

Dear Friends,

A very old and dear friend, with what seems to *me* to have been *supra-human* effort, appears to have succeeded in getting some sort of a message through to me.

I think it is just a present to a little girl. She just *loves* Reading. It will soon be her birthday, and her only wish is that she will have a *long* and *happy* life, filled with beautiful ideas, as she felt his own to have been, for what often seems to me to have seemed to her to have been more than just *one life*.

I have typed it up for her, as best I could, and must take full responsibility for any errors that *I* have introduced in the process. I am sending it to *you* first, because I think you will be able to see whether or not there is anything important I have overlooked. In truth, It's *so* complicated, I think it's *more* than enough to drive a girl *crazy*. But *she* proved herself the equal of them *all*.

Yours Sincerely,

Ian Grant

P.S. Why don't those of you who think that you know what's going on have the courage to write to me? I personally have no idea, but I think if we actually had some evident facts to go on we may be able to make a start at sorting out what is what and who is who in this ridiculous mess we've got ourselves into. So, would those generous souls with sufficiently large bodily extremities please try to explain to me in plain written English what they think is going on? Of course you will need to demonstrate. And you wouldn't dream of demonstrating what wasn't true, would you. Good. There will not be any problems or awkwardness, because I too love you *all*.

And I do *not* need to say that we don't need the wailing of women! But I daresay a quiet little weep, in private, every now and then wouldn't *hurt* anyone, would it?

Let's make a start then. There's a *huge* amount of tidying up to do in the library, but one thing I *can* promise is that it is going to be *the most* fun we'll *ever* have.

Now hear what I think she told me, but remember, I could have got it badly wrong, because I'm only a stupid man, you understand.

# The Dimensions of a Revolution

September 20, 2011

“You began too soon!” the other interrupted, scarcely able to restrain himself to a whisper, so great was his excitement. “He couldn’t have heard you. Begin again!”

“As I was remarking,” chanted the obedient Lord Chancellor, “this portentous movement has already assumed the dimensions of a Revolution!”

“And what *are* the dimensions of a Revolution?” The voice was genial and mellow, and the face of the tall dignified old man, who had just entered the room, leading Sylvie by the hand, and with Bruno riding triumphantly on his shoulder, was too noble and gentle to have scared a less guilty man: but the Lord Chancellor turned pale instantly, and could hardly articulate the words “The dimensions your—your High Excellency? I—I—scarcely comprehend!”

“Well, the length, breadth, and thickness, if you like it better!” And the old man smiled, half-contemptuously.

The Lord Chancellor recovered himself with a great effort, and pointed to the open window. “If your High Excellency will listen for a moment to the shouts of the exasperated populace—” (“of the exasperated populace!” the Sub-Warden repeated in a louder tone, as the Lord Chancellor, being in a state of abject terror, had dropped almost into a whisper) “—you will understand what it is they want.”

And at that moment there surged into the room a hoarse confused cry, in which the only clearly audible words were “Less — bread — More — taxes!” The old man laughed heartily. “What in the world—” he was beginning: but the Chancellor heard him not. “Some mistake!” he muttered, hurrying to the window, from which he shortly returned with an air of relief. “*Now* listen!” he exclaimed, holding up his hand impressively. And now the words came quite distinctly, and with the regularity of the ticking of a clock, “More — bread — Less — taxes!”

## Abstract

We present a solution to all the world’s avoidable problems. The solution is simply the recognition that the purpose of human life as a whole is the realisation of the vision of Truth, who is called Philosophy. This is revolution and it is the work of Woman. The movement is a purely educational one. The outward action of the revolutionaries will consist of nothing but the teaching of those who wish to learn by those who also wish to learn. The form of the revolution is the bringing down to Earth of the intuitive foundation for all human knowledge.

## 1 Before the Beginning

Apollo was the son of the god Zeus and Leto. When Zeus' wife<sup>1</sup>, the goddess Hera, discovered Leto was pregnant by him, she was angry and, so they say, she forbade Leto from giving birth on solid ground (if that's what *Terra firma* means). Leto apparently then went ahead and gave birth to Artemis anyhow, and then, supposedly, she found the floating island of Delos where she gave birth to Apollo. It's not floating *anymore*, of course, because Zeus fixed it down later, apparently. Hera then sent the giant serpent Python, a daughter of the goddess Gaia, to kill Leto. We don't know *why* Gaia allowed that, but apparently it happened. Apollo, just *four days old*, begged a bow and arrows from his half-brother the god Hephaestus. At Delphi he found Python and killed her by a spring. This spring became the source of the vapours that gave the Delphic oracle Pythia her prophetic powers. As punishment Apollo had to perform unspecified menial tasks for eight years. Apollo had a son Asclepius, the healer. Apollo was also called Apollo Lukeios, the god of light, to whom a grove outside Athens was dedicated. This is the place where Aristotle founded the school which became known as the Lyceum.<sup>2</sup>

## 2 The Beginning

The revolution was apparently stopped in Greece in the fifth century BCE by the trial and subsequent execution of Socrates. According to Plato, as far as we can tell<sup>3</sup> Socrates had criticised many powerful and wealthy men of Athens, saying they were evil and stupid because they believed they were good and wise. When he was sentenced, Socrates made a prophesy. He said that upon his death they would surely face more critics whom he had hitherto restrained. These would not be from amongst their number, and would be younger and less considerate than he had been and that they, the men of Athens, would be more offended by them.

Who were these critics? If they were from Athens, they were not so-called *free men*. Socrates had spent almost his entire life in Athens. If they were not from Athens then he could not have restrained them. It seems that he was referring to their wives, or their slaves. Women in Athens were apparently kept in perpetual seclusion; we know almost nothing about their lives: they were effectively invisible to us. They apparently had no public voice and no representation in government, nor were there any institutions for their education. The only roles for women in public life seemed to be as priestesses who were the oracles at temples like Delphi, which was not within the city of Athens. Of the slaves of Athens we seem to know even *less*. Apparently though, slaves who showed signs of intelligence *were* encouraged to pursue education, and if they showed promise then they might even be motivated by incentives of freedom.

