

## God and Science

**S**CIENCE takes things apart to see how they work. **R**eligion puts things together to see what they mean.”

Lord Jonathan Sacks, see *Handouts* n. 113.

The world around us should **stir up our wonder**:

Our world points us towards both Religion and Science.

**Religion** studies God, His plan, and our choices in life.

**Science** studies the created things themselves.

*Catholic Family Catechism Disciples' Edition II* p. 17.

### SHARING IN THE MIND OF GOD

**W**E ARE CREATURES made by God in His image and likeness. Men of faith have always pondered this to good effect:

Thus St Augustine realized that our **memory**, our **understanding** and our **will** are Divine powers which are stamped on our lowly creaturely nature.

And fantasy expert, J.R.R. Tolkien, wrote:

Fantasy can, of course, be carried to excess. It can be ill done. It can be put to evil uses. It may even delude the minds out of which it came. But of what human things in this fallen world is that not true? Men have conceived not only of elves, but they have imagined gods, and worshipped them, even worshipped those most deformed by their authors' own evil. But they have made false gods out of other materials: their notions, their banners, their monies; **even their science** and their social and economic theories **have demanded human sacrifice**. *Abusus non tollit usum* [abuse does not take away use.] Fantasy remains a human right: we make in our measure and in our derivative mode, because we are made: and not only made, but **made in the image and likeness of a Maker**.

*Tree and Leaf*

All human knowledge is an indirect sharing in the Mind of God, knowing what God knows. “Every truth, no matter who said it, is of the Holy Spirit.”

That refers to science (in its modern narrow sense of experimental science) and to philosophy. It is the Book of Nature. See Wisdom 13 and Romans 1-2.

However, the higher human knowledge is from God revealing His mind through prophets and apostles and most of all by His Divine Son, God-incarnate, and His Holy Church, and backed by miracles. This is called **revelation**, and particularly concerns matters vital for living and for getting to Heaven.

Our Christian faith is knowledge, a privileged share in the **Divine Knowledge** in the Mind of God.

In revelation, God unveils things not in His Book of Nature. They include Who He is, what He has done and what it means. Some of it is written in the Bible, which is interlocked with Sacred Tradition (VCII, *Dogmatic Constitution on Divine Revelation*).

These are matters quite beyond human knowledge from philosophy and science, beyond the powers of our human reason. By the obedience of faith, we are called and privileged to give Him “the homage of our reason”:

See Eucharistic Prayer n. 1, “paying their homage to you, the eternal God, living and true,” in the Commemoration of the Living.

### SCIENCE IS A SACRED COW

**T**HIS is by Anthony Standen, a chemical engineer, first published in 1950 and still available.

He loves science but detests the pretensions to infallibility of some scientists. Hence his opening:-

When a white-robed scientist, momentarily looking away from his microscope or his cyclotron, makes some pronouncement for the general public, he may not be understood, but at least he is certain to be believed. No one ever doubts what is said by a scientist. Statesmen, industrialists, ministers of religion, civic leaders, philosophers, all are questioned and criticized, but scientists — never. Scientists are exalted beings who stand at the very topmost pinnacle of popular prestige, for they have the monopoly of the formula “It has been scientifically proved...” which appears to rule out all possibility of disagreement. Thus the world is divided into Scientists, who practise the art of infallibility, and non-scientists, sometimes contemptuously called ‘laymen’, who are taken in by it.

It is a robust introduction to what follows: Physics, Chemistry, Biology, Psychology and Sociology, and climaxes with Mathematics, ‘true science’ and like philosophy, a thinking which matches reality.

It fortifies us to cope with today’s pretensions:

- man-made global warming (which is confused with the evils or pollution and waste),
- an accidental evolution of life (which is confused with evolutions in human thought in making improvements in our way of life), and especially that
- all change is progress, including contraception, IVF, atom bombs, rapid transport, instant communications.

“A psychologist [as a scientist] may know what makes a better rat, but he has no idea what makes a better man” — something far more important.

**G**OD’S UNDERTAKER — *Has Science Buried God?* (2009/2011) is by Professor John C. Lennox.

He refutes Professor Richard Dawkins, the aggressive militant evolutionary atheist of the 21<sup>st</sup> century. It is important that we should be able to do so too.

