A Cabinet of Philosophical Curiosities

By the same author

Blindspots
Thought Experiments
Pseudo-Problems
Vagueness and Contradiction
A Brief History of the Paradox
Seeing Dark Things

A Cabinet of Philosophical Curiosities

A Collection of Puzzles, Oddities, Riddles and Dilemmas

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Contents

Dedication

To
My Broken Arm

I am a better starter than finisher. For wont of endings, this book became late, Late, LATE!

After my right arm broke, I could type s-1 -o-w-1 -y with my left hand.[1] This forced me to spend the summer completing what was nearly done rather than darting to other projects.[2]

The lessons taught by my broken arm began with the Emergency Room poster 'No head injury is too trivial to be ignored'. The sentence is intended to be read as: *However trivial a head injury is, it should not be ignored*. But what the sentence really means is the opposite: *However trivial a head injury is, it should be ignored*. After all, the warning has the same syntax as: *No missile is too small to be banned.*[3]

If you only have a broken arm, do not bring this reversal to the attention of the nurses. They will take the wrong kind of interest. Soon you will be holding your head very still in a computerised tomography scanner.

After surgery, my arm was paralysed for a day. This gave me a phantom limb – and an eerie appreciation of Horatio Nelson's argument for immortality. In 1797, the British admiral was wounded in his right arm. After amputation, he vividly

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[1] Editorial note: we had nothing to do with the breaking of Professor Sorensen's arm.

[2] And I became more interested in left-handed riddles such as 'Which of the United States can be typed with only the left hand?'

[3] Linguists characterise 'No head injury is too trivial to be ignored' as a depth charge sentence. After the initial splash on the surface of consciousness, the sentence penetrates to a deeper level of analysis at which its real meaning detonates in contradiction to the surface meaning.

experienced the presence of his arm, a limb that he could feel but could no longer see. Lord Nelson reasoned that if an arm can persist after being annihilated, so can the whole person.

My broken limb outlived my phantom limb. It taught me how to be a lefty in a world that is subtly right-handed – and less subtly two-handed. Like a good teacher, my broken arm made the novel familiar and the familiar novel.[4]

[4] Experiment revealed that TEXAS is the only the state that can be typed lefty. Thought experiment revealed that OHIO is the only state that can be typed righty.

Introduction

I build up castles.
I tear down mountains.
I make some men blind,
I help others to see.
What am I?

A great quantity is said to be 'without number'. An offended mathematician, Archimedes, believed this confused our inability to number the objects with an objective absence of number. The Roman numerals of his day abetted this confusion. In the *The Sand Reckoner* Archimedes developed another notation that enabled him to estimate the number of grains of sand in the universe. Now suppose another sand reckoner claims to have learned the exact number of grains. Could you perform an experiment to test his claim? (Questions which are answered at the rear of this book are preceded with .)

Suppose everything is made up of atoms[5] and that any combination of atoms is an object. Given that there are only finitely many atoms, prove that you are in an odd universe. Side question: Could you be in an even universe?

Lewis Carroll subliminated his philosophical interests in whimsical dialogues and silly syllogisms:

> Men over 5 feet high are numerous.
> Men over 10 feet high are not numerous.
> Therefore men over 10 feet high are not over 5 feet high.
> What lesson is to be drawn about numerosity?

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[5] Atoms are indivisible in mereology, the logic of parts and wholes. The elements in the periodic table qualify as atoms for chemical purposes but not for the physical processes discovered by Marie and Pierre Curie. Physicists do not know whether anything qualifies as an atom for all physical purposes. Reality might be bottomless.

This book has numerous riddles such as the above. They reflect a philosopher's interest in logic and language, history and mathematics. The puzzles evolved from a habit I copied from Charles Darwin. He was impressed by how quickly he forgot objections to his theories. Darwin took to writing them down promptly in notebooks.

Psychologists support Darwin's policy by asking you to continue the sequence 2, 4, 6, … You guess 8, 10, 12. They congratulate you, 'Right! But what is the rule for continuing the sequence?' You announce the sequence is just the ascending even numbers. 'Sorry, that is not the rule generating the numbers. Would you like try again?'

You try a more complicated hypothesis. You test by asking whether another triplet of numbers is in the sequence. The good news is that, yes those particular numbers are part of the sequence. The bad news is that, once again, your hypothesised rule is mistaken. The good news/bad news cycle continues until you reverse your strategy of seeking to verify your hypotheses. You must instead try to falsify your hypotheses.

