

The Music of Life

What makes us human?

Denis Noble



The Music of Life

What makes us human?

An insect?

The 'music of life'
has no conductor!

or

A violin?



With thanks to the
Japanese Paper Artist

内藤英治

Hideharu Naito

Selfish Genes

“Now they swarm in huge colonies, safe inside gigantic lumbering robots, sealed off from the outside world, communicating with it by tortuous indirect routes, manipulating it by remote control. They are in you and me; they created us, body and mind; and their preservation is the ultimate rationale for our existence.” Dawkins, *The Selfish Gene*, 1976, pp 19-20

“[readers] .. Should imbibe the fundamental truth that an organism is a tool of DNA rather than the other way round”
Dawkins, *The Extended Phenotype* p 159

Genes as Prisoners

Now they are trapped in huge colonies, locked inside highly intelligent beings, moulded by the outside world, communicating with it by complex processes, through which, blindly, as if by magic, function emerges. They are in you and me; we are the system that allows their code to be read. And their preservation is totally dependent on the joy we experience in reproducing ourselves. (Our joy not theirs!) We are the ultimate rationale for their existence.

The fundamental truth is that an organism is the only tool by which DNA can express functionality, by which the “Book of Life” can be read. DNA alone is inert - - - dead

Selfish or Cooperative Genes?

..the vision of life that I advocate ...is not provably more correct I doubt whether there is any experiment that could be done to prove my claim.

Richard Dawkins, *The Extended Phenotype*, 1982

The idea of the selfish gene is metaphorical polemic,
not science

The Story of the Chinese Emperor



and the poor farmer



(The Music of Life chapter 2).

