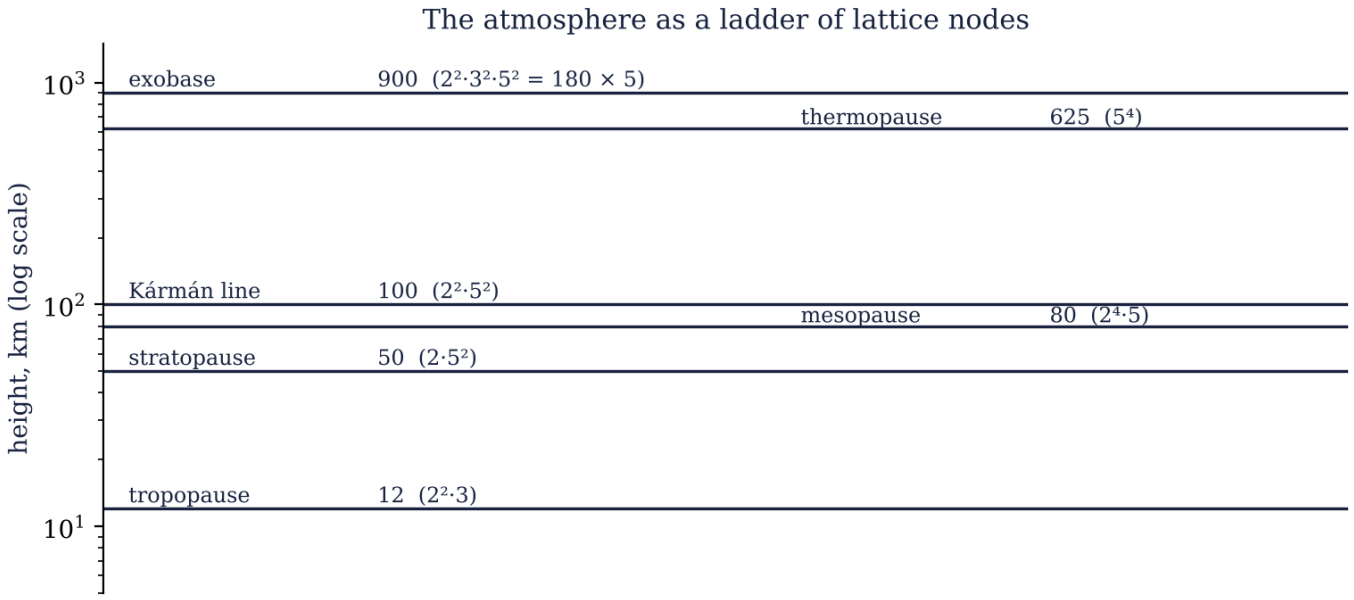


Figure 4 — The atmosphere as a ladder of lattice nodes. The tropopause, stratopause, Kármán line and exobase land on {2,3,5} nodes; so do the mesopause at 80 km (2⁴·5) and the thermopause at 625 km (5⁴).

The top of the sky reads the helix, the Sun and the planet

The heights of the atmosphere are not only nodes; they are the same values the rest of this paper has met, read at the register of the sky. Divide the Kármán line, 3125, by the 360 degrees of a circle and it is the first helical turn of the DNA, 8.680555. Do the same with the thermopause and a whole chain opens.

```
FORMULA F9     THE THERMOPAUSE CHAIN
    3125 / 360                      =   8.680555555555556          ( 5⁴/(2³·3²) )      the first helical turn
    625 / 360                       =   1.736111111111111
      x 864                         =   1500                       the Earth–Sun distance, 150 million km
      / 864                         =   0.002009387860082305       ( 5³/(2⁸·3⁵) )
        / 2                         =   0.001004693930041152       the helical turn, 1.004693930041
    0.002009387860082305 x 2 / 2π   =   6396.080210418890          ( 5¹⁰/(2·3⁵·π) )    the Moho x one helical turn
      x 180/π                       =   366.4684014841499          an orbital time
        x 2π x 16                   =   368.4142201201281          Mercury's G2 rotation x 2π, the A-DNA pitch
      x 9375 / 2                    =   299,816,259.8633855        the G2 speed of light
      squared, x 24 x 24            =   23564.0690254726           the sidereal day
```

The thermopause, read through the circle and the day, is the distance to the Sun, the helical turn, the radius one helical turn above the Moho, the pitch of the reading helix, the G2 speed of light and the sidereal day. The radius 6396.0802 is the Moho, 20000/π, carried up one helical turn. As a radial mass, times 9375 and halved, it is light on the G2 register; squared, carried into the dimension below as an energy, 40.909842, and multiplied by the twenty-four hours twice, it is the sidereal day to every digit — the same 23564.0690254726 that the G2 free fall gave in Part Four. Two roads, one from the fall of a stone and one from the top of the sky, arrive at the Earth's turn against the stars.

