

The Beginnings of Formal Semantics: The Historical Context of Arnim von Stechow's Contributions

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1. Introduction

Arnim and I have been colleagues and friends for a long time. I think we first met at Ed Keenan's 1973 conference at Cambridge University, so more than 40 years ago. We've never worked directly together, but we've interacted over the years in various ways, at conferences, with visits, through students like Irene Heim and colleagues like Angelika Kratzer and mutual admired friends like Max Cresswell and David Lewis.

The organizers of the Von Stechow Workshop at Sinn und Bedeutung 20 in 2015, knowing that I'm working on a project on the history of formal semantics and knowing of my long connection with Arnim, suggested that I might give a talk that takes us back in time to the beginnings of formal semantics and leads us through some of the great achievements, milestones, and the 20 years of Sinn und Bedeutung to the present, setting the scene for the three other invited talks that will celebrate Arnim's contributions to the field.

That suggested job was too big, given the exponential growth of achievements and milestones since the beginnings in the late 60's. I have focused on the period from the late 60's until the late 80's, giving very abbreviated accounts of matters I have written about in other papers (Partee, 2011, 2013a, 2013b, 2015), and inserting little bits of Arnim's history at appropriate points.

And afterwards I was invited to turn my talk into a paper for the workshop collection; I am leaving the paper in the informal style of the talk.

2. Semantics before formal semantics

2.1. Semantics in linguistics up to the 1960s

The context in which formal semantics emerged was different on the two sides of the ocean. In talks and papers on the history of formal semantics, I've emphasized the scene in the US into which Montague emerged. But I've been reminded by a number of European colleagues that parts of that context were quite US-specific.

A thumbnail summary of the early history in the US includes negative attitudes to semantics in American linguistics in the 20th century, influenced by logical positivism and behaviorism. There was rather little semantics in early American linguistics, partly for that reason and partly as a result of fieldwork tradition: one starts with phonetics, then phonology, then morphology, then perhaps a little syntax, and usually no semantics beyond dictionaries and structuralist decomposition of important semantic fields like kinship terms. At the same time, there was great progress in semantics in logic and the philosophy of language, but that was largely unknown to

most linguists.

And then my US-centric history continues with emphasis on Chomsky, the Katz-Postal hypothesis that meaning is determined at Deep Structure, and then the Linguistic Wars (Partee, 2014).

Let me just mention here the Bar-Hillel – Chomsky interchange in the 1950's, since Bar-Hillel will return as part of Arnim's history. In 1954, Yehoshua Bar-Hillel wrote an article in *Language* (Bar-Hillel, 1954) inviting cooperation between linguists and logicians, arguing that advances in both fields would seem to make the time ripe for an attempt to combine forces to work on syntax and semantics together. He was arguing against logicians who considered natural language too unruly to formalize, and appealing to linguists to make use of some of the logicians' methods.

And then in 1955, Chomsky, then a Ph.D. student, wrote a reply (Chomsky, 1955), arguing that the artificial languages invented by logicians were so unlike natural languages that the methods of logicians had no chance of being of any use for linguistic theory. (Chomsky and Bar-Hillel remained friends.)

Bar-Hillel didn't give up, though. In 1967 he wrote to Montague, after receipt of one of Montague's papers: "It will doubtless be a considerable contribution to the field, though I remain perfectly convinced that without taking into account the recent achievements in theoretical linguistics, your contribution will remain one-sided."¹

Semantics in early European linguistics was mainly lexical; lexical semantics and principles of semantic change and semantic drift were important for historical and comparative linguistics. Structuralism arose first in Europe, and Saussure was influential for structuralism, for putting synchronic grammar into the foreground, and for conceiving of grammar as connecting form and meaning. Bühler's *Sprachtheorie* (Bühler, 1934) included an early treatment of indexicality and perspective-shift.

Jespersen made lasting contributions to semantics as well as syntax (Jespersen, 1924); while in the Netherlands, Evert Beth was laying foundations (Beth, 1947, 1963) for the cooperation among logicians and linguists that made the Netherlands one of the major contributors to the development of formal semantics from the start.

The situation in philosophy and logic had different divisions, not Europe vs the US.

The Frege-Russell-Carnap-Tarski developments, and Polish logic (Łukasiewicz, Ajdukiewicz), cut across continents, given that Carnap and Tarski both emigrated to the US.

The Ordinary Language – Formal Language wars in philosophy of language were largely fought

¹ From a letter from Bar-Hillel to Montague, 20 Nov 1967 (in the Montague archives, UCLA).

within Anglo-American philosophy.

