

pler than space, since it only has one dimension and is unidirectional. But there are complications enough there too, as you will see.

## TIME

In my second lecture I spoke about non-deictic conceptions of space; today I will be talking about non-deictic conceptions of time. I will unfortunately have nothing to say about the mysteries and paradoxes of time, the perception of time, illusions about the passing of time which people in different psychological states are said to experience, or indeed any of the really interesting and important insights about time which physicists, astronauts, theologians, and acidheads are said to possess. I'll only talk about a few of the simpler temporal concepts, just a few among those that we need to be able to refer to when we talk about the meanings of lexical items or the functions of grammatical categories in natural languages.

The first thing to notice about time is that it is one-dimensional and unidirectional. If two events can be said to take place at different moments of time, it is necessarily the case that one of them is *earlier*, the other *later*. Since time is unidirectional, the relationship between that which remains the same at different times and the time dimension itself is frequently thought of by the human mind as *movement*. The movement metaphor for time allows one to think of "the world" as moving through time, or "the world" as being constant and time passing by it.

I said earlier in connection with the front/back orientation of objects in motion that the "front" of a moving object was that part of the object which arrives at places earlier than the rest. For things which are located outside a front/back oriented object and are situated along the front/back axis, we say that they are "in front of" or "in back of" that object depending on whether they are closer to the front or the rear of the object. Another way of saying "in back of" is "behind". What I did not point out before is that just in case the setting of the front/back orientation of an object is determined by whether the object is in motion, another way of saying "in front of" is "ahead". In the movement metaphor for time, the front/back axis is set one way or the other depending

on whether we regard time as stable and the continuing world as being in motion, or whether the continuing world is taken as the stable reference point and time is thought of as being in motion. Some locutions in English take the metaphor one way, others take it the other way. In a sentence like "Success lay behind them, failure lay ahead of them," the words "ahead" and "behind" identify periods that are later and earlier respectively than the reference time of the sentence. In a sentence like "Before that time they were successful, after that time they were unsuccessful," the words "before" and "after", derived from expressions relating to spatial orientation, are historically based on the moving-time metaphor. If it is time that is moving, the part that has gone by is leading, is ahead, and the part that is yet to come is lagging behind; if it is the human world that is moving with respect to time, the part that has not yet been experienced is ahead of the travellers, the part that has been experienced already is behind. Different languages arrange the metaphors differently for different uses, and sometimes, as we see in English, the same language can use both metaphors in related expressions. To take another example of the distinction in English, consider expressions like "in the months ahead" as opposed to expressions like "in the following months". The two expressions mean the same thing, but one puts later time ahead, the other puts later time behind.

The words "earlier" and "later", by contrast, are basic temporal notions, not based on a movement metaphor. In fact, an understanding of the setting of the front/back axis for an object in motion presupposes an understanding of unidirectional time, since "front" was defined in that case in terms of a part of something "arriving earlier" than the rest of it.

We can talk about events occurring in time, we can say that one event occurred earlier in time than another, and we can talk about events having duration in time. The extent of time during which an event occurs, or, in fact, an extent of time defined in any way whatever, can be thought of as having a beginning and an end, these unambiguously identified as the earliest and latest time points at which the events can be said to be going on.

Notice the proportionality between "beginning" and "end" with "top" and "bottom" and with "front" and "back", and the proportionality of "before" and "after" with "above" and "below" and with "ahead" and "behind." The up/down orientation provides an axis along which we can speak of the location of objects with respect to a given reference object. If the object being located is outside of the reference object but along the axis, we speak of it as being "above" or "below" the object. If it is an extremity or a part of the reference object located at one of the extremities along the up/down axis as defined by the typical or symbolic orientation of the object, we use the words "top" and "bottom". Similarly with the front/back axis. The nouns "front" and "back" indicate portions of the reference object, the phrases "in front of" and "in back of" — without the definite article — or the words "ahead" and "behind", indicate position outside of the reference object but along the front/back axis. The temporal axis is set up by the earlier/later relationship between events. A time period has an extent along this axis, and "locations" in time can be thought of as positioned with respect to a given time period along the temporal axis. The position of a time period outside the reference period calls for the prepositions "before" and "after", the earlier and later extremities of the reference period being indicated by the words "beginning" and "end". And like the words "front" and "back" and "top" and "bottom", the words "beginning" and "end" can be used either for naming *extremities* or *portions* of the time period.