His Chapter 2 is “The **Scope and Limits of Science**.”

Lennox explains it is not “religion versus science” but religion versus a **false philosophy of materialism** (naturalism) masquerading as science.

### ALL YE WORKS of the LORD, BLESS the LORD

**A**LMOST the entire range of human enquiry is invoked by the **Three Young Men in the Fiery Furnace**:

**Creatures above:** Angels, Heaven, waters above, Lord’s armies, sun, moon, stars, showers, rain, dew, winds, fire & heat, cold & heat, ice, frost, hoar-frost, snow, night, day, light, darkness, lightning, clouds;

**Creatures below:** earth, mountains, hills, greenery, fountains, springs, seas, rivers, whales, birds, beasts wild & tame;

**Man:** sons of men, Israel, Lord’s priests & servants, spirits & souls of the just, holy & humble of heart;

**Us & them:** Ananias, Azarias, Misael: “Praise the Father and the Son with the Holy Spirit.”

See *Liturgy of Hours*: Morning Prayer Sundays 1 & 2, Tuesday 4.

## MATHEMATICS IN THE BIBLE

(1) The Greek letter for  $\pi$  is  $\pi$  and it stands for perimeter or circumference. The bath in Solomon's temple was 10 cubits across with a perimeter of 30 cubits (1 Kings 7:23 and 2 Chronicles 4:2-3), which means our 'pi',  $\pi$  is equal to 3 in the Bible.

Scoffers denounce such crude mathematics: "The Bible's wrong! Don't you know that  $\pi = 3\sqrt{7}$  or more precisely, 3.14159...?"

However, to *one significant figure*,  $\pi$  does equal 3. It is a rough but useful approximation and only 5% too small. After all, we now round off prices to the nearest 5¢, and often approximate distances to kilometres, and don't bother about the odd metres.

Light aircraft navigation uses  $\pi = 3$  with the **One-in-Sixty Rule**, that an object 1m high and 60m away subtends an angle of  $1^\circ$ . A circle has  $360^\circ$  so an arc of  $1^\circ = 2\pi r/360$  ( $r$ =radius). Put 3 for  $\pi$ . An arc of  $1^\circ = 2 \times 3r/360 = 1/60$  of a radius. In skinny right-angled triangles the short side opposite the skinny angle is roughly the arc of a circle with a long side as radius. If you're flown 120km and find you're 4km off course, the compass bearing was out by  $2^\circ$ . Adjust the course to pick up the next landmark.

Also  $\pi$  roughly equals  $\sqrt{10}$ , i.e. 3.1622776... or 3.16 to three significant figures, too big by 6%. The period of a pendulum (time to swing over and back) is  $T = 2\pi \sqrt{\text{length}/g}$  where length is in metres and  $g$  = acceleration of gravity which is  $9.80\text{m/s}^2$  or roughly 10. Thus  $\pi$  roughly cancels with  $\sqrt{10}$  so a pendulum of length one metre has  $T = 2$  seconds.

(2) **The Golden Mean** is written as  $\phi$ , pronounced "fi" as in "fee-fi-foh-fum". It's the ideal proportion for rectangular picture frames and building profiles. It's the median section of a line of unit length on which the longer part  $x$  has a square of area  $x^2$  which is equal in area to the rectangle whose sides are the whole line 1 times the shorter part ( $x - 1$ ); i.e. it's the solution of  $x^2 = x - 1$ . Using the formula for quadratic equations,  $x = 0.61804...$  To one significant figure, this is 0.6 or 3/5. See Exodus 25:10 for the Ark of the Covenant,  $2\frac{1}{2}$  cubits long,  $1\frac{1}{2}$  cubits high, and  $1\frac{1}{2}$  cubits wide, i.e. 5:3:3.

The exact value of  $\phi = \frac{1}{2}(\sqrt{5} - 1)$ , the converging limit of the ratio of two consecutive Fibonacci numbers (see *Handouts* n. 80 of 15-12-2010).

