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CONTENTS

R. Rubens:	From Asperger to Einstein and Bohr.	7
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Sarton Chair Lectures

J. Pieters:	Laudatio Douwe Draaisma	15
D. DRAAISMA:	Who owns Asperger's Syndrome?	23

Sarton Medal Lecture

N. Boon:	Laudatio John William Fisher Costerton	51
J. COSTERTON:	Biofilms in nature and disease	57
D. Heirbaut:	Laudatio Fred Stevens	69
F. STEVENS:	La 'Société des Nations': un entracte?	75
P. Kesteleyn:	Laudatio J.J. Delaey	107
J. DELAEY:	The eye in Vesalius' Works.	113
I. De Beelde:	Laudatio Yannick Lemarchand	129
Y. LEMARCHAND:	Compter, rendre compte et contrôler; regards sur cinq siècles d'histoire de la comptabilité	135
D. De Meyer:	Laudatio Antoine Picon	163
A. PICON:	Contemporary Architecture and the Quest for Political and Social Meaning	169
D. Segers:	Laudatio Jozef Uyttenhove	189
J. UYTTELENHOVE:	Nuclear electronics as a pawn in the development of the instrumentation in the 21 st century.	195

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Introduction

From Asperger to Einstein and Bohr.

R. Rubens

From Asperger to Einstein and Bohr.

R. Rubens

Chairman of the Sarton Committee 2007-2008.

George Sarton (1884-1956), the founding father of the history of science as an academic subject was an alumnus of the University of Gent. He started the two leading journals (*Isis* 1912 and *Osiris* 1934) for the philosophy and history of sciences. It was only thirty years after the death of George Sarton (1986) that Gent University started with the Sarton Chair for the history of sciences. The idea of a multidisciplinary approach, faithful to the idea of George Sarton, of the subject has always been the main aim of the Sarton committee. Each year a selection of the international nominees proposed by the faculties is performed by the Sarton committee, containing representatives of the eleven faculties of Gent University together with two representatives from the museum of the history of sciences.

The selection committee could accept in the academic year 2007-08 seven nominees, one lecture holder and six medallists. Each of the laureates has a very important international curriculum in the history of sciences of their subject.

The lectures printed here in Sartoniania certainly give a broad overview of the subject and are totally congruent with the basic idea and meaning of the Sarton Chair for the history of sciences.

The subjects of the lectures encompass not only the exact sciences but also the arts. This way we get a large perspective with a synthesis between the alpha, beta and gamma sciences of the traditional university.

The study of the history of science has become a rational discipline involving all kinds of human knowledge and is a traditional field wherein the endeavour of the polymath of the sixteenth century and the Enlightenment still lives.

GEORGE SARTON CHAIR

of the

HISTORY OF SCIENCES

2007-2008

SARTON CHAIR LECTURES

Laudatio Douwe Draaisma

J. Pieters

Laudatio Douwe Draaisma

J. Pieters

About a week ago, I witnessed a very touching scene on the television news. I'm sure several of you will have seen it too. The scene takes place somewhere in the English countryside. An elderly lady gets out of a cab. She has just returned from doing groceries in the city. The cab driver gives her a helping hand. The elderly lady is clearly glad to be back in the little village where she lives. And then suddenly, as she gets out of the car, she is confronted by a group of journalists. Several microphones are shoved under her nose, and three or four cameras zoom in on her. Did she hear the news? The old lady is doing her best to look nice on television – an old lady is still a lady, and cameras are cameras, even in the English countryside. What news, she asks. Two hours ago she was awarded the Nobel Prize for Literature in Oslo. No, she didn't know that, she replies. And what does she think of the news? The camera cannot but read her mind: what in earth can a woman of 88 years old think of that? Would they mind and please allow her to get her bag out the cab's trunk?

The following scene on the television news pictures the same old lady. She is sitting on the threshold of her cottage. She still does not look very impressed with what is happening around her. She is chewing on something, a bit of bread, maybe, from the shop in the big city or some grass from her lovely cottage garden. She has already won several of those important prizes, she says, nearly all of them, and now this one. Not, mind you, that she's not happy about it or proud. She is, but still. If it is true that life speeds up as you get older, as the title of one of Douwe Draaisma's wonderful books

has it, then it must also be true that there is less time to make a fuss about a Nobel Prize once you're 88.

The same day, on the same television news, but twenty minutes earlier. The first headline of the day. Again, a group of journalists, their cameras are buzzing even louder, and microphones are being used as swords and daggers. Their target is much younger now, a young man of 19, who has just been told that a jury of his peers has found him guilty on the charge of two murders, committed with racist intentions. The verdict that he is given can hardly be called a prize: lifelong imprisonment. Does life also speed up if you get old in a prison cell? Or do these exceptional circumstances reverse the principle of mental acceleration that characterizes the life of the free human being?

Young Hans Van Themsche (he may come back in Douwe Draaisma's talk later) and the elderly Doris Lessing. As we watch the television news through the eyes of Douwe Draaisma, we start wondering about things which the average viewer will not even think about thinking, things that have to do with the two basic mechanisms used by the human mind in order to feed or to protect itself otherwise, with or without success as the case may be: remembering and forgetting, storing things and erasing things, saving and deleting, to put it in computer jargon. The back cover of one of Draaisma's most recent book publications – the publication of the Van Foreest-lecture that he held on March 27th 2007 and that was entitled: "Wat we over vergeten moeten weten" (What we should remember about forgetting) – brings together a number of his central questions in the following way: "Is it possible to forget something on purpose? Is there a special technique of forgetting, in the same way as there is a 'mnemotechnics'? Is it possible to miss something that we've forgotten? Do people who forget a lot also gradually lose their identities?" With respect to the flip-side of forgetting, remembering, these questions

could be translated as follows: “Do our feelings of self-love increase together with the quality of our memories? And if so, does that quality depend on the accuracy of the memory?” “Are memories of something that we had previously forgotten by definition less trustworthy than memories of events that we consider unforgettable, or even than the memories of those very events before we had forgotten them?” “Why do we remember things forwards and not backwards? Put differently, why does a series of events that we remember always follow the chronological order of what happened?”

This last question (borrowed from the British philosopher F.H. Bradley, the subject of the dissertation that the great poet T.S. Eliot wrote) crops up in the book that I mentioned just earlier: *Why life speeds up as you get older. On the autobiographical memory*, the book from 2001 that gained Douwe Draaisma not only a good amount of renown in his native country but also around the world. The book has been translated into several languages: German, Italian, Spanish, Polish, Korean, Chinese, Hungarian and also in English. The English version, published by Cambridge University Press, was also shortlisted for the prestigious Aventis Prize for Science Books in 2005. The book gained Draaisma an impressive number of awards in the Netherlands as well, the Greshoffprijs, the Eureka!-prijs, the Jan Hanlo-prijs and the NIP-Van Gorcum-mediprijs, to name but those. For his research in the history of psychology Draaisma received the Heymans-prize of the Dutch Institute for Psychology.

In the wake of the success of *Why life speeds up as you get older* – the beautiful book is now also for sale in a recorded version (a ‘luisterboek’ as it is said in Dutch) – Draaisma’s doctoral dissertation, *Metaphors of Memory*, originally published in 1995, appeared in several foreign countries. Draaisma wrote the dissertation (which he defended in 1993, supervised by Piet Vroon) as a research assistant of the NWO and

later as assistant professor at the Department of Psychology at Utrecht University. After the completion of his dissertation he moved to the University of Groningen, where he still works and where he is, currently, professor in the history of psychology.

In 2006, with the publication of *Ontregelde Geesten* (subtitle: *Ziektegeschiedenissen*) (*Disordered Minds. Medical Histories*), Draaisma completed his trilogy on the faculty of memory, one could say. In the latter book, Draaisma tells the story of thirteen scientists whose field was the human brain and who gave their names to one or other phenomenon in this field, a disease or a symptom mostly: Alois Alzheimer, James Parkinson and Hans Asperger are only three of the medical giants Draaisma writes about. Like its predecessors, Draaisma's most recent book¹ bears witness to its author's exceptional talent to treat a complex scientific matter (in which philosophical, historical and medical questions are simultaneously at stake) thoroughly without however disregarding his general readership. As you will shortly notice, ladies and gentlemen, Douwe Draaisma is the kind of scholar who has the rare gift of being able to simultaneously address and entertain an audience of specialists and of laymen.

I have mentioned the three titles of Draaisma's most prominent books, but in focusing on those, I have of course directed your attention away from Draaisma's other work. I have not talked about his numerous publications in such renowned periodicals as *Nature*, *History of the Human Sciences*, *Psychological Medicine* and the *Annals of Science*. I have also left out of the discussion his work as supervisor of several doctoral dissertations and in a considerable number of national and international research projects.

¹ At least, it was the most recent one at the moment Draaisma was awarded the Sarton-medal. In Spring 2008 his new *De heimweefabriek (Factory Nostalgia)* appeared, the first instalment of what will become a larger monograph on the idea of forgetting. The book became an instant success in the Netherlands.

Ladies and gentleman, earlier in this laudatio I already suggested that there is a way of looking at things through the eyes of Douwe Draaisma. Those eyes are the eyes of a scientist, sure, but they are also the eyes of the poet. In stating this for a fact, I am not suggesting that Draaisma actually writes poetry, in the literal sense of the word. But he does have a good feeling for matters poetical. This already helps to solve the mystery why this historian of psychology is introduced before you by a specialist of literary theory. My assertion that Draaisma has a good feeling for matters poetical hints at two things, actually. First, there can be no doubt that the quality of his writing equals that of our language's better essay-writers; second, in his analyses of the workings of the human mind Draaisma very frequently makes use of references to literary texts in which the phenomenon under scrutiny (the paradoxical dialectics between remembering and forgetting, say) is described supremely in his view. Proust's *A la Recherche du Temps Perdu*, the wonderful story by Borges on Funes, the tragical character that does not manage to forget anything, or Vladimir Nabokov's *Speak, Memory*: these are all texts which Draaisma has written about and they give credit to his good taste. In writing about these texts, Draaisma is sure not to use literature as a mere example of what he wants to write about – the fictional stories are not simply illustrations of the phenomenon at hand. Draaisma also has an eye for what makes literature literature and not just a case story for the psychologist.

Ladies and gentleman, a university such as ours that prides itself on its endorsement of the principles of diversity and plurality, is no doubt right to accommodate a diversity of scientific models and cultures, both in terms of the production and the distribution of the scientific results which it obtains. I take it to be a warm and welcome signal that the Scientific board of the Sarton Committee has decided to offer its important annual award to a scholar who unites in his work, and in his entire personality, C.P. Snow's

“two cultures” – not in the tragic, Faustian way, but in a highly productive one. By doing so, the Committee rightly celebrates a scholar who manages to combine in his writing practices that are too often thought to be mutually exclusive: those of popular science and of its ‘harder’ version, those of the natural sciences and those of the human sciences, those of the international forum (with its peer-reviewed agenda, its specialist logic and its global language) and those of the national culture and the language in which he is most at home. The example may be hard to equal, but this surely does not make it a less inspiring one.

Who owns Asperger's Syndrome?

D. Draaisma

Who Owns Asperger's Syndrome?

Douwe Draaisma

RU Groningen,

On the evening of 15 November 2005, shortly after nine, in the Dutch city of Nijmegen, a man was killed by gunfire. The victim, Louis Sévèke, was shot at close range. There were several witnesses and the police distributed a drawing of a caucasian male, between thirty and forty years of age. Despite the efforts of a team of thirty detectives, the murder case remained unsolved for over a year.

At a moment when the investigation seemed completely stuck, justice announced that it was looking for a person who had tried to contact Sévèke in the weeks before the killing. He seemed to have used an alias: 'Edmund Dantes'. This was obviously a reference to the main character in a novel by Alexandre Dumas *père*, *The Count of Monte Cristo*, published in 1844. In this novel Edmund Dantes lands in jail, innocently, as a result of the betrayal by friends. After a miraculous escape he takes revenge.

In March 2007 38-year-old Marcel T. was arrested in a Barcelona internet-café. The next day he made a full confession. The police found some sort of autobiography/diary in which T. described a series of bank robberies with violence and bomb attacks. This document also contained a hitlist of persons who had wronged him in one way or the other. It became clear that killing Sévèke was motivated by intense feelings of revenge: in the 1990s T. had been removed from the squatter's movement that he and Sévèke had been part of and T. felt that Sévèke was the person responsible for his expulsion.

In July 2007 there was a first hearing in the case against T. It appeared that experts from the Forensic Psychiatric Service (FPS) had established that T. suffered

from Asperger's Syndrome. These psychiatrists also felt that Asperger's Syndrome was causally linked to his crimes, and, therefore, T. could not be held fully accountable. T. fiercely opposed the Asperger diagnosis, and indeed *any* diagnosis of mental disorder. He argued he was completely sane, refused further psychiatric examination, saying something to the effect that he hated the idea of spending the rest of his life discussing his mental state with psychiatrists. Several commentators argued that this would be just the kind of thing a person with Asperger's Syndrome would hate to do. The court's president ruled that T. be subjected to further examination and observation in the Pieter Baan Centre (PBC), the institute responsible for forensic-psychiatric assessments in The Netherlands.

According to the PBC-report, discussed during the final court session, T. did *not* suffer from Asperger's Syndrome. This was not to say that there were no disorders at all, but these were only minor disorders and the report concluded that T. was fully accountable for his crimes. The verdict, ruled by a court that had to deal with contradictory expert reports, was a life sentence. Marcel T. refused to appeal.

Marcel T. was not the first defendant to be associated with Asperger's Syndrome. A few years ago we have seen a more or less public discussion on the question whether Volkert van der G., convicted for the assassination of Pim Fortuyn, suffers from Asperger's Syndrome and since this case there is a steadily growing number of forensic cases linking Asperger's Syndrome to a variety of crimes. A famous example, at least in the Netherlands, is a murder case known as the 'Peanut Butter Murder'. It involved a young woman who became very ill halfway eating her lunch. She was taken to hospital and struggled for a few more hours before she died. Both her parents and her partner were present, the partner showing no emotion at all. No immediate cause of death was found, but in a later investigation it turned out that the peanut butter on the bread she had for lunch, prepared by her partner, contained theobromide. This is a type of poison

only a chemist can lay his hands on, and this focussed attention on the partner of the victim, who was a chemist by profession. He confessed to having poisoned her.

During the preparation of the trial two reports were made by experts in forensic psychiatry. A psychologist concluded that the chemist suffered from PDD-NOS (a slightly different disorder within the autism spectrum); a psychiatrist concluded he had Asperger's Syndrome. It turned out that the future victim had repeatedly raised with her partner her wish to have children. As this wish intensified, the man felt cornered, and finally he became obsessed with the thought that there was only one way out: her disappearance. His lack of overt emotions during the final hours of his partner's life was seen as a consequence of his condition. Both reports claimed that his disorder implied the inability to consider other options. Since both PDD-NOS and Asperger's Syndrome are considered to be irreversible disorders the risk of relapse was deemed high. The man was sentenced to 6 years plus preventive detention.

Cases like these make clear that Asperger's Syndrome has found its place among – and partly at the expense of – forensic-psychiatric diagnoses like paranoid disorder or personality disorders like the psychopath, the sociopath, the narcissist or the borderliner. This has been a relatively recent development: less than ten years ago, a man watching his partner die without any signs of distress, would probably have been diagnosed as a psychopath. Today, lack of emotion or limited empathy has become an indication for a disorder in the autism spectrum.

If we take the broader view, outside the courtroom, we find that the number of Asperger patients – or, perhaps put more carefully – the number of Asperger *diagnoses*, is rising quickly. To mention but a few indications: there are discussions whether the high incidence of Asperger patients in the Eindhoven region could be related to an overrepresentation of parents in technical or scientific professions, working either at Philips or the Technical University. There are discussions on the need for special

education for children diagnosed with Asperger's Syndrome. There are the kinds of diagnoses that turn parents of Asperger children, fathers mostly, retrospectively into Asperger patients. There are posthumous diagnoses indicating that Einstein, Bartók, Wittgenstein and perhaps even Hans Asperger himself, were suffering from Asperger's Syndrome. Among historians of literature there is a controversy on the question whether Jane Austen may have modelled her Mr. Darcy from *Pride and Prejudice* after an Asperger patient in her circle of friends or relatives.

Not all of these debates and discussions have serious consequences, but many have – most of them, in courtrooms, classrooms, mental health care institutions, and so on. And certainly Asperger's Syndrome holds consequences for those so diagnosed, as well as for their parents, children, husbands, spouses, colleagues, teachers, employers. This lends a certain urgency to the question who is in charge of the Asperger diagnosis. Who or what defines the criteria? Who or what is in the position to delineate this label? The question, to summarize, is *who owns the diagnosis of Asperger's Syndrome?*

A first answer could be that Asperger's Syndrome belongs to Asperger. After all, he is the eponymist, he is the one who discovered the syndrome named after him, and clearly he knew what he discovered. If we select this option we will just have to check what exactly it was that Asperger discovered. Hans Asperger (1906-1980), a Viennese paediatrician, described the disorder named after him in his 1944 *Habilitationsschrift*.² For a period of almost ten years Asperger had been observing children that entered the Paediatric Clinic of Vienna University, many of them with severe disorders. About 200 of them, he claimed, shared a disorder he called 'autism'. If one reads Asperger's original publication to find out how he characterized this disorder, one is immediately struck by the fact that he worked within a scientific paradigm that has no connection whatsoever

² H. Asperger, 'Die 'autistischen Psychopathen' im Kindesalter', *Archiv für Psychiatrie und Nervenkrankheiten*, 117 (1944), 76-136.

with today's psychiatric conventions. His report on the new disorder has an introduction in which he describes his thoughts on methodology in paediatrics and child psychiatry. From this introduction – which was left out when Asperger's article appeared in English translation – it is clear that Asperger was influenced by Gestalt psychology. He felt that clinical observation was the art of being sensitive to the Gestalt of the other person: voice, face, body language, intonation, gestures, gaze, expression, diction and so on. He stated that the clinician needs to hear what he called the 'Zusammenklang' of the person under observation. But how to present to your readers such an encompassing notion as this 'Zusammenklang'? This is an element of his methodology that remains largely implicit and is perhaps best characterized as the method of family likeness or family resemblance, articulated, of course, by Wittgenstein, also from Vienna. What Asperger did was to write three psychiatric profiles of boys that belonged to this category or family of 'autism'. These three boys were Fritz V., Harro L. and Ernst K.

Fritz V., born in 1933, was admitted for observation at the age of six. His motor development proceeded somewhat more slowly than normal, while his speech was advanced for his age: indeed, he spoke 'like an adult'.³ Fritz was totally unfit for school. He never completed an assignment, and he'd grab things and smash them to bits, or hit the other children with toys, without ever stopping to think about whether he was hurting them. At the clinic, he never entered into an affective relationship with anyone. In addressing adults, he never used the formal *Sie*. For him, everyone was *Du*.

In his case study, Asperger tries to summon up a graphic image of Fritz, as if he invites his readers to join him in the act of clinical observation. Fritz is tall for his age: he slouches and his movements are clumsy. But his facial features are strikingly delicate: Asperger refers to 'fine and aristocratic features'.⁴ His gaze is vacant, travelling swiftly

³ Quoted from the translation by U. Frith: H. Asperger, 'Autistic psychopathy in childhood', U. Frith (ed.), *Autism and Asperger syndrome*, Cambridge 1991, 37-92, 86.

⁴ Asperger, 'Autistic psychopathy', 87.

and absently over people and objects. His voice is thin and high-pitched, with a strange lilting intonation. He speaks slowly, dragging out the words. When he replies, it is seldom an answer to the question. Sometimes he repeats the entire question, or only a word. Fritz has a peculiar relationship with noise: he throws toys, apparently because he likes the sound they make, and sometimes he starts drumming rhythmically on his thigh or the table or a wall, and sometimes another child – as if they are all the same to him. The most paradoxical aspect of his behaviour is that his impulsive actions are invariably so unpleasant, painful, or dangerous that he must know that his behaviour is disagreeable, even though he doesn't appear to be taking any notice of his immediate surroundings. He'll sit there with an absent, sleepy look on his face, and then suddenly jump up and sweep all the teacups from the table or give another child a box on the ears.

This peculiar behaviour also manifests itself during testing. One of the items involves copying a geometric pattern of sticks laid on the table. Fritz barely glances at the example, but lays the sticks down in the correct pattern, and more accurately than the other children in his age group. But with the exception of this example, he is impossible to test. He deliberately falls out of his chair, slaps the teacher on the hand, and gives nonsense answers. When asked what the difference is between glass and wood, he says 'Because the glass is more glassy and the wood is more woody.'⁵ It is only when it comes to figures and arithmetic that he is able to hold his own. He can remember a sequence of six numbers and repeat them, which according to Binet's intelligence test is equivalent to the level of a child of ten. Like almost all children of this type, according to Asperger, Fritz has one specific talent, or *Sonderinteresse*, and that is arithmetic.⁶ He taught himself to count to a hundred and within that range he knows his way around, not only numbers over ten but also fractions. Fritz can ask himself

⁵ Asperger, 'Autistic psychopathy', 89.

⁶ Asperger, 'Autistic psychopathy', 90.

which is larger, one-sixteenth or one-eighteenth, and come up with the right answer. As a joke, someone once asked him what two-thirds of 120 was, and the answer came back in a flash: 80. No wonder the assessments of such children range from genius to mentally retarded.

Asperger explains that while this isolated intellectual skill is intact, Fritz's emotional life is severely disturbed. Even before a 'normal' child – the quotation marks are Asperger's – has any knowledge of words, it learns to obey the look, the gestures and the tone accompanying what the father or mother is saying. It learns how to interpret the facial expressions, body language and voice, via a process which is entirely unconscious. In Fritz's case, it is as if the ability to make contact with others by means of such non-verbal communication is lacking. Conversely, no one can empathize with Fritz. No one knows why he's laughing or hopping around on one foot, why he turns angry, or suddenly starts hitting another child. His feelings are unrelated to the situation, and his mood swings are so abrupt that it is almost impossible to make contact with him. Any show of affection is counterproductive and seems to irritate him.

The case study of Fritz is much longer than can be presented within the compass of this lecture. The second case study, on eight-year-old Harro L., just as aggressive as Fritz and just as clumsy, is considerably shorter, as if Asperger trusts that the prototype is already taking shape. Harro has the same vacant expression, the smile that no one understands, the strange answers: 'Glass is transparent. Wood – if you want to look through it, you have to make a hole.'⁷ His *Sonderinteresse* is doing sums, and he has developed his own systems which are totally different from the conventional methods, so original and yet often so complicated that he ends up making mistakes. Harro is incapable of learning via the normal and much simpler methods. On the ward Harro avoids all contact with the other children in his group. He reads a great deal and when

⁷ Asperger, 'Autistic psychopathy', 99.

he is absorbed in a book, he is oblivious to everything around him. His verbal powers of expression are downright precocious, comparable to that of an adult: he takes pleasure in recounting fantastic stories which go on and on, gradually becoming incoherent.

After Fritz and Harro, the case of seven-year-old Ernst K. conforms to a by now familiar pattern: he cannot abide other children, makes a scene if things are not lying or standing in the same place as he wants or is used to, and he is so clumsy that he has to be helped with the simplest procedures, such as eating and dressing himself. Ernst also does sums according to his own methods. He seems to be looking straight past objects and people. His voice is high and nasal. Like Fritz, he is lanky, with delicate features.

According to Asperger, the differences between Fritz, Harro and Ernst were variations within a common profile. Their voices – to take an example – were often very high or shrill, or by contrast excessively soft or monotonous; in both cases they were unusual enough to invite derisive imitations. Although their special skills and interests were wide-ranging, they were all eccentric. The profile begins to take shape quite early in life, often from the age of about two. As the child grows up, there may be many changes in the expression of the disorder, but it will never go away. When they look at something, their gaze seems to glance off the object, as if they see it only on the periphery of their field of vision: ‘One can never be sure whether their glance goes into the far distance or is turned inwards, just as one never knows what the children are occupied with at a particular moment or what is going on in their minds.’⁸ Their intellectual skills are also different. In ‘normal’ children, intelligence takes shape between two poles: at one end the spontaneous original expressions, at the other end the copying activities, imitation, the learning from others. The latter without the former is empty and mechanical. But the former without the latter is a true handicap: children with this disturbance are incapable of being anything but original, spontaneous and

⁸ Asperger, ‘Autistic psychopathy’, 68-69.

impulsive. They dream up new words that no one understands, design worlds known only to them. The transfer of knowledge via normal learning channels is impossible. The children are totally egocentric. They have no respect whatsoever for others: this is not the reflection of a conscious insolence, but rather a defect in their understanding of other people. They have no sense of social distance: they touch people as they would a piece of furniture. Young or old, acquaintance or strangers – these are not considerations which govern the way they respond to others. Lessons in social mores will have to be explicitly taught. It is only via the intellectual route that these ‘intelligent automata’ are able to internalize behaviour patterns.⁹

Asperger finishes his article with a discussion of the prognosis of these ‘difficult children’, as he calls them with consideration. A great deal depends on the level of their intelligence. Autistic children with sub-normal intelligence have the poorest prospects. Children with a normal or above-normal intelligence have better chances. Once they have chosen a profession, some of them succeed in achieving a remarkably good social integration. In the experience of Asperger, almost all autistic children with a normal intelligence ultimately found a suitable job, often thanks to their prowess in subjects like maths, technology, or chemistry. The one-sidedness, the limited interest, the blinkers – these were qualities eminently suited to such professions. ‘We are convinced, then, that autistic people have their place in the organism of the social community. They fulfil their role well, perhaps better than anyone else could, and we are talking of people who as children had the greatest difficulties and caused untold worries to their care-givers.’¹⁰

⁹ Asperger, ‘Autistic psychopathy’, 58.

¹⁰ Asperger, ‘Autistic psychopathy’, 89-90.

Let's remind ourselves of the courage needed to publish these words in Vienna, 1944.¹¹ Let's remind ourselves also that in Asperger's article there is not a trace of the disorder being connected to crime.

It is clear from his way of presenting his observations that Asperger expected that we, his readers, would form some sort of mental image of the disorder, not as an explicit list of criteria, but more or less as you would recognize someone from a particular family. Each of these three boys is a unique person, yet, as members of a particular psychiatric category they share a profile. Once this profile has been pointed out to you, Asperger claimed, you will recognize it at first sight, as soon as the boy enters, as soon as he starts talking. The sixty densely printed pages of his article are an extremely rich source of observations and reflections. With him, one already finds the idea that the disorder is the result of an extreme type of male intelligence, focussed on facts rather than emotions, more on literalness than the overtones in conversation. It is also a rich source because Asperger makes a serious effort to describe things imponderable in dealing with these children: the emptiness in their gaze, the traits of their faces, the quaint, pedantic choice of words. But this very same sensitivity to the Gestalt of the child typifies Asperger as a representative of a scientific style that is long since gone. What's lacking in his report is the reduction of his observations to a list of specific, verifiable criteria – criteria of inclusion and criteria of exclusion, a list that indicates who suffers from this disorder and who doesn't. The answer to the question who's in charge of Asperger's Syndrome, therefore, is *not*: Hans Asperger.

A second option could be that the criteria are not laid down by the eponymist himself, but by the person *proposing* the eponym who will then have to specify what exactly it is that should be so named. In the case of Asperger's Syndrome this was done by Lorna

¹¹ In the Vienna hospital 'Am Spiegelgrund', some 800 mentally and physically handicapped children died as a result of Nazi experiments.

Wing, a British autism expert. In 1981 she argued that the disorder described by Asperger should have a separate status within the autism spectrum and successfully proposed to label the disorder 'Asperger's Syndrome'.¹² It is only since 1981 that there is such a thing as Asperger's Syndrome. Sadly, Hans Asperger didn't live to see this, he died the year before.

Lorna Wing represented a new generation of scientists. She worked in a methodological style that was radically different from that of Asperger. She too presented case studies, but these were not in the heart of the article (where Asperger had them), but followed the article as an appendix. They were illustrations, rather than constitutive of the new psychiatric category. The focus of her article is an explicit discussion of the classification and differential diagnosis of the syndrome. She separated the disorder from normal variation between individuals in personality, from schizophrenia, obsessive neurosis and in particular from classical autism, the type of disorder that Leo Kanner had described in 1943, one year before Asperger, and that had come to dominate the notion of autism. Wing proposed to apply the label Asperger's Syndrome to a person showing autistic traits, but with preserved grammatically correct use of language and a certain degree of social skills. This moved the syndrome in the direction of a disorder with clearer specifications than in the description by Asperger, even if this clarity came at the expense of an immense reduction in the richness of Asperger's clinical profiles.

Are we to say, then, that the criteria for the application of the Asperger label have been laid down by Lorna Wing and that we will simply have to check her article? Unfortunately, this is not the case. Lorna Wing too was a passing phase in the classification process. This leads us to a third option to consider as an answer to the question who is in charge of Asperger's Syndrome.

¹² L. Wing, 'Asperger's syndrome: a clinical account', *Psychological Medicine*, 11 (1981), 115-129.

Surely an orderly science such as psychiatry, you may think to yourself, will have instruments and institutions to regulate discussions on criteria for classification and labels? Certainly. The most important one is the *Diagnostic and Statistical Manual (DSM)*, issued by the American Psychiatric Association. In ever revised editions it attempts to list inclusive and exclusive criteria for a range of psychiatric and neurological disorders. In 1980 Kanner type autism was included in *DSM-III*. It was only in 1994 that Asperger's Syndrome appeared in *DSM-IV*. For the Asperger diagnosis to apply there have to be severe impairments in the use of nonverbal means of communication, such as eye-to-eye gaze, facial expression or body posture, a lack of spontaneous seeking to share interests and activities, as well as a lack of emotional reciprocity. Indicative of the Asperger diagnosis are also stereotyped patterns of behaviour or interests, such as intense preoccupations, non-functional routines and motor mannerisms. As an excluding criterion there should be no significant delay in language or cognitive development.

Does this point-for-point diagnostic directive nail down unambiguously who suffers from Asperger's Syndrome and who doesn't? Can we say now that *DSM* is in charge of the diagnostic process, or, in a wider sense, the psychiatric community that accepts *DSM* as its diagnostic guide? There are two reasons why this is not the case.

Firstly, the inclusion of both syndromes, Asperger's and Kanner's, has not ended the controversy on the relation between them. The criteria for the diagnosis 'Autistic disorder' overlap those of Asperger's Syndrome. When a child meets six or more of the criteria for autism, the diagnosis will be 'Autistic disorder'. In order to avoid double diagnoses, *DSM* users are instructed to consider the diagnosis Asperger's Syndrome only in those cases where the child meets fewer than six of the autism criteria and, moreover, has no language deficiency. This diagnostic procedure has led to a paradoxical situation: according to a recent analysis, Fritz, Harro and Ernst met so

many criteria for autism that the diagnosis Asperger's Syndrome shouldn't even be considered.¹³ Thus the conclusion would have to be that the children whom Asperger himself described did not have Asperger. Some researchers maintain that this result is proof that there is no essential difference between the two syndromes, while others conclude that the *DSM* is apparently incapable of describing Asperger's Syndrome in the manner intended by Asperger.

The second reason why we shouldn't agree that the *DSM* is in charge of Asperger's Syndrome requires a digression – a rather lengthy digression, I'm afraid – on one of the theories put forward to explain the central defect in this disorder.

In the 1980's the notion that autism is caused by a severe contact disorder gained support from a theory inspired by a combination of developmental psychology and philosophy. It maintained that the core of the defect was the inability to see the world from someone else's perspective. As the British psychologist Simon Baron-Cohen and his colleagues put it in 1985, an autist has no *theory of mind*, no sense of the inner life of others, possibly because he has no access to his own mental life.¹⁴ In a series of tests, he demonstrated that it is difficult for autistic children to work with mental representations of objects. Ordinary children learn at a young age to distinguish between a real cookie and a remembered, imagined, or promised cookie. Autistic children apparently find it difficult to imagine that an object which is not present in a concrete form, but exists in – say – someone's memory can still influence behaviour. Take this simple experiment. There are two dolls, Sam and Kate, the experimenter says. Now both of them feel like having a cookie, but unfortunately only Sam gets a cookie from his mother, since Kate's mother isn't home. Of course, all this is 'make-

¹³ J.N. Miller & S. Ozonoff, 'Did Asperger's cases have Asperger Disorder? A research note', *Journal of Child Psychology and Psychiatry*, 38 (1997) 2, 247-251.