秦始皇帝和貧窮農民









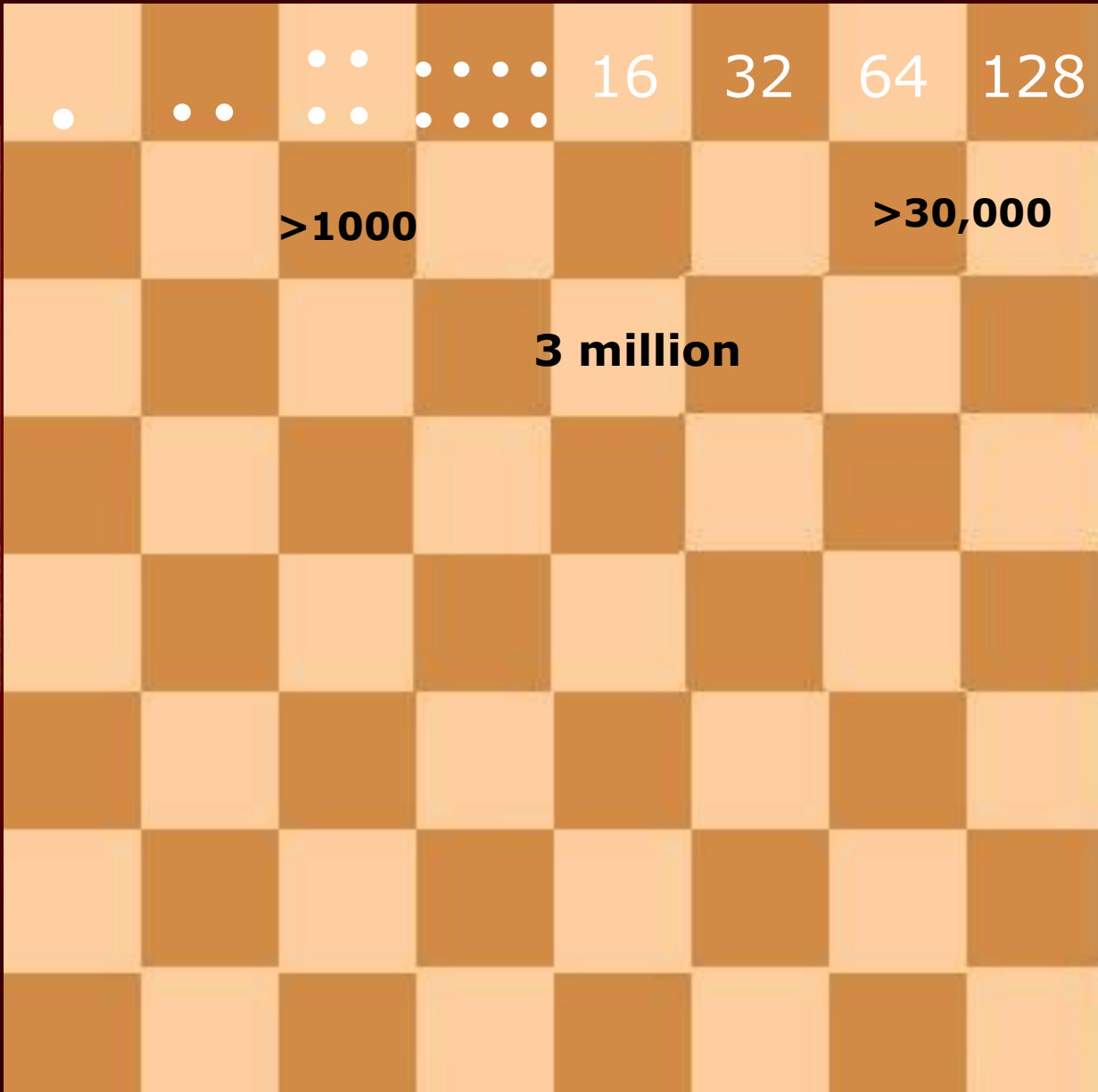


皇建極

天心降鑒惟萬方臣庶

祖訓昭垂我後嗣子孫





**Square 36:
all the rice
in the palace**



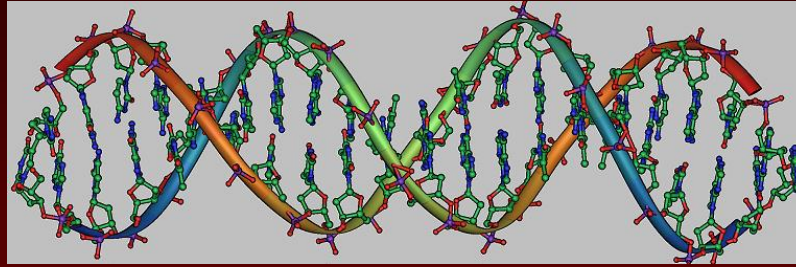
**Square 50:
all the rice
in China**



**Square 64:
all the surface
of the world**



The genome and combinatorial explosion



Assume each function depends on 2 genes
(absurd, but still instructive)

Total number of possible 'functions' would be

$$0.5 \times 25,000 \times 24,999$$

$$= 312,487,500$$

$$10^{289}$$

With more realistic assumptions about # of genes in each function, the figures are huge : at 100/function ($\sim 1.5 e^{302}$);

for all combinations ($\sim 2 e^{166713}$)

$$10^{72403} !$$

10^{72403}

Compare it with the largest number we know

The UNIVERSE





10^{72403}

Number of galaxies \approx 80 billion

Total number of atoms in the universe \approx ?

10^{72403}

Total number of atoms in the universe $\approx 10^{80}$

**There wouldn't be enough material
in the whole universe for nature to
have tried out all the possible interactions
even over the long period of billions of years
of the evolutionary process**

(The MUSIC of LIFE chapter 2).



Guitar solo

Jeux Interdits

Forbidden games

Narcisso Yepes



The French bistro omelette



The Music of Life, chapter 3





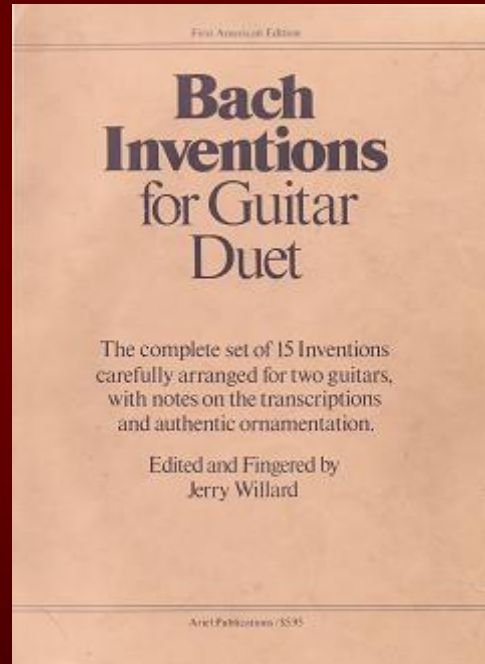


Invention 8

28

Guitar

Bach: Invention no 8



“This is not music!”

