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C O N S U L T I N G

ENHANCING OUR GRASP OF COMPLEX ARGUMENTS

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This is an updated version of a paper presented by Paul Monk as a plenary address to the [2004 Fenner Conference on the Environment](#), Australian Academy of Science, Canberra.

For the next two days, a series of individuals are going to address you, all approaching the matter of population and environment in 21st century Australia from different angles. How much of what they say will you retain? How clearly? How much overlap will there be between what any two of you retain, not to mention the whole gathering? How will you know? How much congruence will there be between the questions you ask of the different speakers? How cogent will their answers be? How will we be clear about the significance of their answers? What consensus, if any, will be generated by the conference? To what extent will such consensus be justified? How will we know? These are all questions about the *cognitive process* of deliberating. It is this process, not the substantive matter in hand, that I will address this morning.

My main contention is simple. Using a technique called argument mapping, we can structure, communicate and correct arguments of any degree of complexity with a clarity and efficiency simply unavailable using other means. If we use the technique in a deliberative process, we can govern the deliberation, constrain it from straying off course, target our use of evidence, specify our disagreements, and capture the whole process with an ease and rigour significantly greater than are available using standard cognitive processes.

We are accustomed to behave as if, where there is a lot of earnest talk and a great accumulation of stuff written or printed on paper, some serious thinking must be going on. This is, in an important sense, an illusion. The standard processes we use to run conferences or conduct other forms of deliberation are highly inefficient and seldom enhance either shared clarity or justified consensus. Why? Because we stumble around in a fog of verbiage, missing much of what is said, asking a scattering of uncoordinated questions, making misinferences and misassociations, grabbing only bits and pieces of arguments and clinging to our own for all we are worth, if only as flotsam that will keep us afloat in the swirling currents of the great river of argy bargy¹. We lack agreed and effective processes for doing better than this. We just do what is customary and write off the ineffectiveness of it all. Isn't that so?

But why is it so? Because we are dealing with cognitive challenges orders of complexity more demanding than our natural faculties and ancient ways of communicating can adequately cope with. We are, after all, biological beings, whose brains evolved, over aeons, to cope with an overwhelmingly sensory environment – visual, tactile, auditory, olfactory. Language emerged very late as a means of more fluidly sharing information and emotion. With it, there emerged a latent cognitive capacity for symbolic thinking. It is this capacity which enabled our species to become technologically and graphically creative. That is a cumulative process, which feeds on itself. It generated the invention of writing, from only 5,000 years ago, followed by more and more advanced systems of record keeping and reasoning based on writing.

Most of the thinking we now do cannot be done without being fed through the loop of externally stored records, writing processes and mental cues linked to such records and processes. Using these records and processes, over just a few millennia, we have accomplished altogether extraordinary things. Yet our biological brains have not changed appreciably in that time. What is the consequence of this? That the demands made on our brains have become ever more varied and complex, while their default capacities and proclivities have remained unchanged.

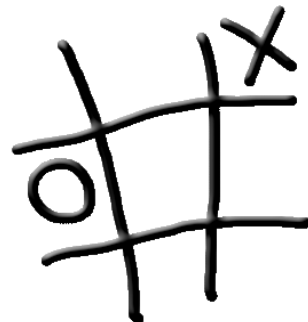
¹ An Australian slang term meaning vigorous, extended and probably futile argument or debate.

This has all manner of implications, but we often behave, in deliberative processes, as though we were almost wholly unconscious of such implications.

In other words, we more or less blunder around in the external record system and behave in argument as if we were still sensory beings hunting and gathering in the uncomplicated, primeval sensory world. We conduct complex arguments as if a combination of holistic apprehension, intuitive judgment and natural language were sufficient for handling them. None of us, I think, would consciously make that claim. We do what we do by tradition and by default, not because we have thought through why we do it, how it works and whether it serves us well. Because we have, all of us, read a lot, argued a lot and consider ourselves – if not those we disagree with – to be more or less rational beings, we hold these debates in ways barely distinguishable from the way tribal moots were held millennia ago. We do so because it is not obvious how we can do much better.

These are large claims to make and it is probably not clear what I am saying here, if only because what I am saying is true! Let me, therefore, illustrate my point in a simple and playful way. Our brains have remarkable capacities for visual apprehension, astonishing capacities for assimilating information into routines of an autonomic kind and into long term associative memory, but they have *very limited working memory*. This has direct implications for any task which requires holding more than a very few items of information in working memory at one time. Any but the most basic thinking task fits this description.

To illustrate this, let's run a few variations on a simple game. Take a piece of paper and, turning to the person next to you, play out a game of noughts and crosses (tic tac toe). Easy, right?