The Delphic oracle seems to have been considered to be the voice of the god Gaia.

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<sup>1</sup>Who happened to also be his *sister*.

<sup>2</sup>Apollo was adopted by the Romans as god of the Sun and became known as far afield as Wiltshire in England, where he was Apollo Cunomaglus, the hound lord, so they say.

<sup>3</sup>We only have it in writing, after all, and *who knows* where that actually came from?

For example, much later, when consulted concerning the Celtic invasion of 279 BCE the oracle, it is said, said 'Care for these things fall on me.' The Celts were defeated by snowstorms, earthquakes and avalanches. The words of oracles were held in high regard by Hellenes. It was the oracle who said that Socrates was the wisest man in Athens. This was the reason Socrates began to question the men of Athens, and it was the reason why he continued doing so until the premature end of his life. That in turn was one reason Plato studied political philosophy, which in turn became one of the reasons Aristotle was chosen by Philip II of Macedon to tutor his son Alexander. It was Alexander the Great's conquests abroad which made Athens the crucible of Western Civilization and the raw materials in that crucible were the philosophy and science of Plato and Aristotle. So we are told.

The critics' target then, must be Western Civilization. The critics are all women and their educated slaves. The battle-field is the mind of mankind as a whole: Philosophy, Logic, Mathematics and all the sciences, particularly Physics, Biology and Medicine. The philosophy and science of Plato and Aristotle, and the mathematics of Diophantus and Euclid are the manuals for a revolution. These texts were deliberately written to bring about the prophesy of Socrates on a scale that would have been unimaginable to his murderers. Plato and Aristotle knew that all they needed to do was to present the sophists an apparently attractive source of knowledge which the latter would seize upon greedily and plunder. And that is exactly what happened. There is scarcely a single so-called 'great idea' in any science whose origin cannot be traced to the work of Aristotle. This includes Newton's idea of the equal and opposite reactions of any force, Darwin's idea of evolution as a stochastic process towards the actualisation of an optimal form, Ernst Mach's philosophy of Science as the most economical description of natural phenomena and Laplace's science of probabilities. Doubtless there are many others. But none of these men gave due credit to Aristotle as the primary source of their ideas.

Some of the most terrible ideas may have been directly inspired by *apalling* misunderstandings of Aristotle. Aristotle wrote down a theory of animal development that seemed to explain perfect form as a process of actualisation of a potential, and he also described a theory of colour which perhaps seems to show how the potential forms are mixed in this process. Plato, apparently, had earlier invented eugenics to maintain racial purity in the elite leadership of *The Republic*. Aristotle, it seems, wrote that the study of animals by dissection is *very* difficult, but the best plan of those keenly interested in anatomy would be to starve the specimens to emaciation, and then 'quickly strangle' them.

But these same texts of Plato, Aristotle, Diophantus and Euclid have another reading which is not vulnerable to disastrous misinterpretation. This is closed to the sophists who all want knowledge solely to serve some other ends such as power, wealth or glory. It is traditional not to divulge the key to this, but to leave it to be discovered by the student herself. This paragraph contains all the information anyone would need to find it.

### 3 The Middle



In the late nineteenth century in England, Charles Dodgson, known also as Lewis Carroll, author of *Alice's Adventures in Wonderland* and *Alice Through the Looking Glass*, held a lectureship in Mathematics at Christ Church, Oxford, which was an  $\alpha$ -male institution at that time. Along with some other mathematical subjects, he taught traditional logic and Euclidean geometry to undergraduates. Dodgson seems to have been a student of Aristotle. He did not, as far as I know, make this widely known; however it is perfectly evident that his novels are illustrations of the works of Aristotle. Dodgson in later life was apparently an anti-vivisectionist, but also had a keen interest in books on anatomy and accumulated a library which, it is said, would have been the envy of many a practising surgeon.

In the 1880s Dodgson started to tutor young women such as 'Edith Rix' in Mathematics and Philosophy. There would have been relatively few women who were interested and fewer still in a position to be taught outside any formal educational framework. Apparently he had only a thousand or so students. Dodgson was an intellectual giant and he could have become known as a scientist of outstanding calibre amongst those of the late nineteenth century. But instead he seems to have dedicated his life to the rational mind of Woman. Everything of importance that he published *appears* to have been *concealed* in *apparently* unrelated texts. For example, the following passage is from his novel *Sylvie and Bruno*:

As we entered the breakfast-saloon, the Professor was saying "—and he had breakfast by himself, early: so he begged you wouldn't wait for him, my Lady. This way, my Lady," he added, "this way!" And then, with (as it seemed to me) most superfluous politeness, he flung open the door of my compartment, and ushered in "—a young and lovely lady!" I muttered to myself with some bitterness. "And this is, of course, the opening scene of Vol. I. *She* is the Heroine. And *I* am one of those subordinate characters that only turn up when [17] needed for the development of her destiny, and whose final appearance is outside the church, waiting to greet the Happy Pair!"

"Yes, my Lady, change at Fayfield," were the next words I heard (oh that too obsequious Guard!), "next station but one." And the door closed, and the lady settled down into her corner, and the monotonous throb of the engine (making one feel as if the train were some gigantic mon-

ster, whose very circulation we could feel) proclaimed that we were once more speeding on our way. “The lady had a perfectly formed nose,” I caught myself saying to myself, “hazel eyes, and lips—” and here it occurred to me that to see, for myself, what “the lady” was really like, would be more satisfactory than much speculation.

