Aphorisms for Math & a Bit/Byte More

#93 of Gottschalk's Gestalts

A Series Illustrating Innovative Forms
of the Organization & Exposition
of Mathematics
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☒ aphorisms for mathematics
& somewhat more

☐ the best mathematics
is mathematics that
simplifies and unifies

☐ the best kind of proof
is
a proof that makes the theorem obvious

☐ the best way to read a book is to write it;
the best way to learn a subject is to teach it

☐ advice to math students:
the best way to learn mathematics
is
a relatively little bit at a time
over
a relatively long period of time;
mathematics is so concentrated that
the rate of absorption is necessarily slow

☐ on context:
• context determines meaning
• meaning is a function of context
• meaning = f(context)

☐ it's just as true in mathematics
as in any other subject,
maybe even more so:
a little head work
can save
a lot of leg work
ie
a little insight
can save
a lot of computation

☐ the results of computation
should be
insight as well as numbers

☐ no problem is so intractable
but that
something of interest & value can be said of it

☐ if the answer you get
turns out to be simple,
then there is likely to be
a good explanation for it

☐ the underlying assumption of cryptology:
what one can invent
another can circumvent

☐ if you have to make a mistake, make it a big one;
so that you will have the opportunity to correct it
(before publication preferably)
and then learn lots;
this process of discovery has likely happened
many times to produce significant parts of mathematics;
eg
Lebesgue measure theory and the Lebesgue integral
arose in this way

☐ on the indissoluble pair:
the observer & the observed

• it is impossible
to completely separate
the observer & the observed

• the theories you fancy
influence
the data you get

• it's just a scientific fact;
¿is it a philosophical fact?
¿are there any philosophical facts?
¿does philosophy consist entirely of questions?
(and possible answers and discussions thereof)

• the Heisenberg
indeterminancy / uncertainty principle
states that:
the uncertainty Δp
in the measured value of momentum p
&
the uncertainty Δx
in the measured value of position x
are connected by
the Heisenberg
indeterminancy / uncertainty relation
viz

$$\Delta p \times \Delta x = \frac{h}{4\pi}$$

wh
$h =_{df}$ Planck's constant

this principle is a reflection of the fact that
any measurement of a system
must disturb the system

☐ ¿does (something like) the Heisenberg principle
have application to mathematics
as well as to physics?

¿do individual mathematicians have influence on
what mathematics is recognized to be?

if you believe that mathematics is invented,
then the answer is ‘yes’;
but
if you believe that mathematics is discovered,
then the answer is ‘no’

in thinking about this topic,
keep in mind that
the notions of mathematics
are not the same thing as
the notation of mathematics;
notation denotes notions
but
notions do not live in notation
ie
notions do not depend on notation for their existence;
notation is clearly created by individuals
but that fact need not force us to the conclusion that
notions are created by individuals

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☐ the aphorism
‘form follows function’
has relevance to
architecture
& likely has relevance to
design in general

¿does it apply
to mathematics
or
to any part of mathematics?

if it is interpreted as a pun for
‘geometry follows algebra’,
then it may have relevance for
analytic geometry
&
algebraic geometry

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☐ guiding axioms

• the guiding axiom of technology states:
if it can be built, it will be built;
also
what can be built must be built

• ¿are there guiding axioms for mathematics?
eg
if it can be proved, it will be proved;
what can be proved must be proved;
if it can be solved, it will be solved;
what can be solved must be solved

• Hilbert declared:
Wir müssen wissen, wir werden wissen. (German)
= We must know, we will know.
This statement was inscribed on his grave monument.

the published quotation above continues:
In der mathematik gibt es kein ignorabimus. (German)
= In mathematics there is no ‘we shall not know’.
the Latin verb form
ignorabimus = we shall not know

☐ all mathematics is quartered into three halves:
analysis, algebra, geometry/topology;
a variation on the opening sentence
in Caesar's 'Gallic Wars'

☐ a 'Grook' by Piet Hein:
Problems. Problems worthy of attack
prove their worth by hitting back.

• bioline
Piet Hein
1905-1996
Danish
poet, scientist, inventor, designer;
created the game of Hex and the Soma cube;
strove to build bridges between science & art

☐ Les mathématiques existent seulement
pour la gloire de l'esprit humaine. Jacobi.
a German speaking French
(from memory)

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