But as Arnim mentioned to me in discussing his own education, philosophy in Germany was largely dominated by continental philosophy. So whereas philosophers were among the leaders in developing the earliest formal semantics in the US, the Netherlands, New Zealand, and Scandinavia, that was not the case in Germany, where linguists, notably Arnim, had to teach themselves the necessary formal and logical tools and develop formal semantics themselves.

2.2. Philosophy and logic: antecedents to the work of Montague, Lewis, Cresswell, et al.

The foundational work of Frege, Russell, Carnap and Tarski led to a flowering in the middle third of 20th century of work on modal logic, tense logic, conditionals, referential opacity, and other philosophically interesting natural language phenomena. It was in (Wittgenstein, 1922) that we find the first articulation of the idea that “To know the meaning of a sentence is to know what is the case if it is true”.

The field was further advanced by Kanger’s and Kripke’s work (1957a, Kanger, 1957b, Kripke, 1959) distinguishing between possible models of a language (the basis for the semantical definition of entailment) and possible worlds (possible states of affairs) to be included within a given model, giving a model-theoretic semantics for modal notions.

Reichenbach (1947) and then Prior (1967) made great progress on the development of the logic of tenses, and hence on context-dependence; Thomason (1996) identifies Prior as an important contributor to “natural language semantics logicism”.

2.3. Pushes towards formal semantics

I mentioned Bar-Hillel’s unsuccessful appeal in 1954. At that time, each side was convinced that they had nothing to learn from the other. Frits Staal and Bar-Hillel both kept trying; both had good relations with both Montague and Chomsky.

In the summer of 1967, Staal, Bar-Hillel, and Curry organized a symposium during the 3rd International Congress for Logic, Methodology, and Philosophy of Science, on “The Role of Formal Logic in the Evaluation of Argumentation in Ordinary Language”. Bar-Hillel prepared an opening position paper, and participants included Montague, Jerry Katz, Dummett, Geach, Hintikka, and others.

As Staal noted in the edited condensed discussion (Staal, 1969), quite a few people then knew of Montague’s work, and quite a few knew about MIT linguistics (represented by Katz), but few knew both.

3. The beginnings of formal semantics – 1966-70

With few exceptions, most of the new work on tense and aspect, modality, opacity, etc., as well as Montague's own work in papers like "Pragmatics and Intensional Logic", followed the tradition of not formalizing the relation between given natural language constructions and their logico-semantic analyses or 'reconstructions': the philosopher-analyst served as a bilingual speaker of both English and the formal language used for analysis.

That changed dramatically in the late 1960's, starting with Montague's "English as a Formal Language" and "Universal Grammar" (Montague, 1970a, Montague, 1970b), David Lewis's "General Semantics" (Lewis, 1970), Terry Parsons' "A Semantics for English" (Parsons, 1968), von Stechow's "Formale Semantik" (Brockhaus and von Stechow, 1971a, 1971b), Cresswell's *Logics and Languages* (Cresswell, 1973).

3.1. Motivations and stimuli for that work

So one might well ask why this big change occurred in the late 1960's and early 1970's. Apart from Arnim, the cited authors are all logicians and philosophers.

In the case of Montague, what I tracked down in the Montague archives and in correspondence with his PhD students Nino Cocchiarella and Hans Kamp is reported in (Partee, 2013a). In a nutshell, it was in part his experience with the Kalish and Montague logic textbook (Kalish and Montague, 1964), where they formulated quite explicit rules for mapping between first-order logic and a regimented subset of English. And I found a statement of his own in his handwritten introduction to an early talk version of "English as a Formal Language", July 31, 1968, UBC, Vancouver, which includes "This work is the result of two annoyances ...", which turn out to be (i) the Ordinary Language vs. Formal Language wars in philosophy of language, and (ii) "The great sound and fury that nowadays issues from MIT under the name of "mathematical linguistics" or "the new grammar" – a clamor not, to the best of my knowledge, accompanied by any accomplishments." He wanted to show that ordinary language could be formally analyzed, even if he somewhat denigrated the task as "rather easy and not very important."

As for David Lewis, he appreciated Chomsky, appreciated the issues in the linguistic wars, appreciated Montague and had similar ideas himself (he discussed things with Montague, so some of their ideas may be joint.) His 1970 paper, written for linguists as an invited talk for a syntax conference at UC San Diego, offers a palette of alternatives, and is designed to show linguists how a "real semantics" can be added to generative grammar.

Max Cresswell visited UCLA in 1969-70, and was greatly impressed by Montague's "English as a Formal Language" course, which inspired his own thinking.