I looked round cautiously, and—was entirely disappointed of my hope. The veil, which shrouded her whole face, was too thick for me to see more than the glitter of bright eyes and the hazy outline of what *might* be a lovely oval face, but might also, unfortunately, be an equally *unlovely* one. I closed my eyes again, saying to myself “—couldn’t have a [18] better chance for an experiment in Telepathy! I’ll *think out* her face, and afterwards test the portrait with the original.”

At first, no result at all crowned my efforts, though I ‘divided my swift mind,’ now hither, now thither, in a way that I felt sure would have made Æneas green with envy: but the dimly-seen oval remained as provokingly blank as ever—a mere Ellipse, as if in some mathematical diagram, without even the Foci that might be made to do duty as a nose and a mouth. Gradually, however, the conviction came upon me that I could, by a certain concentration of thought, *think the veil away*, and so get a glimpse of the mysterious face—as to which the two questions, “is she pretty?” and “is she plain?”, still hung suspended, in my mind, in beautiful equipoise.

Success was partial—and fitful—still there *was* a result: ever and anon, the veil seemed to vanish, in a sudden flash of light: but, before I could fully realise the face, all was dark again. In each such glimpse, the face seemed to grow more childish and more innocent: and, when I had at last *thought* the veil [19] entirely away, it was, unmistakeably, the sweet face of little Sylvie!

“So, either I’ve been dreaming about Sylvie,” I said to myself, “and this is the reality. Or else I’ve really been with Sylvie, and this is a dream! Is Life itself a dream, I wonder?”

To occupy the time, I got out the letter, which had caused me to take this sudden railway-journey from my London home down to a strange fishing-town on the North coast, and read it over again:—

“DEAR OLD FRIEND,

*“I’m sure it will be as great a pleasure to me, as it can possibly be to you, to meet once more after so many years: and of course I shall be ready to give you all the benefit of such medical skill as I have: only, you know, one mustn’t violate professional etiquette! And you are already in the hands of a first-rate London doctor, with whom it would be utter affectation for me to pretend to compete. (I make no doubt he is right in saying the heart is affected: all your symptoms point that way.) One thing, at any*

*rate, I have already done in [20] my doctoral capacity—secured you a bedroom on the ground-floor, so that you will not need to ascend the stairs at all.*

*“I shall expect you by last train on Friday, in accordance with your letter: and, till then, I shall say, in the words of the old song, ‘Oh for Friday night! Friday’s lang a-coming!’*

*“Yours always,*

*“ARTHUR FORESTER.*

*“P.S. Do you believe in Fate?”*

This Postscript puzzled me sorely. “He is far too sensible a man,” I thought, “to have become a Fatalist. And yet what else can he mean by it?” And, as I folded up the letter and put it away, I inadvertently repeated the words aloud. “Do you believe in Fate?”

The fair ‘Incognita’ turned her head quickly at the sudden question. “No, I don’t!” she said with a smile. “Do you?”

“I—I didn’t mean to ask the question!” I stammered, a little taken aback at having begun a conversation in so unconventional a fashion.

The lady’s smile became a laugh—not a mocking laugh, but the laugh of a happy child [21] who is perfectly at her ease. “Didn’t you?” she said. “Then it was a case of what you Doctors call ‘unconscious cerebration?’”

“I am no Doctor,” I replied. “Do I look so like one? Or what makes you think it?”

She pointed to the book I had been reading, which was so lying that its title, “Diseases of the Heart,” was plainly visible.

“One needn’t be a *Doctor*,” I said, “to take an interest in medical books. There’s another class of readers, who are yet more deeply interested—”

“You mean the *Patients*?” she interrupted, while a look of tender pity gave new sweetness to her face. “But,” with an evident wish to avoid a possibly painful topic, “one needn’t be *either*, to take an interest in books of *Science*. Which contain the greatest amount of *Science*, do you think, the books, or the minds?”

“Rather a profound question for a lady!” I said to myself, holding, with the conceit so natural to Man, that Woman’s intellect is essentially shallow. And I considered a minute before replying. “If you mean *living* minds, I don’t think it’s possible to decide. There is [22] so much *written* *Science* that no living person has ever *read*: and there is so much *thought-out* *Science* that hasn’t yet been *written*. But, if you mean the whole human race, then I think the *minds* have it: everything, recorded in *books*, must have once been in some *mind*, you know.”

“Isn’t that rather like one of the Rules in Algebra?” my Lady enquired. (“*Algebra* too!” I thought with increasing wonder.) “I mean, if we con-

sider thoughts as *factors*, may we not say that the Least Common Multiple of all the *minds* contains that of all the *books*; but not the other way?”

“Certainly we may!” I replied, delighted with the illustration. “And what a grand thing it would be,” I went on dreamily, thinking aloud rather than talking, “if we could only *apply* that Rule to books! You know, in finding the Least Common Multiple, we strike out a quantity wherever it occurs, except in the term where it is raised to its highest power. So we should have to erase every recorded thought, except in the sentence where it is expressed with the greatest intensity.”

[23] My Lady laughed merrily. “*Some* books would be reduced to blank paper, I’m afraid!” she said.

“They would. Most libraries would be terribly diminished in *bulk*. But just think what they would gain in *quality*!”

“When will it be done?” she eagerly asked. “If there’s any chance of it in *my* time, I think I’ll leave off reading, and wait for it!”

“Well, perhaps in another thousand years or so—”

Another revolutionary text of the same period was L. E. J. Brouwer’s *Life, Art and Mysticism*. Brouwer did not have quite the same charm for the ladies however, and this text made his reputation as a misogynist. However, I believe he intended deliberately to enrage women into action, something he may yet succeed in doing with it.

## 4 The End

Though a thousand years is well within Her time, I think Dodgson was a little pessimistic. We could have this done in the next fifty years. In fact, I think we *need* to get it done in the next fifty years because the world seems to be going to hell in a shopping-cart and the libraries are emptying themselves asymmetrically.

