

CHAPTER 1

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INTRODUCTION

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1. THE USES OF ARGUMENT

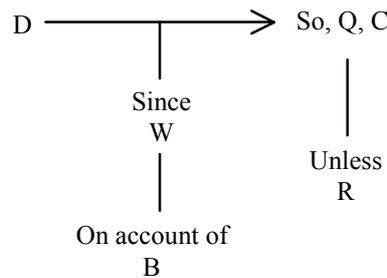
In *The Uses of Argument* (1958), Stephen Edelston Toulmin argued that the abstract and formal criteria of mathematical logic and of much twentieth-century epistemology had little applicability to the methods we actually use in everyday life to assess arguments. Toulmin called for a reform that would blend logic and epistemology into ‘applied logic’, focused on the structures of arguments in different fields and the corresponding differences in the standards for their appraisal. Its method was to be comparative, empirical and historical; it was to look concretely at the similarities and differences between ways of arguing and standards of proof in geometrical optics, historiography, civil litigation, morals and so forth, as these have evolved historically.

Despite the pluralism of his title, Toulmin focused on one use of argument: to defend a claim made by asserting something. He noted certain field-invariant features of our doing so. First we present a problem, expressed in a more or less clear question. We have a certain opinion in mind as our solution to this problem; Toulmin is not concerned in this book with how we did or should arrive at it. We begin by acknowledging various candidates for a solution, candidates that are ‘possible’ in the sense that they have a right to be considered. Then we consider the bearing of information at our disposal on these suggestions, perhaps concluding that some are after all ‘impossible’, perhaps identifying one as most ‘probable’ in the sense of being most deserving of acceptance, perhaps identifying one as ‘presumably’ correct unless certain unusual or exceptional conditions apply.

During this process of rational justification, we throw up what Toulmin called ‘micro-arguments’ (Toulmin, 1958, p. 94), for which he proposed a field-invariant pattern of analysis designed to do justice to the process of defending a particular claim against a challenger. This pattern, which has come to be known as the ‘Toulmin model’ or ‘Toulmin scheme’, differed radically from the traditional logical analysis of a micro-argument into premisses and conclusion. First we assert

something, and thus make a *claim* (C). Challenged to defend our claim by a questioner who asks, “What have you got to go on?”, we appeal to the relevant facts at our disposal, which Toulmin calls our *data* (D). It may turn out to be necessary to establish the correctness of these facts in a preliminary argument. But their acceptance by the challenger, whether immediate or indirect, does not necessarily end the defense. For the challenger may ask about the bearing of our data on our claim: “How do you get there?” Our response will at its most perspicuous take the form: “Data such as D entitle one to draw conclusions, or make claims, such as C” (p. 98). A proposition of this form Toulmin calls a *warrant* (W). Warrants, he notes, confer different degrees of force on the conclusions they justify, which may be signaled by qualifying our conclusion with a *qualifier* (Q) such as ‘necessarily’, ‘probably’ or ‘presumably’. In the latter case, we may need to mention conditions of *rebuttal* (R) “indicating circumstances in which the authority of the warrant would have to be set aside” (p. 101). Our task, however, is still not necessarily finished. For our challenger may question the general acceptability of our warrant: “Why do you think that?” Toulmin calls our answer to this question our *backing* (B). He emphasizes the great differences in kind between backings in different fields. Warrants can be defended by appeal to a system of taxonomic classification, to a statute, to statistics from a census, and so forth. It is this difference in backing that constitutes the field-dependence of our standards of argument. Ultimately, all micro-arguments depend on the combination of data and backing. In rare cases, checking the backing will involve checking the claim; Toulmin calls such arguments ‘analytic arguments.’ Most arguments are not of this sort, so that purely formal criteria do not suffice for their assessment; Toulmin calls them ‘substantial arguments’. The sort of backing that is acceptable for a given substantial argument will depend on the field to which it belongs.

To illustrate the contribution of these constituents, Toulmin proposed the following diagram (p. 104):



D for *Data*
 Q for *Qualifier*
 C for *Claim*

W for *Warrant*
 B for *Backing*
 R for *Rebuttal*

Summarizing, in *The Uses of Argument* Toulmin emphasized a number of points that are by now familiar, but still deserve attention:

1. Reasoning and argument involve not only support for points of view, but also attack against them.
2. Reasoning can have qualified conclusions.
3. There are other good types of argument than those of standard formal logic.
4. Unstated assumptions linking premisses to a conclusion are better thought of as inference licenses than as implicit premisses.
5. Standards of reasoning can be field-dependent, and can be themselves the subject of argumentation.

Each of these points is illustrated by his layout of arguments. The rebuttal illustrates the first point, the qualifier the second point, and the warrant and backing the last three points.

2. RECEPTION OF TOULMIN'S BOOK

As Toulmin himself notes in his essay in this volume, which was delivered as an address in 2005, his fellow philosophers were initially hostile to the ideas in his book. They were taken up, however, by specialists in fields like jurisprudence and psychology, who found that they fit the forms of argument and reasoning that they were studying. And Toulmin's model was embraced by the field of speech communication in the United States, whose textbooks on argumentation now include an obligatory chapter on the Toulmin model of micro-arguments. More recently, the model has been appropriated by researchers in the fields of computer science and artificial intelligence, where it has been adapted for use in decision support systems, for instance in the domains of law and medicine. Work in these fields on topics such as defeasible reasoning, argumentation schemes and field-dependent standards of reasoning has roots in Toulmin's ideas. Toulmin has also strongly influenced the graphical representation of argument today, e.g. in software. And some philosophers have come to take Toulmin's ideas seriously, especially those working in what is called 'informal logic', the philosophical study of the analysis and evaluation of real arguments. In this sub-field, Toulmin's book is a post-war classic.

The present volume attempts to bring together the best current reflection on the Toulmin model and its current appropriation. All the essays were written in response to calls for papers for a special issue of the journal *Argumentation* (19: 3 [2005]) on "The Toulmin model today" and for a conference at McMaster University in May 2005 on "The uses of argument". They are a selection from the papers submitted, revised in the light of comments by referees and conference commentators, and in subsequent discussion. The chapters are not exegetical but substantive, extending or challenging Toulmin's ideas in ways that make fresh contributions to the theory of analyzing and evaluating arguments.

In the first chapter of the current volume, delivered as a keynote address at the McMaster conference, **Stephen Toulmin** acknowledges influences on his book from Dewey, Collingwood and (rather surprisingly) Lenin; recounts the history of its reception; and draws a moral conclusion from the historical relativity of our critical standards in various fields: we should be modest about our intellectual achievements, in the light of what has been and what will come after us. In the process, he reminisces about his teacher Ludwig Wittgenstein, who was clearly a formative influence.

As evidence for the influence of Toulmin's ideas, **Ronald P. Loui** turns to citation counts in his chapter 'A Citation-Based Reflection on Toulmin and Argument'. He reports that citations in the leading journals in the social sciences, humanities and science and technology put Toulmin and his works in the top 10 among philosophers of science and philosophical logicians of the 20th century. Thus, he concludes, Toulmin's *Uses of Argument*, and Stephen Toulmin's work in general, have been essential contributions to twentieth century thought.

Toulmin himself (1958, p. 1) claimed no finality for his ideas. And indeed his model has been reshaped in various ways, his claims have been contested by some and in response reformulated by others, and some but not all aspects of his approach have been incorporated in applications in different domains. The present volume testifies to these developments.