¹⁴ S. Baron-Cohen, A. J. Leslie & U. Frith, 'Does the autistic child have a "theory of mind"', *Cognition*, 21 (1985), 37-46.

believe': Sam doesn't really get a cookie. Children aged around five and children with Down syndrome feel sorry for Kate because Sam got a cookie and she didn't. The autistic children show no sign of sympathy. Why should they? In their literal world, there are just two dolls, and neither one gets a cookie.

Because of the absence of a theory of mind, autists live in a social world inhabited by individuals with an inaccessible inner world: in other words, they live among people who will never become another 'I', but will always be an external 'he' or 'she'. This implies that children with Asperger's Syndrome will always have difficulties with tasks that require insight in what other persons think, want or know. Many tests from the literature on Asperger's Syndrome focus on dealing with so-called 'false beliefs'. A fifteen-year-old boy, Christopher, took a test at his school for special education. His teacher put a tube of Smarties on his desk and asked him what he thinks is inside. 'Smarties', Christopher said. Then she picked up the tube, opened it and pulled out a little red pencil. She put it back in, closed the tube and asked Christopher: 'If your mummy came in now and we asked her what was inside the Smarties tube, what do you think she would say?' 'A pencil', Christopher said.

Some of you may recognize this scene. It's not from the scientific literature, but from a precious little novel, *The curious incident of the dog in the night-time*, by Mark Haddon.¹⁵ Christopher is the main character of a novel that attempts to give an impression of the inner world of someone who has no sense of the inner world of others. Haddon gave the boy a profile that resembles the Gestalt that Hans Asperger tried to summon up sixty years ago. Christopher has a long history of behavioural problems. Although he is of normal intelligence and in some categories, such as mathematical insight and spatial puzzles, far above normal, he attends a school for children with learning difficulties. On a test measuring the interpretation of emotions on

¹⁵ M. Haddon, *The curious incident of the dog in the night-time*, New York 2003, 116.

the basis of facial expression, he scored very low. He recognized the expressions denoting happiness and sadness, but not those for perplexed or surprise. His inability to 'read' emotions often leads to conflicts with other children. On the playground he tends to stay close to the adults.

His interests are monomaniacal. He knows all the prime numbers up to 7057 and has learned the names of all the countries of the world by heart, together with their capitals. His use of language is literal and concrete. He does not understand metaphors. The same is true of humour. Christopher's behaviour is highly ritualized. He will only eat when the various foods on his plate do not touch each other. Colours have a distinct emotional value: red is good, yellow and brown are bad. He doesn't eat brown food. He wants his surroundings to remain constant: he moves pieces of furniture back into their old position. He does not like to be touched.

It is striking that Christopher describes his own mental processes invariably in mechanical terms. He compares his memory to a video recorder, and the reproduction of facts to the processes *rewind*, *play* and *fast forward*. In new surroundings, where there is too much new information to cope with, he feels like a crashing computer. Christopher shuts out the world around him by putting his hands over his ears, and begins to moan softly. He compares this to shutting down the computer by means of *control-alt-delete*.

At the beginning of the book Christopher is fifteen years, three months and two days old. Christopher imparts this information to a policeman who has been summoned in the middle of the night, and is now squatting next to Christopher, staring at the neighbour's poodle, cruelly impaled on a pitchfork. The novel centres on the efforts to solve this cowardly murder, as experienced and recounted by Christopher.

Reading Haddon's novel, one experiences something which does not occur when reading the Asperger case in the *Casebook* that comes with *DSM-IV*. After ten or twelve

pages, you feel yourself being drawn into Christopher's mind. Another ten pages, and you find yourself in an inner world which is at once bizarre and ordered, exotic and logical, eccentric and straightforward. As the story unfolds, you begin to see the world through his eyes and process information through his brain. One of the paradoxes of this strange book is that you begin to experience the inner life of someone who has no notion of the inner life of others. As a reader, you find yourself slipping into the first-person perspective of someone who sees the world from a third-person perspective. At the end of the book, it is difficult to dispel the feeling that you have just experienced something which is impossible, as if you've caught a glimpse of the dark side of the moon.

This is what creates such an intriguing tension in the description of Christopher. A 'normal' first-person narrator allows the reader access to two worlds at once: the world of outward behaviour and acts, and the world of inner experience. With Christopher part of this latter, private world disappears. In the novel one finds some fine examples of the 'translations' he needs to keep out of trouble in the world of acts now that the world of inner experience is inaccessible. His teacher has explained that when someone shuts his mouth and breathes loudly through his nose, this may mean that he is losing his patience. A few pages later Christopher is being interrogated by a policeman who shows precisely this combination of behaviours. Christopher understands that he has to be careful now. The teacher must also explain to him other people's feelings in reaction to what he says or does. When he tells her that some dogs are smarter than Steve, who needs help with eating and can't even retrieve a stick, the teacher asks Christopher not to say this to Steve's mum.

Anyone enjoying the full command of his senses can, by closing his eyes, try to form an impression of what it means to be blind. It will be a clumsy and no doubt misleading

impression, but it is an impression nevertheless. Someone who has been born blind will not have a clumsy impression of what it means to be able to see, he will have no impression at all, any more than a seeing person would have an impression of what it means to have an extra sense. In the eighteenth century persons with a sensory handicap were discovered as epistemological ‘experiments of nature’. In 1749 Diderot wrote his *Lettre sur les aveugles* and in 1754 Condillac devised his thought experiment on a statue gaining ever richer knowledge by opening, one by one, its senses. What does a blind man ‘see’ of reality? What is his experience of space? What kind of knowledge may a deaf man acquire without access to language?

In our time we seem fascinated by a different category of ‘experiments of nature’, those of persons in a deviating state of mind. How does a person with manic depression experience his world? What is it like to suffer from schizophrenia? How does it feel to live with delusions? Or with a dense amnesia? The literature that tries to find an answer to these questions has something in common with the eighteenth century literature on sense and knowledge: the authors are themselves in full command of the faculties they take away from their characters. This is a fundamental asymmetry. If Bernlef had suffered from even the earliest signs of Alzheimer’s, he wouldn’t have been able to write *Hersenschimmen*, his celebrated novel about a character experiencing the first symptoms of Alzheimer’s. *Hersenschimmen* is the result of imagining the absence of something that has to be there in the first place.

The same asymmetry characterizes the relationship between someone with and someone without a ‘theory of mind’. Mark Haddon has tried to imagine a self that doesn’t contain the usual interior of feelings, much less the usual instruments for self-observation. Christopher is a thought experiment. Haddon provides his inner world with little more than a few primary emotions, the emotions he recognized in the facial recognition test, like sad or happy. With these poor instruments Haddon lets him

navigate a world inhabited by people who fine-tune their behaviour to the feelings and expectations of other people, or at least have the ability to do so. Such a world, you will find, empathizing with Christopher, is confusing. You come to understand why he hates lies and fantasies, his world is complicated enough as it is, he has little use for alternative versions of reality.

And so we see Christopher in the classroom and we see Christopher living with his dad, we see how his conversation with the policeman derails and Christopher hits the policeman when he tries to grab him. These are the dozens and dozens of situations and Christopher's reactions to them from which the reader begins to spin, thread for thread, something like insight and empathy. This empathy quickly changes into sympathy and pity, because it gradually turns out that he has been told many a lie, by people who *can* operate with alternative versions of reality – if that suits them better. In this respect, *The curious incident of the dog in the night-time* is also a novel on the defects in non-autistic lives.

Why should we pay this much attention to a boy who is merely a character in a novel? And what has all of this to do with the question who's in charge of Asperger's Syndrome? The answer will lead us to a few peculiarities of classification in general and psychiatric classification in particular. Historian of science and philosopher Ian Hacking has argued that classifications are never in any immediate sense an unambiguous reflection of reality.¹⁶ He favours a more relativistic view in which classifications are the result of interpretations that in different circumstances might have been otherwise, leading to different classifications. This is a view on classification that lends psychiatric classifications a certain leeway. It does *not* mean that there are no disorders in reality; the point is, rather, that symptoms and syndromes, deviations and abnormalities, could have been grouped in completely different classifications. This is an important

¹⁶ I. Hacking, *Rewriting the soul: multiple personality and the sciences of memory*, Princeton 1995.

philosophical point of view, not restricted, incidentally, to psychiatric labels. In 1906 Alois Alzheimer found microscopic abnormalities in the brain of Auguste D., a patient with severe amnesia that had entered his ward a few years earlier. These abnormalities included plaques and tangles. Alzheimer held these abnormalities responsible for the woman's memory disorder. It remained to be seen, Alzheimer thought, whether he had discovered a new disease. Emil Kraepelin, his chief, was more straightforward and proposed to label the memory disorder in combination with plaques and tangles 'Alzheimer's Disease'. Not much later Alzheimer was confronted with a patient that showed the same clinical symptoms of memory loss and after an autopsy also the plaques, but not the tangles. Did this constitute a new disease? Or was it a variant of the first disease? A few years later his colleagues decided to choose the latter option, which is why there exists a 'plaques-only' variant of Alzheimer's Disease. It is important to consider that even in classifications that are ostensibly more clear-cut than Asperger's Syndrome and moreover have a neurological substrate that can be unambiguously demonstrated in microscopic research, it is still a matter of choice to order symptoms under the label Alzheimer.

Perhaps an analogy is helpful. The relation between psychiatric disorders and their labels resembles the signs of the Zodiac. No-one doubts that the stars that combine to form Scorpio really exist; it is equally indisputable that they could have been ordered in different constellations.

Writing on psychiatric classifications, Hacking also identified a mechanism that pertains in particular to diagnoses like Asperger's Syndrome. The crater on the moon that was named after George Sarton hasn't changed because of this. A child that is diagnosed with Asperger does change. Asperger changes something in the life of the child itself, in the life of its parents, in the life of its siblings, its teachers. A label like Asperger carries connotations and consequences, and these, in turn, will influence the

way the child is raised, educated, played with. Hacking called this the *looping effect*: the diagnosis initiates a complicated interaction between the label and the person so labelled. To the person himself, once capable of reflecting on the meaning of the label, on what it stands for, there is now a *relation* to the label, he may – to mention but a few options – decide to live ‘after the label’, to accept what present wisdom decrees to be the limits of his condition. He may also decide that particular elements from the disorder don’t apply to him. He may use the label to explain to others what is wrong with him. He may accept the label and say that he has a mild form of the syndrome. He may find that he has learned to overcome or compensate the challenges of his condition. He may – the options are too numerous to be listed. And these are merely the options for the person so diagnosed. To parents, friends, teachers, roommates, colleagues there is equally a new spectrum of potential relations to the label.

These relations take shape in a world in which psychiatry is not the only force of influence. To someone who has read *The curious incident of the dog in the night-time*, Asperger’s Syndrome is already slightly different and in this sense Mark Haddon is partly in charge of the Asperger label. The same goes for lawyers who appeal to Asperger’s Syndrome in their pleas, or judges who accept or reject this appeal. Or for teachers who tune their lessons to what they have read or heard about Asperger. In this sense Asperger’s Syndrome belongs to each and anyone, because the processes that shape the syndrome have come to be distributed over persons and institutions, literature and film, education and media. Each movie, like *Ben X*, on the life and premature death of a boy suffering from Asperger’s Syndrome, changes something in our ideas of what it means to suffer from this condition. Each book written by parents on what it means to raise a child with Asperger, each course for remedial teaching, every instructional guide for employers’ changes something in the general perception of Asperger’s Syndrome and is, therefore, part and parcel of the looping effect.

But doesn't Asperger's Syndrome belong, first and foremost, to the persons so diagnosed? Perhaps the most convincing sources are letters, diaries or autobiographies. In 2006 Daniel Tammet, diagnosed with Asperger's Syndrome, published his autobiography *Born on a blue day*.¹⁷ Its title refers to the colour associations called up by words: in Daniel's synaesthetic mind the initial letter 'w' turns words into blue, including the Wednesday that he was born. He describes the rigid obsessions implied in his disorder, the ritualistic acts and compulsions, the intense fascination with simple movements like a spinning coin, the peculiar preference for lists of facts, like the capitals of the world or the presidents of America, the equally miraculous talent for calculation and the love of prime numbers, all those traits that ever since the work of Hans Asperger have shaped the family likeness of this syndrome. His autobiography is also a tribute to his parents, who managed to raise a baby that cried almost incessantly for over eighteen months, had to deal with a toddler that was extremely to himself and reacted with a tantrum at the slightest change in his surroundings. Later, in school, at a time when precious little was known about Asperger's Syndrome, Daniel ran into trouble on a daily basis. It was only in his twenties that he slowly adjusted.

What is especially touching in his book are the examples of ways of thinking that one ordinarily finds in the professional literature only in the shape of test results. Lacking a 'theory of mind', children with Asperger's Syndrome find it difficult to handle 'pretend' situations, as in the case of the imaginary cookie of Sam and Kate. Daniel Tammet relates a story that was completely incomprehensible to him at the time. It was called 'Stone Soup'. A soldier wanders into a village and asks for food. The greedy villagers provide none and the soldier offers to make 'stone soup'. All he needs are a

¹⁷ D. Tammet, *Born on a blue day. A memoir of Asperger's and an extraordinary mind*, London 2006.

cauldron, water and a stone. Tammet: 'The villagers huddle round as the soldier begins to cook his dish, licking his lips in anticipation. 'Of course, stone soup with cabbage is hard to beat,' says the soldier to himself in a loud voice. One of the villagers approaches and puts one of his cabbages into the pot. Then the soldier says: 'Once I had stonesoup with cabbage and a bit of salt beef and it was fit for a king!' Sure enough, the village butcher brings some salt beef and one by one the other villagers provide potatoes, onions, carrots, mushrooms, and so on until a delicious meal is ready for the entire village. I found the story very puzzling at the time because I had no concept of deception and did not understand that the soldier was pretending to make a soup from a stone in order to trick the villagers into contributing to it. Only many years later did I finally understand what the story was about.'¹⁸

This is a multi-layered passage. It is a convincing demonstration of the difficulties a child with Asperger will have understanding what is going on in other people's minds. But by writing about his difficulty in figuring out the soldier's intention, Daniel Tammet also relates himself to the hypothesis that persons suffering from Asperger's have no 'theory of mind'. We may even say that without such a 'theory of mind', Tammet wouldn't have been able to write about his failure to understand the story as a child, nor about his present interpretation of his earlier lack of understanding. Hacking would be delighted by this instance of the looping effect: a scientific hypothesis on a central defect in the mental functioning of a person with Asperger's explains to Daniel Tammet why he didn't understand the gist of the story at the time, and at the same time he proves with this passage that this is a handicap than can be overcome. In this way, Tammet's autobiography is a clear demonstration of yet a third important notion derived from the work of Hacking: Asperger's Syndrome is an example of a 'fuzzy concept'. The

¹⁸ Tammet, *Born*, 64-65.

very fact that limits may shift as a consequence of looping effects characterizes Asperger's Syndrome as the type of diagnosis with uncertain boundaries.

Ladies and gentlemen, it's time to see what we may conclude from our considerations. The present developments in thinking on Asperger's Syndrome confirm what historical investigation into this syndrome already suggested: its limits are diffuse, they are constantly changing and have done so since the earliest publications by Hans Asperger. In this respect, history of science has a benevolent, relativizing effect: it is simply not true that psychiatry has a golden standard somewhere to separate those who suffer from Asperger's Syndrome from those that don't. The criteria listed in *DSM-IV* are admittedly an attempt to specify such a diagnostic standard, but the acceptance of a standard depends on its actual use and since this actual use varies considerably, one can hardly grant these criteria standard status. To a large degree, Asperger's Syndrome is what is made of it in day to day dealing with this disorder, in the way it is handled in families, in schools, in court rooms.

To be fair, the notion of Asperger's Syndrome as a 'fuzzy concept' has downsides as well. Sometimes decisions have to be taken or verdicts have to be passed that require a yes or no outcome. Should this child receive special education? Is this man accountable for his crime? In cases like these a clear-cut diagnostic protocol is dearly missed. But in different circumstances the diffuseness of limits may be a blessing in disguise. No doubt it is partly by the dedication of his parents and teachers that Daniel Tammet has been able to expand the limits of his condition. In his book he uses metaphors, he makes jokes, he analyzes his inner life – he does all kinds of things a person with Asperger's Syndrome isn't supposed to do. That's the inspiring consequence of limits that aren't nailed down in a standard: they invite patients, parents and teachers to test whether these limits are permanent, whether handicaps can be

compensated, whether the special abilities and talents one so often finds with them may be a key to better social integration. So, who's in charge of Asperger's Syndrome? Many different people and many institutions, no doubt. But most importantly: the persons so diagnosed and their loved ones. They are the ones who may push limits, transforming the disorder in the process.

Let me finish by thanking Ghent University and the members of the Sarton Committee for the honour of inviting me to such a distinguished position as the Sarton Chair for the History of Science. George Sarton specialized in the early history of physics and his work doesn't intersect with my main interests, but I did read his 1947 essay 'The tower of Babel', in which he pleads that international scientific communication should not be narrowed down to *one* lingua franca, i.e. English, but to English *and* three or four main languages, while simultaneously nurturing national languages. I was struck by his sensitivity to the consequences implied by the choice of language. Hardly a minor consequence is a typical historian's concern: choosing English as the exclusive language for publication and education will gradually but inevitably close the access to the knowledge and experience laid down in the past in other languages. A man after my own heart, your Sarton.

I would also like to thank my colleague and friend Jürgen Pieters for his good care and for his Laudatio – which was grossly exaggerated, but enjoyable nevertheless.

Ladies and gentlemen, this is not the first time that we visit the fairest city of Belgium and it will not be the last, but the occasion for *this* visit pleased us very much indeed. Thank you.¹⁹

¹⁹ I would like to express my gratitude to my colleagues Anne Beaulieu and Maarten Derkzen, who gave the manuscript of this lecture a thorough reading.

SARTON MEDAL LECTURES

Laudatio John William Fisher

Costerton

N. Boon

Laudatio J. William Costerton

N. Boon



It is my privilege and pleasure to introduce the 2007-2008 Sarton

Medal recipient of the Faculty of Bioscience Engineering. J. William (Bill) Costerton is a Canadian microbiologist who has pioneered the recognition of bacterial biofilms as the dominant mode of growth of bacteria, and who first demonstrated their importance in the resistance of bacteria to antibacterial agents and the persistence of some chronic bacterial infections. Not only is Costerton a pioneer in the study of biofilms, he introduced this term in 1978 (Costerton et al., 1978, How bacteria stick. *Scientific American*, 238:86-95).

Costerton was born in Vernon, British Columbia. His early education was in that province. In 1955, he received a B.S. in bacteriology and immunology from the University of British Columbia, followed by a M.S. in the same discipline from UBC in 1956. He then studied in the laboratory of Dr. Robert Murray at the University of Western Ontario in London, Ontario, where he received a Ph.D. in 1960. Following post-doctoral training at Cambridge University, Costerton moved to MacDonald College of McGill University, in the Canadian province of Quebec, where he became first a Professional Associate in 1966 then an Assistant Professor in 1968. In 1970 he moved to the University of Calgary as an Associate Professor. He became a tenured Professor at Calgary in 1975. From 1985 to 1992, he held positions at Calgary as the AOSTRA Research Professor followed by the National Sciences and Engineering Research Council Industrial Research Chair. These two appointments freed him from teaching to concentrate on his burgeoning research into bacterial biofilms.

Research on biofilms has occupied Costerton since his move to Calgary. Costerton and his colleagues demonstrated the existence of biofilms and showed that biofilms are the dominant mode of growth for bacteria. The elaboration of an extensive sugar network that adheres bacteria to surfaces and subsequently buries them was revealed. Research over a decade demonstrated the importance of this exopolysaccharide in enabling the bacteria to survive doses of antibacterial agents, including antibiotics that readily killed bacteria grown in conventional lab cultures. This research was so convincing that an initially skeptical scientific community became convinced of the importance and widespread nature of biofilms.

In 1993, Costerton left Calgary to take up the post of Director of the Center for Biofilm Engineering at Montana State University, Bozeman. Since then, he and his colleagues have used techniques such as confocal microscopy to probe intact biofilms without disrupting them. These studies have revealed the complex nature of biofilm structure and the coordinated nature of the interaction between the bacterial populations in the biofilms. As well, Costerton discovered the so-called bioelectric effect, in which an application of current makes a biofilm much more susceptible to antibiotic killing. These discoveries are having profound influence on the design of strategies to combat chronic infections, such as the *Pseudomonas aeruginosa* lung infections that occur, and can ultimately kill those afflicted with cystic fibrosis.

Honors bestowed upon Costerton include the 2003-2005 Honorary Professorship in the Advanced Wastewater Management Centre at the University of Queensland, Australia; the Excellence in Surface Science Award from the Surfaces in Biomaterials Foundation (2002); Marian E. Koshland Seminar Series Lecturer at the University of California in Berkeley (2002); and an honorary degree, Doctor of Science Honoris Causa, University of Guelph in Guelph, Ontario, Canada.

In 2002, Costerton was added to the Institute for Scientific Information's Highly Cited List (www.isihighlycited.com), which lists the 250 most-cited individual researchers in 21 subject areas as a measure of their influence in research.

He is an Appointed Fellow of the American Association for the Advancement of Science (1997) and has received the Isaak Walton Killam Memorial Prize for Scientific Achievement (1990) and the Sir Frederick Haultain Prize for outstanding achievement in the physical sciences (1986).

Since 2004 upon today, Costerton continues his research at the USC Center for



Biofilms at the School of Dentistry, an interdisciplinary center that will study bacteria attached to surfaces.

Bill Costerton receiving the Sarton Medal from Robert Rubens, president of the Sarton committee during the “Biofilm mini-symposium”, Gent, November 13th 2007 (from right to left: Bill Costerton, Robert Rubens and Nico Boon)

Biofilms in nature and disease

J. Costerton

The Evolution of the Biofilm Concept: A Long and Winding Road

J. Costerton

University of Southern California, LA, USA

“There is a tide in the affairs of men which, taken at the flood, leads on the fortune. Omitted, all the voyage of their lives is bound in shallows and in miseries.”

William Shakespeare

The Origins

In a recent newspaper article in Boston, Roberto Kolter recounted to a breathless reporter how he had discovered biofilms by watching a cloudy film develop on the front glass plate of his tropical aquarium. But several decades before Roberto had gotten depressed, and found much too much time on his hands, dentists had surveyed plaque in people's mouths and sanitary engineers had carefully followed the accretion of slimy films on surfaces exposed to wastewater. These intrepid pioneers had taken the plaque or the slime, placed it under simple microscopes, and found that they were completely composed of bacterial cells, separated by very large amounts of amorphous matrix material that damped Brownian movement. If we extend the use of our senses from the visual to the tactile, we can feel slippery slime on rocks in streams, and the mobilization of our olfactory senses allows us to detect anaerobic bacteria in the dark brown rings that develop at the air-water interface in neglected toilets. Biofilms are all around us, and the first descriptions of the bacterial communities that form on surfaces exposed to sea water date back to 1933 (Henrici) and 1935 (Zobell and Allen). Sea water provides endless fascination to the microscopist, because floating or swimming

(planktonic) cells settle on surfaces to form multi-species of considerable complexity, and Zobell described a “bottle effect” that removes 99 % of planktonic cells from suspension if the sample is simply held in a vessel for one hour.

The Medical Apostasy

While Henrici and Zobell were pondering the ways of sea-going bacteria, their much more numerous medical colleagues were stamping out the last of the great epidemic bacterial diseases, using vaccines developed against pathogens grown in culture.

During the Great War the armamentarium of Medical Microbiology was expanded by the addition of antibiotics, also developed against bacteria grown in culture, and Koch’s Postulates deservedly reigned supreme (Grimes, 2006) because they had provided the intellectual rationale for the conquest of acute bacterial disease. After the confetti from the victory parade was swept up, a number of niggling questions emerged. Why did children with cystic fibrosis die of pulmonary infections, when the infecting organism (*Pseudomonas aeruginosa*) was not really a recognized pathogen, and showed exquisite sensitivity to antibiotics when cultured? Why did bacterial infections associated with orthopaedic prostheses fail to respond to conventional antibiotic therapy, when the bacteria that caused them showed sensitivity when tested in culture? Why did the physical removal of the prosthetic hardware allow resolution of the infection? After victory over bacterial diseases was announced, nagging problems remained unexplained, and it became obvious that a piece was missing from the puzzle.

The Reductionist Apostasy

Single species cultures of planktonic bacteria growing in defined media provided Microbiologists with the prokaryotic equivalent of the ubiquitous fruit fly. If your interest lay in the Byzantine complexities of the nucleic acids that comprise the ribosome, or in

the 14th elongation factor that accomplishes protein synthesis, you needed a consistent source of fast-growing bacterial cells and the liquid culture was your “oyster”. So reductionist Microbiologists could join their “molecular” counterparts in other fields of Biology in discussing, with due credit to the theologians of the University of Paris, how many proteins could dance on the head of a strand of 16 S rRNA. But doubts began to emerge, even in these arcane circles, when it was noted that the lab-evolved K 12 strains of *E. coli* had, in the course of hundreds of transfers, lost 32.5 % of the genome that had allowed them to function as wild strains in the real world (Fux et al., 2005). Reductionist science has dominated the second half of the 21st century, and filled our universities with biologists who have never even seen their chosen subjects in the ecosystems in which they function. The operative assumption has been that their laboratory models mimic natural systems, and the revelation that cells in the biofilms that predominate in nature express phenotypes that differ from those of their planktonic counterparts by as much as 70 % (Sauer et al., 2002) shakes this assumption to its foundations.

The Stage is Set

The stark simplicity of the approach that developed in Microbial Ecology, in the 1960s and 1970s, belied its significance. Robust young men like Gill Geesey and Gordon McFeters would shoulder their packs and trot in to mountain lakes, Staffan Kjelleberg and Kevin Marshall would clamber over the seashore, and we would simply determine the number and location of the bacteria in aquatic ecosystems. How many cells, and where were they located? Our first conclusion was that cultures were useless, because less than 1% (Colwell and Huq, 2001) of the species present in these ecosystems would grow on the media we had, so we unlimbered our microscopes. The conventional light microscope was limited by the fact that we have to study optically tractable

surfaces, but we could recover bacteria from the bulk fluid (filtration) and from surfaces (scraping), and stain them with acridine orange. We could confirm the presence of very large numbers of bacteria on surfaces, by scanning electron microscopy (SEM), and examine their adhesive mechanisms (Costerton et al., 1978) by transmission electron microscopy (TEM) of ruthenium red-stained preparations (Figure 1).



Figure 1: Transmission Electron Micrograph (TEM) of a ruthenium red stained section of a biofilm formed on the surface of a methacrylate disc placed in a mountain stream for 20 minutes. Note the cross sections of two gram-negative bacterial cells, the fibrous matrix material that binds these cells to each other and to the surface, and the electron dense clay platelets trapped in the matrix material.

Soon the verdict was in: the vast majority of bacteria (> 99.9%) in aquatic ecosystems grow in matrix-enclosed biofilms on all available surfaces. The realization that sessile communities predominate in microbial ecosystems, and that the morphological complexity of these communities rivals that of eukaryotic tissues, prompted us to use

the well established technique of confocal microscopy (Lawrence et al., 1991). This microscope uses a laser beam that scans surfaces, without respect to their opacity, and requires neither fixation nor dehydration, and the rest is (as they say) history (Figure 2).

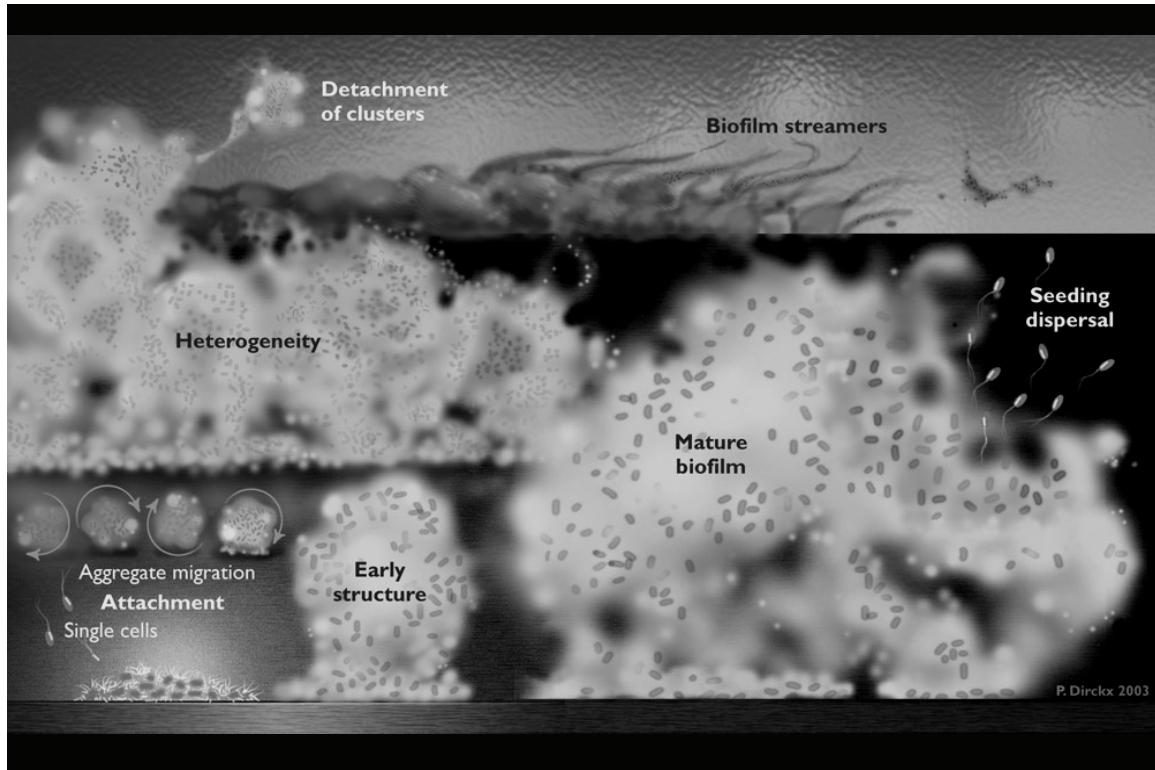


Figure 2: Diagrammatic representation of the structure of a biofilm, based on images obtained by confocal scanning laser microscopy (CSLM). Note the formation of a complex biofilm with water channels and detachment zones, in which bacteria comprise +/- 15 % of the mass of the community, and in which cells are distributed in a highly-ordered species-specific pattern. Multi-species communities show metabolically cooperative zones, and the biofilms are dynamic in terms of movement and detachment.

Biofilms are Phenotypically Distinct, Communities

The first road block in the acceptance of the predominance of biofilms in aquatic system came in the form of a suggestion that these sessile populations were simply an accumulation of dead cells, and that the planktonic cells still represented the vital population. This was disposed of quickly when we showed that virtually all sessile cells

in biofilms are alive and functional, and when we showed that the sediments and other surfaces in rivers carry out > 99% of organic transformations in natural ecosystems (Wyndham and Costerton, 1981). Our tactful suggestions that planktonic bacterial cells are a minor population in nature, and a *de facto* laboratory artefact that has monopolized the attention of Microbiologists for far too long, was then countered by the assertion that biofilm cells are identical with planktonic cells except that they are piled up on surfaces. Inspired by the well-established observation that cells in biofilms are resistant to antibiotics at levels hundreds of times higher than those that kill their planktonic counterparts, we then began to examine protein production/gene expression in biofilms versus planktonic cultures. Both 2 D gel studies of protein production, and array-based studies of gene expression, have shown very large differences in the biofilm and planktonic phenotypes of all species examined to date, and Karin Sauer et al. have recently shown that the biofilm phenotype varies with the age of the community (Southey-Pillig et al., 2005). If the biofilm phenotype differs from the planktonic phenotype, in terms of more genes than are necessary for spore formation, we must conclude that sessile cells differ from their planktonic counterparts in many respects more profound than simple resistance to antibiotics.

