

Advice on the Logic of Argument[†]

John Woods*

Resumen

Desde su creación moderna a principios de la década de los 70, la lógica informal ha puesto un especial énfasis en el análisis de las falacias y los esquemas de diálogo argumentativo. Desarrollos simultáneos en los círculos que se ocupan de los actos de comunicación de habla exhiben una concentración en el carácter dialéctico de la discusión.

PALABRAS CLAVE: Lógica informal, argumento, diálogos

Abstract

Since its modern inception in the early 1970s, informal logic has placed a special emphasis on the analysis of fallacies and argumentative dialogue schemes. Concurrent developments in speech communication circles exhibit a like concentration on the dialectical character of argument.

KEYWORDS: Informal logic, argument, dialogues

“But the old connection [of logic] with *philosophy* is closest to my heart right now I hope that logic will have another chance in its mother area.”

Johan van Benthem

“On [the] traditional view of the subject, the phrase ‘formal logic’ is pleonasm and ‘informal logic’ oxymoron.”

John Burgess

1. Background remarks

Logic began abstractly, as the theoretical core of a general theory of real-life argument. This was Aristotle’s focus in *Topics* and *On Sophistical Refutations* and a

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* The Abductive Systems Group, Department of Philosophy, University of British Columbia

dominant theme of mediaeval dialectic. In our own day, the intellectual skeins that matter for argument-minded logicians are the formal logics of dialogues and games and – on the less technical side of the street – informal logic. Connecting the mathematical theory of games to modern logic was first achieved by Gale and Stewart (1953) and Henkin (1961). Two subsequent branches of these developments of particular interest are *dialogue games*¹ and *semantic games*². Each of these has spawned a large and still growing literature.³ Also important are more recent developments in computer science.⁴

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Some scholars would date the informal logic movement not with the arrival of Charles Hamblin's *Fallacies* (1970), but from 1958, the year in which Stephen Toulmin's *The Uses of Argument* made its first appearance, to yowls of near-universal disapprobation. I would say that although Toulmin has had his intelligent adherents all along, he was not a dominant force in the informal logic community until the turn of the century.⁷ His stock is now blue-chip.⁸

For the most part, formal and informal approaches to the theory of argument are ships that pass in the night. (Exceptions, if I may say so, are Woods, 2004, 2013a). For informalists, formal theories sacrifice realism for rigour; formalists think that informal accounts sacrifice depth for familiarity. This is a disagreeable alienation and it should be made to go away. It is more easily said than done.

Johan van Benthem has recently written of an idea that gripped him in the late 1980s:

The idea had many sources, but what it amounted to was this: make actions of language use and inference first-class citizens of logical theory, instead of studying just their products and data, such as sentences or proofs. My programme then became to explore the systematic repercussions of this 'dynamic turn'. (van Benthem 2011, p. ix)

In the ensuing thirty years, van Benthem and his colleagues⁹ have constructed a complex technology for the execution of this dynamic turn. It is an impressive

¹ E.g. Hintikka (1968, 1973), and Parikh (1985).

² E.g. Lorenzen and Lorenz (1978) and Barth and Krabbe (1982).

³ See, for example, Rahman and Rückert (2001), Parikh (2001), Pauli and Parikh (2003), Rahman and Tulenheimo (2006) and van Benthem (2001, 2004, 2011, 2012).

⁴ See, for example, Andriessen *et al.* (2003), Barringer *et al.* (2005, 2008, 2012a, 2012b), Dunne (2007), Rahwan and Simari (2009), and d'Avila Garcez *et al.* (forthcoming). A recent departure by computer scientists from this dialogical emphasis is Besnard and Hunter (2008).

⁵ E.g. Hamblin, (1970), Walton (1984), Govier (1987), Woods and Walton (1989/2007), Mackenzie (1990), Walton and Krabbe (1995), and Johnson (1996). Later developments include Woods (2004), Freeman (2005), Finocchiaro (2005, 2013) and Blair (2012).

⁶ See van Eemeren and Grootendorst (1992) and Hampe (2005).

⁷ Toulmin (2001).

⁸ See Hitchcock and Vorheij (2006), van Benthem (2009), Xie and Xiong (2012), and Weinstein (2013).

⁹ These include, past or present, Alexandru Baltag, Cédric Dégrémont, Jan van Eijk, Sonja Smets, Jelle Gebrandy, Patrick Girard, Tomohiro Hoski, Daisuke Ikegami, Barteld Kooi, Fenrong Liu, Maricarmen

instrument, an artful synthesis of many moving parts. Here is a close paraphrase of its principal author's summary remarks: With the aid of categorical grammars and relational algebra we can develop a conception of natural language as a kind of cognitive programming language for transforming information. This could be linked in turn to modal logic and the dynamic logic of programs, prompting insights into process invariances and definability, dynamic inference and computational complexity logics. In further variations, logical dynamics would become a general theory of agents that produce, transform and convey information in contexts both social and solo. The result is a *dynamic epistemic logic* (DEL), which gives a unified theoretical framework for knowledge-update, inference, questions, belief revision, preference change and "complex social scenarios over time, such as games." The creator of DEL also

would see argumentation with different players as a key notion of logic, with proof just a single-agent projection. This stance is a radical break with current habits, and I hope that it will gradually grow on the reader, the way it did on me. (p. ix)

Van Benthem also notes with approval the suggestion in Gabbay and Woods (2002) that the interface with argument may be the last frontier where modern logic finds its proper generality and impact on human reasoning. Again I paraphrase: Over the last decade this insight has developed into a paradigm of attack-and-defend-networks (ADNs) – from unconscious neural nets, to variations that adapt to several kinds of conscious reasoning. This, too, is a highly complex technology, a fusion of several moving parts. As provided for in Gabbay (2012) and Barringer, Gabbay and Woods (2012a, 2012b), the ADN paradigm unifies across several fields, from logic programs to dynamical systems.¹⁰ AD-networks have some interesting technical capacities, including for example an equational algebraic analysis of connection strength, where stable states can be found by way of Brouwer's fixed-point result. When network activity is made responsive to time, logic re-enters the picture, including the development of quite novel modal and temporal languages. "Clearly", says van Benthem, "this is an immense intellectual space to consider."¹¹ (2012, p. 83)

Here, then, are two heavy-equipment methodologies, specifically adapted to the requirements of argument. They are unifications of partner-elements, some of their authors' own contrivance, but in the main having an already established and well understood methodological presence in the several research communities from which they have been adapted. Both the DEL and ADN approaches carry the same presupposition for the logic of argument. It is that argument won't yield the mysteries of its deep structure unless excavated by heavy-equipment regimes capable of

Martinez, Stefan Minica, Siewert van Otterloo, Eric Pacuit, Llivier roy, Darko Sarenac, and Fernando Velásquez Quesada.

¹⁰ Colleagues involved in various stages of the ADN project include Guido Boelle, Krysia Broda, Peter Bruza, Valerie Genovese, Luis Lamb, Sanjay Modgil, Rolf Nossum, Hans Jürgen Ohlbach, Gabriella Pigozzi, Olivier Ray, Odinaldo Roderigues, Alessandra Russo, Karl Schlechta, Leendert van Torre, and Jon Williamson.