3. THE SPECTER OF RELATIVISM

For example, Toulmin's field-dependency thesis—that the standards for evaluating an argument are internal to the field to which it belongs—has been alleged to imply an unacceptable relativism, according to which 'anything goes' and nobody outside the specialists in a field can object to the standards that those specialists have developed for their intra-field arguments. The current volume includes four distinct attempts to rescue Toulmin's model from this allegedly dire consequence. To judge by Toulmin's 2005 address printed in this volume, they are trying to rescue Toulmin from himself. The reader will have to judge whether Toulmin ought to be rescued and, if so, which of the four attempts offers the best salvation.

Of the four attempts, perhaps the closest in spirit to Toulmin's own position is **G. Thomas Goodnight's** "Complex Cases and Legitimation Inferences: Extending the Toulmin Model to Deliberative Argument in Controversy". Goodnight's chapter responds to an objection by Jurgen Habermas (1981) that Toulmin does not draw the proper lines between accidental institutional differentiations of argumentation and forms of argumentation determined by internal structure. In response, Habermas introduces his own differentiation of argumentation into theoretical, practical, aesthetic, therapeutic, and explicative discourse and critique (1981, p. 23)—a differentiation that according to Habermas properly weights the validity and proof requirements of each form of argumentation. Goodnight proposes to defend Toulmin's notion that reasoning is grounded in fields by adding

to Toulmin's model what Goodnight calls 'legitimation inferences'. A legitimation inference justifies the selection of backing to support a particular argument by justifying the choice of field in which to ground the argument. Such inferences, Goodnight argues, are of particular importance in what he calls 'complex cases'—cases where a number of reasons are potentially relevant but do not necessarily point in the same direction, and where a decision needs to be made to select some of them as grounds and discard others. Through the example of decision-making about risk, Goodnight argues that Toulmin's field-based approach, when supplemented by legitimation inferences, is superior to Habermas' proposed alternative.

A second attempt that, despite appearances, is close in spirit to Toulmin's own position is **Mark Weinstein's** "A Metamathematical Extension of the Toulmin Agenda". Weinstein accepts Toulmin's contextual, historical and field-dependent approach to understanding reasoning and argument in the sciences as exemplified by *Human Understanding* (1972). He notes that Toulmin presented a preliminary version of his model for the layout of arguments in his earlier work *The Philosophy of Science: An Introduction* (1953) and expresses admiration for his books on the history of science written in collaboration with June Goodfield (Toulmin and Goodfield 1961; 1962; 1965). But he is sensitive to a charge by Harvey Siegel (1987) among others that the absence of a foundation collapses Toulmin's theory of inquiry into an indefensible relativism. Weinstein argues that, although Toulmin is correct in his claim that formal models are of limited value as a way of expressing reasoning and argument in various sciences, there is an important place for formalism in the metatheory of such reasoning and argument. Conscious that Toulmin himself would be skeptical of such metatheoretical formalism, he nevertheless argues for what he calls a 'model of emerging truth' (MET) as an analogue of the metatheory of axiomatized mathematical theories. Unlike the metatheory of mathematics, which presupposes a domain of eternally existing objects and an assignment of once-and-for-all truth-values, Weinstein's proposed metatheory of the sciences allows for their historical development, both in terms of the embedding of one science in another and in terms of increasingly close approximations to an emergent truth. Truth, on Weinstein's model, becomes an ideal limit to which scientific inquiry can get closer as it develops. He advances his formal model as a way of providing a foundation for this Toulminian conception of scientific inquiry.

In "Toulmin's Model of Argument and the Question of Relativism" **Lilian Bermejo-Luque** points out that Toulmin himself criticized relativism, in his *Human Understanding* (1972), as a counterpart of the misconception of rationality as adherence to a deductivist ideal of knowledge. She notes that, despite this rejection of relativism, some scholars (e.g. Willard 1981) have read into Toulmin's theory of argument a deep relativism, according to which fields are independent sociological entities whose practices we can only describe—a view that she takes to imply that standards in different fields are incommensurable and incapable of appraisal from outside the field. She argues that this sort of relativism is unacceptable, and

interprets Toulmin's model in such a way that it provides an antidote against it. She argues, first, that recognizing a piece of discourse as argumentation does not require us to recognize the field to which it belongs, only that a claim is being made and reasons offered in support of it. Thus argument analysis is not field-dependent. As for argument evaluation, she begins by arguing for a rather unusual interpretation of Toulmin's warrants as inference claims, of the form 'if D (data) then C (claim)', construed as a particular material conditional, i.e. as logically equivalent to the statement 'not both D and not C'. The modal qualifier appropriate to an argument's claim, on Bermejo-Luque's interpretation, is a function jointly of the truth-value or acceptability value of the reasons and the warrant. She argues that construing the warrant as a general justification of the inference from reasons to claim is a holdover from deductivism, which Toulmin opposes. On Bermejo-Luque's interpretation of Toulmin's warrants, the role of fields is to provide a stock of accepted truth-values for propositions. At the end of her chapter, Bermejo-Luque addresses the question of whether her interpretation corresponds to Toulmin's own understanding of his model. She concludes that, whatever the answer to this question, construing the value of an argument as a function of the value of its reasons and warrant leaves little room for relativism.

James B. Freeman, in "Systematizing Toulmin's Warrants: An Epistemic Approach", takes relativism to be one of four problems with Toulmin's notion of field. He claims that, if fields are understood as the discourse of a particular community, whose members would be free to set standards, Toulmin's thesis that standards of evaluation are field-dependent "raises the specter of relativism". Further, it is unclear what counts as a field, there is no explanation of why we are entitled to take for granted the reliability of certain warrants (as Toulmin claims we must, on pain of infinite regress), and it is difficult to assign some warrants to fields as Toulmin construes them. To solve these problems, Freeman proposes to classify warrants epistemologically, on the basis of how it is to be determined that they are reliable. He takes a warrant to be a generalization of the associated conditional 'If D, then C' of an argument; to be reliable, it must be capable of supporting counterfactual inferences: Data such as D would entitle one to infer a claim such as C. On this basis, he excludes empirical generalizations that are merely accidentally true, whether universally or for the most part. Lawlike generalizations capable of supporting counterfactual conditionals divide into four main types, corresponding to four distinct modes of intuiting their truth: *a priori*, empirical, institutional and evaluative. Freeman illustrates the distinction with a contrast between a warrant whose reliability is ultimately established by empirical intuition and one whose reliability is ultimately established by institutional intuition. Rather than being classified by fields in Toulmin's original sense, warrants will be classified by the type of intuition on which their reliability rests. Freeman notes that his proposal preserves Toulmin's insight that different kinds of warrant require different kinds of backing.

4. WARRANTS

The contributions by Bermejo-Luque and Freeman open up the question of how we are to construe Toulmin's warrants. Bermejo-Luque, rather unusually, construes them as particular material conditionals, of the form 'If D, then C'. Freeman, in contrast, construes them as lawlike generalizations of an argument's associated conditional, of the form 'In any (almost any/any normal) situation of which D would be true, C would be true.' Two other chapters in the current volume offer rival interpretations of Toulmin's warrants.