Biofilms are Complex Integrated Communities

When Paul Stoodley and Dirk deBeer spent long hours in the lab with single species biofilms growing on surfaces in flow cells, revelations popped out at an amazing rate. Biofilms were not amorphous accretions of cells embedded in a slimy matrix, but they were composed of an architecturally distinct array of “towers” and “mushrooms” interspersed with open water channels. Water from the bulk fluid was entrained into the network of water channels, to set up a convective flow pattern (Stoodley et al., 1994), and this flow carried nutrients (including oxygen) to the tower-like microcolonies, in

which cells were distributed in a species specific pattern (Figure 2). We detected oxygen limitations in the centres of microcolonies, using microelectrodes, and we noted that these anaerobic centres of the towers and mushrooms often hollowed out when the microcolony reached a certain critical size. All of our thought processes slowly distilled into questions: how do water channels remain open, when random growth by adjacent microcolonies would close them? How do the bacterial cells that find themselves in the anaerobic centres of microcolonies revert from the biofilm to the planktonic phenotype and swim away? Even more tentatively, we began to consider the heretical notion that bacteria in biofilms have developed the ability to communicate by means of cell-cell signals, and we enlisted the help of Peter Greenberg of quorum sensing fame. Our subsequent discovery (Davies et al., 1998) that biofilm architecture, and even the process of biofilm formation itself, are controlled by several systems of chemical signals established the fact that biofilms are integrated communities within which individual bacterial cells can communicate with each other. Others have discovered that cells within biofilms can also transmit electrical signals, via nanowires (Gorby et al., 2006), that certainly constitute a method of power sharing and possibly represent yet another means of communication. These totally unexpected and highly sophisticated communications between sessile cells, perhaps ironically, may present the most practical amongst us with opportunities to control biofilm processes, including chronic biofilm diseases, by interfering with these communications. Plans are afoot to block chemical signalling by specific inhibitors, and electrical signalling by voltage clamps, and the sophistication of their communications may prove to be their Achilles' heel.

The Arrested Development of Microbiology

The logical development of Microbiology, as a modern science, is recovering from the Medical Apostasy and from the Reductionist apostasy, and many of us now study

bacteria *in situ* within the communities of which they are integral members. We now realize that mutations that affect the performance of a species as a member of an integrated community may be just as important as mutations that affect the survival of planktonic cells of the same species. We realize that communications within a biofilm community may allow it to respond to a stress (e.g. beta lactam antibiotic) applied to one location in the community, by initiating changes (e.g. beta lactamase production) throughout the community. Biofilms can now be represented as multi-cellular communities that have a primitive circulatory system, a degree of cell specialization, and an unexpectedly sophisticated communication system. Four decades have brought many changes in the way Microbiologists conceive of the organisms that we study:

These are not your Grandfather's bacteria!

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Laudatio Fred Stevens

D. Heirbaut

Laudatio Fred Stevens*D. Heirbaut*

Whatever definition one has of a legal historian, there is no doubt that Fred Stevens is one, as he has studied both law and history. Although his first historical research concerned Belgium's economic history in the 1930's, Fred Stevens soon turned to legal history with a three volume Ph. D. thesis about the Antwerp notaries from 1794 until 1814, which he defended in 1989. When the major part of it was published in 1994, it established his name not only as Belgium's specialist of its notaries, but also as one of its best historians, a fact which was recognized by the Flemish Community which awarded him its prestigious three year prize for historical sciences in 1994. At that time, notaries in Belgium and in foreign countries had already acclaimed Fred Stevens as the great historian of their profession. For example, in 1993 he was the laureate of the Prix Fochrot of the Institute International d'Histoire du Notariat and in 1996 he was the co-author of a book in Italian about notaries in the Low Countries. Speaking from my own experience as co-editor of a book about the history of the administration of justice in Belgium, I can say that as soon as the subject of notaries is mentioned the name of Fred Stevens immediately comes to mind. Consequently, he has written about the most diverse aspects of the history of notaries in Belgium, like the first women to be allowed to the profession, the training of notaries, the languages they used and so on. From this, however, one should not derive that Fred Stevens is now wasting his time studying only some small details. In fact, two of his major books about the notaries were published only a few years ago. I refer here to his study of the famous Ventôse statute of the French Revolution, which even today is still the point of reference for the organization of the notarial profession, and also to his book about the notaries from the Dierckx family.

in Turnhout during the last two centuries. At first sight, this book looks to be about local history, but it far transcends that level and is in fact a model study and it is hoped that it will be emulated by younger legal historians, because Fred Stevens here shows that he is a hands on historian, who delves into the archives and brings the past to life. The old notaries are dead, but the law they made comes to life again in Fred Stevens' writings. His work about the Antwerp notaries around 1800 almost inevitably led him to study the so-called French era of Belgian history. As Belgium's law still is to a large extent French, the two decades between 1795 and 1815 are beyond any doubt the most important ones in Belgian legal history and anyone studying them will have to turn to Fred Stevens' work about the introduction of the French legislation in Belgium, Belgian constitutions around 1800 or labour and criminal law at that time.

As may be expected of a legal historian who is very much aware of the social background of the legal phenomena he studies, Fred Stevens has also published extensively on the history of Antwerp, Turnhout and the Campines area. Once again, it would be wrong here to assume his work is not of interest to a wider audience, because he writes from a local angle. For example, in my personal opinion, his very extensive article about religious institutions in the Campines area during the long nineteenth century is actually about religious institutions in Belgium and even more about the legal status of nonprofit organizations and its wider implications for the relationship between church and state in nineteenth. As such it is indispensable literature for any student of nineteenth century Belgium, but the author is too modest to advertise this.

The paragraphs above may give the reader the impression that Fred Stevens is only working about notaries, the French era in Belgium and the local history of Antwerp and its province, but that is not true. He has written about so many subjects that it is impossible to list of all them here. However, even mentioning only a few of them will make clear to the reader that Fred Stevens is an extremely versatile scholar, who is

able to tackle any subject. He has written articles about the history of the law faculties and legal education, court bailiffs, the influence of Italian lawyers on law in the Southern Netherlands during the sixteenth century, company law in nineteenth century Belgium, the slave trade, the history of codification, legal statistics, nineteenth century labour law, the relationship between theology and law under the emperor Charles V, the publication of new statutes, forced succession and so many other issues. For example, he has also written some biographical articles about famous lawyers. (He will also prove his versatility in the article following this laudatio, which is about the League of Nations, i.e. international law.) Remarkable here is that his publications run from the fifteenth to the twentieth century, and occasionally even go beyond that, like an article dealing with Roman law, a text about legal historians and the internet or his article about the history of terrorism. Fred Stevens' willingness to tackle so many subjects is to his credit, but even more so is the fact that he always displays a mastery of them which many others only achieve after decades of research. To all this, one should add that Fred Stevens has also given many lectures about, once again, the most diverse subjects of legal history and that he was also for many years the secretary of the legal history committee of the Royal Flemish Academy of Belgium for Arts and Sciences. Moreover, he has almost singlehandedly revived the Belgian chapter of the International Commission for the History of Representative and Parliamentary Institutions, which under his leadership is now returning to its glory as a leading institution for the study of the history of public law in Belgium.

As strange as it may sound, in his own country, Fred Stevens has up to now not really received the tribute which is due to him, whereas in other countries, like Germany, but most of all France, he is considered to be one of Europe's leading legal historians. A professor at Leuven University in Belgium, Fred Stevens has also been invited to teach several times at French universities and he was even asked by his French colleagues to

organize the 2008 congress of their Société d'histoire du droit. Although notaries were aware of his qualities from the start, only now it is dawning upon his Belgian colleagues that this modest scholar is one of their best. Therefore, the Institute for Legal History of the University of Ghent is glad that the Law Faculty put his name forward for the Sarton medal and that the committee has awarded it to him. Thus, a debt is paid.

La ‘Société des Nations’, un entracte?

F. Stevens

La ‘Société des Nations’, un entracte?

F. Stevens

KU Leuven

Un politique missionnaire?

‘Nine eleven’, le neuf septembre 2001. Les événements dramatiques de New-York appartiennent désormais à de la mémoire collective de l’humanité. Tout comme la réaction du président américain Georges W. Bush et sa célèbre expression ‘the crusade for democracy’. Cependant, cette vision n’est pas si neuve et si révolutionnaire que l’on pourrait croire. Elle s’inscrit dans une longue tradition de la politique étrangère américaine. Il y a presque cent ans, le président Woodrow Wilson avait défendu avec sa ‘missionary diplomacy’ une idée similaire. Wilson, comme bon nombre d’américains, considère l’Amérique comme le meilleur modèle d’état démocratique au monde. Une démocratie libérale qui s’appuie sur les libertés publiques et l’économie de marché libre. Dans leur opinion, il convient d’exporter cette notion de ‘démocratie’ dans le monde, si nécessaire même contre la volonté les dirigeants des pays intéressés. Dans leur vision, les dirigeants américains sont en outre les plus aptes à promouvoir la paix et la prospérité mondiale.

Après son arrivée au pouvoir, le 4 mars 1913, le nouveau président américain Woodrow Wilson est confronté aux problèmes politiques au Mexique, l’Amérique centrale et les Caraïbes. Dès le 11 mars, il définit clairement la nouvelle politique américaine vis-à-vis de l’Amérique latine : l’Amérique soutiendra les gouvernements démocrates et s’opposera aux dictatures. Wilson n’épargne pas ses mots : il ne veut pas soutenir ‘un gouvernement de bouchers’. Jusqu’en octobre 1913, le président veut reconstituer un

gouvernement au Mexique par des élections démocrates. Après l'installation d'une dictature militaire, le 10 octobre 1913, par Victoriano Huerta, Wilson change de politique : les Etats-Unis emploieront s'il s'avère nécessaire des méthodes moins pacifiques pour garantir la paix en Amérique centrale afin que le processus de 'self-government' ne soit pas interrompu ou annulé. Cette juxtaposition de 'self-determination' et l'intervention des Etats-Unis dans la crise mexicaine est caractéristique pour la politique de Wilson.

En décembre 1914, Wilson projette un 'Pan-American Pact', avec comme but la non-agression, la réduction des armes et pour éviter des guerres dans l'hémisphère Ouest. Bien que ce pacte ne soit pas réalisé, le projet du premier article est significatif : les contractants se garantissent mutuellement l'intégrité territoriale et l'indépendance politique sous les formes républicaines de gouvernement. Cet article peut surprendre si l'on sait que les Etats-Unis bombardent, le 21 avril 1914, Veracruz, qu'ils tiennent occupé pendant six mois ou qu'ils occupent Saint-Domingue de 1915 à 1934. Cette 'politique missionnaire', qui a également des fondements économiques, contribue largement à une véritable 'yankeephobie' en Amérique latine.

Les 'Quatorze points' du président Wilson

Le 8 janvier 1918, le président Wilson adresse les fameux 'Quatorze points' au Congrès américain concernant l'établissement d'une paix durable. Le président insiste sur la nécessité d'une diplomatie ouverte. En outre, il préconise un monde libre avec la liberté absolue de navigation sur les mers en temps de paix et de guerre; la suppression des barrières économiques et l'égalité des conditions de commerce pour tous. Il plaide pour une réduction des armements à un minimum compatible avec la sécurité nationale et un arrangement librement débattu de toutes les revendications coloniales fondé sur

l'observation stricte du principe selon lequel, dans le règlement de toutes les questions de souveraineté, les intérêts des populations intéressées pèseront d'un même poids que les revendications équitables dont il faut déterminer le titre. Les six points suivants concernent des questions territoriales. Pour Wilson, il faut évacuer tout le territoire russe pour que la Russie puisse, en toute indépendance, décider de son développement politique et son organisation nationale; évacuer et restaurer la Belgique; restituer l'Alsace-Lorraine à la France; rétablir la frontière italienne conforme au principe des nationalités; libérer la Roumanie, la Serbie et le Monténégro; garantir aux régions turques de l'Empire ottoman la souveraineté et garantir aux autres nations qui se trouvent sous la domination turque une existence autonome. Aux peuples d'Autriche-Hongrie, le président veut assurer une place parmi les nations. Il prévoit également la création d'un état polonais indépendant avec un accès libre à la mer. Finalement, l'article quatorze insiste sur la constitution d'une association générale des nations visant à offrir des garanties mutuelles d'indépendance politique et d'intégralité territoriale à tous les états. Il convient de noter que le mot 'self-determination' n'apparaît pas dans les quatorze points. Trois jours auparavant, le 5 janvier 1918, le premier-ministre anglais David Lloyd George avait défendu ce 'right of self-determination'. Dans une réaction au discours du président américain, le chancelier allemand, le comte Georg von Hertling, déclare au Reichstag, le 24 janvier 1918, que le gouvernement allemand est prêt d'examiner les fondements d'une société des nations après que les autres questions seront résolues. Wilson informe, le 11 février, le Congrès des réactions internationales à ses Quatorze points. Pour le chancelier allemand la création d'une société des nations reste peut-être un but désirable, mais il insiste qu'il n'y existe pas encore une cour d'arbitrage impartiale organisée par toutes les nations pour le maintien de la paix au nom de la justice. En outre, il ne voit point une telle démarche chez les autres membres de l'Entente comme la Grande-Bretagne. Le 4 juillet 1918, jour de fête

nationale des Etats-Unis, le président Wilson reprend les thèmes contenus dans les ‘Quatorze points’ lors d’un discours à Mount Vernon.

La Société des Nations, une inconnue?

Le point ‘quatorze’ du discours de Wilson, qui prévoit la création d’une association générale des nations pour le maintien de la paix, est généralement considéré comme le fondement de la ‘Ligue’ ou ‘Société des Nations’, fort mal traduit dans le Moniteur belge en néerlandais comme ‘Volkerenbond’ (société des peuples). De nos jours cette organisation a mauvaise presse. En fait, elle reste une inconnue. Si pendant l’entre-deux-guerres, elle a fait l’objet de plusieurs études savantes, aujourd’hui, malgré d’importantes archives, seul un nombre très restreint de scientifiques l’étudient.²⁰ Le nom même de la Société évoque la notion de bureaucrates, d’idéalistes, de résolutions inutiles, de commissions sans résultats et surtout d’un échec immense avec l’éclatement de la Seconde Guerre mondiale. Des dictateurs tels qu’Hitler, Mussolini ou les militaristes japonais n’avaient que du mépris pour cette Société. Bien qu’une initiative du président américain, les Etats-Unis n’ont jamais été membre de l’organisation. Mais en accentuant surtout les événements des années 1933-1939, on omet la totalité d’une histoire de vingt cinq ans d’existence.

Wilson et l’entrée en guerre des Etats-Unis

En 1918, l’idée d’une société des nations n’est pas neuve. Déjà, le 27 mai 1916, devant les membres de la League to Enforce Peace, mieux connue sous ses initiales LEP, Wilson affirme que les Etats-Unis sont prêts de participer à une association de nations qui défendraient la diplomatie ouverte, le droits des peuples de choisir leur souveraineté, les droits égaux des nations en la défense contre l’agression. Dans ce discours, le

²⁰ Pour une bibliographie exhaustive, *vide*: <http://www.indiana.edu/~league/bibliography.php>.

président plaide également pour abandonner la politique traditionnelle américaine d'isolationniste. Sur un programme neutraliste et sous le slogan 'He kept us out of war', Woodrow Wilson gagne de justesse les élections présidentielles en 1916 contre le républicain Charles Evans Hughes de New-York. Dans un premier temps, il maintient sa position de neutralité. Mais à la suite du télégramme crypté de Zimmermann, ministre allemand d'Affaires étrangères, l'opinion américaine va basculer. Dans ce télégramme envoyé à l'ambassadeur allemand au Mexique, Heinrich von Eckardt, le ministre annonce le début d'une guerre sous-marine à outrance à partir du 1er février 1917. En dépit de cela, il désire que les Etats-Unis restent neutres. Si néanmoins ils entrent en guerre, Zimmermann suggère l'ambassadeur de proposer au gouvernement mexicain une alliance. Outre le soutien financier, le Texas, le Nouveau-Mexique et l'Arizona seraient restituées au Mexique. Le président mexicain devrait aussi convaincre le Japon d'entrer en guerre. Ainsi, Zimmermann espère que les Etats-Unis, qui seraient menacés sur leur propre territoire, ne s'engagent pas sur trois fronts et n'envoient point de troupes en Europe. Mais le télégramme est intercepté par les Britanniques et transmis à Wilson, le 24 février 1917. Il est rendu public dans la presse américaine le 1er mars. Zimmermann confirme le continu du télégramme dans des discours le 3 et 29 mars. Dans une session extraordinaire, le 2 avril, Wilson demande le Congrès de déclarer l'Allemagne la guerre. Dans son discours, le président insiste que le monde doit être rendu en sécurité pour le maintien de la démocratie et que seul la participation de tous les états démocrates peut garantir cette sécurité. Quatre jours plus tard, les Etats-Unis entrent en guerre. Depuis la Révolution russe, qui a aboutit en 1917 à la fin du régime tsariste et la mise en place d'un régime léniniste, les membres de l'Entente peuvent en effet soutenir qu'ils seuls défendent la liberté contre les monarchies absolues. Il convient en outre de souligner que le président Wilson et son

administration se sont toujours considérés comme un ‘pouvoir associé’ (associated power) plutôt qu’un allié formel.

Mais début 1918, la situation militaire sur le terrain semble évoluer en faveur de l’Allemagne. Les Allemands suspectent Lénine d’essayer de gagner du temps. Afin de le contraindre de signer un traité de paix, ils entreprennent, le 18 janvier 1918, une offensive militaire en direction de Kiev, alors que les Autrichiens poussent en direction d’Odessa. Le 3 mars, les Allemands imposent le traité de paix de Brest-Litovsk. Cette paix coûte la Russie d’immenses territoires : la Pologne, la Finlande et les pays baltes. L’Ukraine devient indépendante. Sur le front occidental, à la suite d’offensives allemandes en mars, en avril, en mai et en juillet, les soldats allemands parviennent d’atteindre le sud de la Marne et les portes d’Amiens. Ce n’est que le 18 juillet que le général Foch, qui a obtenu le commandement général des troupes franco-anglaises, peut passer avec l’aide des troupes américaines à la contre-offensive.

La genèse d’une idée : Wilson et la Société des Nations

L’élaboration du statut de la Société ou de la Ligue des Nations passe par trois phases : la phase non officielle; la phase des premières délibérations à Paris avant le départ, le 14 février, du président Wilson pour l’Amérique et la phase des négociations à Paris après le retour de Wilson, le 15 mars.

En Grande-Bretagne, le premier-ministre Lloyd George laisse étudier des experts l’idée d’une création d’une organisation internationale. Le 20 mars 1918, une commission présidée par Lord Phillimore, spécialiste du droit international, présente au gouvernement son rapport concernant une League of Nations. Si ce projet contient un bon nombre d’éléments que l’on retrouve dans les statuts de la Société des Nations, il

convient de souligner que le Phillimore Plan prévoit une organisation uniquement constituée par les grandes puissances et ne mentionne rien sur la création d'une Cour de justice, du désarmement, ... Ce rapport s'inspire du Memorandum on proposals for diminishing the occasion of future wars publié en l'automne de 1916 par Lord Robert Cecil, sous-secrétaire du Foreign Affairs. Le projet Phillimore influence le général sud-africain Smuts, membre du War Imperial Cabinet et dont l'ouvrage *The League of Nations : A Practical Suggestion* est rendu public par le gouvernement britannique le 16 décembre 1918. Pour Smuts, la création d'une Société des Nations est la tâche primordiale de la Conférence de paix. Il prévoit une Assemblée (General Conference) avec une représentation de tous les membres de la Société des Nations. Il propose également la création d'un Conseil (Council), composé de représentants des grandes puissances, ainsi qu'une représentation par rotation des moyennes et petites puissances. Son projet accorde beaucoup d'attention aux colonies et au problème des mandats (articles 2-9), le désarmement, ...

En France, une Commission interministérielle d'études pour la Société des Nations est mise en place le 22 juillet 1917 au sein du ministère des Affaires étrangères. Elle transmet son travail au gouvernement le 8 juin 1918. Dans ce document, la commission se prononce pour une organisation permanente d'états souverains de nations libres et responsables, chacune se préservant sa souveraineté nationale. La commission répugne à y admettre l'Allemagne. Ce projet prévoit un Conseil international, composé des chefs de gouvernement ou de leurs délégués, une Cour de justice et la création d'une force armée internationale permanente. Une délégation permanente de quinze membres, composée des représentants de n'importe quel état, serait élue par le Conseil dans son sein.

Le projet Phillimore parvient au président Wilson en juin 1918. Celui-ci l'envoie à son proche conseiller, le colonel House, pour qu'il puisse l'examiner. Le 16 juillet, le colonel House rend au président un projet qu'il nomme 'Covenant of a League of Nations'. Ce plan prévoit la création d'un Secrétariat et d'une Cour internationale de justice. Wilson n'est pas totalement satisfait de ce texte. Cependant, le 'premier projet' du président, contenant treize articles, maintient la plupart des dispositions de House. Mais le président rétablit le principe de sanctions militaires et écarte les articles concernant la Cour internationale. En août, Wilson rencontre House dans la résidence d'été de ce dernier à Magnolia dans le Massachusetts, pour y discuter du projet. Le 'Magnolia Draft' est tenu secret. Wilson craint en effet que sa publication soit à l'origine de polémiques et de critiques en Grande-Bretagne et aux Etats-Unis. C'est lors de ce séjour que le président exprime l'idée que le traité d'une 'Ligue des Nations' pourrait être incorporé dans le traité de paix.

Mais la situation en Amérique change. Depuis 1912, les démocrates ont la majorité dans les deux chambres. A la suite des élections du nouveau Congrès, le 5 novembre 1918, les républicains obtiennent 240 sièges à la Chambre des Représentants et 49 au Sénat contre respectivement 192 et 47 sièges pour les démocrates. Et moins d'une semaine après ces élections, le 11 novembre, un armistice met fin à la Première Guerre mondiale.

La Conférence de la paix et l'élaboration d'un projet de Société des Nations

Le président américain décide de présider lui-même la délégation américaine pour la Conférence de la paix. Son choix des quatre plénipotentiaires se heurte à de sévères critiques : aucun républicain de premier plan, aucun sénateur... Le 2 décembre, dans son 'State of the Union', il annonce au Congrès que les alliées et les empires centrales

ont accepté les principes énoncés dans les Quatorze points, comme base du traité de la paix. Deux jours plus tard, il quitte avec la délégation américaine New York à bord d'un ancien paquebot allemand, le 'George Washington'. Il arrive neuf jours plus tard à Brest. Pour la première fois dans l'histoire, un président quitte les Etats-Unis. Il estime de rester en Europe que pour négocier les grandes lignes de la Conférence de la paix.

Lloyd George ainsi que Wilson veulent initialement organiser la Conférence de la paix dans un lieu neutre. Wilson pense à Zürich, mais des informations alarmantes concernant une révolution imminente et la présence d'espions allemands lui font renoncer à cette idée. Le premier français Clemenceau par contre maintient son choix pour Paris et obtient finalement gain de cause.

Outre les cinq principales nations – Etats-Unis, Royaume-Uni, France, Italie et Japon – 22 états, dont cinq dominions britanniques, sont représentés à cette Conférence. Le véritable pouvoir est mis en mains du Conseil des Dix (Supreme Council), où siègent deux représentants des cinq grandes puissances. Les 'petites' nations et les états neutres n'y sont pas représentés. Le président de la délégation belge, Paul Hymans, s'avère le défenseur des 'petites Puissances' et exprime son inquiétude de voir ces petits états réduit au rôle de figurant. Contrairement à la coutume, les puissances vaincues ne sont pas admises à négocier la paix. Le Conseil se réunit une première fois le 13 janvier 1919. Il tient 76 séances. Il cesse ses activités le 15 février, lorsque Wilson retourne aux Etats-Unis et que Lloyd George rentre au Royaume-Uni. La raison officielle du retour de Wilson est de pouvoir assister à la séance de clôture du Congrès, mais en réalité il est obligé de retourner aux Etats-Unis pour faire tête à l'opposition grandissante contre la 'Ligue des Nations'. Après son retour, le 15 mars, le Conseil des Dix est remplacé par le Conseil des Quatre, sans la délégation japonaise. Entre le 24

mars, date de sa première réunion, et le 28 juin 1919, ce Conseil se réunit 145 fois. Le ‘danger bolchevique’ pèse lourdement sur les discussions, qui se font en français, langue diplomatique traditionnelle, et en anglais. En vain, Sonnino, plaide pour l’emploi de l’italien.

Le 12 janvier, le premier-ministre britannique Lloyd George, le premier français Clemenceau, le premier italien Orlando et le président Wilson se rencontrent pour une première fois au ministère des Affaires étrangères. Six jours plus tard, le 18 janvier, la Conférence de Paix est officiellement ouverte. Est-ce un hasard si cette date coïncide avec la date du couronnement de Guillaume Ier, le 18 janvier 1871, comme empereur allemand ?

Entre temps, la lecture des propositions du général Smuts influence le président Wilson. Il présente, le 10 janvier, une seconde version du Covenant. Dans six articles, les Supplementary Agreements, il reprend et développe les idées de Smuts concernant la création d’un Conseil et adopte le principe des mandats, solution qu’il applique aussi aux colonies appartenant à l’Empire allemand. Les articles ‘supplémentaires’ traitent également de la durée et des conditions de travail et de l’égalité du traitement des minorités raciales ou nationales. A la suite des remarques de ses conseillers, le président remanie son deuxième projet en y ajoutant quatre articles supplémentaires. L’article concernant les mandats est précisé, une clause concernant la discrimination religieuse est ajoutée. Ce troisième projet (le deuxième projet parisien) est terminé le 20 janvier. Le jour précédent, le 19 janvier, Wilson a également pris connaissance du ‘Draft Sketch of a League of Nations’, une révision du texte de lord Robert Cecil.

Le travail de la ‘Commission de l’hôtel Crillon’

Clemenceau propose lors de la première réunion du Conseil des Dix un ordre de travail. La discussion d'une Société des Nations viendrait en dernier lieu. Car si, selon le colonel House, Clemenceau semble avoir été convaincu dès le 7 janvier de l'idée d'une telle institution, le premier français n'est pas très enthousiaste de l'idée 'idéaliste' d'une Ligue des Nations. Pour lui, avant tout, 'L'heure du lourd règlement est venue'. Wilson, qui veut que l'on délibère en premier lieu sur les statuts de cette institution, obtient le jour suivant que le traitement du Covenant est prioritaire. Le 15 janvier, le premier-ministre britannique Lloyd George, qui comme Clemenceau, veut poursuivre des buts immédiats et régler les questions territoriales, politiques et économiques, propose de renvoyer l'étude de la Société des Nations à une Commission spéciale. Il présente également une résolution que la Ligue fera partie du traité de paix. Proposition que Wilson change, le 22 janvier, en : 'une partie intégrante du traité de paix général'. Il est en outre convenu que la commission sera composée de plénipotentiaires, comme le désire Wilson. Le 18 janvier, le président français Poincaré annonce dans la séance inaugurale de la Conférence de la paix la création d'une Ligue des Nations. La célèbre résolution, prise lors de la deuxième séance, le 25 janvier, propose effectivement la création de cette Ligue, comme 'organe de coopération internationale qui assurera l'accomplissement des obligations internationales contractées et fournira des sauvegardes contre la guerre'. Cette résolution comprend en outre les principaux éléments de la Société des Nations : elle fera partie intégrante du traité de la paix, elle fonctionnera par une Conférence intermittente, il y aura une organisation permanente et un secrétariat pour suivre les affaires de la Ligue dans l'intervalle des Conférences.

Wilson, qui veut travailler vite, propose initialement que la Commission chargée de préparer les statuts de la Ligue, soit seulement composée des représentants des grandes Puissances. Est-ce pour alourdir le travail de la Commission que Lloyd George

et Clemenceau insistent que celle-ci soit également composée comme les autres commissions de représentants des ‘petites Puissances’ ? Ainsi, on décide que la Commission comprendrait dix représentants des ‘grandes Puissances’, à raison de deux pour chacune d’elles, et cinq représentants des autres ‘Puissances’. Finalement la Commission se compose du président Wilson et du colonel House pour les Etats-Unis, de lord Robert Cecil et du lieutenant général Smuts pour l’Empire britannique, de Léon Bourgeois et du doyen de la faculté de droit de Paris Larnaude pour la France, du président du conseil Orlando et du sénateur Scialoja pour l’Italie, du baron Makino et du vicomte Chinda pour le Japon, du ministre des Affaires étrangères Hymans pour la Belgique, du sénateur Epitacio Pessoa pour le Brésil, de l’ambassadeur Wellington Koo pour la Chine, du ministre Bathalha Reis pour le Portugal et du professeur Vesnitch pour la Serbie. Ultérieurement la Commission sera complétée par Venizelos pour la Grèce, Dmowski pour la Pologne, Diamandi pour la Roumanie et Charles Kramar pour la Tschécolvaquie. Elle tient sa première séance sous la présidence de Wilson, le 3 février à 14.30 h., au troisième étage de l’hôtel Crillon dans le bureau du colonel House.

Les Américains et les Britanniques se sont concertés avant la première réunion de la Commission. Ils ont rédigé un projet commun, adaptant quelque peu leurs points de vue. Le 2 février 1919, le projet ‘Hurst-Miller’, du nom des deux conseillers juridiques est établi. Le président Wilson, qui n'est pas complètement convaincu de ce nouveau projet, rédige le jour suivant un nouveau projet, qui sera transmis au Sénat américain le 11 août 1919. Malgré son souhait que son quatrième projet sert de base pour le travail de la Commission, il en n'est rien. Le projet ‘Hurst-Miller’, écrit en anglais, reste la base de la discussion. L'influence anglo-saxonne reste dominante lors des discussions, qui se déroulement généralement en anglais. Initialement, l'on dispose même que d'une mauvaise traduction française du projet. Dès le début, le problème de la représentation

des ‘petites Puissances’ s’avère un point difficile. Les ‘Big Five’ s’opposent à une représentation égale des grandes et petites ‘Puissances’ dans le Comité exécutif. Le 4 février, lors de la troisième réunion de la Commission, le ministre des Affaires étrangères belge Hymans objecte que cette proposition ‘n’est en somme rien d’autre qu’une nouvelle Saint Alliance’. Finalement, on opte pour la proportion de cinq ‘grandes’ et quatre ‘petites Puissances’ et on admet que ces quatre représentants sont librement élus par l’Assemblée. Si l’on accepte l’arbitrage comme solution en cas dispute, on se limite à prévoir la création d’une Cour permanente de justice internationale. La création d’une telle institution est en effet trop complexe pour la réaliser en peu de temps. Le 14 février, le projet est adopté lors de la dixième réunion de la Commission. Il est présenté le jour suivant à la séance plénière, mais pas encore voté.

Oppositions et amendements

Le 14 février, le président Wilson rentre aux Etats-Unis. Un mois plus tard, le 14 mars, il retourne en Europe. Il rencontre aux Etats-Unis une opposition plus ardente qu’il ne le supposait. Néanmoins, son attitude reste de refuser toute concession. Entre temps, en Europe, la Conférence est en panne. La question si oui ou non, les Anglais, les Français et les Japonais ont profité de son absence pour régler les questions qui les intéressent le plus et ont ruiné l’œuvre du président, reste entier.

