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Hope for a Long, Happy, Healthy Future for Mankind

By Michael T Deans

Biographical Note- I was born on 18th March 1947. My father, a geologist, found minerals in East Africa, improving agricultural production. My mother, a botanist, drew beautiful diagrams for her biology students. I read Ivy Wallace's 'Pookie puts the world right'1 as a child and sought ways to do so.

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H D P E F D R A L D N G H A P P Y H E A L T H Y F U T U R E F D R MANK I N D

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BIOGRAPHICAL NOTE I.

was born on 18th March 1947. My father, a geologist, found minerals in East Africa, improving agricultural production. My mother, a botanist, drew beautiful diagrams for her biology students. I read Ivy Wallace's 'Pookie puts the world right'1 as a child and sought ways to do so.

Bored proving geometric theorems at Latymer Upper School, I switched to chemistry and entered Churchill College Cambridge. Solving Brian Pippard's 'Cavendish Problems in Classical Physics' convinced me science works.

Contrary to instructions for a procedure confirming Clausius-Clapeyron's relation² for nitrogen, Figure 1, I immersed the helium thermometer. Water used to seal the rubber bung crystallised on the silica

Δ

bulb. Plotting pressure versus temperature showed hysteresis, not the expected straight line. Had a phase change accommodating H₂O molecules' irregular shape, Figure 2, distorted it?



Fig. 2: A Water molecules are 'electrets', B those in ice XIc all point the same way, C phase transition in 2D, D 3D version shows latent energy released as infrared laser light, E crystallising in polar pools of liquid nitrogen during a primordial ice age, it activated deoxyribonucleotides³ creating an equatorial DNA noodle soup

ice

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Sharing Albert Einstein's distaste for 'spooky action at a distance', I failed physics and reverted to chemistry. Biochemist Kenneth McQuillen advised me to read biochemistry at University College London. During my training as a hospital biochemist at University of Surrey, biophysicist Collin McClare read my paper 'Electromagnetic quanta in living systems' sympathetically.

Whilst programming early computers for London Borough of Hounslow, I noted their instruction sets could be reduced to nine. Do our brains have a nine-fold symmetric component? Modelling DNA double helices suggested uncoiling them to form 'minion' complexes. Reading a draft of 'Science Uncoiled'⁴, John Anderson enrolled me at King's College Hospital Medical School to compile a thesis 'Some biochemical consequences of a consistent framework for the origin of life'⁵.

Since examiners Bob Williams and Jack Lucy denied it publication in 1988, I've researched those consequences. Tihey offer better health, user-friendly artificial intelligence and solutions for the global warming crisis.

II. Axioms For Life's Existence

a) Three prerequisites for life's origination emerge

i. A natural laser source equivalent to ice XIc

Much energy is expended on SETI6, the futile search for life elsewhere. According to the 'ice rule', either O···H–O or O–H···O inter-connect H2O molecules in ice at random to four neighbours. At extreme temperatures and pressures, some of the 16 known ice forms are proton ordered. Only ice XIc7 has its water molecules aligned at ambient pressure. Lacking Linus Pauling's residual entropy8, it shares diamond's strength and structure, undergoing a phase transition at 72K releasing latent energy as $\sim 4\mu$ laser light, 'ice-light', life's ordering force.

ii. Photochemical coupling to biomolecular synthesis

Earth's oxygen-free atmosphere during a primordial ice age enabled polar liquid nitrogen to coexist with Charles Darwin's 'warm tropical waters'9. Falling snow recrystallized as ice XIc. Temperature fluctuations caused release of $\sim 4\mu$ laser light. When attempting to deice aircraft wings10, that wavelength is reflected. Likewise, ice in clouds and on Earth's surface reflected and polarized it. Water absorbs it but surface-resident deoxyribonucleotides were activated, creating 'order from chaos', a DNA 'noodle soup'.

iii. Resonant cavities

The sarcomeres of striated muscle, interlamellar spaces of mitochondria, grana of chloroplasts and centrioles afford resonant cavities for ice-light and visible wavelengths. They mediate muscle contraction, ATP synthesis, photo-synthesis and chromosome partition. Sarcomeres contract to form ½-wave cavities, more efficient than Andrew Huxley's sliding filament approach¹¹. Mitochondria trap energy released as $\lambda \sim 4\mu$ by Krebs cycle energizing ATP. Grana commensurate with photosynthetic light wavelengths convert it to λ . Centrioles fire on nine cylinders at cell division, transmitting energy via spindle fibres' nine α -helices to chromosomes. Protons propelled along 'minion' tunnels (see section 5) create alternating electric fields driving matched daughter chromosomes apart, 'pulling' them would contravene Isaac Newton's 3rd law of motion¹².

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Fig. 3: A Sarcomere forms $\frac{1}{2}\lambda$ cavity, B mitochondria afford free paths for λ , C grana accommodate light wavelengths, D spindle's α -helical proteins, F afford 9 paths, G conducting energy as solitons from centrioles. E driving chromosomes apart at cell division

Life evolving elsewhere need satisfy these three criteria. Theorists need search data-bases for alternatives before committing resources to detect it. Ice XIc, DNA and ice-light may prove a unique combination and Earth a unique location for life's evolution. We have a duty to preserve it.

III. How Life Originated

Some DNA formed tRNA analogues, 'transport DNAs', sharing their H-bond-line 'holes',¹³ Figure 4.

