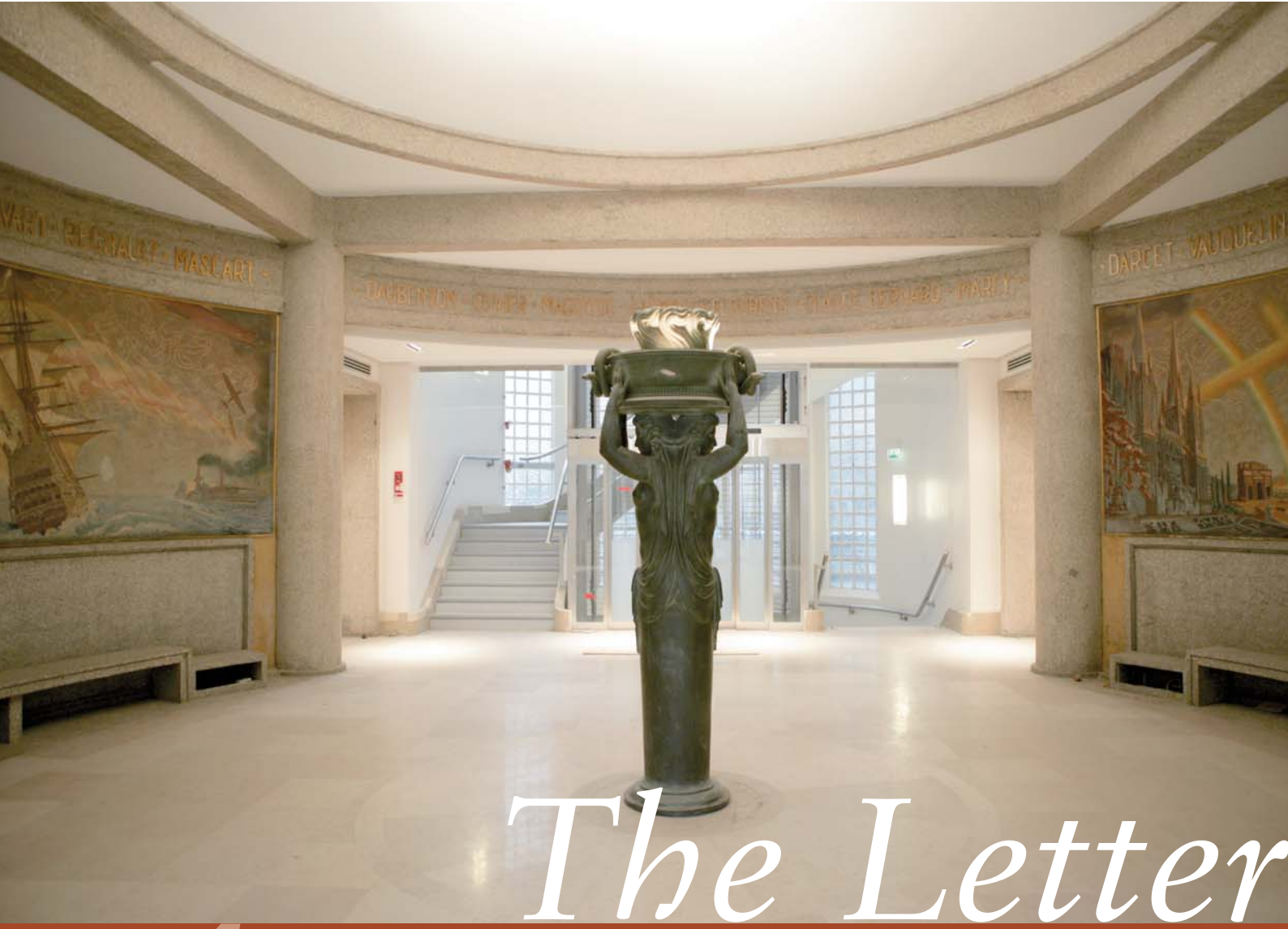


The Letter
of the Collège de France

4

N°4 Academic year 2008-2009

COLLÈGE DE FRANCE
1530

Teaching research in the making

The Collège de France was created in 1530 by François I

The Collège's motto is « Docet omnia »: the vocation to teach everything

The lectures are open to anyone, there are no registration fees, no diplomas are awarded
The program is changed each year

