Book reviews

Sidney Greenbaum (ed.), *Comparing English Worldwide: The International Corpus of English*. Oxford: Clarendon Press, 1996. ISBN 0-19-823582-8, xvi+286 pages.

Most of the work that has gone into compiling English-language corpora since the pioneering Brown Corpus in the 1960s has been devoted to American or British English, which are the standard languages of the two societies with the largest communities of English-speaking computational linguists, and the English varieties with most significance in the context of commercial language engineering. But Britain and the USA are not the only English-speaking countries. The International Corpus of English (ICE), an enterprise initiated by Sidney Greenbaum in 1989 whose participants are oriented more towards arts-based language studies than to industrial applications, aims to develop a co-ordinated collection of 'World Englishes'. When complete, ICE will contain a subcorpus for each of 18 countries or regions, in some of which (e.g. Australia) English is the native language, while in others (e.g. Nigeria) it is the common language of public life although few inhabitants' mother tongue. This book, containing 19 chapters by different participants in the ICE effort, is the first easily accessible survey of what is planned and what has been achieved.

Each ICE subcorpus is intended to resemble Brown and LOB in comprising 500 samples each of 2000 words, but half the samples will be speech, and the written samples will include manuscript as well as printed material. The period represented will be the 1990s, though some teams have had to ignore the original planned cutoff of 1994. Samples are intended to represent the 'educated' or 'standard' English of the respective country, but this is a highly problematic concept – the book contains many references to debates about whether countries such as Nigeria can be described as having a separate local standard variety of English, and/or whether it is desirable for them to develop one. Like Brown and LOB, the ICE subcorpora aim to allot subsets of their samples to different genres in a systematic way, but mechanical equivalence is not possible because of the varying roles of English in different societies; thus Philip Bolt and Kingsley Bolton of the ICE-Hong Kong team point out that newsreaders on English-language television and radio stations in Hong Kong are usually expatriates. ICE itself does not include the English of people who have learned English as a foreign language in countries such as France, but a chapter by Sylviane Granger describes a sister project, the International Corpus of Learner English, which aims to fill this gap.

ICE lays stress on securing copyright permissions for the material it uses, so that the output can eventually be freely published. Because the participating teams are independent groups responsible for finding their own support, their progress is inevitably unequal. Greenbaum states that each subcorpus is envisaged as being annotated with wordtags and parsing information, but at the time of writing this was implemented only for the British subcorpus; and 'implemented' here seems to mean that the work is under way, not that it has been completed. No subcorpora are yet available for public distribution, in annotated or unannotated form, though it sounds as though some of the unannotated versions are close to completion.

Even without grammatical annotation, the texts require considerable markup for matters such as typographic details and overlaps between speakers' utterances. The markup used is

influenced by SGML; some contributors state that it is SGML, but this seems to refer to 'cosmetic' aspects, for instance start and end tags in the form ⟨...⟩, ⟨/...⟩, and use of ISO 8879 & ...; codes for non-ASCII characters. Edward Blachman, Charles Meyer, and Robert Morris of the USA ICE team make it clear that the ICE markup is *not* SGML in the sense that it is not controlled by an explicit Document Type Definition, though they believe that it should be possible to infer an implicit DTD from the compilers' usage. (In some passages, markup seems not to conform to SGML even 'cosmetically'. For instance, ⟨indig=Urdu⟩ to identify a word of the indigenous language Urdu in an Indian English sentence is surely not a possible SGML tag, since it does not begin with a generic identifier?)

Space does not allow individual discussion of each of the diverse contributions to the book; but two aspects of the ICE enterprise raise general issues which may interest readers of this journal.

One has to do with grammatical annotation schemes. For the British subcorpus, at least, the work of adding wordtags and parse structure is evidently well advanced, and there is plenty of information given about the semiautomatic techniques being used to carry this out, and about the coding schemes used to represent the grammatical facts. These coding schemes are unrelated to the schemes used by other well-known English-language corpus projects, and in this respect ICE strategy seems representative of the discipline. Whenever a new corpus-linguistics effort is launched, it usually devises from scratch its own ranges of grammatical categories and codes.

I find this regrettable. With respect to wordtagging, ten years ago I published a tabulation of the main systems of classifying English words known to me then (Sampson 1987), in the hope of encouraging future researchers to build on earlier work rather than always beginning anew at ground level; I have continued to try to promote this idea since (e.g. Sampson 1995). To date I detect very little enthusiasm for such pooling of effort.

In one sense, researchers are quite right to resist standardization. It would be disastrous if annotation conventions were imposed on research groups, perhaps by funding agencies keen to enforce uniformity for political reasons. There have been hints of this in connexion with EU language engineering research; but natural language processing is far too young a discipline to know what categories and data structures are most appropriate – researchers must be free to experiment.

Much of the time, however, it is clear that one group's scheme is different from another's not because either group has consciously decided that an innovation might be desirable, but just because there is no tradition of re-using this sort of material. Lack of standardization in this sense militates against scientifically valuable advance. The real difficulty in devising a grammatical annotation scheme for a natural language lies not in listing a set of categories, but in defining the boundaries between categories with sufficient precision that they can be applied in a predictable way to the endlessly diverse turns of phrase that occur in real-life usage. A research group that sets itself the task of doing this from scratch for all its categories will have its work cut out to sharpen everything up to the point where particular boundaries can be seen as unsatisfactory, making experimentation worthwhile.

Thus, Jan Tent and France Mugler of the ICE-Fiji team note, among other distinctive properties of Fiji English, 'The use of verbal particles as verbs: "I been come down and *off* the light ..."; "You want me to *on* the alarm?"'. This is one way (and there will obviously be very many others) in which any standard system of grammatical annotation based on British and American English would need to be modified to deal with the task confronting the ICE enterprise. One can imagine alternative principles that might be chosen to reconcile an existing scheme with such data. For instance, one might specify that words will always receive tags appropriate to their classification in a dictionary of the 'metropolitan' variety of English, so that *on* and *off* remain particles, and Fiji English is represented as having infinitives headed by non-verbs; alternatively, one might prefer to reclassify words in terms of the wider structures they enter into, so that *on* and *off* become verbs (perhaps special uninflectable verbs) in Fiji English. Choice between these approaches is likely to have real consequences – one approach

might prove harder to apply consistently than the other, or one might lend itself better than the other to automatic language processing; but it will be difficult to put the effort which they merit into making choices like this, if one is committed to defining all one's grammatical categories even in the many cases where taking over existing definitions would be unproblematic.

Another way in which this book crystallizes a puzzle I have about the development of the discipline relates to software tools for working with corpora. Considerable ICE resources have evidently been used to create software systems for helping users of the completed subcorpora execute tasks such as producing concordances and locating specified grammatical configurations. Again, the ICE enterprise in this respect is operating in a way that is quite normal in computational linguistics. I know from personal experience that someone who supplies a language corpus without also supplying purpose-built software for working with it is widely regarded as having left a job half-done.