Embedding in Alexander Oparin's lightning-charged 'coacervate' membranes, they afforded polarized pores. Depolarization by ice-light left an electric field importing ionic complexes, creating a concentrated chemical mixture within.

'Replicate tDNAs' signalled life's origin. In modern life 64 variant tDNAs inherited in parallel with nuclear chromosomes govern nine 'orthogonal' metabolic pathways. Accounts of their roles are discussed below.



Fig. 4: A tRNA showing hole, B ice-light driven pump mechanism

IV. ESSENTIAL TRACE ELEMENTS

Now membrane potential replaces lightning and adenyl cyclase releasing ATP's phosphodiester bond energy drives their ratchet pump mechanism. Table 1 lists 9 independent metabolic pathways: motility, sensitivity, excretion, respiration, growth, rigidity, assimilation, reproduction and osmoregulation deploying trace elements Ca, K, Mn, I, Cu, F, Zn, Ag and Se as carriers.

| Table 1: | Nine metabolic | pathways |
|----------|----------------|----------|
|----------|----------------|----------|

| # | SYSTEM | TISSUE | CARRIER COMPLEXES | PATHOLOGY |
|---|---|--------|---|------------------|
| 1 | motility | muscle | Ca ⁺⁺ Mg ⁺⁺ and SO ₃ ⁼ | spasticity |
| 2 | sensitivity | nerve | Na ⁺ K ⁺ and adrenalin | depression |
| 3 | excretion | kidney | Mn ⁺⁺ and salt | kidney failure |
| 4 | respiration | lung | I ⁺ and O ₂ .H ₂ O | bipolar disorder |
| 5 | metabolism | liver | Cu++ and amino-acids | growth defects |
| 6 | rigidity | bone | SiF ₆ ⁼ AlF ₆ ⁼ and apatite | Alzheimer's |
| 7 | assimilation | gut | Zn ⁺⁺ and glucose | diabetes |
| 8 | reproduction | gonads | Ag ⁺ and pyrophosphate | cancer |
| 9 | water-pumping | heart | Ca ⁺⁺ Mn ⁺⁺ and SeO ₃ ⁼ | heart disease |
| | the second se | | | |

Commercial charts describe mRNA-encoded proteins and barrels of α -helices. tDNAs and dDNAs, 'differentiation DNAs', explain metabolism more simply. Being membrane-bound, they're lost on extraction and have eluded detection.

tDNAs constitute life's molecular vocabulary, trace elements its atomic alphabet and metabolic pathways its grammar. Figure 5 suggests assigning roles to 4 varieties of tDNA.

| <u>00+</u> <u>00*</u> Asn | <u>□∆+</u> <u>□∆*</u> Ser | <u>∆□+</u> <u>∆□*</u> Asp | | |
|--------------------------------|------------------------------|------------------------------|------------------------------|--|
| <u>□+</u> init Met | | | | |
| | | val <u>∆++</u> <u>∆+*</u> | Ala <u>∆*+</u> <u>∆**</u> | |
| <u>+□□</u> <u>+□∆</u> term. | <u>+Δ□</u> <u>+ΔΔ</u> Trp | <u>*□□</u> <u>*□∆</u> Gln | *^_ *^^ | |
| <u>+0+</u> <u>+0*</u> Tyr | <u>+Δ+</u> <u>+Δ*</u> Cys | <u>*0+</u> <u>*0*</u> His | Arg <u>*Δ+</u> <u>*Δ*</u> | |
| <u>++□</u> <u>++∆</u> Leu | <u>+*0</u> <u>+*</u> | <u>*+0</u> <u>*+</u> | <u>**¤ **∆</u> | <u>++0 ++4 +*0 +*4 *+0 *+4 **0 **4</u> |
| +++ ++* Phe | + <u>+++</u> +++ | Leu <u>*++</u> <u>*+*</u> | Pro <u>**+</u> <u>***</u> | <u>+++</u> ++* +*+ +** *++ *+* *** |

Fig. 5: Genetic code for protein synthesis23 predicts tDNA equivalent

dDNAs select from ~2,000 tDNAs resident in all cell membranes, determining cell diet and thereby explaining tissue differentiation. mRNAs selecting tRNAs for protein synthesis are analogous. Mendeleev's

periodic table14, Figure 6, shows essential, toxic and unused trace elements. DNA reported around sperm's entry to ovum suggested tDNAs are inherited independent of nuclear chromosomes.

| Н | | | | | | | | | | | | | | | | | Не |
|-----|----|----|----|-----|-----|-----|----|------|----|----|----|----|----|----|----|----|----|
| LI. | Be | | | | | | | | | | | В | С | N | 0 | F | Ne |
| Na | Mg | | | | | | | | | | | AI | Si | P | S | CI | Ar |
| к | Ca | Sc | TI | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr |
| Rb | Sr | Y | Zr | ND | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Те | 1 | Xe |
| Cs | Ba | La | Hf | Ta | W | Re | Os | lr - | Pt | Au | Hg | TI | Pb | Bi | Po | At | Rn |
| Fr | Rh | Ac | Rf | Db | Sg | Bh | Hs | Mt | Ds | Rg | Cn | | | | | | |
| | | | | Ess | Tox | n/u | | | | | | | | | | | |

Fig. 6: Periodic table showing essential, toxic and unused elements

a) Motility

Low pH inhibits liver glutathione oxidation to sulphite causing cramps. $SO_3^{=}$ exchanges Mg^{++} for