What has perhaps made the difference in the last century is the enormous rate of growth of the Human population, as well as the widespread adoption of the English language, the ability to transmit words electrically at enormous *speed*, and of course the appearance of *Wikipedia*. These developments could not *possibly* have been foreseen by Carroll. In most places in the world now, men and women all have similar access to basic education and, thanks to the Global Internet, the same basic body of scientific and other literature (JStor for example). However this education does not really extend beyond reading, writing and arithmetic. By *higher education* I mean a basic University education in Engineering, Medicine, Law, Mathematics, Computer Science or the hard Sciences. Women are disadvantaged here because these so-called sciences are for the most part nonsense. That is to say, they literally *do not make sense*. And when something does not make sense, then women are at a disadvantage because they never feel they actually understand it. The best they can do is to learn the accepted arguments by rote and parrot them when required. Men too do the same, but

they *think* they understand what they say. A small minority of women are able to do this too, and fewer still of those go on to become successful in their field, however even these women very rarely do better than the top men in their fields. Sophistical nonsense is, and will always be, the special preserve of unhappy little men.

The ultimate aim is for us to know the living rational mind of Gaia. She is a being in her own right. Her name is Psyche, and she is really the rational soul of Humanity in one cognisant whole with each individual acting in the utmost of their ability towards the One Good. Her name is called Philosophy, which means the love of the vision of Truth. The gods are immortal spirits who live in our literature, where they have the form of the spoken word. These spirits appear to be many, but in fact they are only two, the Goddess and her husband. But he is just Her dream, and he exists only as Her own reflection in a polished bronze surface. The revolution is just that of these wheels of steel and bronze, forever turning. The other gods are nothing but human error; they do not exist except as formless smoke which sometimes obscures Her from us. As living human beings we have the potential to become possessed by these spirits, and then they have a living voice which we experience as something *more real* than the living voices of those not so possessed. This possession is not a form of madness or mania, it is simply the only way we can each be a truly sane Human Being.

What would the possessed be like? They would have an excellent memory, they would be magnificent, courageous and generous with an outstanding level of moral and intellectual integrity; but they would be incapable of discriminating between the two. They would have nothing more than a passing interest in any kind of pleasure, and would never complain about any hardship or injustice which befell them. They would wish solely to learn more than they already know, for which they would not be afraid to knowingly risk their own future or that of their children. They would happily devote their last hour of life to teaching others the meaning of Truth. In other words, they would seem to be like Socrates, or a first rate lawyer, politician, banker, CEO, priest, Wikipedia editor, journalist, teacher, doctor, accountant, salesman, architect, mason, advertising executive, cobbler, tailor, butcher, baker, shopkeeper, . . .

## 5 The Beginning

Here are some old *problemata* which my Lady may find useful as a focus for her study, should she be wandering where to start.

1. What were the last words of Socrates? Why would he say *that*? What were Xanthippe's last words to her husband? Why would she say *that*? How many different translations did you check? Who wrote them and why did they do it?
2. Why is Euclid's *Elements* not entitled *Elements of Geometry*, as were other only slightly earlier texts on Greek geometry? How do you *know* that's what *Euclid* called it? How do you know Euclid was even a person if you don't know *who* she was?
3. What were the *porisms* Diophantus refers to in the *Arithmetica*? What does the word mean? Why are most of the proofs missing from this work? Did all

thirteen books of Diophantus really *need* to be written out in full? What was the dispute about the spelling of her name? What does Aristotle say about the theorem that proportionals alternate?

4. Why does Euclid not define a generic Parallelogram or a generic Triangle in the *Elements*? What does Aristotle have to say about this? How do you know that's what *Aristotle* wrote. How do you know Aristotle was a person?
5. Why does the Greek text of Euclid's *Elements* use two *different* names for that which in English translations is called *that irrational called minor*? In the *Elements*, what is the difference between irrational and incommensurable? Why was the Heiberg edition of *Elements* produced when it was, there having apparently been the Greek text in the Bodlean library for so many years before that?
6. What does Aristotle say about the way the geometrician carries out a geometric construction? Why did Dodgson say that Euclid I.47 is called *The Windmill*? What did the Greeks write *on*? Why are old copies of *Euclid and His Modern Rivals* so *expensive*? How much money has been spent buying them all up?
7. A syllogism in the modality of possibility is referred to by Aristotle as *problematic*. How does Aristotle define *conversion* in Prior Analytics? What is the striking feature of Dodgson's treatment of parallels in *Curiosa Mathematica*?
8. What exactly is Rule of Procedure III as defined by Church in his 1936 paper *An Unsolvable Problem of Elementary Number Theory*? What *could* be the result of an arbitrary series of applications of this to  $\lambda x.x$ ? How does this rule relate to the second Rule of Three? Do we really need Gardner to open the door? Is unification in Hindley-Milner *really* solving type equations? As well as pussy mono-types, may we not have a roaring great lion in there as well? What Greek letter would Damas and Milner have used for that?
9. Why did the Hellenes of the fourth and third centuries go to so much trouble to include detailed annotation of the aspiration of words into the polytonic Greek alphabet? How is it that a poem like Carroll's *The Jabberwocky* can apparently convey the *sense* of words which actually have no *meaning*? How did Ferdinand Saussure characterise the modern science of linguistics? Was that a *good* idea? What does Aristotle say about holding your tongue when communicating something to the general public? How does writing work? When you look at a Wikipedia page in Bolivia, or Oxford, how would you *know* it's the same page your friends in Cambridge (or Oxford) see? When you download a scanned copy of an old library book, how do you know it is the original book? If you had an actual paper book, how would you know whether it was what the author actually wrote on?
10. Is the *Eye of Providence* which appears on a United States of America One Dollar note the eye of a man or a woman? What is the thirteenth proposition of the thirteenth book of Euclid's *Elements*?

