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WARMING TO YOU –
FALLING FOR ME

Chapt 1-3

**Beta- for
review
only**

A DIALOG



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Introduction



Jane wants Bruce to explain climate change to her- but Bruce isn't sure that she is prepared for the kind of explanation that she thinks she wants.

Jane hasn't thought about science and maths for about 30 years. Her world has revolved around her passions of literature and art since primary school. Where can Bruce start? What will Jane really know when they get "there"?

Being busy with jobs (Jane's a part-time drama teacher; Bruce is some kind of scientist- we never get to know) and two pre-schoolers, they agree to take the time to explore the issue bit-by-bit.

Bruce has a plan- he wrote an essay on explaining and understanding science some years ago - here's a chance to try it out - eight simple steps from the concrete to the abstract and back again- just like steps on a chessboard.

The book is purely dialog. No description at all. Pillow talk, talk in the car on the way to Bruce's parent's farm, talk in a Chinese restaurant- wherever and whenever they can find a few minutes. Just talk.

The task is nowhere near as easy as Bruce thought it would be - Jane comes from a position of 'belief' and has her own take on the world. She loves Bruce, but his relentless 'empiricist probablist' approach to life can be exasperating. And when she thinks that she has a handle on Bruce's explanations, she re-frames it as a Shakespearean sonnet and sometimes a poem of

her own.

To Jane's feigned occasional annoyance, they never actually get to discuss climate change at all- the journey becomes more interesting than the possible destination. They tour the ideas of ancient Greece, the Renaissance, the Enlightenment, the evolution of art in the nineteenth century, Alice in Wonderland and much more- two bright and willful people agreeing to try to understand each other across the classical divides of art and science, faith and reason, childhood and adulthood- and man and woman.

Why Wikipedia? Bruce explains his passion for the medium that saved him from a fate as a farmhand. And it has a history- Alexandria's library, Diderot's Encyclopedie, Britannica, Richards... a window through which a light softly breaks....

Sure, it's didactic- no sex, no violence- but they do it in small doses. Some things just can't be boiled down to memes. Not for everybody, but maybe for anybody who wondered how we explain and understand and know what we know...

Chapter 1

MORE THAN WHAT WAS EXPECTED

In which Jane asks Bruce a simple question: Why not?
And so the inquiry begins...

Frontispiece (by [Stefano Della Bella](#)) to [Galileo Galilei's *Dialogue Concerning the Two Chief World Systems*](#), published by Giovanni Battista Landini in 1632 in Florence.



Stop smiling, Bruce, or you won't fit through the door! **What gives?**

Just got our new hybrid car!

Hmm – looks nice. **But why the big smile?**

Well, Jane, we've got a car that is all that we'll need for the next ten years – it has **great fuel economy** and really has a low fuel cost – in fact, about **one-third of the cost of our old six-cylinder clunker** according to our motorist club

That's nice!

It's something we can be proud of – our bit towards saving the planet from Climate Change.

That's great, Bruce. Does that mean that we can **take that holiday in Phuket** without stretching our budget?

Err... That would be nice, Jane, but I don't think we would be saving the planet if we did that.

Why not? Our carbon footprint to Phuket and back wouldn't be *that* much – **Wouldn't it?**

Why not? **Please explain!**

Try the short answer first, Bruce! You know that I've got a kind-of acquired attention deficit disorder.

The *short* answer, please, Bruce. **It's dealing with two pre-schoolers that's done it.** Without talk-back radio, I can't keep informed.

That's bloody typical! So obscure that only an **economics professor** could understand it.

Sounds plausible, Jane, but I figure that it doesn't work like that.

Well – there's a **short, simple answer**, but the **full explanation is quite lengthy**.

Yes – well – you do insist in listening to talk-back radio. **It's a wonder that you haven't acquired more than that!**

So much information – so little understanding! – But we won't go there. I'll just give you the short answer: Productivity **has got to be greater than production or we're all bugged.** How's that?

Isn't there anything **in between**? Like a *concerned-playgroup-parent's-conversation-length* explanation? Or a *dedicated-dog-walking-group-member's* explanation? **Like a couple of minutes, not just a couple of fancy words?**

But **that's different**, Bruce.



OK! OK! Point taken. But I'm sure that I could give you the **gist of it** in five minutes. Can't you do that with **climate change**?

New? Teachers have been explaining science for centuries, **surely?**

Well, you asked for an **answer**. An **answer** is **not necessarily an explanation**. That answer summarises it all, but I said that an **explanation could be quite lengthy**.

Hmm...Can you boil down your **master's thesis on Shakespeare's sonnets** into five minutes for me?

Sure, **Shakespeare** is different from **physics**, but I'm sure that **the problem is the same**.

Hmmm... dunno. We have a **real problem** here. It's the problem faced by scientists **every day now** – and I think that it is **actually a new problem** – at least at a **public level**.

Hmm.... go on....

..... and now...?

So what do *you* think is the **basic problem**, Bruce?