Ca⁺⁺, Mg, cofactor for kinase enzymes releases ATP's phosphodiester, Pi \sim Pi bond energy as $\lambda.$





Fig. 7: A Catecholamines form rings around Na⁺ and K⁺, B morphinans form larger complexes

tDNAs' high-voltage synaptic pores stabilize four- and six-member catecholamine rings around Na⁺ and K⁺. They exchange $3Na^+$ for $2K^+$. This changes cell charge & metabolic rate. Na⁺ resembles H₂O and forms large hydrates which make cell sap viscous and slow metabolism. Substituting K⁺ binds less water and increases metabolic rate, the 'fight or flight' reflex¹⁵. Morphine/codeine substitution forms larger complexes, blocking tDNAs and preventing pain transmission. Pain sensitivity increases when more tDNAs are enrolled to compensate, explaining drug addiction, Figures 7A, B.

The neural network model16 distinguishes brain areas using different neuro-transmitters. It accounts for

pain transmission and the way LDopa prevents Parkinson's disease17. However, 'minions' exchanging resonant frequencies across synaptic junctions and deploying axons & dendrites as wave-guides is more efficient.

c) Excretion

Aldosterone, angiotensin, rennin, histamine and aspirin mediate NaCl transport, controlling pH and ionic strength. Angiotensin delivers $MnCl_3^-$, $MnCl_4^=$ and $MnCl_6^{4-}$ and their complexes with NaCl excrete salt in urine, sweat and tears. The 'chloride shift'¹⁸ exchanges HCO_3^- for Cl⁻. Zinc is cofactor for the enzyme carbonic anhydrase which controls pH:

$$CO_2 + H_2O \leftrightarrow HCO_3^- + H^+$$
.

d) Respiration

 O_2 is normally hydrated; biological membranes are impermeable to O_2 , H_2O , so it's actively transported. The lungs exchange O_2 for CO_2 and erythrocyte haemoglobin distributes it. Thyroid glands pack thyroxin with iodine for distribution. Protons at target tissues release purple iodonium, I⁺, forming the I⁺[O₂.H₂O]₂ complex for its transport, Figures 8A, B. Littoral seaweeds use the same regime to manage tidal O₂ concentration changes; their purple and yellow colours reflect those of I⁺ and I⁻.



Fig. 8: A Proton displaces iodinium from throxine, B I⁺.[H₂O.O₂]₂ complex

lodine deficiency causes goitre and adding the $I^+[O_2.H_2O]_2$ complex introduces water to the aqueous humor explaining exophthalmos. Mutant tDNAs disrupt nerve cell oxygenation, explaining bipolar disorder19. Excess and deficient O_2 correspond to mania and depression respectively. Li⁺, diagonally related to I⁺ in the periodic table, stabilizes O_2 transport and controls mood swings but can cause kidney failure.

tDNA inheritance breaches Mendel's law, 1 in 7 siblings inherit bipolar disorder suggesting 7 types of tDNA types manage respiration and confirming the 'seventh son of a seventh son' myth. Sir Winston Churchill was manic depressive, it enabled his ability to review insights gained while 'high' when 'low', helping defeat Nazism.

Figures 9A-D show tDNA proton transport, it links N_2 , O_2 and NO with either the NH₂ or OH group of nicotinamide, driving N_2 fixation, O_2 and NO release. Biological N_2 fixation is more efficient than the Haber process²⁰. O_2 release photolyzes H₂O, it oxygenates the atmosphere, enabling symbiosis between fauna & flora. NO release controls vasodilation. HCN blocks them.



Fig. 9: H⁺ transport to nicotinamide mediates: A N₂-fixation, B O₂ release, C NO activation & D HCN toxicity

e) Growth

The Biuret test illustrates Cu's affinity for peptide bonds. tDNAs failing to feed amino-acids through cell membranes can cause gigantism, dwarfism & acromegaly²¹. tRNAs pass amino acids through endoplasmic reticulum for protein synthesis, tRNAs remain attached to mRNAs once selected.

Feed-back amplifies metabolic disturbances notifying all body cells:

• Nerve signals to the hypothalamus release 3,900 hormone molecules

- Anterior pituitary incorporates Cu to 3,900 hormone molecules
- Endocrine glands synthesize 3,900 hormone molecules Stimulating all 3, $900^3 \approx 6*10^{10}$ body cells.

The liver inter-converts amino-acids the portal vein delivers, Figure 10A, ensuring the brain receives a balanced mixture maintains sanity. Biotechnologists disregarding tDNAs roles and creating novelties could realize, Alexander Pope's 'A little knowledge is a dangerous thing' and Mary Shelley's 'Frankenstein' prophecies.



Fig. 10: A Liver inter-converts amino acids, B guanyl- replaces adenyl-cyclase synthesising hook proteins, C they determine morphology

Figures 10B, C show nutrient-starved tDNAs feeding from blastula and gastrula at cell division 'overheating'. Guanyl-cyclase synthesizing 'hook proteins', replaces adenyl-cyclase feeding substrates. Hook proteins inter-connect daughter cells determining tissue morphology. Stem cells lack hooks, gametes, filaments, sponges and simple worms have 1, 2, 3 and 4 hooks. 5 suffice to form all morphologies.

1-hook leukocytes digest any 6th hooks arising, preventing tumour and cancer growth. Proving my '*Five hook theorem*': *Five connections suffice to form all nature's beauty*, 3D equivalent of the 2D *Four-color mapping theorem*²² might persuade innovators to exercise caution.

