THE DRAMA OF REAL-LIFE IN A TIME-GEOGRAPHIC DISGUISE

Bo LENNTORP

Université de Stockholm, Département de géographie humaine, Kulturgeografiska Institutionen, Suède
bo.lenntorp@humangeo.su.se
http://www.humangeo.su.se/eng/staff/blp.htm

RESUME : Une description de la vie quotidienne d'un ménage, fondée sur la time-geography, *constitue la toile de fond de l'article. Les avantages à utiliser les notations de la* time-geography *seront énoncées tout en introduisant quelques concepts fondamentaux.*

Le corps de l'article consiste en une discussion autour de considérations théoriques concernant les fondements de la time-geography. *On s'intéressera plus particulièrement à l'étude de certains concepts-clefs, tels que la contextualité, la corporéalité et les processus collatéraux. L'interface entre l'approche théorique et le système de notation graphique sera examinée. Des concepts additionnels significatifs seront mis en avant afin d'illustrer le propos et de fournir une base à de possibles applications. Quelques réflexions sur la* time-geography *seront soulevées pour souligner les « pour et les contre ».*

Au final, quelques domaines d'application seront présentés. La conclusion suggérera que la time-geography *peut prendre toute sa valeur dans le cadre, à la fois de l'actuel débat sur les sciences physiques et humaines, et des recherches visant à considérer simultanément le temps et l'espace.*

ABSTRACT. As a background a time-geographic depiction of an everyday life in a household will be presented and commented on. Some advantages of using this sort of notation will be mentioned in connection to the introduction of a few fundamental concepts.

In the main paragraph some of the principal and theoretical considerations underlying the approach will be discussed. Particularly considerations connected to concepts such as contextuality, corporeality and collateral processes will be accentuated. The interface between the theoretical approach and physical notation system will be examined. Additional significant concepts will be pointed out to give a richer flavour and a basis for possible applications. Some reflections concerning the time-geography will be raised to point out pros and cons.

Finally, some areas of application will be presented and the in the conclusion it will be suggested that time-geography could be of value in connection to the ongoing debate on physical and human sciences and the ideas of looking at time and space simultaneously.

The task at hand is to make a very short presentation of time-geography. This of course permits only a very condensed and somewhat superficial description, but one, which I nevertheless hope will be of value.

The title 'The drama of real-life in a time-geographic disguise' sounds perhaps a little odd, but it intends to capture two main characteristics of time-geography, namely; like a drama, it portrays the dynamics of lives and societies and it has a wide scope of applicability without any clear limitations.

A person not very familiar with time-geography but who has heard about it and has some vague idea of what it is all about will usually be aware of some abstract and often intricate diagrams. In contrast to its underlying ideas the form of notation used in time-geography is rather well known, although not always well understood. This paper will concentrate on these and give priority to more theoretical and principal considerations at the expense of concrete applications.

As a foundation for the principal reflections presented here, my point of departure will be *the trajectory*; perhaps the most significant concept in time-geography. Two figures; a mixture of the very abstract and the very concrete, are the main ingredients in the presentation. In the following paragraph some fundamental aspects of the approach will be dealt with, as will be their connection to the notation system. Some central concepts will also be mentioned and at the end of the paper I look towards the future.

The notation system

The central characteristic of notation used in time-geography is the simultaneous use of the dimensions of time and space, i.e. a representation of phenomena in time-space. In time-space, the positions of objects change continuously; either only in time or in both space and time. A simple figure demonstrates this central aspect (see figure 1).

The figure shows a trajectory representing the movement of a physical object in time-space. Initially the object moves only in time; subsequently it moves (or is moved) in both time and space; it then stops at a place for some time before returning to its original spatial location.