The **general population** used to *believe* – or at least **accept** – scientists' occasional public statements – probably because most of those statements were about science with **obvious economic or health or military benefits** – or some totally amazing and way-out discovery that was **useless and harmless**.

Every now and then the **media** would let a scientist **ramble on** in public and they **weren't really any the wiser**, but they were **comforted** because the scientists seemed **confident and in control**.

Now that the scientists are giving us **bad news** that we don't like, we don't want to accept their **ten-second sound bites** of discoveries, outcomes, results and findings and we – the public – still **haven't got the talent** to understand their lengthy explanations.

It's easy to boil down **fear, greed, doubt** and **anxiety** into **bumper-sticker-length statements**. But.....

Isn't *that* a bumper sticker-sized sound bite? So – there's a **no-person's land in understanding** between **one hundred words** and **one hundred pages**?

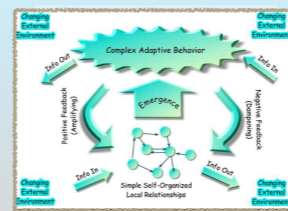
It's pretty well impossible to do that to a **acceptable scientific explanation**. **Flight will always prevail over fight** if we have the option.

Possibly, Jane. Even when one **simplifies** the explanation of a **significant theory** sufficiently to make it understandable to anyone even an **average high school science education**, there is the **danger** that it will **misrepresent** the science sufficiently that **unscrupulous** people can make a **plausible case that you are wrong**.

Is that **always** the case, Bruce?

So is there any way to deal with this **dilemma**, Bruce? **Can an explanation be both simple and true**?

So – do you think that you can **satisfy** me, Bruce?



This is particularly true of descriptions of **complex systems** such as **climate**.

I think that both *simple* and *true* are quite possible – but **one person's simplicity is often another person's difficulty**.

It seems that we are going to have difficulty getting beyond the **notion of simplicity**, Bruce. Are we going to get stuck at some **epistemological first base**?

I thought that it came **after third base** – when you **run home** – it did when we played softball at school.

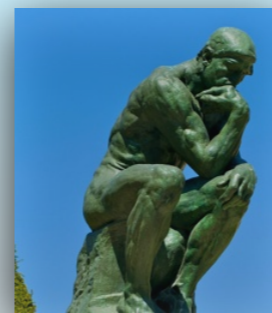
Oh! I thought I saw an **asterisk!**
What's the fine print?

Are you saying that I'm **unreasonable**, Bruce?

Well, Jane, **what comprises a satisfactory explanation** will depend on **how easily you are satisfied** or **how much else** you know about the subject.

Maybe even worse than that, Jane – **home base** comes before **first base!**

Yep – and baseball, too – it's both where you **start and finish**. Mmm.. Maybe there is some middle ground in explanation – but it does come with **a few basic conditions...**



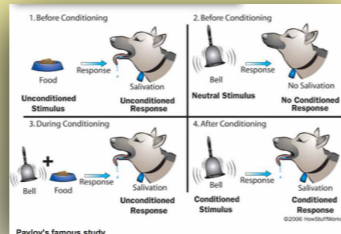
Well... **first** it needs you to keep your **reasoning** abilities switched on. By that, I mean you've got to be prepared to examine the **logical consistency** of your various beliefs and the **causal connections between them**.



No – not at all, Jane. More like **non-reasonable**, in a **scientific sense**. Your **reason** with regards to **moral and aesthetic matters** seems **fine**. I'm no literary or art expert and others have judged you there. But when you hear **quick comments** on matters related to **science** on the radio, or read the headlines in the **mainstream media** and they seem intuitively plausible and comforting, you take them in **without reflection**.

Well, I guess I did ask for it – **is there more?**

You're so sweet, Bruce. **I've never been compared to Pavlov's dog** before. You know that I really care about these things, but **my time is so fragmented** that it's a challenge to put two thoughts together.



Sorry – yes – those comments then **stick in your intuition-bank** – that part of memory that **Pavlov** used to demonstrate **conditioned reflexes** in **dogs**. And when somebody says the **trigger words**, you blurt out the **shock-jock** slogan or headline. Where science is involved, you often don't do a **consistency-check** between the latest statement and previous statements.

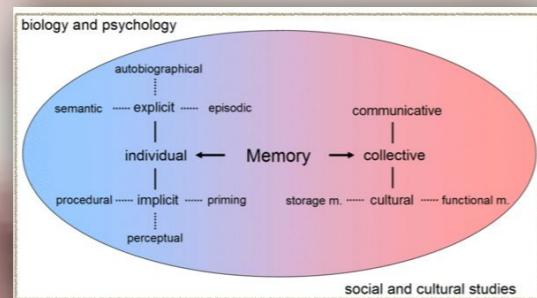
No offence meant, Jane – it's just the difference between a **behavioural** and a **cognitive** approach to these issues.

Y'know what it's like- **the kids yell and I've gotta run.**

Of course you've gotta **run** when the kids yell. The **media** plays on that same **basic reflex** – just that they **transfer** that very sensible **emotional reflex** into the **realm of public debate**. If it's not **fear**, then it's **greed** – the prospect of gain without pain.