Cu bracelets reputedly ameliorate arthritis. Copper accumulating in the eyes can cause Wilson's disease. The Cu in coil contraceptives starves sperm of glucose, preventing them reaching ova.

f) Rigidity

Osteoclasts and osteoblasts deploying SiF₆= as carrier transport calcium phosphate, fluorapatite and apatite, Ca₁₀(PO₄)₆OH₂ and Ca₁₀(PO₄)₆F₂ through membranes for bone and tooth maintenance. The stability of fluorspar, CaF₂, 'Blue John' illustrates Ca's affinity for F. Vitamin D₃ stores ~265 nm UV sunlight with the same energy²³ as Si ~ F bonds. Retinal transfers it as solitons for SiF₆= assembly, Figure 11A, via the pH-sensitive reaction:

$$SiO_2 + 6F^- + 4H^+ + UV \text{ light} \rightarrow SiF_6^- + 2H_2O$$

Both the thyroid and parathyroid glands incorporate halides to hormones, they probably evolved

in parallel. Continuous parathyroid hormone, PTH secretion prevents toxic F^- accumulation. Acidity at menopause and in kidney failure promote SiF₆⁼ synthesis causing osteoporosis.

Since phosphate is scarce, plant life synthesizes its SiO_2 hard parts, preserved as diatomaceous earth, via the same pathway. Acid air pollution entering the stomata of Scandinavian forest trees caused leaf-fall²⁴. The ineffectiveness of liming soils reduced interest in diesel pollution control.

 SO_x/NO_x air pollution acidifying the nasal fossa can cause inappropriate SiF_6 = synthesis. Passed via the olfactory nerves to the brain, depositing aluminosilicate plaques and releasing fluoride. The blood-brain barrier retains F-, it inhibits Krebs cycle, kills neurons and disrupts protein folding. The β -amyloid and τ -protein tangles created explain all Alzheimer Disease symptoms²⁵. Mutant tRNAs mis-interpreting mRNA sequences create similar tangles in prion diseases²⁶.

Fluorinated anaesthetics, typically administered for hip replacement, bring symptomatic relief four days later. Simultaneous with renal AIF_6^{\pm} excretion, the brain is cleared of F⁻ Air pollution control or a pharmaceutical introducing F⁻ to the brain could prevent dementia.

Vitamin D deficiency causes rickets and fluoridation replacing OH- with F-apatite counters childhood tooth decay²⁷. Tea drinking provides enough F⁻, excess causes tooth mottling.



Fig. 11: A Silicon hexafluoride synthesis, B Zn⁺⁺ complexes with Boglucose and 2-keto-Lgulonate

g) Assimilation

Pancreatic β -cells distribute Zn⁺⁺ in insulin and α -cell glucagon recycles it. Glucose transport controls carbohydrate metabolism, maintaining blood, xylem and phloem sugar concentrations. Zn⁺⁺ binds to the 'triangle of sweetness' all carbohydrate metabolism intermediates exhibit, Figure 11B. Vitamin C derivative 2-keto-Lgulonate takes Zn where insulin can't reach. That in limes incorporating OH-proline to collagen prevented scurvy in ancient mariners, CalamineTM lotion works the same way. Nasal cell tDNAs afford rhinovirus entry causing colds and flu. Linus Pauling promoted vitamin C²⁸ supplements to prevent it.

Defects cause diabetes, Zn accumulating in diabetics' vitreous humor explains glaucoma and poor peripheral glucose distribution their kidney and foot problems. An implanted Zn monitor might improve its management.

Zn in oysters boosts appetite for food, that in caviar increases libido for sex. Zn supplements²⁹

prevent such eating disorders as anorexia nervosa and bulimia, they might also prevent obesity.

Alcohol and barbiturate consumption promote transfer of Zn to the liver, where it's cofactor for alcohol dehydrogenase³⁰, for their detoxification. Reduced Zn supply to the brain explains inebriety. Attention to Zn nutrition might manage alcoholism.

A neonate's first breath triggers adult haemoglobin replacing foetal. The bilirubin released is conjugated to glucose by the Zn in colostrum for excretion. Failure can cause neonatal jaundice associated brain seizures³¹. Zn in midwives' pewter spoons prevented it before blue light exposure was introduced.

Divalent ions: beryllium, lead and indium mimic zinc. Victorians used Be as poison, calling it 'glucinium' for its sweet taste. Romans using lead acetate as a sweetener died in consequence. Endocrine glands may deploy In, diagonally related to Zn in the periodic table, to incorporate divalent ions to hormones. h) Reproduction



Fig. 12: A Arg₂.PPi complex synthesis, B Serotonin forms 6-member rings around Ag⁺, C anti-cancer drugs: canaverine, aminoimidazole, dacarbazine and chloroplatinate mimic Arg₂.PP_i

Highly charged phosphate can't pass through the tDNA pore. Retinal has conjugated -/= bonds, they transmit UV sunlight energy vitamin D₃ absorbs as soliton³², esterifying Pi to pyrophosphate, PPi. Figure 12A.

Pineal hormones serotonin and melatonin form 6-member rings around Ag⁺ resembling those catecholamines form with K⁺, Figure 12B. Anti-cancer drugs³³ mimic the Arg₂.PP_i complex supplying 28H, 20C, 8N, 12O and 2P for DNA synthesis at cell division. it, Figure 12C. Ag deficiency lets cancers develop. Porphyrins afford natural colour: red Fe porphyrin, haemoglobin, carries O_2 in erythrocytes, green Mg porphyrin, chlorophyll, performs photosynthesis and pink Ag porphyrin transfers energy from vitamin D_3 . for SiF₆ synthesis.