Arnim had studied logic and also linguistics. He was very interested in semantics, but not satisfied with what was in (Lyons, 1977), because it had a lot of semantics but no entailment –

just notions like synonymy, hyponymy, hyperonymy, ambiguity, etc.²

The mathematician Klaus Brockhaus was Arnim's 'real teacher' in linguistics at the University of Muenster; he worked on machine translation and helped them learn about formal grammar. Arnim wanted to have a more formal kind of semantics; he and Brockhaus worked on that. Their 1971 'Formale Semantik' is in proceedings from a 1970 Regensburg conference; their related 1971 paper in English is in *Linguistische Berichte* – they are important early documents and are Arnim's first semantics papers³. The formal semantics they developed was 'very syntactic' in the sense of all being axiomatic rather than model theoretic; they axiomatized the notions of synonymy, hyponymy, etc.

Arnim at the time "had the idea 'Why we don't have as meanings something you have in the formal languages, truth conditions or truth values, etc.?' and he [Brockhaus] said, 'This is an interesting thought, but it's totally absurd!'". They hadn't heard of Montague – Arnim was inventing it for himself.

3.2 A footnote

About Montague's acquaintance with Chomsky's work: In spring 1966, Montague taught in Amsterdam, and Frits Staal was then leading a workgroup on formal grammar. At a joint group meeting, Staal and Montague compared Chomsky's (*Aspects*) way and Montague's way of dealing with certain sentences. Henk Verkuyl recalls an interesting contrast⁴:

"What Frits did was to take a quite long sentence with adverbials (*on the corner*, if I remember well). Frits took care of the *Aspects* way of dealing with this sentence [with trees]. Montague then presented his own alternative. He did so by climbing on a chair and writing formula after formula on the blackboard -- without too much of an explanation; and so he was generally considered as a somewhat strange sort of person, however kind he seemed to be."

4. Some milestones and issues

1965 – The journal *Foundations of Language* was founded by Frits Staal and colleagues, including Morris Halle, with a call for interdisciplinary cooperation. Its last year was 1976; it was followed by *Linguistics and Philosophy*.

1967-69 -- Davidson and Harman were together at Princeton for those two years, intensely

² These biographical notes about Arnim come from our interview on March 14, 2011, in Oslo.

³ Brockhaus and von Stechow's 1971 papers are the earliest references I know of to the terms *formal semantics* and *formale Semantik* in linguistics. (The next earliest seems to be Keenan's 1973 conference "Formal Semantics of Natural Language".)

⁴ Interview, December 17, 2013, in Amsterdam.

interacting, both optimistic about potential fruitfulness of linguistics-philosophy interactions. They were optimistic about generative semantics. They influenced each other's work; and together they produced some exciting conferences and influential edited collections.

At the same time David Lewis and Montague were both at UCLA, also interacting; David introduced me to Montague and I first sat in on a seminar of Montague's at UCLA (with David and Frank Heny) in 1968. I had a lot of dumb questions at the beginning, and David was the one I could ask them to; he always answered patiently and well. It was also David who urged Max Cresswell in December 1969 to sit in on Montague's winter quarter 1970 course on "English as a Formal Language" – Max says he didn't even know what that meant, but was quite blown away by what he encountered there.

1969 – Davidson & Harman organized a conference of linguists and philosophers at the Center for Advanced Study in the Behavioral Sciences. Generative semantics was well represented. Geach presented "A Programme for Linguistics", countered by McCawley's "A Programme for Logic". At the conference, the philosophers included Quine, Geach, and David Kaplan (and not Montague); the linguists included Bach, Lakoff, McCawley, and Partee. Davidson and Harman published an expanded set of papers in a special edition of *Synthese* in 1970, with more authors than were at the conference (e.g. that's where David Lewis's 'General semantics' was first published), then expanded it further into an edited volume (Davidson and Harman, 1972) (adding Kripke's 'Naming and Necessity'). That volume gives a good picture of the state of linguistics-philosophy interaction in the late 1960's, when there was quite a lot of it, but just before Montague began to have a big influence. Davidson and Harman did a great deal to promote linguistics-philosophy interaction, but not formal semantics as we know it.

1966 – The University of Konstanz, conceived in 1965, started that year with a makeshift beginning in a wing of the Inselhotel, formerly a Dominican monastery.

1967 – The start of today's campus of the University of Konstanz was developed through individual construction projects on the hill known as the Gießberg.

1969 (I think): Arnim came to Konstanz from Münster, as one of the original hires, as Assistant Professor. (The full professor hired then was Peter Hartmann.)