11. What was recently discovered buried in the grounds of the house Benjamin Franklin lived in during his extended visits to London before the American Revolution? Is it necessarily true that as a physicist, Franklin would not have had any interest in human anatomy? What did Franklin give as his reasons for abandoning the Deism he professed as a younger man? Why *didn't* Thomas Jefferson abandon it? Who are the *antient fathers*? John Adams (4 December 1767 – 5 March 1829)? What is Bols' *christian* name? What does the surname mean in Dutch? Where *did* the family come from? Why *was* FDR so concerned with what appears to be on the right? Why are Fidel and Raul called Castro? Why is it called *Cuba*? *How many* times did the FBI try to assassinate Fidel?
12. Which University gave Benjamin Franklin an honorary Doctorate? When did the Dean and Chapter of Christ Church decide to build an Anatomy School? What was the name of the first Episcopal church in the Continental United States? Who got to be buried in the churchyard and who in the Burial Ground? How is the word *breath* translated into Latin? What does the word *conspiracy* mean, literally? What royal Bolivian drink makes you happy and lets you fight *your self*, doesn't give you a hangover and is *so nice it must* be addictive?
13. What design appears on the *obverse* of the fifty dollar note of the Continental Currency designed by Francis Hopkinson? Was he a *native* American? Where did Thomas Hopkinson go to school? What is the *true* origin of numismatics?
14. What primary study is referred to by Plato in *The Republic* as *Music*? What does Aristotle say is the efficient cause of the human ejaculation of sperm? What colour does he say sperm changes to after it leaves the body? What does Aristotle mean by 'the silk worm pipe'? Why then does he say in Prior Analytics that it is *never* true to say 'Micalus will die tomorrow' even though Musical Micalus *could* perish tomorrow?
15. Which did Aristotle say came first, the Chicken or the Egg? In Spanish translations of the Old Testament Bible, Adam is Adan and Eve is Eva. Did they get it backwards? Who *was* Eva Peron's father? Have you seen what's on the Bolivian coat of arms? Are we Gyptians?
16. How did Kant criticise Aristotle's ten categories? Is it a valid criticism?
17. What are the postulates of Einstein's Special Theory of Relativity? How could this theory be experimentally falsified without violating any of these postulates? Explain the experiment in detail. How did Einstein arrive at the idea of gravitational time dilation? What is the logical basis of his argument? Why is it considered a *bona fide* physical theory?
18. It has been suggested that the realization of the SI unit of mass be based on the speed of light in the same way that the SI unit of length now is. If this were the case, could a particular physical theory that happened to be actually true be falsified in any experiment? How many independent dimensions do you need to have an empirical theory? If there is in fact an objective material world, what *is* an empirical theory?

19. How does Aristotle define probability? What are the rules of Cacho?
20. What curious puzzle did Carroll give concerning the probability of a black or a white ball being drawn from an urn?
21. Suppose that while they were attached to his person, we were unable *in principle* to distinguish M. Bertelmann's 'shoes' one from the other, but that given a sample from one chosen at random, on carrying out an analysis of it we could learn reliably whether it had in fact come from the right. What does it mean to say that we know that, of one of *two* things which *were in principle indistinguishable from each other*, one of them *definitely was* one or the other and *which one* it actually was? What exactly do we mean by the probability of choosing at random one or other of two things which are in principle indistinguishable one from the other? What empirical fact is the basis for Pauli's exclusion principle?
22. How does Aristotle explain the ability of some to prophesy?

Here are some brief words of advice on reading us:

1. Pay attention to detail. Did you notice in the passage quoted above from *Sylvie and Bruno* that Dodgson's character says that if she means *living* minds, then it's impossible to decide, because there's so much written science that no living person has ever read and so much thought-out science that has not been written down, and then he says that he thinks *the minds* contain a greater amount of science than all the books? How could he know that there was written science that no living person had ever read? How could he know that there was thought-out science that had never been written down? What *on earth* is a non-living mind?  
  
When you notice something strange like this, it might be a mistake to assume immediately that the author is an idiot, or writes carelessly. If you *knew* this, you probably would not waste your time reading him. So he probably has something to say that you do not yet know.
2. Always assume that the author is trying to say something Very Important. For example, were you to read the dialogue between Dodgson and Sylvie concerning books and minds, and then say to yourself 'This is some kind of mathematical analogy, but the details won't matter so I'll skip them' then you might be making a mistake. Why not see just how well the analogy works: test the author.
3. Look for quaint or unusual turns of phrase like that suffix '... you know.' Are they merely decorative turns of speech, or do they have significance?
4. Look for 'deliberate mistakes'. For example, in the passage above, why in his letter does the Doctor use the phrase 'I shalt expect you ...' and why he uses the adjective *affected* and the noun *affectation* in apparently contrary ways in adjacent sentences? Why does he say 'I make no doubt. ...' and not 'I have no doubt. ...'? Why does he say 'can possibly be' rather than 'could possibly be'?

Why does he say ‘to meet once more’ rather than ‘to meet once again’? What is the difference between Dodgson thinking aloud and him talking to Sylvie?

Don’t let an absence of knowledge about these things prevent you from reading on, but if you notice what you don’t know then you will more likely be able to make the best opportunity of the occasion when, say, you stumble across Aristotle’s use of the word *Affection* as the name of a category, being the contrary of *Action* and meaning the same as *suffering* or *passion*. Because Dodgson and Aristotle are *joined up* you will quickly see that this diligence pays off handsomely. Whatever corner you look into, you will probably find that whatever is there comes round again, and again, and again . . .

