John A. Michon

Opening Address to the Academy Colloquium on 'The Consumption of Time and the Timing of Consumption'

Mr. Chairman,
Ladies and Gentlemen,

At some station in one's career one may find oneself to be invited to open scientific meetings – a conference, workshop, or perhaps an Academy Colloquium such as this. This invariably leads to some introspection: Have I made it at last? The answer is: No, one can't tell!. I can think of thousand and one reasons for being asked, so apparently opening conferences does not put the right kind of constraint on one's recognition as a scientist.

But, having a conference in one's honor! That, dear Professor Etzioni, is an altogether different matter, albeit a perfectly understandable one in view of your commitment to the topic to be discussed (see, e.g., Etzioni, 1988). Therefore, let me first welcome you on behalf of the President of the Royal Netherlands Academy of Arts and Sciences, Professor Pieter Drenth. Allow me to express the Academy's satisfaction with the initiative of the organizing committee to associate your name with this timely Colloquium, and with your willingness to let them have it their way.

Altogether the satisfaction derived from opening a scientific meeting appears to be of a secondary nature. However, in this particular case I find myself in a much more pleasant predicament than I had anticipated. Why this is so, I will explain to you in a minute, but first, allow me to extend the welcome of our Academy to all participants.

The Royal Netherlands Academy of Arts and Sciences was established in 1808 by King Louis Napoleon, brother of the French Emperor Napoleon, and someone who – had he been a monarch of our own choice – would probably have been held in very high esteem. While trying, in vain, to be Dutch with the Dutch he undertook a couple of important things. First, he tried to keep his obstreperous Big Brother at bay as much as he could without arousing suspicion and in this he ultimately failed. Second, he established the Academy. Here he brilliantly succeeded where, earlier, the Republic of the Seven United Provinces had never been united enough to establish a national Academy, although there had been several provincial Learned Societies for many years.

By law the Academy has been assigned a number of important missions to fulfill:

- It shall be a meeting place for scientists and scholars in all walks of science and the liberal arts;
- It shall be the principal adviser to the Dutch government on matters of science and science policy;
- It shall serve as a management organization for scientific institutions;
- Finally, and more recently, the Academy shall play a role in the evaluation of university-based research programs, actually a not altogether trivial or carefree commitment in these days of heavily constrained resources.

The first mission of the Academy, providing a stage for scientific communication, is first of all intended for the Academy's members, altogether 180 active members, and perhaps an equal number of past service members. But increasingly, over the past decade, the Academy has undertaken to organize or sponsor a diversity of forum activities – conferences, symposia, workshops, and colloquia. One of this latter category is what you have come to Amsterdam for, and so, let us forget about the Academy and start talking business instead.

Ladies and Gentlemen,

Why did I become so pleasantly aroused by the

prospect of speaking at the opening of this particular Colloquium? The reason is the following: despite the fact that I have had no influence whatsoever on the considerations and preparations leading to this Colloquium, I find in the topic that will concern you in the days to come, the convergence of two of my dearest hobby horses: the dynamics of the behavioral and social sciences, and the representation of time in the individual and in society. The first appears to fit precisely the concern of this Colloquium for the relation between the behavioral and the social sciences. The delightful matter of fact – polemically speaking – is that none of the five models for this relation proposed in the prospectus for this Colloquium seems to be making any sense at all! The second, topical, issue appears to blend perfectly with my interest in the human experience of time: how do people cope with the changing world around them and how do their efforts lead to the way they represent and manipulate temporal relations.

Incidentally, there was also a third issue in the prospectus that made me feel excited about the prospect of participating in this Colloquium. One of its headings reads "Models about intersections." Those of you who happen to know that I am deeply involved in traffic research will understand why this heading added so much to my initial excitement. Only later I found out that what the organizers referred to were the intersections between the behavioral and social sciences.

The Intersections between the Behavioral and Social Sciences

The organizers distinguish five types of intersection between economics, psychology, and sociology which they indicate, in that order, as

- divergent subdisciplines;
- imperialistic economics;
- imperialistic psychology or sociology;
- consecutive relations;
- convergent subdisciplines.