It is hard to see this as a wise policy for allocating scarce research resources. In practice there are usually two possibilities when one wants to exploit corpus data. Often, one wants to put very obvious and simple questions to the corpus; in that case, it is usually possible to get answers via general-purpose Unix commands like grep and wc, avoiding the overhead of learning special-purpose software. Sometimes, the questions one wants to put are original and un-obvious; in those cases, the developer of a corpus utility is unlikely to have anticipated that anyone might want to ask them, so one has to write one's own program to extract the information. No doubt there are intermediate cases where a corpus utility will do the job and grep will not. I am not convinced that these cases are common enough to justify learning to use such software, let alone writing it.

Since the ICE materials are not yet published, most of the book is concerned with the compilation process rather than with scientific findings that have emerged from the corpus. One exception is the final chapter by Mark Huckvale and Alex Fang, which uses speech sections from the British subcorpus that are both grammatically annotated and recorded to high acoustic standards to explore the interaction between grammar and prosodic phonology. Real discoveries have been made, and many more can be expected from this very promising research avenue.

ICE is not really a single project: it is a loose federation of disparate and widely-scattered research groups who have been guided, co-ordinated, and inspired by one man's leadership. Unhappily, Professor Sidney Greenbaum died in the year this book was published. It is too early to guess how the ICE enterprise will develop without him.

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Daniel Jones, *Analogical Natural Language Processing*. London, UK: UCL Press. 1996. ISBN 1 85728 218 3, £35.00 (hard-back). 155 pages.

The aim of this book is to both describe and demonstrate the feasibility of an analogical approach, or example-based approach to Natural Language Processing (NLP). Jones wishes to challenge the assumption that NLP needs to be rule-based, and the book aims to demonstrate the feasibility of employing example-based methods in Machine Translation (MT).

Chapter 1: Introduction

The first chapter briefly introduces the subject of NLP and then goes on to describe the approach used in the book. This approach uses examples of language usage rather than rules, and typically draws these from real linguistic data (e.g. a large corpus). The predicate frames from Functional Grammar (FG) are used to represent examples and a mechanism known as Analogical Modelling (AM) is employed as a measure of 'distance' between an input and any of the examples in the data set. An input may be broken down and the resulting fragments matched to the closest fragments in the data set then recombined in order to generate a 'clone' of the output and the corresponding translation of the input. The chapter finishes with an overview of the remaining chapters. This chapter thus serves to set the scene and describe the basic approach to prepare the reader for the remaining chapters.

Chapter 2: Background and relevant research

Essentially this chapter forms a survey of the literature on analogical methods and on related work. The subjects covered are example-based machine-translation (EBMT), Analogical Modelling, Functional Grammar (chosen as the representational formalism in the book), Parallel Distributed Processing methods (PDP), Automated Language Processing and Rhetorical Structure Theory.

PDP was included due to similarities with analogical techniques such as the use of a large data set, the role of similarity between data examples and the input and the non rule-based nature of PDP work. However the PDP literature is not surveyed comprehensively; only a few examples of PDP work are discussed, primarily for illustrative/comparative purposes. Most of the discussion of PDP is held to chapter 4 and centres around the work of McClelland & Kawamoto (1986) on the assignment of case-roles, although the work of Chrisman (1991) on English-Spanish translation is also discussed. The reviewer feels that this treatment of PDP could have benefited from a discussion of other PDP approaches to case-role assignment and parsing such as Miikkulainen (1994). However the lack of this discussion does not detract from the main purpose of the book.

As indicated Jones chose Functional Grammar as the representational formalism for the work described in the book. However it is not a 'pure' usage of FG. There is no use of grammar rules for instance as this contradicts the EBMT approach being used. The examples in the data set are represented using FG's predicate frames which were chosen because they can capture different levels of information such as semantic, syntactic and pragmatic information. Other FG-based approaches to MT are also discussed and a short tutorial on FG is given at the end of the chapter.

Chapter 3: Analogical Translation

Chapter 3 forms a discussion of the representation used, the importance of the origin of examples, the role of text description and the translation mechanisms used in EBMT. Regarding the origin of examples it is noted that EBMT relies on a well constructed data-set to perform well. It is argued that examples should include contextual supra-sentential information such as the rhetorical function of the examples in their descriptions, so that recombination can be performed with reference to the compatibility of textual functions and sequential dependences. The chapter finishes with an overview of a hybrid rule-based/EBMT system which uses CFG rules in the cloning process to ensure the compatibility of the textual fragments with each other and determine the textual function of fragments. Since the aim is to eliminate such rule-based processing, the aim of chapters 4 and 5 are to demonstrate the feasibility of replacing this rule-based component with a mechanism which is not rule-based.

Chapter 4: Stochastic and Analogy Based Language Processing

This chapter discusses stochastic and analogy based approaches to NLP and then describes the Analogical Modelling (AM) mechanism used to replace the parsing module in the traditional

analysis phase of processing. The discussion of stochastic approaches seems mainly to serve the purpose of drawing out the distinction between automatic and non-automatic corpus-based processing. In the former a raw corpus is processed by the system directly, in the latter a corpus which has has been at least partially analysed by humans is utilised. The EBMT method employing AM described in the book falls into the latter category. The Analogical Modelling process is then described. Basically it involves determining all the contexts in which a given input can occur, then the disagreements as one moves from a between contexts are calculated and used to determine which set of contexts to retain. If the number of disagreements increase as one moves from a supra-context to a sub-context one does not retain it. Then the probability of each member of the remaining set of contexts being correct (the analogical effect) is calculated and used as the distance measure. The chapter finishes with a comparison between AM and PDP, specifically the McClelland & Kawamoto (1986) case-role analysis and Chrisman (1991)'s MT experiments. Both AM and PDP approaches can make probabilistic judgements, are non rule-based, are based on an example data-set and employ similarity based judgements and can exhibit graceful degradation.

Chapter 5: Experiments in Analogical Cloning

Chapter 5 basically presents 4 experiments aimed at investigating the feasibility of employing AM in the cloning mechanism and therefore completely doing away with rule-based processing. Experiment 1 demonstrates the successful use of AM to predict the likely case-role for a prepositional phrase, although it also shows that you need a well-designed data-set for optimal performance. The performance is compared to a PDP model. As well as the similarities noted above between AM and PDP, several differences are noted: PDP can only give one answer where AM can give more than oner answer, thus better reflecting ambiguity and PDP seems more prone failures of expressive representation in the training data. Whether these limitations are inherent to PDP seems to the reviewer an open question however, given the versatility of designs and even significant differences of approach within PDP. Experiment 2 involves case-role assignment. A simple word-grouping heuristic is employed and the groupings are then assigned to slots in an example case-role predication. This experiment demonstrated that ambiguous results (i.e. more than one answer) can often occur, but also that the mechanism can be employed for the purpose. Experiment 3 allows the use of lexical categories in the data-set to guide the process, demonstrating that AM can be used to predict the analogical effect (or distance) of example predicate terms against the proposed input sentences based on word grouping heuristic. Experiment 4 refines the distance measure with meaning definitions which can increase the effectiveness of the mechanism. The chapter concludes with a discussion of how to use AM to perform cloning and recombination. In summary the experiments and discussion suggest that AM can be used effectively for matching input, creating a clone of the input and then constructing the translation from the clone.

