

Philosophical Semantics and Linguistic Semantics

Myrna Gopnik

Number 2, 1973

Problèmes de sémantique

URI: <https://id.erudit.org/iderudit/800017ar>

DOI: <https://doi.org/10.7202/800017ar>

[See table of contents](#)

Publisher(s)

Les Presses de l'Université du Québec

ISSN

0315-4025 (print)

1920-1346 (digital)

[Explore this journal](#)

Cite this article

Gopnik, M. (1973). Philosophical Semantics and Linguistic Semantics. *Cahier de linguistique*, (2), 201–218. <https://doi.org/10.7202/800017ar>

PHILOSOPHICAL SEMANTICS AND LINGUISTIC SEMANTICS

This paper will present a brief sketch of semantics from the point of view of philosophy during this century. We do this not only from an interest in these theories themselves but also because this work has had a direct influence on the semantics done by linguists in the past fifteen years.

With the publication of *Language* in 1933, Bloomfield eliminated semantics as an appropriate field of inquiry for linguists. For him the task of semantics was to describe the relationship between words and their referents, but in order to do this it was necessary to first have an adequate description of the referents themselves and this description was the business of physicists, psychologists, chemists but not of linguists. As he puts it :

In order to give a scientifically accurate definition of meaning for every form of a language, we should have to have a scientifically accurate knowledge of everything in the speaker's world. The actual extent of human knowledge is very small, compared to this. We can define the meaning of a speech-form accurately when this meaning has to do with some matter of which we possess scientific knowledge... but we have no precise way of defining words like *love* or *hate*, which concern situations that have not been accurately classified¹.

1. L. Bloomfield, 1933, *Language*, New York, Holt, Rinehart and Winston, p. 139.

This restriction on the activity of linguists was, for the most part, followed in North American linguistics until recently when there has been an awakened interest in semantics, and arguments about the appropriate form a theory of semantics abound. Some of these arguments seem to be reflections of different concepts of the role of a semantic theory which were developed in philosophy in the previous fifty years. It seems fruitful, therefore to look at some of these philosophical theories not only because they are interesting in their own right, but also because they may help us to understand some of the present controversies about the role and structure of a linguistic semantic theory.

Philosophical semantics can be roughly divided into two different approaches to the problem of meaning; the logical empiricist position and the ordinary language position. In order to explicate these two positions we will discuss the theories of Alfred Tarski (a logical empiricist), John Austin and Ludwig Wittgenstein (ordinary language philosophers).

The logical empiricists approached the problem of meaning from the point of view of a formalized or at least a formalizable language. The attempts at formalization followed logically enough from the success during the latter part of the nineteenth century and the early part of the twentieth century in formalizing a large part of arithmetic and logic. The monumental work of Whitehead and Russel, *Principia Mathematica*, set down principles which they felt would allow any field of scientific inquiry to be ultimately reducible to logic and that logic itself would be totally formalizable. There were, of course, flaws in this formalization of logic, as Russel himself pointed out in his famous antinomy which goes like this :

Let's consider some characteristics of sets of objects. We can easily distinguish two different kinds of sets : those which contain themselves as members and those which do not contain themselves as members. An example of the first kind of set would be all of the people

in a room. This set would not contain itself because when we put a number of people together we do not make up a new person. But consider the set of all piles of sugar. That set must contain itself since the set of all piles of sugar would itself be a pile of sugar. Or again, the book which lists all books. It would have to list itself since it is a book. Let's call the first kind of set, the kind of set which doesn't contain itself as a member, ordinary sets and let's call the second kind of set, the one which does contain itself as a member, extraordinary sets. Now comes the antinomy. What kind of set is the set made up of all the ordinary sets (those which don't contain themselves). There are two possibilities. Either this set contains itself as a member or it doesn't. Let's suppose it contains itself as a member. By the definitions we gave above, that would mean it was extraordinary, but the set we are considering is the set of all ordinary sets and no extraordinary set could be a member of it, so it could not contain itself. Likewise, if we assume it is not a member of itself, it would fit our definition of ordinary and therefore it must be a member of itself.