Dissemination of knowledge

- Lectures, seminars, guest lecturers from abroad, international and multidisciplinary conferences: attended by 120,000 people annually
- Publications: abstracts of work under way (*Yearbook*), Inaugural lectures, reopening symposiums and guest professors' lectures, DVDs

Website in French and English (www.college-de-france.fr) (4,500 visits/day), Podcasts (3,350,000 downloads/month), audio and video retransmissions

- Lectures broadcast by France-Culture (800,000 listeners/month)

57 chairs

- 52 Chairs + 5 Chairs renewed annually (Artistic Creation, Information Technology and Digital Sciences, Knowledge against Poverty, Sustainable Development - Environment, Energy and Society, Technological Innovation - Liliane Bettencourt)
- Promoting the emergence of new disciplines
- Multidisciplinary approach to cutting-edge research
- Creation of a new Chair in the scientific domain of every nominated professor (Mathematics, Physics and Chemistry, Biology and Medicine, Philosophy, Sociology, Economics, Archaeology, History, Study of the great civilizations, Linguistics and Literature)

International relations

- Lectures ans conferences delivered abroad
- The professors may deliver some of their lectures abroad (Agreements with: Germany, Belgium, Brazil, Canada, China, USA, Israel, Lebanon, Singapore, Sweden, Switzerland, Czech Republic)
- Foreign professors invited
- Program of reception of post-doctoral researchers from abroad

Research at the Collège de France and training through research

- 4 institutes (Institute of Biology, Institute of the Contemporary World, Institute of Oriental Studies, Institute of Literary Studies)
- 304 researchers
- 148 PhD students and post-doctoral students
- 315 engineers, technicians and administrative staff
- 10 research teams hosted
- Affiliated organizations: Collège de France, CNRS, INSERM, Universities, EPHE, EHESS, Pasteur Institute

The Collège de France libraries

A heritage of rare books and some of the best specialized libraries in Europe
Open to a public of outside specialists

- General library: 120,000 books
- Social anthropology library: 28,000 books
- Libraries of the Oriental Studies Institute: Egyptology, Ancient Near East, Byzantium, Arab, Turkish and Islamic Studies, Far East (India, Tibet, China, Korea, Japan): 500,000 books

Budget

- Operating budget: 14.8 M€
  - State grant: 6.7 M€
  - Own income: 1.7 M€
  - Institutional contracts : 6.4 M€
- Total payroll: 15.1 M€

Sponsorship

- Collège de France Foundation
- Collège de France Hugot Foundation

Relations with the business world

- Contracts with industry
- Budé Committee, corporate managers club

"What the Collège de France is expected to bring to its audiences is not established knowledge, but the idea of free research."

(Ce que le Collège de France, depuis sa fondation, est chargé de donner à ses auditeurs, ce ne sont pas des vérités acquises, c'est l'idée d'une recherche libre.)

Maurice Merleau-Ponty

Editorial

by Pierre Corvol
Administrator
of the Collège de France
Professor,
holder of the Chair of
Experimental Medicine

After the modernization of the lecture and seminar rooms, the inauguration on 26 May 2009 of the renovated premises of the chemistry and biology departments and of the general library constitutes a new phase in the Collège de France's major renovation project.

The renovation of the 8,000m² chemistry and biology laboratories was essential to provide researchers with adequate working and safety conditions. It breathed new life into a long tradition of research in the exact sciences on the Collège de France's Marcelin Berthelot campus, within the same walls that still resound with great names famous for major discoveries: Frédéric Joliot, Francis Perrin, Louis Leprince-Ringuet, Pierre-Gilles de Gennes, Alain Horeau, Jean Roche, Alfred Jost, François Morel – to cite but a few of those who are now deceased.