Chapter 6: Conclusion

This short chapter summarises the findings of the earlier chapters, with reference to the aim of demonstrating the feasibility of Example-Based Machine Translation and more widely Analogical NLP. It also suggests various avenues for further research. It is noted that recombination research has concentrated on English/Japanese translation and it would therefore be useful to see how well it fares on other language pairings. Other suggestions include further research into incorporating rhetorical context information into the process, investigating the benefits/effects of employing PDP mechanisms in EBMT and parallel processing.

Finally, the reviewer believes this book does demonstrate that analogical methods are feasible and thus worthy of further research. The book could have benefited somewhat from

a wider discussion of connectionism, but otherwise has served its stated aims. It will be of interest to anyone working in computational linguistics.

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Jaap van der Does and Jan van Eijk, editors. *Quantifiers*, *Logic*, *and Language*. CSLI (Center for the Study of Language and Information) Lecture Notes, No. 54. Stanford, California: CSLI Publications (distributed by Cambridge University Press). 1996. ISBN 1-57586-001-5 (hardback), 1-57586-000-7 (paperback). Price $69.95 (hardback), $24.95 (paperback). vii + 424 pages.

When I started to read this book I was excited because I knew that a study of quantifiers may throw light on our linguistic and cognitive abilities, cf. (Brooks and Braine 1996). Thus, I thought, I'll learn not only about a specialized subject of semantics but a more general subject which has something to do with our "mental spaces". Perhaps not surprisingly, the book proved itself to be decidedly on the technical (logical) side. Unlike another book which I quite liked (Bach et al. 1995), this one did not really care much about the linguistic or cognitive motivations. (Fortunately, there are a number of exceptions to this generalization, to be noted below.) In (Bach et al. 1995) a majority of the papers elucidate assorted questions of language typology and syntactic/morphological variation. (The languages discussed include English, Dutch, Italian, Hindi, etc.) The present volume is not for the weak-kneed; it requires close familiarity with the worst of mathematical logic.

The predecessor of this book is a workshop on "Generalized Quantifiers" at the Institute for Logic, Language and Computation (ILLC), Amsterdam, circa 1990. The list of contributions (reproduced below) clearly demonstrates that Dutch authors are in a clear majority, perhaps substantiating B. H. Partee's well-known observation, found in (Gamut 1991), that "the Dutch not only have what must be the greatest number of linguists per capita in the world, they also have a very long and rich tradition of combining linguistics, logic, and philosophy of language."

1. Basic quantifier theory, J. van der Does & J. van Eijck
2. Quantifiers in the world of types, J. van Benthem
3. Dynamic generalized quantifiers, M. van den Berg
4. Monotone quantifiers: Interpolation and preservation, K. Doets
5. Quantifiers and partiality, J. van Eijck
6. The semantics of exception phrases, J. Hoeksema
7. Further beyond the Frege boundary, E. L. Keenan

As usual with such edited volumes, the contributions are of differing quality and relevance. For instance, Westerstahl's paper (Chap. 16) is a technical note on finite model theory and requires familiarity with his review paper (Westerstahl 1989). Doets' proof of a variant of the Lyndon interpolation theorem in Chap. 4 is clearly of a technical character too. Van Lambalgen studies natural deduction for generalized quantifiers in Chap. 9, another short contribution. Lapierre's work (Chap. 10) pertains to the logic of conditionals, analyzing conditional sentences from the perspective of generalized quantifiers.

Similarly, van Benthem's paper (Chap. 2) touches on various bases and cannot be comprehended without an appreciation of the frontiers in quantification research. On the other hand, van der Does & van Eijk do a reasonably good job of covering the essentials of Basic Quantifier Theory. Still, their paper (Chap. 1) suffers from heavy and occasionally unwarranted formalism, and a general lack of motivation. (Could this be another Dutch tradition that Partee forgot to tell us?) In my view, Keenan & Westerstahl (1997) do a better job in terms of giving a balanced review of quantifiers.

Here is a brief appraisal of some good papers (viz. papers which try to inform the reader of their linguistic motivations before they jump into formal analysis) that I have found just to my liking. Van den Berg's paper (Chap. 3) attempts to connect the theory of generalized quantifiers and dynamic logic. In Chap. 5, van Eijck deals with partiality, putting generalized quantifiers in a 3-valued framework where they can introduce truth value gaps. Hoeksema's investigation of the semantics of exception phrases (e.g., "The lady was anything but polite") makes Chap. 6 a lucid and readable one. Keenan's paper (Chap. 7) is an augmented version of his thought-provoking 1992 article, published in *Linguistics and Philosophy*, where he shows that English presents a large variety of non-Fregean quantifiers. (Fregean quantifiers can in principle be expressed by the iterated application of unary quantifiers.) Ladusaw's concern in Chap. 8 is negative concord, as exemplified in the following widely understood but nonstandard sentence: "The lady didn't say nothing to nobody." De Mey's short paper (Chap. 12) on generalized quantifier theory and the semantics of focus is intriguing, and includes a valuable discussion of the most plausible semantics for *only*. De Swart's fine paper (Chap. 14) delves into the extensions of Generalized Quantifier Theory to cover expressions of temporal quantification (e.g., "The lady mostly drinks white wine"). Verkuyl and van der Does' goal in Chap. 15 is to reduce the number of readings for plural noun phrases of the sort "Two ladies ate three croissants." (In a related paper, Liu presents simple cases of branching quantification in English in Chap. 11.) Zwarts' work in Chap. 17 is concerned with an accurate description of the connections between sentence negation and predicate negation.

Overall, this collection could have easily been a major reference for "quantifier" researchers. Unfortunately, it fails in this endeavor badly. While the preface states that the book is a cleaned up and substantially revised version of the early proceedings (of the workshop mentioned in the beginning of this review), I have found out that this is not the case at all! In fact, it would not be wrong to assert that this is one of the poorest volumes in the CSLI Lecture Notes Series in terms of the abundance of typos, omissions, and further errors. While I sympathize with the Series' aim to make new ideas in logic, language, and information available as quickly as possible, it looks like in this particular case the output was prepared just too quickly and

carelessly. There is a limit to laxness; with this volume CSLI Publications is really swimming in the waters of negligence and imprudence. (Witness Spaan's bankrupt contribution, Chap. 13, which, due to some silly blunder, omits in the body of the paper all the citations to the references listed at the end. The references are badly incomplete anyway…) All this is unfortunate because technically speaking, most of the papers promise to be quality – yet occasionally speculative – contributions to the literature. It is a pity that the editors did not do their homework to prepare a coherent and complete volume. As a matter of fact, I am glad that I did not have to pay for the present bound volume, which is most certainly in need of an emended version if it is going to be of any use.

I would like to mention another (two-volume) recent study on quantifiers (Krynicky et al. 1995), because it seems to be relevant, at least at first sight. (Its title, on the other hand, indicates that it may well be similar in nature to the book under review, e.g., lots of mathematics, so beware…) And on a related note, in this rather homogeneous and rapidly developing field, time is probably right to write a lucid, luminous textbook rather than putting together papers of unequal importance and quality.

In the words of Charles Olson, "I'm running out of appetite. Let this swirl – a bit like Crab nebula – do for now."

