

Some Math Allusions in the Good Book

#47 of Gottschalk's Gestalts

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

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□ the biblical value of pi from ca 550 BCE

- 1 Kings 7:23 KJV

And he made a molten sea,
ten cubits from the one brim to the other:
it was round all about, and his height was five cubits:
and a line of thirty cubits did compass it round about.

- 2 Chronicles 4:2 KJV

Also he made a molten sea of ten cubits from brim to brim,
round in compass, and five cubits the height thereof;
and a line of thirty cubits did compass it round about.

- consequently

the biblical approximation to pi is

$$\pi \approx 3$$

which is the floor of π

ie the integer part of π

(unless the unspecified thickness
of the container is somehow
to be considered);

the cubit is the ancient

Middle Eastern standard unit of length

which is the length of the forearm

from elbow to tip of extended middle finger,

usually ca 18 inches;

the English word cubit comes from

the Latin word cubitum = elbow

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□ a phrase
with intimations of infinity

- Psalms 90:2, 103:17, 106:48 KJV
... from everlasting to everlasting ...

- from minus infinity to plus infinity
along the time coordinate axis;
this is still the notion of potential infinity;
the notion of completed infinity presumably
does not appear convincingly and in force
until the nineteenth century

□ on the length of human life

- Psalms 90:10 KJV

The days of our years
are threescore years and ten;
and if by reason of strength
they be fourscore years,
yet is their strength labor and sorrow;
for it is soon cut off,
and we fly away.

- the word score = twenty
suggests a numeration system to the base twenty;
the base twenty has a physiological basis
because the human body has a score of digits
viz ten fingers & ten toes;
the word score comes from
an Old Norse word meaning
notch, tally, twenty

□ a large finite set

• Psalms 147:4 KJV

He telleth the number of the stars;
he calleth them all by their names.

• here the verb

to tell

has its old-fashioned meaning of
to count;

assuming an alphabet of

20 consonants,

5 vowels,

$100 = 20 \times 5$ syllables of the form

consonant+vowel,

there can be formed

100^n words of $2n$ letters and n syllables

to name as many objects

□ a comment
on mathematical anxiety

- Ecclesiastics 12:12 KJV
... of making many books there is no end;
and much study is a weariness of the flesh.

- mathematics is infinite
but our energy to learn
is finite & very bounded;
perhaps it is often better
to learn a little
and then
think a lot about it;
I am sure that
the subconscious plays a big role
in the acquisition of mathematics,
learning & searching both,
and the subconscious
takes its own time in doing things

□ a passage
relevant to the teaching & learning
of mathematics

- Isaiah 28:10 KJV
For precept must be upon precept,
precept upon precept;
line upon line,
line upon line;
here a little,
and there a little.

- students often do not understand
at the first attempt;
they must sometimes try again & again;
the best way to learn mathematics
is
a little at a time
over a long period of time;
mathematics
is
so organized & so concentrated
that it takes the mind a while to digest it,
even working subconsciously;
a little repetition may be a good thing

□ a passage with geometric overtones

• Isaiah 40:4 KJV

Every valley shall be exalted,
and every mountain and hill shall be made low:
and the crooked shall be made straight,
and the rough places plain.

• rectification

= to make a straight line out of a curve
& thus find its length
(‘straighten the curve’)

• quadrature

= to make a square out of a plane region
& thus find its area
(‘square the region’; recall ‘square the circle’)

• complanation

= to make a plane region out of a curved surface
& thus find its area
(‘flatten the surface’)

• cubature

= to make a cube out of a solid region
& thus find its volume
(‘cube the solid’)

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□ an exhortation
which may be interpreted to mean that
the best system of logic
is our customary familiar two-valued logic

- Matthew 5:37 KJV
Let your communication be,
Yea, yea; Nay, nay ...

- it seems undeniable to me that
our prevalent (mostly lower) predicate calculus
is the logical vehicle par excellence;
it seems to be the logic we are born with;
it is the logic built into natural languages;
it is the systematized logic that began
with the ancient Greeks
and continues rampant today;
it is used even to study other kinds of logic

□ an injunction
relevant to algorithms & solvability

• Matthew 7:7-8 KJV

7 Ask, and it shall be given you;
seek, and ye shall find;
knock, and it shall be opened unto you:

8 for every one that asketh receiveth;
and he that seeketh findeth;
and to him that knocketh it shall be opened.

• this sounds like the description of
a decision procedure;
mathematics has provably few decision procedures;
that is likely just as well as not
because otherwise
mathematicians would be out of a job;
iow
mathematicians will never be out of a job
& mathematicians can prove it

□ a reminder
that every set has a unique cardinal number
&
that every set can be well-ordered
by the well-ordering theorem
& thus exhibit an ordinal number too

- Matthew 10:30 KJV
But the very hairs of your head
are all numbered.

- two thousand years ago
the Indo-Arabic positional decimal numeration system
was still very much in the future
and the number of hairs on a person's head
was no doubt considered to be
a metaphor for an inconceivably large number;
the number of hairs on an adult human scalp
is likely to be around 150,000 or less

□ the Matthew effect

• Matthew 13:12 KJV

For whosoever hath,
to him shall be given,
and he shall have more abundance:
but whosoever hath not,
from him shall be taken away
even that he hath.

• the Matthew effect

= the unjustifiable tendency to attribute
mathematical/scientific discoveries/inventions
to better-known mathematicians/scientists
who do not deserve the credit

&

not to recognize
the lesser-known mathematicians/scientists
who do deserve the credit

• it is a misconception

that science/mathematics progresses mostly
by the work of just a few great scientists/mathematicians

□ a quotation
with syntactic & semantic comments

• Matthew 19:30 KJV
But many that are first shall be last;
and the last shall be first.