Now, let's move to stage two. This time, play a game of noughts and crosses *without using a board*. Just hold the grid in your mind's eye and talk one another through the game. Harder, right? Doable, but you have to concentrate a lot more, because what was held for you, fixed in place on an external record before, now had to be held in place in your own working memory.

Now, consider playing noughts and crosses on a 4 x 4 grid, but again without the board. This stretches working memory capacity beyond its ordinary limits. What is a straight forward enough cognitive task, when external records are in use, becomes an extremely challenging task when we must rely on the unassisted brain. Of course, to some extent, we can train our brains to do complex tasks, just as we can train our bodies to perform remarkable feats of athleticism or endurance. But I invite you to reflect for a moment on the implications of what you have just experienced for the incomparably more complex cognitive task of debating such issues as we are gathered here to discuss.

Consider that, in the noughts and crosses game, you have to keep the whole grid in mind throughout the game. If part of it drops out, or if you forget where you or your opponent have placed a marker, you put your game in jeopardy. If this is so, why do we try to play the game of argument, where there are incomparably more pieces than in a 4 x 4 noughts and crosses grid,

as if we have every chance of playing it well? I suggest that the answer is, at least in part, that we do so because we have only a hazy notion of what we are actually trying to accomplish. In other words, the rules of the game are so ill-defined that all sorts of cognitive chaos gets accepted, as if it was sound gamesmanship.

Who among us would suggest that it made any sense at all to play a gigantic game of noughts and crosses without the use of an external record, or with only bits of it visible at any given time? Yet isn't this the way we conduct conferences, meetings and other deliberative processes? The consequence is that move and counter move are made while large parts of the board or game sheet light up or fade out. Moves become confused, repetitive, uncertain, controverted. Our powers of concentration are severely taxed, we tend to become frustrated, exhausted and skeptical of the reasoning abilities of others. Very often, the game is declared over without any demonstrable end game having been reached.

This problem of limited working memory capacity is accentuated by three additional factors: cognitive blind spots and biases, the methods we actually use to record and communicate arguments, and the fact that different disciplines create their own idiolects, their own peculiar jargon and languages of proof, that cut them off from one another. All these factors impede both the progress of inquiry, in general, and collaborative inquiry across disciplines, in particular. All of them I suggest, clearly operate in the prolonged and complex debate over population policy and environmental futures in this country.

Consider first the cognitive blind spots and biases, which distort the way we process even what information we grasp. There is quite a list of these blind spots and biases, but let me mention only two of the most evident and endemic: belief preservation and confirmation bias. Belief preservation is the automatic human tendency, once having formed a strong opinion, to cling to it not only while available evidence might appear to support it, but even when a good deal of evidence begins to suggest it is questionable, if not downright false. It involves the default tendency to ignore, deny, devalue or dismiss such evidence.

Confirmation bias is the tendency to seek information that will confirm a belief, a hypothesis or an intuition, rather than trying to test or falsify them. We are all prone to these tendencies. Mentioning them is not to imply that they are why one side or another in the population debate is wrong. Rather, it is to intended to encourage all participants in the debate to open their opinions up to critical examination and allow that they could be in error in some fundamental way. For nothing is more striking to an observer of the debate than the manner in which passionate opinions are *polemically defended* by environmentalists, economists, physical scientists, business people and policy makers, rather than conceded to be uncertain and *open* to critical examination.

To this end, we need something other than a free-flowing argy bargy, or even the giving of speeches and the circulation of manuscripts – the standard methods we use to record and communicate arguments. I do not, of course, mean to suggest that these methods are hopelessly flawed. Their accomplishments, over the past ten millennia and especially over the past few centuries, have been astonishing. I do, however, suggest that they have more serious limitations, from the point of view of cognitive process, than is ordinarily understood – and that we can do better. Since we seem to have a greater need than ever to be able to generate rational consensus

and to be able to sift truth from error, anything that improves the way we record and communicate arguments must be of benefit.

A third reason why standard means of doing deliberation are inefficient is the fact that different disciplines create their own idiolects, their own peculiar jargon and languages of proof that cut them off from one another. The most notorious kinds of idiolect of this nature are, by common agreement, the arcane jargons developed, during the past half century or so, by various, mostly French, schools of philosophy. The problem, however, is not confined to those intellectual impostures so memorably parodied by Alan Sokal in 1996, in his long article in *Social Text*, 'Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity'. It extends across far more reputable fields, because we lack a common language of good reasoning.