¹¹ Van Benthem adds that he "totally agrees" with the ADN "vision, and am happy to support it." (2012, p. 84)

mathematically precise formulation and implementation. It is here that the fissure between formal and informal logic is deepest and most intensely felt.¹²

2. Arguments broad and narrow

It would help in understanding this rift between formalists and informalists to take note of a crucial distinction. In logic's foundational writings, Aristotle contrasts – although not in these words – arguments in the broad sense with arguments in the narrow sense. Arguments in the broad sense are social exchanges between parties who hold conflicting positions about some expressly or contextually advanced thesis. Arguments in the narrow sense are abstract sequences of categorical propositions, of which the terminal member is the conclusion and the remaining ones its premisses. Aristotle called the study of arguments in the broad sense *dialectics* and of arguments in the narrow sense *analytics*. The word “logic” would wait to take hold as a synonym of “analytics” until the 2nd-3rd century A.D. There is *nothing* dialectical or social or interactive about arguments in the narrow sense. A special subclass of these Aristotle calls syllogisms. The whole emphasis of Aristotle's earlier logic is focused on the proposition that essential to a satisfactory theory of argument in the broad sense is a well-developed embedded logic of argument in the narrow sense – that is, syllogistic would be the theoretical core of dialectic.¹³ The point of calling attention to this distinction is that when in the present paper I talk about argument, it is to argument in the broad sense that I normally refer. Occasional exceptions will be indicated by context.

The starkness of the difference between arguments in the narrow and broad senses is reflected historically in a sharply wrought division of labour. Logic, the theory of arguments in the narrow sense, has as its primary focus the syntactico-semantic relation of *consequence*, a binary relation on premiss-sets and conclusions. (In Aristotle's case, the target relation is *syllogistic* consequence, which is logic's first-ever nonmonotonic, paraconsistent, relevant and at least quasi-intuitionist treatment of the consequence relation.) Dialectic, the theory of interpersonal competitions about disputed propositions, is work of a different order. Aristotle himself worked both sides of the street, but in doing so, the integrity of the distinction between logic and dialectic was never in doubt. That same division is with us to this day. Conservatively-minded logicians want to see the name of logic reserved for the study of arguments in the narrow sense. Informal logicians think otherwise. What, they ask, justifies so circumscribed a usage? Why can't arguments in the broad sense have their logics too?

¹² Note again the Burgess epigraph which reports the standard view that “formal logic” is pleonasm and “informal logic” oxymoron. In the early days, informal logicians used to fret about the suitability of the adjective “informal” in apposition to so noble a noun as “logic”. “Informal”, they feared, bespoke a kind of casualness or, heaven forbid, sloppiness. One day Michael Scriven announced his own view of the matter. “Informal logic” was indeed the wrong name for their enterprise. “But what should we call it?” came the plaintive quest. “Call it what it is”, said Scriven. “Call it ‘logic’”.

¹³ Of course, contemporary studies in logical theory being what they are, this too is disputed. Game theoretic logic has achieved of late a large and growing presence in the heavy-equipment world. Here, too, there is a distinction to be observed. It is possible to conceive of dialectical arguments as dialogue games and to write a logic for them accordingly. But it won't be a game-theoretic logic in the strict sense unless it interprets quantifiers, connectives, logical truth, entailment, etc. by way of conditions that regulate the dynamics of the attack-and-defend exchanges with von Neumann and Morgenstern instruments. My view is that this is the last thing that Aristotle was doing in his logic of syllogisms. For the contrary position see Marion (2013) and Marion and Rückert (to appear).

In this they are joined not only by informal logicians, but also by all manner of dialogue and game theoretic logicians, among them of course the DEL and ADN crowd.

The people who built these heavy-equipment logics conceive of themselves as radicals. They've long had a desire to re-humanize logic, to cancel the exclusive proprietorship of mathematics, and to reinstate logic as a vital part of philosophy. To that end, the new logic would have to extend principled recognition to agents and actions, to goals, times and resources, and to strategies. This would be done in the usual sorts of ways. Vocabularies would be enlarged, grammars and proof rules adjusted, semantics re-jigged, and theorems would provide the formal representation of intelligent agency at work. Underlying it all would be a mathematics of sufficient complexity and suppleness to regulate the models that direct the system's formal representability traffic.

Lying along side the divide between logic in the narrow sense and logic in the broad sense is a further distinction involving the consequence relation. It is the threefold distinction between consequence-*having*, consequence-*spotting*, and consequence-*drawing*. For purposes of illustration, consider a contradiction in the form $\Phi \wedge \sim\Phi$. Suppose for the sake of argument that the *ex falso quodlibet* principle holds true. Then $\Phi \wedge \sim\Phi$ has every proposition whatever as one of its consequences. Let ψ be an arbitrarily selected one of them. The history of logic reveals that logic was centuries old before it was noticed that ψ is a consequence of $\Phi \wedge \sim\Phi$. If we think it plausible to suppose that ψ was a consequence of $\Phi \wedge \sim\Phi$ before it was spotted as one, then we have a well-motivated distinction between having and spotting. There now comes the third part of the trichotomy. Granted that ψ is a consequence of $\Phi \wedge \sim\Phi$, and that this is now a known fact, what more, if anything, should be done with this knowledge? Should the consequence ψ now be *drawn* from $\Phi \wedge \sim\Phi$? Should the good reasoner rearrange his belief-set accordingly?

Of course, *ex falso* is the subject of a good deal of unresolved contemporary controversy. Some readers are likely to think that *ex falso* is itself false. It doesn't matter. *Ex falso* is a vivid way of motivating the having-spotting-drawing trichotomy without the necessity of having to make up our minds about whether inconsistencies really do entail everything. Consider, even so, a more straightforward case: $\Phi \wedge (\Phi \rightarrow \psi)$ has transfinitely many consequences. One of them is ψ . Another is $\Phi \vee \sim\chi$. Yet another is $(\psi \vee (\psi_1 \supset \psi_2)) \vee (\psi_{10} \equiv \psi_{12})$. It is hardly likely that anyone before now has actually noted this consequence, much less drawn it. But now that it has been spotted, what is the rational thing to do? Draw it, or get on with better things?

It is now easily appreciated how the trichotomy might motivate a more fine-grained division of labour for logicians. Those who prefer their logics on the narrow side could concentrate on consequence-having and consequence-spotting. Those who relish a broader reach for logic – especially those who admit human reasoners into the mix – will have no option but to train their guns not only on having and spotting, but on drawing as well.

These are not high-walled divisions of labour. If a logician wants to know how consequences are spotted, he will have to know what it is to *be* a consequence. If a logician wants to know when the consequence should be drawn, he will have to have some grasp of how the consequences are spotted, and some antecedent command of what it takes to be one. Logic in this last sense offers a full-service treatment of consequence. But full service can't possibly be given if logic's special-service requirements aren't also mastered. This helps us see more of the texture of the divide between informal and heavy-equipment logics such as DEL and ADN. Informal logics

concentrate on consequence-drawing, and give comparatively little investigative notice to having¹⁴ and spotting. On the other hand, DEL and ADN attend to them all. Let's also note that we now have an assured basis for not reserving the name of logic for the having/spotting side of the enterprise. Everyone agrees that the consequence relation is the central target of logic. But, as our trichotomy shows, consequence is deeply implicated in all three components. So it is simply ill-advised to deny consequence's full-service investigation ready admittance to the halls of logic. As we presently have it, there is something to complain of on both sides of the formal/informal divide. Orthodox formalists tend to ignore consequence-drawing and informalists tend to ignore consequence-having. My view of the matter is that a decent logic of argument requires the repair of both these omissions.