You're starting to sound a bit **preachy**, now, Bruce! Let's stick to the subject. What are the other **conditions for understanding?**

Next- you've got to try to **remember things**. I know that it's not fashionable to have a good **memory** – although I know that **yours is pretty good** when it comes to **Shakespeare**. It's okay for the theatre and party tricks, but it seems that it's considered **rude** to point out that a **technical statement** somebody makes **today** is at odds with a statement they made **yesterday**.



But there's **so much stuff** out there. How can I remember all that stuff?

Well, there's a lot of **stuff** in the media, but **not really as much new, relevant or important stuff** as you might think. The first problem with memorizing is that all that **stuff** creates a **mental state** called '**backward masking**'.

Take me back to the ball, Bruce!

So how does *that* work, Bruce?

Are you sure that you're not being **paranoid**, Bruce?

Then what happened?

You really are **cynical**, Bruce!
That was a long time ago.

Well – the **next new stuff** comes so soon after the **last new stuff** that you don't get to form a conscious memory of it. But it can go **straight to your sub-conscious** so it can be triggered later. **Woof woof!**

No – I'm not paranoid – **they really are after me!** Or, more correctly, they're **after us**. All of us. These ideas were the **feed-stock of psychology PhDs** in the 'fifties and 'sixties. It was just **interesting stuff**, then.

When they couldn't get jobs as academic researchers, **they went into marketing and advertising**. **Vance Packard** first alerted the world to this in his book **The Hidden Persuaders** in 1957. I suspect that **it did more to attract sharp minds into psychology schools** than it did to sharpen up **advertising regulators**.

Go on, Bruce....

Sounds grim...

You're making it sound like [Nineteen Eighty Four](#), Bruce.

More than **half a century on**, all of these techniques are bread and butter to **every large corporation and political party** – particularly those that employ or retain **public relations and media management people**, which is most of them. These people are now taught in the *Communications and Media schools* – they don't even call it *psychology* any more.

It's like the link between **physics and engineering** – but in this case it's **psychology and mind-engineering**. More than half the stuff that you read and hear in the public media is **straight from these people** even if it looks like edited news.

On reflection, they're not **after** all of us – they've **already** got most of us. They're just mopping up the **dissidents and intellectuals** now. When did someone in the play-group utter anything more than a cliché or [meme](#)? And, I'd say that your playgroup friends are amongst the most **well-educated** in the country.

But let's not get bogged down. So I need a **pinch of reasoning** and a **good dose of memory**. I got A's and B's at high school and uni. Even **got a prize in third year English Lit** for the most original semester essay.

Steady, Bruce. We learnt our multiplication tables by **chanting** first thing in the morning. I'm **hard-wired** with them now.

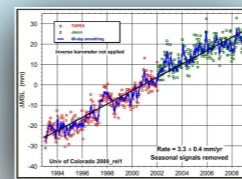
Hmmm.... Well, OK. I used to do a quick check on **value-for-money** at the supermarket – you know how **every brand is a different size and price** – these days it's all there on the price tag – **unit pricing**. No need to use my tables. Thanks.

And the pollies? – you can't believe anything they say, anyway, so why try to make sense of their extravagant statements. **They are probably don't understand their own words.**

Well, **you've got all that you need**, then, Jane. Can you remember your **times tables** from primary school and **graphing** from high school?

Just asking, Jane – but do you ever **use them**? Like – do you do a **guesstimate** of the cost of groceries or apply them when a **politician mouths off** about billions of dollars wasted on some **public project**?

And the pollies?



I rest my case regarding media managers. **What about graphs?** Do the **finance reports** make any sense to you on the **TV news**?

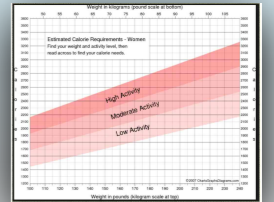
Graphs! TV! That's generally when I'm putting the kids to bed – OK – I know that we both share putting the kids down. Those reporters are **so quick and slick** that you haven't got time to really take it in. Most of it is **financial gobbledegook**.

Just don't go there, Bruce! I guess if I had the **time** to sit and look at a graph, I know how to sort it out. Just getting the **time...**

I know that one! It's the skill that enables you to interpret a modern **hyperlinked movie** or **soapie** with its **rapid change of scenes, parallel stories and twisted plots!**

Anything else? This started with your smiling because of our new hybrid car. **I wasn't expecting the Spanish Inquisition.**

Maybe so, but do you get the **gist of what a graph is?** You know – how some quantity varies against another varying quantity. **Like weight gained versus calories consumed....**



Fair enough! You know that I'm pretty good at that kind of thing, but **I wasn't born programmed with graph-knowledge**. Sure, I might have more than average basic abilities, but most of it comes from **practice**, like most other **skills**. It's called **visual literacy**.

That's right, Jane! We **integrate** them in our mind because they are **visual clichés – abbreviations** of things that we have seen at length before. Like the kids with their music lessons – **it takes practice**.