Ce n’est qu’au retour de Wilson à Paris, le 15 mars, que la Commission reprend ses travaux le 22. Divers amendements sont introduits : un amendement japonais, déjà présenté le 13 février, sur l’égalité des peuples est repris lors d’une réunion de la Commission le 11 avril, mais est rejeté. Tout comme un amendement français sur l’institution d’un organisme militaire de coordination. Wilson soupçonne les Français de vouloir transformer la Société des Nations en un instrument de suprématie militaire

avec le maréchal Foch au commandement. Le président trouve en lord Cecil un précieux allié. Un amendement concernant l'application de la doctrine Monroe est considéré par les Américains comme essentiel pour que le texte soit approuvé par le Sénat américain. En réalité, celui-ci ne peut accepter les obligations d'intervention qui dérivent du traité. Le débat est passionné. Le compromis, proposé par lord Robert Cecil, d'insérer la mention de la doctrine de Monroe non plus à l'article dix, où elle aboutit à restreindre l'obligation de garantie, mais à l'article 20 qui traite des obligations et engagements internationales compatibles avec le traité, aboutit finalement à la rédaction de l'article 21. Contre le gré des Français, qui ont proposé le choix du français pour la rédaction du traité, la version anglaise et française, qui sont les deux langues officielles du traité, font foi. Si la question de l'unanimité dans les délibérations du Conseil et de l'Assemblée est restée en suspens pendant les délibérations en février, la Commission affirme finalement ce principe. La question où sera finalement établi le siège de la Société des Nations est l'enjeu de vives discussions. Après que l'on a abandonné l'idée de choisir un grand état, trois possibilités restent : la Belgique, les Pays-Bas – pays qui est resté neutre pendant la Grande Guerre ! - et la Suisse. Les Anglais étant en faveur de la neutralité de ce pays, Genève emporte le choix avec 12 voix sur 18. La Belgique n'obtient le soutien que de la France, la Chine, le Portugal et la Tchécoslovaquie. Le 11 avril, la Commission finit ses travaux. A la suite de la traduction du texte anglais en français, quelques petites modifications y seront encore apportées. Lors de la quatrième séance plénière de la Conférence de la paix, le 28 avril 1919, Wilson présente lui-même les modifications apportées au texte primitif. La traduction française est présentée par le traducteur Paul Mantoux. Le président américain propose une résolution afin de nommer sir James Eric Drummond, secrétaire privé du Secrétaire d'état au Foreign Office, comme premier secrétaire-général. Il propose en outre que provisoirement la Belgique, le Brésil, la Grèce et l'Espagne complètent le Conseil

comme membre. Un choix judicieux : la Belgique étant liée à la politique française, la Grèce à celle de la Grande-Bretagne, le Brésil pour assurer le soutien des états de l'Amérique latine et l'Espagne pour représenter les états neutres. Le scénario étant réglé d'avance, on obtient une unanimité.

Le Pacte de la Société des Nations

Le Pacte de la Société des Nations est composé de 26 articles, précédés d'un bref préambule. Celui-ci insiste que le Pacte est destiné pour développer la coopération entre les nations et pour leur garantir la paix et la sûreté. Pour la réalisation de ce but, les nations contractantes s'engagent 'de ne pas recourir à la guerre', d'entretenir au grand jour des relations internationales fondées sur la justice et l'honneur, d'observer rigoureusement les prescriptions du droit international ..., de respecter scrupuleusement toutes les obligations des traités'.

Les sept premiers articles organisent la nouvelle institution. Les 'membres originaires' sont les signataires du Pacte, ainsi que les états, restés neutres pendant la guerre, qui accèdent au Pacte. Le Pacte prévoit la possibilité d'accession de tout état, dominion ou colonie qui se gouverne librement, ainsi que les modalités de retraitement des membres de la Société. L'Assemblée est composée de représentants des 'membres de la Société'. Chaque membre a une voix. Le Conseil est composé de représentants des 'Principales Puissances alliées et associées' – France, Royaume-Uni, Italie, Chine, Etats-Unis -, ainsi que des représentants de quatre autres membres de la Société. Sauf des dispositions expressément contraires, les décisions des Assemblées et du Conseil sont prises à l'unanimité. Un Secrétariat permanent est établi au siège de la Société à Genève.

Les dix articles suivants (8 à 17) traitent du maintien de la paix. Les armements nationaux doivent être réduits ‘au minimum compatible avec la sécurité nationale et avec l'exécution des obligations internationales imposée par une action commune’. Le Pacte prévoit la formation d'une Commission permanente pour informer le Conseil sur les questions militaires, navales et aériennes. Les membres s'engagent à respecter et à maintenir l'intégrité territoriale des membres en cas d'agression extérieure. Une procédure de d'arbitrage où de recours au Conseil sont prévus avant tout conflit. Une Cour de justice internationale doit être créée afin de connaître les différends d'un caractère international. Si un membre recourt à la guerre, il est considéré comme ayant commis un acte de guerre contre tous les autres membres. En ce cas, le texte prévoit des sanctions économiques, financières, politiques et, si besoin, militaires. Ces dispositions peuvent également s'appliquer en cas de différend entre plusieurs états, dont un seul est membre de la Société.

Les articles 18 à 21 traitent des engagements internationaux. Tout traité doit être immédiatement enregistré par le Secrétariat et publié par lui aussitôt possible. Les membres acceptent la prédominance du Pacte sur tous les autres traités et engagements internationaux. Expressément, et ceci constitue une conditio sine qua non pour l'acceptation par les Etats-Unis, le texte mentionne que la doctrine de Monroe n'est pas incompatible avec le Pacte.

Un seul article (22) est consacré à la question des mandats. Trois types sont prévus selon le degré de développement des territoires concernés. Ceux-ci sont sous contrôle des puissances de tutelle.

Les articles 23 à 25 ne concernent pas tellement le maintien de la paix, mais constituent le fondement l'œuvre technique de la Société. Les conditions du travail, le traitement équitable des populations indigènes, la répression de la traite des femmes et des enfants, du trafic de l'opium et autres drogues nuisibles, le contrôle du commerce des armes et des munitions, le maintien de la liberté des communications et du transit, le traitement équitable du commerce de tous les membres de la Société, la prévention et le combat contre les maladies.

Le Traité de la paix de Versailles

Les dispositions de la Société des Nations constituent la première partie du Traité de paix. La deuxième partie comprend les clauses territoriales des nouvelles frontières de l'Allemagne. Ce pays perd environ 15,5 % de son territoire et 10 % de sa population. L'Allemagne renonce, en outre, dans la quatrième partie du Traité, à tous ses droits et titres sur ses possessions d'outre-mer en faveur des puissances alliées. Dans la troisième partie, 'Clauses politiques européennes', le Traité reconnaît l'indépendance du nouvel état Tchécoslovaque (art. 81) et de la Pologne (art. 87). L'indépendance de l'Autriche est également explicitement reconnue (art. 80). Les clauses militaires ont pour but une sensible réduction de la puissance militaire allemande. Dans la septième partie, les puissances alliées mettent en accusation Guillaume II de Hohenzollern 'pour offense suprême contre la morale internationale et l'autorité sacrée des traités'. La création d'un tribunal spécial pour le juger est prévue. La huitième partie concernant les réparations rend l'Allemagne et ses alliés responsables 'de toutes les pertes et tous les dommages' subis par les alliés. Si la Société des Nations a pour but d'établir 'la paix universelle', le Traité est conscient 'qu'une telle paix ne peut être fondée que sur la base d'une justice sociale'. Il prévoit donc la création d'un Bureau International du

Travail, qui sera établi au siège de la Société des Nations et fera partie des institutions de la Société.

Les membres de la Société des Nations

Les membres de la Société sont les vainqueurs de la ‘Grande Guerre’, les états qui sont restés neutres pendant la guerre et les nouveaux états qui ont accédé au Pacte. Surtout la France s’oppose à l’admission des vaincus et en premier lieu de l’Allemagne. Le nouvel état soviétique refuse d’entrer dans cette Société ‘capitaliste’. Le 10 janvier 1920, le Pacte de la Société entre en vigueur. Six jours plus tard, le Conseil tient sa réunion inaugurale à Paris. Lors de la première réunion de l’Assemblée, le 15 novembre 1920, sous la présidence de Paul Hymans, la Société des Nations compte 42 membres. La plupart sont des états européens (38 %) et américains (40,4 %). L’Asie (11,9 %), l’Afrique (4,7 %) et l’Océanie (4,7 %) sont peu représentées. Depuis la défection des Etats-Unis, en mars 1920, la France et la Grande-Bretagne dominent l’institution.

Car le Sénat américain rejette, le 19 mars 1920, le Traité. La Constitution américaine prévoit en effet que le Sénat doit ratifier les traités conclus par le président avec une majorité de deux-tiers. Le 10 juillet 1919, le président Wilson présente personnellement – un fait unique depuis 1789 – le Traité au Sénat. Comptant sur un soutien populaire, le président refuse toute ‘réservation’. Il demande même aux démocrates de voter, le 19 novembre 1919, contre la ratification avec les amendements du président de la Commission aux Affaires étrangères, le sénateur Lodge. Le même jour, les sénateurs rejettent également le Traité original avec 53 voix contre 38. Le Sénat cherche un compromis. Mais Wilson maintient, le 8 janvier 1920, que le Sénat ne doit pas réécrire le Traité. Le 9 février, le Sénat vote la reconsideration du Traité. Le texte est renvoyé au Comité des affaires étrangères du Sénat, qui l’adopte avec les ‘réservations’ de Lodge.

Mais, le 8 mars, Wilson maintient son opposition à ce texte. Finalement, le Sénat rejette le texte le 19 mars. L'échec de la ratification du Traité signifie aussi le retrait des Etats-Unis de la Société des Nations. Ce refus compromet également les changes de réaliser immédiatement une Société des Nations universelle. Le vote du Congrès est en quelque sorte confirmé par l'élection, en novembre 1920, du candidat républicain Warren Harding comme président. Le 20 mai, le Congrès réuni vote la fin de la guerre. Mais sept jours plus tard, le président Wilson oppose son veto à cette résolution. Le 2 juillet 1921, le Sénat et la Chambre des Représentants réunis votent finalement la fin de la guerre. Fin août 1921, les Etats-Unis signent des traités de paix bilatéraux avec l'Autriche, l'Allemagne et la Hongrie, qui sont ratifiés le 18 octobre 1921.

Si l'Autriche et la Bulgarie sont accueillies comme membres dès décembre 1920, l'Allemagne doit attendre 1926 avant d'être acceptée. L'Union soviétique ne devient membre qu'en 1934. En 1925, Costa Rica quitte la Société, suivie du Brésil l'année suivante. Entre 1935 et 1942 neuf pays d'Amérique latine suivent leur exemple. En 1933, le Japon et l'Allemagne nazie quittent l'institution, en 1938 l'Autriche et en 1939 l'Italie. Seul un pays, l'Union soviétique, est expulsé en 1939 de la Société après l'agression contre la Finlande.

Si l'égalité des états se reflète dans la composition de l'Assemblée, cela n'est pas le cas pour le Conseil. Après la défection des Etats-Unis, il y reste quatre sièges permanents. Lors de l'adhésion de l'Allemagne en 1926 à la Société, celle-ci est accueillie comme membre permanent, ainsi que Union soviétique en 1934. Mais l'Allemagne et le Japon quittent l'institution en 1934 et l'Union soviétique est expulsée en 1939. Le nombre des états temporaires augmente de quatre à six en 1922, à neuf en 1926, à dix en 1933 et à onze en 1936.

En 1933, le français Joseph Avenol, qui est depuis 1923 Secrétaire général adjoint de la Société des Nations, succède le premier secrétaire-général, James Eric Drumond. Ses contemporains et les historiens ont fortement critiqué Avenol. Lors de l'invasion de l'Ethiopie par l'Italie en 1935, il semble s'être plus occupé de maintenir l'Italie comme membre de la Société des Nations que de l'agression de Mussolini. Avenol est très conservateur et semble soutenir au début du conflit de la fin des années trente Hitler et Mussolini. Il adhère aux idées du maréchal Pétain. A-t-il vraiment voulu une collaboration entre la France avec l'Allemagne et l'Italie pour tenir la Grande-Bretagne hors du continent, comme certains l'estiment ? Finalement, l'irlandais Sean Lester lui succède en 1940. Il exerce les fonctions de Secrétaire-général jusqu'à la dissolution officielle de la Société des Nations en 1946.

La défection américaine a des lourdes conséquences pour le budget de l'institution. Les contributions financières des membres sont en effet fixées en fonction de l'état économique et financier de chaque membre. Le budget de 3.346.535 \$ en 1920 s'élève à 5.214.813 \$ en 1929. La Grande-Bretagne intervient pour 10,6 % du total, la France et l'Allemagne pour 8 % chacune, la Chine 4,6 % et la Grèce pour 0,7 %. Si l'article huit du Pacte prévoit que toutes les fonctions sont également accessibles aux hommes et aux femmes, ces dernières ne constituent au maximum 10 % du personnel, surtout des rédactrices, secrétaires ou traductrices.

Maintenir la paix

Pour maintenir la paix, l'article huit du Pacte prévoit que les membres s'engagent à préparer des plans de réduction des armements nationaux 'au minimum compatible avec leur sécurité nationale et avec l'exécution des obligations internationales imposée

par une action commune'. La course aux armements est en effet considérée comme une des raisons majeures de la Grande Guerre. Lors de l'Assemblée générale en 1925, une Commission préparatoire de la Conférence de désarmement est installée. Mais ce n'est que le 2 février 1932 que la première Conférence mondiale du désarmement tente de s'entendre sur un traité de désarmement qui concerne tous les membres de la Société des Nations, ainsi que les Etats-Unis et l'Union soviétique. Le retrait, le 14 octobre 1934, de l'Allemagne hitlérienne de la Conférence et de la Société, signifie l'échec de cette tentative.

Un règlement des conflits internationaux?

Les articles onze à quinze organisent le rôle de la Société des Nations dans le règlement des conflits internationaux. Les membres s'engagent de soumettre des différends susceptibles d'entraîner une rupture soit à la procédure d'arbitrage, soit à l'examen du Conseil. Le Pacte prévoit en outre la création d'une Cour permanente de justice internationale qui connaîtra tous différends d'un caractère international entre les membres. Les statuts de cette Cour sont acceptés le 13 décembre 1920 par Assemblée générale. Bien que les Pays-Bas sont restés neutres pendant la Grande Guerre et que ce pays est considéré comme pro-allemand - l'ancien empereur allemand y vit en exil -, le siège de cette Cour est établi à La Haye. Le 22 janvier 1922, la Cour tient sa première séance.

En 1924, un nouveau sang anime l'Assemblée. L'aventure de l'occupation de la Ruhr a pris fin. Des nouveaux hommes sont arrivés au pouvoir à Londres et à Paris. Lors de la cinquième session, en septembre 1924, le premier-ministre travailliste anglais Ramsay MacDonnald y évoque dans son discours, le désarmement et le concept d'arbitrage obligatoire en cas de conflit. Le jour suivant, le chef du gouvernement républicain

français Aristide Briand, se rallie à cette idée. Lors d'un discours à la Chambre des députés, le 17 juin, il avait déjà insisté sur la nécessité de renforcer la Société des Nations et toutes les institutions internationales d'information, de rapprochement au d'arbitrage pour pacifier le monde. Le 2 octobre, l'Assemblée adopte à l'unanimité le 'Protocole de Genève'. Ce protocole systématisé un nouveau droit international en définissant et sanctionnant 'l'agresseur' et en renforçant 'l'arbitrage'. Si les Britanniques se montrent assez réticent contre un déclenchement automatique de sanctions militaires en cas d'agression, l'opinion publique s'émeut contre le fait que la marine britannique pourrait être obligée faire respecter un blocus maritime par exemple contre les Etats-Unis. En novembre 1924, le gouvernement travailliste anglais est remplacé par un gouvernement conservateur. Le conservateur Austen Chamberlain devient ministre des Affaires étrangères. Il se déclare opposé au Protocole. La Grande-Bretagne répugne à participer à des sanctions, même économiques, en cas de non-respect de l'arbitrage. Le 12 mars 1925, il rejette au Conseil le Protocole.

L'échec du Protocole suscite des déceptions. Mais, déjà en février 1925, sur suggestion de l'ambassadeur de la Grande-Bretagne en Allemagne, lord Aberdon, le chancelier Stressemann propos d'élaborer un acte par lequel l'Allemagne reconnaîtrait ses frontières de l'ouest. Les ministres des Affaires étrangères Gustav Stressemann pour l'Allemagne, Aristide Briand pour la France, Emile Vandervelde pour la Belgique, Austin Chamberlain pour la Grande-Bretagne et Benito Mussolini pour l'Italie signent en octobre 1925 à Locarno plusieurs accords, dont le 'pacte rhénan'. Sous la garantie anglo-italienne, l'Allemagne, la Belgique et la France s'engagent à maintenir les frontières telles quelles ont été fixées en 1919. Si ces accords sont négociés hors de la consultation des membres de la Société des Nations, et même du Conseil ou de l'Assemblée, ils laissent néanmoins une place à la Ligue dans le processus de la paix.

Ainsi, l'admission de l'Allemagne est évoquée, mais le pays ne sera admis à la Société des Nations avec un siège permanent au Conseil qu'en septembre 1926. A la demande des Allemands, la question des frontières orientales de l'Allemagne n'est pas comprise dans ce pacte.

En août 1927, Aristide Briand propose à l'occasion du dixième anniversaire de l'entrée en guerre des Etats-Unis au secrétaire d'Etat américain Frank B. Kellog de s'engager mutuellement à renoncer à la guerre comme moyen politique. A la demande de Kellog, ce pacte est élargi à toutes les nations. Le 27 août 1928, le 'Pacte de renonciation générale à la guerre' – mieux connu sous le nom du Pacte Briand-Kellog – est signé par quinze pays à Paris. Soixante-trois états y adhéreront.

Vers une Europe unie?

L'idée d'une Société des Nations comme institution universelle semble s'évaporer dans la deuxième moitié des années vingt. Le discours d'Aristide Briand, le 5 septembre 1929, à Genève comme président du Conseil s'inscrit également dans cette lignée. Il y souligne qu'il 'doit exister une sorte de lien fédéral' entre les peuples d'Europe. Cette association doit surtout agir dans le domaine économique 'sans toucher à la souveraineté des nations'. Quatre jours plus tard, le 9 septembre, 27 états européens se réunissent à l'Hôtel des Bergues sur les bords du lac Leman. Certains représentants ont des doutes. Ainsi le délégué allemand pense que ceci pourrait nuire 'au caractère universel' de la Société des Nations. Pour le représentant anglais, l'existence d'une telle institution distincte de la Société pourrait inquiéter les Etats-Unis et l'Union soviétique. La réunion charge Briand d'élaborer un mémorandum, qui est envoyé aux représentants. Contrairement à l'enthousiasme initial, leurs observations sont pour la plupart négatives. Les débats lors de la séance de septembre 1930 est conforme à ces

réactions. Le changement du contexte économique et social à la suite du 'krach' à la Bourse de New York a radicalement changé le climat.

Une succession de malheurs?

Mais l'histoire de la Société des Nations n'est pas uniquement une succession de malheurs. Malgré sa position relativement faible, la Société des Nations obtient parfois des succès dans la résolution de conflits internationaux. La résolution du différend entre la Suède et la Finlande concernant les îles Åland en 1920-1921 ; la convention en 1922 dans le différend entre l'Allemagne et la Pologne concernant la Haute-Silésie ; l'action dans le conflit gréco-bulgare en 1925. Mais, dès le moment que l'un des 'puissants' membres de la Société des Nations est impliqué dans des conflits, la Société ne réussit pas à s'imposer. Ainsi, en 1923, dans l'affaire du Corfou où Mussolini vengea le meurtre des membres italiens en Grèce avec l'occupation du Corfou. Ou en 1931-1933, lors du coup de force de l'expansion japonaise en Mandchourie, lorsque la Société reste impuissante contre le Japon, membre permanent du Conseil depuis le début.

L'idéal de l'autodétermination des nations?

L'idéal de l'autodétermination et donc de l'égalité des nations a eu des conséquences inattendues. Plusieurs populations se sont référées à ces principes pour exiger leur indépendance : non seulement les Polonais, mais aussi les Egyptiens sous l'autorité anglaise, les Arméniens en Turquie, ... Car la Grande Guerre a remanié la carte de l'Europe. Dans le cas de la Sarre ou de la ville libre de Dantzig, la Société des Nations intervient activement. La Société se considère aussi comme le gardien des droits des minorités contenus dans les divers traités, en premier lieu dans les nouveaux états créés en Europe de l'Est. Pour optimaliser ce système, le Conseil de la Société des Nations institue en 1919 une 'Commission des nouveaux Etats et de la protection des

minorités'. Cette Commission est en outre compétente pour évaluer des pétitions en cette matière. Entre 1920 et 1939, elle traite non moins de 883 pétitions, dont 395 sont jugés recevables. Seulement six sont soumis au Conseil, qui dans quatre cas condamne des états pour des traitements des minorités non conforme. Les traités concernant la protection des minorités concernent pour la plupart des nouveaux états.

Les anciennes colonies de l'Allemagne et de l'Empire ottoman par contre restent soumises au contrôle de la Société des Nations. La Belgique, l'Empire britannique et la France exercent leur tutelle en qualité de mandataires et au nom de la Société dans le cadre d'une politique que 'le bien-être et le développement de ces peuples forment une mission sacrée de civilisation'. Les territoires sous mandat sont divisés en trois catégories 'suivant le degré de développement du peuple, la situation géographique du territoire, ses conditions économiques'. L'impact de cette approche d'un nouveau contrôle 'colonial' sur le Tiers Monde reste jusqu'aujourd'hui significatif.

Une réussite de l'œuvre technique

Dans les aspects 'techniques' de sa mission, la Société des Nations est bien plus performante. A la suite de l'article 23 du Pacte, la Société des Nations installe des organismes techniques : l'Organisation des communications et du transit ; des Commissions sur le contrôle de l'opium et des drogues nuisibles ; la Commission des questions sociales ; l'Organisation économique et financière ; l'Organisation d'hygiène ; l'Organisation de coopération intellectuelle ; le Comité pour la répression de la traite des femmes et des enfants ; le Comité pour la protection de l'enfance ; la Commission consultative de l'esclavage...

En outre, la politique de la Société des Nations envers les réfugiés reste une étape importante de l'histoire moderne. En 1920, la Société des Nations désigne le Dr. Fridjof Nansen, célèbre explorateur polaire norvégien, pour réaliser le rapatriement des prisonniers de guerre. De 1920 à 1922, 427.368 personnes appartenant à 26 pays regagnent leurs foyers. En juin 1921, Nansen est nommé Haut-Commissaire pour les réfugiés russes, titre qu'il change en 1923 en 'pour les réfugiés' à la suite des problèmes des réfugiés grecs et arméniens. Le 5 juillet 1922, il réussit à faire accepter par 53 états le 'passeport Nansen', lequel offre aux réfugiés des papiers d'identité reconnus. Après la mort de Nansen, en 1930, le Haut-Commissariat est transformé en Office internationale Nansen pour les réfugiés. La signature, le 28 octobre 1933, de la 'Convention relative au statut international des réfugiés', signifie le début d'une nouvelle ère. Ratifié par seulement huit pays - la Grande-Bretagne n'acceptant pas le deuxième paragraphe de l'article trois –, la Convention introduit le principe du non-refoulement dans les traités internationaux.

La fin de la Société des Nations : une tragédie grecque?

Dans le courant de 1938-1939, il semble que les Etats-Unis sont prêts de collaborer aux activités non politiques de la Société des Nations. Dès lors, le Conseil décide l'installation d'une commission sous la présidence de l'australien Stanley Bruce. Son rapport est publié en août 1939. Il recommande la création d'un 'Comité central des questions économiques et sociales'. Le 14 décembre, la vingtième Assemblée accepte cette recommandation. Un Comité d'organisation est créé pour implémenter cette décision. Ce Comité s'est réuni une seule fois, les 7 et 8 février 1940, et sans les Etats-Unis.

Quelques jours après la publication du rapport Bruce, le 1er septembre 1939, l'Allemagne nazie envahit la Pologne. La Grande-Bretagne et la France, qui avaient en mars 1939 encore garanti l'indépendance polonaise, exigent le retrait des troupes allemandes. Berlin refuse de satisfaire cette demande. La Seconde Guerre mondiale est un fait. En outre, l'Union soviétique attaque la Finlande le 30 novembre 1939. Le 3 décembre, le gouvernement légal de la Finlande demande la convocation du Conseil et de l'Assemblée. Unanimement, le Conseil demande l'Assemblée à élaborer dans le plus bref délai un rapport. L'Union soviétique ne participe pas aux débats. Le 14 décembre 1940, une résolution exclue la Russie de la Société des Nations. Ce pays s'en souviendra lors des discussions concernant l'avenir d'une coopération internationale après la guerre.

La Société des Nations continue néanmoins à fonctionner pendant la Seconde Guerre mondiale. En juin 1940, l'Université de Princeton, l'Institute of Advanced Study et le Rockefeller Institute for Medical Research invitent le Secrétariat à transférer les services techniques à Princeton. Le nombre de fonctionnaires du Secrétariat à Genève est fortement réduit. Le 25 juillet 1940, le Secrétaire-général Avenol annonce sa démission. Le jour suivant, il demande Sean Lester de fonctionner comme 'Secrétaire général par intérim'. Cette situation ambiguë ne se résout qu'un mois plus tard, lorsque Avénol démissionne effectivement. Le 1er septembre, Lester est officiellement nommé Secrétaire-général. Si le nombre de membres de la Société des Nations reste oscillant entre 50 à 44 pendant les années 1939 et 1945, il n'y a que peu d'états qui participent activement à ses travaux.

De la Société des Nations aux Nations Unies

Déjà avant l'attaque de Pearl Harbour en décembre 1941, le président américain Franklin D. Roosevelt et le premier-ministre de la Grande-Bretagne Churchill ont dessiné les lignes de force de la politique internationale d'après-guerre. Finalement, la 'Charte Atlantique', signé le 14 août 1941, joint fortement les idées de Woodrow Wilson : l'autodétermination et l'égalité des états, l'accès libre des mers, le désarmement, la coopération économique, le maintien de la paix. Ces principes sont confirmés dans la 'Déclaration des Nations unies' signée le 1er janvier 1942 à Washington, D.C. par les Etats-Unis et 25 nations qui s'engagent à poursuivre ensemble la guerre contre les puissances de l'Axe. Afin d'éviter les fautes du passé, Roosevelt engage une grande partie de l'administration et des élus dans la construction de paysage international d'après-guerre. Un 'Special Subcommittee on International Organization' est créé dans l'Advisory Committee on Postwar Planning pour aviser le Congrès. Il recommande le remplacement de la Société des Nations par une nouvelle organisation plus efficace. Le secrétaire d'état Cordell Hull, adversaire du régionalisme, tente d'obtenir le soutien dans le Congrès de républicains et des démocrates pour une telle organisation. A la suite de conférences entre le Congrès et le 'Department of State', un projet de charte des nations unies est rédigé. Le 30 octobre 1943, la Chine, les Etats-Unis, la Grande-Bretagne et l'Union soviétique affirment dans la 'Conférence de Moscou' la nécessité pour maintenir la paix de l'organisation d'une institution internationale, basée sur l'égalité des états pacifiques. Lors de la Conférence de Téhéran, fin 1943, le principe de Nation Unies pour le maintien de la paix est confirmé. Le projet de la Charte des Nations Unies, préparé au cours d'une conférence à Dumbarton Oaks en septembre-octobre 1944 par les experts des Etats-Unis, de la Grande-Bretagne, de l'Union soviétique et de la Chine, indique que "l'Organisation devrait faciliter la solution des problèmes internationaux dans les domaines économique et social, ainsi que d'autres

problèmes humanitaires, et favoriser le respect des droits de l'homme et des libertés fondamentales". La Conférence de Yalta, en février 1945, prévoit une conférence concernant les Nations Unies à San Francisco fin avril 1945.

En guise de conclusion: la Société des Nations est morte, vive les Nations Unies

Tout comme lors de la création de la Société des Nations, la Belgique et les autres 'petites puissances' tentent en vain, lors de la Conférence de San Francisco, de limiter les pouvoirs des 'grandes puissances'. Mais aussi bien les Etats-Unis que l'Union soviétique considèrent le droit de veto comme un élément essentiel pour leur adhésion à la nouvelle organisation. Constat assez étonnant : la Charte de l'Organisation des Nations Unies ne fait aucune référence à la Société des Nations. Une délégation de cette organisation, dont le Secrétaire général Lester, ne joue aucun rôle officiel lors des discussions à San Francisco. Lester quitte même la Conférence avant la fin des discussions et sans avoir été entendu. Néanmoins, un Comité préparatoire des Nations Unies, institué le 26 juin 1945, reçoit comme mission d'étudier le sort des fonctions et pouvoirs attribués à la Société des Nations par des traités internationaux, ses fonctions et pouvoirs techniques et non-politiques, ainsi que le transfert des biens de la Société aux Nations Unies.

Avec l'entrée en vigueur de la Charte de l'Organisation des Nations Unies, l'on se trouve dans une situation où deux institutions internationales ayant les mêmes buts, coexistent. Plusieurs états font partie des deux organisations. Le 20 septembre 1945, le Secrétaire-général Lester propose les membres de la Société des Nations de tenir une dernière Assemblée. Celle-ci décide, le 18 avril 1946, la dissolution de la Société des Nations.

Bien que fortement tombé dans le discrédit, la Société des Nations tient un rôle fondamental dans le développement des relations entre les états. Celles-ci sont depuis la création de cette institution, imprégnée par les activités des organisations internationales. Et si, lors de la création de la Société des Nations à Paris en 1919 il n'y a qu'un pays non-européen qui participe aux discussions – les Etats-Unis -, on constate que lors des négociations de l'Organisation des Nations Unies, il n'y a qu'un pays européen – la Grande-Bretagne – qui est présent au débat. Il est évident que le centre du monde s'est déplacé de l'ancien continent vers le nouveau monde.

Laudatio Jean Jacques Delaey

P. Kesteleyn

Laudatio Jean Jacques Delaey

P. Kesteleyn

Prof. De Laey is born in Bruges in 1940. He graduated in medicine at the University of Ghent in 1966. He completed his residency in the department of ophthalmology under Professor Jules Francois and became an ophthalmologist in 1970. He joined the department in 1971 as a junior staff member. Professor Francois encouraged his young co-worker to explore the potential of a new technique: fluorescein angiography and introduced him to Pierre Amalric from Alby, France, not only a pioneer in the field of fluorescein angiography, but also the proud owner of a magnificent collection of historical ophthalmology books, which must have given added value to a training in Alby. He successfully introduced the new technique in our department and the rest is history: in 1976 Prof. De Laey was secretary of the organizing committee of the International Symposium on Fluorescein Angiography held in Ghent that same year. He became an active member of the FAN Club, the European Fluorescein angiography club and the founding father of the FAB Club, The Belgian Fluorescein Angiography Club. The explosion of knowledge gained from the new technique led to the creation of a new and distinct subspecialty in ophthalmology: medical retina. Prof. De Laey would become the indisputed leader of this field in Belgium.

He defended his thesis successfully in 1978 and it was published in book form in 1979 with as title: "Fluoroangiographic study of the choroid in men"

Two years later, in 1979, he became professor in Ophthalmology, in 1987 full professor and in 1988 senior full professor at our university. In 1980 he succeeded to Professor Francois as director and chairman of the department of ophthalmology. It was, as he states himself, a prestigious but difficult heritage.

It is well known that administrative skills are one of his many talents and therefore he became a welcome board member, secretary, or president of many societies, councils, and committees both nationally and internationally. His CV mentions not less than 34 such mandates, some of them mainly honorary, most of them implicating huge responsibilities and a heavy workload. Let me just cite a few of them:

- medical director of the University Hospital from 1991 to 1999, a job he describes himself as the right punishment for someone guilty of the vilest crimes
- President of the European Board of Ophthalmology from 1994 to 1996
- Member of the "Hoge Raad van geneesheren –specialisten en huisartsen, from 1997 on
- External examiner for the Royal college of Ophthalmology of Ireland
- President of the Standard Committee of the International Council of Ophthalmology from 2002 to 2006
- Program Secretary of the European association for Vision and Eye Research, EVER, from 1999 to 2004

Professor De Laey was the organizer or member of the scientific committee of 24 Symposia, Courses and Conferences in Belgium and abroad. Ghent hosted several prestigious conferences thanks to his efforts: the Conference of the International Research group on Colour Vision Deficiencies in 1997, the Michaelson Symposium in 2005 and the EUPO course on Retinal Diseases in 2006.

The EUPO course which he organized three times, exemplifies his role as a teacher. Professor De Laey's enthusiasm for teaching is reflected by the fact that he gave more than 120 lectures in Belgium and more than 240 lectures abroad, in every continent of the world, underscoring his international reputation in medical retina.