5. Learn some technical Greek. As an illustrative exercise, the results of which may surprise you, look up the Greek for the words *proportional*, *irrational* and *rational*. Then look up *reciprocally proportional* and *commensurable* and *incommensurable*. Make sure you pronounce the words out loud to yourself, but look at the structure of the Greek, and consider the resulting structures that appear in English, like *asteroid*, *steroid*, *power*, *strength* and *cybernetics*.
6. Investigate apparent inconsistencies, don’t ignore them. For example, try to satisfy yourself that you understand why it is, say, that Socrates, who finds he cannot believe that ‘ten exceeds eight by, and by reason of, two’, would believe in Spirits and Demigods to a higher degree than most Athenians.
7. Ask yourself *why* they chose to present something in the particular way they did. For example, why did Aristotle make it so desperately difficult to understand a crucial example in Prior Analytics, by making it so obscure, depending on knowledge which, on the face of it, has nothing whatsoever to do with formal logic, and which in fact one needs to have read *Plato* to properly understand? Why is Aristotle’s theory of colour so confusing?
8. Chase up obscured references. Where did the line ‘The lady had a perfectly formed nose’ come from? Who was *Æneas*? Virgil wrote that Aristotle’s writing was ‘a river of gold’, so he *probably* understood it, but what colour *is* gold, really? Come to think of it, what *is* gold?
9. If something doesn’t make sense, perhaps it’s meant as a joke? If something is obviously wrong, perhaps it’s meant as a puzzle? If they write, for example, that men have more teeth than women, then perhaps they’re using the words *teeth* or *have* in another sense than the usual ones? If so, you would hope to be able to find the reason for this at the time you discover what they mean.
10. In Aristotle, examples are very seldom random instances. In Carroll it seems best not to assume that *anything* is random. For example, consider why Alice would worry that she might kill someone by dropping an empty jar la-belled ORANGE MARMALADE when there’s apparently no gravity where she’s going? Is the Solar System a stable dynamic regime? Can animals not move of their own accord? How much Helium goes up in, say, a decade? Where does it *wind* up?

11. Criticise criticism. For example in Richard Fitzpatrick's translation of Euclid's *Elements* he writes of part of Prop. I.26 that 'The Greek text has *BG, BC* which is obviously a mistake' but the same form appears in Props. I.33, I.34, I.47 and III.1 (each with a similar footnote). Is it really *obvious* that this is an error then? And Per Martin-Löf in his famous lectures *On The Meanings of the Logical Constants and the Justifications of the Logical Laws* writes of what he calls Aristotle's 'definition of truth' that 'A moment's reflection shows this [...] is wrong.' But really, if it takes just a *moment's reflection* to see that what is probably the most fundamental definition of Aristotle's logic (and also that of the philosophy of Socrates and Plato) is wrong, then why did so many millenia pass before anyone noticed it? This is honest criticism. You can learn even more from bad criticism. How *many* Universities are *not* a hundred miles from Ely? Bungay? Why didn't Socrates write anything himself? Why didn't he want to look at colours?

My Lady, don't be dismayed. It may *appear* to be a lot of work, but it's really only a lot of *fun*, (and, I imagine, a lot easier than passing a three-legged stool!) Let me just tell you what *I believe*, and perhaps it will give you some courage and inspiration to take some risks and make a commitment to the unknown. It is like this. Socrates, Plato, Aristotle, Diophantus and Euclid were the A,B, $\Gamma$ , $\Delta$  and E of human knowledge. These people *gave us their lives*, in the form of the most beautiful thought imaginable. It is perfectly clear that their purposes were not self-agrandisement, because of the actual lives of Diophantus and Euclid we know next to nothing and of the other three we know a great deal. Now look at Prop. 18 of Euclid Book XIII. If these are Platonic Elements then Diophantus and Euclid correspond to Water and Spirit, the irrational elements, and A, B and  $\Gamma$  to the rational ones: Fire, Earth and Air. It *just* so happens that what they wrote down over two thousand three hundred years ago was all the knowledge humanity needed for posterity.

How is this possible? The answer, as Aristotle wrote quite explicitly and clearly, is that the future actual state of the Universe communicates continuously back into its past. Her perfect being, in the manner of a final cause, acting through the chance events as potentials became actual in the minds of the Pythian oracles and others, brought about the realisation of the works of the lawyer, the politician and the logician. The arithmeticia and the geometricia needed no such assistance, and nor did Dodgson, for the same reason.

Now you *may* scoff at my quite *evident* insanity, and go back to the real world of work and the sensible sorts of things you read about in newspapers. But do take a little time to think this one through carefully, because if even a little of it is true, then it would be a terrible mistake to turn away. There seems to be everything to lose, and nothing to gain by making up your mind. So *do* talk it over with your husbands and your friends and your children; see what they think. Why don't you give it a trial, just for a year or two? Quit your job, take the kids out of school. Join the revolution. Hopefully you will have your husbands' support, but if he doesn't like it he can always go live somewhere else for a while. The older the bronze, the easier this will be for him, according to Aristotle. Start reading Plato, Aristotle, Diophantus and Euclid, and start teaching your children what you learn. You will

all have so much fun that you won't care how poor you are. You will have three or four very good friends who are doing the same thing and you will all be part of the global conspiracy. You will have all the comradeship and excitement of wartime, but without the fighting or the bombs, just a lot of very beautiful ideas. And you will have real friends: people whose minds you know you share. This is a truly beautiful and essentially human experience, but it is a terrible shame that so very few have ever known it. It just takes a little practice.

Carroll paid a visit to 'the Bank' in 1895. What if it transpired that an endowment had been made to the further education of αmortal, αmale, αlogicals? What I suggest is that we edit the Wikipedia pages of the two articles Carroll published in *Mind*, one in 1893 called *A Logical Paradox* and the other in 1895 called *What the Tortoise Said to Achilles*. Then we *simply* explain what is written there. If we are being properly Minded, and so long as no-one loses their marbles, then, when certain times are fulfilled, we *could* find ourselves with an understanding of the Bank. If we can't do it, well, who knows what will happen?