Nobody does! So that's just **three things** that you need to understand all this stuff on **climate change...**

Just **three** things, Bruce?

Very droll! I know – *fourth* – you need a bit of time....



Maybe it'll come to that! The kids are having their afternoon nap, so I've probably got another **five minutes** before I'm interrupted by something or somebody. **The clock's ticking – now!**

*“Yet be most proud of that which I compile,
Whose influence is thine, and born of thee:
In others' works thou dost but mend the style,
And arts with thy sweet graces graced be;
But thou art all my art, and dost advance
As high as learning, my rude ignorance”*

Yep! **One** – elementary reason and logic; **Two** – some capacity to remember; **Three** – a ninth-grade ability at arithmetic and graphs- and **Four...** There are **four** things that you need.....

Exactly! So...what about a series of **five-minute Scenes**? Despite the years of **media grabs**, there's a lot missing from the public discussion. Do you really want to **understand**, or just get by on **plausible clichés**?

OK, darling, here's the **first five minute chunk**. You can take it away and chew on it until we've got another five-minute **window of opportunity**.....

Sonnet 78



OK! Let's start, Jane!

Chapter 2

TRUST

Camille Flammarion
(1842 – 1925): *The*
Flammarion Engraving
(1888)



Well, Bruce, what I understand is that there are claims that the climate is changing very rapidly due to human activity and counterclaims that this is doubtful – and besides – *the climate has always changed*, so **what's new?**

I know that we've recently seen a **long drought** in Australia that broke with record floods – and then **fires** – and most other countries seem to have **dramatic changes in weather** as long as I can remember. So – **what do we mean by climate change** and **how do we know that we're responsible?**

Well – I've got a problem, Bruce: **I'm prepared to believe** that we're causing climate change on the basis that **you believe** it and I trust your judgment on this because you've been looking at this for a long time. But I'm *not* prepared to say *that* to my friends – **I need my own response**. **What do I say?**

OK, Jane – the kids are watching a video and your fair-trade/soy/low-GI'd coffee is poured. **Where would you like to start?**

New? It all depends on what you mean by *new*. **What do you want to know?**

Hmm... again, Jane, **a short answer is possible**, but it may not satisfy you and a satisfying answer could be a lengthy journey. **It all depends on whether you want to take the journey.**

I can see your **dilemma**, Jane. It doesn't seem to be politically correct to **refer to expertise** in others – particularly one's partner. But first, Jane, let's pause and look at that word *believe*.

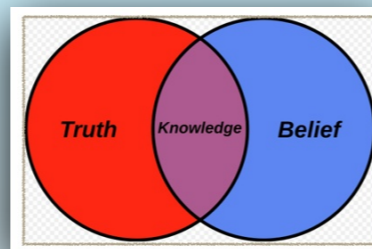
I don't *believe* in human-induced climate change, or anthropogenic global warming – AGW as it's often called. In fact I'm not sure that I *believe* in much at all...

Oh?

Aren't you being a **bit pedantic**, Bruce? How would you describe *your view*, then?



....other than I **believe** that I **love you and the kids** and I believe that trying to make a **sustainable planet is worthwhile**. Belief is slippery notion, but I take it to mean *a basic or fundamental view that I am not prepared to surrender, that may – or may not – be based on any evidence*.



I prefer to say that something – say AGW – *seems to be very likely, based on the available evidence and more likely than other plausible explanations*. To me, if someone says that they *believe* something or *don't believe* something, then I wonder **whether it is worthwhile continuing the discussion with them**.

More likely! Very likely! Isn't that the same as *belief*?

Not at all, Jane. **Beliefs** are **fixed mental positions** that are immune from change by what we call empirical evidence.

That's a **bit strong**, Bruce. I don't think that everyone is saying that they'll **die in a ditch over everything that they say they believe**. Religion and gurus aside, I think that most people use the word **believe** when they mean **this is the present position that I'm taking on this particular matter**. Why they take that position is another matter.

Well, I hope that **I** can. I said that I **trust** your judgment on this subject, so I'm prepared to **accept** your comments – so long as I can have **some foundation of information to build on**.

I think we're in danger of going **backwards** in this conversation, Bruce. *Climate change* seems to be receding from view. **Trust is trust – isn't it?**

You've got one minute on trust, Bruce, and then back to **climate change**. I know that kids' video backwards – it's got less than five minutes to run before the kids start **bugging each other**.

.... So if someone **believes** in AGW, God or some guru or wise person, the best we can do is have a 'yes-yes' conversation. **Disagreement is pointless**.

I agree that it may be so in **some cases**, Jane – but in **many cases** that *present position* **never changes** – maybe because **they don't know how to**

Hmmm... the word **trust** also hits my **hot button**. **What are you trusting** when you say that you **trust me?**

Not quite. I doubt that we'll make much progress unless we can make sure that we have agreement on **a few of these words that we throw around so loosely**.

...and the **difference** being?

So when we say that **we don't trust politicians**, then we're probably talking about **both kinds of trust**?