Out of order but relevant here - 1973: While at Munich, Irene Heim wrote to Peter Lutzeier (June 1973) for some advice; he replied (July 1973) with a good letter about what he thought about linguistics in departments all over Germany. So in the summer of 1973 Irene looked at some places, fell in love with Konstanz; Lutzeier had also recommended it as an excellent place, because of Arnim.

Fall 1973 Irene remembers a class with Arnim in which they read Schnelle's translation of Montague's "Universal Grammar" (Montague, 1970a).

Spring 1970 - There was a small conference of linguists and philosophers at UCLA, memorable

in part because it was moved to the basement of a church after Reagan closed the University of California in the wake of protests over the bombing of Cambodia. Talks were by philosophers Montague, Julius Moravcsik, John Vickers, and Martin Tweedale, and linguists George and Robin Lakoff, George Bedell, and me; attendees included Bruce Vermazen, Lauri Karttunen, Bob Wall, and then-students Michael Bennett and Larry Horn.

That was the time when I intervened in an argument between Lakoff and Montague about whether it was crazy to derive prenominal adjectives from relative clauses or crazy not to, explaining to each of them where the other's position was coming from, and during the coffee break got the closest to a compliment I ever got from Montague – “Barbara, I think that you are the only linguist who it is not the case that I can't talk to.” (Larry Horn, already a budding negation specialist, also noticed that sentence and copied it down; our memories agreed 35 years later.)

Fall 1970 – the Moravcsik, Hintikka and Suppes conference at which Montague presented PTQ; the resulting publication was (Hintikka et al., 1973).

There was more at that conference, but I don't remember much else. When “part 2” was held a few months later, in December, we were all to make comments on as many of the other participants' papers as we wished. I decided to put all my efforts into commenting on Montague's paper. I commented on Montague's syntax, comparing it with transformational grammar (Partee, 1973b). I recall David Kaplan saying that by listening ‘inversely’, he was able to understand something about how transformational grammars worked. And Montague didn't object to my description of what he was doing – that was reassuring.

I wasn't ready to work with Montague's semantics yet, but I was quite excited about it, and started working on a UCLA research grant proposal to try to work ‘with’ Montague, sort of. (I planned to pose puzzles and see if I could interest him in trying to solve them.)

March 7, 1971 – Montague's death, at age 40 - a total shock.

Summer 1971 -- Summer School in Semantics and Philosophy of Language at UC Irvine, organized by Donald Davidson and Gil Harman. A life-changing event for some of us. [Montague had been upset when he learned about it – he was not invited.]

There were two 3-week sessions, each with twice-a-week lecture plus discussion session (3 hours) by 3 philosophers and one linguist. Lecturers in the first session were Grice, Davidson, Harman, and me as the linguist; the second session had Strawson, Quine, Kaplan, and Haj Ross as the linguist. And there was a special evening series by Kripke on his just-completed “Naming and Necessity”. The “students” were young philosophy professors, including Rich Thomason, Bob Stalnaker, Gareth Evans, Dick Grandy, Peter Unger, Steven Stich, Bill Lycan, Bob Martin, Oswaldo Chateaubriand, Carl Ginet, Sally McConnell-Ginet, James McGilvray, and many others; and many of them gave evening lectures. (And Gil Harman reports “After intense discussions, we would spend time in Laguna Beach, where Davidson was teaching Quine to

surf.”)

(For me that was the summer I finally appreciated what lambdas could do. I saw how one could get rid of Equi-NP-deletion by introducing a Derived VP rule to make open sentences into property-denoting VPs (Partee, 1973a)).

Fall 1971: David Kaplan and I each taught a seminar at Stanford, one afternoon a week, and sat in on each other’s seminars – his on demonstratives and mine on Montague grammar. I learned a lot from him, and also got a lot of help from him, Jaakko Hintikka, and Julius Moravcsik as I struggled to understand Montague’s intensional logic in my first attempt to explain what he had done and what a linguist could do with it.

1971 – Brockhaus & von Stechow papers, independent of Montague
Also Bar-Hillel spent 1971 sabbatical year at Konstanz – more on this below.

1971 – This year also saw the publication of two papers by the independent Ed Keenan on what may well be called formal semantics: Names, quantifiers, and a solution to the sloppy identity problem (Keenan, 1971a), and Quantifier structures in English (Keenan, 1971b).

1972 – The circulation of the second version of Terry Parsons’s big fragment with his combinatorial way of doing formal semantics of English (Parsons, 1972), whose first version had been circulated in 1968 (Parsons, 1968).