James F. Klumpp, in "Warranting Arguments, the Virtue of Verb" approaches the task of construing Toulmin's warrants from the point of view of Toulmin's aim of producing a 'working logic' that can be used on the fly by real people dealing with real arguments. He notes that students in his field of speech communication have great difficulty distinguishing data from warrants when they are asked to cast the components of an argument into propositional form. As a solution to this problem, Klumpp proposes to use the word 'warrant' not as a noun but as a verb, 'to warrant', thus capturing Toulmin's original dynamic presentation of the process of defending a claim against a challenger. Klumpp distinguishes seven different strategies that Toulmin uses in his chapter "The Layout of Arguments" to define 'warrant'. He finds unhelpful those strategies that characterize warrants in terms of their propositional form. More helpful, Klumpp maintains, are strategies that appeal to the function of warrants: to authorize the taking of data as proof of a claim. To warrant, according to the dictionary, is "to provide adequate grounds for; justify; to grant authorization or sanction to (someone); authorize or empower". So Toulmin's question, "How do you get there?", to which the answer is the warrant, should in Klumpp's view be rephrased as, "How do those data warrant the claim?" And the best way of understanding this functional construal is to present the constituents of Toulmin's model as arising in a conversational interchange, as Toulmin himself initially presented them. This functional construal of warranting, Klumpp argues, puts warranting at the heart of Toulmin's working logic, contextualizes micro-arguments, is much easier for students to apply, and gives rhetorical critics a richer vocabulary for dealing with the texture of argument.

In "Evaluating Inferences: The Nature and Role of Warrants", **Robert C. Pinto** takes Toulmin's warrants to embody a proposal to take generalizations that are not logical truths as rules of inference. He notes that such other philosophers as Peirce (1955), Wilfrid Sellars (1953; 1963), Hitchcock (1985; 1998), and Brandom (1994; 2000) make similar proposals. In discussing such proposals, in particular those by Hitchcock and Toulmin, Pinto is led to a novel position about the virtues arguments and inferences should have if their premisses are to be considered properly connected to their conclusion, i.e. to provide adequate reasons for the conclusion. He shifts from the usual criterion of truth-preservation to one of entitlement-preservation: arguments and inferences capable of justifying their conclusion are those in which premisses that it is reasonable to embrace make it reasonable to embrace the conclusion. The shift to entitlement-preservation in turn leads Pinto to

appropriate from Toulmin's account of warrants a number of positions about the form statements expressing non-logical rules of inference should take: (1) Warrants when most candidly expressed take the form of granting an entitlement. (2) Warranting statements are general statements. (3) They should indicate the normative and action-guiding force of the warrant. (4) They should have a place for modal qualifiers, interpreted functionally. (5) When incorporated into the statement of a warrant, modal qualifiers should take the form of conveying entitlement to take a particular cognitive or doxastic attitude to a propositional content. (6) Warranting statements should acknowledge the existence of defeaters. (7) Determining whether a warrant has authority involves appeal not only to matters of fact but also to the goals and purposes of the reasoning that uses the warrant. On the basis of these principles, Pinto articulates an alternative account of warrants, an account that incorporates a qualitative 'evidence proportionalism' by licensing only doxastic attitudes toward conclusions that are appropriate to the evidence on which those conclusions are based. With this alternative account in hand, Pinto is then able to sketch an account of what makes a warrant reliable. He notes that such an account involves a critical appraisal of our inferential practices, as opposed to individual inference. Such practices, he holds, play certain roles in our lives, and their reliability is a function of how well they serve that role in the typical circumstances in which we rely on them. A reliable warrant is thus one that licenses a reliable inferential practice, and a reliable inferential practice is one that is objectively likely to produce an appropriate doxastic attitude in the typical circumstances in which we rely on it.

5. QUALIFIERS

Pinto's proposal to replace truth by doxastic and epistemic attitudes as the focus of arguments and inferences has far-reaching implications for our practice of argument evaluation. Additional arousal from our dogmatic slumbers comes from the defense by **Robert H. Ennis**, in his chapter entitled "'Probably'", of Toulmin's contextual definition in *The Uses of Argument* of this particular qualifier. According to Toulmin, "When I say 'S is probably P', I commit myself guardedly, tentatively or with reservations to the view that S is P, and (likewise guardedly) lend my authority to that view" (1964, p. 53). Thus the word 'probably' is given a speech-act interpretation. Ennis argues with great care that this interpretation not only is intrinsically plausible, but also fits the facts of our use of the term 'probably' better than its four current rivals: an objective specific numerical definition, an objective nonspecific numerical definition, an objective non-numerical definition, and a subjective numerical definition. Specifically, he subjects all five proposed definitions to three tests. Is a simple affirmative sentence containing 'probably' still meaningful enough in an argument-appraisal context when the proposed defining phrase is substituted for it? Does the proposed definition retain the inconsistency when someone asserts, "Probably p , but not p " for any proposition p ? When one

person says, “Probably p ”, and in the same situation another says, “Probably not p ”, does the proposed definition retain the inconsistency between the statements? Only Toulmin’s speech-act definition passes all three tests. In addition, it fits definitions of ‘probably’ in good dictionaries. Ennis then deals at length with substitution-in-different-contexts objections by John Searle, in his *Speech Acts* (1969), that result in Searle’s concluding that speech-act interpretations like Toulmin’s commit a so-called “speech act fallacy”. Ennis argues that Searle’s objections do not stand up to critical scrutiny.

Ennis also urges that, if we are to give advice about argument appraisal to fellow human beings, our focus should be on real arguments, not artificial arguments composed solely of propositions; and holds that real arguments consist of commitments and committings of various sorts, none of which are propositions (although the commitments and committings can be to propositions). Because conceptions of the relationships of deductive validity and inconsistency that are current in contemporary logic, which successively are necessity and contradiction between *propositions*, these conceptions require adjustment. Ennis sees deductive validity in real arguments as a relationship between commitments, and uses ‘inconsistency’ in its everyday sense. Thus Pinto’s construal of warrants as preserving entitlement to adopt a doxastic or epistemic attitude converges with Toulmin’s and Ennis’ focus on real arguments and a speech-act analysis of ‘probably’ to demand a radical shift in the concepts used to appraise arguments.

In agreement with Toulmin’s situational emphasis, and in tune with the human judgment required to decide whether and how strongly to commit, Ennis urges the importance, not only of criteria and standards of argument appraisal, but also of sensitivity, experience, background knowledge, and understanding of the situation on the part of the arguer and the argument appraiser. He also suggests that the computerization of the appraisal of most real arguments, if they contain ‘probably’ in the conclusion, is doomed.

6. REBUTTALS

One of the distinctive features of Toulmin’s model is its provision for rebuttals, exception-making conditions that undermine the authority of the warrant and may require retraction of the claim. In “The Voice of the Other: A Dialogico-Rhetorical Understanding of Opponent and Toulmin’s Rebuttal”, **Wouter Slob** uses Toulmin’s understanding of the rebuttal as the basis for incorporating into contemporary dialectical logic a substantial role of the opponent. Because dialectical logic treats all arguments as supportive, Slob argues, it does not take seriously its own dialogical perspective. Rather than treating the opponent’s role as simply that of requesting a proponent to defend a claim or an inference, dialectical logic should recognize that an opponent, in principle, can be called upon to defend a challenge as reasonable. Further, the counter-considerations that an opponent may introduce ought to be allowed to be of sufficient weight to justify such qualifiers of the conclusion as

‘probably not’ or ‘certainly not’. Thus the conclusion would be the result of supporting considerations and rebutting forces brought forward by both proponent and opponent. Toulmin’s rebuttal, Slob holds, allows for the introduction of counter-considerations. If we allow the rebuttal in Toulmin’s diagram to be developed, with data provided in support of a claim that some exception-making circumstances obtain, we allow for a robust ‘voice of the other’. Slob proposes an amplification of Toulmin’s diagram to accommodate such a robust voice, an amplification that he argues is superior to that proposed by Freeman (1991). Rather than focusing on how well supported is the conclusion, as dialectical logic does, we should see arguments as interchanges of supporting and rebutting forces, in what Slob calls a ‘dialogico-rhetorical’ approach.