It is interesting to note that there is one crucial point on which informal logicians and the heavy equipment crowd are at one. Both sides think that mainstream mathematical logic is wrong for human argument and inference. They both think that mainstream mathematical logic has lost its rightful home in philosophy. Van Benthem's advice to theorists of argument is to reform mainstream logic by enhancing its formal power and reach, as well as its mathematical elegance. The informalist's advice to theorists of argument is – in a slight exaggeration – to reform logic by getting rid of all that mathematical paraphernalia once and for all. Van Benthem's advice is that the way to make logic right for argument is by complexifying logic's mathematical structure. The informal logician's advice is that van Benthem's way would only add insult to injury. It would be a case of “all wind-up and no pitch.” The heavy equipment way is offered as a rapprochement between logic and philosophy, but it offers no solace to parties who, as a matter of course, will have none of it. I think that such parties should lighten up, that informal logicians should moderate their readiness to cold-shoulder the alternatives and favourably consider not foreclosing on enlargements of their own “intellectual space”.¹⁵

Full-service logic is indeed a radical departure from today's orthodoxy. Orthodox logic has no *people* in it. By design. The new logic not only welcomes them, but gives its people load-bearing work to do there. Let me repeat the point that both the DEL and ADN approaches are sold on the idea that doing well with argument in the broad sense requires a hefty upgrade of theoretical infrastructure, a well-crafted enhancement of capital assets. Both these formalizations are answers to the question, “What does it take to *humanize* the logic of argument?” Of course, even if spot on, they are only part of the answer. What I want to do in this essay is to sketch some further options for readers to reflect on. Before getting on with it, I should make it clear that this is more a promissory note than a fully developed treatment. My goal is exploratory and experimental. I will try to stake my claim rather than aggressively mine it. Making good on it is more than there is space for here, but interested readers may wish to track developments more fully plotted in Woods (2013a).

3. Paradigm creep

Speaking as a co-conspirator, there is little doubt that contemporary enthusiasms for heavy-equipment syntheses flow from the antecedently established

¹⁴ An exception is Hitchcock (2009).

¹⁵ Attempts at rapprochement also include, to little avail so far, Gabbay and Woods (2003a, 2005). More recent attempts, possibly with better prospects, are Weinstein (2013) and Woods (2013a).

bona fides of their moving parts, and by the fact that their effectuation is in its own right a significant intellectual achievement, as well as for those who pull it off a lot of *fun*.

I hope that the many [heavy equipment] notions and results in [*Logical Dynamics of Information and Interaction*] are appealing per se, even if you have no wish to reform logic, and lose no sleep over the affairs of rational agents. And if there is pleasure in reading it is bound to mean something in the end. (van Benthem, 2011, p. 345)¹⁶

A further consideration is a methodological conservatism, which says that to the extent possible it is better to make our enquiries with methods that are tried and true. It is ill-advised to start every new venture *ab initio*. We could think of this as the Can Do Principle (Woods 2013a). It tells us that the tried and true is the place to start, that constructive adaptation has advantages that sheer innovation often lacks. Can Do enjoys a large and deserved provenance in the theory-construction business. It underlies the synthesizing impulses of reductionism and theory unification.

Can Do is a procedural default. It lacks the backing of the universally quantified conditional. There are in all cases limits to its reach. Often enough, an established methodology or framework will be stretched to no good end. When this happens, it embodies the false wisdom that a wrong theory is better than no theory at all. This is the degenerate version of Can Do. I call it Make Do. When Make Do is in effect, paradigmatic resources are summoned up without beneficial effect. This is “paradigm-creep”; and *sometimes* when an informal logician rails against heavy equipment methodologies for argument, it is precisely this that he is worried about. My advice is that this is not an *à priori* dismissible complaint.¹⁷

A critic who charges a theory with paradigm-creep is responding to a quite general and entirely proper interest. He is interested in knowing what it takes to produce in the right way a good theory of the subject matter at hand. If the subject is argument, and the theorist a logician, he will be interested in what it takes to produce a good logic of argument in the right way. If he is an informal logician, he will think that heavy-equipment mathematical methodologies are not the way to go and that going that way gets us bad theories. In this he could be wrong. But if indeed he is, he is wrong in particular, not in general. Sometimes good methods do produce bad theories.

This would be the right place to say a little something more about the sheer allure of heavy equipment, whether in aerospace, oil sands exploitation, or logic. It is the allure of building something that is difficult to put together and difficult to make work. This is especially true of innovative or ground-breaking technologies. Everyone appreciates the instrumental *telos* of technological innovation. It is driven by the desire to achieve some prior end, some end whose value and importance lies apart from the other virtues exhibited by the means of its achievement. It is also appreciated – but less widely and sure-footedly so – that technological innovation is also its own end. The equipment of heavy-equipment logics are in their own right intellectual achievements of high order, achievements the talent for which is quite sparsely distributed in the population at large. It only stands to reason that there will be cases in which the building

¹⁶ van Benthem is directing these assurances to conservatively minded mathematical logicians. They could with equal effect be passed on to informalists.

¹⁷ Let me quickly note a separate wrinkle. Not invariably, but often, an informalist’s complaint against mainstream logic is that it is too mathematical, made so by the fact that argument is not a subject matter that readily lends itself to mathematical description. The countervailing claim for formalists is that informal logic lacks rigour, and that rigourizing and mathematicizing simply go hand in hand.

of new machinery will be a greater intellectual achievement than the realization of the end for which it was intended in the first place. Sometimes when this happens the mathematics of the situation will have taken on a life of its own (Hacking). But the more general concomitant is a shift in priority-weighting from the originally-sought end to improving (or creating anew) the official means of its putative attainment.

When a heavy-equipment technology has a heavily mathematical character, there arises the occasion of further distraction, and a corresponding shift in priority-weighting. A familiar case in point is a Kripkean possible worlds semantics for modal logic. It is a set-theoretic semantics in which the truth of a modal assertion $M(\Phi)^{\top}$ is the truth of its scope Φ is a quantification of elements in an abstractly set-theoretic structure, $W = \langle W, A, v \rangle$. W is a non-empty set of otherwise undescribed elements w_1, w_2, \dots , A is a binary relation on W susceptible to possession of various properties (or none) of the abstract algebra of relations, but otherwise undescribed, and v is a function that assigns truth values to pairs of atomic sentences and elements $\langle \Phi, w_i \rangle$. Sets, of course, are mathematical entities, themselves the subject of deep theories. Accordingly, the machinery that matters for Kripke-semantics has a self-referential appeal apart from the theory's original goal to characterize the consequence relation in necessity and possibility contexts. Kripke-structures are in and of themselves open to and sitting ducks for, further investigation, development and experimentation. (Think here of impressive advances in hybrid logics.)

Kripke's apparatus is widely agreed to have delivered the most significant advance in the history of modal logic. It was nothing less than a breakthrough. But what *was* this breakthrough? Was it a deeper analytical grasp of the ancient concepts of necessity and possibility? Was it a superior command of the meaning of the English predicate "is a consequence of"? Whether or not it has these advantages, there is no one in the high-tech community who would have the least hesitation in saying that Kripke's great achievement in 1959 was a *completeness proof* for a formally simplified modal language.¹⁸ The proof established a perfect concurrence between the respective extensions of two of its own predicates, "is derivable in S" and "is a valid formula of S". The lack of completeness proofs had been considered a standing embarrassment for modal logic. Everyone knew that removing the embarrassment would require considerable technical ingenuity. It is nothing but right to celebrate the 1959 proof as a breakthrough. But it is far less obvious that a like breakthrough had been achieved for a philosophically enriched appreciation of necessity and possibility. Answering *this* question would require prior assessment of the conceptual adequacy of the system's definitions of "is derivable of" and "is a valid sentence of S" for the English predicates "is provable" and "is logically true". Why would this be? Because the system's predicates "derivable in S" and "valid in S" are intended as *formal representations* of the English predicates "is provable" and "is logically true". So they are; but being so doesn't, like that, settle the matter of the representations' accuracy.

This sets the stage for a twofold distraction. One is that the set-theoretic machinery is more interesting than its intended provisions for consequence-having in modal contexts. The other is that, as research into the machinery increases and attains even greater self-referential appeal, the greater the likelihood of paradigm creep.¹⁹ The

¹⁸ Saul A. Kripke, "A completeness theorem in modal logic", *Journal of Symbolic Logic*, 24 (1959), 1-14.