1971 – Bar-Hillel spent a year at Konstanz. He read the Brockhaus and von Stechow papers, and as Arnim recalls, “he said he had studied the thing Brockhaus and I had written, and he said it was ingenious and it had gone almost so far as Montague, and I should read that. So then I started reading Montague, and the first thing I read was English as a Formal Language. That I always liked, because I also always had the idea that you have to have sentence meaning as truth conditions somehow. And then the second idea was also that you had to interpret syntax directly, and EFL did that, without [some translation] in between, and that I liked.” Let me include a part of our interview here (A = Arnim, B = Barbara):

A: And later on, the second thing I read then was Universal Grammar. ... It’s hard, yeah, but that’s the one I liked best in some sense.

B: And you read these by yourself? It’s hard!!

A: Well, we did, ... I could ask no one, I had a bit of logical background, but I had to teach myself everything and this was really hard stuff.

B: Did you know lambdas before?

A: No, of course not!

B: Neither did I and it was ...

A: Hard. No, it took me also a long time.

...

A: And PTQ came much later, and I never liked it so much.

There were major early contributions to formal semantics in Europe starting in the early 1970’s.

Renate Bartsch had come to UCLA to work with Montague just before his death; she and I had fruitful discussions, but much more significant was her collaboration with Theo Vennemann, which began then at UCLA and continued in Germany (Bartsch, 1972, Bartsch and Vennemann, 1972). Arnim von Stechow was an early and influential contributor to the rise of formal semantics in Germany and Europe. A number of formal semanticists in other European countries point to von Stechow as the source of their earliest acquaintance with Montague's work.

In my interviews with them, both Arnim and Angelika told me more about their substantial work on theories of syntax (Kratzer et al., 1974), including context-free grammars with features, transformational grammar, dependency grammar, categorial grammar ... So they were never as impressed as some of us were when Gazdar et al's work in the early 1980's plus a rich semantics seemed to eliminate the need for transformations.

With a "real semantics" to work with, one no longer needed sameness at any syntactic level such as Deep Structure to capture sameness of meaning, as observed early on in (Thomason, 1976). And the advent of a "real semantics" helped to end the linguistic wars between generative and interpretive semantics.

But the introduction of "real semantics" led to a new split – whether to get rid of transformations. As Irene Heim said to me⁵, having a real semantics "makes the game harder, because it's true of course that a lot of the early work in syntax was in some sense born of lack of imagination about what you could do with semantics. But then once you know that you could do it this way or that way, you know, there is still a question about which way you *should* do it."

Winter-Spring 1972: my first MG seminars at UCLA. (Stockwell: "But when are you going to get back to doing linguistics?") My three main UCLA Ph.Ds – Larry Horn and Frank Heny in linguistics, Michael Bennett in philosophy.

Fall 1972 – I moved to UMass Amherst, still as a syntactician, but also teaching introduction to semantics and seminars in Montague grammar. Terry Parsons moved to UMass at the same time, and we got a joint NSF grant in 1973. Emmon Bach moved to UMass in 1973, and also became a Montague grammarian; the three of us taught jointly in various combinations and supervised the first UMass semantics Ph.Ds together: Robin Cooper 1975, Muffy Siegel 1976, Greg Carlson 1977.

1973 - publication of my first paper on Montague Grammar, (Partee, 1973a), which had earlier appeared in a UCLA Occasional Papers volume edited by Bob Rodman, (Partee, 1972)⁶. I had

⁵ Interview Oct 23, 2013, Cambridge, MA.

⁶ That 1972 UCLA Occasional Papers volume is historic for two reasons. For one, the unicorn on its cover, designed at Bob Rodman's request by his wife Joanne because of Montague's famous example sentence *John seeks a unicorn*, led to the unicorn being adopted for many years as the "mascot" of Montague grammar (see my t-shirt in the group photo from the 1978 Konstanz conference in (Bäuerle et

given the corresponding talk at a workshop at the University of Western Ontario in April 1972, with a little help from my friends the philosophers -- Bill Harper, one of the conference organizers, recalls the evening before my talk, somewhere upstairs with a whole gang helping me – David Kaplan, David Lewis, Dana Scott, Rich Thomason, Bob Stalnaker, Bas van Fraassen, Bill Harper ... I remain grateful!

1973 – publication of Cresswell's *Logics and Languages*. It had reached Konstanz earlier.

Spring 1973 – The earliest international conference on formal semantics (construed broadly) of natural language was organized by Ed Keenan at Cambridge University in 1973; eighteen of the twenty-five published contributions in (Keenan, 1975) were by Europeans, including Östen Dahl, Hans Kamp, Peter Seuren, John Lyons, Renate Bartsch, Arnim von Stechow, Franz von Kutschera, Carl Heidrich, and Theo Vennemann. Americans there included David Lewis, Barbara Partee, George Lakoff, Stephen Isard, Ed Keenan, Haj Ross. The term 'formal semantics' was not common then outside of logic but soon gained ground among like-minded semanticists who weren't all strictly Montagovian, Keenan being a prime example.