Much more briefly in logical notation we can define the set A as :

$$\forall X \quad \lceil (X \in A) \equiv (X \notin X) \rceil$$

by substituting the constant A for the variable X we get :

$$A \in A \equiv A \notin A$$

It is clear that something is wrong with set theory if it can lead us to an antinomy, but such problems were viewed not as "in principle" limitations, but rather as local problems which could be solved (Russel solved his antinomy by defining a concept of types and saying that a set had to contain objects of the same type and a set of objects is always of a higher type than the objects it contains, therefore, no set could be a member of itself).

The ultimate goal therefore, was to express each general scientific discourse in a formalized language. In order to do this, it was clear that two different levels of the structure of these languages had to be

formulated : syntax and semantics. The questions of syntax can be phrased in terms of the restrictions on concatenation of symbols. What the syntactic level of a formal language must do is to specify the syntactic classes of the language, the members of these classes and the restrictions on the arrangement of these classes. Let us for a moment consider a language with three syntactic classes :

- A. a class of objects
- B. a class of functors which combine two objects to form a new object
- C. a class of functors which combine two objects to form a proposition

Let us define the lexicon of this language as :

members of class A : 1,2,3,4,5,6,7,8,9,0

members of class B : +,-

members of class C : =

There are only two syntactic patterns in this language.

ABA (which is itself an object and therefore a member of class A)

ACA (which is a proposition)

We can by following the allowable patterns produce :

$$1 + 2 = 3$$

$$1 + 2 = 4$$

as syntactically well-formed strings in the language while :

$$1 + + 1 = 2$$

will not be well-formed.

In order to produce a formalized theory for a domain, we choose a subset of the well-formed sentences of the language as axioms and then from this set of axiomatic propositions, by using the logical operations of substitution and detachment, we can derive all of the sentences of the theory. (This set may be infinite.) The operation of these two

rules of deduction can be defined as purely syntactic operators which derive new sentences of the language from sentences already in the language².

What is important to see is that a formalized language as defined up until now is a purely syntactic language. Its sentences have no meaning and are neither true nor false. Though we may have some intuitive notions that :

$$1 + 2 = 3$$

is true and that

$$1 + 2 = 4$$

is false there is no way so far in the formalization to distinguish them. More than that, we have no reason to suppose that the symbol which we have written as "1" means the number one or that the symbol which we have written as "+" means addition. We can, for instance, assign the meaning of sugar to "1", water to "2", flour to "3", syrup to "4", mixed together to "+", and produces to "=". In this way all of the syntactic constraints are respected, e.g., a food mixed with another food gives us a food. Now what we mean by the string :

$$1 + 2 = 3$$

is that sugar mixed together with water produces flour, while what we mean by the string :

$$1 + 2 = 4$$

is that sugar mixed with water produces syrup.

2. Though I cannot go into the details here, these operators look very much like transformations and the well-formedness rules work like phrase structure rules.

As you can see, the concept of truth does not reside in the symbols themselves but in their interpretation. It was Tarski's aim to make as explicit as possible the criteria for assigning interpretations to syntactically well-formed strings and to establish criteria for deciding when these interpreted strings were true. The details of this work can be found in his famous paper, "The concept of truth in formalized languages".

It is interesting that in the introduction to this paper, Tarski discusses the application of his approach to natural language. It is clear that semantic interpretation requires that the syntactic well-formedness conditions which we mentioned above must be explicitly stated before an interpretation of these strings can take place. But Tarski says one of the problems is that the syntactic component of natural languages is not explicitly statable :

Yet this way also seems to be almost hopeless, at least as far as natural language is concerned. For this language is not something finished, closed, or bounded by clear limits. It is not laid down what words can be added to this language and thus in a certain sense already belong to it potentially. We are not able to specify structurally those expressions of the language which we call sentences, still less can we distinguish among them the true ones³.

It is interesting that Tarski's skepticism about the possibility of a complete formalization of the syntax of natural language is explicitly denied by Chomsky (1965) who claims that the rules for syntax are independent of any semantic considerations and that these syntactic rules provide a formalized string on which the semantic interpreter must work. The possibility of an autonomous syntax is denied by the generative semanticists who echo Tarski's claim that autonomous syntactic description for

3. A. Tarski, 1956, "The concept of truth in formalized languages, in *Logic, Semantics and Meta-mathematics*, Oxford, Clarendon Press, p. 164.

natural language is not possible, (though, of course, their arguments are different from his).