¹⁹ I admit to thinking Kripke's semantics to have suffered both these fates. See Woods (2010).

alienation between ends and means is at its most acute when the dominance of means over ends is paid no mind.

This should get us to thinking. In the case of argument and the logics we seek to make for them, what are the questions we should pause over? Here are seven of them.

1. To what extent is it incumbent on a logic of argument to heed the ins-and-outs of arguments on the ground, that is, arguments as they occur in conditions of real life?
2. If it is a goal of a theory of argument to lay down normative conditions of goodness and badness, what is the source of this normative legitimacy, and how does the logician have access to it?
3. When a logic's norms conflict with argumentative behaviour on the ground, is there a solid basis for the adjudication of this tension?
4. Relatedly, how should a logic of argument balance (if at all) the analytical elucidation of its target concepts and the technical virtuosity of the theory overall (e.g. its soundness and completeness, the categoricity of its axioms, and the like)?
5. What are the data that a logic of argument should aspire to account for? What steps are available to discourage data-bending, that is, the re-interpretation of data for their anticipated fit with the theory's pronouncements upon them?
6. Given the substantial likelihood that different logics will reach different conclusions about common targets, to what extent does the resulting pluralism admit of a disciplined resolution?
7. In light of answers to the above, might a case be made for *naturalizing* the logic of argument?

Because space is limited, I'll try to make a degree of headway with (1), (2), (7) and (5), leaving the others for another occasion.

4. Concerning question (1)

Even at its most aggressively mathematical, more often than not theories of argument are influenced by a simple principle:

CONCEPTUAL RECOGNIZABILITY: *Whatever its other features, a theory of argument should try to make the concept of argument recognizably present in its theorems.*

A mathematical theory of a subject matter S which, except for the theory's tutelage, no one in his right mind would recognize as S-like would be a theory of S in name only. Equally, a computational theory of argument that mechanized a practice which, without

the theory's tutelage, no one would recognize as *argument* would be a theory of argument by baptismal fiat.²⁰

Of course, not every formal system with an empirically instantiated subject matter whose theorems are empirically false on the ground lacks a recognizable subject-matter. Some such theories have theorems that are approximately true of what occurs there. But we should be careful to note that not every theorem is like that. For example, the axiom which says that belief is closed under consequence is *transfinitely* beyond approach of the inferences of real life.

It is not unheard of that a formal theory that sets out to honour the conceptual recognizability constraint ends up not honouring it at all. When this happens, we often have it that the mathematics of the theory's models has indeed taken on a life of its own. Whatever the reason, such theories effectuate not conceptual elucidation but rather *conceptual change*. All formal theories do this to some extent – there is a slope of some slipperiness from *clarification*, to *explication*, to *rational reconstruction*, and finally to outright *creative stipulation*. The conceptual recognizability constraint tells a theory that wishes to heed it not to slide too far.

If someone is going to humanize his logic, it becomes necessary to ask how vivid and extensive the human presence should be. A common answer (very often a tacit one) is that the human footprint should be just large enough, and no more, for unearthing the *norms* by which intelligent human practice on the ground is to be judged. After all, isn't it that what logic is, a normative enterprise?

5. Concerning question (2)

Yes. Yes, but. When a logician tells us that it is a norm of good reasoning for an agent to close his beliefs under consequence, we should be ready to ask how he knows this to be so. We should be ready to ask in what the binding authority of this norm consists, and by what means he had access to it. I readily concede that subscription to such distortions can be beneficial. It might facilitate the engagement of some helpful mathematics. It might simplify programming. That is not my question here. I want to know how the theorist knows that closure under consequence is normatively binding on the belief updates of real people – on Joe Blow and Sally Blu – and Patrick Suppes too. I have argued for many years that *this* question has yet to meet with anything close to an adequate answer, whether in heavy-equipment logic or informal logic.²¹ So let me simply state without much further ado:

DOUBTFUL NORMATIVE LEGITIMACY: The normative legitimacy of heavy-equipment models of the intelligent behaviour of human individuals presently lacks a secure foundation. Their normative *bona fides* are in doubt.

The little ado I'll give it here also comes by way of a promissory note. Here is the gist of it. Consider first the ideal model approach to normativity. The theorist lays down

²⁰ Perhaps logic's first unrecognizability complaint was that lodged by Quine against the dialectic logician's selective entertainment of true contradictions. The very idea of a true contradiction, Quine said, makes the concept of negation unrecognizable. (Quine 1970/1986, p. 81) A later example is the Routley semantics for First Degree Entailment which even its founders granted lacked a recognizable concept of negation. Greg Restall demurs. He describes some sort of negation rolling around in FDE. (Restall, 1997)

²¹ For more, see Gabbay and Woods (2003b).

what he takes to be defining conditions on ideal rationality, and his theorems give them a binding force on the idealized agents of his model. Consider Super-Draw, the ideally rational agent who draws every consequence of anything he assents to. I don't mind in the least a theorist arranging his theoretical models in such a way that its norms are indeed binding on Super-Draw. But my concern is not Super-Draw. It is the guy on the ground – Joe, Sally and Pat. If the ideal model theorist persists in the conceit that what holds of Super-Draw holds equally of Joe, Sally and Pat, I am prepared to look him in the eye and ask, “Who made you king of the castle?”

The king-of-the castle phenomenon presents itself in another quite common way. It is the way of reflective equilibrium. Suppose that we are trying to figure out how belief-updates should go on the ground. It is often suggested that good update practices are those that accord with what we all take to *be* good practice on the ground. The nub of it all is the purported referent of this “we”. If it is Joe, Sally and all the rest of us, closure under consequence fails the test hands down. However if as the ideal-modelling crowd routinely insist, the “we” is *they* – Leonard Savage, Howard Raiffa, Jaakko Hintikka, and – yes, Johan van Benthem, Dov Gabbay and John Woods – I am prepared to look them (and me) in the eye and ask, “Who made you king of the castle?”

If the doubtful legitimacy claim is true, it is consequential. To date, the best-liked formal theories of human performance routinely have a terrible traffic record empirically. Their theorems are false on the ground. Actual behaviour is conspicuously askew from the demands of theory. One standard answer to this is that empirical fidelity is not what these theories intended, but rather that the norms, not the realities, of such behaviour be sought. But if the normative authority of these theories is in doubt, if their normative legitimacy lacks a secure foundation this defence is lost, and with it prospects for conceptual recognizability. And if, as I am currently supposing, that is indeed the way things are, the question that presses is, “What now?”

I don't want to leave the impression that the norms for arguing well are beyond our analytical reach, that access to them is a forlorn hope. On this matter I have a “social practice” kind of nose. The norms of good arguing are discernible *somewhere*, but not I think in the formal theorist's ruminations about ideal rationality. On the contrary, the norms of good arguing are to be found at the other end of the spectrum, in the argumentative behaviour of real people having real-life arguments on the ground. It is decidedly not my view that anything goes provided only that it happens on the ground. Rather, when the norms are indeed recognizable, they are discernible in those actual cases in which arguments are themselves discernibly good (or bad). It is notoriously difficult for the theorist to bring these norms to a condition of crisp articulability. But one thing is clear. Norm-spotting won't be possible without careful – indeed tenacious – regard for what actually *does* occur on the ground.

Notwithstanding my own involvements in them, I myself attach to the ADN models no normative presumption as regards Joe Blow, Sally Blu and Patrick Suppes. (So, in this respect, I don't need to look myself in the eye after all.) Apart from the fun of thinking them up, I see such models as putting in play a not necessarily pre-existent concept of argument for which useful applications may or may not exist, or may be hit upon in times yet to come. But if it's the *Joe Blow* (etc.) norms that we're after, we're going to have to start looking elsewhere.