Like Slob, **Bart Verheij** wishes to extend Toulmin’s conception of rebuttals so as to allow them to render a claim unsupported or defeated, despite the data offered in its support. In his chapter entitled “Evaluating Arguments Based on Toulmin Scheme”, Verheij develops his account of rebuttals in the context of a formal reconstruction of Toulmin’s scheme. He expresses the inference from data to claim by a conditional ‘if D then C’ that is defined only by the fact that one can apply modus ponens to it; it is not supposed to be a material conditional. The warrant in turn is expressed by a generalization of this conditional that covers the particular case mentioned in the data and claim. In both the inference claim and the warrant, the consequent can be qualified by any of Toulmin’s qualifiers, which Verheij leaves uninterpreted. As Verheij notes, Toulmin in *The Uses of Argument* described the function of rebuttals in various ways: as setting aside the authority of the warrant, as contesting the applicability of the warrant, as defeating the claim. Verheij’s formal reconstruction brings out that there are five possible targets in the data-warrant-claim part of Toulmin’s model against which a rebuttal can be directed: the data, the claim, the warrant, the inference claim ‘if D then C’, and the inference from warrant to the inference claim ‘if W, then if D then C’. Equipped with his formal reconstruction and his five types of rebuttal, Verheij constructs a theory of the evaluation status of the statements in an argument, according to which in relation to a given set of assumptions a statement can be either justified or defeated (contra-justified) or unevaluated. He provides for reinstatement of claims that have been defeated or left unevaluated. In his concluding remarks, Verheij notes that according to his formal reconstruction the main departure of Toulmin’s model from standard logical notions is its introduction of the concept of rebuttal. Contemporary work on defeasible argumentation carries forward this novelty of Toulmin’s approach.

7. EVALUATION

In *The Uses of Argument*, Toulmin gave no specific direction on how to evaluate arguments laid out according to his model. His subsequent co-authored textbook (Toulmin, Rieke and Janik 1979; 1984) proposed in summary form eight ‘essential merits’ of arguments: clarity on the kind of issues the argument is intended to raise, clarity on the underlying purpose of the argument, grounds relevant to the claim,

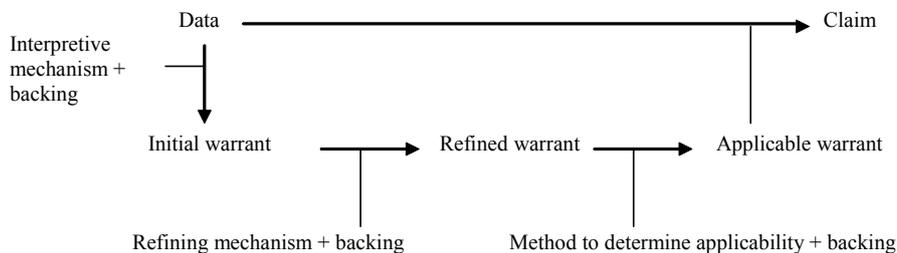
grounds sufficient to support the claim, warrant applicable to the case under discussion, warrant based on solid backing, modality or strength of the resulting claim made explicit, possible rebuttals or exceptions well understood (1984, p. 238). But it did not elaborate. Verheij's "Evaluating Arguments Based on Toulmin Scheme" thus not only reconstructs Toulmin's account formally but also repairs an omission.

David Hitchcock in his "Good Reasoning on the Toulmin Model" likewise supplements Toulmin's analytical model with a scheme for evaluation. Toulmin himself proposed his layout as a tool for analyzing micro-arguments arising in a process of justifying a claim that articulated one's prior belief. He explicitly set aside the question of how someone might come to adopt the belief in the first place, as part of a process of inquiry. Hitchcock maintains, however, that one can apply Toulmin's model to inquiry as well, where one begins with a question to which one does not know the answer. He proposes criteria for reasoning that is directed at working out such an answer on the basis of information available to the reasoner. According to Hitchcock, good reasoning requires the fulfillment of four conditions. First, the grounds on which the reasoning is based must be justified. Hitchcock discusses the sources for such grounds. He notes that no sources for justified grounds are infallible and then provides a list of the most trustworthy ones: direct observation, observation records, memory, personal testimony, expert opinion, reference sources and previous good reasoning. Each of these sources is addressed from the perspective of a reasoner trying to answer a question. The second condition that must be fulfilled is that the reasoning is based on a justified, general warrant. As Hitchcock points out, good reasoning is not a function of the correctness of the warrant. What counts is whether the reasoner is justified in accepting the warrant at the given time and in the given context. This resource-awareness of Hitchcock's approach shows even more clearly in the third condition: the information used for the reasoning must be adequate. This adequacy includes the practical obtainability of the information, both in the sense of time and effort and in the sense of importance of the question to be answered. The fourth and final condition of good reasoning proposed by Hitchcock is that the reasoner must be justified in assuming that there are no exceptions to the warrant. This can for instance be the case when one knows of no exceptions, not even after a pragmatically justified search.

8. PRACTICAL REASONING

Toulmin claimed in *The Uses of Argument* that his model was invariant across fields. What varied, he thought, was the nature of the backing used to establish the authority of the warrants in a particular field. The field-invariance component of Toulmin's approach has come under attack from investigators of practical reasoning, especially legal reasoning. They point out that, in contrast to the single, static, established warrant of Toulmin's diagram, practical discourse—discourse that applies rules, principles and standards to decisions about what is to be done—needs to take account of a variety of sometimes conflicting rules and considerations.

Toulmin's diagram fits easy cases, where there is no controversy about which rule applies, how it is to be interpreted or what the facts of the case are. It does not fit hard cases where there is controversy about one or more of these questions. **Olaf Tans**, in "The Fluidity of Warrants: Using the Toulmin Model to Analyse Practical Discourse", argues however that, if we look beyond Toulmin's diagram to what he says in *The Uses of Argument* about the construction of micro-arguments, we can find the resources for a dynamic interpretation of how warrants unfold in practical discourse. On Tans's reading, Toulmin's theory accommodates three aspects of argumentation. First, we take steps from a foundation to a conclusion; these may include not only the familiar step from data to claim, but also an inference of the data from evidence or an induction of a preference for one warrant when two contradictory warrants are applicable. Second, we use backing, qualifier and rebuttal to test the authority of a given warrant. Third, as the argument unfolds, the warrant to be applied is tested, refined and adjusted to fit the case at hand. Tans finds this structure in the argumentation of the United States Supreme Court in a celebrated case involving the authority of the United States Congress to implement a treaty by regulating the killing of migratory birds. In the court's argument, Tans finds a sequence of three processes: initial construction of a warrant on the basis of the facts of the case and the relevant legal sources; refinement of the warrant in the light of backing, qualifiers and rebuttals; application of the warrant at a certain stage of this refinement process to the case at hand. Tans captures these three processes in a revised version of Toulmin's diagram, one that shows the data being used to generate an initial warrant, which in turn generates a refined warrant, which in turn generates an applicable warrant, which then authorizes the step from data to claim:



Tans points out a number of respects in which this analysis differs from the standard Toulmin model: the initial warrant is drawn from data; it undergoes change to fit the case at hand; the role of qualifier, rebuttal and backing is to help refine the initial warrant to make it applicable; and backing supports all the steps taken to arrive at an applicable warrant. Despite these differences, Tans regards his model as an elaboration rather than a refutation of Toulmin's theory, and indeed an elaboration foreshadowed by Toulmin himself in *The Uses of Argument* in the distinction between a warrant-using and a warrant-establishing argument.