A WORKED WALK ALONG THE CHAIN

A lecture-theatre reader should be able to walk the whole chain with a pocket calculator, so here it is step by step.

Start with the light. Hydrogen's Balmer-β line is 486 nanometres. Write its form beside it: two to the fourth, three to the fifth, five cubed picometres. There is no π in it. A line of light from an atom is a pure count.

Turn it into degrees. Divide by the veil, 57.2957795. That brings in one π, in the numerator. The universe runs on degrees; the radian is a convenience of the textbook, and the veil is the price of leaving it.

Divide by the day. Divide by 864. The result is 9.81747704 — five squared times π over two cubed — the free fall at the Earth's surface on the G1 register. Every factor is accounted for: the 486 and the 864 have exchanged their twos and threes, and only twenty-five, eight and one π remain.

Square it and carry it through the day. Square the free fall and multiply by 864 and by 3600. The student watches the π become π squared, and the twos, threes and fives assemble into two cubed times three to the fifth times five to the sixth. The answer is 299,789,233.68 metres a second. A dropped stone and a beam of light are one value at two depths of the clock.

Climb one step. Multiply the free fall by the G-bond step, 1.0000901506. The answer, 9.81836209, is the free fall of the register above the surface. Multiply it by 2400 and read the digits as a clock: 23 hours, 56 minutes, 4.069 seconds — the Earth's turn against the stars.

Turn the Earth. Go back to the G1 free fall. Multiply by 24 and by two π twice, divide by two, and you have 4650.9415 — at its decade 465.09415 metres a second, the speed at which the equator turns. Multiply that by the G2 sidereal day in seconds, 86,164.069: 40,074,404.46 metres, the circumference of the equator. Divide by two π: 6,378,039.56 metres, the equatorial radius. Multiply the speed by a quarter of π: 365.28409 days, the G1 year.

Close on the surface. Finally take the rotation speed through the mile and back — times four, times 3125 over 1944, divided by 360 and by 864 — and take the square root. The answer, 9.8054876, is the free fall a surface instrument records. Climb it by the square root of the G-bond step and you have its G2 face. The step is halved, and the student can see why: the square root halves every exponent, and the step's exponent with them.

Nothing in that walk was adjusted. No figure was fitted and no correction chosen to close a gap. Each step is a multiplication or division of exact forms, and each result can be predicted in its π-degree before the arithmetic is done.

PART SEVEN — WHAT THIS REVISION CORRECTS

- **The G2 free fall.** Rev 3 gave the G2 free fall as the G1 value times the square root of the G-bond step, 9.817919558. That is a half step, and the flow-rate faces of free fall are a full step apart. The G2 free fall is **9.818362093946918 (25π/8 × the G-bond step)**, the value that, times 2400, is the sidereal day. The half step

belongs to the surface pair, **9.805487562539 and 9.805929537889**, which are reached through a square root.

- **The sidereal day.** Rev 3 derived the sidereal day from the equatorial radius and then compared it with a figure from tables. That runs the chain backwards and benchmarks it against a value off the lattice. The sidereal day is **23564.0690254726 (7500π × the G-bond step)**, read on the clock as 23 h 56 m 04.069 s, and the equatorial radius follows from it.
- **No off-lattice benchmark.** Every comparison with a tabulated figure has been withdrawn. The framework's values are the values.
- **New in this revision:** fall is light, one value in two dimensions of time; the G2 speed of light as g1 × g2 × 3,110,400; the connector as 7776/(5π), carrying a quarter of the ground-state spin-orbit year; the surface pair and why its step is halved; free fall as the gear between the solar and sidereal days; the year as the rotation speed through a quarter circle; the mesopause settled at 80 km ($2^4 \cdot 5$) and the thermopause at 625 km (5^4), with the thermopause chain to the Sun, the helix, the G2 speed of light and the sidereal day.

CONCLUSION — NOTHING IS PULLING

Science measures the fall of a stone and stops. It names the number, tabulates it to many places and attributes it to the Earth's mass, and there the account ends. The Universal Force of Time does not stop, because it does not believe there is anything pulling. It reads the fall as a value of time, and a value of time can be followed.

