The Panoramic Pentagon

#10 of Gottschalk's Gestalts

A Series Illustrating Innovative Forms
of the Organization & Exposition
of Mathematics
by Walter Gottschalk

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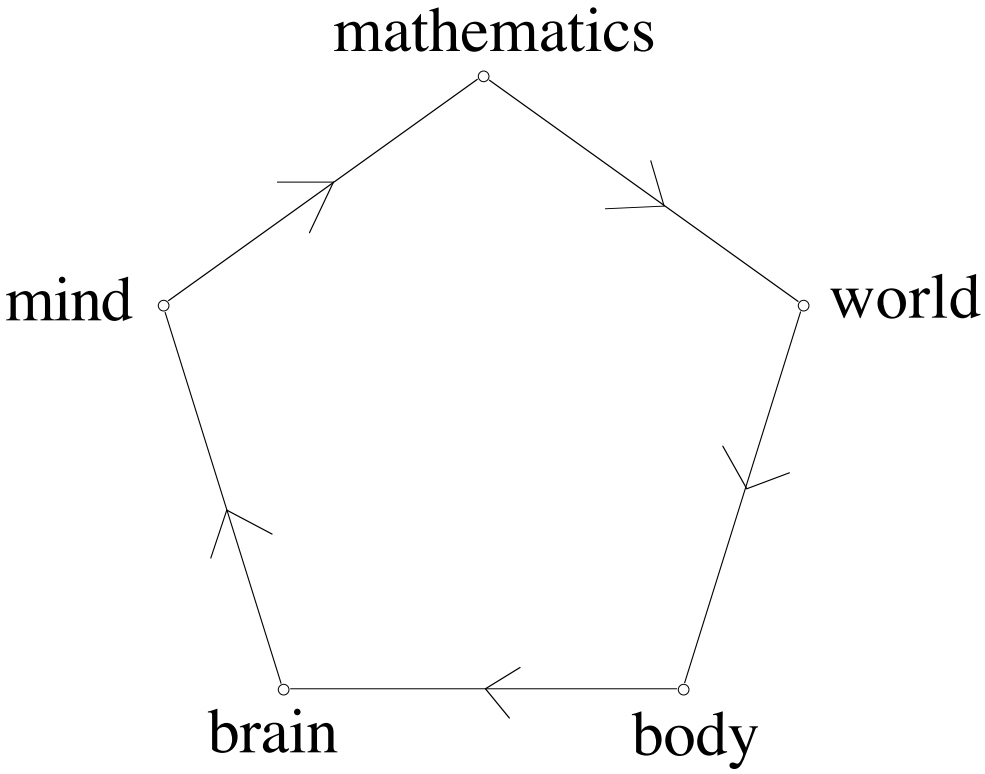
GG10-2

the panoramic pentagon



arrow = generates

all is mathematics

exegesis of the panoramic pentagon

□ the panoramic pentagon is a work of art (of sorts);
every work of art needs an interpretation;
the interpretation may vary from observer to observer;
indeed, a single observer may recognize
the existence of more than one interpretation,
some acceptable to them and some not;
the following is the artist's interpretation
which is a philosophy of mathematics
(and everything else as it turns out)

• the expression
all is mathematics
may be abbreviated

$$\forall = \text{math}$$

but a more precise symbolic formulation
of this philosophy would be

$$\forall x \,.\, x \in \text{math}$$

$$=_{\text{rd}} \text{ for all x, x is mathematics}$$

or

$$V = \text{math}$$

$$=_{\text{rd}} \text{ the universe is mathematics}$$

□ the panoramic pentagon,
abbreviated ‘panpen’,
is
an initial overview of all there is
in six carefully chosen words,
consisting of
five nouns at the five vertices of a pentagon
viz
mathematics
world
body
brain
mind
in clockwise order from the top vertex
&
one and the same verb for all of the five
coherently clockwise directed sides of the pentagon
viz
generates

