

Comparisons & Contrasts

#94 of Gottschalk's Gestalts

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of the Organization & Exposition  
of Mathematics  
by Walter Gottschalk

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500 Angell St #414

Providence RI 02906

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☒ examples of comparison/contrast

☐ a writing system is

- ideographic

= df one which has  
one character per word

- syllabic

= df one which has  
one character per syllable

- alphabetic

= df one which has  
one character per sound (more or less)

eg

English is alphabetic

Chinese is ideographic

Japanese has both

ideographic & syllabic forms of writing,  
the ideographic form being from Chinese

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□ on measurement

- mensuration

=df

the mathematics of measurement

- metrology

= df

the science of measurement

- the abstract general notion of measure is treated in various ways in the established theories of measure, such as Lebesgue measure, and which lead immediately to the notion of the integral of a numerical function on a measure space; it remains an open question as to whether there can be a substantial theory of measure, at least at the beginning, that does not use the notion of real number; similar questions have been answered affirmatively for many algebraic structures & topological spaces & uniform spaces

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□ Science is what you know,  
philosophy is what you don't know.  
–Bertrand Russell.

□ my philosophy about philosophy

philosophy is the study of questions  
that have no answers;  
science is the study of questions  
that have answers

□ the physical object,  
word or special sign or picture,  
which names or has reference to  
a mathematical object  
is not itself a mathematical object;  
rather it is called  
a 'metamathematical' object;

- mathematical objects are abstract objects
- metamathematical objects are physical objects
- mathematics  
= df  
the study of mathematical objects
- metamathematics  
= df  
the study of metamathematical objects

□ on flows

- a smooth flow

= df a flow

whose behavior is predictable

- a turbulent/chaotic flow

= df a flow

whose behavior is unpredictable

□ both noun & adjective in three cases

- a literate (person)

= df a person who can  
read & write

- a numerate (person)

= df a person who can  
think quantitatively & scientifically

- a computerate

= df a person who can  
operate & use electronic computers



□ on curves

- a spiral

= df a certain kind of  
plane curve

- a helix

= df a certain kind of  
skew curve in 3 –space

wh

skew = non-plane = non-planar

□ some mathematical prerequisites

- the study of physics & chemistry requires a background in continuous mathematics

=

differential and integral calculus  
& differential equations  
& real analysis  
& complex analysis  
& maybe some specialized topics  
depending on the specializations of the scientist

- the study of computer science requires a background in discrete mathematics

=

logic  
& combinatorics  
& graph theory  
& applied algebra  
& maybe some specialized topics  
depending on the specializations of the scientist

□ the very small, the very large,  
& their relationship

- elementary particle physics  
= the study of  
the very small = the microcosm

- astrophysics  
= the study of  
the very large = the macrocosm

- the relationship between the two disciplines  
is called  
the micro-macro connection

□ the two cultures

- bioline

Charles Percy Snow

1905-1980

English

novelist, physicist

- in a lecture

entitled 'Two Cultures' that was given in 1959

C P Snow

announced the existence of

two adversarial cultures in modern society

viz

The Sciences & The Scientists & Their Supporters

versus

The Arts & The Artists & Their Supporters

and averred that to bridge the gulf between them

is a continuing big problem of our time

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□ from philosophy to math

- here is an attempt to give a more-or-less mathematical meaning to the often vague philosophical concepts of intension

versus

extension

- the intension of a mathematical object  
= df the class of all true statements  
which mention the object

- the extension of a mathematical object  
= df the mathematical object defined as a set

□ some notions/words in opposing pairs

abstract

vs

concrete

algorithmic

vs

existential

algebraic number

vs

transcendental number

an objective event

vs

a subjective experience

concentric

vs

eccentric

concept

vs

percept

GG94-14

decidable

vs

undecidable

discrete

vs

continuous

exact

vs

approximate

finite

vs

infinite

integer

vs

fraction

local

vs

global

GG94-15

meaning

vs

mark

orientable

vs

nonorientable

partial

vs

total

provable

vs

disprovable

rational number

vs

irrational number

real number

vs

imaginary number

GG94-16



semantics

vs

syntax

sense

vs

symbol

set as One

vs

set as Many

single

vs

plural

singular

vs

regular

stochastic

vs

deterministic

GG94-17

straight/flat

vs

curved

the 'is' of identity

vs

the 'is' of predication

type

vs

token

verify

vs

falsify