Well, Bruce, **our relationship** is based on the first type – **intentional trust**, and on the matter of *climate change*, I trust your competency on *that* more than I do on birthdays. Four minutes left – **how do I start explaining climate change to the playgroup?**

So **which kind of trust** do we accord to **scientists**?

One minute? OK! there's a lot that can be said about **trust**, but for the moment, we are interested in ***intentional trust and competency trust***.

Well... it's like this: If you say that you trust me to **tell you the truth**, then that's **intentional trust** – it's a **moral** issue. If you say that you can't trust me to **remember your mother's birthday**, then that's **competency trust** – that's a **technical** issue.

They sometimes **shade the truth** when they actually know something and often they don't know what they're talking about. Then they accuse each other of being *untrustworthy*. **I think that it's useless to trust someone's intentions if they don't know the relevant facts.** They might *sincerely* take us to hell.

Maybe if you use the issue of **trust** with them. We all know that a lot of scientists agree that the climate is changing due to carbon-dioxide and other pollutants **generated by human activity**.

97 out of 100 climate experts think humans are causing

Safety in numbers! Always numbers! So **what are the numbers here, Bruce?**

Aren't they just **following the fashion and the money?**

And what about the **conspiracy theories?**

Bruce – six hundred years ago probably 97% of people believed that the **Earth was flat**. **The majority *can* be wrong!**

For scientists, I think that we don't need to go past **competency trust**- there's **so many of them**. **Collectively**, all the individual technical errors tend to be removed and any **intentional trust** problems gets pushed aside very swiftly.

How many climate scientists? I'm not sure, but there are **many thousands**. And reliable **surveys** have found that **97-98%** of them support the tenets of AGW outlined by the **Intergovernmental Panel on Climate Change**.

Hardly! Climate change has been researched intensively since the early 1970s – **more than 40 years**. And there is also plenty of evidence that the 97% of **supporters** are **far more competent** at climatology than the 3% of **doubters**.

Are we going to trust **that** much competency – **or are they very competent in sustaining a conspiracy over dozens of countries over that period of time?** Or are we going to trust the **less-competent 2-3%** who disagree with them – along with some prominent people who are **not competent climatologists?**

Oh? **Christopher Columbus?**
Queen Isabella of Spain?
You know the story, Bruce.



Oh! The **flat earth thing!** Interesting point, Jane – and a **point that is wrong.**

One of the most **enduring myths** in history, Jane – practically **nobody** since the time of **Aristotle** has considered the Earth to be flat – at least nobody of public consequence. It's a myth with a tenuous history, but one that is **used frequently by climate-change doubters to try to undermine the scientific consensus.**



So how did the idea get any **traction**, Bruce?

But I don't think that the **peasants** had much to do with promoting the myth.

What! Another **conspiracy theory?**

Just think about **Medieval** and early-**Renaissance** times. For most people, the Earth was, for all intents and purposes, flat. They never went more than a few kilometres from home. It didn't matter and they probably didn't care – **the local hills and dales were the limit of their world.**

A few of them – **princes and popes mainly** – had a **vested interest in saying that the Earth was flat** because they couldn't fit a **spherical-Earth model** into the rest of their world-view even though it had been around for thousands of years.....

Where's the evidence, Bruce?

So – leaving aside for the moment the **pillage and plunder** that ensued from his adventures, **did Columbus make any difference** to the debate about the shape and nature of the Earth?



Sounds like he was **competent**, even if his **intentions** weren't pure!



Just look at the grief that **Galileo** suffered 400 years ago at the hands of popes and princes. They had the **power**, so their **word was rule**. I'm sure a lot of people in those times said *the hills go up and down, but that doesn't mean that the world isn't basically flat*. These days, lots of people say *the weather goes up down but that doesn't mean that the climate is changing* – that's the modern flat-Earth view.

He probably did, Jane. Up Until then, most of the argument was based on fairly **local experience** – you didn't have to go very far out to



sea to notice the buildings and trees near the shore disappearing from sight – and some rather ingenious calculations of the Earth's diameter **had been made for over two thousand years**.

But it was **Columbus**, as the story goes, who was the **scientist** in this matter – the *empiricist* – he was the one who went out and **tested** the curved-Earth theory.

Before you get onto your bike about monarchies and papacies, Bruce – **could you make the connection to the present issue?**

Columbus wouldn't have thought of himself as a scientist, but he **tested his ideas** over large distances – compared with the distances familiar to most people. **Others followed and reported the same findings as Columbus** – to the benefit of those same-said princes and popes. **That's how science works!**

Okay, Bruce – I'll buy that one – **but what about Y2K then?** As I recall, thousands of technical people believed that **catastrophes were imminent** if we didn't check out every computer's calendars before the turn of the Millennium.