Chairman, administrator, organizer, teacher, but also prolific scientific writer.

Professor de Laey contributed as author or co-author to five books, among them a classic work on vascular tumours and malformations of the Ocular Fundus in collaboration with Professor Hanssens. He has published more than 260 papers in peer reviewed journals, mainly on retinal disorders. He was a precursor in the use of indocyanine green angiography in the mid- eighties and the first papers on this subject published with Dr. Hayashi from Japan already belong to the history of our specialty. To his scientific credit we must add that his was managing Editor of the Journal International Ophthalmology from 1978 to 2000 and member of the editorial board of 10 other ophthalmology journals.

Professor De Laey also stimulated and guided others to do scientific work: he was the promotor or copromotor of 11 doctoral theses. Seven of these were written by former or present staff members. Needless to say that he acted as an extramuros member of many theses in Belgium, France and the Netherlands.

Such a broad range of responsibilities and activities inevitably resulted in a number of honours and awards. Let me just cite a few. Professor De Laey delivered the Montgomery Memorial Lecture in Dublin, The European Guest Lecture in Oxford, and the Saudi Ophthalmological Society Gold medal lecture. He is honorary fellow of the Royal College of Ophthalmologists of the United Kingdom and of the college of Ophthalmologist of South Africa. He is an honorary member of the Club Jules Gonin and of the Instituto Barraquer. Last year he was the recipient of the Donders Medal, the most prestigious international honour given by the Ophthalmological Society of the Netherlands. Professor De Laey retired in 2006 but ophthalmology did not disappear from his life as he got elected secretary-general of the International Council of

Ophthalmology. It is an honour for Belgian ophthalmology to have our “éminence grise” in such an important position.

Professor De Laey is a compulsive reader of non-fiction and his interests range from linguistics to geography, politics, and of course history. His knowledge of medieval history is legendary and on several occasions he has combined his interest in ophthalmology with his passion for history. At the occasion of the biannual scientific reunion of the former residents of our department in 2005, professor De Laey gave a wonderful overview of the development of ophthalmic care in Ghent from the nineteenth century till today that started with a discussion of the importance of the struggle against trachoma, the so called “ophthalmie militaire”, and its role in the development of the ophthalmic care system in the Netherlands and Belgium as well as in the whole of Europe. In 2007 he delivered a prestigious keynote lecture at the EVER meeting (European Association for Vision and Eye research) on the history of the ophthalmoscope. For this audience it might be of interest to mention that these two topics, l’ophtalmie militaire and the use of the ophthalmoscope invented and introduced by Helmholtz in 1851, were the official subjects of the first international conference in ophthalmology held in 1857 in Brussels. The third topic of the conference addressed the mechanism of accommodation discussed at the conference by Cornelius Donders himself.

I believe it is clear that Professor De Laey has the right credentials to deliver this Sarton lecture and it is my privilege to introduce him. His lecture will scrutinize Vesalius' understanding of the eye and the visual pathways and we are all anxious to hear how Vesalius, a giant in the history of Belgian medical science, stands up against the critical reading of a contemporary expert.

The eye in Vesalius' works.

J. Delaey

The eye in Vesalius' works.

J. Delaey

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Summary

In the times of Vesalius, the knowledge of ocular anatomy was limited. Probably the first description of the anatomy of the eye is due to Democrites, for whom the eye is surrounded by two coats, filled with a homogenous fluid. The optic nerve is hollow and the lens is considered to be a postmortem artefact. Till the 15th century AD medicine will be influenced by Galenus' writings and the model of the eye which he proposes will still be considered valid even after the time of Vesalius. Following the Alexandrian tradition the lens is considered as the seat of visual perception. Whereas Vesalius rightly deserves the title of Father of Modern Anatomy, his description of the ocular anatomy is rudimentary and often incorrect. He still describes a Musculus retractorius bulbi, which is only found in lower mammals but not in primates. The lens, of which he correctly recognizes the role as an optical device is placed too centrally in the eye. The optic nerve is not correctly placed and following Galenus, he only describes seven cranial nerves. The Galenian concept of ocular anatomy will last till the discovery of the microscope by Anthony van Leeuwenhoek and modern ocular anatomy will in fact only start with the works of Zinn.

Introduction

Ophthalmology is one of the eldest medical specialities. Iry is the first ophthalmologist whose name was recorded. He lived during the 6th dynasty (about 2400 BC) and his tomb was found near the pyramid of Cheops. Iry's title was "royal oculist and shepherd

of the rectum". A number of ocular diseases are described in the Edwin-Smith papyrus (1800 BC) now in the library of the New York Historical Society. The Ebers papyrus which was found in 1862 between the legs of a mummy and is now owned by the University of Leipzig only contains no anatomical references except that the blood of the eyes is supplied by temporal vessels. It discusses a number of ocular diseases such as blepharitis, chalazion, ectropion, entropion, trichiasis, pinguecula, leucoma, staphyloma, iritis, cataract, dacryocystitis and ophthalmoplegia.

In the Codex Hammurabi (about 1800 BC) the fee for ocular surgery is indicated. To operate on a free man, the ophthalmologist was entitled to ask the considerable sum of 10 silver shekels (about the annual salary of a workman), for a poor 5 and for a slave 2 shekels. However if the patient lost his eye after an unsuccessful operation, the surgeon was penalized by having his hand cut off. Possibly this punishment was inflicted not on the surgeon himself but on one of his slaves. If the eye of a slave was lost, the surgeon had to replace the slave.

Ocular anatomy before Vesalius

Democrites (ca 460-370 BC) gave probably the first anatomical description of the eye. He describes two coats, the eye is filled with a homogenous fluid, there is no lens and the optic nerve is hollow. Alcmaeon of Croton (500 BC) is considered to have given the first description of the optic nerve, indicating that it is connected to the brain. For him the brain and not the heart is the seat of the soul and also the organ of movement and sensation.

Hippocrates of Cos (ca 460-375 BC) is considered as the father of medicine. He insisted on careful observation of the patient. He probably was the first to describe what would later be called Behcet disease and notes the cardinal symptoms of the disease: fever, aphths in mouth and genitalia, joint and ocular inflammation.

No dissections were performed in the early Greek period as they had a reverence for the dead body which needed a proper burial.

Aristotle (384-322 BC) probably dissected animal eyes. He describes the eye as a spherical organ with 3 coats filled with a homogenous fluid. The eye is in contact with the brains by means of three tubes, of which one is in contact with a similar tube originating from the other eye. This could be the first observation of the optical chiasm. The two other tubes represent possibly bloodvessels and the trigeminal nerve. The lens is considered as a postmortem artefact, due to the accumulation of phlegma.

In Alexandria dissections were performed on convicts and the anatomical knowledge of the Romans is based on the Alexandrian school. The Romans were quite superstitious and thus dissection of the human body was for them unthinkable.

Aurelius Cornelius Celsus (25 BC-50 AD) lived under the emperor Tiberius. His description of the ocular anatomy is probably based on papyrus from the Alexandrian Library. Celsus describes three ocular coats and the lens (crystalloides), which is still considered as the seat of visual perception. For the first time the anterior chamber (*locus vacuus*) is mentioned as well as the vitreous body.

Rufos of Ephesus (98-117), a contemporary of the emperor Trajan mentions a fourth ocular coat, the conjunctiva which he calls "epidermis". He distinguishes the anterior chamber filled with an aqueous fluid from the posterior segment of the eye, which contains a substance resembling white of an egg.

Claudius Galenus (130-200) is the best known physician in the roman period and his writings will be considered as the essential of medicine till the period of Vesalius. Galen originated from Pergamon, studied in Alexandria and became physician of the emperors Marcus Aurelius and Commodus. His writings on ophthalmology are lost although his description of ocular anatomy survived. He considers seven coats: the conjunctiva which for him is an extension of the periost of the orbit, the ocular muscles

and their tendons, the sclera, the choroid, the retina, the vitreous body and the crystalline lens. The corneoscleral limbus is the junction of choroid and retina. The optic nerve is hollow, allowing the passage of pathological humours which provoke ocular diseases. There are 7 ocular muscles, including the M.retractor bulbi, which is only found in lower mammals. It is worth noting that Vesalius will not rectify Galen's mistake. The retina is an extension of the optic nerve which nourishes the vitreous and through the vitreous the crystalline lens. The lens (*divinum oculi*) is considered as the center of visual perception. Visual corpusculi or emanations are sent from the lens to the object which is looked at and return via the lens to be transported through the hollow optic nerve to the third ventricle of the brain where the soul is located.

After Galen starts a period of scientific inertia especially in Western Europe. The burning of the Alexandrian Library in 641 resulted in the loss of a mass of knowledge, fortunately partially transmitted by the Arabs to the West through the schools of Toledo and Salerno. Rhazes (Al Razi, 865-925) describes the reaction of the pupil to light. The mathematician Alhazen (Ibn Al Haitham, 965-1038), who worked in Cairo, dismissed the corpuscular emission theory of vision

Averroes (Ibn Rushd, 1126-1198), wrote extensively on optics and suggested that the retina and not the crystalline lens was responsible for vision..

A few schematic descriptions of the eye are known, especially from Alhazen and from Hunain Ibn Ishak. They are still based on the Galenic concepts: the optic nerve is hollow, the crystalline lens, which is considered as the most essential part of the eye is centrally located and connected to the optic nerve. Cataract is considered to be a corrupt humour in front of the lens, and could thus not be located immediately behind the iris.

The ophthalmological treaties written during that period in the West are far from original. Peter the Spaniard who will be the only ophthalmologist to become a pope (John XXI,

1210-1276) wrote the “Liber de oculo”. The most popular work on ophthalmology in those times is the “Practica oculorum” of Benvenutus Grassus (or Grapheus).

Even Roger Bacon (1214-1294), a franciscan and philosopher, still considers the crystalline lens as the site of visual perception. The optic nerve is hollow as the visual spirit or pneuma passes through it.

The most reknown surgeon of his time, Guy de Chauliac of Montpellier, wrote in his “Chirurgia Magna” : “I am not interested in knowing whether the cataract is present between the cornea and the iris , as Jesus proves, or between the aqueous and the lens as Galen pretends”. This sentence illustrates the total lack of scientific interest of even the most famous physicians in the Middle Ages.

Leonardo da Vinci (1452-1519) adheres to the old anatomical description of the eye, but for one point. The lens is no more responsible for visual perception. He describes the double refraction of the light by the cornea and by the crystalline lens which then reaches the optic nerve. The lens in his drawing, is relatively too large and centrally located , the optic nerve is hollow and connected to the third ventricle. Leonardo could have been the first to consider a technique of fixation of ocular tissue. He proposes to place the eye in white of egg and then boil it, so that it would be easier to dissect.

Vesalius and the eye

Vesalius rightly deserves the title of father of modern anatomy. Andreas van Wesel was born on December 31, 1514 in Brussels. The family with the name Wytinck originated from Wesel in the duchy of Cleves and had close links with the court. Vesalius great-grandfather Johannes obtained his medical degree in 1427 at the University of Padua and was appointed as professor of the recently created University of Louvain in 1429. In 1449 he became the city physician in Brussels. The emperor Frederic III delivered him a coat of arms with three weasels. This coat of arms is to be seen on the frontpage of the

Fabrica. Johannes' eldest son Everaert studied medicine in Louvain and became physician to the Emperor Maximilian of Austria. He did not marry but had a number of illegitimate children, one of whom was Andries, who became an apothecary and worked for Margaretha of Austria and later for Charles V.

Andreas Vesalius started his medical studies first in Louvain and later in Paris where he became a pupil of Jacques du Bois (Jacobus Sylvius) and of Johann Günther d'Andernach. In Paris, Vesalius performed his first public dissection, and in contrast with was usual in those days, where the teacher supervised, sitted on his catheder, the dissection done by an assistant, he and not an assistant, did the job.

He returned to Louvain where he studied further one semester and left in 1537 for Padua. On the 5th of December 1537 he obtained his doctoral degree "cum ultima diminutione": This "diminutione" means that because of the excellence of his defence he only had to pay a markedly reduced fee of 17 ½ ducats for the diploma. One day after graduating he was appointed as professor of anatomy and of surgery at the University of Padua. He immediately started to work as the same semester he obtained a corpse for dissection. Already in Paris but even more in Padua, Vesalius realized that Galen's anatomy was based on the dissection of animals and did not necessarily correspond to the human anatomy. In Paris he had the opportunity to collaborate with Günther van Anderach at a new edition of Galen's "Institutiones anatomicae". In Padua he will further adapt this work for his students and include own drawings but also illustrations of his friend Jan Stevens van Calcar, a former pupil of Titian. This work is entitled "Tabulae Anatomicae Sex". Calcar most probably also produced the frontpage of the "De Humani Corporis Fabrica Libri Septem" and drew the skeletons. A portrait of Vesalius painted by Calcar is to be seen in the collections of the Hermitage in St Petersburg. The Fabrica, dedicated to the Emperor Charles V, is published in Basel by Vesalius' friend Johannes Oporinus in 1543. There is also a shorter (and less expensive) version for students and

artists: the “Epitome”, dedicated to Philips II of Spain, Charles’ son. The *Fabrica* becomes a bestselling book. However Vesalius’ corrections of some of the errors he had detected in Galen’s work were not unanimously accepted and some, among them his former teacher Sylvius will heavily criticize Vesalius for daring to contradict the unfailing Galen. As a reaction to Sylvius’ criticism Vesalius will write the “*Epistola rationem modumque propinandi radicis Chynae*”. In fact this letter to Joachim Roelants, physician to Margaretha of Austria, who asked him about the use of the china root gives the opportunity to Vesalius to respond to Sylvius’ accusations. Meanwhile Vesalius had become physician to the Emperor and later to his son Philips II and had thus to live in Brussels.

He will have the opportunity to visit Padua again where his pupil Colombo had succeeded him. In 1550 Vesalius is sent by Philips II to Paris where King Henri II had been fatally injured by the earl of Montgomery during a tournament. There Vesalius meets Ambroise Paré. After the death followed by the autopsy of Henri II he will return to Brussels. He will accompany King Philips to Madrid but is not particularly well received there. His autopsies provoke marked criticisms. Possibly to escape from this animosity, but also possibly by order of the Inquisition or even by pure religious believes, Vesalius undertakes a pilgrimage to Jerusalem. He certainly obtained the permission to leave Madrid from Philips II as he was entrusted by him of a sum of 500 ducats to be given to the guardians of the Holy Places. He will receive a letter of thanks addressed to Philips, which is a clear indication of his intention to return to Madrid and not to accept the chair in Padua, left vacant by Fallopio death as had been proposed. During the return journey the boat on which he sailed was struck by a heavy storm near the Greek island of Zanten. Probably Vesalius did not drown. He nevertheless died on the 15th October 1564 on the island of Zanten, possibly from typhus.

Vesalius was a true innovator and the quality of his' anatomical descriptions especially of the skeleton and of the muscles introduced a new era. In sharp contrast with this is his limited contribution to ocular anatomy. In the sixteenth century there were no adequate fixation techniques and the instruments at his disposal did not allow minute dissections. He follows Galen in his description of the extra-ocular muscles and still mentions the *musculus retractorius*, which is only to be found in lower mammals. He also adheres to Galen's classification of 7 pairs of cranial nerves:

- I Nervus Opticus
- II Nervus Oculomotorius
- III Sensible branch of the Trigeminal nerve and N. Trochlearis
- IV Motor branch of the Trigeminal nerve
- V Facial acoustic complex with the N. Abducens
- VI N.Glossoparyngeus
- VII N.Vagus

The crystalline lens is still placed in the center of the eye. He however recognizes the optical role of the lens "quodammodo ad lentis similitudinem". He also shows that the anterior lenscurvature differs from the posterior curvature but considers both as separate parts. He points out that the colour of the iris is due to irispigmentation and not to the aqueous humour. The ciliary body is described as follows "Tunica ab uvea unitatem ducans, cili i seu palpebrarum pilis imagine correspondens ac interstitium pariter vitrei humoris ab aquo" (A tunic starting from the uvea and with an aspect corresponding to eyelashes or eyelid hair as well as interspaces dividing equally the vitreous and the aqueous". That description could indicate that he noticed the ciliary processes and the zonular fibers, unfortunately his drawing is unclear in that respect. The retina is described as "Tunica quam reti assimilamus quamqui resoluta visorii nervi efficit substantia" (A tunic which we compare to a net which is detached from the

substance of the optic nerve). Vesalius' optic nerve is nor more hollow as was the opinion of previous anatomists including Jan Yperman and da Vinci, but is still located exactly opposite to the center of the cornea.

Vesalius' anatomic studies of the eye does not match his other achievements. He remains in the Galenic tradition and we will have to wait till the 18th Century for an adequate ocular anatomy.

Ocular anatomy after Vesalius

Vesalius will be plagiarized without any scruple and his description of the ocular anatomy (with an identical drawing of the eye) will be used by Felix Platter in his "De Corporis Humani Structura" published in 1583 by Oporinus. Platter reiterate the opinion which was introduced 4 centuries before by Ibn Rushd that the retina and not the crystalline lens was the place where visual stimuli were processed.

Whereas Galen considered that the conjunctiva was an extension of the orbital septum Giacomo Berengario (1470-1530) showed it to be a separate structure. Gabriele Fallopio (1523-1563), who became professor of anatomy in Padua after Vesalius and Colombo, denies the existence of a musculus retractorius bulbi in humans. He also describes the M.Levator Palpebrae, gives a more correct description of the Mm.Obliqui and adds the Trochlear nerve to Galen's 7 cranial nerves. Georg Bartisch (1535-1606) oculist and lithotomist from Dresden is the author of the first book on ophthalmology written in German, "Ophthalmodouleia, das ist Augendienst" published in Dresden in 1583. It contains a number of colourful illustrations and descriptions of a series of eye diseases and of ocular surgical procedures. He remains however highly superstitious. Ocular surgery is best performed under the following constellations: balance, sagittarius or aquarius. In case of emergency one can also intervene under the constellations of virgo, scorpio or pisces. His book contains remarkable drawings of the eye and of the

brain, with consecutive sheets which can be flipped over so to discover the various structures layer by layer. The lens is situated more anteriorly than for Vesalius. According to Bartisch the crystalline lens contains fluid surrounded by arinea. He still describes the M.retractorius bulbi raound the optic nerve and seems not to know the chiasm, already mentionned by Aristotle.

Hieronimus Fabricius ab Aquaponte (1537-1619) disciple and succesor of Fallopio, will show the correct location of the crystalline lens. We will have to wait till 1619 for the first more or less acceptable diagram of the eye. Christophorus Scheiner (1575-1650) a jesuite priest shows that the radius of the cornea is smaller than the radius of the sclera, places the lens where it belongs and moves the optic nerve to the nasal side.

Frederik Ruysch (1638-1731) is the first to use injection techniques to study the ocular vessels and describes the central retinal artery and the vortex veins.

Antony van Leeuwenhoek (1638-1731), the inventor of the microscope discovers the corneal epithelium and could be the first to have seen rods and cones in the retina uitvinder van de microscoop, ontdekt het cornea epitheel en de lensvezels en zou als eerste ook staafjes en kegels gezien hebben in het netvlies.

Antoine Maître-Jean (1650-1730) and François Pourfour du Petit (1664-1741), two french scientists will demonstrate the lamellar structure of the lens and the latter will introduce frozen sections which allow a more correct representation of the ocular tissues. The posterior chamber is noticed for the first time.

The true father of ocular anatomy is however Johann Gottfried Zinn (1727-1759). Zinn studied anatomy and botanic in Göttingen and Berlin en becomes professor at the medical faculty of Göttingen in 1753 where he will also be the director of the botanic garden. His reputation as a botanist is suggested by the fact that Linnaeus named the genus *Zinnea* after him. In his "Descriptio Anatomica Oculi Humani" published in 1755 Zinn describes layer by layer the various ocular structures. The ocular muscles are

correctly reproduced. Zinn introduces the term of ciliary processes, describes the zonular fibers and the bloodvessels around the optic nerve head. Three ocular structures are named after him: the zonula of Zinn, the annulus tendineus of Zinn and the circulus of Zinn. This clearly indicates the importance of this brilliant anatomist who died in 1759 at the young age of 31 years. Further scientists who continued the work of Zinn and his predecessors are Fontana, Cloquet, Schlemm, Bowman. The improvement of fixation and coloration techniques by Purkinje, the invention of the microtome, of phase contrast microscopy, of polarization microscopy and finally of electronmicroscopy will lead to our actual knowledge of the anatomy and the histology of the visual system.

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Laudatio Yannick Lemarchand

I. De Beelde

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The 2008 Sarton medal is awarded by the Faculty of Economics and Business Administration to Prof. Dr. Yannick Lemarchand of the University of Nantes.

This distinction is awarded to Prof. Lemarchand for his contributions to the study of the history of accounting.

Prof. Lemarchand received his Masters degree in Economic Sciences in 1969. Two years later, he obtained an additional degree in Logic, Epistemology and History of Science and Technology. He started his academic career as a lecturer in the University of Nantes. After successfully defending his doctorate in 1993 at the University of Paris XII and passing the *aggregation*, the French state exam that one has to pass before becoming a university professor, in 1995, he became a professor in the Faculty of Law and Economic Sciences at the University of Brest. From 1998 until now, Prof. Lemarchand is professor at the Faculty of Economics and Business Sciences at the University of Nantes.

His teaching interests include accounting, corporate finance, business history and the history of accounting and management. He has held teaching positions at the universities of Rennes, Nantes and Paris Dauphine. He also has been visiting professor at the universities of Burgos and Seville in Spain.

Between 2002 and 2005 he directed the Management Research Centre Nantes-Atlantique (*Centre de Recherche en gestion Nantes-Atlantique*), a research centre of the University of Nantes that includes 10 professors, 22 senior lecturers and 32 doctoral students. In the same period, he also was the head of the Doctoral School in Law and Economics, coordinating 10 doctoral programmes with a total of 360 students defending their PhD's.

His most recent position is directing the Social Sciences and Humanities Research Institute of Nantes, the *Maison des Sciences de l'Homme Ange Guépin*, from July 2005 onwards. It is an independent institution that develops research activities that adopt an

interdisciplinary perspective, combining diverse fields of study such as law, sociology, geography, languages, psychology, economics and management sciences. It is active on the national French level, but also on the international level.

Prof. Lemarchand served or serves on the editorial boards of the *European Accounting Review*, *Accounting, Business and Financial History*, *Accounting Historians Journal*, *Comptabilité-Contrôle-Audit*, *Contabilità e Cultura Aziendale*, *De Computis (Revista Espanola de Historia de la Contabilidad)* and *Histoire et Mesure*. He published or contributed to 6 books and 35 articles.

Prof. Lemarchand is today with us for his work in the field of accounting and management history. Accounting history is a field of study that is currently only marginally present in many of the major international accounting journals. This has been different in the past: *The Accounting Review*, e.g., has published many papers discussing the development of accounting standards and practices and in this way providing input for the development of accounting concepts that are underlying accounting theory. However, the mainstream journals are currently strongly driven by empiricist approaches to accounting and history papers are nowadays mainly published in specialist journals and in a limited number of generalist journals, such as the Australian-based *Abacus* or the UK based *Accounting and Business Research* and *Accounting, Organizations and Society*.

In this context the number of academic accounting history scholars is rather limited in most countries. However there are a few exceptions. In the UK, there is a very active group of researchers, mainly linked to the University of Cardiff in Wales. Also in Spain, the number of accounting academics with a historical perspective is larger than in most countries, partly because of the existence of exceptional archival sources. The third country where there is a rather large group of accounting historians is France. We could even say that there is an active French accounting history school, and Yannick Lemarchand has played an essential role in the establishment of this school. He has been an active member of the scientific committees and the board of the *Association Française de Comptabilité*, the organisation of the French accounting professors with over 200 members. On a wider field, he was the initiator of the transformation of the AFC into the *Association Francophone de Comptabilité*, opening the association to French-speaking accounting academics from all over the world. On accounting history,

he took the initiative in 1995 to organise an annual conference on accounting history, the *Journées d'Histoire de la Comptabilité et du Management*. This successful event not only brought together French accounting history scholars, but also served as a meeting point between French, UK and US academics. Since a few years, Yannick also played an important role in broadening these events from the more narrow accounting perspective, mainly attended by academics coming from economics and business studies departments, to a wider managerial focus, establishing links with business historians rooted in the history departments of the universities.

In 1995, Prof. Lemarchand acquired, on behalf of the University of Nantes, the important collection of old accounting books and manuscripts of the Belgian accounting historian Ernest Stevelinck. This is probably the most important collection in continental Europe and has since been enlarged through donations and acquisitions.

Internationally, Prof. Lemarchand served as convenor for the 11th World congress of Accounting Historians in 2006, an event attended by 160 academics from 20 countries. He received the Basil Yamey price 1994, the Manuscript Award 2002 from the Accounting History Special Interest Group of the Accounting Association of Australia and New Zealand, and was awarded the Hourglass Award of the (American) Academy of Accounting Historians in 2000, for his contribution to the study of the history of accounting.

One of the contributions of Yannick Lemarchand to the study of accounting history relates to the debate on the relation between accounting and the genesis of capitalism. Contrary to Sombart, who considered capitalism and double-entry bookkeeping as 'absolutely in dissociable', Prof. Lemarchand found that at least up to the 19th century, capitalist enterprises actually used two types of accounting: double-entry bookkeeping and a 'financial' system based on the accounting practices of landowners that made traceability of capital flows difficult. This coexistence led to hybrid vocabulary and practices and accounting thought was probably influenced by the merchants' practical experience and their perception of the different uses for certain expenses. Other work focused on the development of cost and management accounting, e.g. drawing attention on the military origins of French management accounting. Yannick Lemarchand also published articles on the role of individuals who contributed significantly to the development of French accounting, such as Emile Rimailho, Jacques

Savary and Mathieu de la Porte. His most recent work includes an analysis of accounting for the slave trade and a French perspective on international accounting congresses.

**Compter, rendre compte et
contrôler; regards sur cinq
siècles d'histoire de la
comptabilité**

Y. Lemarchand

Compter, rendre compte en contrôler; regards sur cinq siècles d'histoire de la comptabilité.

Y. Lemarchand

Université de Nantes

J'ai cru comprendre que la plupart d'entre vous n'étaient guère familiers avec la comptabilité et je tenterai donc d'être le moins technique possible, bien qu'il me faille néanmoins vous parler de l'histoire d'une technique. En toutes hypothèses, avant d'évoquer le moindre aspect technique, il me faut vous expliquer pour quelles raisons j'ai choisi d'évoquer aujourd'hui cinq siècles d'histoire de la comptabilité, et pourquoi pas quatre ou six ou bien davantage ? Cela me permettra également de préciser quelques unes des raisons qui font que je suis tout particulièrement honoré que ce soit votre université, c'est-à-dire une université flamande, qui me décerne aujourd'hui une récompense pour mes travaux sur l'histoire de la comptabilité.

Si donc j'ai choisi cinq siècles, alors que l'on dispose d'archives comptables beaucoup plus anciennes, voire millénaires, c'est parce que le premier traité imprimé de comptabilité, le *Tractatus de computis et scripturis* du moine mathématicien Luca Pacioli (1494) a été publié à Venise en 1494. Or si cette publication marque le début d'une diffusion élargie d'une technique née en Italie du Nord, issue d'un lent processus de maturation mais déjà vieille de plus d'un siècle — la partie double — on remarquera qu'elle suit de deux années, seulement, la découverte du continent américain et précède de trois le contournement du Cap de Bonne-Espérance. La modification des courants d'échanges induite par ces découvertes maritimes va provoquer le déplacement du centre de gravité du capitalisme de l'Italie vers le Nord : de Venise et Florence à Anvers, puis à Amsterdam. En vérité, il est frappant de constater que c'est

au moment où l'Italie perd sa suprématie commerciale, que la plus perfectionnée des techniques patiemment élaborées par ses marchands se trouve être mise à la disposition de ses concurrents.

Et c'est précisément à partir de la Flandre que cette technique va se diffuser en Europe par le biais du livre. En effet, en dehors de quelques rares auteurs, continuateurs de l'œuvre de Pacioli, la littérature comptable italienne ne produira guère d'ouvrages dignes d'intérêt avant le milieu du XIX^e siècle. La plupart des perfectionnements pratiques et doctrinaux qui interviendront à partir du XVI^e siècle, proviendront d'abord des auteurs flamands, puis des britanniques et des français.

Les Pays-Bas du moment et plus particulièrement la Flandre, furent parmi les premiers à utiliser la nouvelle technique italienne. En 1543, Iehan Ympyn Cristophle, qui avait passé une douzaine d'années à Venise publia à Anvers une traduction adaptée de l'ouvrage de Pacioli (Ympyn, 1543), que sa veuve traduisit en français et dont une version anglaise dont le traducteur demeure inconnu fut également en 1547. Iehan Ympyn joua donc un rôle clé dans le processus de diffusion de la comptabilité en partie double en Europe. Dans la longue liste des auteurs flamands de traités de comptabilité, on ne saurait oublier le mathématicien brugeois Simon Stevin (1548-1620) qui, parmi ses nombreux écrits a laissé un *Livre de compte de prince à la manière d'Italie, en domaine et finance extraordinaire* (Stevin, 1608), dédié au prince Maurice de Nassau et dont je reparlerai un peu plus tard. L'éminent historien des sciences Georges Sarton, au nom duquel vous me décernez aujourd'hui une récompense, en a d'ailleurs livré une description dans un long article qu'il a consacré à Simon Stevin et à son œuvre (Sarton, 1934).

Plusieurs ouvrages comptables sont sortis des presses de l'imprimeur anversois Plantin, notamment le premier traité français de tenue des livres en partie double, celui de Pierre Savonne (1567). Si je le mentionne, ce n'est pas pour la simple raison qu'il fut

écrit par un français, un français dont il est facile de deviner qu'il était d'origine italienne, mais du fait que grâce aux archives comptables de la maison Plantin, nous connaissons le coût de production de cet ouvrage. Et c'est là l'un des plus anciens exemples de calculs de coûts que l'on connaisse, dans le cadre d'une comptabilité tenue en partie double. J'ai d'ailleurs eu l'occasion de travailler sur les archives Plantin, il y a une vingtaine d'années, en particulier pour y étudier cette question, mais j'y avais été précédé, il y a bien longtemps puisque cela remonte à 1937 par une historienne américaine : Florence Edler (Edler, 1937).

Mais si j'évoque cette historienne c'est qu'elle était l'épouse d'un homme dont il me faut dire maintenant quelques mots car il fut l'un des premiers chercheurs européens à s'intéresser aux archives comptables et à l'histoire de la comptabilité, car il apporta par ce biais une importante contribution à l'histoire économique de l'Europe et que lui aussi était de votre région : Raymond de Roover.

Comptable de formation, Raymond de Roover (1904-1972) s'intéressa très rapidement à l'histoire économique et notamment aux archives des marchands brugeois. Ses premières publications relatives à l'histoire de la comptabilité furent un essai sur Jan Ympyn (de Roover 1928) et des articles sur les livres de commerce de marchands brugeois du XIV^e siècle (de Roover 1930 and 1934). Parti étudier l'histoire économique à Harvard, il publia en 1937 un article fondateur intitulé "*Aux origines d'une technique intellectuelle : la formation et l'expansion de la comptabilité à partie double*" dans les *Annales d'histoire économique et sociale*, une revue française fondée en 1929 qui joua un rôle majeur dans le renouvellement de la recherche historique, en particulier dans le domaine de l'histoire économique.

Ayant passé son doctorat en 1943 à l'Université de Chicago, il publia en 1948 *Money, Banking and Credit in Mediaeval Bruges*, un livre issu de sa thèse. A partir d'une étude fouillée d'archives comptables, lesquelles constituent très souvent la seule source de

renseignements sur les activités des marchands de cette époque, il réussit à apporter de précieux éclairages sur toute une série d'opérations techniques comme la comptabilité elle-même, le change et les arbitrages, les transferts monétaires ou encore les prêts. Appuyé sur le même type de sources, sa plus importante contribution à l'histoire économique et à l'histoire des affaires est un ouvrage intitulé *L'évolution de la lettre de change (XVI^e-XVIII^e siècles)*, publié en 1953.