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Alex Alsina. *The Role of Argument Structure in Grammar: Evidence from Romance*. Stanford, California: CSLI, 1996. ISBN 1-57586-035-X (hardback), 1-57586-034-1 (paperback). Price £14.95/US $24.95 (paperback), £40.00 (hardback). 306 pages.

This book is a revised and expanded version of parts of the author's dissertation. As its subtitle indicates, it deals mostly with constructions in Romance languages, mainly Catalan, which create problems for some syntactic theories. The author claims that the problems are due to theory-internal assumptions; in particular, the notion of argument structure (henceforth a-structure) is rather loosely defined in most other theories and this makes its interaction with other levels of syntactic representations unclear. The author maintains that these can be solved by having a rigorously defined autonomous a-structure and explicating its interaction with other levels of representation.

The book starts with the introduction, giving a brief review of overall structures of linguistic

theories incorporating a-structure. Chapter 2 provides necessary theoretical details of Lexical-Functional Grammar (LFG; cf. Bresnan 1982), a framework which Alsina adopts. Chapter 3 summarises two accounts that try to account for the behaviour of reflexive clitics in Romance languages and points to the 'paradox' they encounter. This 'paradox' is solved in Chapter 4 where a-structure binding, Alsina's original contribution to a theory of the reflexive construction is proposed and its effects are explicated. Chapters 5 and 6 discuss two constructions which still appear to present problems to his theory, i.e. case marking of objects and the causative, and show his theory better accounts for the facts than others, especially in the Government-Binding theory (GB; Chomsky 1986). Chapter 7 picks up the topic of a-structure binding again and compares it with anaphoric binding which Alsina argues is involved in clitic doubling. It is also shown that a-structure binding can explain reciprocal readings of the reflexive construction. Chapter 8 concludes the book by summing up how his theory differs from GB accounts and providing evidence that shows the excellence of his theory.

Alsina's theory of a-structure, couched in LFG, is different in several respects from accounts in GB. Since GB differs from LFG and other constraint-based frameworks (e.g. Head-driven Phrase Structure Grammar: cf. Pollard & Sag 1993), GB accounts are used as a yardstick throughout the book. As an LFG account, his theory consists of three levels of representations: a representation of syntactic functions (functional structure, or f-structure), a representation of morphosyntactic expressions of these functions (constituent, or c-, structure), and a representation of arguments (a-structure). His conception of a-structure is similar to that of Grimshaw's (1990) in that arguments are represented not in d- but in a-structure and that the latter does not contain thematic information as that is part of the lexical semantic expression (or, the Lexical Conceptual Structure) where the prominence relation follows the thematic hierarchy (pp. 36–38). Furthermore, a-structure in Alsina's theory is incorporated in the f-structure as the value of the PRED[icate] feature. By adapting Dowty's (1991) notions of *Proto-Agents* (or P-A) and *Proto-Patients* (or P-P), arguments which are either P-A or P-P are called 'direct arguments' which are susceptible to a-structure operations and principles (p. 41). P-P arguments correspond to internal arguments and the P-A arguments of the least embedded a-structure are realized as external arguments. This mapping of arguments to syntactic functions is called the Functional Mapping Theory.

In Alsina's theory, arguments and adjuncts are defined to be complementary: the former is represented in a-structure but the latter is not. They are similar, however, in that they are both represented in a semantic structure. It follows from this that 'argument-adjuncts', a quirky notion proposed in Grimshaw (1990) to account for the *by*-phrase in the passive, has no role in his theory. They are replaced by 'obliques' which are defined at f-structure and optional by definition.

Alsina's theory departs from accounts in GB, including Grimshaw's, in that d-structure, which some consider as a '"pure" representation of theta-structure' (Chomsky 1986), is deemed dispensable. A-structure is not even isomorphic to d-structure and hence is an autonomous level of representation. Notions such as external and internal arguments which were traditionally represented in d-structure within the GB framework can be recast in a-structure.

This, in turn, leads to abandoning three assumptions that GB practitioners consider requisite: (i) 'each argument of a predicate has a constant d-structure representation: the hypothesis of the *Configurationally Uniform Representation of Theta-roles* or *CURT*'; (ii) detailed information concerning arguments is represented in phrase structural terms: 'the *Phrase-structure Encoding of Argument Relations* or *PEAR*'; and (iii) 'a given syntactic constituent cannot correspond to more than one argument of a predicate, and vice versa: the *1–1 match*' (p. 266). This follows from analyses of reflexivized constructions and case marking of objects in Romance languages.

The reflexive clitic in Romance languages can be considered a valence reducing morpheme because monotransitive verbs with a reflexive clitic side with intransitives with regard to (a) the possibility of NP extraposition, (b) case marking of objects (accusative vs. dative), (c) the

possibility of nominalizing the infinitive and (d) past participle agreement (pp. 85–98). The clitic, therefore, is not an argument or a syntactic anaphor.

Furthermore, the Romance reflexivized constructions have contradictory properties. On the one hand, they behave like the unaccusative with regard to auxiliary selection and the formation of participial absolutes in Italian and the omissibility of the causee in the causatives. This means that the subject in this construction is an internal argument. However, there is evidence that suggests that the reflexivized construction is like the unergative and hence the subject is an external argument: (a) not allowing the bare indefinite NP as a subject, (b) not triggering *en*-cliticization, (c) not allowing adjective modification of logical subjects, and (d) not selecting the logical subject in the same way as the passive (pp. 98–113).

This apparent paradox can be solved by abandoning the 1–1 match. Alsina proposes that the Romance reflexive clitic specifies an operation in a-structure called 'a-structure binding' which co-links two arguments and maps them onto the same syntactic function. That is, in the reflexivized construction, the arguments corresponding to the subject and the object are co-linked, or have the same index, in the a-structure representation, and they are mapped onto the same function as required by the Uniqueness of F-structures: 'Each f-structure is uniquely identified by its index' (p. 24). By allowing a many-to-one relation, a single syntactic function can correspond to two arguments. Through this operation of a-structure binding, the behaviour of the reflexivized construction in Romance can be explained. In addition, this indicates that the PEAR cannot hold because it is impossible to represent co-linked arguments in phrase-structural terms.

Alsina's conception of a-structure can also explicate complex behaviour of object case marking in Romance. In his theory, indirect objects are on a par with direct objects and subjects in being direct functions; they thus stand in opposition to obliques which are indirect functions. The two types of objects are distinguished by morphological case. An indirect object is a dative object and a direct object is non-dative. In Romance languages, dative is a marked case: (a) it is accompanied by a preposition; (b) it is morphologically marked in third person pronominal clitics; and (c) gender distinction is not marked in third person pronominal clitics, which conforms to Greenberg's (1966) claim about morphological syncretism and a marked category (p. 161). As the marked category, a given function will correspond to an indirect object or not is determined by the thematic prominence of an argument expressed by that function.