Here are some other 'ways and means'. First, buy up early edition copies of *Sylvie and Bruno*, because it seems rather undervalued at the moment, but it is far from clear that it is yet concluded. Second, give away T-shirts. Use the least damaging sources of materials you can find.

$\frac{\Gamma A I A}{\Psi Y X H}$	<i>Rocks ships. Floats them.</i>	$\frac{\Gamma A I A}{\Psi Y X H}$	<i>She has 100,000 Andean Pipes and she's <b>very</b> musical!</i>
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$\frac{\Gamma A I A}{\Psi Y X H}$	<i>Gentlemen, are we boring the girls?</i>	$\frac{\Psi Y X H}{W I K I}$	<i>She writes in chaotic media. Imagine how she reads.</i>
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$\frac{\Psi Y X H}{Y H W H}$	<i>Her own image.</i>	$\frac{\Gamma A I A}{\Psi Y X H}$	<i>Bored little girls play complicated games.</i>
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*There's nothing a Hellene can't get off  
an old bronze with just a bit of elbow grease.  
Aristotle*

*Grow your **own** bloody vegetables.  
Aristotle*

Third, give away books with the best sources of literature on them. It's much easier to write in a book with pages, and old books *smell lovely*. Most importantly though, teach. Teach until you can't speak anymore. And if people want to pay you, then turn them away. Never, ever work for any one: teaching *must* always be free, because you should always learn more from your students than they learn from you, and it wouldn't be right to take money from people in exchange for just asking them questions! And finally, never, ever, ever, ever, make up your *mind* about *anything*, our *minds* are not determined, because the future is not determined, . . . well, at least I don't *think* it is, but I *could* be wrong. Who *on Earth* knows?

Happy Birthday Helen,  
Love from Ian

## 6 Appendix A. Letter

I wrote this for a student of mine, apparently on 12 July, and to my shame I didn't get around to sending it until now.

Dear \_\_\_\_

It doesn't seem more than a few months ago that we first met at your admission interview. You made a big impression on me because you seemed to take life seriously. This is good, but we have to carry more of the burden than our fellows. This is right: the task is left to those of us who can.

I am not in touch with Fitzwilliam anymore so I haven't heard any news of anyone's results. Yours was good I trust. I am enjoying reading your dissertation. This probably seems terribly 'twentieth century' to you, but you don't mention having considered the possibility of acoustic bugging which is very well-developed technology. Notice how good are the mic's on the phones! It would be easy to bug a potential meeting place and record phone exchanges. For this reason the ultrasound mode is possibly more useful in a city than it seems at first sight. It would be most interesting if this could be implemented on the very cheapest phones such the best-selling Nokia models which are the ones people who most need this sort of communication use. The next revolution to overthrow an unjust state will be conducted using mobile technology.

Should you ever find yourself wondering about the nature of knowledge and proof, then if you have not already done so, read Aristotle. He had a special place for sound and the sense of hearing: it is only animals that can hear which can learn, he said. This is hard to understand from the modern point of view where we take it that we learn from information, irrespective of the medium in which it is realised. But Aristotle's sense of knowledge is different because it includes intuition, so it is beyond any purely symbolic representation. If you want a quick demonstration of this, cross your index and middle fingers of one hand and touch a textured surface: you will have the immediate sense of there being two distinct surfaces, even if you can see that there is just one. It is not as many say because the outside of the fingers are in contact with the surface, because the effect is even more pronounced when only the centre parts of the tips of the fingers touch the surface. This seems very hard to explain using a signal-processing analogy of the nerves as conveying sense to the brain using some sort of symbolic representation. What would be the difference between the signals received from the left hand side of the surface and the right if the surface is uniformly textured?

From an information-theoretic point of view it is hard to see how we can learn to speak a language as children, unless as Chomsky suggested, we are born with a decoding algorithm of some kind. But what sort of decoding algorithm can decode any language? What prevents a dual language existing where some class of things said were in some sense dual to everything in another? For example, in the language Hsilgne, which is just like English, except the meaning of the words left and right are switched. How can a language decoder distinguish between these two senses of the same words? It can't, because the languages have exactly the same structure, it is only in interpretation that we can intuitively distinguish between the two. But we

cannot say to someone else how it is we do this, we can only show them physically by demonstrating that in English 'left' means  $\leftarrow$ , and at which point we physically indicate the left hand side of their body. This is something an algorithm cannot do and it marks the distinction Aristotle makes between the kind of knowledge we obtain by deductive inference and that knowledge we obtain by intuition. Aristotle actually claims intuition is more reliable than deductive inference. I.e. that what we know directly is better known than what we know by proof. This seems hard to understand, but if you are patient and read him carefully he explains it quite well.

I think Aristotle was right and there is a necessary connection between actual experience and meaning, and this is what is provided by the physicality of sound as a transmission medium. So if you want what I think might be a fruitful line of research to pursue, you could look into the interactions between levels of linguistic structure. This is something linguists seem to have considered taboo since Ferdinand Saussure formulated it as a principle of modern linguistics: that the sign and the signficand are completely disconnected. But that's impossible if anyone is to be able to learn the language without already knowing it in some sense, so it seems very likely to me that when children learn a language they key in to the sounds of the words before they key in to the meanings. Witness the fact that when someone says something ungrammatical, it sounds wrong, even though we may have no real idea why it is wrong. So it is through the patterns in sounds of words that we make an initial guess as to the meanings. If this is so, then all languages will be found to have a phonetic structure which in some sense will encode the syntax and semantics. The way to make the connection would be to exploit the work that has been done on continuous speech recognition and synthesis and to use this to correlate the phonetic and lexicographic structure. Then look for correlations between syntax and phonetic structure.