C'était là quelques raisons qui font — pardonnez-moi de me répéter — que je suis tout particulièrement honoré de recevoir cette récompense en terre flamande, puisqu'elle fut, non seulement, le berceau de toute une série d'éminents auteurs comptables et le point de départ de la diffusion élargie de la technique italienne, mais aussi car elle donna naissance à l'un des premiers et des plus importants historiens de la comptabilité.

Compter, rendre compte et contrôler

Venons-en maintenant aux questions comptables proprement dites. Le titre de mon exposé commence par « compter, rendre compte et contrôler », en effet, quelles que furent ses formes et ses modalités, la comptabilité a toujours rempli diverses fonctions, relevant d'objectifs variés, qui peuvent néanmoins se résumer à trois : compter, rendre compte et contrôler.

Compter s'entend ici au sens d'enregistrer des flux monétaires ou réels entre une entité économique que l'on gère (administre) et divers autres agents, puis d'organiser les données recueillies de manière à en obtenir divers indicateurs chiffrés : position créitrice ou débitrice, résultat d'opération, solde de trésorerie, ...

On peut gérer sa propre affaire et donc compter pour soi — se rendre compte à soi-même pour reprendre une expression utilisée dans les manuels anciens — ou gérer pour autrui et donc devoir rendre compte de sa gestion.

Dans le premier cas, la comptabilité pourra jouer le rôle d'instrument de contrôle des subordonnés, des mandataires (agents), voire des partenaires. Dans le second elle aura en outre vocation à permettre le contrôle du gérant lui-même par ses mandants. Selon les époques, les secteurs d'activités et les formes de mobilisation des capitaux, les systèmes comptables mis en œuvre ont privilégié l'une ou l'autre de ces deux fonctions.

Ainsi, la comptabilité des marchands, dont le mécanisme de base — la comptabilité en partie double —, mis au point aux environs du XIV^e siècle, est aujourd'hui d'application quasi universelle, était avant tout destinée à la gestion en compte propre. Et lorsqu'il s'agissait de gérer pour autrui, la reddition de comptes prenait place dans un contexte particulier, celui de la réciprocité des situations, chacun pouvant être tour à tour, voire simultanément, mandant et mandataire — ou principal et agent pour reprendre le vocabulaire de la théorie de l'agence.

Parallèlement, un autre modèle comptable, plus ancien, était utilisé dans le cadre des états, des principautés et des domaines seigneuriaux, directement destiné à permettre le contrôle de ceux à qui était confié le maniement des deniers du Prince ou la gestion de ses biens : la comptabilité en recette et dépense. Toute la logique de cette comptabilité s'articulait autour de l'exercice de reddition de comptes.

Entre le XVI^e siècle et le XVIII^e, ces deux modèles cohabiteront, essentiellement cantonnés dans leurs sphères respectives, malgré quelques rares tentatives de substitution de l'un à l'autre ou parfois d'hybridation. Les débuts de la Révolution industrielle au XVIII^e siècle les verra cependant se livrer concurrence dans certains secteurs d'activité, puis le modèle marchand finira par s'imposer dans l'industrie durant la première moitié du XIX^e siècle, notamment en raison de son aptitude à livrer, par le biais du système de comptes, une représentation des processus industriels, facilitant

tant la gestion, que le contrôle des responsables des subdivisions de l'entreprise impliqués dans ces processus

C'est à la même époque que les sociétés par actions vont se développer et que la problématique de la reddition de comptes va prendre une dimension nouvelle, conséquence d'un éloignement de plus en plus grand entre la propriété du capital et la gestion de l'entreprise. La nécessaire protection des actionnaires et, plus généralement, de l'épargne publique conduiront un certain nombre d'Etats, face aux scandales financiers à répétition, à mettre en place un début de réglementation comptable. Encore embryonnaires à la fin du XIX^e siècle, ces réglementations se développeront, à des rythmes variés et selon des modalités différentes, dans la plupart des pays occidentaux dans le courant du XX^e siècle. Mais c'est durant le dernier quart de ce siècle que l'internationalisation des marchés de capitaux conduira à un mouvement d'harmonisation de ces réglementations puis de normalisation internationale, dans le sens du renforcement du pouvoir de contrôle des actionnaires sur les managers.

Ce sont ces diverses évolutions que je vais examiner et, au terme de cet exposé historique, je m'interrogerai sur certaines des directions qui ont été prises récemment dans ce processus de normalisation. D'autant qu'aux diverses époques, les dispositions adoptées en matière de réglementation comptable, par les Etats, les organisations supranationales ou par d'autres organismes à vocation normalisatrice, sont le produit d'un rapport de force entre les diverses parties prenantes à l'information comptable (*stackholders*). Or malgré ses apparences de dispositif étroitement codifié, la comptabilité n'est pas une technique neutre, loin s'en faut, elle n'est pas davantage une science exacte et certaines des informations chiffrées qu'elle livre résultent de choix qui possèdent une réelle dimension sociale et politique par les conséquences qu'ils peuvent avoir, notamment du fait du gigantisme croissant des entreprises.

La comptabilité marchande

A de nombreuses reprises, j'ai fait allusion à la comptabilité en partie double et vous vous demandez peut-être ce que recouvre cette expression. Elle vient du fait que chaque flux monétaire ou réel entre l'organisation et son environnement ou éventuellement en son sein fait l'objet de deux inscriptions simultanées : l'une au crédit d'un compte (celui qui représente l'origine du flux) l'autre au débit d'un autre compte (celui qui représente la destination du flux).

Ce mode de comptabilité a donc d'abord été celui du monde marchand et demeurera plus ou moins son exclusivité jusqu'à la fin du XVIII^e siècle. Divers fonds d'archives ont permis de montrer qu'il a commencé à être utilisé dans plusieurs villes de l'Italie du Nord dès le XIV^e siècle. Son émergence et ses perfectionnements sont étroitement liés à l'essor commercial qui a suivi la fin des Croisades, à la sédentarisation des marchands, ainsi qu'au développement du crédit, de l'activité bancaire et des sociétés commerciales, toutes institutions qui requéraient un outillage plus sophistiqué que celui du simple marchand itinérant.

Les comptabilités marchandes se caractérisent par l'utilisation intensive de comptes d'opérations c'est-à-dire de comptes ouverts à des opérations déterminées, comme l'achat d'un lot de marchandises pour le revendre, l'expédition d'un navire chargé de denrées diverses ou encore une opération de change. Débité de l'ensemble des dépenses relatives à la réalisation de l'opération, ce compte est crédité de l'ensemble des produits qui en sont issus et, une fois l'opération terminée, la différence entre le crédit et débit en donne le résultat. Le solde obtenu, profit ou perte est ensuite viré au compte « profits et pertes ». Un compte représentatif de la caisse et un ensemble de comptes ouverts aux tiers avec lesquels on commerce — souvent simultanément clients et fournisseurs — viennent s'articuler avec les comptes d'opérations et sont crédités des dettes contractées dans le cadre de la réalisation des opérations ou

débités des créances qui en proviennent. Très souvent, il n'y a pas de calculs réguliers de résultats globaux mais simplement détermination de résultats partiels, notamment dans le commerce maritime où la longueur du cycle d'exploitation, l'aspect discontinu de l'activité, le recours fréquent à des sociétés éphémères — les *participations* — expliquent ces pratiques. La confection d'un bilan est de peu d'intérêt lorsque les soldes des comptes représentent des engagements dans des aventures multiples dont les probabilités de succès sont totalement indépendantes. Un résultat global est alors peu significatif et les formes sociales utilisées, participations et petites sociétés familiales, ne nécessitent nullement son calcul. Seules les grandes compagnies commerciales et bancaires, comme on en trouve à Florence dès le XIV^e siècle clôturent leurs comptes de manière régulière, pourtant, cette clôture apparaît souvent comme une pseudo-liquidation, destinée à accompagner une modification du partenariat — éventuellement au sein de la famille élargie —, en permettant l'évaluation des parts. Avec le développement des succursales implantées à l'étranger, souvent constituées sous forme de sociétés en commandites, l'élaboration régulière d'états de situation devient l'élément central du contrôle exercé par la société mère.

À la fin du XVIII^e siècle, les méthodes comptables des marchands ont atteint un relatif degré de perfection par rapport aux besoins qui sont alors ceux du commerce : suivi des créances et des dettes, de la trésorerie et des multiples opérations réalisées isolément ou en participation. En outre, principalement utilisées par le grand négoce qui pratique le commerce international, on les retrouve à l'identique ou presque dans la plupart des pays européens ; on constate notamment que dans le cadre de chaque activité particulière — opérations à la commission, opérations en compte commun, opérations de change et arbitrages, armements de navires en copropriété, etc. —les modes de reddition des comptes entre partenaires ne varient guère d'un pays à l'autre.

Qu'en est-il des activités industrielles ?

Notons d'abord qu'elles sont quasiment absentes des traités de comptabilité. Très peu d'auteurs y font allusion. Le britannique Robert Hamilton (1777/9) et à un bien moindre degré le français Edmond Degrange (1795) leur accordent une certaine place mais, selon Basil Yamey (1991), le premier ouvrage consacré à la comptabilité industrielle fut écrit en 1789 par le hollandais Jacob Kneppel (1789), c'est-à-dire assez tard dans le siècle.

De même, les rares archives d'entreprises industrielles antérieures au XIX^e siècle ne recèlent que peu d'exemples de comptabilités tenues en partie double. On en trouve dans certains secteurs fortement liés au monde marchand, comme le textile, ou dans des pays et régions où la tradition de la partie double était très forte comme l'Italie ou la région lyonnaise en France, elle-même très influencée par l'Italie.

Si la relative faiblesse de l'industrialisation, dans certains pays européens, peut en partie expliquer cette situation, il est un autre élément qui permet de mieux la comprendre, c'est la concurrence d'un autre modèle comptable.

Un modèle concurrent

Depuis bien longtemps, les seigneurs et les souverains utilisaient, pour la gestion de leurs domaines et de leurs finances, un autre modèle comptable : la comptabilité en « *recette et dépense* ». Le fondement initial de cette comptabilité est le contrôle de ceux à qui est confiée la responsabilité du maniement des deniers royaux ou seigneuriaux ou la gestion d'un domaine. Elle est censée aboutir à l'établissement périodique d'un *compte rendu* dans lequel le *comptable* fait *recette*, ou se *charge* de tout ce qu'il reçoit, tant au début de sa gestion que dans le courant de celle-ci, pour être ensuite *déchargé* de la totalité des *dépenses* effectuées pour les besoins de cette gestion — pièces justificatives à l'appui — et rester redevable du reliquat : le *débet*. Le vocabulaire

employé explique également que cette comptabilité était également désignée par l'expression de tenue des livres en « *charge et décharge* », expression qui se retrouve dans plusieurs pays et donc dans plusieurs langues : « *charge and discharge* » (Chatfield, 1977, p. 19-29; Edwards, 1989, p. 32-44) ou « *cargo y data* » par exemple. Beaucoup plus qu'un simple mode de tenue des livres, nous avons là un mode de reddition des comptes, dans le cadre de la gestion des biens d'autrui. Un mode de reddition des comptes utilisable par « *tous ceux qui ont le maniement du bien d'autrui, ou de celuy qui leur est commun avec d'autres, et qui sont obligez de rendre compte, ... tuteurs, protuteurs, curateurs, fermiers judiciaires, séquestrés, gardiens, administrateurs généraux et particuliers de biens publics ou privez... commissionnaires, et à ceux qui font les affaires d'autrui, etc.* » (Irson, 1678, préface, chap. 2).

On remarquera que dans cette comptabilité, le résultat global de l'exercice n'est pas calculé, le solde du compte rendu par le régisseur n'est ni un profit ni une perte mais seulement la résultante des flux effectifs de trésorerie. Seul un *dépouillement* permet d'opérer une ventilation entre catégories de dépenses et de recettes et de séparer, par exemple, ce qui relève de l'investissement et des charges de fonctionnement. Il ne peut donc y avoir de calculs de résultats, même partiels, sans retraitements des données comptables.

Mais ce type de calcul ne relève pas vraiment de la philosophie de cette comptabilité, dont la finalité première est le contrôle du comptable.

C'est l'élément fondamental de ce modèle — d'ailleurs *contrôle* et *comptable* sont des mots qui apparaissent dans la comptabilité publique et sont indissociables —. Bien longtemps avant de désigner une fonction, le mot comptable exprime un état : est comptable « *celui qui a manié des deniers dont il est tenu de rendre compte* »²¹. Quant

²¹ *Dictionnaire des finances*, n° 104.

au mot contrôle, il vient de *contre rolle*, document destiné à être confronté à son double originel, le *rolle*.

L'ensemble de l'organisation comptable et les procédures de reddition des comptes ont pour but de s'assurer de son intégrité ou, pour le moins, de se prémunir contre les risques de prévarication. Dès lors, tout le modèle est sous-tendu par l'objectif qui lui est assigné de produire ce compte final, aux fins de vérification, pièces justificatives à l'appui.

La comptabilité commerciale, au stade auquel elle est parvenue au XVIII^e siècle, n'a pas du tout les mêmes fonctions. En droit, le commerçant est comptable de sa gestion vis-à-vis de la masse de ses créanciers, mais ceci ne reçoit de traduction pratique que dans le cas de faillite avec la production des comptes en justice, c'est-à-dire de manière exceptionnelle.

Pour le négociant, il nous semble que la finalité essentielle de l'outil est le suivi des comptes de tiers et de la trésorerie. Sa comptabilité n'est pas destinée à produire un compte final, mais une série de comptes permanents, ouverts aux personnes avec lesquelles il est en relation d'affaires. Ces relations entre marchands sont d'une toute autre nature que celles existant entre l'Etat et un receveur général ou entre un propriétaire terrien et son régisseur, car elles sont fondées sur la symétrie des positions respectives : chacun est comptable vis-à-vis de l'autre. La réflexivité de la relation client - fournisseur se traduit par la réciprocité comptable des comptes courants ; elle permet un contrôle mutuel simple des engagements et des paiements. La conformité livraison — facture est sans doute l'objet d'une plus grande attention.

Il est vrai que d'autres types de relations existent, non réflexives, impliquant donc reddition de compte : ce sont les opérations réalisées en commun, telles que les sociétés en participation ou l'armement de navires ; elles ont conduit à l'élaboration de formes spécialisées de comptabilité, dans le prolongement du modèle initial. Mais, là

encore, le meneur de jeu d'une opération sera le partenaire passif de la suivante. L'aspect interchangeable des différents rôles permet d'éviter le recours à des procédures formelles ; l'honnêteté du partenaire est postulée ; le principe du respect de la parole donnée sous-tend l'ensemble des relations marchandes. Et le contrôle des subordonnés, dira-t-on ? Il existe, bien entendu, mais il a un caractère permanent. Un volume important de transactions ne nécessite pas forcément l'emploi d'un très grand nombre de commis. Même dans une grosse maison de négoce, le commerçant pourra lui-même effectuer la surveillance quotidienne de la caisse, dont la comptabilité en partie double lui donne en permanence le solde. S'il s'agit d'établir une succursale quelconque, elle sera confiée à un associé ou à un proche parent.

La concurrence fut vive entre les deux modèles. Nombreux furent ceux qui recommandèrent à leurs souverains d'utiliser la comptabilité des marchands dans le cadre de la gestion de leurs finances publiques. Le premier d'entre eux fut précisément Simon Stevin, ce qui nous explique le titre de l'ouvrage évoqué plus haut : *Livre de compte de prince à la manière d'Italie, en domaine et finance extraordinaire* (Stevin, 1608). En effet, l'objectif de Stevin n'était pas simplement d'apprendre les mécanismes de la comptabilité au prince d'Orange, mais bien de le convaincre de la supériorité de la méthode comptable italienne et de la nécessité de l'appliquer dans la comptabilité de ses États, ce qui fut fait par le Prince, ainsi que par le Roi de Suède. Mais si l'ouvrage de Stevin est précédé d'une dédicace à Sully, Premier ministre du Roi de France Henri IV, auquel il vante les mérites du système qu'il propose, il faudra attendre plus d'un siècle pour qu'une tentative soit réalisée en France mais elle ne durera que quelques années (Lemarchand, 1999). D'autres auteurs reprendront le flambeau, tels Irson (1678) ou encore Barrême (1721), pour les auteurs français, mais en dehors d'exemples précoces et exceptionnels comme ceux de l'Espagne, à la fin du XVI^e siècle

(Hernandez Esteve, 1986) ou du Portugal dans la seconde moitié du XVIII^e (Rocha Gomes, 2007), il faudra attendre la première moitié du XIX^e siècle pour que certains éléments de la comptabilité en partie double soient intégrés aux méthodes de la comptabilité publique dans les principaux états européens.

Comptabilité industrielle, contrôle et calculs de coûts

Une partie de l'industrie naissante, dans certains pays tout au moins tels la Grande-Bretagne ou la France, a d'abord utilisé ce dernier modèle comptable, tout simplement car les investisseurs appartenaient à la noblesse, laquelle utilisait cette comptabilité dans la gestion de ses terres, ou faisaient partie de ceux que l'on appelait alors les financiers et qui avaient en main la perception des impôts ou la gestion des deniers du Royaume — toutes fonctions alors privatisées — et qui ne connaissaient, eux aussi, que ce mode de comptabilité (Lemarchand, 1995)

Présente principalement dans l'industrie textile et parfois dans d'autres secteurs, la comptabilité en partie double se substituera totalement à la comptabilité en recette et dépense dans le premier tiers du XIX^e siècle mais certaines entreprises conserveront des pratiques héritées de ce modèle et notamment le fait de ne pas établir de distinction claire entre les consommations et les investissements, ce qui aboutissait à de sévères distorsions ne termes de calcul des résultats et de représentation comptable du patrimoine de l'entreprise.

Dans son adaptation à l'activité industrielle, l'utilisation de la partie double pouvait se limiter à une comptabilité assez proche de celle des marchands ou au contraire utiliser pleinement les potentialités du mécanisme des comptes d'opérations pour en obtenir une représentation comptable du processus de production, permettant le suivi de la formation du coût des produits fabriqués, comme addition de coûts successifs engagés aux différents stades de ce processus. Ce suivi des flux internes à l'entreprise, mettait

en jeu une série de comptes appropriés. En dehors des comptes de trésorerie, de créances, de dettes, d'immobilisations, etc. fonctionnant comme ceux des marchands, une entreprise industrielle ouvrait un compte à chaque activité dont le mode de fonctionnement découlait de celui des comptes d'opérations. C'est ainsi, par exemple, que dans une usine métallurgique on ouvrait des comptes au fourneau et à la forge, Au débit du compte fourneau figurait, pour chaque période (le mois, l'année ou la campagne, tant que l'exploitation dépendait du débit des rivières) les consommations de charbon et de minerai, les salaires et divers frais d'exploitation du fourneau. Au crédit figuraient les livraisons de fonte faites à la forge et le stock final de fonte, le tout estimé au coût de production constaté ou à un prix de cession prédéterminé. Le compte forge était lui-même débité des consommations de charbon et de fonte, puis des salaires, ce qui permettait d'obtenir le coût de production des fers mis en magasin. Dans une telle articulation, que l'on pouvait subdiviser autant que de besoin selon le type d'industrie, la partie double interdisait qu'aucune charge n'échappe aux mailles du filet comptable.

Mais ce découpage comptable permettait aussi d'isoler des responsabilités et, dans le textile comme dans la métallurgie, une des principales fonctions de la comptabilité des coûts semble avoir été la surveillance des consommations de matières premières (Fleischman et Parker, 1991, p. 370). La vigilance des entrepreneurs devait être d'autant plus forte que la concurrence se faisait plus vive et cette dernière a donc pu constituer un puissant stimulus à l'amélioration des méthodes (Fleischman and Parker, 1990, 1991, p. 368). Les situations de crise ont pu jouer le même rôle, c'est ce qu'a montré Hopwood (1987) à propos de Josiah Wedgwood. Cherchant à connaître ses coûts de production pour fixer ses prix, alors que son marché était en plein déclin, ce potier anglais s'aperçut que ses employés le trompaient. Il retombait ainsi par hasard sur une des finalités qui semble avoir été depuis longtemps assignée à la comptabilité

industrielle : le contrôle des subordonnés, qu'il s'agisse des ouvriers ou des divers responsables intermédiaires, jusqu'aux directeurs d'établissements. En effet, les subdivisions comptables correspondant très souvent à ce que nous appelons aujourd'hui des centres de responsabilité. La séparation géographique du siège administratif et des usines a également conduit à la mise en place d'outils de contrôle à distance de plus en plus élaborés.

La technique s'est perfectionnée tout au long du XIX^e siècle, pour aboutir dans les années 1920 à des modèles de plus en plus sophistiqués inspirés des idées du Scientific Management de Taylor ; la surveillance se rationalise de plus en plus avec l'apparition de la technique dite de coûts standards et du contrôle budgétaire dans les années trente.

Développer sur généralisation contrôle interne et line performance contrôle dans toutes les organisations et y compris dans administrations et les services publics, les excès du *management by numbers*.

Tandis que se développe la comptabilité industrielle, l'essor des sociétés par actions vient rapidement poser la question de l'information comptable destinée aux actionnaires et plus généralement aux tiers.

La comptabilité financière

Dans quelques pays, de grandes sociétés de commerce et de colonisation furent créées, sous formes de sociétés par actions, dès le début du XVII^e siècle telles que la *British East India Company*, créée en 1600, et la *Verenigde Oost-Indische Compagnie*, fondée à Amsterdam deux ans plus tard ou, plus tardivement, la Compagnie française des Indes Orientales créée en 1664. L'avènement de ces sociétés d'un genre un peu

nouveau s'accompagnera d'ailleurs de quelques-unes des premières et plus importantes crises financières comme le *South Sea Bubble* en Grande-Bretagne et la faillite de John Law en France. Mais c'est surtout au cours du XIX^e siècle que les sociétés par actions vont se développer, avec l'industrialisation bien sûr mais aussi avec le développement des chemins de fer, des grandes compagnies de transport maritime, des banques et des sociétés d'assurances. Là encore, divers scandales financiers vont régulièrement défrayer la chronique dans plusieurs pays européens et la question de l'information comptable diffusée par ces sociétés va bientôt être posée sur la place publique, tant les intérêts en jeu et les risques encourus deviennent de plus en plus importants et concernent une fraction de plus en plus large de la population.

En effet, lorsque les sociétés de capitaux ont commencé à donner une certaine publicité à leurs comptes — ceci remonte au milieu du XIX^e siècle avec l'essor des grandes compagnies de chemins de fer —, il n'existe aucune règle de présentation de ces comptes et la forme des bilans communiqués aux actionnaires ou, parfois, publiés dans la presse financière variait d'une entreprise à l'autre. Puis, lentement, certains pays ont commencé à mettre en place une réglementation (Edwards, 1989) ; le rythme des réformes et les choix effectués variant en fonction des rapports de force entre les différentes catégories de tiers intéressés.

La protection de l'épargne publique (fournisseurs, actionnaires et prêteurs effectifs et potentiels, clients, etc.) nécessitait que l'on fixe quelques règles garantissant la fiabilité de l'information diffusée. Technique d'observation et de représentation et instrument de mesure, la comptabilité n'a pas de réel fondement scientifique et la représentation comptable de l'entreprise repose sur des conventions forgées de façon totalement empirique. Or dans la vie de l'entreprise, divers faits viennent modifier sa substance et sa valeur sans engendrer de flux de biens ou de services entre elle et son environnement et ne reçoivent donc pas de traduction comptable immédiate ; la

comptabilité ne peut cependant les ignorer sauf à renoncer à fournir une image fidèle. Il en va ainsi de tous les phénomènes de dépréciation ou d'appréciation de certains des éléments du patrimoine, aussi est-il obligatoire, dans la plupart des pays et depuis très longtemps, de contrôler annuellement, par inventaire, l'existence et la valeur des éléments actifs et passifs de l'entreprise. Les questions d'évaluation revêtent donc une importance toute particulière en raison des incidences qu'elles peuvent avoir sur la détermination des résultats.

Les dirigeants de sociétés ont très largement usé des possibilités de manipulations qui en découlent, surtout lorsqu'il n'existe qu'une réglementation comptable minimalistre. Dans les grandes entreprises françaises de la seconde moitié du XIX^e siècle, le mécanisme de l'amortissement comptable fut ainsi pendant longtemps l'auxiliaire actif d'une politique d'autofinancement intensif (Lemarchand, 1993). Cette attitude déclencha d'après conflits entre administrateurs de sociétés et actionnaires minoritaires. Encore ces actionnaires pouvaient-ils s'estimer heureux puisque cet autofinancement ne faisait qu'accroître la valeur de leurs parts. Moins enviable était le sort de ceux qui se retrouvaient victimes d'escrocs manipulant leur résultat à la hausse, pour attirer les souscripteurs, avant de réaliser une augmentation de capital et de partir sans laisser d'adresse.

L'essor considérable des sociétés de capitaux, auquel on assiste durant cette période va s'accompagner d'une série de scandales financiers retentissants. Juristes, comptables et économistes se font alors l'écho de l'émoi qui saisit périodiquement l'opinion et, bientôt, se développe une réflexion sur l'information comptable délivrée par les sociétés et sur les modalités de son contrôle. Nombreux sont ceux qui réclament alors une réglementation comptable. Et bientôt, la plupart des législations européennes

vont intégrer des éléments relatifs à la façon dont ces sociétés doivent rendre compte de leurs activités à leurs actionnaires. Ainsi se succèdent le *Joint Stock Companies Act* de 1856, puis le *Companies Act* de 1862 en Grande-Bretagne (Edwards, 1989, p. 192-7), les lois françaises sur les sociétés commerciales de 1856, 1863 et 1867, la loi sur les sociétés de 1873 en Belgique, et la loi du 18 juillet 1884 en Allemagne dont les dispositions seront peu ou prou reprises par l'Autriche, la Hongrie et la Bosnie (Verley, 1906).

Mais tous ces textes restaient limités à quelques aspects institutionnels très généraux et rares étaient ceux qui évoquaient par exemple les règles d'évaluation des éléments d'actif ou de présentation des bilans. Parmi les plus avancés en la matière, le Code fédéral suisse des obligations de 1881 précisait cependant : « Le bilan doit être dressé d'une façon assez claire et facile à saisir pour que les actionnaires puissent se rendre un compte aussi exact que possible de la vraie situation de la fortune de la société » (Art. 656) (Verley, 1906). Pour autant, nous étions encore très loin de la moindre idée de standardisation des bilans. Les premiers à se poser la question à l'échelle internationale ne furent ni des comptables ni des juristes, mais des statisticiens qui, depuis plusieurs années, étudiaient les variations des cours des valeurs industrielles et auraient souhaité pouvoir les relier à des informations comptables un tant soit peu homogènes dans leur présentation et leur mode d'élaboration. C'est ainsi qu'en 1901, l'Institut international de statistique fit réaliser une enquête sur « le meilleur mode à indiquer au point de vue statistique international pour la confection des bilans des sociétés anonymes » pour le congrès qu'il tint à Budapest en 1902 (Neymarck, 1902). Les deux premiers tiers du XX^e siècle verront plusieurs pays renforcer leurs réglementations, se doter d'organismes de normalisation comptable ou encore mettre en place des plans comptables destinés codifier les pratiques de tout ou partie des entreprises. Mais ces avancées restent disparates et bientôt, l'intégration européenne,

l'important mouvement de concentration qui l'accompagne et l'internationalisation des marchés de capitaux qui en découle vont rendre nécessaire une harmonisation des systèmes comptables nationaux. En 1978, une directive européenne impose aux états membres de se doter d'une réglementation comptable respectant certains principes communs, notamment en ce qui concerne les sociétés de capitaux, dans un but de protection des associés et des tiers.

Cependant, cette directive ne concernait que les comptes individuels des sociétés or le développement de groupes de sociétés de plus en plus ramifiés et leur manque de transparence comptable appelaient de nouvelles mesures. Une deuxième étape du processus d'harmonisation intervint alors avec une autre directive prescrivant aux états membres de mettre en place une réglementation relative à l'élaboration et à la publication des comptes consolidés et en définissant le cadre général.

Seulement depuis longtemps déjà, des entreprises européennes se finançant sur le marché boursier américain avaient décidé de se conformer aux normes comptables en vigueur à Wall Street. Celles-ci reposaient sur un ensemble de principes définis dans les années 1930 — les *Generally Accepted Accounting Principles* (GAAP) —, à l'initiative de la *Securities and Exchange Commission* (SEC), dont la mission était de surveiller les sociétés cotées. Créée en 1933 et pièce essentielle du dispositif de régulation des marchés mis en place après le krach de 1929, la SEC joua un rôle déterminant dans le processus américain de normalisation comptable, en l'orientant immédiatement vers les besoins de la bourse et des grandes sociétés. Les GAAP furent repris et détaillés dans un ensemble de normes élaborées par le *Financial Accounting Standard Board* (FASB), organisme créé en 1973. Le poids économique des Etats-Unis et l'attractivité du marché boursier américain pouvaient laisser penser que l'internationalisation de l'économie allait conduire à une adoption généralisée des normes américaines mais la

concurrence d'un autre système de normes à vocation internationale allait en décider autrement (Walton, 1996).

Créé à Londres en 1973, l'*International Accounting Standards Committee* (IASC) regroupait les organisations professionnelles comptables d'Australie, du Canada, de France, d'Allemagne, du Japon, du Mexique, ses Pays-Bas, de la Grande-Bretagne et des Etats-Unis. À ses débuts, l'IASC était davantage un " harmonisateur " qu'un normalisateur, puisqu'il ne disposait daucun pouvoir coercitif. Mais progressivement ses normes devinrent la référence. La Commission européenne, qui avait d'abord envisagé de développer son propre référentiel comptable, a commencé à se rapprocher de l'IASC à partir du milieu des années quatre-vingt-dix et a finalement décidé d'en adopter les normes à partir de 2005. Réorganisé et rebaptisé IASB en 2002, cet organisme est aujourd'hui le normalisateur officiel de la Communauté européenne, ce qui signifie que des règles de droit européennes sont désormais élaborées par une organisation privée non européenne ! Ajoutons à cela que la présence de la Commission au sein de l'IASB se réduit à un seul siège dans son organe consultatif Sans doute fallait-il agir car, depuis quelques années, plusieurs pays européens, dont la France, avaient autorisé les sociétés cotées à établir leurs comptes consolidés conformément aux normes IASB ou aux GAAP américains, leurs comptes individuels restant établis selon les normes nationales, ce qui ne faisait que multiplier les référentiels utilisés. Mais cette décision a scellé l'abandon des tentatives destinées à faire émerger un modèle comptable européen différent du modèle anglo-saxon et orienté par une autre conception de l'économie, c'est-à-dire qui ne soit pas conçu comme étant avant tout au service des seuls actionnaires.

Pour illustrer et apprécier ce dernier aspect il me faut, sans entrer dans des détails trop techniques, me pencher quelques instants sur l'un des aspects fondamentaux des choix

effectués, celui de l'évaluation à la « juste valeur » ou plutôt *fair value* pour reprendre l'expression originale. Le résultat annuel d'une entreprise se mesure par la variation de la différence entre ses actifs (ce qu'elle possède) et ses dettes ou, dit plus simplement, par la variation de sa valeur comptable. Ce qui apparaît simple ne l'est pas vraiment, dès lors que l'on sait que s'il est aisément d'évaluer certains de ses actifs, comme des créances sur ses clients, la chose devient plus délicate dès que l'on passe à d'autres catégories comme par exemple des actifs financiers ou encore une marque. Jusqu'à la fin du XX^e siècle, il était habituel, dans de très nombreux pays, de faire preuve d'une certaine prudence comptable et de considérer seuls des « bénéfices réalisés » à la date de clôture d'un exercice pouvaient être inscrits dans les comptes annuels, ce qui interdisait notamment qu'une plus-value latente soit intégrée au bénéfice, en augmentant par exemple la valeur d'une immobilisation.

Certes, cette attitude pouvait aboutir à une relative déconnexion entre la valeur économique d'une entreprise et son image comptable. Néanmoins, à défaut de toujours fournir une image réellement fidèle, au sens économique de l'expression, ce système minimisait les risques de surévaluation du résultat et de la firme.