There are, however, more important problems in using Tarski's concept of interpretation and truth in natural language. But first let us take a brief look at how Tarski goes about defining the concept of truth for formalized languages.

Given any formal language, we usually find among the signs which it uses a set of constants which belong to the propositional calculus like negation, implication, universal and existential quantifiers. These signs are interpreted with their usual meaning. That is, we cannot choose to interpret the mark " \sim " as "is sometimes interesting". The constants of logic retain their meaning in whatever system they are used. There are always, however, certain constants and variables which, as Tarski says, "are connected with the individual peculiarities of the language and denote concrete individuals, classes or relations such, for example, as the inclusion sign of the language of the calculus of classes, which denotes a particular relation between classes of individuals. Usually there are infinitely many variables. According to their form, (that is their syntactic characteristics) and the interpretation of the language (that is, the meaning assigned to them) they represent names of individuals, classes, or relations⁴ (sometimes there are also variables which represent sentences)". In this way each constant and variable is assigned an interpretation. In order to consider the concept of truth we must first distinguish all of the expressions which are the primitive sentential functions : The exact description of the form of the sentential functions and the specification of their intuitive sense will depend upon the special peculiarities of the language in question⁵.

4. A. Tarski, 1956, *op. cit.*, p. 212.

5. *Ibid.*

It is clear that Tarski provides no way to assign interpretations or to combine the interpretations to get the sense of the primitive sentential functions. However, once this assignment is made, he can compute the truth-value of more complex sentences given the truth-value of these primitive sentential functions. Thus, by knowing the truth of the set of primitive sentences he can arrive at the truth-value of all sentences in the language.

Tarski points out that this technique for determining the concept of truth is applicable for all formalized languages in which "the metalanguage possesses a higher order than the language which is the object of investigation"⁶. The metalanguage is the language which you use to describe the language in question. For example, a grammar of a language is part of its metalanguage. In more informal terms Tarski describes the problem by saying :

A characteristic feature of colloquial language (in contrast to various scientific languages) is its universality. ...If we are to maintain this universality of everyday language in connection with semantical investigations, we must, to be consistent, admit into the language, in addition to its sentences and other sentences and expressions, the sentence containing these names, as well as such semantic expressions as "true sentence", "name", "denote", etc. But it is presumably just this universality of everyday language which is the primary source of all semantical antinomies, like the antinomies of the liar (this sentence is false) or of heterological words. These antinomies seem to provide a proof that every language which the normal laws of logic hold, must be inconsistent⁷.

Everyday language is a very powerful language in that within natural language we can construct both the syntax and semantics of this language. It is because of this power that antinomies can be constructed in natural languages. Linguists have been concerned with the problem of separating the metalinguistic sentences constructable in natural language from its non-metalinguistic sentences. In particular,

6. A. Tarski, 1956, *op. cit.*, p. 273.

7. *Ibid.*, p. 165.

Zellig Harris has devoted a chapter of his book, *Mathematical Structures of Language*, to providing rules which will separate the metalinguistic sentences from the rest of natural language.

Besides this problem of the metalanguage being in the language, Tarski also points out another problem in using formal methods for doing the semantics of natural language and that is the ambiguity of its terms. In a formal language it is assumed that a single expression has a single meaning which is the same wherever it occurs. Of course, this is not the case in natural language. Many expressions are ambiguous and the particular complex expression may be dependent on the meanings of other expressions. In order to eliminate this problem it would be necessary to specify the different meanings a word can have and to provide formal criteria for when one meaning is to be chosen over another. This is, of course, precisely one of the aims of the theory of semantics presented by Katz and Postal in *An Integrated Theory of Linguistic Descriptions*. The structure of the lexical entry specifies the details of each different meaning of the lexical entry and the projection rules determine which of these meanings is to be chosen in a particular case.

As we have pointed out in the preceding section, Tarski sees three principal difficulties in applying methods he uses for formal languages to natural language :

Whoever wishes, in spite of all difficulties, to pursue the semantics of colloquial language with the help of exact methods will be driven first to undertake the thankless task of a reform of this language. He will find it necessary to define its structure, to overcome the ambiguity of the terms which occur in it, and finally to split the language into a series of languages of greater and greater extent each of which stands in the same relation to the next in which a formalized language stands to its metalanguage⁸.