It is the latter model that, I understand, will be the aim for the present Colloquium.

Let me try to disturb your peace of mind by proposing a sixth model that is not based on some form of intersection placed somewhere on a scale dissociation-association, or hate-love, but on the concept of epistemological complementarity that presently plays a very important role in theoretical psychology.

Let me introduce my position with the following tasteful example. We may describe cooking in terms of three distinct frames of reference: the dish, the recipe, and the ingredients.

The first deals with such matters as the appearance and taste of prepared food, the second with the rules that, when followed, will produce a certain dish, whilst the third concerns the physical and chemical properties of the food stuffs to which the rules of the recipe are applied.

These three frames of reference are representative of three fundamental levels of explanation, or stances as they were called by the philosopher Dennett (1978). The first is known as the intentional or rational stance. This point of view acknowledges the fact that it is possible to predict the behavior of a complex system even if we are ignorant about its internal structure. If we know the purpose of a system and the conditions under which it operates, we can predict its behavior simply by assuming that it is an intelligent or rational system. It does not matter if the system is 'really' intelligent or 'really' rational, simply because we do not know what 'really' really means in the first place. The second level of explanation is called the functional or design stance. From this point of view the behavior of a system is described in terms of a set of rules or procedures.

Together these rules form a behavioral 'grammar' that is capable of generating precisely those behaviors that strike us as intelligent or rational when we look at them from the intentional stance. The third level of explanation, finally, looks at a system from the physical point of view. It will explain the activity of a system in terms of its basic architecture – its hardware – and the natural laws that apply to it. Incidentally, it should be noted that each level of explanation may be,

and frequently is applied to any phenomenon, limited only by practical considerations. Nobody will stop you, for instance, from explaining in terms of the interactions between elementary particles why some people like to ride a motor bicycle, although such an explanation would turn out to be quite cumbersome, to say the least. Conversely, explaining the behavior of a falling stone in terms of its desire to return to earth is ill advised, simply because it will not carry us very much ahead on the difficult path to understanding the universe if we compare it with a simple explanation in terms of Newtonian dynamics.

Now, this three-level approach to the scientific explanation of behavior is, in my opinion, reflected in the specific contributions of different branches of science, respectively the social sciences (represented by economics, law, and sociology), the behavioral sciences (psychology, ergonomics, and increasingly artificial intelligence), and engineering (e.g., mechanical and electrical engineering). Riding, just for a moment, my third hobby horse – Traffic broadly understood – it should be clear that of these three, the social sciences deal mostly if not exclusively with the intentional aspects of transportation and traffic, that is, the goals and motives of the actors – travelers and authorities, bus companies and garages, users and suppliers. Engineering, on the other hand, is mostly if not exclusively concerned with the architecture or infrastructure of the transport system. Finally, the behavioral sciences are concerned mostly with the intermediate, functional level of explanation.

A well-developed approach to traffic science – or any other discipline, for that matter – will depend equally on these three levels of explanation and, consequently, also on a balanced contribution of the social and technical sciences as well as the behavioral sciences (Michon, 1990). The coherence and the direction of traffic research is bound to remain marginal unless all three levels of explanation are intrinsically involved.

Leaving out one level leads to scientific incoherence (and in the case of traffic to a waste of public money). However, conventionally traffic administrators, who are usually strongly dominated by economic considerations, tend to adopt the intentional stance that is characteristic of the social sciences.

And conventionally these administrators communicate directly with engineers. The engineers conventionally rush to their workshops or studios to try implementing the administrators' requirements directly into infrastructure or hardware. Unfortunately this approach leaves both the engineers and the administrators ignorant of the functional relations that govern the behavior of human beings in complex environments. The result may be a badly designed system or badly adjusted users – or both!

I am not suggesting that this thoroughly conventional approach never works. As a matter of fact it frequently does work. The more complex the system, however, the smaller becomes the likelihood of success. Once more in terms of my culinary figure of speech, it means that if you put ingredients together without a recipe, you're probably in good shape if you are cooking porridge. But if you adopt this strategy while aiming for a Civet de Canard à l'Orange, the odds that you will succeed will be overwhelmingly against you.