La mise en œuvre de l'évaluation la « juste valeur » est en totale rupture avec ces pratiques. Selon la norme IAS 32, la *fair value* est " le montant pour lequel un actif pourrait être échangé ou un passif éteint, entre des parties bien informées et consentantes dans le cadre d'une transaction effectuée dans des conditions de concurrence normales. " Concrètement, la *fair value* d'un élément donné sera fournie par le prix de marché, pour les actifs négociés sur un marché avec cotation, ou calculée à partir d'une estimation des flux de trésorerie attendus pour les autres catégories.

Cette dernière mesure suppose que l'on puisse prévoir de façon précise et fiable ces flux de trésorerie, ce qui est aisément pour un actif dont les revenus sont certains, comme une obligation, mais l'est beaucoup moins pour des produits dérivés, tels que les

options par exemple. Dans ce cas, les normes recommandent d'utiliser des modèles d'évaluation relativement sophistiqués mais reposant sur des hypothèses contestables et des paramètres incertains, si bien que leurs utilisateurs sont conduits à constituer des provisions pour risques de modèle !

Si, pour le moment, l'application de la *fair value* dans les IAS/IFRS concerne essentiellement les instruments financiers ou encore les immeubles de placement, il faut savoir que la *full fair value*, autrement dit son application à tout élément d'actif ou de passif — le "tout juste valeur" — a de chauds partisans. Là encore, la mise en œuvre risque d'être relativement délicate en matière d'actifs industriels ou d'immobilisations incorporelles, telles que brevets ou marques. Pour de nombreux actifs, malgré la simplicité de son principe, l'évaluation par actualisation des flux de trésorerie futurs pose certainement davantage de problèmes qu'elle n'en résout.

En outre, au-delà des questions pratiques de mise en œuvre, l'abandon du principe de réalisation des bénéfices pose la question de la fiabilité du résultat comptable, surtout dans les entreprises dont les activités de portefeuille représentent une part importante de l'activité globale. Les marchés des instruments financiers sont relativement volatils et les résultats obtenus par le biais de l'évaluation à la juste valeur peuvent être entachés d'une grande incertitude.

Mais la juste valeur n'est qu'un élément, parmi d'autres, d'un système de normes comptable qui forme un tout cohérent et privilégie une catégorie d'utilisateurs.

La primauté de l'actionnaire

Ces choix comptables s'inscrivent dans une logique de gouvernance d'entreprise réservant une place privilégiée à l'actionnaire. Cette évolution est la conséquence du passage d'un capitalisme dans lequel, au sein des grandes sociétés, le pouvoir était

aux mains de managers recrutés pour leurs compétences et largement indépendants des actionnaires, à un capitalisme où ces derniers exercent l'essentiel du pouvoir en contrôlant de plus en plus étroitement les dirigeants. La maximisation de la valeur actionnariat est désormais l'unique objectif assigné aux managers et un ensemble de mécanismes d'incitation et de contrôle est censé assurer sa réalisation. La convergence d'intérêts entre actionnaires et dirigeants est notamment supposée réalisée par l'octroi de *stock-options* aux dirigeants, alors directement intéressés à l'évolution de la valeur boursière de la firme, ce qui peut favoriser les comportements de court terme au détriment des choix stratégiques et de la croissance de l'entreprise.

L'évaluation à la juste valeur s'inscrit dans cette logique, mais ainsi mise au service exclusif de l'actionnaire, on peut se demander quelle peut-être l'utilité de la comptabilité pour les autres utilisateurs ? À cet égard, le paragraphe 9 du cadre conceptuel de l'IASB se montre délibérément optimiste : " Comme les investisseurs sont les apporteurs de capitaux à risque de l'entreprise, la fourniture d'états financiers qui répondent à leurs besoins répondra également à la plupart des besoins des autres utilisateurs susceptibles d'être satisfaits par les états financiers. " On a quelques raisons de douter que les choses soient aussi simples.

Terminer sur l'aspect désormais primordial des fonctions de reddition des comptes et de contrôle, tant en comptabilité de gestion qu'en comptabilité financière.

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Laudatio Antoine Picon

D. De Meyer

Laudatio Antoine Picon*D. De Meyer*

Antoine Picon received engineering degrees from the Ecole Polytechnique and from the Ecole Nationale des Ponts et Chaussées, an architecture degree from the Ecole d'Architecture de Paris-Villemin, and a doctorate in history from the Ecole des Hautes Etudes en Sciences Sociales in Paris.

Professionnellement, il vit une sorte de double vie: de ce côté de l'Atlantique, il est *ingénieur général* auprès des Ponts et Chaussées, on the other side of the ocean he is a Professor of the History of Architecture and Technology at Harvard's GSD (Graduate School of Design), where he is also Director of Doctoral Programs. At Harvard he teaches courses in the history of architecture and technology.

Trained as an engineer, an architect, and an historian of science and art, Picon is best known for his work in the history of architectural technologies from the eighteenth century to the present. His *French Architects and Engineers in the Age of Enlightenment* (1988; English translation 1992) is a synthetic study of the disciplinary "deep structures" of architecture, garden design, and engineering in the eighteenth century, and their transformations following new issues of territorial management and infrastructure-systems planning. *L'ingénieur artiste* (1989) nous montre l'apprentissage de l'ingénieur, qui, jusqu'au milieu du XIXe Siècle, se forme au dessin et au lavis — comme un architecte. Cet apprentissage lui permet de concevoir des ouvrages d'une grande qualité expressive qui s'intègrent harmonieusement au paysage. Picon nous montre là que 'ingénieur est encore un artiste qui sait concilier l'imitation des modèles reçus et la recherche de solutions techniques inédites. Il poursuit son travail dans

L'Invention de L'ingénieur moderne, L'Ecole des Ponts et Chaussées 1747-1851 (1992).

Cette lignée de travail abouti dans l'ouvrage encyclopédique qui accompagne l'exposition à Beaubourg: *L'art de l'ingénieur* (1997).

Parmis ses autres ouvrages je vous mentionne: en 1988, une monographie de *Claude Perrault (1613-1688) ou la curiosité d'un classique* (1988) — le chercheur de l'anatomie, de la physiologie, le physique et la mécanique qui devient architecte de l'Observatoire, mais aussi de la façade du palais du Roi, Le Louvre.

Picon s'intéresse aussi à la plus grande échelle: il publie *La ville territoire des cyborgs* (1998), une étude sur la grande ville contemporaine, qu'il décrit comme une nappe d'infrastructures et d'équipements qui s'étend à perte de vue, mais aussi qui échappe aux grilles de lecture traditionnelles de l'urbanité. Dans cette lignée il va diriger le volume *La Ville et La Guerre* (1996). Il nous montre l'évolution du rôle de la ville, depuis l'époque de dissuasion nucléaire, où elle se réduisait à la fonction d'otage passif, jusqu'à nos jours où Beyrouth, Sarajevo et Grozny marquent le retour des sièges et des combats de rue, des bombardements et de la résistance urbaine.

A book that for me opened a complete new view on the early nineteenth century was *Les Saint-Simoniens: Raison, Imaginaire et Utopie* (2002), dealing with one of the most influential utopian movements in France, joined by hundreds of engineers, physicians, and lawyers. By paying a special attention to the Saint-Simonian approach to territories, cities, and architecture Picon proposes a reexamination of the relations between space and utopia in the 19th century. In today's lecture, he will draw upon this extensive knowledge — ranging from Saint-Simoniens to cyborgs — in order to examine what can

be learnt from the utopian tradition in order for architecture to regain political and social relevance. I think it is difficult to consider a more urgent, more relevant question today.

More recently, in 2003, he edited, with Alessandra Ponte, *Architecture and the Sciences: Exchanging Metaphors*. The book shows how architects, in recent years, again are looking at science (as opposed to technology proper) as a source of inspiration in the production of their designs and constructions. *Tra utopia e ruggine, Paesaggi dell'ingegneria dal Settecento a oggi* (2006)(Between utopia and rust) is a collection of essays dealing with the topics I have already mentioned. Picon has also published numerous **articles** and he received a number of **awards** for his writings, including the *Medaille de la Ville de Paris*.

While thinking about someone to propose to the Sarton committee to receive the medal named in Sarton's honour, I could not think of a better choice than you, cher Antoine. Sarton, as you know, studied philosophy and mathematics at our University. He left Belgium at the beginning of the war and moved with his family, via England, to the US. He started lecturing at Harvard in 1920 and became professor in the History of Sciences, a study he actually helped forging into an own, new discipline. In honouring you, Antoine, it seems as if a son of Sarton is returning to Sarton's alma mater.

Abstract:**Learning from Utopia: Contemporary Architecture and the Quest for Political and Social Meaning**

Antoine Picon, Harvard & Ecole des Ponts et Chaussées

Since Manfredo Tafuri's severe critique of its shortcomings, utopia has been generally discarded by contemporary architects. Rem Koolhaas among others advocated a realistic attitude enabling architecture to deal finally with the challenges of global and accelerated urban growth. In the past years, however, a different tone can be heard. Architecture has become too estranged from political and social perspectives. Design seems no longer to carry the promise of a different future. It is in that context that the question of utopia and its relation to architecture has emerged again. The lecture will examine what can be learnt from the utopian tradition in order for architecture to regain political and social relevance. In this process, the very notion of utopia may need to be redefined.

Contemporary Architecture and the Quest for Political and Social Meaning

A. Picon

Contemporary Architecture and the Quest for Political and Social Meaning

A. Picon

Harvard & Ecole des Ponts et Chaussées

THE RETURN OF UTOPIA

A few years ago, the subject of utopia and its relation to architecture was solely of historical interest. The utopian character of modern architecture has often been denounced, and is held responsible for the mistakes of modern urbanism. Modern architects, it was said, had jeopardized the quality of life in their attempts to change society. In his 1973 essay, *Architecture and Utopia*, the Italian historian Manfredo Tafuri was even more severe.²² He believed the utopian streak of modern architecture was based on the fundamental delusion that Capitalism needed architectural and urban order to function in an efficient manner.

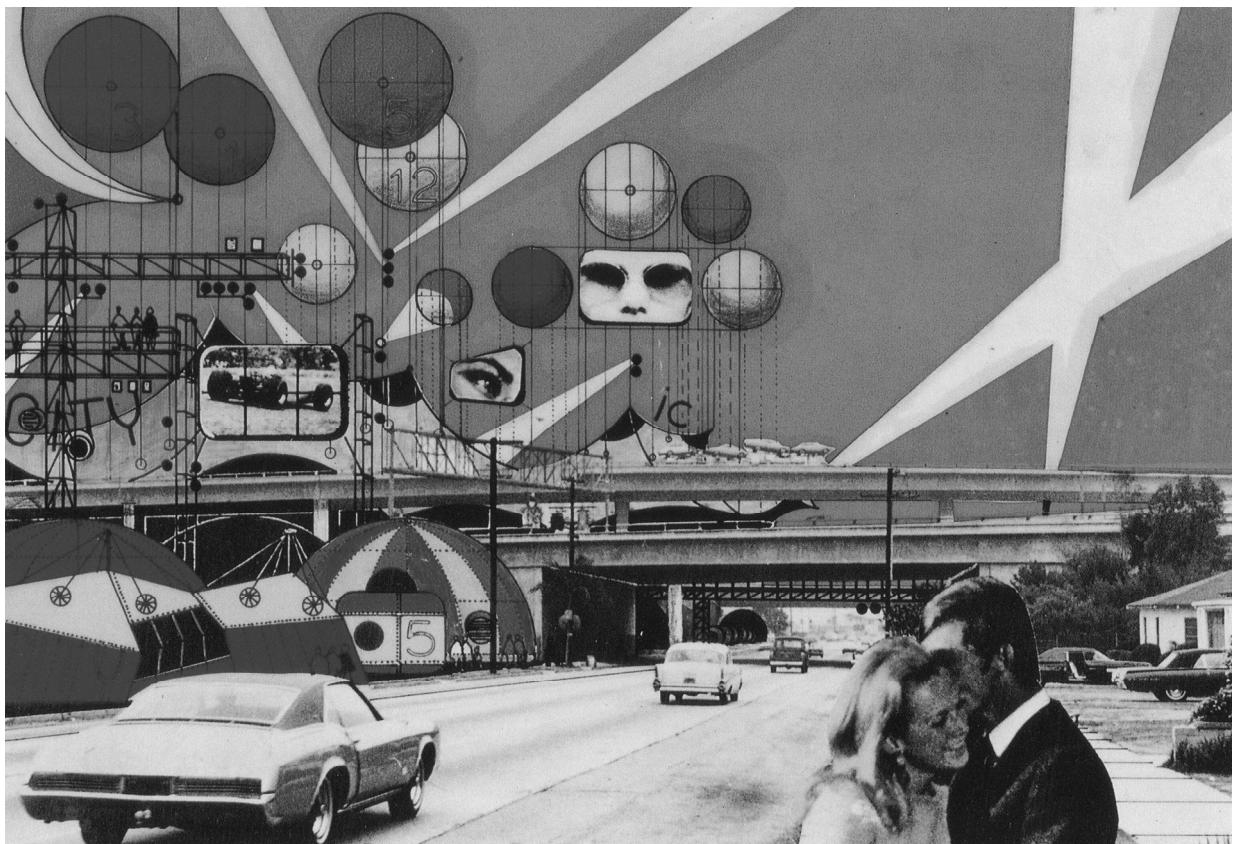
In order to counter this, Rem Koolhaas and his followers tried to connect architecture with the real trends of the times, beginning with the accelerated circulation of people, goods and money, as well as sprawling urbanization. In order to cope with the prevailing conditions of the "generic city", architecture had to abandon its pretensions to change the world in a demiurgic manner.²³ It had to become realistic, in tune with what was really happening in the world, rather than pursuing the old pipe dreams of modernity. For Koolhaas, this meant the study of urban areas such as Lagos, which present great problems for mainstream modern architecture and urban planning.²⁴

²² Manfredo Tafuri, *Architecture and Utopia. Design and Capitalist Development* (Bari: 1973, English translation Cambridge, Massachusetts: MIT Press, 1976).

²³ Rem Koolhaas, "The Generic City," in S, M, L, XL (New York: The Monacelli Press, 1996).

²⁴ Rem Koolhaas and al., *Mutations* (Barcelona, Bordeaux: Arc en Rêve, 2001).

However, there have recently been some changes. Utopia is returning to favor, such that it is being mentioned again at architectural exhibitions, and in books and lectures.²⁵ Considerable interest has developed in post-war utopian and counter-utopian movements. The megastructural projects of the 1950s, the Archigram legacy and the provocations of early 1970 Radical architecture movements, are being scrutinized in detail, not only by theorists and historians, but also by a growing number of practitioners.²⁶



These movements have created an agenda that we still share today. The early megastructures and other radical provocations offered the possibility of redefining design objectives and methods, by taking into account new technologies emerging at

²⁵ Let us mention for instance the exhibition "Utopia's Ghost: Postmodernism Reconsidered" organized in February-May 2008 by the Canadian Centre for Architecture, or Felicity Scott's book *Architecture or Techno-Utopia: Politics after Modernism* (Cambridge, Massachusetts: MIT Press, 2007).

²⁶ On Archigram and Radical architecture, see for instance *Archigram* (Paris: Editions du Centre Georges Pompidou, 1994); Dominique Rouillard, *Superarchitecture: Le Futur de l'Architecture 1950-1970* (Paris: Editions de La Villette, 2004).

the time; electronics, computers and new media were playing a more prominent role.²⁷

And because architectural discourse and practice are usually about endorsing the present state of things instead of proposing alternative futures, there is a growing dissatisfaction with the estrangement of architecture from political and social concerns. Megastructural and radical architecture interest us today for their capacity to imagine a different future. Conversely, the influence radical architecture has exerted on designers such as Koolhaas or Tschumi tend to demonstrate that utopia is not necessarily a sterile concept, that it can steer architecture and provoke its renewal.²⁸

Thus we clearly have something to learn from the utopian tradition, but we must avoid the temptation to idealize it, after having discarded it for so long. Despite its ambition to transcend the flow of historical conditions, utopia is actually deeply historical; its status and content have changed throughout history, and its connection to architecture is thus more complex and ambiguous than usually assumed. Before returning to the present and to what we may have to learn from utopia, I would like to comment on the historical transformation of the utopian discourse and the various kinds of relations it has had with architecture.

THE HISTORY OF UTOPIA AND ITS RELATION TO ARCHITECTURE

Until recently, utopia was often treated paradoxically as a genre that had been created during the Renaissance, while remaining at the same time mysteriously untouched by the flow of history. Recent research breaks this mould, by not only paying attention to

²⁷ The English historian of architecture Reyner Banham had already foreseen this dimension in his pioneering book *Megastructures: Urban Futures of the Recent Past* (London: Thames and Hudson, 1976).

²⁸ On the influence of Radical architecture on Koolhaas or Tschumi, see for instance Dominique Rouillard, "Radical" Architettura", in *Tschumi une Architecture en Projet: Le Fresnoy* (Paris: Editions du Centre Georges Pompidou, 1993), p. 89-112.

the context in which utopia is discussed, but also by considering it as revealing a certain state of affairs, rather than as an alternative to the existing order of things.²⁹

There is also a new interest in activities involved in the name of utopia; many are established social movements corresponding to specific practices, for instance the nineteenth-century utopias such as Saint-Simonianism, Fourierism or Owenism. These movements embraced not only the publication of journals but also the foundation and management of utopian communities. I would now like to identify some of the major turning points, and to underline at each stage the relationship established between utopia and architectural and urban concerns.

The word utopia was coined in 1516 by Thomas More from the Greek *ou* and *topos*, referring to the negation and to the place; utopia was literally nowhere. It was an island far away, on which an ideal society had developed, a perspective which owed a lot to the discovery of the New World, a giant remote island where strange societies could be found.³⁰



²⁹ See Michèle Riot-Sarcey, *Le Réel de l'Utopie: Essai sur le Politique au XIXe Siècle* (Paris: Albin Michel, 1998); Michèle Riot-Sarcey, Thomas Bouchet, Antoine Picon (eds.), *Dictionnaire des Utopies* (Paris: Larousse, 2002).

³⁰ See on that theme Lyman Tower Sargent, Roland Schaer (eds.), *Utopie: La Quête de la Société Idéale en Occident* (Paris: Fayard, 2000).

The view prevailed until the eighteenth century. It was imagined that a traveler had visited this island, perhaps by accident, following a shipwreck for instance. Because utopian texts were usually written in the present tense, utopia was thought of as existing in the present, although in an unknown location.

Utopia's most decisive feature was probably its criticism of the existing social order; however, it was not synonymous with social reform. It was therefore not expected to have any immediate social effects, but rather to act as a lens through which to view the arbitrariness of the social order, which bordered on the absurd. Swift's account of Gulliver's travels is a good example, the various countries Gulliver visits being in one way or another evocative of utopias.

Utopia was less critical in dealing with architectural and urban issues; many utopian texts, beginning with More's, described ideal cities very close to those of which architects and engineers dreamt. There were several reasons for this more positive tone towards architectural and urban improvement. In order to be believable, utopia needed to describe concrete features, such as buildings and streets. From its start, utopian concepts fed upon the architectural and urban production of its time, upon the projects of ideal cities of architects and engineers.³¹

There was an expectation that beyond the critical stance usually adopted by utopians, there lay the possibility of some real social and political progress. Architecture and urban design thus offered a path towards concrete reform. Despite its critical attitude, utopia was even then about hope. But at the end of the eighteenth century, the status of utopia began to change dramatically; having remained most of the time a concept

³¹ Cf. Ruth Eaton, *Cités Idéales. L'Utopisme et l'Environnement (non) Bâti* (Antwerp: Bibliothèque des amis du fonds Mercator, 2001); Lorette Coen, *A la Recherche de la Cité Idéale* (Arc et Senans: Institut Claude-Nicolas Ledoux, 2000).

lacking any clear and immediate prospect of application, it now became increasingly associated with social and political transformation. It became a message capable of universal application, intended to reign everywhere in the future. This transformation is already noticeable in the writings of the late eighteenth-century philosopher Condorcet, whose *Esquisse d'un Tableau des Progrès de l'Esprit Humain* paved the way for various nineteenth-century utopian thinkers.³² The importance of Condorcet's essay should not be underestimated; Karl Marx was one of many influenced by it.

Thus with the disciples of Saint-Simon and Fourier in France, and of Owen in England, utopia further evolved; having been chiefly a literary genre, it now became synonymous with social movements and experiments. In the early 1830s, Saint-Simonianism attracted the bourgeoisie and the workers.³³ Fourierism met with similar success a decade later in both France and in the United States.³⁴ This popularity must be taken into account when dealing with French utopian thinkers of the first half of the nineteenth century. By this time, utopia was firmly established as a political and social movement, whose influence extended far beyond the initial impact of its founding fathers. Now, its relationship to architectural and urban thought changed profoundly; the project to change society gained a spatial dimension, and utopian thinkers began to grapple with architectural and urban issues. The major novelty was the criticism of existing architectural and urban conditions. Owen, Fourier and their disciples insisted especially on the rejection of city slums and industrial suburbs; they dreamt of a new architecture for an age of harmony that would be a complete departure from existing conditions.

³² On Concorcet, see Keith Michael Baker, *Condorcet From Natural Philosophy to Social Mathematics* (Chicago: Chicago University Press, 1975).

³³ Cf. Jacques Rancière *La Nuit des Prolétaires. Archives du Rêve Ouvrier* (Paris: Fayard, 1981); Antoine Picon, *Les Saint-Simoniens: Raison, Imaginaire et Utopie* (Paris, Belin, 2002).

³⁴ On the impact of Fourierism in America, see Carl J. Guarneri, *The Utopian Alternative. Fourierism in Nineteenth-Century America* (Ithaca, London: Cornell University Press, 1991).

However, by becoming universal in its ambition, utopia was threatened even more than before; the call for an urban architectural program of transformation implied a risk of becoming abstract and losing credibility. This explains the central role played by the architecture of the Phalanstery in the Fourierist movement.

The relationship between architecture and utopia had now become symmetrical; not only did utopia borrow from architecture, but architecture itself was increasingly influenced by utopian perspectives. One reason for this was that nineteenth-century architecture began to lose its own sense of direction, confronted as it was by a rapidly changing society and new programs that challenged its traditional knowledge.³⁵ Thus utopia naturally led the quest for an organic architectural and urban expression that would fulfill both the material and spiritual requirements of the industrial age. The chart of the successive styles of architecture published by architectural theorist and journalist César Daly in *La Semaine des Constructeurs* neatly illustrates the influence of utopia upon architecture. Indeed, after listing the major styles of the past, from the Egyptian to the Renaissance, the chart ends with a series of question marks regarding the architecture of the future.³⁶

For some utopian thinkers as well as architectural theorists, the key to such an organic state lay in the past, particularly the Middle Ages, although for Viollet-le-Duc, Gothic was the preferred prototype.³⁷ The mediaeval age was also fundamental for the utopian thinker and designer William Morris, the founder of the Arts and Crafts movement who

³⁵ This is the title of the influential essay of German theorist and architect Heinrich Hübsch. Cf. Wolfgang Herrmann (ed.), *In what Style Should We Build? The German Debate on Architectural Style* (Los Angeles: The Getty Center for the History of Art and the Humanities, 1992).

³⁶ César Daly, "Tableau de l'Evolution des Styles d'Architecture en Regard de l'Evolution des Civilisations Correspondantes", in *La Semaine des Constructeurs*, Saturday 20 July 1889. On Daly's theory, see Marc Saboya, *Presse et Architecture au XIXe siècle: César Daly et la Revue Générale de l'Architecture et des Travaux Publics* (Paris: Picard, 1991).

³⁷ See for instance Martin Bressani, "Science, histoire et archéologie: Sources et généalogie de la pensée organiciste de Viollet-le-Duc". Ph. D. dissertation (Paris: Université de Paris IV-Sorbonne, 1997).

suggested the possibility of England returning to a pre-mechanized state in his 1889 *New from Nowhere*.³⁸ Although the Gothic influence was abandoned, twentieth-century architecture and utopia remained permeated by the nostalgia of a lost state of equilibrium and innocence, which explains the enduring fascination exerted by primitive or nomadic conditions on so many utopian figures as well as designers.

In the twentieth century, utopian concepts reached several defining stages. The most important was the merger between utopian perspectives and mainstream political and economical agendas. The advent of communism promised to many a golden age; others bet on fascist regimes, while some regarded capitalism as a realized utopia. Connections were established between these utopian perspectives and the new practice of large-scale planning. Territorial concerns were already present, but planning as such first appeared on the eve of the twentieth century. As Tafuri rightly pointed out, planning was the essential link between architecture and utopia throughout the twentieth century. The proposals of Le Corbusier were made utopian through planning, as were so many others, such as Ludwig Hilbersheimer post-war dispersion schemes.³⁹

The gradual discovery of what the brave new worlds of communism and capitalism had in stock for man and society caused a strongly negative contra-utopian perspective in the twentieth century. These worlds exerted an especially strong appeal on Radical architecture in the early 1970s. Even more than utopian, Radical architecture can be dubbed as counter-utopian, with projects like Archizoom's No-Stop City, where the urban fabric transforms into a continuous strip saturated with mass consumption symbols. The lack of relationship to the exterior makes it comparable to a prison.⁴⁰

³⁸ Cf. Paul Meier, *La Pensée Utopique de William Morris* (Paris: Editions Sociales, 1972).

³⁹ Ludwig Hilbersheimer, *The Nature of Cities: Origin, Growth, and Decline. Pattern and Form. Planning Problems* (Chicago, Paul Theobald, 1955).

⁴⁰ On this project, see Dominique Rouillard, *op. cit.*

CONVERGENT AGENDAS

Although both utopia and architecture changed throughout the nineteenth and twentieth centuries, their relationship remained defined by several constant preoccupations. It is probably more accurate to speak of a convergence between utopia and modern and contemporary architecture, than to construe their relationship as simply osmotic. The most fundamental convergence was linked to the ambition of reconciling nature and technology, or individual and collective life, at a time when these seemed to be drifting apart. Another was the desire to transform the earth into the "house of man", as the Saint-Simonian utopian movement expressed it.⁴¹ Both utopia and architecture tried to fully equip and manage the earth, even if this implied preserving large territories as natural reserves. This ambition reached one of its climaxes with Buckminster Fuller's reflections on the possibility of inhabiting the entire earth, including the poles.⁴²

The growing gap between the natural and industrial worlds preoccupied both utopia and architecture. Even at the height of technology, utopia presented itself as the filler in this gap, and thus a 'return to the past', or at least to some of its fundamental values, was tempting. Morris was not the only utopian to envisage such a return; the pastoral has always been a feature of utopian discourses. Even now, our digital society revels in evoking a green and almost pastoral future made possible by the substitution of electronic exchanges to physical circulation, a theme present in William Mitchell's influential essay, *City of Bits*.⁴³

⁴¹ The expression was coined by the Saint-Simonian engineer and philosopher Jean Reynaud. See Jean Reynaud, *Prédication sur la Constitution de la Propriété* (Paris: impr. Everat, 1831), p. 23.

⁴² Cf. Joachim Krausse, Claude Lichtenstein (ed.), *Your Private Sky: R. Buckminster Fuller, The Art of Design Science* (Baden: Lars Müller, 1999).

⁴³ William J. Mitchell, *City of Bits: Space, Place and the Infobahn* (Cambridge, Massachusetts: MIT Press, 1995).

Architecture has also repeatedly tried to overcome the gap between nature and the industrial world. The symbolic importance of the terrace roof, is that it is supposed to put man in direct relation with the elements, light, air, wind and plants. Terracing, decking, conservatories and suspended gardens were also put forward.⁴⁴ In the megastructural movement of the 1950s and 1960s, individuals were supposed to roam freely, experiencing natural elements, like birds on a tree. The Pompidou Centre in Paris, with its ascending promenade, is an example.⁴⁵

The convergence took other forms, e.g. references to tents and huts; the tent has become a useful concept for architects and engineers involved in light structures, which in turn relate to the longing for reconciliation between nature and technology.⁴⁶ The longing for a nomadic form of life is a feature of the work of Jean Prouvé and Buckminster Fuller. Ironically, although these designers dreamt of mobile, often ephemeral forms of dwelling, they were also involved in large-scale constructions. The reconciliation between the individual and the collective was another essential objective shared both by utopia and architecture, particularly when the industrial age brought growing conflicts; political and social unrest and the increasingly individualistic character of social life threatened the fabric of society.

Throughout the nineteenth and twentieth centuries, many architectural theorists and practitioners embraced utopian thinking, e.g. Ruskin's theory of ornament. For Ruskin, Gothic ornament in particular was supposed to bear the imprint of individual impulse

⁴⁴ Cf. Antoine Picon, "L'Invention du Toit-Terrasse: Imaginaire Architectural, Usages et Techniques", in François Leclerc, Philippe Simon (eds.), *De Toits en Toits Les Toits de Paris* (Paris: Les éditions du Pavillon de l'Arsenal, Hazan, 1994), p. 35-44.

⁴⁵ On the Centre Pompidou's ambition, see Renzo Piano, Richard Rogers, *Du Plateau Beaubourg au Centre Pompidou*, a conversation with Antoine Picon (Paris, Editions du Centre Georges Pompidou, 1987).

⁴⁶ See for instance Horst Berger, *Light Structures, Structures of Light* (Basel: Birkhäuser, 1996).

while relating to collective inspiration.⁴⁷ The Ruskinian architects Deane and Woodward imposed elaborate decoration on their Oxford University Museum; the relation between the cast and wrought iron structure with its elaborate decor and the hand carved stone sculptures was supposed to express a new equilibrium between collective means of production and individual creative impulse.⁴⁸

The fascination with the ocean liner represented the same concern for the expression of a true collective spirit. In the industrial age, the liner appeared to authorize individual life, while submitting it to a common destiny, a concept mentioned as early as the 1840s by the utopian writer Victor Considérant, the main disciple and inheritor of Fourier. He considered liners to be prototypes of the collective living of the future, and was thus clearly a model for the Phalanstery collective dwelling.⁴⁹



This emblematic character of the liner probably explains why the sinking of the Titanic so gripped the imagination of the public, but despite this catastrophe, the liner remained

⁴⁷ Michael W. Brooks, *John Ruskin and Victorian Architecture* (London: Thames and Hudson, 1989).

⁴⁸ Eve Blau, *Ruskinian Gothic: The Architecture of Deane and Woodward, 1845-1861* (Princeton: Princeton University Press, 1982).

⁴⁹ Victor Considérant, *Description du Phalanstère et Considération Sociales sur l'Architectonique* (Paris: 1848, new edition Paris: G. Durier, 1979).

a source of inspiration for modern architecture. Its cabins inspired the German concept of the existence minimum. With his Unités d'Habitation, Le Corbusier was among those who admitted the influence of the liner as a model.⁵⁰

Beyond the attempt to reconcile nature with technology, or the individual and the collective, another common property of utopia and architecture was their paradoxical attitude towards time and the direction of history. On the one hand, they presented themselves as the logical outcome of history and the prevailing historical conditions. On the other, they both aimed at identifying principles that could resist the erosion of time. Their attitude towards time was characterized by a simultaneous quest for both historical relevance and for permanence, an ambiguity which remained fundamental to architectural modernity; for instance, were the five points of Le Corbusier supposed to be the pure products of their time?

Like utopia, modern architecture often announced implicitly or explicitly the end of history in the very name of history. Despite their harsh criticism of former modernist utopian attitudes, the counter-utopian Radicals of the 1970s were no better; what did their spectacular projects announce, if not the ultimate end of history under the dissolving power of global Capitalism? In such a context, the necessity of architectural form itself, as an historical product, was often challenged.