I should also say, by the way, that it is not lost on me that thinking of things in ways they are not or could not possibly be sometimes stimulates further thinking that gets how things are or could be quite seriously right. Perhaps the day will come when some real insight into Joe's and Sally's and Pat's situation is achieved concurrently with

the recognition that it couldn't have *been* achieved without the obviously absurd assumption that they close their beliefs under consequence. Speaking for myself, I'll believe it when I see it.

One way of proceeding with the humanization of logic is by admitting *more* of Joe Blow into the model than is usually there. We might consider admitting him as he actually is, warts and all. Concurrently, we might also start paying attention to lawlike correlations of the relevant empirical sciences and to the data they collect and analyze. In other words, we might opt for an *empirically sensitive* logic, and in so doing we make a brief return to question (1).

EMPIRICAL SENSITIVITY: A good way for a formal theory with empirically false theorems to preserve the recognizability of its own subject matter is to advance those theorems in an empirically sensitive way.²²

Empirically sensitive theories won't succeed unless they take proper notice of such lawlike pronouncements as the data on the ground may lend their support to. Concerning which, consider for a moment some strange words of Howard Raiffa. Speaking of Savage's notion of expected utility, Raiffa opined:

If most people behaved in a manner roughly consistent with Savage's theory then the theory would gain stature as a descriptive theory but would lose a good deal of its normative importance. *We do not have to teach people what comes naturally.* (Raiffa, 1961, pp. 690-691. Emphasis added.)

But not even Raiffa would deny that if it is not the job of decision theory to teach people what already comes naturally, saying so is of little avail in the absence of a correct understanding of what it is about decision-making (or arguing) that comes naturally to them. So empirically indifferent theories (both heavy-equipment and informal), no less than empirically sensitive ones, have an interest in how these practices actually do play out.²³

It lies in the nature of orthodoxies to resist disturbances of the *status quo*. If empirical sensitivity is indeed the best way to go with argument, there is always the option of wishing the ensuing *theory* well but denying it the name of logic and sending it to where it properly belongs – to psychology, or to pragma-dialectics, or to informal logic. My advice is not to fly off in a huff. There is nothing in empirical sensitivity that is hostile to formal methods as such. No one thinks, for example, that the empirical sensitivities of population genetics deny it the idealization of infinitely large populations.

With normative legitimacy presently side-lined, there are as far as I can tell just three ways in which a model's distortions can be virtuous. They are indispensable to the

²² An important recent attempt to show empirical sensitivity is Mercier and Sperber (2011), together with the several commentaries and replies that accompany this article. See also van Benthem (2008).

²³ There is a story about Raiffa too good to be true, but told as true by Paul Thagard at the Conference on Model Based Reasoning, in Sestri Levante, in June 2012. At the time in question Raiffa was at Columbia, and an offer from Berkeley had recently arrived. Raiffa was having difficulty in making up his mind about exchanging the East Coast for the West Coast. A day or so later, Ernest Nagel noticed his friend's preoccupation. When Raiffa explained his quandary, Nagel suggested that Raiffa construct a decision tree, and wait to see what popped out. "Come on, Nagel", cried Raiffa, "this is *serious!*"

theory's overall success at the empirical checkout counter, notwithstanding that they themselves are false. Or they are indispensable for the creation of a concept whose theorems are in and of themselves objects of intellectual beauty and achievements of technical ingenuity. But I say again that if what our theory seeks is the truth about Joe, and Sally and Pat, some rapprochement with psychology is the way to go. In this spirit, let me now put down three more cards.

DESCRIPTIVE ADEQUACY: While we are cooling our heels waiting for a genuinely helpful and intellectually secure normative reawakening, let's readjust our theoretical ambitions towards a refreshed regard for *descriptive adequacy*.

LOGIC NATURALIZED: Let's try our hand at *naturalizing* our logic. Let's contemplate doing for logic what over fifty years ago Quine and others did for epistemology, but with a difference I'd recommend. Let our experiment be more "cooperative" than "replacing".²⁴

WHAT AGENTS ARE LIKE: A cooperative naturalization would require that a logic of argument inform itself about how the human arguer is actually put together, what his interests, capacities and resources are, what conditions are in play when arguments actually occur, what he is good at and what he is good for.

Here is van Benthem on this point:

We humans live in a tiny range of the total physical scale of magnitude, where our body movements bring new objects of the right size under our deliberate control. 'Below' us is the statistical molecular and atomic reality over which we have no control, 'above' us is the large-scale structure of the universe with the same lack of control. Likewise, cognitively, we live in a tiny personal zone of deliberation and decision described by logical and game-theoretic models, with below us the statistical physics of brain processes, and above us the statistical realities of long-term social group behaviour. (van Benthem, 2012, p. 86)

How much, I wonder, of Joe, Sally and Pat as they actually are is discernible in these words?

6. Concerning question (5)

Speaking of Pat, fifty-three years ago, when the Congress on Logic, Methodology and Philosophy of Science met in Palo Alto, the now classic paper, "Models of data" was presented. In it Suppes re-made Bacon's point that a theory's intended data often lie beyond the grasp of its methods, and cannot be engaged by them unless suitably massaged or prepped or "conceptually cleaned up". Suppes went on to point out that sometimes the prepping of the experimental data will have to be quite extensive, often with the effect of making a *model* of them. In which case, what the theory would end up modelling is not the conceptually cleaned-up data, but rather models of the conceptually cleaned up data. Modelling is distortion. Everyone concedes that distortions occur on the theoretical side. What Suppes was telling us is that often they also occur on the data side, that good theories are often *distortions of distortions*:

²⁴ The irony won't have escaped us that Quine, the unfettered fallibilist, would be more than ready to put the analytic philosophy of knowledge into permanent retirement, but would allow no glove to be laid on classical first order logic.

Generally speaking, in pure mathematics the comparison of models involves comparisons of two models of the same logical type, as in the assertion of representation theorems.

However,

A radically different situation often obtains in the comparison between theory and experiment. Theoretical notions are used in the theory which have no direct observable analogue in the experimental data. In addition, it is common for models of a theory to contain continuous functions or infinite sequences although the confirming data are highly discrete and finitistic in character. (Suppes, 1962, p. 25)

No one need tell Patrick Suppes that sometimes data-modelling goes too far, that sometimes it costs a theory conceptual recognizability and descriptive adequacy. This was a point that Gerd Gigerenzer would make much of 36 years later. Gigerenzer would warn of “data-bending”, of taking the prepping of data too far, of tendentiously misconceiving the facts on the ground solely for their anticipated comportment with the theory being readied to accommodate them.²⁵

I have heard it said that physicists have a common complaint about biologists. They aren't very good at modelling biological data. And they aren't very good at data analysis. I have no wish to calumniate biologists, but the physicists are certainly right to say that biological data are easy to misconceive. How can the same not be so – and then some – for cognitive and social data? So, picking up now on question (5), here's a further card:

RESPECT FOR DATA: In readying data for theoretical engagement by a logic of argument, pay attention to how the ground-data actually go, and do your level best to avoid data-bending.

7. Cognitive agency

If a descriptively adequate, non-data-bending, empirically sensitive, naturalized logic of argument is one that attends to what beings like us are actually like, it will find that to a striking extent we are beings that make our way in life by *knowing things*. We are *cognitive beings*. We are cognitive beings with a quite good track record. We know a lot. We know quite a lot. We know enough to survive, to prosper, and occasionally to build great civilizations. That is one of the data for a logic of argument to take heed of, made necessary by the fact that one of the purposes of argument is the advancement of epistemic ends. So I take it to flow from the respect-for-data principle that:

EPISTEMOLOGICAL SENSITIVITY: A theory of argument for beings like us should take care to adjust to the revelations of epistemology. (After all, isn't DEL an epistemic logic, and isn't ADN a logic of cognitive systems)?²⁶

²⁵ Gigerenzer (1996) and Gigerenzer and Selten (2001).