**Digression:** Notice that the various axes have certain inherent differences, making it always possible for us to keep them apart conceptually. The up/down axis is determined by the direction of the pull of gravitational forces, and the outside-the-reference-object indicators "above" and "below" are unambiguously specifiable independently of whether the reference object itself has an up/down orientation or whether the up/down axis defined for the object is set to agree with the gravitational up/down axis. (I can be under something even if it's upside down.) The setting of the front/back axis is determined by the built-in orientational properties of the object itself, as defined by the various criteria I mentioned last time, or by the direction of movement. I can

therefore be in front of somebody when he faces me but in back of him the next moment if he turns around. With the temporal axis, however, the earlier/later orientation is permanently set, and the beginning and end portions of a time period are not conceivable independently of the earlier/later ordering relation in time.

We recognize time periods and time points, and we recognize that a time period can be defined uniquely by identifying its beginning and ending time points. Time periods can be compared with one another, so that we can speak of one time period being longer or shorter than another. The activities of human beings establish various norms for time periods, and the vocabulary of a language can have words that name relatively short periods like "a while", very short periods like "moment", "jiffy", and "trice"; very long periods like "eon", "age", and "era"; or a maximally long period like "eternity".

In addition to speaking of events occurring in time and occupying time periods, we can speak of event types *recurring* in time. Certain *ordinal time specifiers* indicate recurrences of event types, as in a sentence like "John went to Chicago *twice* last month." The same event type—that is, two events of the same type—occurred at two different times.

When nature provides sequentially recurring event types having apparently the same duration, these event types can be used to provide measuring units for temporal extent. The recurring event types that are most constant, most common, and most accessible to ordinary observers are the daily alternation of light and dark, changes in how the moon looks to us, and the apparent annual course of the sun accompanied by the regularly recurring changes in the seasons. These particular event types are cycles which do not involve the sequencing of discrete separable events, and so, when they are used for providing units of measure, it is necessary to identify recurrences of the *same phase* of the cycle. Those phases which seem to have constant temporal extents between recurrences of them are, for example, the full moon, the most vertical position of the sun, the shortest day of the year, etc.

If these cycles are to be taken only as units of measure, it makes no difference which phase of the cycle is taken as the starting point for the

measurement; one cycle has passed with the return to the same phase. If, however, these cyclic events are to provide concepts for locating events in "absolute time", then there is a special need for *fixed-phase* units, time units which have been assigned fixed starting points recognizable, in principle, by all members of the speech community.

Time measure periods taken only as units of measure we can call *non-calendric*. Time measure periods having fixed starting points in absolute time can be called *calendric*. Many of the time measure words in English have both calendric and noncalendric uses, for example, the word "year". If I say that the time between noon on June 28, 1971 and noon on June 28, 1972 is one year, I am using the word "year" non-calendrically. On the other hand, if I use the expression "last year", meaning the period of time between the beginning of January 1, 1970 and the end of December 31, 1970, I am using the word "year" in its calendric sense.

In addition to the time units which are provided more or less directly by the phenomena of nature, it is possible for the members of a human community to construct derivative units consisting of *partitions* of the naturally given time units, or *sequences* of the natural units. The day is divided into 24 hours, each hour into 60 minutes, each minute into 60 seconds, and so on. Specialists make even further divisions. These terms are used mainly as non-calendric or pure measurement units, but for "hour", at least in communities where class lectures or radio programs are scheduled in hour-long blocks of time matching clock time, it has a calendric use, too. A disc jockey, for example, can speak of ending one hour with a commercial and beginning the next hour with the news.

Examples of derivative units defined as fixed-length sequences of naturally given time units include "week", "fortnight", "pentad", "decade", "century", etc. The word "week" can be taken as either a calendric or a noncalendric unit, the word "fortnight" has only a non-calendric use.

In addition to these more or less explicitly bounded time periods, there are other sequences which are informal and vague with respect to

their boundaries, but which relate in some way to local "outdoor" changes. The annual cycle, for example, is divisible into "seasons", and the daily cycle is divided into the parts of the day such as "morning", "afternoon", "evening", and "night". In some languages, the long period we call "night" has many subdivisions, and some languages have more or fewer distinctions than we have for the daylight hours.