Legal reasoning, of the sort that Tans discusses, has attracted the attention of researchers in artificial intelligence. In “Artificial Intelligence and Law, Logic and Argument Schemes”, **Henry Prakken** explores the extent to which these researchers have taken to heart the lessons of *The Uses of Argument* for modeling legal reasoning. Prakken uses the perspective of argumentation schemes as they are studied in argumentation theory to discuss research into the application of artificial intelligence ideas to the field of law. Prakken notes that argumentation schemes can extend an approach to legal argumentation that is based on formal logic. Whereas logic focuses on form, argumentation schemes allow the specification of other considerations than purely formal ones, for instance epistemological or pragmatic. Prakken argues that much work on the application of artificial intelligence to the field of law can be regarded as taking an argumentation schemes approach. He divides legal problem solving into three main phases, viz. proof of the facts, rule interpretation and rule application, and subsequently shows how work dealing with these phases can be approached in terms of argumentation schemes. The chapter ends with a discussion of the extent to which the main lessons of Toulmin’s work have been taken into account in the field of artificial intelligence and law. Prakken notes that especially Toulmin’s points that argument premisses can play different roles, that arguments are defeasible and that evaluation criteria are field-dependent are adhered to.

Christian Kock points out in his “Multiple Warrants in Practical Reasoning” that both Toulmin in *The Uses of Argument* and the pedagogical applications of his theory focus much more on arguments in support of the truth of some proposition than on arguments in support of a policy. Brockriede and Ehninger, in their influential Toulminian typology of warrants (1960; 1963), distinguish only one type of warrant, a ‘motivational’ warrant, as available to support practical claims about what course of action to pursue. Kock argues that we need to distinguish different types of motivational warrants, because they belong to different and incommensurable dimensions—a feature of our practical reasoning on which Toulmin did not focus. In his co-authored textbook (Toulmin, Rieke and Janik, 1979), for instance, there is no distinction among warrants for practical claims. Kock finds the resources for a typology of practical or ‘motivational’ warrants in what is probably the oldest rhetorical handbook in the western tradition, the *Rhetorica ad Alexandrum*. The author’s dictum as to what one must show when one exhorts an audience to do something constitutes, on Kock’s interpretation, an inventory of the incommensurable dimensions relevant to deciding what to do: justice, lawfulness, expediency, nobility, pleasure, ease of accomplishment, necessity, practicability. With no calculus available to weigh up these incommensurable values against one another, we must support our preferred ranking with rhetorical appeals to analogy, to difference and to examples, as well as with rhetorical devices of amplification and diminution.

Toulmin himself proposes a qualitative weighing approach to such situations, an approach also endorsed by the 17th century philosopher Leibniz. **Txetxu Ausin** argues in “The Quest for Rationalism without Dogmas in Leibniz and Toulmin” that

Leibniz shares the situated approach to practical reasoning exemplified in Toulmin's attack on 'the tyranny of principles' (1981) and his promotion of a 'new casuistry' (Jonsen and Toulmin, 1988). Like Toulmin in *Return to Reason* (2001), Leibniz wished to strike a balance between the legitimate demands of formal models of rationality and the lessons of a historically and socially situated practice. Also like Toulmin, he turned to jurisprudence as his model for reasoning about contingent matters. Ausín notes the gradualism of Leibniz, which permits degrees of licitness or illicitness, and suggests that both Leibniz and Toulmin could endorse fuzzy logic as appropriate for a working logic of such nuanced verdicts. Leibniz and Toulmin, he concludes, share a soft rationalism, open to difference, pluralism and controversy—a 'rationalism without dogmas'.

9. APPLICATIONS

As the saying goes, the proof of the pudding is in the eating. In this context the proof, or test, of Toulmin's model is in the results of its application in various fields. The just-mentioned contributions have revealed a need to extend the model when it is applied to legal and other practical argumentation, while at the same time retaining the core of Toulmin's insight that real argument uses material warrants as rules of inference and is defeasible.

How does Toulmin's model fare when applied in other fields? In their chapter "From Arguments to Decisions: Extending the Toulmin View", **John Fox** and **Sanjay Modgil** report on their adaptation of the Toulmin model to provide computational decision support for clinical decision-making in the field of medicine. Their research is based on a varied methodology, which is imperative given the admirable multidisciplinary nature of their research context. They have systematically observed medical professionals, they have designed and tested decision support software for the medical domain and they have done foundational work in argumentation theory. In the course of this research, a Logic of Argument has been developed, in which several elements of Toulmin's model are recognizable, in particular warrants, backings, rebuttals and qualifiers. In Toulmin's spirit, they specify several possible backings that can provide justification for the warrants underlying medical argumentation, as follows: general medical knowledge and scientific principles; objective evidence from clinical observations and trials; the authority of professional organizations; a local hospital policy; and the clinical judgement of an individual doctor. Fox and Modgil pay special attention to the occurrence of competing claims with several arguments for and against them. This requires the assessment of the relative confidence in such claims, a topic not addressed by Toulmin. Fox and Modgil discuss a set of qualifiers in terms of argument relations. For instance, they take 'P is possible' to mean that there is an argument that supports P and no argument that rebuts it. As an illustrative parallel, they mention the standardization of risk categories by the International Agency for Research on Cancer concerning claims of the form 'Chemical X causes cancer',

where for example the qualifying term ‘probable’ stands for ‘There is better evidence than merely recognition of possible carcinogenic activity’. A further topic treated by Fox and Modgil is what they call stopping rules. Stopping rules provide criteria for answering the question: when can argumentation safely stop and commitments be made? In practical domains such as medicine, the safety that should be assured by stopping rules is especially tangible. Fox and Modgil discuss an epistemic and a utilitarian stopping rule. They have applied their research to the assessment of suspected breast cancer, to the prescription of drugs for common conditions, and to the assessment of genetic risk of cancer.

Another area where the Toulmin model has been applied is the law. The starting point of **John Zeleznikow**’s “Using Toulmin Argumentation to Support Dispute Settlement in Discretionary Domains” is the need to deal with discretionary decision-making when developing software support in the domain of law. Whereas the positivist aspects of legal decision-making, i.e. those determined by legal sources such as legal statutes, can be fruitfully modeled in by now classical rule-based expert systems, discretionary decision-making requires another approach. Zeleznikow explains that he and his coworkers have selected neural network technology to allow for the modeling of discretion. They noted certain problems with this approach, and turned to Toulmin’s argument model in an attempt to deal with these problems. In one of the projects that Zeleznikow describes (Split-up, dealing with software that supports decision-making about the distribution of marital property), the connection between data and claim in Toulmin’s model is implemented by a neural network trained on the basis of existing decided cases. The neural network plays the role of a so-called ‘inference warrant’, and the training of the network is its backing. Which data are relevant for determining a conclusion is determined by ‘relevance warrants’, which can be backed by statutes and cases. Zeleznikow describes a number of other projects in which he and his group continue on this approach. Zeleznikow and his group have for instance addressed eligibility for legal aid, evaluation of eyewitness evidence, refugee law and sentencing. He also reports on the use of Toulmin argument structures to build an online dispute resolution environment with the goal to provide software that can help to avoid litigation.