Figure 1. A simple trajectory in time-space
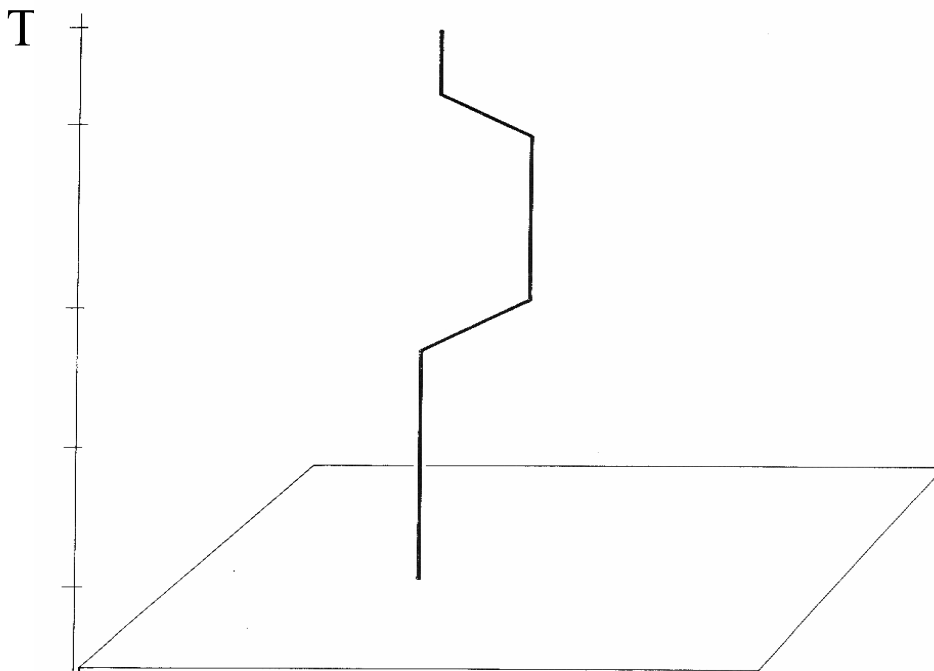
Every physical object can be represented by such a trajectory and they are always indivisible, continuous (they always have to exist), and have a positive direction in relation to the time axis - i.e. always moving into the future and never faster than the speed of light backwards into history. Movements in time-space are consequently constrained to certain forms that are independent of time and place.

Such a path could, for example, show a person's movement lasting but a few seconds or a person's daily journey to work and then back home again or, alternatively, show a person's lifetime incorporating emigration to the United States and return migration back to the native country at the end of the lifetime. From this very simple example we can draw a great many conclusions, among others, that the notation is not delimited to certain scales in time or space.

For an arbitrary individual object and in a manner pertaining for all types of population, there are three principal types of possible events for all points in time, namely; coming into being, survival or death/destruction.

As a contrast to this somewhat abstract figure some comments will be made concerning trajectories in a more familiar setting that show the daily paths of a household. This aims to provide a richer background for associations and applications. The household and everyday life is an often-used example in time-geography and my comments will therefore be brief.

Figure 2 shows an ordinary 24-hour weekday for a Swedish family with two children. Instead of using a three-dimensional diagram, a one-dimensional representation of space is employed that ignores distances but which indicates various places of interest including workplace, school and nursery school. This is done for practical reasons and the underlying idea of time-space is not abandoned in the analysis.

Each individual's path throughout the day can be easily followed and a colour-code is used to indicate the main categories of activity. During the first eight hours of the day the whole family is at home, sleeping, eating breakfast, brushing their teeth and so on. From eight a.m. the family members are spread out over the city. The father takes the bus to his place of work, the mother walks together with her two children and accompanies the youngest to the nursery school and the other to a leisure centre in close proximity of his school before hurrying off to her own workplace.

At approximately four o'clock in the afternoon the fusion process starts (contrary to the fission process in the morning). The father picks up the youngest child and brings her home and the mother meets the oldest child and together they do some shopping before also returning home.

Once they are at home the dinner is prepared - probably by the woman – they read books, the children do their homework, they watch television etc. The father takes a short walk to buy an evening newspaper and, eventually, they all go to sleep.

Although movements within their home are not shown here, the scale of representation could easily have been altered in time or space or both to suit the objective of the study. The representation of the family members clearly displays aspects such as where, when, and for how long the family members are together in different combinations. It is also relatively easy to discern the logic in the sequences of activities throughout the day.

One major feature of the arrangement of their daily pattern is that small children must be coupled to an adult almost continually. As both parents work, there must be social institutions ready to take care of the children during the working day and during the periods before and after school when the parents are at their respective places of work. The diagram clearly demonstrates whether this condition is fulfilled or not.