1974: Publication of Montague's *Formal Philosophy* (Montague, 1974), edited and with extended introduction by Rich Thomason.

1974: Michael Bennett's UCLA dissertation (Bennett, 1974). It was co-chaired by Kaplan and Partee – it was originally to have been chaired by Montague.

Summer 1974 – The LSA's then-annual Linguistic Institute was put on by UMass Amherst, with semantics and philosophy of language as a major theme, and with a large group of faculty, students, and visitors from all over. My course on Montague grammar had about 80 participants; besides the chance to learn and discuss MG, they all got to know each other, there and in courses by Kamp, Karttunen, Parsons, Dowty, Thomason, Stalnaker, Keenan, Janet Fodor, Bach, ...

At the Institute there was a lively 6-week MSSB seminar on Non-Extensional Contexts that I organized, which included Rich Thomason, Bob Stalnaker, David Lewis, Terry Parsons, David Dowty, Ray Jackendoff, Janet Fodor, Ed Keenan, Hans Kamp, Lauri Karttunen, Michael Bennett, Enrique Delacruz, and graduate students Anil Gupta (Thomason's) and Robin Cooper (mine). We had subgroups working on Montague Grammar, Propositional attitudes, Non-declaratives, and "Entia non grata" (fictional entities, intentional identity, intensional transitive verbs).

Other people at the institute for longer or shorter times included Perlmutter and Postal, Max Cresswell, David Kaplan, Jim McCawley, Haj Ross, John Searle, Larry Horn, Polly Jacobson, Barbara Abbott, Östen Dahl. Ivan Sag organized fraternity houses into co-ops, with weekly parties. It was intense!

al., 1979.) And that volume was also identified by the editors of the *Oxford English Dictionary* as the origin of the term "Montague grammar".

The Institute newsletter, put out by a group of students, had a different title each week – The Morning Star, The Evening Star, Venus, Hesperus, ...

By mid-1970's, Montague grammar and related work in formal semantics was flourishing as a cooperative linguistics-and-philosophy enterprise in parts of the U.S., the Netherlands, Germany, Scandinavia (including Oslo and Trondheim), and New Zealand, and individually elsewhere.

The biennial Amsterdam Colloquia, still a major forum in formal semantics, started in the mid-1970's and became international in the late 1970's.

1976 – publication of my edited volume *Montague Grammar* (Partee, 1976) containing contributions by Lewis, Partee, Thomason, Bennett, Rodman, Delacruz, Dowty, Hamblin, Cresswell, Siegel, and Cooper and Parsons. Issues treated in those 1976 papers included extensions of Montague grammar to handle plurals, transformational constructions, aspect, restrictive and non-restrictive relative clauses, factive complements; predicative and attributive adjectives in English and Russian (Siegel); comparatives and positives and semantics of degrees (Cresswell); questions (Hamblin); and intertranslatability of theories of 'Quantifying In' (Cooper and Parsons).

1977 – there was a conference organized by Steven Davis and Marianne Mithun at SUNY Albany; the first international conference on formal semantics held in the US, published as (Davis and Mithun, 1979). Papers included Thomason and Mithun's Montague grammar of a fragment of Mohawk – an early application of MG to typology. My paper offered constraints on the form of a Montague grammar, hinting toward type-driven translation. There's Emmon Bach's "MG and Classical TG", Michael Bennett on mass nouns and mass terms, Groenendijk and Stokhof's first international conference paper, "Infinitives and context", McCawley's "Helpful hints to the ordinary working Montague grammarian", and Terry Parsons's type-schemata solution to the increasing proliferation of types for NPs proposed for plurals, for nominalizations, etc.

1977 – the first issue of *Linguistics and Philosophy*, successor to *Foundations of Language*. The first article was by Lauri Karttunen on the syntax and semantics of questions (Karttunen, 1977), the second by David Dowty on verb aspect and the English 'imperfective' progressive (Dowty, 1977). Later in Volume 1, there were papers by Carlson on bare plurals (Carlson, 1977), Hintikka, König, and Kratzer on *must* and *can* (Kratzer, 1977). That was Angelika Kratzer's first English-language journal publication, and one of Greg Carlson's first three, all 1977.

1978, September: Conference in Konstanz, Semantics from Different Points of View, organized by Arnim von Stechow, Rainer Bäuerle, and Urs Egli. The corresponding volume (Bäuerle et al., 1979) includes a great group photograph with a key to all the participants.