Before antibiotics were introduced, Ag was commonly used in medicine for tissue repair and sleep regulation. Ag-colloid proved effective against cancers in animal trials. Although experts regard it as a 'quack remedy', its reinstatement could be beneficial³⁴.

i) Osmoregulation



Fig. 13: A Mevalonate transports H_2O , B glutathione energises SeO_3 = synthesis for Ca⁺⁺/Mn⁺⁺ exchange, C cholesterol synthesis

Keshan Disease in China first evidenced selenium's essentiality. Contrary to Peter Mitchell's assumption when proposing chemiosmosis³⁵, membrane potential prevents water diffusing through membranes. Mevalonate, residue of saturated fat breakdown³⁶, mediates active water transport, essential for health maintenance. Animal life exchanges mevalonate-5-phosphate for mevalono-lactone-5-phosphate transporting water, Figure 13A.

Posterior pituitary hormones oxytocin and vasopressin distribute Se in their S-Se bonds. Vitamin E, α -tocopherol delivers energy as solitons oxidising Se to selenite, SeO₃⁼ exchanges Mn⁺⁺/Ca⁺⁺ and Mn cofactors enzymes converting surplus mevalonate to cholesterol, feedstock for steroid hormones, Figures 13B, C. Sea-floor Mn nodules evidence its participation in early life. 'Man gains ease' is mnemonic for 'Manganese controls blood pressure'.

Figure 14 shows eight blood pressure controls:

- 1 tDNA genetics
- 2 Saturated fat consumption

- 3 Lipid cholesterol transport
- 4 Mn nutrition
- 5 Exercise and Ca levels
- 6 S metabolism
- 7 HgMe⁺ versus SeMe₂⁺
- 8 Se and vitamin E nutrition

Pandemic Se deficiency is most significant, causing high blood pressure, heart attacks, strokes, eclampsia and cancers of breast, bowel, prostate and cervix. It's the prime cause of death in industrial societies, attributable to:

- Water purification³⁷
- Crops grown in Se-poor soils³⁸
- High temperature food preparation and preservation³⁹
- Junk food consumption.



Fig. 14: Blood pressure controls

Limes for scurvy, iodine for goitre, cod liver oil for rickets and fluoridation for dental caries are precedents for Se supplementation, isn't 'mass medication'. 'Hard' water percolating through sedimentary rocks includes Se deposited by early life, it's preferable to 'soft' water. The persistent correlation between surface geology and breast cancer incidence⁴⁰ and European royalty's longevity⁴¹ evidence Se nutrition's importance. Animal husbandry⁴² yields best evidence:

- S in superphosphate fertilizer competes with Se causing swayback in sheep.
- Se supplements prevent hypertension in pregnant cattle.
- Se supplements protect pigs from heart failure on their way to market.



Fig. 15: A β-sheet binds uncoiled B-helix, B analogous gramicidin S, C 21-unit coil and NCP, C chromosome stacking, D replication, F H-bonds and adjacent tunnels, T

Reducing computer instruction sets to nine suggested some component of human intelligence has nine-fold symmetry. James Watson and Frances Crick interpreted Rosalind Franklin's X-ray diffraction images⁴³, introducing DNA's B-helical structure.

Figure 15A illustrates oligo-peptides forming 'minion' DNA/protein complexes. 189 anti-parallel β -pleated sheet hairpins have alternate neutral and basic A | L | I | V and K | R residues, P makes 17° bends between adjacent units. They bind nine-base-pair DNA sections retaining B-helical spacing and overlap.

Figures 15B-E shows 21-unit coils degrading to nucleosome core particles, NCPs⁴⁴ on extraction. 9 coils complete a minion, signifying mind and subservience. A report of 'beads on a string'⁴⁵ supported their existence. Minions replicate 1,701 base-pairs without engendering the mutations associated with uncoiling and recoiling. Bacterial protein gramicidin S⁴⁶ has pFs, F, equivalent to bases, siRNAs are also analogous.

Amino acids A, L, I and V matching bases C, G, A and T, mnemonic 'A LIVE CiGAreTte', conserves critical sequences. Minions pack DNA on chromosomes more neatly than NCPs. Three types of H-bond interconnect them together, Figure 15F. Those between ω amines and phosphates contribute their emergent functions as biological clocks, chips in the brain and safe nuclear fusion reactors. Minions also govern the nine biochemical pathways discussed above.

a) Biological clocks

Light passes thrice around a minion coil in:

$$\tau = 3 * 189 * 7.37 * 10^{-10} * 3 * 10^8 \approx 1.39 * 10^{-15} \text{ secs}$$

where '3' reflects Dekatrons[™] logic used in Geiger counters⁴⁷, there are 189 base-pairs/coil, 7.37 Å is β-sheet spacing and $3x10^8$ the velocity of light. Using the formula $63^N\tau$, N = 1 to 18, N = 11, 13 and 18 predict day-length, Sun-spot cycle period and the age of the universe respectively, suggesting time's a figment of our imagination.

b) Chips in the brain

Each minion is a coiled abacus with 63 beads on 18 rungs. It counts from 1 to $63^{18} = 244,416,145,091,$ 043,012,544,965,789,715,329 ~ 2.444 * 10³² and uses

ratios, percentages, exponents and logarithms for comparisons, see section 6.

c) Molecular-scale nuclear fusion

The 'Tyger' equation, Figure 16C, named after 'What immortal hand or eye dare frame thy fearful symmetry?' in William Blake's synonymous poem⁴⁸, replaces Einstein's relativity, reinterpreting Newton's gravitation, Heisenberg's uncertainty and Lemaître's bigbang cosmology. It's a parabolic function compensating minions' 1 in 63⁹ wrap-around 'errors' and uses polar coordinates Θ and Φ , $\beta = 63^{-9}$.