Followed backwards, the fall is hydrogen's blue line, read in degrees and divided by the day. Followed upwards, it is the speed of light, and on the next register the sidereal day, read off as the clock. Followed outwards, it is the speed of the turning equator, the distance to the Sun, the radius of the planet and the length of its year. **One value of T, read at a different depth each time, is all of these.**

And the reason science has never joined them is the same reason it has never seen the four faces of free fall. It reads each on a single face, in its own unit, and puts them side by side as if they shared a register. Read face by face — a flow rate and a surface reading, a G1 register and a G2 register — every value in this paper is an exact address, and the fall of a stone is the turning of the planet.

WHAT STANDS, WHAT IS OPEN

Forced, and stated at full force. The G1 free fall is the Balmer-β line divided by the veil and the day. The G1 free fall squared, through the clock of a day, is the G1 speed of light. The two flow-rate faces are one G-bond step apart; the two surface faces are half a step apart because they are reached through a square root. The G2 free fall times the day is the sidereal day. Each is an exact relation in this paper.

Arrived at, and exact on every line. The connector 7776/(5π); the rotation speed $15\pi^3$ and the Earth–Sun distance $3 \cdot 10^6 \cdot \pi^3$ miles; the equatorial radius as $7.5\pi^2$ times the sidereal day; the G1 year as the rotation speed through a quarter circle; the tropopause, stratopause, mesopause, Kármán line, thermopause and exobase on {2,3,5} nodes; the thermopause chain of Formula F9.

Open. The free fall of the other planets — Venus, which completes its turn by the reciprocal, and Mercury — belongs to their own papers. The shell structure beneath the smooth mean of free fall awaits a measurement fine enough to see it.

WHAT WOULD BREAK IT

- A free fall that cannot be carried from the hydrogen line to the sidereal day by the operators set out here.
- A sidereal day whose clock reading is not the G2 free fall times the day.
- A surface pair separated by anything other than half the G-bond step.
- A very fine, height-bracketed measurement of free fall that finds no structure at all beneath its smooth mean.

A NOTE ON THE NUMBERS

The values in this paper are written as plain numbers — not pinned to one unit, and not carried to one particular power of ten. Under the Universal Force of Time a quantity is not the property of one dimension: the same T-value shows up as a free fall at one register, a speed of light at another, a day at a third. The unit and the power of ten are the costume a number wears where it is read. That is why 9.81836209, times the day, can be read straight off as a clock time, and why 465.094 can be both a speed in metres a second and, at its decade, a distance in miles. Each number is given with its lattice address in brackets, so that the reader can rebuild it from 2, 3, 5 and π alone.

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APPENDIX — EVERY NUMBER, REBUILT

Each value below is rebuilt from its lattice form alone, at thirty digits with π carried as a symbol.

THE ANCHOR

Balmer-β	$2^4 \cdot 3^5 \cdot 5^3$ pm	486,000
the veil	180/π	57.295779513082320876798 15
free fall, G1	$5^2 \cdot \pi / 2^3$	9.817477042468103870195761
connector	7776/(5π)	495.0355349930312523755361

THE STEP AND THE FLOW-RATE PAIR

G-bond step	$5^{10}/(2^4 \cdot 3^9 \cdot \pi^3)$	1.000090150603356200676414
free fall, G2	g1 x step	9.818362093946918018331128
light, G1	$2^3 \cdot 3^5 \cdot 5^6 \cdot \pi^2$	299,789,233.6830892680470977
light, G2	g1 x g2 x 3,110,400	299,816,259.8633854915833344

THE SURFACE PAIR

surface, G1	$100 \cdot \sqrt{(5^5 \cdot \pi^3/(2^9 \cdot 3^9))}$	9.805487562539485379081368
surface, G2	x √(step)	9.805929537888606098553223
√(step)		1.000045074285832478684213

THE DAY, THE EARTH, THE YEAR

sidereal	7500π x step	23564.069025472603243 99471
in seconds	23:56:04.069...	86,164.069025472603243 99471
$300\pi^3$		9301.883004089946052642895
circumference	$15\pi^3$ x sidereal s	40,074,404.46156382845357204
rotation speed	$15\pi^3$	465.094150204497302632 1447
Earth–Sun	$3 \cdot 10^6 \cdot \pi^3$ miles	93,018,830.04089946052642895
equatorial radius	$7.5\pi^2$ x sidereal s	6,378,039.561521787662123498
G1 year	$15\pi^4/4$	365.2840913775091396366512

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