Depending upon the specific aims of a study, this type of diagram is open to many forms of analyses because of the wealth of information that it contains. Consider for example how much information would be lost if we represented the same individual paths on the planiform surface of a map. We would lose the sequencing of activities, all of the vital co-ordination of persons and activities in time and in fact also in space. All dynamics would be lost as would the very complex co-ordination of persons and things; aspects which together can be thought of as constituting the imprint of our society of today.

Figure 2. A weekday for a Swedish family with adults and two children

Both parents work during daytime and one of the children is at school. The family lives in a large town so school and workplaces are a long way from home. The diagram shows where and when each member of the household performs certain activities. (Ellegård & Lenntorp 1993, p25)
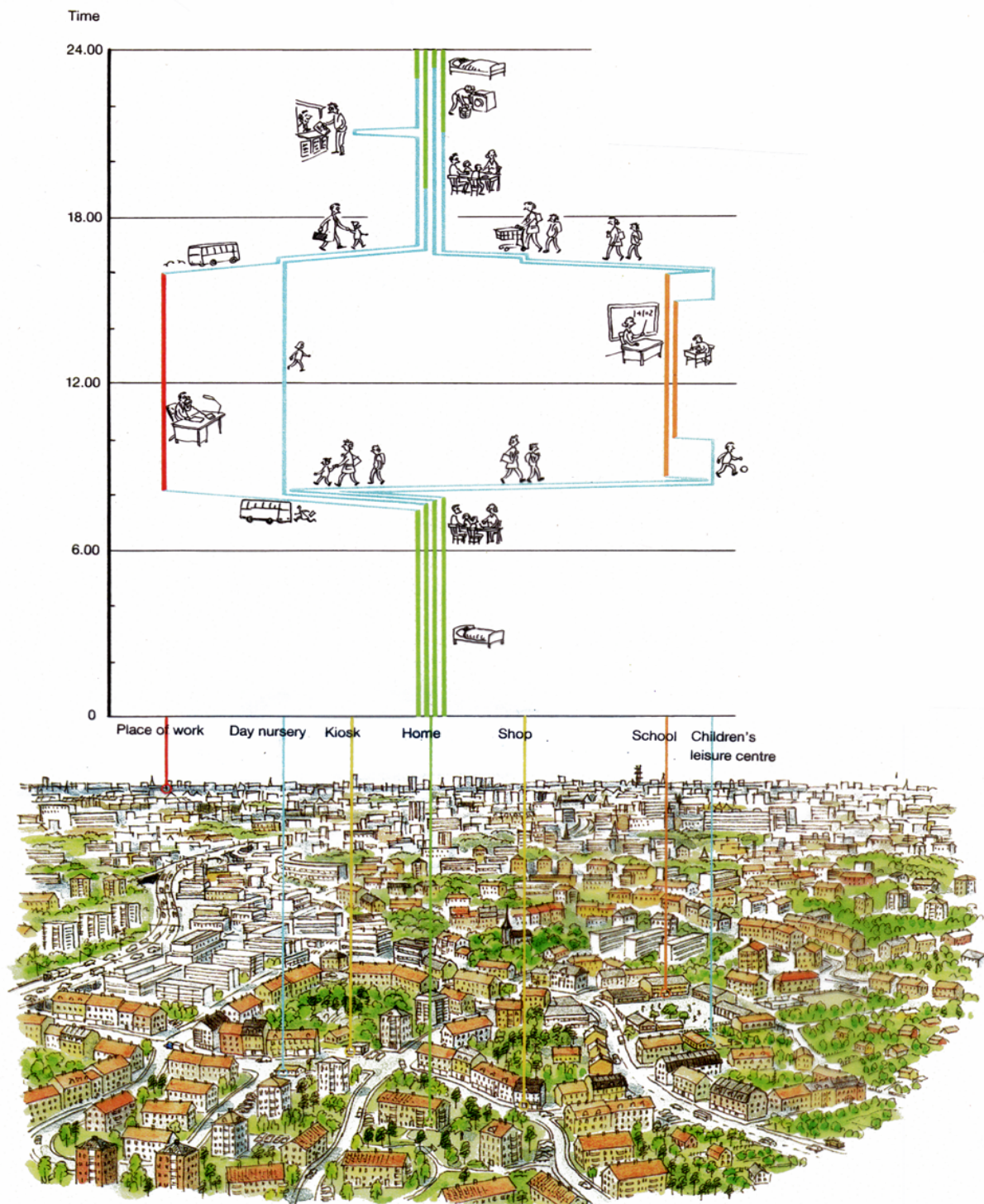
To end this section some general characteristics of the notation system which time-geographers see as beneficial are pointed out (Hägerstrand 1974).