8. A. Tarski, 1956, *op. cit.*, p. 267.

In the past fifteen years, there has been work done which attempts to solve each of these objections. Chomsky (1965), for one, has asserted that one of the jobs of a linguist is precisely to define the syntactic structure of language. And further, he has asserted that this task is double in terms of a formally constructed series of rules. If we turn to the problem of ambiguity, we see that Katz and Postal (1964) have attempted to specify a formal procedure for the specification of the ambiguities of sentences which, if successful, would eliminate Tarski's second problem. In the case of the language-metalanguage difficulty, Tarski's suggested procedure of establishing languages and sub-languages is precisely the path which Harris (1968) has followed. Of course, the ultimate success of each of these efforts is still in doubt. We cannot say that linguists have solved Tarski's objections, but it is nonetheless interesting that recently each of the three objections which he raises has been seriously treated by linguists. What the ultimate fate of these solutions will be must be decided in the future.

There is, however, still another problem with applying Tarski's methods to natural language which he himself does not mention and which may be in the long run more intractable than the three which he raises. Tarski's method for defining the concept of truth in formalized languages involves arriving at the truth-value of complex expressions from the truth-value simpler expressions. In order to be able to do this, it is important that the symbols used for logical operators have the same meaning as they have in the sentential and predicate calculus. But this is clearly not the case in natural languages. Negation, sentence conjunction and quantification do not function in natural languages in at all the same way in which they function in formalized languages. It is a mistake, for example, to think that the logical operator \sim (not) is directly representable in natural language or that the operations of "and" in natural language obeys the same semantic rules as the operator \wedge (and) in the sentential calculus. There is now a great deal of activity by linguists to describe

the truth-value functions in natural language of these operators, but at the moment it looks like the particular value which one of these expressions has is not formalizable and is dependent on pragmatic considerations about the world.

Though we will not attempt here to go into the semantic theories of other of the logical empiricists such as Rudolph Carnap, Nelson Goodman or W.V.O. Quine, though many of the problems they deal with involve questions which concern linguists, it should be clear from our brief sketch of Tarski that the logical empiricists approach the problems of semantics by trying to specify in as much precise detail as possible, a particular semantic problem. In order to do this, they concentrate on rendering the concepts involved as precise as possible. Often this involves isolating a particular sense of a word or expression and, very often in a prescriptive way, dismissing its other senses. Though in this way only a portion of natural language is treated, the precision of the treatment makes up for its limitedness.

A totally different approach to the semantic of natural language is taken by the ordinary language philosophers. For them the appropriate way to study the meaning of a word is to study all of the uses of the word in ordinary language. In this way philosophical problems which were obscured by just looking at a single meaning of a word might become clarified by not having to look at only one of its meanings.

Perhaps the contrast between these two positions is most dramatically stated by Ludwig Wittgenstein whose first book, *Tractatus Logico-Philosophicus* (1922), was written in the logical empiricist tradition and whose second book, *Philosophical Investigations* (1953), was written in the different tradition of ordinary language philosophy. As he explains it :

In philosophy we often compare the use of words with games and calculi which have fixed rules, but cannot say that someone who is using language must be playing such a game. But if you say that our languages only approximate to such calculi you are stan-

ding on the very brink of a misunderstanding...logic does not treat of language — or of thought — in the sense in which a natural science treats of a natural phenomenon, and the most that can be said is that we construct ideal languages. But here the word "idéa1" is liable to mislead, for it sounds as if these languages were better, more perfect, than our everyday language; and as if it took the logician to show people at last what a proper sentence looked like⁹.

Of course, not all ordinary language philosophers worried about the same issues, but in general they do hold the view that the subset of language treated by the logicians hides many important philosophical issues. One of these philosophers, J. Austin (1962), is concerned with the problem of investigating sentences other than descriptive sentences. It is clear when Tarski is discussing sentences, he always means sentences which can be true or false. He does not even mention the fact that many sentences in language, as for example questions, are neither true nor false. For instance, it is meaningless to ask whether a sentence like "Who are you?" is true or false. Austin is interested in investigating some particular kinds of sentences which are not truth-functional. Moreover, he points out that for the most part philosophers have been concerned with only those aspects of language which are truth-functional :

It was for too long the assumption of philosophers that the business of "a statement" can only be to "describe" some state of affairs, or to "state some fact", which it must do either truly or falsely. Grammarians, indeed, have regularly pointed out that not all "sentences" are (used in making) statements : there are traditionally besides (grammarians') statements, also questions, and sentences expressing commands or wishes or concessions¹⁰.