James F. Voss reports in his chapter entitled “Toulmin’s Model and The Solving of Ill-Structured Problems” on the use of Toulmin’s model to study how experts solve ill-structured problems. Ill-structured problems differ from well-structured problems in having a vaguely stated goal, requiring retrieval of constraints from outside the problem statement, admitting a variety of ways of representing the problem and working out a solution, having plausible or acceptable solutions rather than right or valid ones, typically eliciting supporting argument for a proposed solution along with arguments against alternative solutions, not admitting final solutions, and needing a database that makes simulation difficult. The argumentative and rhetorical features of solutions to ill-structured problems made them suitable for analysis using the Toulmin model. In their study, Voss and his co-investigators used the Toulmin model to analyse written transcripts, generally about 10 paragraphs long, of tape-recorded oral responses

by experts on the Soviet Union to the problem of how to improve agricultural productivity in that country. In order to model the highly developed arguments found in their transcripts, Voss and his co-investigators found it necessary to make six extensions to the Toulmin model. First, they allowed the claim of one argument to be the datum of another, thus permitting the chaining of arguments together. Second, they introduced an explicit definition of an implied warrant. Third, they allowed the backing to be an argument. Fourth, they allowed such backing arguments to have a rebuttal. Fifth, they allowed the qualifier to be an argument. Sixth, they allowed the rebuttal to be an argument. With these extensions, the investigators were able to code the components of a complex line of argument using Toulmin's terminology. But it was difficult to tell whether a given statement was datum or backing, and they almost never found a stated warrant. Furthermore, Toulmin's model did not provide information concerning the problem-solving process as a whole, for the analysis of which the investigators used another model. Toulmin-type argumentation thus turned out to be embedded in a higher-level problem-solving process.

We find another specific application of Toulmin's model in the chapter by **Manfred Kraus** entitled "Arguing by Question: A Toulminian Reading of Cicero's Account of the Enthymeme". Cicero in his *Topics* describes an argument from contraries, called by rhetoricians an 'enthymeme', which he says "springs from" the third undemonstrated argument of Stoic propositional logic. He gives as an example a line in iambic verse: "Do you condemn this woman whom you accuse of nothing?" Such compressed rhetorical questions can be reconstructed as valid arguments of the form: Not both p and q; q; therefore not p. The example would have the form: Not both you condemn this woman and you accuse this woman of nothing; you accuse this woman of nothing; therefore, you do not condemn this woman. The logical form is impeccable, but Cicero's formal analysis fails to bring out how dubious such rhetorically framed arguments are, and thus needs to be supplemented. Toulmin's model, Kraus argues, provides exactly what is needed. The conclusion is the claim, and the second premiss the datum. The negated conjunction is the warrant. But this warrant must be interpreted as postulating some incompatibility between the conjuncts, in order to have some basis independent of the truth of the conclusion to be proved. And the alleged incompatibility will require backing, which as Toulmin says will be field-dependent. As it turns out, in every one of Cicero's examples, the available backing does not support an unqualified universal warrant. Hence the negated conjunction requires qualification and the conclusion must be accompanied by acknowledgement of a potential rebuttal. The weakness of the warrant explains why the argument is phrased as a rhetorical question. A rhetorical question puts strong psychological pressure on the addressee to provide the anticipated response, and thus compensates for the epistemological weakness of the warrant. In Cicero's examples, Kraus finds a small number of topical argumentative patterns that constitute the backing for the incompatibility warrants in a rhetorical enthymeme. Once these topical patterns are detected, it is easy to detect the appropriate rebuttals. Kraus's analysis demonstrates the insight that can be gained by applying Toulmin's model as a supplement to a formal analysis.

Toulmin explicitly characterized his model as a jurisprudential one focused on procedure, rather than a mathematical one focused on a quasi-geometrical ideal (1958, p. 95). It would be easy, then, for a casual reader to think that his model was not intended to apply to mathematical proofs, which were the focus of the logical tradition against which he was setting himself. But **Andrew Aberdein** argues, in “The Uses of Argument in Mathematics”, that Toulmin’s layout of arguments can represent the structure of arguments in mathematics. A ‘critical’ argument in mathematics, i.e. one that challenges a prevailing mathematical theory or seeks to motivate an alternative, is an argument about mathematics rather than in it, and so is just as amenable as any other critical argument to analysis on the Toulmin model. Aberdein cites as an example a Toulminian analysis of a critical argument by Ernst Zermelo and others for admitting the axiom of choice as an axiom of set theory. The challenge is to see how well Toulmin’s layout models ‘regular’ arguments in mathematics, i.e. mathematical proofs. Aberdein finds quite satisfactory Toulmin’s own use of his model to represent the proof by the ancient mathematician Theaetetus that there are exactly five platonic solids (Toulmin, Rieke and Janik, 1979). Further, Aberdein notes that Toulmin’s qualifier permits the analyst to represent which steps in a non-constructive classical proof are constructive, thus flagging those components that are problematic from a constructivist point of view. He also considers the charge by some critics that the abstraction of diagrams like Toulmin’s makes different and even incompatible reconstructions possible. For a number of proofs where different reconstructions are possible, he shows that these differences reflect ambiguity in the original text, and thus provide a useful service of clarification. A particularly difficult challenge comes from two competing reconstructions using the Toulmin model of the proof of the four colour theorem, the theorem that four colours may be assigned to the regions of any planar map in such a way that no two adjacent regions receive the same colour. The proof of this theorem is so long that no human being has ever reviewed all its steps; instead, a computer has constructed the lengthiest part of the proof on the basis of an algorithm produced by a human being. Aberdein attributes the difference in the reconstructions of the proof to the fact that one of them restricts itself to the only sort of defeater recognized by Toulmin, a rebuttal that shows that the conclusion is false, whereas the other allows an undermining defeater (Pollock, 1987) showing that the conclusion does not follow. Since all defeaters of mathematical proofs are undermining defeaters, whether or not they also rebut the conclusion, Aberdein proposes to add undermining defeaters to the rebuttals that Toulmin recognized, in order to recognize as a potential defeater of the proof of the four-colour theorem an error in our human mathematical reasoning or in the hardware or firmware on which the algorithm establishing the data has been run.