- It is easy to see the correspondence between what is represented in the diagram and reality.

- It has a wide scope of applicability; e.g. it is not scale dependent; a trajectory can be a person, an animal, a mobile telephone and so on and so forth.
- It has the ability to generate questions.
- It admits conclusions and even calculations, whose correspondence with reality does not have to be verified by observations.

Principal considerations

The founding father and principle developer of time-geography is of course Torsten Hägerstrand, nowadays Professor Emeritus at Lund University. In response to somebody once asking him to define or describe time-geography in a few short sentences, he argued that it:

- constitutes a foundation for a general geographical perspective
- represents a structure of thought, which attempts to consolidate the spatial and temporal perspectives of different disciplines
- is not a subject area per se, or a theory in its narrow sense, but rather an attempt to construct a broad structure of thought.

In short, a main objective of time-geography is to work against disciplinary fragmentation of knowledge and to promote both a more synthesising knowledge and the building of platforms for more concerted interdisciplinary interaction.

Time-geography, Hägerstrand argues, is a conceptual way of examining processes such that nothing existing or present is separated from its given milieu in order to study it in isolation, experimentally or in some other way distilled. In other words, he rejects what can be called a *compositional approach*. This is an approach in which human activity is broken down into general categories based on principles of similarity. Hägerstrand's idea is to establish a difference between this kind of approach and time-geography, which is instead founded on a contextual basis (e.g. Hägerstrand 1974, 1998).

In a *contextual approach* the foremost ingredients are the situations developed in time-space settings and the sequences of human activities in collaborations. We live our lives in close proximity both to other human and non-human beings, indeed the whole gamut of other beings, living or inert, good or evil, etc. These settings (or habitats, situations, pockets in time-space) can't unequivocally or easily be broken up into pieces, classified and studied in isolation. It is, if not dangerous, then far from unproblematic to ignore the contexts in which phenomena locally develop, locally connect, and locally survive. Everywhere and always we live in local contexts, even if our heads are filled with global ideas.

Many of the various trajectories or human biographies interact simply because they are collateral, proximate to one another in time-space, bounded within a local area. Hägerstrand's emphasis on the corporeality of human existence is also vital. He points out that 'Touch is so basic for what is going on in the physical world, that we normally fail to recognise in full, what is means for the configuration of phenomena within and around us.' (Hägerstrand 1985, p 201)

He further claims that the number of entities that can be in immediate physical contact with each other at one and the same time is limited. Although seemingly a trivial fact, it is nonetheless one that is very often overlooked. A simple example is a traffic jam, but there are more sophisticated ones and in many situations this 'packing' problematic constitutes a severe constraint to the number of possible patterns or arrangements of people and things.

Principal considerations reflected in the notation system

One could discuss and debate the question of representation at considerable length. Indeed, it is a dear subject within the scientific community (see for example Gren 2001). I choose not to go into that discussion here but instead wish to make some more or less subjectively chosen comments.

6èmes Rencontres de Théo Quant. Février 2003

5

A principal point to make is that it isn't time plus space, but time-space. Time and space are not dimensions primarily for the localisation of objects and events. Time-space is not a sort of container from which or into which one can pick or deposit things for special studies (although the style of the notation may give this impression). Rather, it is all encompassing, constituted by everything, demanding a certain space. Phrased in a popular way: if something takes place, it takes time. If it does not take time, it is not taking place.

The very general, or one could say extremely general, approach of time-geography is mirrored in the notation. It is a sort of lingua franca, a neutral disciplinary language, which takes its point of departure from the really primary in-variances in our world (Asplund 1983). The level of abstraction is extremely high, which has a cost. The information content of a trajectory is in some respects limited. It seems to tell us very much and almost nothing at one and the same time (Asplund 1983). In other words, it balances on the thin edge separating the self-evident from the extremely complex or what we often taken for granted and consequently often overlook, but which could severely influence the analysis. Anyway, it is very worthwhile to ponder over the significance of these types of constraints.

Hägerstrand once said something in the vein that it is rather plausible that it is the relatively trivial physiological, psychological and social characteristics that should be determined in the first instance, and that more subtle nuances in behavioural characteristics are less crucial even though they are perhaps that much more enchanting. In sum, what strategies should be used to understand humans and societies?