Arnim told me that he organized it to help build a sense of community in semantics within and beyond Germany, since most semanticists in Europe were quite isolated.

Participants and their papers included, among others:

- ❑ Rainer Bäuerle – Questions and answers
- ❑ Max Cresswell – Interval semantics for event expressions
- ❑ Irene Heim – Concealed questions (her first publication)
- ❑ Hans Kamp – Events, instants, and temporal reference
- ❑ Angelika Kratzer – Conditional necessity and possibility
- ❑ David Lewis – Scorekeeping in a language game
- ❑ Arnim von Stechow – Visiting German relatives
- ❑ Barbara Partee – Semantics – Mathematics or psychology?

1978 – The first US ‘pre-textbook’ - (Dowty, 1978).

1970’s - Four textbooks on Montague grammar were published in Germany, the last and best being (Link, 1979); all were reviewed in (Zimmermann, 1981).

1980 – Arnim spent 4 months as a Visiting Professor at UMass Amherst. He and Emmon and I had many intense discussions and interactions. He learned to pronounce “Montague Grammar” with an American accent.

1980 – This was the first time that the Amsterdam Colloquium included invited semanticists from the US; the formal semantics community was becoming increasingly integrated across Europe and the US.

1981 – The first Montague textbook in English:(Dowty et al., 1981).

1982 - Publication of the 2-volume Gamut introduction to logic and formal semantics in Dutch (Gamut, 1982), which was finally translated into English in 1991.

5. An emerging issue in the 70’s: Context

At the Staal-Bar-Hillel round table in 1967, Bar-Hillel described context-dependence as one of the major issues that needed to be addressed before logical approaches could handle natural language. Montague replied that “context-dependent sentences present no special problem... Formal systems containing [tensed sentences] are easy to construct. ... And a comprehensive formal treatment can be found that will apply to every other sort of indexical reference known to me ... one replaces moments by *possible contexts* or *points of reference* ...

But in extensions of MG in the US, semantics and pragmatics were strongly separated: semantics put in free variables of various sorts, to be filled in ‘later’ by some assignment function that represented the ‘context’.

At the 1978 Konstanz conference I saw how far ahead of us Arnim and Angelika were; and in

interviewing Jeroen Groenendijk in Amsterdam in 2011 ago I learned that much of their work had also been motivated by wanting a more sophisticated treatment of context-dependence.

By the early 80's, with the work of Heim, Kamp, and the Amsterdam crew, we had context-change potential, dynamics, and a fading of the line between formal semantics and formal pragmatics (the context part).

6. Formal semantics as an autonomous subdiscipline of linguistics, and other later developments.

I think the height of interaction on semantics between linguists and philosophers had passed by 1980, followed in the US by the rise of cognitive science, in which semantics was one of the highly interdisciplinary concerns.

A major development in the 80s was greater specialization of semantics inside of linguistics proper, though always with many individual scholars maintaining links of various kinds within and across disciplines. By the middle of the 1980's the increasing recognition of formal semantics as part of the core curriculum in linguistics was seen in the publication of textbooks and the growing number of departments with more than one semanticist, and a few, like ours, with more than two by the end of the decade.

By the beginning of the 1990's, formal semantics (no longer "Montague grammar", though that's about the time that the term "Montague grammar" made it into the OED) was a fully established field within linguistics, and students were not conscious that the core fields hadn't always been 'phonology, syntax, semantics'. Semantics textbooks published around 1990 included (Bach, 1989, Chierchia and McConnell-Ginet, 1990, Gamut, 1991). Departments with one or two formal semanticists increased in the 1990's.

In the 1980's and 1990's, there was noticeably less interaction between linguists and philosophers in semantics in the U.S., in part because within philosophy interest in the philosophy of language had declined as interest in philosophy of mind increased.

In the 1990's there was some divergence between (parts of) Europe and the US. The ILLC was founded in Amsterdam in the late 1980's, leading to the creation of the new journal JOLLI and the ESSLLI summer schools, with equal weight on language, logic, and computation. The Amsterdam Colloquium also became somewhat more logic-and-computation-heavy. In the US, the journal *Natural Language Semantics* was launched in 1992 by Heim and Kratzer, specifically aiming to integrate formal semantics more closely into linguistic theory, especially to connect semantics with syntactic theory, unlike the older interdisciplinary journal *Linguistics and Philosophy*. The SALT conferences began in 1991, with similar motivation.