□ the five vertices of panpen

Δ mathematics
is
what it was before now
and
what it is now
and
what it will be seen to be in the future

Δ the world
is
primarily the physical world
of matter and energy
from the clusters of galaxies
to the particles of atoms
&
from everlasting to everlasting

Δ humanity = body + brain + mind,
that geometric/golden mean in the middle,
between the macrocosm & the microcosm,
is represented primarily
at the body/brain/mind vertices

Δ the body

is
the human body considered exteriorly
which is symbolic of
the species Homo sapiens
and
its descendants

Δ the brain

is
the central controlling organ of the body viewed exteriorly
and
what it will develop into in the future

Δ the mind

= the functioning of the brain
= what the brain does
= brain activity
= we ourselves now
and
what we will evolve into in the future

□ the five sides of panpen
are represented by
one verb with a mathematical flavor
which is sufficiently general that a particular meaning
must be ascribed in each of the five particular cases

Δ mathematics
generates
the world

• mathematics helps us to understand the universe

• scientific explanations are essentially mathematical;
in particular
observation & experiment result in measurements ie numbers
and
laws of nature have mathematical form
and
theories are embedded in mathematical systems

• as time goes by and a particular science matures,
it becomes more mathematical;
science flows toward mathematics

• ultimately
the explanation of the universe
ie science
will become entirely mathematical

• to describe the world is
to speak the language of mathematics;
one can say
the world speaks the language of mathematics
and
to understand the world
one must then understand mathematics

• it is inescapable that more and more mathematics
will be taught by scientists in science courses
as part and parcel of a science
and not as an independent discipline;
this fact has major consequences for
mathematicians and mathematics departments

∆ the world

generates
the body

• this refers to the beginning of life and its evolution

• the intent is that life is an inevitable/intrinsic development of the material universe where life did not exist before

• it is to be recognized that there will be
a future development/evolution of the body
which will probably be different from evolution in the past

Δ the body

generates
the brain

• as the body evolved so did the brain
as a part of the body

• the body makes the brain possible,
altho it could be argued from evolutionary principles that
the body of earlier species brought the brain into existence
in order to make the continued existence of the body
more likely

• the body supports the brain,
which is now the primary reason for the body's existence
ie the primary function of the body is now
to support the brain

Δ the brain

generates
the mind

• the mind evolved as the brain evolved

• the mind consists totally of the workings of the cells, neurons, axons, biochemicals, molecules, ions, etc, etc, of the brain

• to adopt a computer metaphor,
the brain is hardware
&
the mind is software

• more metaphors:
the brain is the platform of the mind;
the brain is the receptacle of the mind;
the brain is the vehicle of the mind

Δ the mind

generates
mathematics

• mathematics is mental abstraction in the extreme;
of all the mind's activities,
mathematics is the end of the line -
the ultimate distillation and crystallization;
you can't simplify/unify/compactify mental processes
any more than mathematics

• mathematics is both discovery and invention

the notation of mathematics
= the linguistic/spoken/graphic/written/printed
expression of mathematics
= the raiment of mathematics
is invented & fortuitous;
the essential content of mathematics
is discovered

to the question ¿what does mathematics discover?
the answer is ¡everything!

to the question ¿where is mathematics?
the answer is ¡everywhere!

to the question ¿when is mathematics?
the answer is ¡all of time!

• a preceding comment is not intended to deny
the importance of notation to mathematics;
mathematical notation
- both in its mere existence and the particular kind -
is of overwhelming importance;
mathematics would get virtually nowhere without a
rich flexible compact suggestive written notation;
natural language alone,
whether Greek or Latin or English or etc,
is woefully inadequate for mathematics
as the history of mathematics has clearly shown;
to be sure, a natural language
is an indispensible part of mathematical discourse,
and symbolic mathematical notation as of now
needs to be embedded in a natural language
(the best currently available being English)
as a very practical matter