A novel view of Darwinism

The Silmans find some tropical islands



The Music of Life chapter 8

The Silmans' error



Human spermatozoon fertilizing an egg cell

Can acquired characteristics be inherited?

Motherly love may alter genes for the better

Grooming makes rats less fearful, research suggests

Genetic changes could be passed on to descendants

Ian Sample
Science correspondent

A good dose of motherly love may be enough to alter our genetic code, leaving us less fearful and stressed out in later life, researchers have found.

The striking claim suggests that rather than our genetic blueprint being fixed before birth our bodies can tweak its biological book of instructions, allowing us to adapt more swiftly to a changing world, instead of waiting millions of years for evolution to take its course.

The Guardian
14 February 2007

Weaver et al
The Journal of Neuroscience
(2007) 27,1756 –1768

A black and white photograph of a crescent moon rising over a horizon line. The moon is positioned in the upper center of the frame, partially obscured by the dark, curved horizon. The sky is a deep, dark black. The foreground is a light gray, textured surface that slopes upwards from the bottom left towards the horizon. The text 'Jupiterians' is written in a white, italicized serif font on the right side of the image.

Jupiterians

The Music of Life, chapter 10



The first humans to visit this new world







A silhouette of a large, pointed dome, likely a cathedral, set against a clear blue sky. The dome is dark and stands out prominently against the lighter background. The sky transitions from a pale blue at the horizon to a deeper blue at the top. The entire scene is framed by a dark red border.

They find buildings that are,
to all intents and purposes,
CATHEDRALS



They are
beautiful
ornate
treasures

There are are 'priests'
dressed in colourful robes



The inhabitants practise a special form of 'prayer' -- meditation



There are scriptures

>81,000 'books'

52 million 'words'

God?

“why do you ask that question?”

Self/soul? “No-self – it’s a process”

Descartes: I think therefore I am? “No-'I' – “Thinking – so being”