The rule intended by the psychologist is: 2, 4, 6, then the numbers after 6. This floods the search space with confirming instances. The rule is difficult to discover because we test our hypotheses by seeking confirmations rather than refutations. One motive for this confirmation bias is that we are fond of our hypotheses. We do not look for bad news. Even when we get counterevidence, we protect our pet theories by forgetting failures and exaggerating successes.

Confirmation bias is highly confirmed! When I asked one lecturer whether there were any counterexamples, she could not think of any. But then again, she sheepishly admitted, this could be because she never tried to refute the principle that we are biased towards confirming hypotheses. Then the psychologist brightened up, 'Hey, that proves my point!'

Nevertheless, the anomaly collector should include anomalous anomalies. The 'paradoxes of confirmation theory' show how a theory can be disconfirmed by combining data that is separately confirming. In 'Conform to Confound' I discuss

examples that conform to a generalisation and yet disconfirm it. There is even hope for the inheritor in the Charles Dana Gibson cartoon:

Cousin Kate: Now that you are well off, Charles, you mustn't let them say of you, a fool and his money are soon parted.
Charles: No, you bet I won't; I'll show them that I'm an exception to the rule.

Philosophers of science and historians of science have disconcerting ironies that do not make it into the pious methodology sections of science textbooks.

Psychologists focus on the confirmation bias we harbour towards our own hypotheses. We are not invested in the theories of others. Indeed, children go through a counter-suggestible phase. Told 'Nobody is perfect', one little girl in Sunday School silently pointed up.

Lawyers make a living generating counterexamples. In response to the retaliatory principle 'an eye for an eye and a tooth for tooth', William Blackstone (1723–1780) queried, 'What if a two-eyed man knocks out the eye of a one-eyed man?'

Since we enjoy counterexampling our adversaries, we

can counter confirmation bias by imagining someone else has come up with the principle. This is the method of 'auto-sadism', a term I picked up from a rental car agent.

Even with my nurturing, most of the anomalies that made it into storage perished from neglect. However, a minority took on a life of their own.

Their paths of development proliferated under the influence of a 'letter' I received, as a graduate student, from the logician Bas van Fraassen. He was in a hurry and mailed me notes for a letter instead of the letter. The notes showed a different style of thinking than his polished correspondence and articles. Instead of marching through a proof, Professor van Fraassen engaged in a lively inner debate.

I was impressed by how his dialogue grew alternatives, how it inhibited premature fixation of one's opinions, how it encouraged synthesis. In addition to writing dialogues, I tried other stylistic variations.

My files grew into a cabinet. Then a bank of cabinets. The cabinets were then transmuted into virtual cabinets on my computer.

The anomalies cross-fertilised into advertisements, contests and poems. Some of these were published in professional journals and anthologies, others appeared in newspapers and magazines, and many reappear in this volume. But many needed a different environment.

A promising niche was revealed by Ian Stewart's *Cabinet of Mathematical Curiosities*. As a 14-year-old, he began to fill notebooks with interesting 'maths' he found outside the classroom. After the notes migrated into filing cabinets, he assembled them into a miscellany of marvels. They could be enjoyed independently but gained mutual support when read in Stewart's clusters and mini-series.

That is the format I borrow for this book. Just as Professor Stewart exhibits the interesting mathematics that can be found outside the classroom, I exhibit the interesting logic that can be found outside the classroom.

Logic is everywhere there is a motive to imply rather than say.

One does not need to step far outside the classroom to feel the bite of an enthymeme (an argument with a suppressed premise or conclusion). Consider the Oxford undergraduate who spotted Sir John Pentland Mahaffy (1839–1919) chatting with a colleague in a corridor of Trinity College. The desperate student interrupted the professors to ask the location of a lavatory. 'At the end of the corridor,' Mahaffy grandly gestured, 'you will find a door marked GENTLEMEN: but don't let that stop you.'

Some of the logic in this book might have started in the classroom – and got expelled! As a cadet at West Point, George Derby (1823–1861) enrolled in a class on military strategy: 'A thousand men are besieging a fortress that contains these quantities of equipment and provisions,' said the instructor, displaying a chart. 'It is a military axiom that at the end of 45 days the fort will surrender. If you were in command of this fortress, what would you do?' Derby raised his hand, 'I would march out, let the enemy in, and at the end of 45 days I would change places with him.'