Another basic idea behind the notation is the need to clearly identify what is present and what is absent. This is particularly difficult to keep track of when using our conventional verbal or written languages. The use of trajectories clearly indicates that every configuration of what is existent in time-space also indicates a configuration of absence (Hägerstrand).

It is apparent that what can be described with the formal time-geographic notation is the fundamental corporeal or physical world of populations. The often complex pattern of individual paths is of course constrained by the elementary prerequisites pointed out earlier, but also further constrained by human needs and desires, intentions and plans, experiences, feelings and struggles for the control over resources etc. This has to be added, but it can't explicitly be illustrated in the time-geographic notation. Nowhere is it claimed that what can actually be represented in the notation system is the sole concern for time-geographic analysis. On the contrary, it is supposed to be the base for further elaborations keeping in mind, for example, that the interplay of matter and mind must be reflected in the pattern of trajectories of the past – however difficult to empirically sort out or distil and prove.

In time-geography the concept 'project' is used to capture the meaningful, intentional, and conscious actions of a person. We all have a great many projects in mind, short-term, long-term, projects we can achieve ourselves, and projects that are dependent on social networks, technology and society. Projects may be successful or they may fail. The survival and success of projects is a tough, ongoing battle between individuals, institutions, and organisations etc, where the power to couple and combine and control resources in time-space is essential.

In this setting structures lose or gain in importance. In this interplay the structures of a society are continuously reinforced or weakened. To understand these processes, we have to understand the world in which they are developed. In this respect corporeality really is a reality that matters.

Time-geography is said to be individually oriented and that much is true, but it does not mean that every individual per se is of interest or that we have to keep track of each and every individual. Very soon the number of trajectories creates a messy web, as is illustrated in figure 3 which shows a large number of individual paths during a day.

Although figure 3 is far from transparent and enumerating exactly how many trajectories there are is far from easy, we know - mathematically speaking - that trajectories are countable and that together they form a finite set. But the main point is to emphasise that criteria for individual trajectories constrain the number of possible outcomes at an aggregate level. Every arrangement at an aggregate level of persons and things must comply with the rules of every single object (see above).

In spite of the jumble of trajectories a pattern is nonetheless discernible, a rather expected one, it is far from random, it is not by chance that it looks like that. Clearly there must be some conscious, intentional actions behind them, which emphasise the importance of incorporating both physical and mental possibilities and constraints.

Figure 3. Individual trajectories
*(Space-time aquarium with the space-time paths of minority groups, from Kwan 2000)*
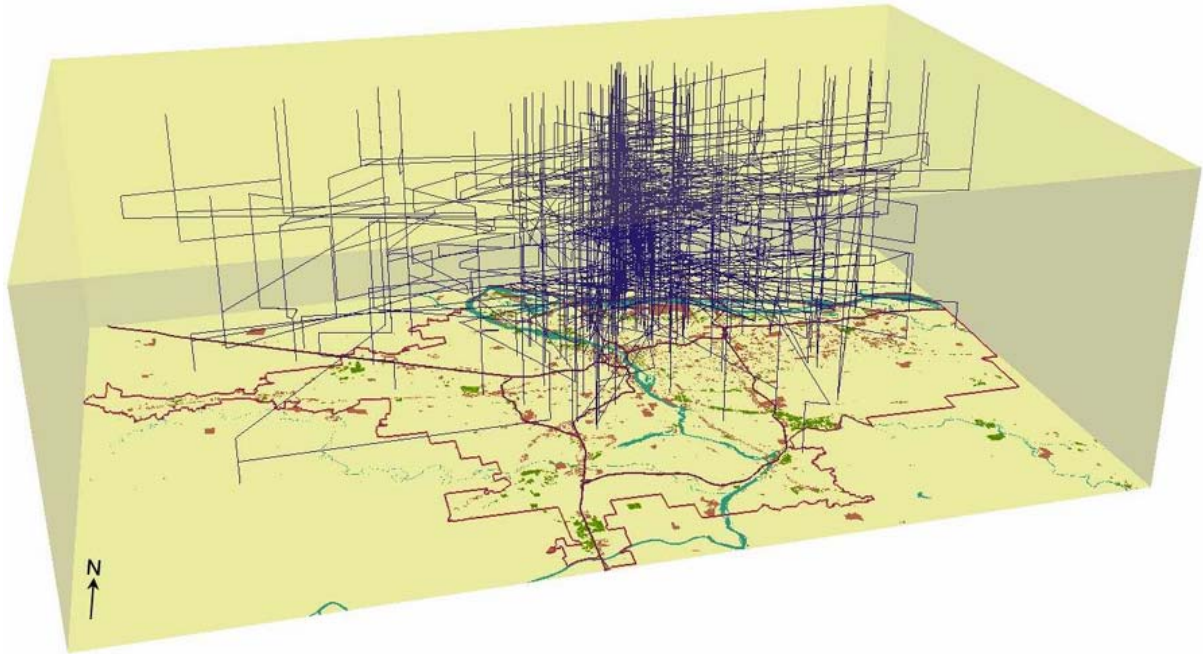
An application