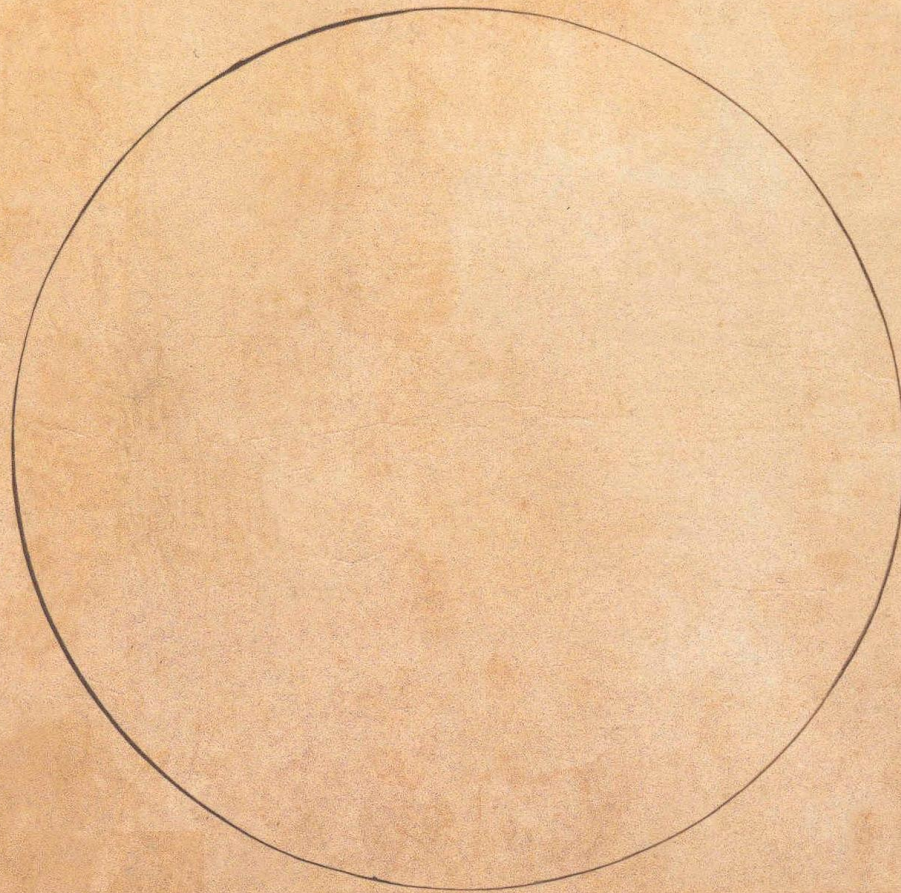
UNESCO World Heritage Site



海印寺 Hae-in-sa

THE
OXHERDER

A ZEN PARABLE ILLUSTRATED



STEPHANIE WADA

Non sai tu che la nostra anima è composta di armonia?

No words are needed for those who understand music

Do you not know that our soul is composed of harmony?

Leonardo da Vinci
Trattato della Pittura



Finale

A l'Ora de l'Aubada
At the hour of dawn

Nadau

A l'ora de l'aubada
Que t'vieneri cercar
Conneissi ua istoria
Te la podi contar
Si l'aiga shebiteja
Quand n'i aura pas na bruch
A l'ora de las hadas
T'estuparei las lutz

A l'ora dau silenci
Que saurei descobrir
Quand pots estar beroia
E ou sont tos camins
A la punta dau dia
Que t'preneri la man
Pagera dins la mia
Tornarem comencar

At the break of dawn
I will come to find you
I know a story
I will tell you
When the water shimmers
When there is no sound
At the witching hour
I'll turn off the light

At the hour of silence
I know how to find
When you are beautiful
and where you go
at the break of day
I'll take your hand
put it in mine
we'll start together

Sens pietat ni cadena
Coma un heuc dins la nueit
Coma un heuc dins ma vida
Enta virat lo hred
Que t'aimera ma mia
Sei pas quand des matins
Aura luseich l'eslama
Lheu qu'es va amortir

Si as los uelhs a la lua
Qu'aniram pasejans
Coneissi las estelas
Qui hen virat los caps
Si as los uelhs a la bruma
T'inventarei sorelhs
Et ton cos sera prima
La pausa d'un saunei

Without pity or chains
life a fire in the night
like a fire in my life
to chase the cold
I'll love you, my love
how many mornings
now the light shines
perhaps it will die

if you look at the moon
we'll go together
I know stars
that will turn your head
if you look at the dark
I will invent suns for you
your body will shine
like a dream



Thank you

Arron d'aimar -- after love

Occitan love song (Nadau)

Arron d'aimar -- after making love
quauque còp que sauneji -- sometimes I dream
a mars-grana de nèu -- of oceans of snow
e aus navius negats -- of drowning ships
aus arrisers gaujós -- of laughter of children
au dia que punteja -- of the break of day
au dessús d'un camin -- over a road
que non s'acaba pas -- that never ends

Que t'aime -- how I love you
pr'amor dau temps qu'acaças -- for the time you dispel
que t'aime
per la nèu e lo huec -- for snow and fire
que t'aime
caminaram amassas -- we'll go together
que t'aime
per l'aiga o l'eslambrec -- for water and lightening

La hièstra que obèrta -- the window is open
la lua que t'bailina -- moonlight caresses you
e tu qui vas dromir -- and you who go to sleep
ton cap s'ei amagat -- your face is hidden
per delà lo plaser -- beyond pleasure
la tendressa engalina -- beyond tenderness
io qu'espïi ton còs -- on seeing your body
e'u gausi pas tocar -- I dare not touch

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per l'aiga o l'eslambrec -- for water and lightening

Arron d'aimar -- after making love
quauque còp que sauneji -- sometimes I dream
que lo vent nos a miats -- that the wind has put us
cap sús los crums negrós -- above the black clouds
en un pais sens fin -- in a distant country
ont dab tu me passeji -- where we go together
ont lo monde es perdonan -- where people forgive
aus qui s'aiman, urós -- those who love, and are happy

Que t'aima -- how I love you
pr'amor dau temps qu'acaças -- for the time you dispel
que t'aima
per la nèu e lo huec -- for snow and fire
que t'aima
caminaram amassas -- we'll go together
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