Locally Newton's straight line, it describes light's apparent boomerang-like trajectory and renders plane surfaces spherical. Nested plane combinations, Figure 16E afford a new perspective on nuclear structure, predict allotropy and reinterpret s $| p | d\pi|$ electron orbitals and $- | = | \equiv |$ H-bonds.

Oscillating H-bonds, Figure 16A, propel protons along adjacent tunnels, Figure 15F with energy:

where proton mass, $p_m = 1.67 * 10^{-27}$ kg and $c = 3 * 10^8$ m/s, conducting the carbon-nitrogen fusion cycle:

$$^{2}C \rightarrow {}^{13}C \rightarrow {}^{14}N \rightarrow {}^{15}N \rightarrow {}^{4}He + {}^{12}C$$

Recoiling molecules: ${}^{12}CO_2$, ${}^{13}CO_2$, ${}^{14}NO_2$, ${}^{15}NO_2$, ${}^{12}CH_4$, ${}^{13}CH_4$, ${}^{14}NH_4$ and ${}^{15}NH_4$ emit γ -rays. Their ${}^{1}\!/_2$ -lives and frequencies match those of pulsars⁴⁹. DNA diffracts them at source and they return manifesting cosmic patterns of stars and galaxies.



Fig. 16: A ω-amine-phosphate H-bonds oscillate, B amino acids match bases, C Tyger relativity equation, D cold fusion under H₂O on Pd, E nine plane combinations, F carbon-nitrogen fusion cycle

Cold fusion has also been reported in electric storm clouds, collapsing bubbles and water adhering to palladium crystals⁵⁰, Figure 14D. Humanity's~ 10^{28} minions replenish H, C, N, O, S & P, sustaining life. This argument is circular but complete.

d) How our brains work

Numbers 1 to 9 have meaning and colour, Figure 17A. Shakespeare's gold, bronze and silver caskets in his 'Merchant of Venice', politics, national flags and metaphors illustrate them. Each bead's a witch, one per coil opposes the rest storing one letter of an 18-character word irrespective of language. Minions play a chord corresponding to their stored word. Nerve fibers serve are wave-guides, equivalent to optic cables, communicating faster than neural networks' electrical potentials. Others holding similar words, either in the same nucleus or connected by axons and dendrites, resonate recalling memories, 'ring a bell'. An infant's first breath changes O_2 explaining astrology⁵¹, even the first-born of identical concentration, establishing a datum on all its minions twins can be distinguished.



Fig. 17: A Concepts and colours B astrology

Scientists regarding astrology as superstitious nonsense might statistically test the following correlations. Tour an art gallery and compare artists' birth dates with the seven-year period their masterpiece was created, see Table 2.

Compare numbers assigned to astrological birth-charts with Bernard Le Gette's 'Numera'⁵². Ask an aesthete to correlate art works with personality.

| # | METAPHOR | SENSE | 7-YEAR PERIOD |
|---|--------------|------------|---|
| 1 | green | instinct | 0-7 infants behave, 63-72 olds remember |
| 2 | golden truth | belief | 7-14 kids understand, 72-81 re-educate |
| 3 | pied beauty | aesthetics | 14-21 teens wonder, 81-88 rest content |
| 4 | daffodils | joy | 21-28 adults learn, 88-91 elders teach |
| 5 | roses | touch | 28-35 couples love, 91-98 remember |
| 6 | crocuses | hearing | 35-42 thinkers realize their dreams |
| 7 | conservative | taste | 42-49 investors promote future welfare |
| 8 | liberal | sight | 49-56 citizens advise and publish |
| 9 | socialist | smell | 56-63 leaders govern wisely |

Table 3: Astrological great ages

| The Roman Empire ended the Age of Aries, emphasizing stability, justice and unity. | | | | | | | | | |
|---|-----------------------------|---------------|-----------------|--------------------|------------------------|--|--|--|--|
| Emperors used bronze ornaments and wore purple togas, Buddhists wear saffron robes. | | | | | | | | | |
| Cancer | -goodness | Scorpio | -truth | Pisces | -beauty | | | | |
| Gemini | +peace | Libra | +love | Aquarius | +progress | | | | |
| Faurus | -stability | Virgo | -justice | Capricorn | -unity | | | | |
| Aries | +stability | Leo | +justice | Sagittarius | +unity | | | | |
| The Age of Pisce | es, ~0-2000 _{AD} , | peaked in the | e Renaissance | and Victorian I | Empire, | | | | |
| emphasizing goodne | ss, truth and be | auty. Imperi | al flags tended | l to be red, silve | er and blue. | | | | |
| Cancer | -goodness | Scorpio | -truth | Pisces | -beauty | | | | |
| Gemini | +peace | Libra | +love | Aquarius | +progress | | | | |
| Taurus | -stability | Virgo | -justice | Capricorn | -unity | | | | |
| Aries | +goodness | Leo | +truth | Sagittarius | +beauty | | | | |
| The Age of | f Aquarius, em | ohasizing pea | ace, love and p | orogress, started | l~2000 _{AD} . | | | | |
| Newly ind | lependent natio | ons have ofte | n chosen greet | n, gold and yell | ow flags. | | | | |
| Cancer | -peace | Scorpio | -love | Pisces | -progress | | | | |
| Gemini | +peace | Libra | +love | Aquarius | +progress | | | | |
| Taurus | -stability | Virgo | -justice | Capricorn | -unity | | | | |
| Aries | +goodness | Leo | +truth | Sagittarius | +beauty | | | | |