I am referring here to informal reasoning, not to mathematical or purely logical reasoning. It seems difficult for economists and historians, physicists and biologists, ecologists and accountants to engage in clear and effective intellectual exchange; or more difficult more often than we might prefer. I suggest that one reason for this is that they do not have the means, for the most part, to *make themselves clear* to one another. For example, when Paul Krugman first took to writing short essays on economics for a general readership, he did so, by his own account, because too many economists were *failing to communicate their reasoning* to the non-specialist public. He did not mean simply the under-educated. He meant all those not specifically trained in mathematical economics.

I'm saying that basic, standard cognitive processes we use to conduct deliberative argumentation are inefficient because, as human beings, we have limited working memory, and, therefore, lose the thread all too easily; are given to default biases such as belief preservation and confirmation bias, which compound the memory problem; use methods of recording and communicating argument that systematically obscure our reasoning; and, across disciplines, do not use the same methods for conducting inquiry, discussing reasons or setting out cases.

I should qualify this summary by stressing that, as much as anyone, I appreciate the depth of scholarship and the careful thinking that goes into the best books and papers. And I often enjoy the stimulus of conferences such as this, with the opportunity they afford to hear and meet a variety of specialists and a range of opinions. Please don't misunderstand me, therefore, when I speak of the deficiencies of our standard procedures. When I read, for example, Joel Cohen's *How Many People Can the Earth Support?*, or Mancur Olson's *Power and Prosperity*, or Andrew Parker's *In the Blink of an Eye*, to choose three tomes somewhat at random, I am enormously impressed.

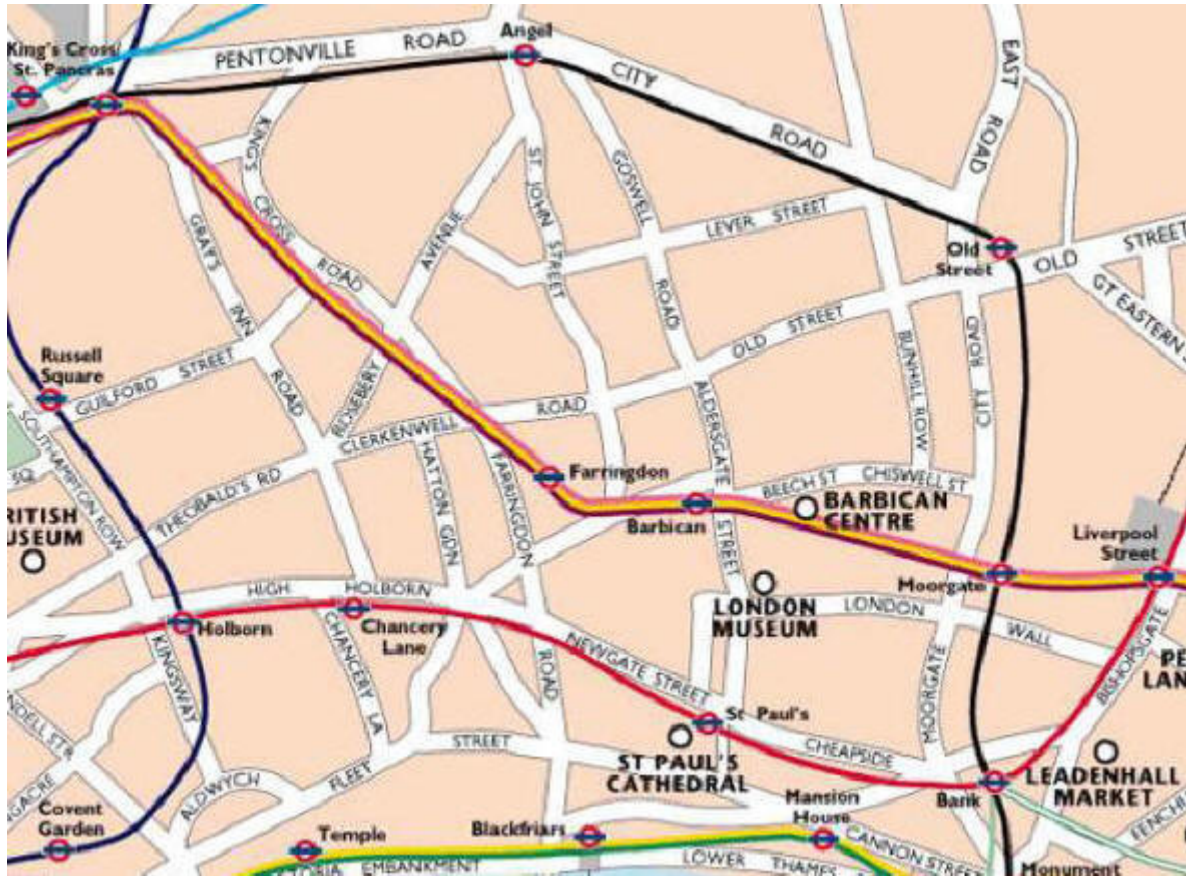
My suggestion, however, is that even in the case of tomes of that calibre, we have to do a great deal of work to distill what, exactly, their argument is on any given point; to say nothing of where such an argument clashes with the arguments of others and precisely why one or another is mistaken. When reading, when taking notes, when seeking to analyse such arguments or communicate them to others, we have to *decode* them. Because of the means used to encode them in the first place, this is very hard work. Why need it be so? Just because the world is complex and reasoning itself irreducibly difficult? Actually, no. This is my core message.