10. COMPARISONS

Diagramming is a standard technique for representing the structure and content of arguments, both in pedagogical contexts and in certain professions such as law. But

diagramming on the Toulmin model is not the only available method. A popular alternative is the sort of box-and-arrow diagram introduced by Beardsley (1950). As **Chris Reed** and **Glenn Rowe** point out, in their chapter entitled “Translating Toulmin Diagrams: Theory Neutrality in Argument Representation”, each diagramming technique involves deep assumptions about the nature of argument. Thus translating diagrams of one sort into diagrams of the other is more than a technical task of transforming pictures: it involves the integration of the two underlying theories. In their chapter, Reed and Rowe report on how they have accomplished this integration and implemented it computationally in their software Araucaria. In the process of doing so, they provide a comparison of Toulmin’s theory of argument structure to the theory underlying box-and-arrow diagrams, which they call the ‘standard treatment’. Reed and Rowe took as their objective to work out theoretically and implement computationally a system of storing in a common interlingua diagrams constructed using either theoretical framework, in such a way as to make possible a consistent and deterministic conversion, without input from the user, from one type of diagram to the other, with no impact on analysts working within one theoretical framework of the idiosyncratic features of the other. They report that the atoms recognized by the two theories, such as a Toulminian datum and a standard treatment premiss, are the same. They argue that a Toulminian datum-warrant-claim (DWC) structure corresponds to a standard treatment structure of a linked argument with two premisses. A standard-treatment linked argument with more than two premisses corresponds, they hold, to a Toulminian DWC structure with a single datum and multiple warrants. To permit translation into a Toulminian diagram of the complex argument structures recognized by the standard treatment, they propose to allow any of the five ancillary components in a single Toulmin argument (data, warrant, backing, qualifier, rebuttal) to be a claim in another Toulmin argument; the resulting recursive definition allowing for Toulmin arguments of arbitrary complexity has been widely adopted in computational implementations of the Toulmin model. Analogously, they allow multiple Toulminian components in support of a single claim. Toulmin’s qualifiers correspond to a degree of support used in the standard treatment to label an arrow between two argument components. The backing in Toulmin’s model is difficult to distinguish from the data offered in support of a warrant that is supported by a sub-argument; if the distinction has meaning in Toulmin’s framework, it disappears on translation into the standard treatment. On translation back from a standard treatment analysis to Toulmin’s framework, the default decision is to translate premisses offered in support of a warrant as data in a new argument with the warrant as its claim. The most troublesome and theoretically interesting component of Toulmin’s model for translation purposes is his rebuttal. Unlike Aberdein, Reed and Rowe treat Toulmin’s rebuttal as what Pollock (1987) calls an ‘undercutter’. They consider four ways of translating rebuttals into a standard treatment diagram, and opt for representing it as a counter to an implicit premiss, e.g. that no exceptional condition obtains, which in the standard treatment might be part of an argument scheme. The two frameworks thus handle undercutters in distinctively different

ways, Toulmin's by identifying multiple forms of inference and the standard treatment by treating them as counters to implicit premisses within a basically deductivist model. Reed and Rowe store analyses couched in either theoretical framework in an Argument Markup Language (AML), whose scheme is thus the 'deep structure' from which various kinds of analyses can be generated.

Fabio Paglieri and **Cristiano Castelfranchi** undertake a comparison of a different sort in their chapter entitled "The Toulmin Test: Framing Argumentation within Belief Revision Theories". Their focus is the relation between theories of belief revision and theories of argumentation. In their delineation of the terms, Paglieri and Castelfranchi regard belief revision theories as dealing with an agent changing his mind in the light of new information and argumentation theories as being about agents trying to persuade other agents to believe something. The main goal of the chapter is to start the investigation of how belief revision and argumentation are systematically related. The method underlying the chapter is to apply what Paglieri and Castelfranchi call the 'Toulmin test' to two theories of belief revision, namely the canonical Alchourrón-Gärdenfors-Makinson version of belief revision (AGM) and their own Data-oriented Belief Revision (DBR). The Toulmin test is whether one can map Toulmin's argument model onto a belief revision theory. They argue that AGM belief revision fails the test in two ways. First it cannot distinguish between new information that comes to be believed and new information that fails to be believed. This is related to the so-called, much-debated, success postulate underlying the original AGM approach: new information simply is believed after a belief change. The second and more severe failure of AGM belief revision is that it does not distinguish structure in doxastic states, and this prevents it from encoding even the simplest forms of argumentation. For instance, there is no notion of beliefs being reasons for other beliefs. DBR belief revision fares better on these points. The success postulate is left behind by considering belief change as a two-step process: new information directly affects an agent's data structure (to be distinguished from his belief set), which in turn can lead to a change in the agent's beliefs. Whether a belief change occurs is determined by structural relationships with other data and by a process of belief selection. The belief selection process uses relevant properties of data, for instance their relevance, credibility, importance and likeability, to assess whether they are believed or not. Paglieri and Castelfranchi discuss how elements of Toulmin's model can be implemented in their DBR approach and discuss some extensions. They treat the topic of focusing in argumentation and include a discussion of plausibility.

11. REFLECTING ON TOULMIN

In the final chapter in this volume, "Eight Theses Reflecting on Stephen Toulmin", **John Woods** engagingly confesses that he himself was part of the early resistance among philosophers to Toulmin's ideas. Influenced by developments in computer science, cognitive psychology and logic in the last 40 years, Woods now recants that

resistance. His eight theses are stimulated in part by Toulmin's theoretical approach, and in part by his example.

Woods defends his first thesis, that validity is nearly always the wrong standard for real-life reasoning, on the ground that the cognitive limitations and situatedness of human beings make the necessary truth-preservation that is the hallmark of validity the wrong standard in most situations: it is unattainable and too brittle. Here Woods endorses Toulmin's recognition that our warrants, and thus our claims, are often qualified—an endorsement that virtually all the contributors to this volume share.

Woods' second thesis is that the probability calculus distorts much of probabilistic reasoning. In contrast to mathematical theories of perspective and continuity, he argues, the mathematical theory of probability developed by Pascal does not supersede and displace the pre-mathematical treatment of it. In fact, Woods notes, we often use the word 'probable' as a synonym for the non-quantitative term 'plausible'. This residue of our earlier usage, not covered by Pascalian probability, has its own place. Woods' third thesis is that scant resources have a benign influence on human reasoning. In support of this thesis, he notes that individual human beings do not have enough information, time, computational capacity, infrastructural support and money to adhere on their own to standards of deductive or inductive reasoning. For an individual human being, falling short of those standards is not a fault, but to be expected. Recognition of our resource constraints implies a fallibilist epistemology, one that allows for defeat of previous reasoning by new information. Woods' fallibilism accords with the universal recognition by our contributors of the role of defeaters in argumentation, a role first made widely popular through the concept of rebuttal in Toulmin's model.

Woods' fourth thesis is that conceptual change drives scientific advancement, a thesis that he finds subtly defended in Toulmin's *The Philosophy of Science* (1953). Woods' fifth thesis is that logic should attend to the cognitive aspects of reasoning and arguing. Although there is no place for psychology in set theory, model theory, recursion theory or proof theory, there is a place for psychology in the logic of agent-based reasoning, which must attend to how human beings actually do reason. Woods' thesis chimes with Toulmin's call in *The Uses of Argument* for an applied logic that the man in the street can use (1958, pp. 1, 254-255), though Toulmin himself was averse to introducing psychological considerations into the study of argument. Woods' sixth thesis is that ideal models are unsuitable for determining normativity. The fact that something is analytically true in a certain model (e.g. that in rational decision theory the best option in a situation of decision-making under risk is the one that maximizes expected utility) does not make it true. To get our normative bearings, Woods argues, we do better to look to our actual practice rather than to an ideal model, because we know that by and large our practice enables us to survive and flourish. Woods' call to base our norms on how human beings actually reason and argue is reflected in Toulmin's field-dependency thesis, according to which the backings for our warrants, and thus the standards by which our arguments are to be appraised, are the standards of the argument's field as they exist at the time.