²⁶ Note here Gila Sher: “The scarcity of attempts to provide a theoretical foundation for logic is especially notable in light of epistemologists’ recognition that logic has a special standing in knowledge.” (Sher, 2013, p.

As we have it now, the going philosophical theories of knowledge loosely subdivide into two broad clusters, themselves susceptible of further division. The oldest by far is the Command and Control Model in which knowledge is occasioned in very large measure by the free and deliberate exercise of our intellectual powers. Also in serious but more recent contention is the Causal Response Model, in which knowledge is occasioned in large measure by a causal responsiveness to informational inputs.²⁷ Here, too, there is no time for details, beyond saying that CC-theories mandate a hefty provenance for a *justification* requirement on knowledge, whereas for CR-theories justification is only an occasional and context-sensitive contingency. Indeed, the most typical version of CC-theories is that knowledge is justified true belief (JTB).²⁸ The stripped-down version of CR-theories is that knowledge is true belief generated by belief-forming devices in good working order operating as they should on good information.²⁹ The CR-model generalizes perceptual and introspective knowledge to all of knowledge. The CC-model treats the perceptual and the introspective as special cases. CC-knowledge requires good advocacy skills. CR-knowledge requires good equipment. By and large, CC-knowledge is down to you. CR-knowledge is down to your devices. CC-knowledge is a forensic achievement. CR-knowledge has only selective need of lawyerly flair. CC-knowledge is largely manual-mode knowledge. CR-knowledge is largely automatic-mode or point-and-shoot knowledge. CC-knowledge is expensive. CR-knowledge a lot less so.

We have in CC and CR a fateful dualism about which argument theorists should try to make up their minds. In taking the decision to return the logic of argument to philosophy, we should note with care that DEL and ADN theorists have chosen to send it to a case-making discipline whose stock-in-trade is argument, a discipline in which, therefore, there exists a strong presumptive readiness to see knowledge the CC-way. Here too my advice is that we not rush to judgement. Respect-for-data demands *epistemological sensitivity*, and epistemological sensitivity counsels a principled resolution of CC-CR tensions. But I have already said that it is a *datum* about the human animal that he makes his way in life by knowing things and that he knows an awful lot, enough to survive, prosper and from time to time fill up the Tate and the Prado. If the empirical record is anything to go on, there isn't nearly as much evidence of wide-spread justified opinion as there is of wide-spread knowledge. Justificationist definitions encumber the predicate "knows that" with a shriveled extension. Justificationist definitions are hard on knowledge, making for less of it than the empirical record would suggest is actually there. For a long time, whole armies of justificationists have made determined efforts to re-establish for the predicate "is justified" a robustly populated

148). I would say it differently: Knowledge has special standing in logic.

²⁷ See here Armstrong (1973), Goldman (1967), (1973), Stich and Nisbett (1980), Dretske (1981), Millikan (1984), Goldman (1986), (1992), Nozick (1986), Stich (1990), Plantinga (1993) and Trout and Bishop (2005). It all began with Ramsey (1931).

²⁸ Here is Plato: Epistemē = endoxon + aletheia + logos. (Theaetetus, 201c-d)

²⁹ Here is what I mean by "stripped down". A stripped-down version of the CR-model is one that has the courage of its own causal-response convictions. Most of today's CR-theories leave the justification condition in play. The (intended) difference between the J-condition in CC-environments and CR-environments is that in the former instance it is a "normative" condition, whereas in the second it is a "naturalistic" condition denoting the reliability of the human knower's belief-making devices. My own view is that, naturalistically construed, the J-condition is redundant. Accordingly, on the stripped down version, knowledge is *well-produced* true belief. Goldman (1967) comes close to this, I think.

extension. They've been dancing as fast as they can, but I think to little avail. For all their exertions in this regard, they have made the concept of justification largely unrecognizable. So here is a further matter on which I'll simply declare myself. The CR-model is the right model for a *naturalized* logic of argument, and in so saying we touch base with question (7).

I don't want to be misunderstood on this point. It is not my position that there is no warrant for logicians to investigate justification,³⁰ still less that justification is of no importance for knowledge. It bears repeating that in lots of cases a person's belief-forming devices simply won't fire unless justificational processes are engaged. Nor do I overlook justification's role – its *selectively rightful* role – in argument.

8. Knowledge by telling

Right or wrong, the CR-choice matters. For one thing, it gives a conception of knowledge which offers safe harbour to:

THE TOLD-KNOWLEDGE THESIS: To a first approximation, most by far of what an individual knows he knows by being told it or by having relied at least in part, but ineliminably so, on what he's been told of what others have been told. He is up to his neck in tellings.³¹

Consider a far from common example:

Harry: Tomorrow is Barb's birthday, so I'll have to send an e-card.

Sarah: No, it's on the 3rd.

Harry: No kidding, I thought it was earlier.

Sarah: Nope.

Harry: Good. That gives me time to get a present.

What we have here is correction-by-contradiction, that is, correction by contradictory *sayso*. Let's assume that Sarah knows what she's talking about. She tells it to Harry. Hey presto, Harry knows it too. After all, Barb's birthday *is* on the 3rd, Harry now believes it, and there was nothing defective about his belief-forming devices on this

³⁰ Heavy equipment logicians have long paid attention to truth, and later to knowledge and belief. Now it's the turn of justification. About time, I would say. See, for example, Renne (2008), (2009), and Giordani (2013).

³¹ Except for some modest mention by formal epistemologists, the formal dynamics of told-knowledge haven't had much of an innings in the logical, still less the philosophical, mainstream. Of most direct consequence for epistemology is the theory of telling investigated by public announcement logic (PAL). It originates in Playa's (1989). PAL is just one of many logics that model the dynamics of knowledge and belief in multiagent settings. PAL is a relatively simple extension of epistemic logic (EL) got by the addition of dynamic operators on formulas. PAL is a logic that permits agent's knowledge states to be updated by the public announcement of epistemic formulas. Thus PAL extends multiagent EL so as to model the communicational consequences of announcements to multiagents. Each formula of PAL can be rewritten as an equivalent formula of EL. A technical advantage of the reduction is that PAL is intrinsically more succinct than EL. There is a rapidly growing PAL literature. Important papers are, among others, Baltag, Moss and Solecki (1998); van Ditmarsch, van der Hoek and Kooi, (2005), van Benthem, van Eijck and Kooi (2006); and Kooi, (2007), and French and van Ditmarsch (2008).

occasion. Harry's is a well-produced true belief. So on the CR-model, he now knows when Barb's birthday is.

It is noteworthy – indeed of the first importance for what I am about here – that in the Harry-Sarah exchange there is a solution achieved to a conversationally embodied difference of opinion. But it is not in any sense a case-making settlement, still less an argument. Nor is there any hint here, either ventured or resisted, of justification. So

DATA-BENDING (1): It is data-bending to take well-negotiated conversationally embodied differences of opinion as inherently case-making or argumentative. It is data-bending not to note that the ratio of *case-making* or *argumentationally-engaged* differences of opinion to conversationally embodied differences of opinion in the general case is comparatively slight. If there are, as I freely assume, norms for good *argument*, it would be data-bending to invoke them here.

It is also noteworthy that in our sample dialogue, Sarah has contradicted Harry *outright* and *without ado*. I wonder whether anyone knows of a single theory of argument in which this episode wouldn't be harshly judged, Sarah for begging the question, and Harry for letting her get away with it.

Most conversationally embodied differences of opinion that aren't settled by correction-by-contradiction are settled non-conversationally by display of a contradicting fact, or conversationally with instructions about how to find one. But here too, it would be data-bending to think of these as instances of case-making or argument-making. Of course, there is a great deal of error-correction that goes on in human life. Even when the corrections are administered by a human being with a voice-box it, they are comparatively speaking hardly ever a case-making or argument-making correction.