To illustrate this in a simple and accessible way, let's do another little exercise. Here is a prose description of an area of London.

Pentonville Road runs from east to west, then turns into City Road, which comes to a T-junction where East Road meet Moorgate City Road. Running roughly south from Pentonville Road is first Gray's Inn Road and then King's Cross Road, which turns into Farringdon Road after the intersection with Clerkenwell Road. Where Pentonville Road turns into City Road, St. John's Street runs south. As you go along City Road, you come to Goswell Road (which turns into Aldersgate Street) and Bunhill Row running south. As you go down Gray's Inn Road, the first intersection is with Guildford Street, which continues to a T-junction with King's Cross Road. The next intersection, as you continue down Gray's Inn Road, is with Theobald's Rd, which at that point turns into Clerkenwell Road, though you could veer of NE along Rosebery Avenue which crosses King's Cross Road before it joins St. John's Street near the junction of Pentonville Road and City road. Gray's Inn Road terminates at High Holborn, a major E-W road which, as you go east, turns into Newgate Street and then Cheapside. St. Paul's Cathedral is between Newgate Street and Fleet Street, which runs roughly parallel to Newgate. Southampton Row goes south intersecting with Guildford Street, Theobald's Road and High Holborn, where it becomes Kingsway, which continues south to a T-junction with the curve of Aldwych, which begins and ends on Fleet Street. From Roseberry Road you can head east along Lever Street, which crosses St. John's Street and Goswell Road before finishing at Bunhill Row where it meets City Road. Heading south down St. John's Road, you cross Lever Street and then Clerkenwell Road. Goswell Road also crosses Lever Street and Clerkenwell Road (which at that point becomes Old Street). Goswell Road becomes Aldersgate Street. Hatton Garden goes between Clerkenwell Road and High Holborn. Streets running south from High Holborn are Kingsway, Chancery Lane and Farringdon Road. Chancery Lane is a short street finishing at Fleet Street. Fleet Street ends at a large intersection just east of St. Paul's. Aldersgate Street continues past London Museum (which is at the corner of Alsdersgate and London Wall) down to Newgate Street. Beech Street runs E from Aldersgate, turning into Chiswell Street before it meets City Road. East Road runs south, past the intersection of City Road, over Old Street and London Wall, where it becomes Moorgate Street.

Those of you who are fairly familiar with London may know your way around this part of it. It's the area surrounding St Paul's Cathedral and the London Museum. Now, please tell me, based on the information provided here: How does one get from St Paul's Cathedral to London Museum? The information is all there. What makes it difficult to answer the question? You could figure it out, given enough time, but you are, surely, both a little frustrated at the unexpected difficulty of the task and puzzled at why I would present the information to you in this form.

Why not in *this* form?



This is, of course, a map. Referring to it, we can use visual cues of color, line and spatial relations to pick almost instantly how to get from St Paul's Cathedral to London Museum. That's why we use maps. It would not occur to any of us, unless we had no other choice, to try getting around a city without a street map, simply relying on the verbal directions of its inhabitants and our own working memory; to say nothing of relying on some gargantuan directory in prose. Just imagine it!

Yet time was when the first of these is pretty much what everyone did. Good, reliable maps – and consequent ease of navigation and motoring – are modern inventions. It is worth recalling, in this context, that, in the words of Paul Binder, from his book *Imagined Corners: Exploring the World's First Atlas*,

“The most successful book of the entire sixteenth century – the first century to open with the printed book as a fact of Western life – was *Theatrum orbis terrarum* (*Theatre of the Countries of the World*). It did something no previous book had done. Here was the world itself, with its many component parts, and it was shown to be both a place of extraordinary varieties and a singular whole. The *Theatrum*, published in Antwerp on 20 May 1570, was the world's first-ever atlas.”