UTOPIA REALIZED

How should this complex history of interactions, exchanges and convergence between utopia and architecture be assessed? I will argue that it is far from being globally negative, as historians and critics such as Manfredo Tafuri have generally put it. I will

⁵⁰ This is especially clear with the Unité d'Habitation of Marseilles. See Jacques Sbriglio, *L'Unité d'Habitation de Marseille* (Marseilles: Parenthèses, 1992).

begin by addressing the commonly acknowledged shortcomings of the utopian perspective in architecture. The most common criticism is of the failure of the demiurgic ambition of modern architecture, and the sometimes inhuman ambience it has generated. I believe this is a superficial approach to the problem; the real flaw is an excessive desire for reconciliation, as if the world could be pacified once and for all. It is a dangerous temptation for architecture to believe that it has the key to ending conflict rather than revealing its true nature. Similarly, the ambition of terminating history in the name of history is another major flaw, which has often prevented modern architecture and urbanism from adapting to changing conditions, despite claims to the contrary.

These criticisms, of architecture as excessively foundational, parallel those of Peter Eisenmann. Must we engage in some kind of deconstruction to cure architecture from its utopia-related problems, its demiurgic ambition and its tendency not to acknowledge human history? I think not, for at least one reason. What is attributed to utopia often belongs to its double, ideology. As philosophers such as Karl Mannheim and Paul Ricoeur have shown, utopia and ideology are simultaneously both opposed and strangely connected one to another.⁵¹ Both are about society and the projects that can be formed in relation to it. But whereas utopia is about social change and the possibility of a radically different future, ideology tries to stabilize the dominant features of the present. This does not mean that utopia does not care about the present; in *Principle of Hope*, Ernst Bloch stated that utopia is always about the present.⁵² But it chooses in the present the seeds for the expression of radical difference, rather than encouraging the continuation of existing societal norms.

⁵¹ Karl Mannheim, *Ideology and Utopia* (Bonn: 1929, English translation New York: Harvest/HBJ, 1985); Paul Ricoeur, *L'Idéologie et l'Utopie* (New-York: 1986, French translation Paris: Le Seuil, 1997).

⁵² Ernst Bloch, *The Principle of Hope* (Francfort: 1959, English translation Oxford: Basil Blackwell, 1986).

As a deeply social art, architecture is about both the stabilization of existing social uses and their possible mutation. It thus always relates to both ideology and utopia; its foundational character and its presence are probably even more ideological than utopian. The utopian dimension in architecture always has a somewhat disturbing character, which challenges the received categories of monumentality and permanence, even if the aim is to redefine them. In other words, I am not sure that the deconstructionist cure really addresses the question raised by the enduring relation between architecture and utopia.

I now return to the most common criticism of the utopian dimension in architecture, namely the assumption that it ultimately always failed; in fact, I believe that the main goals of utopian architecture have been achieved. One of these was to fully inhabit the earth, to equip and manage it as the "house of man". As philosopher Peter Sloterdijk puts it, the result has exceeded the expectation, for the earth has truly become a house.⁵³ In other words, the world no longer surrounds architecture, it is rather that architecture encloses the world.

As Sloterdijk rightly points out, this situation was already anticipated by the gathering of many nationalities in a single building, the Crystal Palace. We now have to regard our technology as a giant structure sheltering the world, as a glass house shelters all kinds of trees and plants. Buckminster Fuller was prompted to compare earth to a spaceship or to imagine giant domes on the geological scale. If these domes could enclose towns the size of New York, they could also enclose nature and perhaps earth as a whole.

⁵³ See among other writings his *Spheres* trilogy.



By the same token, the conflict between the natural and the artificial has become totally blurred today. As the social scientist Bruno Latour puts it, we live in a techno-nature in which the traditional distinction between the two domains no longer applies.⁵⁴ Genetic modification is an example of this.

Similarly, we have also overcome the typical nineteenth- and early twentieth-century concerns about reconciling the individual and the collective. Our consumer-driven, digitally-equipped society functions through a series of short-circuits between the individual and the collective, as Nicholas Negroponte demonstrated in his 1995 best-seller *The Digital Condition*.⁵⁵ Globalization is also based on these short-circuits, and is often described as a crisis of the intermediary levels between these two orders of reality.

Francis Fukuyama announced 'the end of history' in a famous essay of that title.⁵⁶ Some advocates of digital culture held a similar belief in the capacity of the Internet to put a definitive end to the traditional vicissitudes of history. The "realistic architecture"

⁵⁴ Bruno Latour, *Politiques de la Nature* (Paris: La Découverte, 2000).

⁵⁵ Nicholas Negroponte, *Being Digital* (New York: A. A. Knopf, 1995).

⁵⁶ Francis Fukuyama, *The End of History and the Last Man* (New York: Free Press, 1992).

advocated by Rem Koolhaas and his followers similarly envisaged an ever-intensifying urban present, instead of a radically different future. Thus one might almost claim that the utopian program of modernity has been largely realized, and, contrary to Tafuri's claims, this is perhaps the real reason for the demise of utopia some thirty years ago.

But what does it mean to say that utopia is realized? Koolhas' outlook suggests that this has been, in reality, synonymous with its transformation into a new ideology. The architectural star-system is an integral part of this ideology, embracing the unconditional acceptance of globalization into the new forms of individualism made possible by digital culture.

UTOPIA NOW

Let me be clear that I am not against the architectural star-system, globalization, and digital culture, nor the transformation into icons of projects like the Guggenheim Museum or the Seattle Library. But do we need perhaps to replace them in the perspective of a different future? How can we otherwise restore hope? In the past year, we have forgotten that architecture is also about the hope of a different and better future, and this is its real political and social function. This hope cannot be found in traditional formulas; the issue is no longer to design ideal cities or plans. The first lesson of history is to try not to repeat itself; a new kind of utopian perspective is needed today.

Its starting point must be present day conditions, one of which is the blurring between nature and technology. Sustainable development also has to start from this point; for instance, in projects like the Fresh Kills Park, in New York, created on one of the world's largest dumps, the designers have had to put vents for the gases still produced in the underground as well as all kind of monitors.⁵⁷

⁵⁷ On the Fresh Kills project, see *Praxis*, n° 4, 2002.

The short-circuits between the individual and the collective, and also the local and the global, raise a series of as yet unanswered questions, such as whether we should try to recreate intermediary levels between these orders of reality, or consider that the immediate communication between the particular and the general is an unavoidable fact. If sustainability is among the clearest paths to reconstruction of the utopian dimension of architecture today, the question of the relationship between the individual and the collective remains unclear.

Indeed, the true importance of the individual in a world that is unfolding before our eyes remains unclear. Our age of paroxysmal individual expression, from iPod playlists to blogs, is also one of increased anonymity, because of the sheer number of potential authors. Should architecture participate in the individual screening that is going on from consumer markets to security administrations, or should it rather play on the new conditions created by modern communication media? The answer is far from clear.

Speaking of the individual, one cannot but be struck by the importance of faculties such as sensory experience. Architecture has recently preferred abstract schemes; a return to experiential dimensions may bring back richer sensory experiences. However, the advent of the digital age implies that these sensory experiences differ greatly from traditional ones.

A QUESTION OF MEDIATION

Ultimately, a new utopian concept may necessitate a different sort of relationship between image and practice, which will determine architecture's social impact. The hope it inspires is linked to the perception of how images and projects relate to reality,

and how they can be realized. This in turn raises the question of mediation and media. Key moments in the history of the interaction between architecture and utopia often correspond with a redefinition of the relationship between image and practice. One such instance came at the end of the eighteenth century, when Boullée produced spectacular, innovative drawings at a time when architecture was being regarded as an integral part of the public sphere, and was widely discussed.

The press became the dominant medium during the nineteenth-century. New journals, e.g. the Saint-Simonian *Le Globe* and the Fourierist *La Phalange* appeared, and many former members of the Saint-Simonian and Fourierist movement became founders of, or contributors to, such journals. Similarly, one could argue that Archigram and Radical architecture reflected the reorganization of the relations between image and practice implied by the media of their time, from television to the first computers. Like Pop Art, they participated in this reorganization.

The utopian dimension of architecture is inseparable from the question of how we communicate architectural concepts to the public; digital media present the obvious route, although this is more problematic than usually assumed. Take Toyo Ito's Sendai Mediatheque, or Foreign Office Architect's Yokohama Terminal; notwithstanding the continuous chain of computer documents linking the initial concept to the finished structure, the eventual realization differs markedly from the initial idea. Reinventing utopia today might ultimately not only be about sustainability or contemporary emergencies, as considered by Shigeru Ban; these issues are of course absolutely imperative, but we need also improve the linking of digital imagery to reality. What radically different future lies in such links? This may prove to be one of the questions architecture has to address today.

Laudatio Jozef Uyttenhove

D. Segers

Laudatio Jozef Uyttenhove*D. Segers*

Academic personal, doing research on the history of their research domain, is since a number of years awarded a distinction by the Sarton Committee of the Ghent University. Besides a chair the committee also presents a number of medals coupled to a series of lectures. The chair and the medals are denominated by Georges Sarton who lived between 1884 and 1956. He was a pioneer in the study of the history of science and started his career at our university.

For the academic year 2007 – 2008 the faculty of science could propose a candidate for the Sarton medal and this was Prof. emeritus Jos Uyttenhove.

Colleague Jos Uyttenhove was born in Antwerp on February 22nd 1944. He went to the “Royal Atheneum” in Antwerp and afterwards he started the studies of physics at the former Ghent State University. He obtained the diploma of “Licentiate in Science, group Physics” in 1967.

Immediately thereafter, from August 1967, he was appointed as a certified researcher of the former “Interuniversity Institute for Nuclear Science” (in Dutch abbreviated by IIRW), a subdivision of the form “National Fund for Scientific Research”. He performed research in the field of experimental nuclear physics at the “Laboratory Verschaffelt” with the late Prof. J. L. Verhaeghe. He obtained the degree of “Doctor in Science, group Physics” on May 25th 1971.

He performed his military services in the period between 1972 and 1973. Thereafter he was again employed at our university. He became “assistant” and later on “Researcher in Charge” at the “Physics Laboratory” headed by Prof. Dr. J. Demuynck.

He expanded his nuclear research what in 1985 resulted in a "Habilitation Thesis in Experimental Nuclear Physics".

Colleague Uyttenhove performed research in different disciplines such as nuclear electronics and instrumentation, experimental nuclear physics, natural radioactivity, measurements of low radioactivity levels in-situ, gamma spectroscopy, radon research,... This resulted in numerous contributions at international conferences and about fifty publications in A1 journals.

Colleague Uyttenhove built on his academic career and run through all the different academic levels from University Teacher, Senior Lecturer, Full Professor up to Extraordinary Professor.

Courses belonging to his teaching duties were "Physics", "Experimental Physics" and "Principles of Physics". These courses were lectured to large groups of several hundreds of students in the disciplines of veterinary science, medicine, dentistry, physical education and physiotherapy. He also lectured a course on "Electronics" to students in physics. Undoubtedly colleague Uyttenhove is an expert in the grew up and later development of nuclear electronics. Later on he also founded a course "History of Science", which was an optional course in the discipline "Licentiate Physics" and which was also offered to the engineering faculty.

From January 1991 on Prof. Jos Uyttenhove was director – head of department of the "Physics Laboratory (group 2)". From 1992 till 2000 he was chairman of the interfaculty department "Physics for the biomedical sciences". From November 2001 till September 30th 2006 he was director – head of department of the "Museum for the History of Sciences". During this period of administration he further developed the Museum for the History of Sciences. He actively participated at many international conferences on the history of sciences and he was a member of associated organizations such as SIS (the Scientific Instrument Society), the SIC (the Scientific Instrument Commission) and the

National Committee on Logic, History and Philosophy of Sciences. He also published a number of scientific works on subjects in the field of history of sciences.

From the 1st of October 2006 he obtained the emeritus status. He is still performing active research in his specialty fields such as low activity measurements, natural radioactivity and the history of radioactivity and electronics.

Colleague Uyttenhove will now talk about a subject on which he is an expert: the history and the impact of the evolution of nuclear electronics. The title of his speech is "Nuclear electronics as a pioneer in the development of instrumentation in the 20th century".

**Nuclear Electronics as a pawn in
the development of the
instrumentation in the 21st
century.**

J. Uyttenhove

Nuclear electronics as a pawn in the development of the instrumentation in the 21st century.

J. Uyttenhove

Abstract

Nuclear electronics played a decisive role in the development of scientific instrumentation in the 20th century. To prove this statement, the history of instrumentation is discussed starting with the laboratory equipment in the pre-electronics era (1900). Important milestones in the evolution of instrumentation were the use of vacuum tubes (1920), the breakthrough in electronics during the Second World War (Manhattan Project, Los Alamos, 1943-1945), the advent of computers, transistors and the digitalisation based on integrated circuits.

Introduction: Science in the 20th century

In fact two periods can be distinguished in this century:

-1895-1952 Physics period: discovery of X-rays, radioactivity, nuclear physics, quantum mechanics, theory of relativity, solid state physics... Nuclear electronics is the driving force in the evolution of instrumentation in research laboratories.

-1953-2000 Biology period: starts with the discovery of the DNA-structure in 1953. Modern biotechnology uses techniques and instruments mainly developed in physics research.

In the second part of the century the development in electronic instrumentation is stimulated by the availability of integrated circuits and the rise of digitalisation. New spearheads are space research, navigation (GPS), telecom, biotechnology and medical imaging (CT-scanners, magnetic resonance imaging).

Laboratory equipment in the pre-electronics era (1900)

The famous Pierre and Marie Curie set-up for the measurement of ionisation caused by radiation from radioactive decay is a good example of an advanced electric measuring system around 1900.

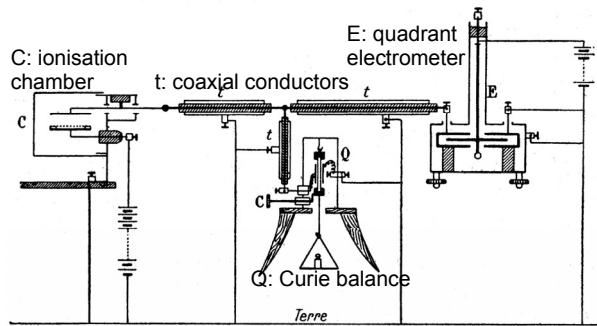
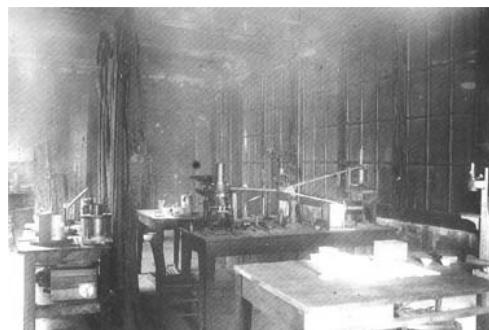
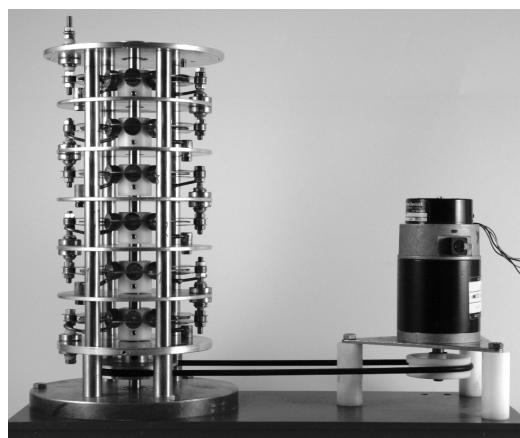


Figure 1. Photograph and schematic view of the Curie set-up with compensation of the ionisation current by the signal from the piëzo-electric Curie balance Q (© Musée Curie, Paris)

The compensation principle provides high sensitivity; coaxial conductors are used against leakage currents and other interferences.

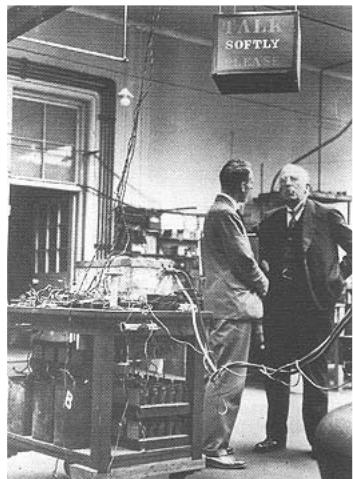


The “Maschinchen” of Einstein [1] - an electro-mechanical pre-amplifier for small charges in the electron charge range - is another example of the ingenious attempts to make sensitive instruments in pre-electronics era around 1910.

It was not really a success. In literature no scientific articles are found where measurements are described carried out with the Maschinchen.

Figure 2. Photograph of a replica built by the Museum for the History of Sciences at Ghent University [2]

Early electronics 1920-1940



Electronics really started when vacuum tubes (triode in 1907 - Lee De Forest (1873-1961), tetrode in 1916, pentode in 1926) became available as active components for electronic apparatus. Vacuum tube amplifiers were widely used in atomic and nuclear physics research to measure small signals from various detectors. Early instrumentation badly suffers from instability, temperature drift, microphonics and limited vacuum tube life time.

The famous Cavendish Laboratory at Cambridge University (U.K.) with director Ernest Lord Rutherford (1871-1937) provides a good example of early electronic instrumentation.

Figure 3. Photograph of E. Rutherford (director at Cavendish Laboratory from 1919 till his death in 1937) with the “TALK SOFTLY” panel warning against interferences by sound vibrations (microphony)

The Great Leap Forward: the Manhattan Project - Los Alamos, 1943-1945



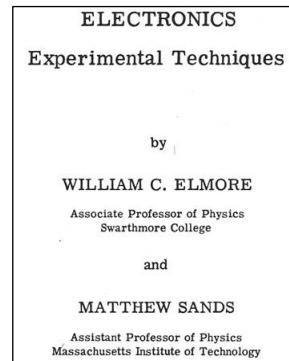
The aim of this huge project (1943-1945) was the development of the nuclear fission bomb; it was headed by General Leslie R. Groves (1896-1970) and scientific director Dr. J. Robert Oppenheimer (1904-1967).

Gen. L. Groves describes the Manhattan Project as “a generation of scientific development compressed into three years”; this is surely the case for the advancement in electronics and instrumentation.

The book “Electronics” by W.C. Elmore contains an overview of the (unclassified) developments at Los Alamos during World

and M. Sands (1949)
electronic
War 2 [3].

Figure 4. Gen. L.R. Groves and Dr. J. R.



Oppenheimer

The title of the book, simply “Electronics”, is revealing: it contains the state of the art of electronics applicable in all fields of research.

Figure 5. Title page of “Electronics” edited by McGRAW-HILL Book Co. (1949)

Some topics from the table of contents in “Electronics”:

Circuit components and construction practice, circuit elements (theory and practice), networks, noise theory, delay lines, amplifiers, feedback loops, oscillators, trigger circuits, multi- and univibrators, flip-flops, clamping circuits, gates, coincidence circuits, voltage amplifiers, pulse-shaping amplifiers, integrators, electronic counters, discriminators, scale-of-ten, integral and differential discriminators, count rate meters, time discriminators, oscilloscopes, generators, sweep circuits, power supplies and control circuits.

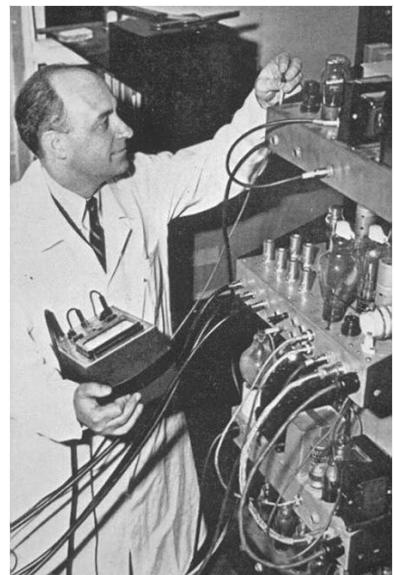


Figure 6. Enrico Fermi (1901-1954) checking the electronics used for the first nuclear bomb test on July 16 1945 at Trinity test site (New Mexico). The Nobel Price 1938 was awarded to Enrico Fermi for his research in nuclear physics

Note the standardisation in the instrumentation in fig. 6:

- 19" rack mounting
- use of "miniature" tubes
- coaxial cables and connectors

Compare the picture in figure 6 with the situation 20 years earlier in figure 3.

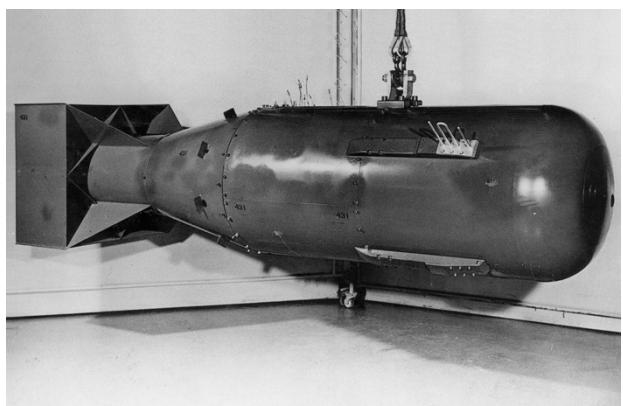
Spin-off the Manhattan Project: isotope separation on industrial scale for nuclear weapons

The scientific results of the Manhattan Project were immediately used for the production of a nuclear weapon. The Hiroshima-bomb was a uranium-235 fission type; the highly enriched U-235 isotope was produced in Oak Ridge in an industrial mass-separation factory, the "Y-12 plant", using hundreds "Calutrons" electromagnetic mass spectrometers.



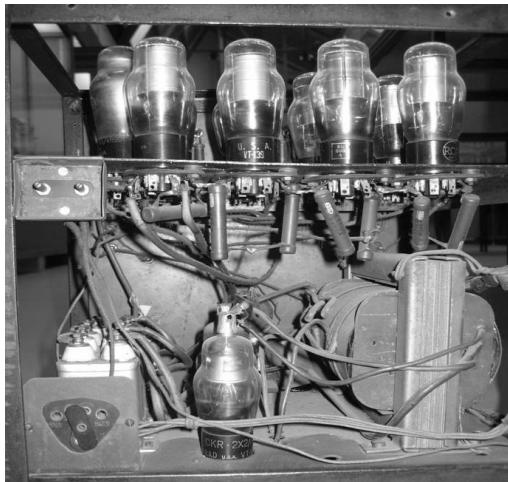
Figure 7. Control room of the Calutron mass-spectrometers at Oak Ridge. In the "Y-12 plant" at Oak Ridge, Tennessee, uranium isotopes U-238 and U-235 were separated on industrial scale to produce the first U-bomb.

Figure 8. First U-bomb called “little boy” was used on August 6, 1945 against the city of



Hiroshima, Japan

Nuclear electronics as a pioneer in laboratory instrumentation (1945-1970)



In the first years after WW2, lot of instrumentation in research was home-made. Commercial firms in the USA and Europe started with nuclear instrumentation lines, based on the experience of the Los Alamos scientists.

Some well-known names in the USA and Europe were: ORTEC, Tennelec, Canberra, ECKO,

Intertechnique, Laben, Baird Atomic, Philips, MBLE...

Later on, new components were used; the semi-conductor devices (transistors) replaced the vacuum tubes during the sixties, but the circuit concepts from “Electronics” remained.

Modular instrumentation in a NIM-bin replaced the old 19” racks

Figure 9 (above). Inside view of a high voltage power supply made in 1947 by the workshop of the Nuclear Physics Lab. at Ghent University with US-army dump material



Figure 10 (right). MBLE spectrometer: Single Channel Analyser with pulse amplifier, discriminator, scalers and power supply, all with vacuum tubes (150x50x40cm³)

The firm MBLE (Brussels, Belgium) produced lot instrumentation for nuclear research around 1960.



Figure 11. MBLE preamplifier PNB 015 for scintillation detector with 3 SQ E90F tubes

The invention of the transistor at Bell Labs, NJ, USA by William Shockley (1910-1989), John Bardeen (1908-1991) and Walter Brattain (1902-1987) in 1947 allowed more complex circuits with lower power consumption and highly improved reliability.



Figure 12. The Nobel Price Laureates 1957 in Physics for the invention of the transistor.
From left to right William Shockley, John Bardeen and Walter Brattain

In Belgium Bell Telephone (Hoboken-Antwerp) had a nuclear division producing advanced transistorised modular instrumentation (NUK-modules) in the early '60s.



Figure 13. Early modular nuclear instrumentation with germanium transistors by Bell Telephone Hoboken-Antwerp (1962). It contains a high voltage power supply for Geiger-Müller counters and a control unit for an angular correlation measurement set-up

Gradually transistors, field effect transistors and later on integrated circuits were used in all fields of instrumentation and NIM (Nuclear Instrumentation Modules) and CAMAC (Computer Aided Measurement & Control) became new standards in instrumentation [4, 5], until now widely used.



Figure 14. Top: low-noise preamplifier model 103 for semiconductor detectors with 6 vacuum tubes by ORTEC (Oak Ridge, TN, USA) 1969
Bottom: transistorised low-noise preamplifier with field effect transistor input stage by Princeton □-TECH (Princeton, NJ, USA) 1971



Figure 15. NIM-modules: shaping amplifier with P/Z and BLR (TENNELEC, USA), SCA-discriminator (Nuclear Enterprises, UK) and 4 kV bias power supply for semiconductor detectors (Wenzel, D)

Introduction of computers in data handling and storage systems

The complexity of the experiments and the large amount of data lead to the introduction of computers in nuclear instrumentation in the '70s.

ESONE (European Standard of Nuclear Electronics) developed the powerful CAMAC-standard (CAMAC: Computer Aided Measurement & Control, EURATOM 1969 [5]) between 1966-69.

A “dataway controller” couples the modules in a CAMAC-crate with a minicomputer like PDP-8 or later on a PDP-11. The data-bus concept was later on generally used in other fields of instrumentation. The CAMAC specifications have been frequently updated (FAST-CAMAC) and CAMAC modules are still widely used in large and complex experimental environments. Microprocessors (80XX, Z80, 6502) allowed build-in local calculating and control power inside the modules in the 80's.

Another approach is the interfacing of NIM-modules (via ADC's) with minicomputers like the PDP-15 and PDP-11 in less complex experiments.



Figure 16. NIM-bin interfaced with a PDP-15/20 Digital Equipment “mini”computer (16 K core memory, TTL-logic, price €125 000) in 1972 at the linear accelerator of the Nuclear Physics Lab. at Ghent University

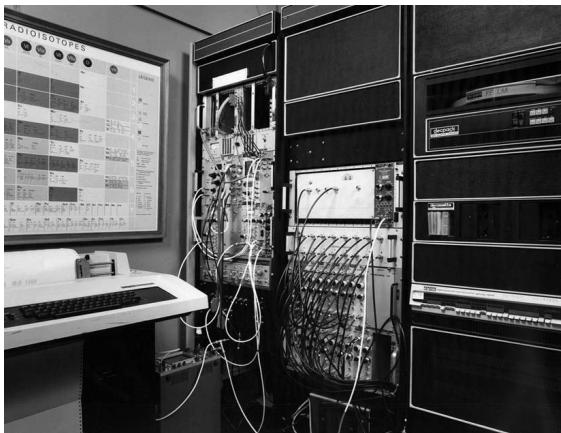


Figure 17. NIM-electronics interfaced with a PDP-11 Digital Equipment computer in the 80's at the Nuclear Physics Lab. at Ghent University (photograph by P. Dorikens, Gent)

The availability of powerful PC's at low prices in the 90's has virtually eliminated the use of stand-alone data acquisition systems like multichannel analysers (MCA). Special data acquisition plug-in cards for PC have been developed by various firms (ORTEC, Nuclear Data, Canberra).

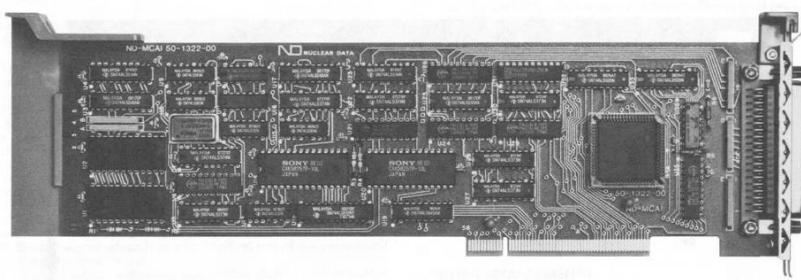


Figure 18. Data acquisition ISA plug-in card for PC by Nuclear Data Systems, Schaumburg, IL, USA

Total integration of a high resolution measuring chain for semiconductor detectors (completely digitally controlled via USB-link to a notebook PC) is recently available. The InSpector 2000 by Canberra Ind. (Meriden, CT, USA) e.g. contains a HV power supply, an amplifier with digital pulse shaping (DPS), PZC and BLR, a 16K ADC with memory

and digital peak stabiliser. The dimensions are 18,5 x 17,3 x 3,8 cm³; mass 1,3 kg and the power consumption is only 3 Watt!



Figure 19. Portable spectroscopy workstation, model InSpector 2000 by Canberra Ind. (Meriden, CT, USA). This completely integrated high resolution measuring chain for Ge-detector is fully digitally controlled by a notebook PC via USB. It has 10 hours autonomy of on a standard camcorder battery pack

Other important consequences of the use computers in (nuclear) physics

Theoretical physics and especially high energy physics were a stimulating factor in the development of “supercomputers” like the Control Data (CDC) and Cray series. The data handling division (DD) of the nuclear physics research centre of the “Conseil Européen pour la Recherche Nucléaire” (CERN) in Geneva, Switzerland played herein an important role [6].



Figure 20 (left). Control Data CDC 6500 at CERN (ca. 1967)



Figure 21 (right). Cray X/MP-48 supercomputer at CERN (1988-1993)

Robert Cailliau (1947), alumnus of Ghent University, and Tim Berners-Lee (1955) conceived and developed the World Wide Web (www) at CERN in Geneva around

1989-1990. The www-concept with URL and hyperlinks was primarily intended as an internal tool in CERN for data exchange and retrieval.

Figure 22. Ir. Robert Cailliau, doctor honoris causa of UGent in 2000

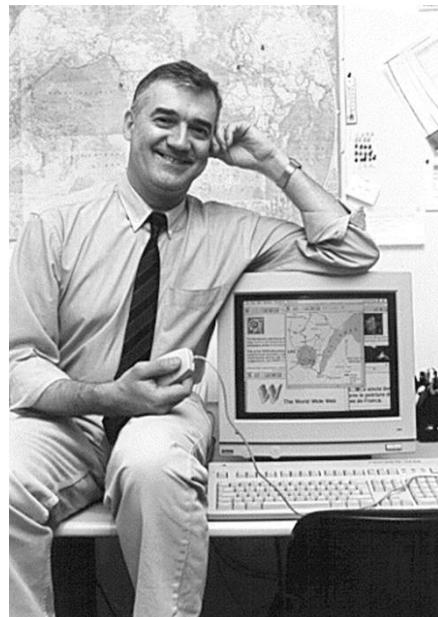


Figure 23. Sir Tim Berners-Lee



Conclusions: from radioactivity to www

Nuclear electronics has played a pioneering role in the evolution of laboratory instrumentation in the 20th century. The Manhattan Project during WW2 caused a real breakthrough in electronic instrumentation. The implementation of computers and

microprocessors in the laboratory environment had a great impact on instrumentation and led to new and innovating applications like the World Wide Web (www – Internet).

The innovating and leading role of nuclear physics was gradually taken over by other research fields: medical instrumentation and imaging, space research, telecom (GSM), GPS etc.

A lot of the research in those new fields was conducted by physicist and engineers, trained in nuclear research and using methods originally intended for applications in that field. The modern medical imaging techniques by CT-scanning and by nuclear magnetic resonance (NMR or MRI) are striking examples of this evolution, as demonstrated by some recent Nobel Prizes for Physiology or Medicine:

-The Nobel Prize for Physiology or Medicine in 1979 was awarded "for the development of computer assisted tomography" to the physicist Allan M. Cormack (1924- 1998) and the engineer Godfrey N. Hounsfield (1919-2004)

-The Nobel Prize for Physiology or Medicine in 2003 was awarded "for their discoveries concerning magnetic resonance imaging" to the chemist Paul C. Lauterbur (1929-2007) and to the physicist Peter Mansfield (1933)

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- M.&L. Dorikens and Paul Dorikens

- Websites of the Nobel Foundation, IEEE, Wikipedia
- Catalogues and documentation from Canberra, ORTEC, Philips, DEC

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