Neither should we confuse case-making with *contestation*. There are lots of cases in which disagreements aren't settled by one-shot tellings to the contrary. There are lots of cases in which they aren't settled *at all*, since settlement wasn't what the interlocutors sought. In late May, a friend and I found ourselves in disagreement about the coming Los Angeles-San José conference semi-finals, I opting for LA and he for SJ. We laid out our respective cases. They were good cases, well-made by two knowledgeable hockey fans. Of course, there was a lot of bantering. There was also a good deal of heartfeltness. But neither of us thought that minds would change. They didn't, and my friend's parting shot was that although I was an idiot it will be interesting to see what happens. At least we agreed on that. We had had a case-making conversation, but at no stage was anyone arguing with anyone. We attached to one another's positions opposing truth values. But in so doing, no one was anyone's opponent or adversary.

DATA-BENDING (2): It is data-bending to take case-making conversations about disputed matters as inherently argumentative. It is data-bending to ignore the comparative slightness of the ratio of argumentative or dialectical case-making exchanges to case-making exchanges.

Another case in point: In criminal trials at common law opposing counsel are frenetic case-makers. But in no instance do they engage each other in dialogue. They lack all occasion for *dialectical* embrace.

9. Inefficacious telling

Of course, told-knowledge has its limits. There are classes of cases in which telling someone something is not doxastically or epistemically efficacious, notably normative claims and disputed theoretical claims. Even if Sarah actually did know it, Harry isn't likely to come to believe that active euthanasia is morally justified just on her sayso. Why? Because, at bottom, his belief-producing devices simply won't fire on that basis.

We are now in a position to see a rough but substantial correlation between epistemically inefficacious tellings and conversationally embodied disagreements whose removal requires a degree of case-making. This latter class subdivides into removals achieved by matters of fact and those achieved by generally accepted methods of proof. The first of these subclasses is very large and not very interesting. Sarah thinks that Harry wears a size 7 hat. Harry removes his hat and shows her the size stamped on the inner band – 7 $\frac{3}{4}$. The second subclass is comparatively very small indeed and also quite interesting. Harry doubts a particular theorem. Sarah shows him the proof and he sees the light. Notwithstanding their differences, they are bound by a common methodological principle: To get Harry to believe P (even in those cases where he now believes not-P) show him the fact or the proof that contradicts it.

Here again we see the utter prevalence of conversationally expressed settlement of disagreement in which the concept of argument has no recognizable presence. But we also see something fundamental about the removal of disagreement when argument is doing the heavy lifting.

NON-CONTENTIOUS ARGUMENT: Comparatively speaking, the satisfactory removal of disagreement by argumentative means is *non-contentious* and *non-adversarial*.

Accordingly,

DATA-BENDER (3): It is data-bending to assume that arguments aimed at the removal of disagreement are intrinsically or typically or even in the majority of cases contentious arguments.

Historically speaking, philosophy is chock-a-block with contentious argument. An argument turns contentious when there is no pre-settled method for its removal, which is a chronic feature of philosophy and the hallmark by normative discord quite generally. Philosophers are drawn to contentious argument because they are themselves contentious arguers by profession. Theorists of argument have inherited this focus. Contention is their central preoccupation. In this they have been abetted by a further misconception, also of philosophy's own making. It is that, aside from perception and introspection, cognitive competence is intrinsically argumentative. Of course, I demur from this.

DATA-BENDER (4): Taken together, this is data-bending on a grand scale: Cognitive competence is dominantly argumentative? Argument is dominantly contentious? No. Wrong on both counts.

10. Contentious arguments

There is widespread agreement that an argument is made contentious if it pits its parties as one another's adversaries. This goes part of the way, but leaves out what I think is an essential feature. It is that when Harry and Sarah are locked into a contentious argument about some disputed matter, they typically attack not only one another's respective positions, but rather the *arguments* each gives pro and con, thus making contentious argument typically *metadiological* in character (to borrow Erik Krabbe's word for it.)³² If this is so, then it is easy to see the truth of the propositions just above. Most disagreements removed by argument are not contentious in this sense. The contradicting fact (or proof) is taken at face value.

The natural centre of contentious argument is where the known facts and available proofs are inefficacious as disagreement-removers. Perhaps there is no better example of the type unresolved normative disagreement. But the thing that matters most for what I am about to say is the contentiousness of the arguments it provokes, not the normative character of the issue in conflict. (So I'm not just now discussing question 2.)

Krabbe's notion of metadiologue is important, and with it the related idea of *meta-argument* (Finocchiaro, 2013). We have it almost by definition that contentious argument is occasioned by two principal factors. One is that tellings to the contrary are inefficacious. The other is that the sleeping-dog convention of agreeing to disagree is not presently in force. If, contrary to fact, my friend and I *had* been having a contentious argument about which team would win the LA-SJ series, at least one of us would have tried to construct a case that did one of two things. It would have so solidly supported his own position as to prompt his opponent's retirement in the manner of Locke's *ad ignorantiam*.³³ Or it would have attacked and eventually demolished his opponent's case to the contrary. The very fact that our disagreement was no longer responsive to contrary telling makes both these courses difficult to bring off, made so in particular by the looming threat of reciprocal question-begging. But the second case carries difficulties of its own. Had we started examining (and attacking) one another's cases, we would have left the original dialogue for metadiologue thereby ascending from argument to meta-argument. Consider a brief snippet of how things might now go:

Me: But that just doesn't follow.

Friend: It sure as heck does!

Of course, what we have now is a disagreement about the consequence relation, which is the special preserve of logicians. Even if we were to make the ludicrous assumption that logicians are pretty adept at handling consequence-disagreements in natural

³² Krabbe (2003).

³³ I mean Locke's *ad ignorantiam*, not the silliness of the same name attributed by present-day textbooks. Locke (1690) characterized the *ad ignorantiam* as a demand one opponent addresses to the other to produce a better argument for the opponent's position than the argument he himself has advanced for his own.

language contexts, no one in his right mind would suppose the laity at large to have the means of handling this kind of traffic.³⁴

What, now, are the further facts on the ground about contentious argument? The one mega-fact is that it hardly ever happens, and with it a further data-bender.

FURTHER DATA-BENDERS: It is data-bending for a theory of argument not to attend to the actual circumstances that inhibit the frequency and appropriateness of contentious argument, of which the following are of special importance.

Inhibitors of contentiousness:

1. Arguing contentiously is nearly always rude or out of place.
2. It is discouraged by the value we all place on tolerance and the freedom of conscience and expression.
3. Arguing contentiously is an acquired skill, with a less than winning track record. Arguing contentiously is difficult. Again, there is a reason for this. Metadiological argument is an extremely shaky enterprise.
4. With tutelage or without (but especially without), contentious argument is unstable, frequently converting into merely *explanation*-arguments³⁵ or deteriorating into *quarrels*.
5. Contentious arguments are expensive, carrying direct costs (time, effort, wear and tear), opportunity costs (going for a swim, making a nice ham sandwich), dangers (a ruptured engagement, a furious head of state), and embarrassments (fallacy-mongering and other forms of intellectual chicanery)³⁶

My space is shrinking. So let's start to bring things to a close. No one doubts that arguments do happen. No one doubts that arguments are theoretically interesting, notwithstanding their relative infrequency. In *My Fair Lady*, Eliza Doolittle observes that in 'Ertford, 'Ereford and 'Ampshire, 'urricanes 'ardly ever 'appen. The same is true of arguments. Arguments hardly ever happen either. Here again is why. Arguing presupposes an intimacy that is rarely present, or requires otherwise highly selective enabling conditions. In most circumstances arguing is for *boors*. The subclass of most interest to logicians from Aristotle onwards, are what Aristotle calls contentious arguments, and Gabbay and I and game-theoretic logicians generally think of as attack-and-defend arguments. Aristotle goes to the heart of contentious argument. Its goal is to subject the opponent to the logical humiliation of having contradicted his own thesis "out of his own mouth". Herein lies the idea that argument is warfare, with destruction as its ultimate goal. The bellicosities of contention are extremely difficult to execute,³⁷ and economically depleting. They take too long, they take a lot of effort, and they

³⁴ Woods (2007) examines the byplay of two toxic skeins in meta-arguments of this sort – question-begging and irrelevance.