The Romance causative construction poses yet another problem for GB. This is because the causative 'consists of two theta-role assigning verbs that behave in many ways like one single verb' (p. 185); verbs behave differently when used as base verbs in the causative. Accounts in GB, owing to the CURT, would have to assume either (a) that the two verbs in the causative are a single distinct lexical item or (b) the behaviour of the base verb in the causative is not really different from that of the same verb when used independently (p. 185). Alsina rejects both by stating that there is no syntactic evidence for them. In his account, an equivalent of the CURT does not exist. The base verb and the causative verb form a single a-structure through predicate composition. The apparent monoclausality of the causative can be explained because it has one, albeit complex, a-structure and hence one PRED value in f-structure. The P-A argument of the base verb is bound to the P-P argument of the causative verb, and they map onto the same function, which will be the object of the complex predicate (p. 189). Since the CURT has no place in Alsina's theory, the base verb and the causative verb can be represented as two constituents in c-structure, which suggests that predicate composition occurs in syntax rather than lexicon (pp. 200–207).

Thus, examining Romance reflexive and causative constructions and case marking of objects, it is shown that d-structure cannot represent a-structure and that the CURT, the PEAR and the 1–1 match, its three corollaries, cannot persist. Alsina's theory of a-structure and operations such as a-binding and predicate composition, in contrast, is a lucid exposition. Featural decomposition of syntactic functions (direct vs. indirect, and subject vs. non-subject) achieves a succinct account of argument alternation. As it is formally expressed, the gist of his

theory appears to be easily transportable to other constraint-based theories. The overall architecture of LFG achieves conceptual simplification compared to GB with d-structure.

There are, however, a couple of points that puzzled me. Firstly, when discussing reflexivized causative, Alsina mentions in passing that 'there is no general principle that rules . . out' coindexing the causer and the causee, even though the resultant sentence is ungrammatical. He goes on to state that this in fact is 'a desirable situation' because it allows the reciprocal morpheme in languages like Chicheŵa to co-link the causer with the causee (p. 222, fn.17). It seems to me that reciprocal (or reflexive) interpretation is an exception, rather than a rule. Having one's theory fit the exception and necessitating some ad-hoc means to account for the 'normal' cases is rather odd. Another point concerns the relationships among different representations in the theory. Alsina postulates that a-structure arguments are mapped onto f-structure functions, which then are mapped onto c-structure. This means that a-structure will not directly interact with c-structure. He notes, however, that 'the possibility that the a-structure may directly constrain the c-structure or viceversa [sic] cannot be excluded' (p. 278) as this happens with, among other things, predicate composition. A-structure refers to semantic as well as syntactic information and it affects lexicon, so it seems natural that it interacts with different levels of representations. I find it rather disturbing, however, that Alsina appears to posit a rather rigid overall structure of a theory which restricts interaction among its components and implies the existence of some loophole. Since he presents a convincing explanation of how his a-structure accounts for complex phenomena in Romance, it would have been preferable to have a theoretical architecture that allows multi-level interaction. Having said that, this book still is the best exposition of a-structure among currently available books or articles and probably the most accessible for computationally-oriented theoreticians.

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Georgia M. Green and Jerry L. Morgan, *Practical Guide to Syntactic Analysis.* CSLI Publications, 1996. ISBN 1-57586-016-3. £13.95. 114 pages.

There is a strangely schizophrenic feel to this book. Not only does it cover two subjects, research in general and syntactic analysis in particular, it seems to be written in two styles. Thus while some is plain and easily understood, other sections are almost impossible to read; no short word is used if a longer one, or preferably a phrase, will do – and these are invariably the sections that deal purely with syntax. In fact there are two stylistic problems; at times the authors seem unable, or unwilling, to give clear explanations without clouding the issue. Chapter 1, for instance, sets out to clarify some common misunderstandings but instead of simply giving correct definitions, first describes the misunderstandings in great detail – thereby introducing confusion where there may have been none! Yet the same chapter also employs some very good similes, such as grammar as a sieve. Likewise, Chapter 2 begins badly then goes

on to give excellent advice on such research problems as choosing an area and creating a structured and detailed plan.

The two subjects mentioned are not, of course, mutually exclusive but it seemed that there was a far better book on general research mixed up among the linguistic content. Chapter 2 includes suggestions of questions students should ask themselves to help clarify the hypothesis being tested, describes the need for precision and universality of hypotheses and explains how negative evidence contributes to the advancement of knowledge. The areas of assumptions and definitions are also covered. Chapter 3 gives more advice on topics and hypotheses while Chapter 4 is devoted to the organisation and writing of research papers. Ironically, the importance of a plain writing style is stressed.

The syntactic analysis is aimed at students of all levels and is generally interesting, if not always comprehensible. In Chapter 1 we are given an introduction to Chomsky's theories, justified by the statement that they dominate linguistics, though not until Chapter 5 are we told that many of his assumptions and claims have been rejected. Chapter 2 gives a well-presented possible phonological explanation for the unacceptability of certain sequences of words, but also includes a potentially interesting section on cultural taboos which is spoilt by the lack of examples (the only one given is Japanese) and by the fact that the point being made is not clearly expressed. Chapter 5 acquaints the reader with standard and extended standard theory, introducing the base component, transformational rules and the principle of cyclic application of transformations. Chapter 6 concentrates on developing constraints (island, complex NP and sentential subject constraints, among others) on possible descriptions. In contrast to most other chapters, this had pages of example sentences. Chapter 7 consists of a comparison of three theoretical frameworks (modern phrase structure theory, Government and Binding theory and Relational Grammar) with standard theory, and an overview of current directions of syntactic analysis. This is the best section, particularly on relational grammar, and includes just enough detail to encourage further reading.

There are some assertions that are arguable, for instance that rules of syntax cannot be applied – NLP developers would disagree with this – and at least one analogy seemed inappropriate. The argument that there is a distinction between competence and performance uses the analogy of chess players: all players know the rules of chess (competence) but good and bad players use this knowledge differently (performance). But it could be argued that where language is concerned those who cannot perform well may be those who do *not* know, or are unable to access, grammatical 'rules'. So, while it is true that even bad chess players must be familiar with the rules, it does not follow that bad writers or speakers have the same knowledge, nor allow for the fact that some naturally good language-users have no formal knowledge at all. This is probably unimportant but the entire discussion was confusing, partly because of the authors' attempts to cover every possible angle, and the summary did nothing to clarify the points raised.

It should be noted that 'Lecture Notes' figures prominently on the book's cover and the preface makes clear that this is not a textbook. As this reviewer has not attended any relevant lectures, some criticisms of the linguistic content may be unjust, and in fairness the book has lots of references, particularly of recommended introductory reading to new areas. The authors also state that a glossary was not included because of the instability of definitions of meanings, but it really is necessary. The lack of example sentences and diagrams in the early chapters was a problem (I had to draw my own to understand some of the points being made) though when given they were useful. The overall conclusion is that this is two books in one and I would have liked the authors to write the truly excellent 'Practical Guide To Research' which is hiding here. Perhaps then more explanations, diagrams and a glossary could be included to improve a separate guide to syntactic analysis.

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D. Arnold, L. Balkan, R. Lee Humphries, S. Meijer and L. Sadler. *Machine Translation: an Introductory Guide*. NCC Blackwell, Oxford, 1994. (Hardback ISBN 1-85554-246-3 $49.95/£40.00; Paperback ISBN 1-85554-217-X $19.95/£18.99) viii + 240 pages.