Most certainly, Jane. Climatologists have tested their ideas over long periods of time – **greater than personal experience**. The 97% of scientists today are all *Christopher Columbuses* and [Vasco da Gama's](#), to extend the analogy. **Empiricism rules – OK!**

Yes, the [Y2K](#) is often raised as **being comparable to climate change**, because **both involve the opinions of a lot of technical people**. There are big differences – leaving aside **allegations related to intentional trust and competency trust** – a lot of people made a lot of money over Y2K. It was more about [risk](#) – **the potential or possibility of loss** – and the *time* available to minimize the risk. [Risk management](#) was a pretty new idea in the late-'nineties and even mentioning the word *risk* **frightened people**.

Now you're throwing around words that sound much the same to me – **possible** and **probable** – but you're making a lot of a **fine distinction**, aren't you?

Physically Possible

It's an important distinction, Jane - one that the **doubt-ers** wish to blur. To say that something is **possible** is to say that it is **not impossible** – in that if it did actually happen, it would not defy the **laws of physics**, as we know them – and even if it did, **we would be prepared to review our understanding of the laws of physics.**

.6

Raw Data

And **probable**, Bruce?

Rather **difficult to define**, Jane. A lot of definitions simply say that the **probability** of an event happening is the **likelihood** of it happening. That's almost a **tautology** – but the word **likely** is often used **subjectively**.....

Like – it's almost **bound** to happen? Hmm.. I can see now that it's a bit **slippery**.

Indeed, Jane – We can make mathematical **estimates** of probability, but practically, we can only say that **'in our experience**, this kind of outcome has happened about **so-many times in every hundred comparable events.**



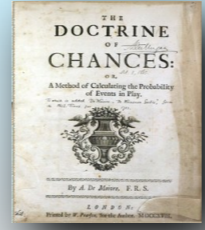
So you don't rule anything out **entirely**?

Nope!

Then miracles **can** happen?



Possibly!



Groan!

I think I've now got the hang of the difference between possibilities and probabilities. **So where does that leave the Y2K schemozzle?**

But what went wrong with Y2K?

So what's the difference between that and climate change, Bruce?

So, in summary – **what's my one-liner?** I can hear the end-music on the kids' video.

What they were trying to say was that there was **a small – but *real* – probability that computer errors could lead to catastrophic results** – like planes crashing or nuclear power plants malfunctioning.



As I said, it was all done in a rush – a couple of years – and **panic prevailed over rational risk assessment**. It was **Chicken Little Syndrome meets China Syndrome** – the likelihood was small but the consequences of failure *could* have been large.

There were many allegations of failure of both **intentional trust and competency trust** – and there probably were plenty of instances of that – but I think that the biggest problem was **the lack of *time* to make a better assessment**. When somebody yells *fire* in the theatre, we assume both intentional trust and competency trust – **and run for the door**.

AGW has been looked at by thousands of very qualified scientists for over 40 years. They are saying that there is a problem, but we have a few decades to fix it. **There is a *fire*, but there's no need to panic** – we can move in an orderly way to the door, so to speak. But we've got to get moving. **Y2K was a panic**.

So what's my one-liner, Bruce?

It's this: *Who do you trust?* – thousands of scientists with forty years of heavily scrutinized research, or a handful of scientists backed by carbon-companies? Would you take our new hybrid to a backstreet mechanic? **Where would you place your bets?**

*How careful was I when I took my way,
Each trifle under truest bars to thrust,
That to my use it might unused stay
From hands of falsehood, in sure wards of trust!
But thou, to whom my jewels trifles are,
Most worthy comfort, now my greatest grief,
Thou best of dearest, and mine only care,
Art left the prey of every vulgar thief.
Thee have I not locked up in any chest,
Save where thou art not, though I feel thou art,
Within the gentle closure of my breast,
From whence at pleasure thou mayst come and part;
And even thence thou wilt be stol'n I fear,
For truth proves thievish for a prize so dear.*



.....End Scene 2

Chapter 3

KEEPING IT SIMPLE

...In which Jane and Bruce engage in a few minutes of pillow talk about their different approaches to “The Truth”. Bruce has a close shave so it all finishes quite smoothly.....

Auguste Rodin (1840-1917):

The Kiss (1889)



Ahh! **An early night!** That gives us a few minutes to chat about **climate change** before going to sleep. I'd like to get some hard information from you, Bruce, but first, **I want to know a bit more about scientists.**

They seem to be getting a bad rap these days that **makes them sound like a bunch of conspiring crooks.** I'm sure that it can't be as bad as that – otherwise you wouldn't hang around with them, but they seem to present themselves as something special – I'd like to know **what's so special about scientists that gives them a greater claim to believability?**

They're not a very loveable lot – they seem either *shy* or *arrogant* and often don't speak in everyday English. **How can we trust a bunch like that?**

Maybe – but they sure make it hard to get at. Why? **Don't they realize what game they're in?**

What would you like to know, Jane?

What's your problem with them, Jane?

A bit of a **generalisation**, Jane – but I agree that there are plenty of public examples to point to. Where to start in defending them? **Should I be defending them?** Well – yes, because, ultimately, when you strip away their façade, you'll find **above-average trustworthiness** – both *intentional* and *competency* trust.



And what **game** is that, Jane?