(3) In John 21:11 there were **153 fish** in a miraculous catch. Now 153 is a **quite unique number**:-

1. The sum of the cubes of its digits equal the number itself:  $1^3 + 5^3 + 3^3 = 1 + 125 + 27 = 153$ .

2. Add up the numbers 1 to 17 (it's an arithmetical series: 9 is median, and  $9 \times 17 = 153$ ) or use mental arithmetic to add up  $1+2+3+ \dots + 15+16+17 = 153$ .

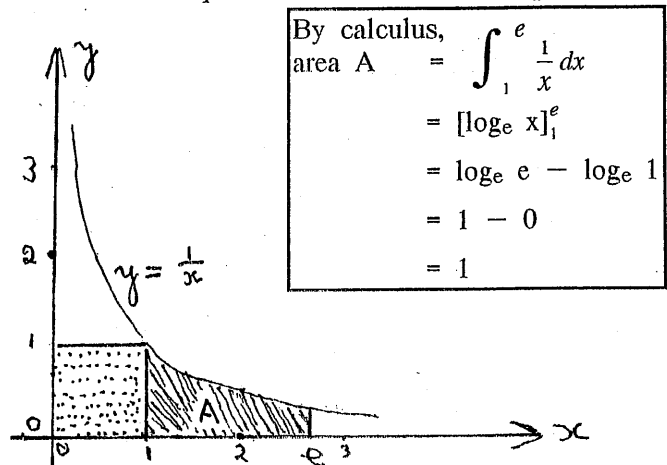
3. Add up the **factorials** of the first five numbers: These factorials are written  $1! + 2! + 3! + 4! + 5! = 1 + 1 \times 2 + 1 \times 2 \times 3 + 1 \times 2 \times 3 \times 4 + 1 \times 2 \times 3 \times 4 \times 5 = 1 + 2 + 6 + 24 + 120 = 153$ .

St Augustine said there are 153 kinds of fish and that this means the Church is universal, for everyone.

## THE EXPONENTIAL NUMBER 'e'

Here are three ways of calculating the mysterious number 'e'; roughly,  $e$  is 2.7. It's not in the Bible.

(1) See diagram: 'e' is on the x-axis at lower right of a shaded trapezium(!) with a curved top whose area  $A$  is under the hyperbola  $y = \frac{1}{x}$ , from  $x=1$  to  $e$ , and has unit area equal to that in the dotted square:



(2) As  $n \rightarrow$  infinity,  $\text{limit } (1 + \frac{1}{n})^n = e$ . Use  $x^y$  on your calculator with  $n$  as big as possible. On a 10-digit calculator, put  $n = 1,000,000,000$ . So  $e = (1.000000001)^{1,000,000,000}$ , that is,  $e = 2.718281827$ .

Check by direct entry:  $e^1 = 2.718281828$ .

On an old 8-digit,  $(1.000001)^{1,000,000} = 2.718282$

(3) "e" is series  $e = 1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} \dots$ . To add these up, use a setting out aligned in columns. Each line is derived from a new divisor, thus:

Add	1	·000	000	000	0
÷1	1	·000	000	000	0
÷2	0	·500	000	000	0
÷3	0	·166	666	666	7
÷4	0	·041	666	666	7
÷5	0	·008	333	333	3
÷6	0	·001	388	888	8
÷7	0	·000	198	412	7
÷8	0	·000	024	801	6
÷9	0	·000	002	755	7
÷10	0	·000	000	275	6
÷11	0	·000	000	025	1
÷12	0	·000	000	002	1
÷13	0	·000	000	000	2
e =	2	·718	281	828	5

Thus to 11 significant figures,  $e = 2.7182818285$ .

On a calculator, 'log' means to the base 10 and 'ln' to the base 'e'; it is the natural base of logarithms. To change base:  $\log_e x = \log_{10} x \div \log_{10} e$ .

The exponential number 'e' is linked with *sine* and *cosine* using the *imaginary number*, the square root of minus one,  $\sqrt{-1}$ , and written as 'i' (hence  $i^2 = -1$  and  $\sqrt{-x} = xi$ ).

Along with the transcendental numbers  $\pi$  and  $e$ , 'i' is used in algebra and trigonometry, and electrical calculations.