• a typographical comment

abbreviations:

first = 1st

&

last = 1st

numeral one & lowercase letter e1

are printed as similar/identical characters

• an order-theoretic comment

to interchange

the notions of first & last

in an ordered set,

dualize it = invert it = turn it upside down

□ a direction
that the mathematics teacher
may quote to his/her own pupils
after solving a certain type
of mathematics problem
at the board

• Luke 10:37 KJV
Go, and do thou likewise.

• it is a fine thing to say that
everyone should think for themselves
and not 'just memorize';
but the ability and the motivation to do this is
not as abundant
as we would like to believe,
as any teacher in front of a class of unwilling minds
can verify vehemently;
some, indeed many,
mechanical forms & algorithms
are necessary for anyone to make progress

□ a description
that suggests the beginning of thoughts
on randomness & the theory of probability

• John 3:8 KJV

The wind bloweth where it listeth,
and thou hearest the sound thereof,
but canst not tell
whence it cometh,
and whither it goeth.

• it is likely that
the mathematics of chance = probability
does not come to mind from introspection
as easily as
the mathematics of determinate exactness
ie traditional algebra & geometry;
the mind needs the prodding of external nature
& human-made games of chance
to think about undetermined things
and indeed which history has shown to be the case

□ a basic question

- John 18:38

What is truth?

- this is a little question
in the sense that
it contains only three short words;
but it is the Big Question
in the sense of its sense
that everyone, including Pilate, asks
and no one, including Pilate,
answers completely

□ a reference to the number 153

• John 21:11 KJV
Simon Peter went up,
and drew the net to land
full of great fishes,
a hundred and fifty and three:
and for all there were so many,
yet was not the net broken.

• 153
= $1! + 2! + 3! + 4! + 5!$
= the 17th triangular number
 $= \frac{1}{2} \times 17 \times 18$

wh

$17 = 10 + 7$

&

10 = the number of

The Ten Commandments in the Old Testament

&

7 = the number of

The Seven Gifts of the Spirit in the New Testament

note: there are exactly four three-digit numbers

which are equal to

the sum of the cubes of their own digits

viz

153; 370; 371; 407

□ a quotation
that suggests an equation

- 1 Corinthians 13:2 KJV
... I am nothing.

- this does not mean that
this first person singular does not exist
which could be symbolized

$$\neg \exists x . x = \text{FPS}$$

where x is a universal variable;
it means rather that
the measure of merit of FPS vanishes;
perhaps in symbols

$$\text{meas}(\text{FPS}) = 0$$

□ an exhortation
to the diligent quest
for perfection

- Hebrews 6:1 KJV
... let us go on unto perfection ...

- always seeking
but perfection is more a road
than a final destination
where we expect to one day arrive;
indeed,
what would we do if we ever got there ?

□ ¿ is mathematics 'a book of seven seals' ?

• Revelation 5:1-4 KJV

1 And I saw in the right hand
of him that sat on the throne
a book written within and on the back side,
sealed with seven seals.

2 And I saw a strong angel
proclaiming with a loud voice,
Who is worthy to open the book,
and to loose the seals thereof ?

3 And no man in heaven,
nor in earth, neither under the earth,
was able to open the book,
neither to look thereon.

4 And I wept much,
because no man was found worthy
to open and to read the book,
neither to look thereon.

□ the largest biblical number appearing explicitly

• Revelation 9:16 KJV

And the number of the army of the horsemen
were two hundred thousand thousand ...

• two hundred thousand thousand

$$= 200 \times 1000 \times 1000$$

$$= 200,000,000$$

= two hundred million

$$= 2 \times 10^8 \text{ in scientific notation}$$

assuming that thousand is intended

to denote an exact number

& is not being used simply as a metaphor for
an indeterminate large number

□ a reference to the number 666

• Revelation 13:18 KJV

Here is wisdom. Let him that hath understanding
count the number of the beast:
for it is the number of a man;
and his number is Six hundred threescore and six.

• The Apocalyptic Number

= The Number of the Beast

= 666

= the 36th triangular number

$$= \frac{1}{2} \times 36 \times 37$$

$$= 6 \times 111$$

$$= 2 \times 3^2 \times 37 \text{ (pf)}$$

= DCLXVI in Roman numerals

which is the decreasing sequence
of all basic Roman numerals except M

□ four quotations from
The Book of Common Prayer (1662)
which are given mathematical interpretations

- on a mathematical symbol:

... an outward and visible sign
of an inward and spiritual grace.

- on studying mathematics:

... read, mark, learn, and inwardly digest ...

- on making mathematical errors
of omission & of commission:

We have left undone those things
which we ought to have done;
And we have done those things
which we ought not to have done ...

- an expression of the Platonic philosophy
of the constancy and eternity of mathematics:

... As it was in the beginning,
is now, and ever shall be:
world without end. Amen.

□ quotations from the Apocrypha KJV

- 1 Esdras 3:10

Above all things Truth beareth away the Victory.

- 1 Esdras 4:41

Great is Truth, and mighty above all things.

- 2 Esdras 14:25

I shall light a candle of understanding in thine heart,
which shall not be put out.

- Ecclesiasticus 5:15

Be not ignorant of any thing in a great matter or a small.

- 2 Maccabees 2:32

It is a foolish thing to make a long prologue,
and to be short in the story itself.