The game of **winning hearts and minds** – or minds and hearts – getting people to *understand your ideas and believe them*. That's what everybody else is doing – you've **gotta sell your product** – it's a **crowded market of ideas!** out there.

What's *obvious* about science? When it comes to science, there seems to be only **two sorts of people in the world** – **scientists**, who all nod knowingly at each other when they talk, **and the rest of us**, who find science almost totally **inaccessible**. I don't think that the 97% are wrong on that one.

Tell me – what on earth do they think is so 'obvious' that they don't need to bother to explain to **us mere mortals?**

The *truth*... huh?.....

Most of them **don't think about science in those terms**, Jane – they think that their product should sell itself, **because it's obvious**.

Hmmm....



The truth, my dear Jane, the *truth*. That's what they think is obvious. In their view, they are telling the *unvarnished truth*. **There is no place in science for deceit**, so when they speak they assume that others will respect the fact that they are **not hedging the truth**. They aspire to **one hundred percent intentional trust** – even if their **competence** is less than perfect.

*When my love swears that she is made of truth,
I do believe her, though I know she lies,
That she might think me some untutored youth
Unlearnèd in the world's false subtleties...*



Oh! What is that?

The beginning of [Shakespeare's Sonnet 138](#).

And I wish that I could quote science like you do. **Maybe we're not as far apart in our understanding as we first thought.**

Hmm... in a nutshell – *convenient lies will always prevail over [inconvenient truths](#).*

Basically, the relationship between these two lovers is one of **mutual dishonesty**. He's much older than she is. He wants to appear younger, while **she wants to think that she is with a more youthful lover.**

Indeed, but there is [much more to the sonnet](#) than that.....



Very nice, Jane. I wish that I could quote Shakespeare like that. **I guess that's your forte.**

I don't know. I haven't a good ear for Shakespearean English. **What was he on about?**

That sounds familiar! **But how so?**



Well – so long as they are **consenting adults** and nobody else gets harmed, I'd say that they are responsible for the outcomes of their **mutual deceit.**

And what's the **lesson in the digression**, Bruce?

I bet there is – at least one master's thesis – and probably a library full of them. I think that this is a **beautiful and instructive digression**.

Whose world, Bruce?



To me, the **important difference** between what I have heard of **Sonnet 138 and science** is that so long as the couple wish to continue to **kid each other**, they'll get along, notwithstanding their internal torments – **but science is not science unless ideas and thoughts are tested against the *external* world.**

Everyone's?

Everyone's, Jane.

Yep! No one's excluded – **so long as they follow the rules.**

Rules, eh? So **science is a game**, after all!

Maybe – **if you call *life* a game.**

Wow! **Heaaavvvy!** Statements like that could **vaporize our whole discussion!**

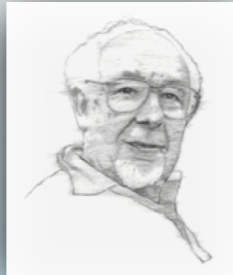
Ooops! Your call!

I don't give up easily- **but can you bring it to bear on science and climate change in one easy step?**

An agreeable sort of fellow?

I'm sure that **Shakespeare** would have said the same about *his* writing – **but it's nothing like science** – as far as I can tell.

Point taken, Bruce – but let's try to stay on – or close to – the **scientific track**. I heard the words **true goal** and *consensus of universally accepted knowledge*. **Truth and consensus don't necessarily go together** – we talked about Christopher Columbus before. **How do you wriggle out of that?**



I wondered when you'd ask me, Jane. Sure – science has been described as 'public knowledge'. John Ziman, an English-born physicist coined that description. Professor Ziman argued that the true goal of all scientific research is **to contribute to the consensus of universally accepted knowledge.**

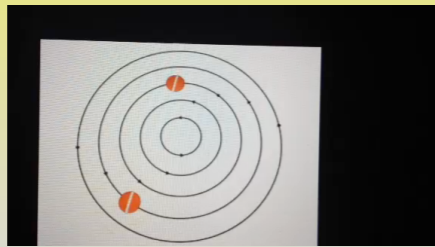
Ziman was really a great communicator – he said that ***all genuine scientific procedures of thought and argument are essentially the same as those of everyday life.***

Shakespeare seems like a **rather different approach** to everyday thoughts and procedures than science – as far as I can tell.

Well, as I said before, as far as we can tell from the historical record, most people who **thought** about the earth's shape probably thought that it was a sphere. **But most people didn't think about it much at all** and probably **assumed that it was flattish**, so I suppose that you are right – the majority weren't round-earth advocates. I think that the **key word** here is actually 'knowledge'.

I can hear a **giant sucking sound** of us disappearing into a **semantic vortex**. Get out of this one – and quickly – [Indiana Jones](#)

We're getting closer to the edge of the vortex – quick!



I'd prefer **quick to fancy** with this one, Bruce. Our **semantic canoe** is starting to go 'round and 'round.