Time-geography has, over time, been applied in a large number of studies with various focuses. The everyday context is undoubtedly the most commonly used time-perspective even if longer perspective have also sometimes been used. One of the most successful applications is in the area of describing and analysing people's accessibility.

The physical range of people captured in the specific time-geographic concept of 'prism' has played a central part in this context (see e.g. Lenntorp 1978). It is an integral element in the development of what has been called the human activity approach and has certainly influenced a large number of studies (e.g. Fox 1995, Timmermans et al 2002). It is the widening of the focus from the trip of a person per se, to include the whole chain of activities and the household as a whole and as a decision-making unit, that has transformed the perspective and models used in the field. Kwan (1998), for example, has shown that models based on time-space activity sequences more adequately and realistically describe the characteristics of female behaviour than other type of models do.

In this field, time-geography has emphasised the analysis of potential and possible behaviour rather than actual behaviour. A prism illustrates this idea in time-space (see Figure 4).

Figure 4. A prism illustrating possible and impossible paths in time-space

Hour
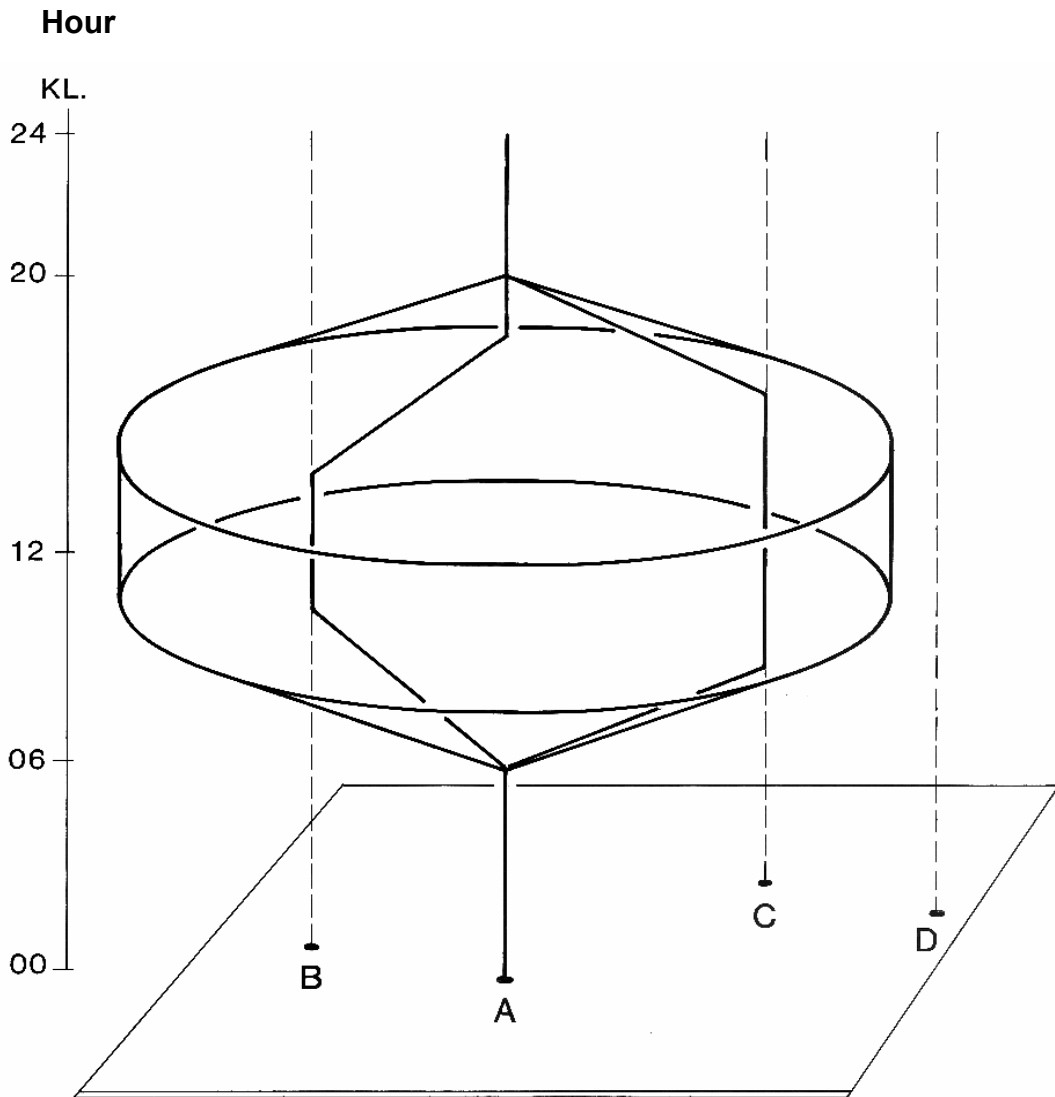
Time-space constraints form a prism that is shaped under certain conditions and within which every trajectory must proceed. If this is not adhered to, some conditions have to be overruled and the person must deal with the resulting consequences. Some constraints are, however, absolute in some sense or other and are impossible to overcome.