Since the *Theatrum* was published, mapping has taken giant strides, but let's register what it was about this first world atlas that so impressed people in the late sixteenth century. It was not simply a book of maps. Being an atlas, it was a book in which all the maps cohered with one another – in scale, symbols, names, lettering, figures – so that, in Binder's words, “there is a rationalized consistency throughout the book enabling us to compare like with like – large

country with large country, smaller island with smaller island – while seeing them all as constituents of the same one world.” One could see the whole and the part laid out with rational consistency and move from the part to the whole with ease. That’s what the *Theatrum* made possible that had not been possible before.

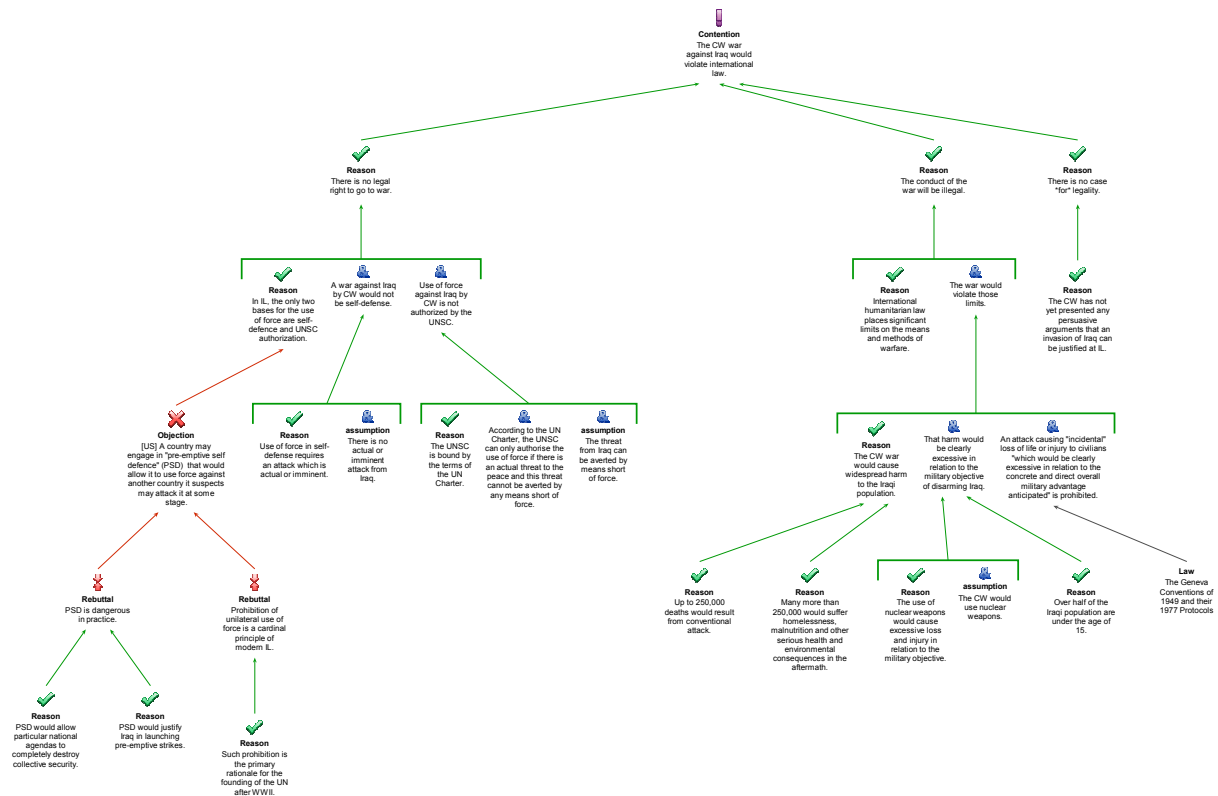
Now, while consideration of the history of maps and atlases might lead on to thoughts about the intensive colonization and exploitation of the whole planet by our kind, I want to take the technology of mapping in a different direction, as you will have guessed. Consider, in juxtaposition with the prose description of the area of London around St Paul’s Cathedral and London Museum, a standard opinion piece from a daily newspaper, dating back a few years now. [Coalition of the Willing? Make That War Criminals](#) is an argument presented in prose. It was written by, or at least signed by, 43 Australian international lawyers, before the war against Saddam Hussein began last year.

There is nothing unusual about this piece of writing as an opinion piece, or as a piece of argument in prose. Its main contention is that, if the coalition of the willing go to war, they will be war criminals, because the war will be illegal under international law. Now, consider three questions. First, at the top level, how many distinct arguments do they provide for their main point? That is to say, how many main lines of argument do they have to back it up? Second, do they support all of these primary arguments with further evidence? Third, do they countenance any objections to their argument and rebut them?