Talk about **tangential mental forces**! But wait! They aren't on the shore, yet – they're actually on a rock with swift currents between themselves and the shore. **And there's an alligator in the way, too!**

They might be on dry land but *you* aren't yet. **Where's the connection to science in all this roudiness?**

Right on, Jane! **Indiana Jones to the rescue!** Now there's someone I really admire – an **intellectual as well as a man of action!**

Yep! Knowledge seems to come in **two basic flavours** – *words* and *action*. **Descriptive knowledge** and **procedural knowledge** if you want to be fancy.

Well, here's Indiana Jones's **overhanging branch** at the edge of the whirlpool: He's a man of **knowledge and a man of action** – he *knows* what actions to take and importantly, **how to take them** – to him, *true knowledge* is **procedural** – it's a **capacity to act** – and that capacity is only **believed** to exist if it is **demonstrated** – no waffling, no overblown claims! He knows how to flick his whip around the overhanging branch and let the **near-tangential forces** push the boat towards the shore. Whhhhhipppp! **QED!**

Easy! He picks her up and nimbly treads on the slow-witted alligator. Presto! **Dry land.**

Is it ethical to **experiment with alligators** like that?

OK! I feel that we've been sucked into that vortex and out into an **alternative universe.....**

No! – that was another Harrison Ford movie, Bruce. **Meanwhile, back on Earth...**

Oh! – I wondered what that little asterisk was – **'conditions apply'**. What are the conditions, my love?

It's like this, Jane: Indiana Jones went to whip-school, studied fluid dynamics and saurian biology. **All before breakfast.** But importantly, he is an empiricist – **he only accepts those things that are tried and tested.** He might experiment out in the realms of low-probability events, but he'd never have survived to make the movie sequels if his knowledge wasn't **grounded in the knowledge of the scientists that went before him.**

Just as ethical as it is to experiment with **alligator-hopping scientists.** Read the small-print in the credits: 'No animals were harmed...'

....The Empiricists strike back!

Well, the point is that **science is about what works** – with some conditions...

Hmmm... Let's see. **There're five. First,** empirical science – or **empiricism** – **only relates to what we can perceive through our five senses.** **Secondly,** there must be **agreement** – **my perceptions might be delusions.....**

Hmm... maybe... and *number two*?

So much for the Post-modern movement... and *three*?

*Proof and ..disproof...OK... Well, finish your sentences first and then I'll give my verdict. ..and *four*?*

*'Is this a dagger which I see before me,
The handle toward my hand? Come, let
me clutch thee.
I have thee not, and yet I see thee still.
Art thou not, fatal vision, sensible
To feeling as to sight? or art thou but
A dagger of the mind, a false creation,
Proceeding from the heat-oppressed brain?'*

Can *I clasp* Ockham's Razor, Bruce?



Secondly, there must be **agreement** – my perceptions *might* be **delusions** – other people have got to agree that *their* perceptions, with regards to the subject at hand, **are much the same as mine**. That's the **public knowledge** part.

Next, any generalized statements – that is, 'theories' about my perceptions – **must be testable and refutable** – that last bit's really important – ***it must be amenable to disproof***.

Then there's the Ockham's Razor bit....

Well, **Macbeth** wasn't much of an empiricist – **he was *deluded***, I know *that* much Shakespeare.

Well done, darling. Now cut to the chase. **What's Ockham on about?**

Uh?

A clash of daggers! **Could you bring it down to earth?**

Oh – the **KISS principle**. Why didn't you say so before, Bruce?

Sounds reasonable. Any other fine print for empiricism?
Number five?

Entities must not be multiplied beyond necessity.



It's the **law of succinctness** – it's a principle that generally recommends selecting the **competing hypothesis or theory** that makes the **fewest new assumptions**, when the hypotheses are equal in other respects..... for instance, if all the hypotheses can sufficiently explain the observed data.

For example, a **spherical earth makes for a more succinct explanation than a flat earth.**

Because **KISS might fail the Ockham's test** – if it's *too* brief to cover the whole principle. **You can boil things down only so far.** But, yes, it's the KISS principle of science.

Yes...**five** – that we **tacitly accept reason and causality**. There's no place for saying '**then a miracle occurs**'. **The chain of logic and reason can't be broken.**

**Pretty cruel conditions.
Not much room for romance, is there?**

**Cruel – but fair. They apply to everyone.
No exceptions.**

What about a kiss good-night?



**You can multiply it beyond necessity if you like, Bruce.
There are no conditions!**

An Ockham's kiss?

*How oft when thou, my music, music play'st,
Upon that blessed wood whose motion sounds
With thy sweet fingers when thou gently sway'st
The wiry concord that mine ear confounds,
Do I envy those jacks that nimble leap,
To kiss the tender inward of thy hand,
Whilst my poor lips which should that harvest
reap,
At the wood's boldness by thee blushing stand!
To be so tickled, they would change their state
And situation with those dancing chips,
O'er whom thy fingers walk with gentle gait,
Making dead wood more bless'd than living lips.
Since saucy jacks so happy are in this,
Give them thy fingers, me thy lips to kiss.*