The seasons and the subdivisions of the day are informal units, though, as we know, in communities which support astronomers and clock-makers, the separate seasons are taken as having fixed starting points. Even at that, their informal character is not lost, however, as we know when we hear our Michigan friends complain about having a long winter. That the terms have more to do with what it's like outside than with parts of the calendar year is clear from the fact that the cycle is shifted by two seasons in the southern hemisphere, and that in many parts of the world we are told that they lack the standard four seasons, and use some other number, such as two, for example, "wet" and "dry".

The calendric "day" can be used to refer to a recurring 24-hour cycle, conventionally recycling at midnight, or it can refer just to the daylight portion of the cycle, in opposition to "night". The word "morning" can be used to refer to the daylight hours before noon, or to that part of the calendar day before noon. Thus, the "morning" is that part of the "day" which ends at noon, in either of the two calendric senses of "day". Next time you hear somebody say, "Why are you calling me in the middle of the night? Don't you realize it's three o'clock in the morning?" point out to him that he has chosen the word "night" from the day-subdivision cycle which is not put in phase with the calendar day and that he has chosen the word "morning" from the day-subdivision cycle which is put in phase with the calendar day, and explain to him that the reason is that only the latter is appropriate in expressions of clock time.

Some repeating sequences have named members, as, for example, the sequence "morning"/"afternoon"/"evening"/"night", the sequence "summer"/"autumn"/"winter"/"spring", the sequence "Sunday"/"Monday", etc., and two that I haven't mentioned yet, namely, the months of the year and the numbered dates of months. The named members of cycles I will refer to as *positional* terms.

Some of the positional term sequences have *designated first members*, while others do not. The reason for the difference seems to be that cycles can be said to have fixed starting points only if they are run through completely within some larger time unit, with their first member beginning at the same time the larger unit begins. As it happens, there is a calendar year change during the winter and a calendar day change during the night. Since the annual cycle of seasons is does not begin and end with the calendar year, and since the day-subdivision cycle does not begin and end with the calendar day, these two cycles do not have first members.

A formally defined cycle, such as that comprising the names of the days of the week, can quite easily have a "first" member, since the word "week" designates this seven-member sequence by definition. However, there is one fussy and unfortunate problem with that, and that is that people do not agree on which is the first day of the week. Calendar makers typically start the week off with Sunday, but ever since the beginning of the five-day work week, many people speak of Monday as the first day of the week. This difference will take on some importance when we talk later about deictic calendric expressions.

The annual solar cycle and the lunar cycle are not in phase naturally, so in communities which make use of the lunar calendar but recognize the annual cycle with some accuracy, there is typically no first month. In the lunar calendar used by the Saulteaux, the months are named by the animals or plants which first make their appearance during that month. (Again, my source is Hallowell.) Since the Saulteaux have no fixed-phase calendar year which exactly includes the complete sequence of the lunations, there is no first month. Accordingly, when the Saulteaux are asked to recite the names of the months, they recite them in order, beginning with the current month. (Incidentally, when the lunar calendar gets out of phase with the biological year, the Saulteaux just let one month go by unnamed.)

The months of our calendar have their origin in the lunar calendar, but they are now artificial segments of the calendar year. The word "month" has both a calendric and a non-calendric use, but because of the differing lengths of different months, it does not name a constant

length unit in either of these senses. The problem becomes apparent if you move into an apartment on the 18th of the month and you have signed a three-month lease; you will be expected to leave by the 17th of the month three months later, no matter how long the intervening months are. (Bankers, of course, use the word more carefully. A three-month loan must be paid off in 90 days.)