Machine Translation (MT) now has some of the aspects once attributed to the problem of flight and flying: there are many exemplars of the phenomenon around (more than a hundred companies world-wide sell MT products) but substantial disagreement as to how it is done, or should best be done. Many feel there must be some analogue of an aerofoil waiting to be discovered, rather than proceeding, as is the norm until now, by some form of sustained flapping of wings.

The two best known of the five authors of this book have been associated for some years with a theoretical approach to the problem, but there is little of their autobiography to be found in this book. It is, as it says, an Introductory Guide to MT, and readers will search in vain for any account of how the best known and most used MT systems, such as SYSTRAN, METAL or Logos, actually work. Nor will they find any serious account of the history of MT, chequered and exciting as it has been, for none of the following names appear in the index: Dostert, Garvin, Toma, Hays, Martin Kay, Booth, Richens, Masterman, Oettinger, though many lighter folk, including myself, do.

It will be a useful complementary volume to the Hutchins & Somers book (1992) where such issues are treated, but where far less space is given than here to the interaction of MT and word processing, or what has come to be known as machine-aided translation (MAT).

That is the form in which most users of the cheaper and more accessible MT systems will first encounter the technology, probably acting as amateur or professional human translators. Pushing the flight analogy too far, one could say that this book is in a sense for the birds, those who actually fly, and tells them what help they may expect from the little MT jockey hitching a ride on their backs and who may one day want to learn the skill himself!

Martin Kay once argued in a well-known paper (reprinted, 1997) that MT was not going to work in the foreseeable future and that MAT was the best we could hope for, and that we should concentrate on it. He has not been proved right, largely because he failed to anticipate the large market for the indifferent quality (about 60% of sentences correctly translated) output that full MT continues to produce. But he did guess that the spread of PCs, to human translators along with everyone else, has meant that there is a new market for providing aids, in terms of access to machine dictionaries and blending the (human) skills of translating with word processing, or what is now MAT, which I take to include the use of poor quality MT systems whose output is subsequently postedited by humans.

This last is really the main theme of the book: how to see translating as a form of document processing and to introduce the practitioner to the use of e.g. lexicons on line. This is skilfully blended with an elementary introduction to linguistic representations, and a rapid dash through the major approaches to MT in the past, such as the use of interlinguas, and the role of knowledge representations. At the end is a chapter on more recent developments in field (and MT has just finished its most exciting decade for some time), such as example-based MT, new approaches to statistically based MT, and the now extensive use of marked-up/tagged corpora in MT R&D. The book picks up a lot at this point (it may be a change-over of authors?) and one feels closer to the issues for a moment or two. The history of MT has in fact been full of intellectual issues, but this book manages to ignore them for the most part; I assume this must have been a group policy and thought appropriate for an introductory text. Even when they note (p. 171) the striking fact that the scores for the intelligibility of an MT system's output (judged by monolinguals) are strongly correlated with its fidelity or accuracy of translation (judged by bilinguals), they do not comment on the point or discuss it. As a whole, the book is not at all interested in issues; perhaps the authors themselves lost any such interest, during the storms that passed over European MT in the 1980's which, if so, is a pity. There is a brief

reference (p. 15) in passing to EUROTRA, possibly the largest MT project ever, funded to some 75 million ecus/euros/dollars, but there is nothing on its nature or outcome.

Yet, most of the authors were closely associated with the project over many years (as was the present writer, as their colleague, though over a much shorter period). EUROTRA had virtually no output for so vast an enterprise, which makes all the more poignant their setting the book's basic translation examples in terms of an imaginary system ETRANS for illustrative purposes only, and as a paper exercise.

This book has many virtues: its early discussion of 'misconceptions about MT' is spot on, well done and absolutely necessary; devoting a chapter to the evaluation of MT is important, given the central role of testing in MT's slow passage to credibility, and the glossary of terms and the end-of-chapter readings are both useful. But again, anyone who knows anything of the field will feel how low they have pitched the level, how much they have left out, how many interesting things they might have said, given their experiences and pivot position in the subject during a key period.

One could suspect that they agree profoundly with the position attributed to Martin Kay earlier: they are theorists and theory has not paid off, so the only rational way forward is theory-free MAT. This may not be right: it may simply be that certain kinds of theories and techniques have not worked well so far. This defeatist position also ignores the extraordinary resilience of full MT as a discipline and commercial enterprise.

One can always quibble with books: p. 199 has a misnumbered example; and the formula on p. 204 is not accompanied by sufficient explanation (in terms of the peculiar notion of 'probability of the source given the target sentence') for it to seem other than muddled. But, all in all, the book will perform a service and one not done by anything else currently on the market. It is also a remarkable achievement to produce so seamless an object with five hands.

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J. B. Paris, *The Uncertain Reasoner's Companion: A Mathematical Perspective*. Cambridge University Press, Cambridge, 1994. ISBN 0-521-46089-1.

I suspect that the title, "The Uncertain Reasoner's Companion," might provoke very different ideas of the likely contents of this book in the minds of different people. Some of my own preconceptions turned out to be wrong. Similarly the notes on the back cover about the intended readership illustrate how words and phrases might mean different things to different people. Here I refer to the statement that the book "is suitable for readers with some knowledge of undergraduate mathematics." Perhaps there is a need to be more specific. The book is aimed, I think, at those with some knowledge of and interest in mathematical logic. The author himself is much more specific in his introduction, suggesting familiarity with the propositional and predicate calculus and elementary analysis and linear algebra. Of course a reasonably mathematical reader can often make up for a little unfamiliarity by slower and more careful reading.

The book is not a practical handbook on how to do reasoning under uncertainty or even how to construct computer programs to do this. It is not really a philosophical book about how we

might justify reasoning under uncertainty in particular ways. It is a book, with its origins in a course on mathematical logic, which applies the tools of mathematical logic to uncertain reasoning, or rather to a particular problem in uncertain reasoning, since the phrase "uncertain reasoning" is also applied to work which is not really the topic of this book. This is not to say that those working on the practical applications of uncertain reasoning, or on the philosophical background, should not read the book or at least be aware of some of its content. For example, some who feel that they work at the practical end of the spectrum would do well to appreciate the weaknesses in some currently popular methods which can be exposed by the sharp tools on display here.

The problem which is the subject of this book is this. It is required to construct an expert system. An expert has provided a number of statements which can be expressed in terms of a "belief function," where by "belief function" might be meant probability or one of a number of other suggestions for expressions of uncertainty. The statements of the expert provide only an incomplete specification of beliefs over the domain of interest. Thus we are left with the problem of what to do about possible statements, the degree of belief in which is not implicit in the expert's statements. The relevance of this to natural language work is clear.

While in much of the book, especially after the first few chapters, degree of belief is recognised as probability, or at least probability is acknowledged as the ideal, the notation "Bel" is used throughout to encompass the other theories which are discussed. These are Dempster-Shafer belief and truth-functional belief, the latter including fuzzy logic and possibility theory.

The problem tackled in the book is expressed in terms of the sentences of a finite propositional language. This does not actually rule out the use of other approaches to partial belief specifications, such as Bayes-linear methods (e.g. Goldstein and O'Hagan, 1996), which are more associated with quantitative variables, but the omission is perhaps not surprising. Perhaps more surprising is the omission of the theory of imprecise probability (e.g. Walley, 1991).