□ in summary
all is mathematics
which may be abbreviated
$\forall$ = math

• a single word to stand for the philosophy
that all is mathematics
may be manufactured as follows:

panmathesis

(the stress on the second syllable)
made from two Greek words,
the prefix
$\pi\alpha\nu$ – (Greek) = pan - = all
and a noun contributing to the origin
of the word mathematics
$\mu\alpha\vartheta\eta\mu\alpha$ (Greek)
= $\mu\alpha\vartheta\eta\sigma\iota\varsigma$ (Greek)
= mathesis (Latin)
= all knowledge

• one could even abbreviate panmathesis as
panmath

□ scholia

• the five vertices are reference points of explication
that appear to be of comparable complexity
as we now view the universe;
ultimately
they will be recognized for what they all are - mathematics

• another way of stating my primary contention is this:
consider the distinction between
reality and mathematical models of (parts of) reality;
as science and mathematics continue to advance/expand,
there will be a steady continued diminution of this distinction
until it vanishes altogether;
in certain fields of science
there is already a considerable amount of this blurring
eg mechanics, particle physics, cosmology;
¿ if ultimate reality
can be described only in mathematical terms,
how should it be identified but as mathematics,
what should it be called but mathematics,
what is it but mathematics ?

• probability considerations
are no barrier to this philosophy
since
probability theory is a branch of measure theory,
measure theory is a branch of analysis,
analysis is a branch of mathematics

• awareness/consciousness
is only a very small part of the mind

• introspection likely plays
a larger role in mathematics
than in any other scientific enterprise

• a mathematician's comment is that
lacking identity between reality and mathematics,
look for a canonical isomorphism
which is just as good;
my contention is that
this isomorphism is the identity map
because there is no room for anything else

• ¿ how can an internal mental abstraction,
such as a mathematical object,
possibly be the same thing as
an external material object ?
the answer is: easily, remembering that
thought is also (based upon) a physical/chemical activity,
this time inside the brain instead of outside the brain;
let P & C stand for physics & chemistry;
it's P & C inside the brain
and
it's P & C outside the brain;
it will be recognized (if not already) that
the P & C inside
and
the P & C outside
are fundamentally the same,
altho different in many ways
eg in amount of energy;
this sameness is both
in the small and in the large;
eventually
the mind will understand the brain
and
it will be seen that
the universe is the universal theorem

• the weaker version of this philosophy is:
epistemology = mathematics;
and the stronger version of this philosophy is:
ontology = mathematics

• the philosophy of

all
everything
reality
the cosmos
the universe
the world
is
mathematics

can be given many abbreviated names
eg

all is math
all-is-math
aim
AIM
all = math
∀ = math

• ¿ does the philosophy of
all is math
have the ancient Pythagorean doctrine of
all is number
in its ancestral roots ?
certainly
but I would emphasize that
all is math
is a thoroughly scientific philosophy
and is fully supportive of
the scientific enterprise

• I would also regard ∀ = math as essentially Platonistic
(say, mathematical objects are discovered
and not invented,
mathematical theorems are facts/truths
that are discovered and
not just conventions,
and mathematical existence is independent of
and pre-exists the human mind);
more precisely ∀ = math is
the inevitable development of Platonism
altho the beautiful regions in
In den schönen Regionen
Wo die reinen Formen wohnen
turn out to be the observable universe itself
and not ‘something else’

GG10-20

• everything evolves;
mathematics evolves too
or more accurately
our conception/vision of mathematics evolves;
imagine how the mathematicians
Euclid, Archimedes, Viète, Descartes,
Newton, Leibniz, Gauss, Cantor, Hilbert,
to select a few names suggesting
the past historical unfolding of mathematics,
must have thought of mathematics;
as time passes,
mathematics accretes,
mathematics grows,
mathematics broadens and deepens
until eventually
mathematics will enclose all things

• in the matter of philosophy
a little redundancy
is no bad thing
but all to the good

• sub specie aeterntitatis
question: ¿ what is mathematics ?
answer: all things