³⁵ Sarah is pro-euthanasia and Harry otherwise disposed. "How can you not be for it?", demands Sarah. "Well, I'm a Catholic", replies Harry. "Oh, I see. Right then", says Sarah. Harry has explained himself in ways that makes contention perfectly avoidable.

³⁶ For more on the cost-benefit character of argument, see Karunatilake and Jennings (2004) and Paglieri and Castelfranchi (2010).

³⁷ See here Magnani (2009) on the executive role of "military" intelligence in human cognition. (p. 450)

discommode less onerous alternatives. They are subject to high levels of screw-up. Indeed

THE SIX-D PHENOMENON: Contentious arguments are, *difficult*, *depleting*, often *disagreeable*, sometimes *dangerous*, usually *disappointing* and (thank God) nearly always *discretionary*.

Most of the present-day theories of contentious argument are advanced with normative intent, subjecting discomfort on the ground to the opprobrium of the logician's theoretical disapproval. But if, as I suggest here, it is an empirical fact that contentious arguments hardly ever happen, then it can only be the case that in those instances in which disagreement-removal is pursued non-contentiously, the normative standards of these logics aren't in play. And if they aren't in play, they can't be violated.

So isn't it fair to ask of these theories, "What, pray, is the good of them, apart from the ingenuity and fun of thinking them up?" After all,

... [the heavy-equipment view] ... has a certain mathematical elegance that can be appreciated even when [it's] grand perspective leaves you cold. (van Benthem, 2011, p. x)

11. Fallacies

The relative infrequency of contentious argument in conversationally embodied difference-of-opinion contexts turns out to matter in a quite significant way for *fallacy theory*, which had its origins in logic's earliest foundational writings. In *Topics* and *On Sophistical Refutations*, a fallacy is committed when a non-syllogism is mistaken for a syllogism. In a more general sense, a fallacy is the error of thinking that an argument is good in a certain respect when it is not in fact good in that respect. Aristotle was clear that the project of stabilizing dialectic could not proceed until an adequate mastery was achieved of the distinction between good arguments and those that are merely good-looking. The fallacies project remained on the agenda of western logic until (shall we say) 1879, the point at which logic engineered a decisive break with the concerns of human reasoning. The orphanhood of the fallacies, their exclusion from mainstream logic, has endured ever since. This was the development against which Hamblin railed in 1970 when he called upon logicians to readmit fallacy theory into their theoretical purview. Informal logicians have tried to pay Hamblin some heed, but it remains the case that the fallacies have got nowhere in the mathematical orthodoxies of formal logic.

As it has come down to us since Aristotle, a fallacy is an error of premiss-conclusion reasoning (or argument) satisfying the following conditions:

THE TRADITIONAL CONCEPTION OF FALLACY: A fallacy is a premiss-conclusion error which people in general are disposed to commit with a notable frequency. It is an attractive error, with high levels of postdiagnostic recidivism.

A further qualification is necessary. Errors that are committed with a notable frequency are errors whose frequency is higher than that of error-making in general. Moreover, notable frequency is always *occasioned* frequency. For example, we don't commit the hasty generalization error unless we are doing some sample-to-population reasoning.

We don't commit the fallacy of false cause unless we're in an event-correlation assessment context. We lack in each case the contextually set occasion to commit these mistakes. Accordingly, frequency of commission is an occasioned frequency, the frequency to commit an error of a given type when there is occasion to commit it. Fallacies in turn, are errors whose occasioned frequency exceeds the rate of error-making in general. They are errors of a kind that stands out from the crowd.

Suppose that we agree that conversationally embodied disagreements are occasions for argumental error. If what I've been saying here is true, the frequency with which the norms of contentious or adversarial argument are violated is not a notably occasioned frequency, hence are not fallacy-makers in the traditional sense. One of the questions that puzzled Hamblin is why the then-current treatments of the fallacies project – as evidenced in Introductory Logic primers – were so theoretically unimpressive. My answer is that these were treatments in which the *cited* fallacies failed to instantiate the very idea of fallacy. If true, that would be shocking news for informal logic. If true, it would also be vindication of sorts for the neglect of the formal mainstream. Perhaps, in the end, my suggestion is not true, but I daresay that it is something that any seriously-minded logician of argument should look into with care.

Against all this, it could be argued that hammer-and-tong argumentative errors demand a narrower occasion of committal. Suppose we say that a hammer-and-tong mistake can be made only when a hammer-and-tong argument is actually underway. Fair enough. But now let's ask ourselves what *are* the errors typical of hammer-and-tong exchanges and which of them are committed with a frequency that exceeds the general rate of error-making across such contexts? In all of the standard lists, the fallacies are conceived of as mistakes of hammer-and-tong reasoning. The traditional list is a long one, running to at least eighteen. I lack the space to review them all. Instead I will mention six of them, and having done so will leave the reader with the question: "How many of these occur with a notable (higher than usual) frequency in hammer-and-tong contexts? They are: the fallacies of composition and division, the fallacies of affirming the consequent and denying the antecedent, the *post hoc ergo propter hoc* fallacy, the *ad baculum* fallacy? (Let's throw in for good measure the *ad misericordiam* and gambler's fallacies.)

Of course, as I use it here, the concept of occasion to err is not all that clear, and certainly is not well-defined. Whatever we end up saying about it upon further reflection, one thing to avoid is the danger of over-narrowness. We don't want it to be the case that occasions to err are precisely those in which the error in question is actually committed. If that were the case the occasioned frequency of errors of that type would be always. Consider a case. If an occasion for drawing a hasty generalization were one in which a hasty generalization mistake is actually committed, we would have it that hasty generalization is an error whenever it's an error.³⁸ But that is trivial and not, in any event, intended by the traditional concept of fallacy.

12. What now?

I am not in the slightest doubt that my advice in this essay stands little chance of heedful, never mind sympathetic, attention in the very quarters where it is intended to

³⁸ Full disclosure: I happen to think that hasty generalization is not a fallacy. When committed in the circumstances of real life, hasty generalizations are much oftener accurate than not. Details can be found in Woods (2013a), section 6.12.

do some good. I see little prospect of the heavy-equipment crowd shucking off its normative conceits, still less of its polluting the elegant flow of mathematical idealization with the sludge of what happens on the ground. The same is true of virtually all the mainstream approaches to informal logic. Even so, I harbour some faint hope for minority attention, no matter how slight. The failure to fix the normative authority problem is a standing embarrassment for logical theory and, I would say, a disgrace. If repairs are to be found, they will evade capture in the absence of a thorough and disciplined examination of the ground-data; and this alone means that logic will have to lighten up in its haughtiness towards the empirical. It means that in addition to its undoubted mathematical virtuosity, logic – I mean the full-service logic of consequence – will have to contemplate the enrichments that naturalization would bring. In so saying, perhaps it may be thought that my betrayals of it here have denied me a respectable membership in the heavy-equipment business. I have two things to say about this. One is that the empirical betterment of heavy-equipment technologies might well occasion – not without considerable effort and ingenuity – some terrifically satisfying results. The other is that there is, in any event, no necessity for anyone, myself included, to quit the heavy-equipment business. Let the business flourish unmolested, and let new concepts be introduced. There is nothing wrong with enlargements of our conceptual space. There is nothing wrong with thinking big.

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