Without reading the text, you can’t answer these questions. I promise you, though, that doing so would take more minutes than I have left in which to speak. And, at the end of that time, you would still be discussing with me or one another what the answers to my questions are and why.

Here is a different way to present such an argument: an argument map.

The screenshot shows the top portion of a newspaper article. At the top right is the logo for 'smh.com.au The Sydney Morning Herald'. The article title is 'Coalition of the willing? Make that war criminals'. Below the title is the date '10/10/2001'. The main text of the article begins with 'The coalition of the willing... would be a fundamental violation of international law...'. The article discusses the legal implications of the coalition of the willing and the potential for war crimes. At the bottom of the screenshot, there is a section titled 'THE EXPERTS' which lists the names of the 43 international lawyers who signed the piece.



For other versions, which you may find more easily readable, [click here](#).

Let me briefly and simply explain its design principles. There is a proposition in play, the chief contention. That is at the top. Supporting claims are colour coded green and objections red. The claims are not in linear sequence, as in the prose version, but are arranged in a pyramidal hierarchy, so that their evidential and logical relationships are instantly apparent.

Now, let me repeat my questions. At the top level, how many distinct arguments do they provide for their main point? [Three]. Do they support all of these primary arguments with further evidence? [Yes]. Do they countenance any objections to their argument and rebut them? [Yes, there is one objection and it is rebutted on two grounds, each of which is supported by further argument].

Note that you were all able to see these characteristics and effortlessly answer my questions about the structure of the argument, because of its visuo-spatial design, in contrast with the abstract, linear, non-colour coded version of the argument in prose. There are at least seven reasons why this mapping of the argument, or of any argument, confers cognitive advantages that prose lacks.

- First, it makes explicit logical relationships that the linearity and abstractness of prose cannot help but obscure. And I am referring here even to good prose, carefully drafted, not merely to that sludge we all too frequently encounter and, let's be brutally frank, all too often *write*.
- Second, the map offers an instant and effortless scannability of the overall structure of the argument, which you simply cannot derive from prose. You found this the moment I asked you those three basic questions about the structural characteristics of the War

Criminals opinion piece. Just think of the advantages this would confer, if it was to become standard practice, on the reviewing of research papers, university essays, doctoral dissertations, policy proposals, intelligence analyses. It simply saves time and effort, which we are accustomed to expending, in trying to figure out what argument a piece of prose presents.

- Third, there is an ease of movement from the detail to the overview that is far more difficult in the case of prose. Just because the evidential and logical relationships between propositions are visually explicit, one can move back and forward between them rapidly, without the risk of misplacing, overlooking or confusing claims, as chronically happens in critically analyzing even relatively simple pieces of prose argumentation.
- Fourth, there are unambiguous visual clues as to the significance that particular details have, due to the hierarchical ordering of the structure, the colour-coding of the individual boxes and the inferential relations between boxes. Whereas standard discussion or prose entails prolonged efforts to establish the precise significance of details, in a map this is far more readily apparent, with the consequence that we can much more rapidly zero in on the accuracy of the detail, or the cogency of an inference from it.
- Fifth, a map offers a visual clarity as to the limits of a debate, whereas prose obscures these limits or labours to spell them out. It is, for example, instantly apparent, as we saw, in the map of the War Criminals argument, that in one line of argument they had canvassed, and then rebutted, an objection to their reasoning. Though you won't be able to read it from where you sit, it is also readily apparent that the four reasons offered in support of the contention that war would cause excessive loss of life or injury to civilians, in relation to the overall military advantage anticipated, consist of three unsubstantiated allegations and a strange *non sequitur*.
- Sixth, the cognitive burden imposed on us by the task of analyzing a piece of prose is drastically reduced in the case of a map, for the same reasons that it is reduced in moving from a prose description of London to a map. We can see and move around the landscape and get down to the real work so much more quickly, because we do not have to decode the prose. We don't have to assemble a representation of it in working memory. Given, as we have seen, that working memory is so limited, this is no mean advantage.
- Seventh, for any given proposition, all claims are integrated into a single structure, instead of consisting of various component parts, which then have to be assembled by whoever happens to be trying to comprehend the argument in question. Considering how prone we are to be swayed by salient details and forgetful of many details, due to the combined effects of limited working memory capacity, confirmation bias and belief preservation, this has decided advantages in communicating complex argument.