Summarizing, cyclically recurring events provide standard measurement units for time periods. Non-calendric terms are used only for measuring time intervals. When designated phases of cycles are taken as fixed starting points, the word used to indicate the period between one such phase and the next is a calendric term. Derivative non-calendric and calendric units are defined as segments or sequences of the naturally given units. Some calendric units are the named members of larger cycles. These I call *positional*, because they indicate a position within a sequence. Positional calendric units, then, include "April," "Tuesday," "morning," and "winter." There is a difference between positional-term sequences that are put in phase with larger calendric units and those which are not. The names of the seasons are not put in phase with the calendar year. The names of the day-subdivisions have one use by which they are and another use by which they are not. In one usage, the night ends at the same moment the day ends (midnight), and the morning and the day begin at that same moment; in the other usage, the day cycle changes at midnight, but the transition from night to morning is at sunrise. The day names and the month names, by virtue of being artificial or "culturally" imposed units, are put in phase with higher calendric units, namely the calendar week and the calendar year respectively. All of these distinctions will become important later, when we talk about deictic time expressions.

So far, now, we are equipped to talk about priority in time, extent in time, cycles which allow measurement of temporal extents, and the *phase-fixing* of these cycles. In order to locate events unambiguously in "absolute time", it is necessary to have one or more absolute temporal reference points, and for that a community can choose something like the presumed birth date of a culture hero, the beginning of a revolu-

tion, an emperor's accession to the throne, and so on. Once a temporal reference point has been established, it is then possible to speak of any point in time as being at a measurable distance earlier or later than, or coinciding with the accepted reference point. Notice that I am now talking about an objective, external temporal reference point in "absolute time". In contrast to this, when we talk about deictic time expressions, we will make use of a subjective, changing temporal reference point, namely the moment of speaking, the coding time.

We can talk about a time point or a time period, we are able to locate the time point or the beginning and end of a time period at a particular "location" in "absolute time", if we care to, and we are able to indicate the length, or *duration*, of a span of time. The phrase which associates the time of an event with that event might not specify the exact moment, but might specify instead a larger calendar-unit which includes the time of the event. A sentence like "He was born in 1940" can be thought of as elliptical for "at a time which is included in 1940".

There are a great many devices for indicating the relative times of two-events—that is, devices for identifying the time of one event relative to the time of another event. Some of these have to do with time units of the sort we have been discussing. Thus, if I say "She divorced Schwartz and married Harry in the same week," I have located two events as occurring within a single calendar week; but if I say "She divorced Schwartz and married Harry within a week," I have located the two events as having occurred within a single seven-day stretch, but this time the two points are free to cross the boundaries of the calendar week. Similarly, if I say that one thing happened "a week later" than another, I say that there is a seven-day-long span between the two events; if I say the one thing happened "the next week" after the other, I say that the two events happened in two successive calendar weeks, but I haven't said whether the time between the two events is three or six or ten days.

In general, though there is apparently a certain amount of dialect variation here, there is a systematic difference in the understanding of *positional* terms depending on the presence or absence of a *demonstrative*, and in the understanding of *nonpositional* terms depending on

whether a *definite* or *indefinite determiner* is used, as is shown in the following examples: "He was to meet her on Thursday" means that he was scheduled to meet her on the first Thursday after the reference time; "He was to meet her that Thursday," by contrast, adds the understanding that the reference time itself was within the same calendar week as the Thursday in question. Similarly with "He had arrived in London on Thursday" as compared with "He had arrived in London that Thursday." The former sentence could be spoken on Monday, the latter could not. In the sentences about remarriage in the preceding paragraph, there would be a difference between "within a week", which has the interpretation I gave it, and "within the week", which means the same thing as "within the same week." It should follow, and I think it does, that terms which have no calendric function do not occur with the definite article: thus, we can say "in a while" but not "in the while", "within a fortnight", but not "within the fortnight", "in a trice", but not "in the trice", and so on. These remarks, needless to say, are to be taken with the usual qualifications one adds to generalizations about the use of English articles.

Expressions not identifying calendar units can indicate relations of *priority*, *coincidence*, or *containment* between the times of two events. Coincidence can be made explicit with expressions like "at the same time" or "simultaneously" or less explicit with a "when"-clause. Near coincidence, or close succession, can be indicated with an expression like "as soon as". Containment of a point within a span can be expressed as in "She was watching *Sesame Street* when I left"; containment of a span within a span can be expressed as in "I read *War and Peace* while she talked to her mother on the phone." And so on. Priority in time can be shown with "before" and "after," and these are paraphrasable as "at a time which is earlier than the time when" and "at a time which is later than the time when", respectively.