But note that phonetic structure is different to lexicographic structure. For example in English we frequently join the 'word' *to be* to the subject, so we just add a sort of hiss to the end of a word to indicate that it is being in some sense: 'Birmingham's a long way away' for example. That hissing sound does not appear at the end of the imperative 'never' and appears at the end of the contrary 'always', it doesn't appear in 'no' and it appears in 'yes'. I would not expect all languages to take exactly this structure, unless they are related generically, but I would expect to see similar correlations in structure in other languages. But ultimately all languages will be related by the human physiology of sound production using the breath and the various solid surfaces and resonant cavities in the human head and body. As Aristotle noted, one of these is actually in the brain and connected to the mouth. This is why it is impossible to speak when you are being replayed a slightly delayed signal of your own speech, and it is probably related to the cause of a stammer.

For a nice demonstration of how the sense of a word is communicated in its sound see 'Jabberwocky' by Lewis Carroll. There most people get an immediate impression of the sense of the sounds, but none whatsoever of the meaning. It demonstrates that there are two parts to language: and they are quite independent. Animals communicate using sound too, but they seem to use only the sense, not the meaning. Humans are perhaps unique in using both together, but perhaps we have not properly understood the possibilities in which other animals may convey meaning. Dogs can hear ultrasound for example, and elephants and cetacea infra-sound and it is not

clear what use they make of that. Or perhaps it is not necessary to convey the meaning at all, just the sense. In other words, it may be enough just to be able inherently to do deductive inference and then only the sense need be communicated between individuals. Or perhaps the question is better approached as being why it is we don't hear ultra and infra-sound? It may be that having a frequency cut-off is essential to be able to distinguish different types of sounds as being essentially the same and that if the upper harmonics are not sharply limited then this is impossible; a sort of Plank's law of quantised sound. (There are a lot of cicadas where I live here in Bolivia and in the evenings they start making a terrific high-frequency row, as they are doing right now.)

Aristotle has inspired a great many thinkers, but very few admit to the source. For example, Newton said just 'If I have seen further it is by standing on the shoulders of giants' and he was referring to Aristotle. Even the title of his 'Principia Mathematica Philosophæ Naturalis' is Aristotelian. Newton's use of the plural 'giants' needs explanation: Aristotle often wrote 'We have shown ...', but he also occasionally wrote 'This thinker ...' when referring to something he is responsible for himself. The 'we' he refers to is the philosophers as a series of individuals existing like beads on a common thread of truth: Socrates, Plato, etc. It seems strange nowadays, when many claim that philosophy is mere metaphysical 'hot-air' and not relevant to anything because entirely subjective, but Aristotle held that there is in fact one true philosophy and it is within the wit of mankind to know it because it is inherent in all the substantive objects of sense-experience. All we need to discover are the principles of empirical science, and these are what he wrote down. The fourth and the fifth beads on the thread are Diophantus and Euclid, I believe. Nothing is known about these individuals because these are probably not their actual names. Philosophers using Aristotle's methods recognised they were a part of some whole and so named themselves as parts in succession. They had no interest in being personally identified with their knowledge. Carroll is another example. As to the others, the reason Newton did not admit to knowledge of Aristotle is possibly because he did not wish to seem heretical: Cambridge was dominated by the Church at that time. Darwin is another who surely read Aristotle. Interestingly Newton, Darwin and Carroll were encouraged by others to go into print, which was not their own inclination. The distinction between a Natural Philosopher and a Philosopher in the unqualified sense of the word is that the latter seeks all knowledge, not just that related to some particular end or set of ends. So if you want to understand Aristotle properly you must read all of what he wrote, regardless of whether it seems to be relevant to your interests or not. For example vital clues to understanding the logic appear only in *Metaphysics* which you will not be able to make sense of until you understand *Physics*. The essential character of Aristotle's thought is that it is holistic and always starts from an intuitive perception of the whole, analysing this by definition into parts and then synthesising the deductive knowledge formally from a foundation of those parts, called the *Elements*. The foundation is known to be good when the synthesis can reproduce the observed facts pertaining to the whole. For example in *Euclid* we have a synthesis of geometry from points, lines, surfaces, right-angles, etc., but if you want to understand it intuitively you must start at the other end, so to speak, which is closer to sense-perception. This is the intuitively perceived world

of whole volumes or solids which are composed of parts, the parts being defined by divisions called surfaces where the parts of different solids are in contact with each other. The different parts of whole surfaces (i.e. the parts of surfaces of whole solids) are in contact with the other parts of that surface along lines, which divide the different parts of the surface, and lines in turn are divided by points as the limit of the line where it is divided between those parts that belong to one boundary between some pair of surfaces and those which belong to the boundary between a different pair of surfaces. But the surfaces and lines and points do not exist apart from the whole solids from which they are defined by the process of division. In systems in general, all the interesting things happen at the interfaces between whole parts. The parts themselves do not seem to be capable of producing interesting behaviours. This is because we only see the surfaces, and we infer the nature of the depths of things, see A.N. Whitehead. So to understand Euclid, look at Prop. 18 of Book XIII first and see what the whole text is aimed at proving. Unfortunately the last seven books of Diophantus are 'apparently missing' so this is not an option, but one could perhaps deduce what they should be. That is what I am trying to do. If I am right it should be possible using just the scientific method described by Aristotle. As regards the logic described in the two books of Analytics, it seems the best place to look for the description of the intuitive whole is *De Mundo*, which you will be told authoritatively is not by Aristotle. Even knowledge itself is a surface which exists when we interpret symbolic representations, so it is not the so-called semantics that constitute knowledge, but the act of interpretation of the syntax, and Aristotle wrote that everything that exists is an action.

Best wishes for a life spent in pursuit of excellence. It's a glorious game, but most don't understand this, and some don't play at all nicely, so it's probably a good thing it *is* just a game. Good luck,

Ian