While a number of approaches are considered, the emphasis of the book seems to be more on demonstrating the results which can be proved about them and the logic of this process rather than passing judgement on their usefulness. A comment in the introduction that "a theorem…remains a theorem even if the original reason for proving it disappears" illustrates this. Generally there is little comment or discussion on the meanings or use of the ideas but, of course, showing how to prove results is useful in itself.

Though much of the book reflects the "inevitability of probability," some statements and features of its treatment raise questions, especially for those who, like me, adopt the subjectivist view of probability and are used to the ideas of Bayesian analysis. For example, if degree of belief might not be probability, a situation which is suggested as possible, then what is being meant by the word "probability"? Is it meant to have a limiting relative frequency interpretation? Is it meant to be a property of the world being described rather than a description of beliefs? It is not always clear. If it is a subjective degree of belief then whose belief is it? Is it the expert's? Is it ours? Whose beliefs are we trying to represent? I take it to be the expert's but occasionally it seems to be rather some sort of statistical property of nature. I can not help thinking that, if these questions were answered clearly, then the answers to some other questions considered in the book might become more clear.

To try to answer the question of what the missing beliefs might be, various methods are discussed, some of which are more promising than others. Several appeal to some kind of indifference argument. The well-known difficulty with this can be illustrated with a simple example related to the doctor-as-expert example which is used through much of the book. Suppose we are interested in the doctor's unstated beliefs about whether or not n future patients will have a particular disease. We could suppose indifference between the 2^n possible sequences of disease states. However this would lead to being not indifferent between the $n+1$ possible numbers of patients with the disease. The "commonsense" of indifference turns out to be a rather flimsy foundation on which to rest powerful mathematics.

There is a section which deals with conditional independence relationships, which have, of course, proved very useful in recent years, particularly when represented graphically. However I would have expected more discussion, somewhere in the book, on exchangeability.

Of course, as a Bayesian statistician, rather than a mathematical logician, I probably look at things differently. For example, on page 116, it is suggested that Bayesian updating is limited because the data have to be certainties. This is illustrated by the case of a patient who claims to have a symptom but may not actually have it. Surely though the observation here is the claim of the patient, not the suffering or otherwise of the symptom, and Bayes' theorem can be applied provided we can express probabilities, for example, that the patient would make the claim conditional on the true symptom-state, or indeed on the true disease state. Similarly, on page 190, the rule, from Carnap's continuum of inductive methods, looks very much like a special case of the linear Bayes rule for exchangeable binary variables. In fact, one of the justifications given for the rule relates it to the case of a uniform prior but this is just a special case of the standard beta-binomial model which is commonly used (though this is not necessary to justify the rule). Some readers might benefit from more discussion of these relationships.

The later chapters of the book deal with computational feasibility and with uncertain reasoning in the predicate calculus. I think that many readers with "some knowledge of undergraduate mathematics" would find these chapters hard going, unless their knowledge happens to be of the right sort, of course.

Perhaps some of my criticisms refer to the subject matter rather than this book in itself. Perhaps this is unfair. Provided the reader understands and accepts the nature of the book then there can be much to be gained from studying the impressive mathematics on display here. There are a few minor typographical errors but the careful reader will spot these and, given the complicated arrays of mathematical symbols, they are perhaps not surprising. The book grew on me as I read it. I found it interesting and informative. In particular it gave me a new insight into some areas with which I was less familiar and stimulated me to think carefully about others.

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Jerry Seligman and Dag Westerstahl, editors. *Logic*, *Language and Computation*, vol 1. Stanford, California: CSLI, 1996. ISBN 1-881526-89-5. US \$22.95.

'These are the proceedings of the conference on Information-Oriented Approaches to Logic, Language and computation held at St. Mary's College, Moraga, California, June 12–15, 1994. The conference was also the fourth in the series of conferences on Situation Theory and its Applications.'

The change of name is not a mere flight of fancy, but corresponds to the realisation that there has arisen a new field of science, that one may call 'informatics' or information sciences and that includes computer science, much of cognitive science and linguistics, as well as much of what has gone on in logic in recent years; cf the guest editorials by Johan van Benthem and Jon Barwise in the *Journal of Logic*, *Language and Information*, vol. 6, nos. 1 and 3 respectively. This science, which wants to answer the question 'What is the nature of mind, or intelligence?'

is the third of the fundamental questions in science (the other two being 'What is the nature of life?' and 'What is the nature of matter?') is in the process of emerging and considers the following issues: what is the basic structure that permits computation, perception, cognition, language, communication, inference, reasoning and other forms of information-mongering activity.

While Situation Semantics is still strongly represented it is now in a context that also includes other information-based frameworks such as dynamic logic and relevant logic.

The format of the volume under review consists of a collection of a large number of papers (three invited talks and thirty-five contributed talks) given at the conference. Since it is impossible to review in detail such a large number of papers, we shall simply list them with a very brief comment for each.

1. Generalized Set Theory by Peter Aczel. A description of a set theory that incorporates a universe of objects for situation theory without any need for the algebraic apparatus.
2. Information-Oriented Computation with BABY-SIT by Erkan Tin and Varol Akman. A computational medium (called BABY-SIT) based on situations is introduced to facilitate the development and testing of programs in domains ranging from linguistics to artificial intelligence.
3. Reasoning with Diagram Sequences by Michael Anderson. A diagram sequence is a meta-diagram composed of a number of sub-diagrams arranged in an order incorporating some manner of moving time. This paper proposes a logic for these objects.
4. Information Flow and the Lambek Calculus by Jon Barwise, Dov Gabbay and Chrysafis Hartonas. An investigation into the logic of information flow. Assumption is that logic flows in virtue of constraints and that constraints classify channels connecting particulars.
5. Logical Aspects of Combined Structures by Patrick Blackburn and Maarten de Rijke. Hybrid ontologies arise when applying logic to areas like AI or linguistics. The paper attemps to identify plausible strategies for coping with these ontologies.
6. On Rich Ontologies for Tense and Aspect by Patrick Blackburn, Claire Gardent and Maarten de Rijke. Back-and-forth structures (an event structure and an interval structure communicating via a relational link) are defined and applied to the semantics of natural language.
7. Naturalising Constraints by Nick Braisby and Richard F. Cooper. Examines the extent to which different formulations of conditional constraints respect the naturalisation requirement that they be grounded in non-intentional terms. This ends up in a proposal that constraints are propositional and 'borne' by situations.
8. Reflexivity and Belief De Se by Karen Leigh Brown. It is asserted that when using reflexive pronouns the indirectly, or accidentally reflexive *Bob scratched Bob* claims and the directly, or essentially reflexive *Bob self-scratched* claims are in fact separable interms of circumstances.
9. A Channel-Theoretic Model for Conditional Logics by Laurence Cavedon. Seligman and Barwise have developed a mathematical model of information flow, making use of the notion of channels. The latter can be seen as structured objects that support conditional information (of the form 'if P then Q'). The present paper sketches out a semantics for conditionals based on the theory of channels.
10. The Attitudes in Discourse Representation Theory and Situation Semantics by Robin Cooper. Kamp has presented a treatment of attitudes based on DRT. The paper under review does the same in terms of Situation Semantics.
11. A Compositional Situation Semantics for Attitude Reports by Robin Cooper and Jonathan Ginzburg. Attitudes, many researchers agree, should be analyzed in terms of structured objects better adapted than Montague's possible worlds. The author claims that Situation Semantics provides the necessary tool.
12. Intensional Verbs Without Type-Raising or Lexical Ambiguity by Mary Dalrymple,

John Lamping, Fernando Pereira and Vijay Saraswat. An analysis of the semantic interpretaion of intensional verbs (such as seek) that allows them to take direct objects of either individual or quantifier type, is presented -- all without the need to stipulate type-raising or quantifying-in rules. This follows from the use of logical deduction in linear logic (for expressing relationship between syntactic structures and meanings).