This is a lot to claim, a lot to digest, but consider that it is all visually apparent in the very simple exercises we have shared. Let's now revisit the standard deliberative practices to which I made such critical reference earlier in my speech. This, also, is visual and will bring many experiences to mind. What do we do, when we are trying to nut something out? We sit and contemplate, like Rodin's *penseur*, or Archimedes in his bath, holding a mental representation of a puzzle in our minds and trying to focus on important aspects of it in order to get a breakthrough insight.

Occasionally, this may work, as it appears to have done in the case of Archimedes. But it is seldom effective on its own.

More commonly, we refer to the external record system, in the form of libraries and databases. We avail ourselves, with greater or lesser facility, of the notational tools necessary to work through the external record system. We confer with others around tables, we debate across desks, we hold forth in public assemblies and, perhaps, field questions. Very often we feel overwhelmed by the complexity of the task and baffled even by the tools we use to try to work things out.

But let's focus on the single most familiar practice in the processing of deliberation, ever since the invention of writing: writing things down, or up, as we sometimes phrase it. We tend to take writing so much for granted now that we don't reflect sufficiently on the fact that it is a kind of secret code. To decipher what writing is saying requires that we interpret the symbols. This becomes immediately apparent when we are confronted with a foreign language, but we forget we are doing it when we are reading our own language.

Now consider that, when we are reading and analyzing an *argument* in prose, we have to decode not simply the symbols and the meaning of the words, but the *reasoning* that is being represented. What has to happen here is that someone has to think up an argument, encode it in prose and pass it to someone else, *who then has to accurately decode it*. The emphasis here is on the word *accurately*. It is readily demonstrable that, in fact, the argument suffers not only in formulation but in transmission and decoding. Put bluntly, writing – in all its standard forms – is simply a *difficult* medium for encoding and communicating arguments.

The consequence is that, more often than not, reasoning in prose is both poor and poorly communicated. But even where it is reasonably sound, much of it remains obscure to the reader. Commonly, however, argument is just poorly structured and *therefore* poorly communicated. A central reason for this is that the medium of prose does not lend itself to the clear structuring or communication of reasoning. The wonderful Larson Far Side cartoon *The Boneless Chicken Ranch* captures the point at issue. Such poorly encoded and communicated arguments are what might be called Boneless Chicken – plenty of flesh, but no skeleton, so they ain't going anywhere much.

I submit that this is a dismal state of affairs at a time when, more than ever in the past, we rely on the rapid and accurate communication of analysis and argument. This is what Robert Reich was driving at, a decade ago, when he described the knowledge economy as one in which

“The intellectual equipment needed for the job of the future is an ability to define problems, quickly assimilate relevant data, conceptualise and reorganise the information, make deductive and inductive leaps with it, ask hard questions about it, discuss findings with colleagues, work collaboratively to find solutions and then convince others.”

We are admonished, from time to time, to let the force be with us in this regard, to trust our gut, to work on our intuitions, to not suffer paralysis by analysis and so on. But these are superficial and even dangerous maxims. They are responses to the sense of being overwhelmed by the

complexity of the cognitive tasks that our immense system of knowledge and activity imposes on us. The reality is that, whatever our intuitions, whatever the pressures on us, *we have to assemble arguments* and we have to make judgments that don't turn out to be wrong.

This is what assembling arguments actually looks like, visually conceptualised. This is not simply a recommendation that we attempt a fancy new method. It is a method based on what our brains instinctively *try* to do, but cannot manage beyond a certain modest point, because of limited working memory and lack of a clear technique. Because this is what our brains are *trying* to do – assemble a representation in visual terms of what the structure of an argument presented in speech or prose actually is – a technology for doing it systematically and externally *can work*.

The practice *enters into* the suite of standard practices and modifies them. It no more abolishes prose than prose abolished speech. Rather, the traditional techniques of contemplation, research and debate feed into a new approach to drafting, refining and evaluating argument structure, making possible a whole new level of clarity in communicating and correcting arguments. This new approach, argument mapping, offers the possibility of navigating around arguments with the increased ease and clarity that was offered by Abram Ortelius's *Theatrum orbis terrarum* to those who desired, mentally or physically, to navigate around the known world.

The technology is, of course, at an early stage of development. Argument mapping can, in principle, be done on paper or on a whiteboard, but it quickly becomes messy and cumbersome using those technologies. This may go far toward explaining why it was not taken up, or even conceived, until quite recently. The earliest record of anyone using a graphical device to lay out argument structure is a footnote to an influential nineteenth century text book on logic, by one Richard Whately. Some cumbersome efforts were made to pioneer the technique in legal reasoning a century ago, but it was only with the advent of reasonably sophisticated information technology and graphical software, about a decade or so ago, that the technique started to become feasible on a wider basis.