History repeats itself, prophecies reflect human nature and are repeatedly fulfilled. Table 3 lists astrological 'great ages' and changing emphasis on body, mind and spirit needing scientific, philosophical and governmental changes.

Integrating neurological, psychiatric and philosophic classifications⁵³ identified nine independent personality traits: goodness, truth, beauty, peace, love, progress, stability, justice & unity and 'senses': instinct,

belief, aesthetics, joy, touch, hearing, taste, vision & smell. Table 4 correlates the interests and personalities of specialists. Negative/positive traits match intro-/extra-version⁵⁴.

| # | QUALITY | PERIOD | COLOUR | MASS | DISCIPLINE |
|----|-----------|--------------|--------|--------------------|---------------|
| -9 | unity | 8.7 f-secs | red | electron mass/7 | quantum |
| -8 | justice | 5.5 p-secs | silver | proton mass /7 | physics |
| -7 | stability | 350 p-secs | blue | 2 x base pair mass | chemistry |
| -6 | progress | 22 n-secs | violet | 8.3 n-grams | computer |
| -5 | love | 1.4 µ-secs | bronze | 0.033 p-grams | biochemistry |
| -4 | peace | 87 μ-secs | yellow | 130 p-grams | genetics |
| -3 | beauty | 5.5 m-secs | pied | 0.51 µ-grams | biology |
| -2 | truth | 350 m-secs | gold | 2 m-grams | engineering |
| -1 | goodness | 22 seconds | green | 8.1 grams | psychology |
| +1 | goodness | 23 minutes | green | 32 kilograms | psychiatry |
| +2 | truth | 1 day* | gold | 130 tons | head hunting |
| +3 | beauty | 9 weeks | pied | 0.5 M tons | sociology |
| +4 | peace | 11 years* | yellow | 2000 M tons | politics |
| +5 | love | 685 years | bronze | 8 G tons | history |
| +6 | progress | 43,000 years | violet | 31 P tons | archaeology |
| +7 | stability | 2.7 M years | blue | 1.8 x moon mass | palaeontology |
| +8 | justice | 170 M years | silver | 84 x earth masses | astronomy |
| +9 | unity | 11 B years* | red | 1 x sun mass | cosmology |

Table 4: Qualities associated with minion coils

 \pm correspond to intro-/extra-vert personalities, colours feature in metaphors, masses are in ratio 63², periods = 63^N τ , *approximate. f, p, n, μ , m, k, M, B, G & P represent 10⁻¹⁵, 10⁻¹², 10⁻⁹, 10⁻⁶, 10⁻³, 10³, 10⁶, 10⁹, 10¹² & 10¹⁵ respectively.

Human intellect translates experience into words, pictures and symphonies. Minion storage is holographic, survives brain damage and lasts a life-time⁵⁵. Synesthetes transposing senses and changing key in music reflect transference of settings between minion coils, accounting for lateral thinking⁵⁶.

Our 26-letter alphabet, base-10 arithmetic and 64 'I Ching' entries are consistent with minion logic. As Piet Hein wrote, 'Things Take Time'. Indexing information according to minions' 18 minion categories would enable faster retrieval and greater relevance than binary search engines. Inter-minion signals are confined to the brain, ensuring privacy. Contrary to the uncertainty principle, in-phase biological clocks may explain telepathy. Allowing for differentiated brain regions using different neuro-transmitters would address mental disorders. Gamblers confuse cardinal, counting numbers with ordinal, measuring numbers, understanding minion logic could redirect their attention.

Artificial intelligence emulating minions satisfying Turing's 'play the imitation game' criterion57 would facilitate matchmaking, diplomacy and interdisciplinary communication. Human intelligence has evolved to exceed silicon technology.

VI. Organising Life's Survival

According to the Greek Gaia myth⁵⁸ mankind has evolved to share Earth's resources with other forms

of life. Robert Malthus⁵⁹ cautioned population size need be restricted to avoid corruption. Rachel Carson⁶⁰ revived public interest in conservation, see also the Club of Rome Report⁶¹.

Visiting Mars won't secure life's survival. We need conserve resources, prevent epidemics and educate our offspring to care. 'Turning swords to plough-shares' as Isaiah suggested, destroying nuclear warheads, banning hand-guns and disarming terrorists are essential first steps.

Recreating the Garden of Eden and eating all its fruit might uncover more secrets. Zoos, gardens and aquaria enable scientific studies, public education and temporary refuges for threatened species. They also discourage environmental disruption associated with eco-tourism.

Inter-ethnic, -racial and religious harmony is prerequisite for establishing a stable environment for raising families. Meetings in churches, mosques and temples bring like minds together. Peace marches, demonstrations and signing petitions bring government representatives on side.