So much then for an alternative approach to the quest for a modus vivendi between the social and behavioral sciences. Let us now turn to the representation of time as a consumable good.

The Representation of Time

Time too can be looked at from the three points of view I presented in the preceding section. Thus at the architectural level we may observe the human organism and identify any number of time keepers, periodic and progressive – clocks and switches – of a physiological, anatomical, cognitive, or social nature.

These clocks and switches provide an underlying structure, a stream bed, on which humans base their ability to cope with the highly complex temporal constraints imposed on them by nature, culture, or themselves (Michon, 1985; 1990).

At the intentional level we have a great many

metaphors of time, the ones we use to organize our lives, our memories and futures. Besides the simple spatial metaphor that allows us to speak of temporal relations in terms of approach or recedence – as when we say that a colleague has a bright future behind him – there are much more interesting and mysterious metaphors telling us, for instance that time heals all wounds, or that time is devouring everything indiscriminately; that time is killing us or that we are killing time. This metaphorical symmetry of time, incidentally, is an interesting phenomenon in its own right! Of course, there is also the fascination with the metaphor stating that time is a scarce commodity, expressed most directly, if not very subtly, as "Time is Money." And here we plunge in medias res, because this, it seems, is the metaphor that will dominate the discussions during this Colloquium.

But what about the functional stance, in between the clocks on the one hand and the metaphors on the other? How do people establish these temporal metaphors, what temporal relations does a particular metaphor allow them to represent and manipulate?

What mental models, and what syntactic, semantic, and pragmatic relations do they use? What are the formal properties of such metaphors: do they require continuous or discrete quantized time?

Such are the questions to which as an experimental psychologist, I hope to find an answer at this Colloquium!

By now you should be able to appreciate the excitement to which I confessed earlier. Here is this group of established experts in their field who, I presume, are thoroughly trained in the use of this one particular metaphor "Time is a consumable good." Observing these experts should bring out the cognitive processes by which human beings are able to encode a fairly coherent set of dynamic situations and circumstances into a model that is summarized by this metaphor, "Time is a consumable good."

In other words, from your deliberations it may be possible to extract enough insights to be able to once more relate the rational level of the economic metaphor with the architectural level of the psychobiological organism trying to satisfy its needs in an ever changing world. We should be able to do so by defining the intermediate cognitive level that supplies just the functional constraints that allow us to behave as if time is indeed a consumable good.

Mr. Chairman,

In 1981 I participated in a Colloquium not unlike the present one. One of the participants was John Fowles, author of The French Lieutenant's Woman, The Magus, The Collector, and several other novels in which time plays an important, if somewhat mysterious and even frightening role. John didn't say much, but towards the end of the Colloquium he expressed his reservations about what we had been doing to the mystery of time. "You looked to me," he said, "like a bunch of no-good boys chasing a little kid. And once you got him trapped in a corner, you gave him the thrashing of his life." Much as I admire John Fowles the artist, I think he was wrong, scientifically speaking. Science is like that, whether you like it or not. I therefore expect to see the same thing happen once again: you too will be chasing time, and once again time will get a thrashing... but then, let me remind you of this particular symmetry that time displays: isn't time constantly giving us the thrashing of our lives?!

I wish you a fruitful – or should I perhaps say frightful? – Colloquium.

References

Dennett, D.C., 1978. *Brainstorms: Philosophical essays on mind and psychology*. Hassocks, Sussex: Harvester Press.

Etzioni, A., 1988. *The moral dimension: Toward a new economics*. New York: Free Press.

Michon, J.A., 1985. The complete time experiencer. In: J.A. Michon & J.L. Jackson (Eds.). *Time, mind, and behavior*, 20-52. Berlin: Springer-Verlag.

Michon, J.A., 1990a. Implicit and explicit

representations of time. In R.A. Block (Ed.). *Cognitive models of psychological time*, 37-58. Hillsdale, NJ: Lawrence Erlbaum Associates.

Michon, J.A., 1990b. The need for a unification in traffic science. *IATSS Research* 14, 12-16.