Digression: We must keep in mind the difference between the *factive* and the *counterfactive* uses of "before." Its factive use is seen in "He finished the symphony before he died," where the clause that follows "before" is assumed to be true; its counterfactive use is seen in "He died

before he finished the symphony." The difference can be made apparent when we try to introduce a temporal extent phrase. "He finished the symphony three days before he died" is okay, but "He died three days before he finished the symphony" is not. A sentence like "He got sick before he finished the symphony" is ambiguous, then, in a way in which "He got sick three days before he finished the symphony" is not.

There are various verbs in our language which make it possible to relate an event to an indication of the extent of time during which the event can be said to have occurred. One example is the verb "last." The noun "concert" is the name of an occasion or event which has a temporal extent, and we can say such things as "The concert lasted three hours." There are also verbs which relate the agent in an event to the event and to the time span occupied by the event. Some event types are characterized as having fixed terminations, others are characterized in terms of the activity itself. We can call these *bounded* and *unbounded*, and refer to the verbs as *completive* and *durative*, respectively. Time-indicating verbs of the type I have been discussing which distinguish between these two notions are the verbs "take" and "spend". Notice that we can say "It took me three hours to *find* the diamond" and "I spent three hours *looking for* the diamond." Verbs like "look for" and "find" have the aspectual information built in, but certain verbs can be used in either way. Thus, in "It took me three hours to read the book," the verb "read" is understood completely whereas with a sentence like "I spent three hours reading the book," there is no suggestion that I finished reading it.

Digression: the time extent *preposition-phrases* are selected according to this same distinction. Notice the difference between "I read the book in three hours" and "I read the book for three hours"; notice too that "I looked for the diamond for three hours" is better than "I looked for the diamond in three hours," and "I found the diamond in three hours" is better than "I found the diamond for three hours."

The verbs "last", "take", and "spend" are verbs which in different ways indicate something about the relation between an event and the temporal extent of that event. All three of these verbs can have their

temporal extent complements given as either calendric or non-calendric units. For example, one can say "The concert lasted all afternoon" or "I spent Sunday looking for the diamond" as well as one can use pure measurement phrases like the "three hours" of my earlier examples. There is another verb which is used to indicate the distance in time between two reference points in time, and that is the verb "elapse". This verb accepts as its temporal expression only a non-calendric time extent phrase. For example, although it is possible to say "Two days elapsed", it is not possible to say "Monday and Tuesday elapsed."

I said earlier that since the time dimension is unidirectional, there are fixed earliest and latest time points within any span of time. A time period can be indicated not only by means of a measurement expression, but also by identifying one or both of the extremities of the period. The prepositions which indicate the early and late extremities are "from" and "until," as seen in "The concert lasted from noon until midnight." There are analogies between time-extent expressions and the source/goal/distance notions associated with movement in space, and in many cases similar syntax is called for. We say both "He stayed there from Monday to Friday" and "He travelled from Chicago to Pittsburgh." In the temporal "movement" case, however, there is nothing that corresponds to the notion Path which we proposed for characterizing movement in space. There is only one route between two time points: one cannot go from 1970 to 1971 by passing through 1929.

In addition to the notions of the actual time of an event, one can also speak about the expected or theoretical time of an event. That being so, we can talk about the difference between the actual time and the expected time, as in sentences like "John arrived early" or "John arrived late." One can furthermore talk about an agent in an event doing something in order that the actual time of the event will be different from the expected time. The verb "postpone" refers to doing something so that the beginning of the event will be later than the time expected for the event to begin, and the verb "prolong" refers to doing something which will cause the end of the time period for an event to be later than what was expected. And so on.

When we think about *tenses*, the first words which come to mind are "past", "present", and "future." These are notions related to deictic time, and that is something that will concern us shortly. The notions associated with tense that can be taken up in connection with nondeictic time are, in particular, the difference between the time of an event or a condition—let's call it the *event time*—and the time or time period that is taken as the background or setting for time indications in the clause—and let's call that the *reference time*. The simplest illustration of this distinction is the so-called *perfect* construction, seen most clearly in one use of the past perfect, as in "John had retired three years earlier." Here, the reference time is associated with the tense on "had" and can be interpreted only by knowing the discourse context of the sentence; the event of John's retiring is placed at three years earlier to the reference time.

In my next lecture I will begin the discussion of *deixis*.