In his book, *How to Do Things with Words*, Austin is concerned with investigating the class of sentences which he calls performatives. These sentences look very much like statements, but they have very different

9. L. Wittgenstein, 1953, *Philosophical Investigations*, Oxford, p. 38.

10. J. Austin, 1962, *How To Do Things With Words*, Cambridge, p. 2.

properties. He points out that very often philosophers have taken "as straightforward statements of fact utterances which are *either* (in interesting non-grammatical ways) nonsensical or *else* intended as something quite different¹¹".

Austin himself is interested in this second case, utterances which are intended as something quite different from statements of fact. He describes the characteristics of these sentences as :

A. they do not "describe" or "report" anything at all, are not "true or false". B. the uttering of the sentence is, or is a part of, the doing of an action, which again would not *normally* be described as saying something¹².

A few examples will probably help to explicate what he has in mind.

- (1) *I bet you five dollars it will rain tomorrow*
- (2) *I sentence you to five years in jail*
- (3) *I promise you to come to your party*

It is clear that it is not appropriate to ask whether (3) is true or false. What is important to realize is that in no sense is this sentence a report of a state of affairs in the world. It is not used to describe an event of promising which has taken place somewhere else, in your mind for instance, but rather saying the *I promise* sentence is part of the event of promising itself.

When we say that the statement is part of the act, it should be clear that it does not make up the total act. Therefore, Austin's investigation of the meanings of performative sentences must go beyond the consideration of the structure of the sentences themselves and must consider such things as the other events surrounding the saying of the sentence including such things as the social role of the speaker. For example, only a judge can correctly say "I sentence you" and only certain people can correctly say "I pronounce you man and wife". If I now say

11. J. Austin, 1962, *op. cit.*, p. 3.

12. *Ibid.*, p. 5.

"I sentence you all to five years in prison", you do not tremble with fear, because you know very well that I can't sentence anyone to anything because I do not have that social role. It is not only the social role which may make the performative not work, but the occasion might not be appropriate for the acting out of this role. A judge must be functioning in his role as judge for him to be able to use the performative correctly.

What seems to underlie these social conditions as well as restrictions on the occasion is that performatives are instances of ritual acts, and certain preconditions must be fulfilled if the ritual is to be performed at all. If, for example, the purser and not the captain of a ship recites all of the text of the marriage ceremony perfectly, still no marriage has been performed, because the preconditions of the ritual have not been correctly observed. Of course, the preconditions for a marriage are more complex than just who performs the ceremony. The participants must also be not married at the time, of appropriate age, of different sexes, etc. Since the rules of this particular ritual are determined by law, they may be changed at any time, but at any particular time the preconditions for the words to have their performative effect are pretty well understood. These kinds of infelicities in the utterance of a performative sentence is what Austin calls "misfires".

He contrasts these to cases in which the preconditions of the ritual are met, but some subsequent act implied by the ritual is not carried out. For example, if I say "I promise to be done at 9:30" and I really intend to go on till 10:00, then there is something wrong with my promise. These kinds of infelicities Austin calls "abuses". We will not go into all of the many distinctions which Austin makes in how a performative may not work out, but just point out that it may go wrong, because some non-speech event doesn't work out; e.g., you say "I christen this boat the S.S. Austin" but the bottle of champagne doesn't break, or someone else doesn't perform his part in the ritual; e.g., you say "I bet you five dollars the Canadiens win the Stanley Cup" but the other person

doesn't accept the bet.

These ritualistic uses of language have been investigated by anthropological and sociological linguists. For example, D. Hymes distinguishes eight different parameters for describing speaking as an act within a society. What is interesting about Austin's work is that he is not describing the general social context in which a speech act can take place, but rather specific conditions for specific acts. Throughout the work Austin considers lists of specific words which have particular conditions on them.

A different concept which Austin raises is the internal state which a speaker must hold in order for him to correctly use a particular word. He distinguishes three internal states :

1. Feelings

"I congratulate you", said when I did not feel at all pleased perhaps even annoyed.

2. Thoughts

"I find him not guilty — I acquit", said when I do believe that he was guilty.

3. Intentions

"I declare war", said when I do not intend to fight.