Derby went on to a distinguished career as an officer – and humorist. The pairing is less incongruous when you reflect on the reciprocal relationship between humour and rules. A joke requires building expectation. Nothing grounds expectations as efficiently as a rule. Ludwig Wittgenstein suggested that a serious philosophical book might contain nothing but jokes:

> The problems arising through a misinterpretation of our forms of language have the character of depth. They are deep disquietudes; their roots are as deep in us as the forms of our language and their significance is as great as the importance of our language. – Let us ask ourselves: why do we feel a grammatical joke to be deep? (And that is what the depth of philosophy is.)
>
> – Wittgenstein, *Philosophical Investigations*, 1958, §111

In the Spanish proverb '*Mañana* is the busiest day of the week', *mañana* is treated as a day of the week such as Monday, Tuesday, and Wednesday. '*Mañana*' is actually an indexical term in the same category as 'yesterday' and 'today', 'now',

'before', 'past'. An indexical takes a feature of its own utterance, such as when or where or who uttered it, as an input to determine its output meaning. This recursion makes indexicals popular in calculative riddles: 💡 José will patch the roof four days after two days before the day before tomorrow. When will the roof be patched? There is a whole logic of time that systematises this dynamic manner of orienting to the world (which contrasts with the static coordinate system of physics). Wittgenstein believed that our tendency to model all words on names is a fertile source of philosophical perplexities: 'When is it now now?, What does "I" refer to?, and 'How can we know that the future will resemble the past?'

Or consider the problem of evaluating counterfactuals such as 'If the numeral for three was "2", then 2 + 2 would equal 6.' To protect the necessary truth of 2 + 2 = 4, logicians invoke a riddle Abraham Lincoln formulated to rebut legislation that euphemised slavery as 'protection'. 'If you call the tail of a calf a leg, how many legs would a calf have?' Lincoln's answer: 'Four, calling a tail a leg does not make it one.' When evaluating a counterfactual, we must hold the language constant. If the language is, say, present-day English then we stick with present-day English even when imagining situations in which a slight variation of English is spoken. The evaluating language can be any language but once you choose this unit of measurement, you must stick with it *exactly*.

On 23 September 1999, the $125 million Mars Climate Orbiter failed to manoeuvre into a stable orbit. One engineering team had used the imperial measurement system for the aerobraking sequence while another team used the metric system.

Metaphysicians studying other possible worlds have never made such a costly error. Usually, nothing is damaged. To illustrate the safety, I shall eventually lure you into a painless metaphysical error with the help of a mysterious footnote.[6] Relax! You will feel nothing.

[6] EQC OBA ERO BOH QRG

Conform to Confound

Whereas a 51-foot-tall woman is a counterexample to 'All women are less than a fifty-one feet tall' a 50-foot tall woman is a conform-example to it. A conform-example conforms to 'All *F*s are *G*s' by being both *F* and *G* but *dis*confirms the generalisation. Once you learn there is a 50-foot-tall woman, you lose confidence in 'All women are less than fifty-one feet tall.'

There is a tradition of conform-examples in biology. In 1938 'All coelacanths are dead' became *less* probable to the ichthyologist J. L. B. Smith when he examined a freshly dead coelacanth. The fish had been netted by a South African trawler. Smith was astounded because the species had been thought to be extinct for 40 million years. Although the dead specimen conformed to the generalisation that there are no living coelacanths, it was strong evidence for the incompatible hypothesis that there were some live coelacanths. When a live specimen was finally caught in 1952, the South African prime minister, D. F. Malan, was aghast, 'Why, it's ugly! Is this where we come from?'

Conform-examples have been historically momentous. Consider the generalisation that nuclear weapons never

detonate accidentally because they are equipped with many safety devices. In 1961, a B-52 bomber carrying two hydrogen bombs disintegrated in flight over North Carolina. Five out of its six safety devices failed. But just as the generalisation implies, the sixth safety device succeeded.

Yet the Secretary of Defense, Robert McNamara, was not heartened by this successful prediction. Instead he cited this incident to justify a new policy of nuclear disarmament.

To sum up, a conform-example is a non-exception that disproves the rule.

Razing Hopes

Undergraduate: When may we hope to see
your Harvard lectures published sir?
Professor J. L. Austin: You may hope to
see them published any time.

Are two reasons for hope always better than one reason for hope? Sorry, reasons that separately raise hope can jointly dash that hope.

Suppose Nick and Nora bet another couple that all three drunks leaving a party have mixed up each other's hats. Nick learns that the first drunk took the second drunk's hat. This raises Nick's hope that all of the drunks mixed up each other's hats.

Nora learns that second drunk took the first drunk's hat. This raises Nora's hope that all of the drunks mixed up each other's hats. But when the couple's reasons are pooled together, they collectively dash hope of winning the bet. For, together, the two reasons guarantee that the third man is wearing his own hat. The conjunction of good news can be bad news.

The winning couple draws the optimistic lesson. Conjoining a reason to fear with a reason to fear can yield a conjunction that is welcome. Two facts, considered in isolation can each be bad news. Considered together, as a conjunction, they are good news.