In Figure 4 the possible options available to a person living at A to reach various other places (B, C and D) under specified conditions are shown. The possible options may be dependent upon the time available (e.g. setting off after six p.m., returning before eight a.m.), duration of activities (e.g. staying four or eight hours), or by use of a specific mode of transport. (See also Baptiste 2003)

The prism captures the physical constraints (what is within range) but not the mental limitations (what is within reach). A simple example of the latter would be a person's awareness of how to find a quick route on the public transport system or not. It is not a question of one or the other but both in the realisation of, for example, an individual daily programme (trajectory).

Looking to the future

In an article published several years ago Doreen Massey (1999) wrote about what she called 'one of the most well established and best-fortified of divides within knowledge, namely that between the 'physical' and 'human' sciences. In her discussion she pointed out that 'the way that spatio-temporal processes are studied is strongly influenced by the model of space and time that is adopted. In other words, it matters; it makes a difference.' The project of reuniting space and time, she observed, is one, that is now being taken up by many writers and adds that one feasible approach might be a re-conceptualisation of time-space.

Massey did not deem time-geography to be an approach with a part to play in the task of bringing about such a reunification. Clearly time-geography was not considered, which I find both surprising and disappointing as the field she points out could well benefit from time-geography at least as an alternative option. Although not commonly recognised or very well known, at least one can say, "the rumour of its death is exaggerated". A swift and very limited search on the world wide web seems to suggest that time-geography is fairly well spread and recognised in various fields: from modelling space-time paths of grizzly bears (Baer & Butler, 2000), time-management at a software factory (Nandhakumar, 2002), navigating the time-space context of HIV and AIDS (Takahasi et.al 2001), time-management in project-based team-working (Nandhakumar & Jones 2001), ethnic residential segregation (Omer, 1999), and integrating time and space dimensions in modelling urban activity spaces (Newsome, Walcott & Smith, 1998) to name but a few examples.

Time-geography seems to be very much alive. Time-geography will survive and develop (Lenntorp 1999). Such comments are perhaps to be expected from a time-geographer who has a very pragmatic view of the approach and who looks upon the notation system as a language capable of taking care of not least the corporeality and contextuality in our world. Time-geography doesn't *answer* a lot how and why questions, but that is due to its general nature. What it *does* do is to form a sound basis for asking these types of indispensable questions.

As has been pointed out earlier, time-geography is not a theory, but more an 'ontological contribution preceding formation of theory' according to Hägerstrand (1985, p 195). Adopting time-geography doesn't mean you get a fully developed theory, but a direction to think and a direction to discover something that triggers off new thoughts and that refurbishes one's world-view.