Woods' seventh thesis is that what he calls the 'Can Do Principle' should be applied with caution. The Can Do Principle is to use what we can do to deal cognitively with a new situation; for example, if we have an axiomatized probability theory, we apply it to everyday reasoning about probabilities. Toulmin's lifelong emphasis on the contextuality and situatedness of our reasoning corresponds exactly to Woods' note of caution about the Can Do Principle; to impose abstract schemes on complex realities without regard for their complexities is both anathema to Toulmin and a violation of Woods' thesis. Woods' eighth and final thesis is that domain-specific logics are as welcome as they are unavoidable. Woods points out the difficulties that have faced the project of constructing a logic that is a universal foundation of the sciences, for example in applying it to quantum mechanics. He thus warmly embraces Stephen Toulmin's idea that logically correct reasoning be made sensitive to disciplinary peculiarities.

12. SYNTHESIS

When we look back at the chapters in this volume, what can we say in general about the contemporary appropriation of the Toulmin model? The first and most obvious point to make is that Toulmin's model has had, and continues to have, an enormous influence on the study of argumentation. The citation indexes consulted by Loui put this point beyond doubt. It is reinforced by the number, scholarly excellence, geographical range, and disciplinary breadth of the contributions to this volume. Here are 24 substantial articles by 27 scholars from 10 countries on three continents, working in an interdisciplinary domain ranging from artificial intelligence via philosophy to speech communication—all of them addressing directly Toulmin's work on argument, especially his famous model. And they are doing so from the perspective of their contemporary work, not from a purely historical perspective.

Part of the explanation for the influence of Toulmin's 'layout of arguments' is its simplicity. As Toulmin himself says in this volume, it was never intended to be a comprehensive theory of argumentation. It formed part of Toulmin's case, made against the background of British analytic philosophy of the 1950s, for a new turn in logic. Precisely because it was so incomplete, it has leant itself to varying interpretations, extensions and amendments. An obvious extension, exhibited in several chapters in this volume, is to allow the chaining together of Toulmin argument structures by transforming into the claim of a new argument any of the six elements in a given argument—even its claim, for which a new independent argument can be made. Another extension, exhibited for example in the chapters in this volume by Verheij, Aberdein and Slob, is the development of Toulmin's ambiguous conception of a rebuttal into a comprehensive doctrine of argument defeaters, including at least the distinction between rebutting defeaters and undercutting defeaters (Pollock, 1970). A third extension, exhibited in textbooks by Brockriede and Ehninger (1963) and by Toulmin himself and his collaborators (Toulmin, Rieke and Janik, 1979), as well as in chapters in the current volume by

Freeman and Kock, is the development of a taxonomy of warrants, which may be grounded sociologically, epistemologically or in some other way. Typologies of argumentation schemes, with their associated critical questions, may be interpreted as taxonomies of warrants, even though the concept of an argumentation scheme stems from a different source, *The New Rhetoric* of Chaim Perelman and Lucie Olbrechts-Tyteca (1958/1969). A fourth extension, articulated in different ways by Olaf Tans and Thomas Goodnight in the current volume, is to allow argumentative development of a warrant appropriate for the issue at hand, thus making warrants dynamic. A fifth extension, illustrated in the current volume by the chapters of Freeman, Verheij and Hitchcock, is to develop a system for evaluating arguments when they are analyzed on the Toulmin model.

Not everything in Toulmin's simple model has stood the test of time, but much has. Virtually all contributors to the current volume accept that rules of inference can have material content, and can be modally qualified. The latter shows most explicitly in Woods' remarks about our concept of the probable, in Ennis's defense of Toulmin's speech-act interpretation of the word 'probably', and in Fox and Modgil's qualitative interpretations of Toulmin's qualifiers. With qualification comes the possibility of defeaters, i.e. what Toulmin called 'rebuttals'. And with all this apparatus comes inevitably the recognition of different roles for the premisses of traditional logic: data supporting a claim, backing for a warrant, counters to potential rebuttals. Further, though Toulmin's field-dependency thesis has its critics, and can be given different interpretations, the idea that standards of logical appraisal vary by field is accepted by a good number of contributors to the current volume, and has received computational implementation in the decision support systems referred to in the chapters by Fox and Modgil and by Zeleznikow.

In his 1958 volume, Toulmin decried the mathematical logic of his day and called for an applied logic that would combine logic and epistemology. A striking development since then has been an increasing rapprochement between Toulmin's ideas and formal logic. We can see this in all the work in artificial intelligence that uses argumentation, work illustrated in the current volume by the contributions of Fox and Modgil, Paglieri and Castelfranchi, Prakken, Reed and Rowe, Verheij and Zeleznikow. It is evident as well in the chapter by Woods, which is explicitly a recantation of Woods' earlier expressed skepticism, and in the attempt of Weinstein to give Toulmin's contextualized and historicist philosophy of science a meta-mathematical foundation. Those with a visceral antipathy to formalisms of all kinds may decry these developments. Those who appreciate the precision of formal treatments, with their externalization of components often left implicit in natural language communication, will welcome them.

Two related issues in particular stand out from this volume as being part of ongoing debate. The first is what if anything to do about the apparent relativism involved in making standards for the appraisal of argument dependent on what the practitioners in the relevant field have come to agree upon at a particular time. Toulmin himself in his introductory chapter seems to counsel: do nothing, because the relativism is not pernicious. But be modest about what you think you have

accomplished in your work in your own discipline. Other contributors to this volume are not so insouciant. Goodnight, Weinstein, Bermejo-Luque and Freeman each propose a distinctive route to firmer ground.

The second issue is how to interpret Toulmin's warrants. This volume includes proposals to take them as singular essentially truth-functional conditionals (Bermejo-Luque), as generalizations of conditional inference licenses (Hitchcock), as generalizations of singular defeasible conditionals (Verheij), as law-like generalizations supporting counter-factual claims (Freeman), as authorizations of entitlements (Pinto), and as acts of authorizing (Klumpp).

A novel development in these chapters is a reclassification of the claims that we support by argument. Pinto in his chapter construes the presentation of an argument as justifying a certain doxastic attitude to a proposition, rather than the proposition itself. A similar idea emerges quite independently from Ennis's defense of Toulmin's speech-act analysis of the meaning of the word 'probably'. It is the idea that the conclusion of an argument is not a proposition, or a sentence, or a statement—in a word, not something that can be true or false—but an act. According to Toulmin, "When I say 'S is probably P', I commit myself guardedly, tentatively or with reservations to the view that S is P, and (likewise guardedly) lend my authority to that view" (1964, p. 53). If we accept this analysis, then a conclusion like 'The raccoon will probably not bother you' is a speech act, and its acceptance would be, as Pinto claims, the adoption of a certain doxastic attitude to the embedded proposition. If so, we need a wholly new approach to the analysis and the evaluation of arguments. We predict that this development will continue.

How can we sum up Toulmin's distinctive contribution? He has consistently defended the local and the particular over against the decontextualized universal. His most recent book *Return to Reason* (2001), for example, celebrates the renewed contemporary appreciation of 'the reasonable' in preference to 'the rational', in the sense of the abstract a priori rationality that has dominated modern thinking since Descartes. The present volume gives evidence of a wide appreciation for Toulmin's celebration of the reasonable. But the attraction of the universal understandably remains very strong. In fact, the search for the universal has given us deep and important results. But while we dream of the universal, we should never forget about the particular that's before us here and now.