But I think there's been more back-and-forth since then, and I don't feel that separation now as much as I did in the 1990's. And it's fine to have a variety of subtypes of interdisciplinary

emphases at different conferences, especially as the field grows and diversifies. And I understand that the conference *Sinn und Bedeutung* was started in 1996 just to increase communication of ideas and bring people together, not to push any particular agenda.

7. Examples of renewed linguistics-philosophy interaction.

When I wrote my semi-autobiographical essay (Partee, 2004), there seemed to be little real linguistics-philosophy interaction. But later I happily came to realize that it's on the increase, and more sophisticated than ever. One reason has been the rise of formal pragmatics in linguistics together with the rise of "contextualism" in several areas of philosophy. Other areas of mutual interest and recent activity include vagueness, and the "judge" parameter with predicates of personal taste and epistemic modals. And there are more.

All of these issues seem to relate in one way or another to the interaction of meaning and context, still a growth area. Since that's always been a strength of the semantic community Arnim helped to build, that's as good a place as any for me to stop. Except for an epilogue especially for and about Arnim.

8. Epilogue – a few of Arnim's "likes", and giving Arnim the last word.

While transcribing my interview with Arnim in May 2011, I was struck by quite a number of places where he inserted "and that I liked" or the like. And that I liked, so I want to report some of them in closing.

Romance philology in his student years was unexciting, "but what I liked already then was the bit of historical linguistics, so from Vulgar Latin to French etc – that I liked."

"In Bonn (62-64) I had a girlfriend who was a mathematician, so I had already linear algebra, and the first contact with logic – that I liked."

"Someone recommended to me for my voyage to the Phillipines (1964) a textbook on logic by - I think the man was called Irving Copi – and my feeling was that this was the first subject I understood." He read the whole book and did all the exercises and thought "I have to do that."

[Around 1970] "I was in a train, I had travelled to Hamburg and for some reason I had that book by Hughes and Cresswell about modal logic. I know exactly in the train in the night I read the entire book more or less, I mean without going into all the details, and that I liked a lot."

And later about Cresswell's *Logics and Languages*, "and that I liked a lot".

"And David Lewis, for me, when it comes to the philosophy of language, was always in a way the greatest. ... in 'General Semantics' I liked the remarks he makes about the pragmatics, about

the role of illocution, -- he quotes Stenius, this idea about ‘saying so makes it so’, and [it had been] one of these general objections against truth conditional semantics, that ‘what’s this performativity, you can’t express that’, but here it’s very clear, it’s Stenius, how things get true by saying them. And so I thought, it was really a justification of that kind of semantics against major objections from philosophers of language. ‘General Semantics’ is one of the things that influenced me a lot. ...I’m still completely an adherent of David Lewis.”

“Karttunen’s semantics of questions is a very great achievement; and also one of the personal heroes for me is Dowty - so that’s the reasonable first account about the progressive, still the best we have, so that’s the right way to go, and of course also this idea of lexical decomposition, ... ”

“Categorial grammar, what I liked, and what was so attractive was ... that this really has this close fit to ordinary language so that one has the feeling that that must be right. ... it’s such an attractive idea, and that must be in some sense correct.”

Re Montague grammar – “You could criticize the way the syntax is done, yeah, but what is this criticism? We’re all in some sense Montagovian grammarians, yeah, so we take the syntax, a reasonable syntax, it must be, and we interpret it and assign truth conditions or something more complicated – maybe to characters -- ..., so, fully Montagovian, and this is the framework still full of life, yeah, so that’s standard.”

B: It’s almost as if we used the word “Chomskyan syntax” to mean *Syntactic Structures*. And you can say, well people don’t do *Syntactic Structures* anymore. But as a program, it has a continuity, and still –

A: Chomsky has invented an entire discipline, he has really said what in principle syntax should be -- it’s a recursive system that generates trees, ..

B: I like Emmon in *Informal Lectures on Formal Semantics*: “Chomsky’s great contribution is that English can be understood as a formal language; Montague’s great contribution – that it can be understood as an interpreted formal language.”

A: Exactly. That’s the way –

B: And in that deep sense, they’re perfectly compatible.

A: Exactly. And that’s what I believe. [chuckling] Right, yeah.

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I am indebted to Arnim von Stechow for more ideas and inspiration over the decades that we have known each other than I can express, and especially for his wisdom, sanity, and positive attitude towards the work of so many linguists and students. Arnim doesn’t hesitate to criticize what he thinks is wrong, but he is even more ready to praise what he thinks are good ideas; he is one of the most generous-spirited linguists I know. I am also indebted to the organizers for inviting me to be a part of the wonderful workshop celebrating Arnim’s work.

This paper is connected to my current project to write a book on the history of formal semantics.

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