In reflecting on why this should be so, I am drawn back to the origins of writing itself. As many of you are doubtless aware, writing originated, or so the best current research tells us, in Sumer in the fourth millennium BCE, as city states struggled to deal with the cognitive burdens entailed in trade and taxation. Writing arose, in other words, as a thoroughly practical accounting measure, not as a poetic or literary device. Those things came later. Necessity was the mother of invention, as the old saying has it. Beyond that initial necessity, however, the new technology opened up possibilities almost certainly not imagined by the original utilitarian inventors.

In the present case, the necessity is generated by the sheer, overwhelming quantities of information and argument we have to cope with in the early twenty first century. We can no longer afford the inefficiencies and expenditures of energy entailed in processing such information and argument by the traditional means. We need – as we are continually reminded by strategic and intelligence failures in both the corporate and government worlds – greater transparency in how decisions are reached and greater clarity in reasoning within decision-making groups.

Argument maps are a means to this end. They are not proofs of a given proposition, but displays of an argument for a such a proposition. They are more open to precise, useful correction than is prose. The better the map, the truer this is. Remember, even the best geographic maps change, when the facts change. Their truth is not given once for all. Until 1992, for example, there was no separate Ukraine, Lithuania, Latvia, Estonia, Khazakhstan, just the Soviet Union, on maps of Eurasia. Argument maps, too, then, are open to correction. Their clarity of inferential and evidential structure makes them readily corrigible, but in a transparent manner, not by the mere accumulation of polemics that all too often bypass one another in a blizzard of prose.

About four years ago, I read Doug Cocks' book on the population debate in Australia. Austthink had, at that time, only just been created. I was interested in the book from a substantive point of view, but what struck me especially was the all but impenetrable complexity of its argument. This is not a comment on Doug's prose, but on the nature of prose itself and the considerable complexity of the debate he was seeking to elucidate.

In an effort to clarify what the balance of claims was in this debate, at least as recorded by Doug, we created [an argument map](#). I don't present it here with any intention of suggesting that it is a complete representation of the debate or of Doug's book, but simply as an example of how even a basic, top-level map, can give us a rapid grasp of both the scope and balance of claims in a major debate.

Observe that, simply in colour-coded, structural terms, you can see here that there are five top level claims both for and against the proposition that Australia should increase its population. Unlike almost any prose representation that I can think of, this instantly creates a sense of balance or, if you like, counter-balance, in the debate, which acts as an automatic corrective to those tendencies I referred to earlier – confirmation bias and belief preservation – that tend to skew our attention to and use of evidence in argument.

At least on this representation of the matter, one can also see, almost instantly, that two of the reasons in support and one of the reasons against the proposition have been heavily rebutted, while one of the reasons against has no supporting evidence of any kind. This is simply a representation of the argument as Doug presented it. It does not contain any opinion of ours. What it offers, I suggest, is an access to what the debate actually is, where the balance of considerations lies, where the boundaries of it lie, that is exceptionally difficult to gain from simply reading the book.

Is argument mapping difficult? Actually, it is not. If you are completely clear what your argument is, then mapping it is a trivial exercise. The difficulty you experience in mapping your argument is a direct measure of the lack of clarity you have about what your argument is. Standard cognitive processes enable you, indeed encourage you, to remain vague about this and to obscure your lack of clarity in prose that can seem profound because impenetrable.

Argument mapping offers the possibility of easier and greater comprehension of arguments, increased quality of arguments, better communication of arguments and more reliable judgments based on better reasoning. But it is, of course, a skill, like any technical skill and one that will initially seem foreign and awkward to most of us, because we are so accustomed to the use of other methods for recording, analysing and communicating arguments.

Faced with this elementary cultural reality, I console myself with the remembrance that writing was, for millennia, an arcane art confined to priests and scribes, while until even a few years ago the use of email was similarly a rare and unfamiliar art. We have just begun a process of innovation here and the usual tests of technological feasibility, cultural acceptability and, overwhelmingly, of practical utility will determine the path forward. I am just pleased to be at the edge of innovation and to have the opportunity to share with you a little of what it is about.

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AUSTHINK CONSULTING

Austhink Consulting is small Melbourne consulting firm providing facilitation, consulting and training services in critical thinking for organisations. Austhink have been pioneers in the development of decision mapping and related mapping techniques. Austhink clients tend to be large organisations in the corporate, government and professional worlds, including major intelligence agencies, law firms, banks and government departments.

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