REFERENCES

Asplund, Johan (1983) *Tid, rum, individ och kollektiv*. LiberFörlag

Baer LD,& Butler DR (2000) Space-time modelling of grizzly bears**, *GEOGRAPHICAL REVIEW* 90 (2): pp 206-221

Baptiste, Hervé (2003) Évaluer la Qualité d'un Service de Transport Collectif Interarbain. Paper presented at the Sixièmes Rencontres de Théo Quant – Nouvelles approches en Géographie Théorique et Quantitative. Besançon, Frankrike.

Ellegård, Kajsa & Bo Lenntorp (1993) Transformation of Everyday Life. In *THE NATIONAL ATLAS OF SWEDEN, VOL.10, WORK AND LEISURE*: pp 22-39

Fox, Michael (1995) Transport planning and the human activity approach. *JOURN. OF TRANSPORT GEOGRAPHY* Vol 3 no 2: pp 105-116

Gren, Martin (2001) Time-geography matters. In Thrift & May (eds *TIMESPACE: GEOGRAPHIES OF TEMPORALITY:* pp 208-225. Routledge

Hägerstrand, Torsten (1974) Tidsgeografisk beskrivning — syfte och postulat. *SVENSK GEOGRAFISK ÅRSBOK* 50: pp 86—94

Hägerstrand, Torsten (1985) Time-geography. Focus on the Corporeality of Man, Society and Environment. *THE SCIENCE AND PRAXIS OF COMPLEXITY*. The United Nations University, Tokyo: pp 193—216. French translation in Science et pratique de la complexité La Documentation Francaise, Paris 1986: pp 225—250

Hägerstrand, Torsten (1998) The Compositional and the Contextual. *CONSEQUENCES OF THOUGHT FORMS IN INDUSTRIAL AND ACADEMIC PRODUCTION. TECHNOLOGICAL SYSTEMIC CHANGES AND ECONOMIC THEORIES*. Jan Odhnoff and Uno Svedin (Eds.): pp 141-146. Forskningsrådsnämnden, Report 98:5.

Kwan, Mei Poe (1998) Space-Time and Integral Measures of individual Accessibility. *GEOGRAPHICAL ANALYSIS*. Vol 30, No 3: pp191-216

Kwan, Mei-Po (2000) Interactive Geovisualization of Activity-Travel Patterns Using Three-Dimensional Geographical Information Systems: A Methodological Exploration With A Large Data Set. *TRANSPORTATION RESEARCH C* (2000) 8,: pp 185-203.

Lenntorp, Bo (1978) A Time-Geographic Simulation Model of Individual Activity Programmes. In *TIMING SPACE AND SPACING TIME*, Part 2, Carlstein, Parkes & Thrift (eds.): pp 162-180. Arnolds. London

Lenntorp, Bo (1999) Time-geography – at the end of its beginning. GEOJOURNAL 48: pp 155-158.

Massey, Doreen (1999) Space-time, 'science' and the relationship between physical geography and human geography. *TRANSACTIONS OF INSTITUTE OF BRITISH GEOGRAPHERS,* 24: pp 261-276.

Nandhakumar J (2002) Managing time in a software factory: Temporal and spatial organization of IS development activities. *INFORMATION SOCIETY* 18 (4): pp 251-262

Nandhakumar & J, Jones M (2001) Accounting for time: managing time in project-based teamworking *ACCOUNTING ORGANIZATIONS AND SOCIETY. 2*6 (3): pp93-214

Newsome TH, Walcott WA & Smith PD (1998) Urban activity spaces: Illustrations and application of a conceptual model for integrating the time and space dimensions *TRANSPORTATION,* 25 (4): pp 357-377

Omer I (1999) Demographic processes and ethnic residential segregation. *DISCRETE DYNAMICS IN NATURE AND SOCIETY,* 3 (2-3): pp 171-

Takahashi LM, Wiebe D, Rodriguez R (2001) Navigating the time-space context of HIV and AIDS: daily routines and access to care. *SOCIAL SCIENCE & MEDICINE* 53 (7): pp 845-863

Timmermans, H, T. Arentze & C-H Joh (2002) Analysing space-time behaviour: new approaches to old problems. *PROGRESS IN HUMAN GEOGRAPHY*, Vol 26, no 2 pp 175-190