Careful attention to farmland, greenhouses and waterways ensures wildlife thrives independent of agricultural food production. Genetic modification and breeding can introduce cooperative organisms. Happy families foster children aspiring to create a peaceful, loving progressive planet.

Although the hollow-headed 'Thinker' above Auguste Rodin's 'Gates of Hell' thinks nothing, he's inspired many generations. James Watt's steam engine, Robert Stevenson's Rocket, Michael Faraday's dynamo and Alexander Fleming's penicillin have changed everything.

Planting forests, releasing fish and feeding garden birds can restore natural habitats, allowing country walks, watching trout leap for flies and birds feeding their young. City parks and holiday retreats. Small changes could ensure life's survival.

VII. PEACEFUL COEXISTENCE

Plato's 'Republic'⁶² surveyed possible forms of government, history records their successes and failures. 20th century dictators wrought atrocities, terrorists persistently seek revenge. Bertrand Russell and Nelson Mandela advocated Mahatma Gandhi's peaceful protest to influence authorities.

Respecting our moral values overrides religious the protests of zealots and nationalists. Laws, peace treaties and military defence, not indoctrination are needed. Individuals can share resources internationally to prevent conflict. Information should be freely accessible, not masked by a cloak of secrecy.

The 'Compulsion for International Service', CIS proposal in *Science Uncoiled* (published by Melrose Press, available in English, Chinse and e-book formats)

outlines ways for disparate cultures, nations and religions to live in harmony and share the planet equably.

Former civilisations envisaged races, sects and nations coexisting. Their artists captured natural beauty, scientists managed assets and philosophers thought creatively. Socrates suggested 'know thyself ... the unexamined life is not worth living'. Self-knowledge facilitates knowing others and addressing unresolved problems.

The Buddha, Christ and Mohammed advocated loving others, tolerance, sharing and cooperating. Farmers need avoid over-grazing, architects design energy efficient homes and entrepreneurs avoid environmental pollution. Sharing the benefits of new discoveries can improve future welfare.

To withstand earthquakes and fires and floods, buildings need strong foundations and to follow building regulations. Children's education must enhance their inherited talents and encourage further studies to enjoy happy, healthy and fulfilling lives.

The 'Truth and Reconciliation Commission' forgave European colonists when South African apartheid was overthrown. Free speech, lateral thinking and rehabilitating offenders must replace burning witches, hanging robbers and exiling deviants. Reconciliation, discouraging vengeance and applying jurisprudence are necessary.

Visionaries have sought peaceful strategies throughout history. Crusaders, the League of Nations and United Nations afford opportunities for individuals to realize shared hopes and wishes for future survival. Governments are bound to keep peace, distribute aid, forge treaties and advocate disarmament.

The Book of common prayer includes the phrase 'peace in our time' which Neville Chamberlain misquoted as 'peace for our time' before World War II. Pacifists need exemption from military conscription, they must volunteer first aid. If we keep the flame of remembrance alight, allow civilisation to evolve and foster enterprise all will be well.

VIII. EFFICIENT ENERGY GENERATION

Although hydroelectric power generation is efficient compared to other methods, Figure 19, its distribution is wasteful and involves unsightly pylons. Deploying genetically modified bacteria to perform nuclear fusion in safe shoe-box-size units could power homes or vehicles.

Dam-building floods villages and farms, prevents fish returning to their spawning grounds and their failure endangers downstream city dwellers. Rainfall varies, rendering their utility uncertain. Burning fossil fuels increases global warming and deprives future generations of feed stocks for plastics. Harnessing the energy genetically modified bacteria performing nuclear fusion release to the grid

might address global warming. If interested readers contact me, I'll coordinate your suggestions.



Fig. 19: Electricity generation efficiency

IX. CONCLUSIONS

Pasteur established life can't arise spontaneously. Miller and Urev's simulated lightning synthesized amino-acids from methane and ammonia. 'Coacervates' and clays enable catalysis but fail to determine life's chemistry. Ribosomes arising spontaneously in temporary hydrothermal vents seem improbable, protein synthesis is complex. DNA's greater stability than RNA makes its precedence more likely, discrediting the 'RNA world' approach. Hovle's 'Panspermia' doesn't address early chemistry.

Self-knowledge and understanding life's history enable intervention for its evolution and survival. My model for life's origin invoking ice XIc energetics matching DNA's may uniquely enable life's existence. It accounts for substrate concentration, chirality, time, uncertainty and brain function. It also obviates seeking life elsewhere.

The consequences of my chance discovery as a teenager afford hope in a time of crises. Public confidence is essential for implementing solutions resolving climate change, morbidity, obesity, dementia & malnutrition. Empirical tests would encourage public acceptance and implementing its proposals:

- Trace element supplements prevent morbidity.
- Minion-based AI would improve matchmaking and diplomacy.

• Molecular-scale cold fusion could resolve pollution problems.

40M US citizens⁶³ are at risk from flooding. Western populations overeat, obesity needs attention. Supplementing vitamin C preventing scurvy and fluorinating water supplies reducing dental caries are precedents for augmenting selenium to prevent heart attacks, strokes and cancers of breast, colon, prostate and cervix. Eliminating acid air pollution could end the scourge of Alzheimer's dementia. I believe this paper justifies adopting new axioms, readers are welcome to contact me by e-mail.

Acknowledgements

Like Isaac Newton quoting Bernard de Chartres 'I have stood on the shoulders of giants and seen further'. Correspondence has suggested omissions. The X-ray-diffraction image of tRNA needs copyright permission.

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