13. Representation and Information in Dynamic Semantics by Paul Dekker. The author has presented elsewhere a system of predicate logic with anaphora where anaphoric relations are accounted for by keeping track of the possible values of potential antecedent terms, not of the variables with which they have been associated. The impact of this is now discussed on the notions of representation and information involved in a dynamic semantics dealing with the interpretation of anaphoric relationships.

14. A Persistent Notion of Truth in Dynamic Semantics by Tim Fernando. For a certain interpretation of 1st-order formulae A as input/output relations //A// on a set S of states, a notion /A/ (part of S) of truth for A is investigated, arising from the intuitonistic double-negation translation of the domain of //A//. A global Boolean-valued analysis is presented alongside a local, 3-valued non-compositional approximation of it. Complications are exposed and suitable generic models constructed.

15. Dynamics and the Semantics of Dialogue by Jonathan Ginzburg. Dialogue (as in plays) is an efficient medium for informational exchange. Two particular aspects contribute to this: discursive potential and ellipsis. The paper sets out to describe the context needed for a semantics that captures these two features.

16. Towards a Channel-Theoretic Account of the Progressive by Sheila Glasby. Two recent accounts of the semantics of the progressive are examined, none of which turns out to be satisfactory. The author then proposes anew treatment based upon recent developments in channel theory.

17. This Might Be It by Jeroen Groenendijk, Martin Stokhof and Frank Veltman. This paper adds one more system to the existing stock of semantics for the language of modal predicate logic. It characterizes the meaning of a sentence in terms of its information change potential rather than its truth conditions. Information change is implemented by interpreting sentences as updates, functions from information states to information states.

18. Euler and the Role of Visualization in Logic by Eric Hammer and Sun-Joo Shin. The paper examines Venn and Peirce diagrams from the perspective of an increase in the expressive power of Euler diagrams, reconstructs Euler systems to overcome some problems and proves soundness, completeness and decidability for the system.

19. Individuation and Reasoning by Kiyoshi Ishikawa. An information-based theory of the referential/attributive (R/A) distinction is given, based on the descriptive content conception as well as an analysis of the particular individual conception in terms of it. Meaning is analyzed in terms of information-state change for cognitive agents rather than truth condition in an agent-independent model.

20. Where Monsters Dwell by David Israel and John Perry. Are there operators which when prefixed to a sentence yields truth if and only if in some context the contained sentence expresses a content that is true in the circumstances of that context? The authors claim that NO.

21. A Distributed System Model for Actions of Situated Agents by Yasuhiro Katagiri. A model is given that expresses and investigates relationships between agents' mental states and actions.

22. Information, Representation and the Possibility of Error by Robert C. Koons. This is an attempt to give an information-based theory of representation and the possibility of error.

23. Bridging Situations and NPI Licensing by Ik-Hwan Lee. An account is presented of the licensing phenomena of the Non-assertive Polarity Sensitive Items (NPIs) within the framework of Situation Semantics.

24. A Diagrammatic Inference System for Geometry by Isabel Luengo. It is claimed that diagrams can be used in geometry proofs in essential ways. A visual inference system for geometry describing its syntax and semantics is given.

25. Belief as a Form of Subjective Information by Daniel Mack. The relationship between notions of belief and of information is examined and it is argued that belief can be regarded as a subjective form of information. This allows the derivation of a formal model.

26. Diagram Contents and Representational Granularity by Kenneth Manders. It is shown how the individuation of diagram contents in traditional geometry practice is intimately bound up with the workings of that practice and differs from individuation of corresponding contents in other geometrical representations. Then an attempt is made to get a theoretical grip on this behaviour and its consequences for the notion of representational content.

27. Constraints on Coalgebras by Kuniaki Mukai. The objective of the paper is to generalize Barwise's unification lemma with the final coalgebra theorem to include coalgebras for set-based functors: automata, rational trees, directed graphs, feature structures, terms, processes, and so on.

28. Proof Styles in Multimodal Reasoning by Jon Oberlander, Richard Cox and Keith Stenning. The paper introduces Hyperproof (a computer program due to Barwise and Etchemendy for teaching 1st-order logic) and studies two cases of proofs constructed in Hyperproof. Answers are attempted to the question of whether different individuals develop different styles of proof and if they do, what patterns emerge.

29. Austinian Pluralities by Dick Oehrle. The paper is an attempt to provide a perspective on plurality which answers numerous questions on the problem.

30. Interfacing Situations by John Perry and Elizabeth Macken. The paper, first in a series of two, will attempt to (1) explore aspects of heterogenous systems of representation and communication; (2) show how the American Sign Language exhibits some of those features; (3) draw some morals for the design of interfaces.

31. Information Flow and Relevant Logics by Greg Restall. There is some kind of connection between relevant logic and situation semantics, it has been conjectured; that is shown to be true.

32. Attunement to Constraints in Nonmonotonic Reasoning by William C. Rounds and Gou-Qiang Zhang. An attempt to use domain theory to throw light on semantic problems in the area of non-monotonic logic within AI is generalized to include information flow settings.

33. A Simultaneous Abstraction Calculus and Theories of Semantics by Peter Ruhrberg. Similarities between recent semantic theories such as Discourse Representation Theory, Dynamic Montague Grammar, and Situation Theory can be viewed as involving forms of simultaneous abstraction. The common core is the author's Simultaneous Abstraction Calculus.

34. Minimal Truth Predicates and Situation Theory by Stephen Schulz. An attempt to employ modal situation theory in explicating and investigating anti-realist construals of truth.

35. Reasoning with Diagrams and Geometrical Constraints by Atsushi Shimojima. An attempt to build an information-theoretic model of diagrammatic reasoning that predicts both the advantages and the disadvantages of the use of diagrams in reasoning.

36. A Legal Reasoning System Based on Situation Theory by Satoshi Tojo and Stephen Wong. The purpose of the paper is to introduce a formal model of legal reasoning based on situation theory.

37. An E-Type Logic by Jaap van der Does. This is a presentaion of DQL, a dynamic quantifier logic in which somepronouns are treated as as E-types, in the sense explained by the author.

38. From Utterances to Situations: Parsing with Constructions in Small Domains by

Wlodek Zadrozny. A description is given of data structures and algorithms for computing parameters of situations from NL utterances in conversation-for-action dialogues.

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