Austin does not mean these distinctions to be rigorously defined. As he says : "The distinctions are so loose that the cases are not necessarily easily distinguishable; and anyway, of course, the cases can be combined and usually are combined¹³". This concept of Austin's that the speaker must have certain feelings, thoughts and intentions in order for an expression to be used appropriately has become an important concept in some current linguistic theories. For example, we find Charles Fillmore saying :

13. J. Austin, 1962, *op. cit.*, p. 41.

From the writings of the ordinary language philosophers, linguists can learn to talk, not so much about the meanings of linguistic forms — where "meanings" are regarded as abstract entities of some mysterious sort — but about the rules of usage that we must assume a speaker of a language to "know" in order to account for his ability to use linguistic forms appropriately. Although it is true that the use theories in philosophy have not given linguists a tool which we can merely take over and turn instantly to our own use, I believe that we can profitably draw from some of the philosopher's discussion of language use when we propose or examine semantic theories within linguistics. In particular, we can turn our own inquiry toward the conditions under which a speaker of a language implicitly knows it to be appropriate to use given linguistic forms¹⁴.

The use within linguistic semantics of the concept of presuppositions has currently been widely investigated. We cannot go into these theories here, but it is interesting to note in passing that at least two different linguists have attempted to combine the insights of the ordinary language philosophers with the rigor of logic. For example, E. Keenan says that :

We can define one notion of presupposition solely in terms of the basic semantic concepts used in mathematical logic truth and logical consequence¹⁵.

and J. McCawley says :

In referring to the "logical well-formedness" of a semantic representation, I used the terms "proposition" and "predicate" as they are used in symbolic logic. I will in fact argue that symbolic logic, subject to certain modifications, provides an appropriate system for semantic representation within the framework of transformational grammar¹⁶.

-
14. C. Fillmore, 1971, "Verbs of judging : an exercise in semantic description" in *Studies in Linguistic Semantics*, New-York, Holt, Rinehart and Winston.
 15. E. Keenan, 1971, "Two kinds of presuppositions in natural language", in *Studies in Linguistic Semantics* New-York, Holt, Rinehart and Winston, p. 45.
 16. J.D. McCawley, 1970, "Where do noun phrases come from ?", in R. Jacobs and P. Rosenbaum, *Readings in English Transformational Grammar*, Waltham, p. 219.

Unfortunately, neither of them demonstrate the use of logic in the rest of their arguments and their advocacy of logic is a statement of belief rather than a demonstrated fact. Keenan, for example, treats sentence negation as equivalent to logical negation which is certainly not proved. And McCawley goes about amending the concept of quantification so that the reference to logic cannot be more than metaphoric.

It will be instructive to go back to Austin and look briefly at some of his conclusions. He makes a three way distinction in what we do in saying something. These three distinctions are : "locutionary acts which are roughly equivalent to uttering a certain sentence with a certain sense and reference... illocutionary acts such as informing, ordering, warning, undertaking, etc., i.e. utterances which have a certain (conventional) force... perlocutionary acts : what we bring about or achieve by saying something, such as convincing, persuading, deterring, etc." These are at least three of the different senses of "the use of a sentence"¹⁷. Linguists have concerned themselves with the first two senses of use, but not the third.

The most surprising result of Austin's work is that he comes to the conclusion that "so-called" descriptive sentences are really illocutionary sentences and are not in any significant way isolatable from other illocutionary sentences and that the concepts of truth and falsity are just one particular kind of presupposition of the speech act.

Stating, describing etc., are just two names among a very great many others for illocutionary acts, they have no unique position. In particular, they have no unique position over the matter of being related to facts in a unique way called being true or false, because truth and falsity are (except by an artificial abstraction which is always possible and legitimate for certain purposes) not names for relations, qualities, or what not, but for a dimension of assessment — how the words stand in respect of satisfactoriness to the facts, events, situations, etc., to which they refer¹⁸.

17. J. Austin, 1962, *How To Do Things With Words*, Cambridge, p. 108.

18. *Ibid.*, p. 148.

So here we are back again full circle. Austin says we can abstract the concept of truth from natural language and use it for semantics for special purposes as Tarski does for formalized languages. But then can we take it back again from this specialized use to do the semantics of natural language ?

Myrna Gopnik
McGill University
Montreal