The Collège's renovation project was launched in 1991 under the impetus of André Miquel, then administrator, following the decision of President François Mitterrand to classify this operation as part of the mission of the President of the Republic's "Grands Travaux". Jacques Glowinski headed the project from beginning to end. Now honorary administrator, he has been charged by the Assembly of the Professors to pursue this mission. Without his skills, his aesthetic sense and his persistence, this splendid project would not have been completed so successfully.

The renovations were possible thanks to the decisive aid of the state, which financed most of the project despite many complex administrative and financial situations that the Ministry of Research and the Rectorat (state education office) helped us to solve. We also benefited from the assistance of the Mairie de Paris, the Ile-de-France Region – for renovating the animal house and the library –, and the Pierre and Marie Curie University – for equipment for our chemistry laboratories.

The support of our sponsors has been crucial. The Bettencourt-Schueller Foundation enabled us to complete the architectural project and to renovate the biology and chemistry laboratories, while the Sanofi-Aventis group participated in the acquisition of equipment for the biology laboratory. Finally, the Collège also used its own funds and maintenance budget to contribute to financing this complex operation.

The objective of the architectural project, designed by architect Jacques Ferrier in 2000, was to create continuity between buildings that were adjacent but had different levels and layouts. The idea was to rationally distribute circulation within and between the buildings, and to create common areas and a cafeteria. In addition the plan was to create a general library in the east wing of the main courtyard, with reserve collections in the basement, as well as a museum-walkway linking the library to the chemistry and biology building. Apart from Jacques Ferrier, architects Jean Bernhart and then Jean-Marie Coustère participated in the design and the work. The appointed project manager Technip TPS was involved in the entire operation from the outset. The contractor for all the renovations and conversions in this phase of the work was EMOC, a public-sector contractor specialized in building projects for cultural purposes.

The buildings inaugurated on 26 May house the CNRS chemistry and biology laboratories of the Collège de France: those of the Chair of Chemistry of Condensed Matter, held by Jacques Livage, and of the Chair of Morphogenetic Processes, held by Alain Prochiantz. They also house young research teams as well as a cellular imagery centre, large equipment for research on molecular structures, and a transgenic animal house. The building furthermore has a superb cafeteria and common areas, a common seminar room and conference rooms facilitating interaction between researchers.

The general library, run by Marie-Renée Cazabon, head librarian, has 2,000m² of floor space and is equipped with state-of-art technologies, thanks to the support of Michel David-Weill. The Collège de France's collection of 120,000 books and its archives, currently stored off

campus, will thus be able to return to the Marcelin Berthelot site and to be made available to its researchers.

All that remains is the final phase: the third stage of the work will concern the complete conversion of an additional 8,000m² of laboratories devoted to chemistry and physics, as well as the creation of a centre for the holders of the Collège's annual Chairs and for foreign guest professors. This project, financed by the state in the framework of the State-Region Contract for 2007-2012, with the support of the Bettencourt-Schueller Foundation, will be launched at the end of 2009 and is expected to be completed in 2012.

Once completed, the lecture halls, laboratories and libraries of the Collège de France will constitute an ideal infrastructure for research and teaching, in the heart of the Latin Quarter with its grandes écoles and universities. All the conditions will be met to nurture truly interdisciplinary research on this site: the diversity of disciplines – physics, chemistry and biology, as well as mathematics and informatics –, the quality of the laboratories, and the physical proximity of the various teams all facilitate access to the teaching imparted at the Collège de France.

We already have a foretaste of what is becoming possible. The arrival of new biology teams is leading to the creation of an interdisciplinary biological research centre with the teams present on site. A call for applications from young biological research teams has recently been put out, so that new researchers can benefit from the excellent working conditions and the Collège's technical facilities. The two young INSERM teams of Christian Giaume and Guy Tran Van Nhieu have moved onto these premises. The first contacts between researchers in chemistry and biology, who arrived recently, have opened new, as yet unexplored research fields. An example? How are the siliceous envelopes formed in the case of diatoms, those plankton micro-algae on which Jacques Livage's and Clément Sanchez's chemists are working? Can their surprising process of bio-mineralization allow for an original encapsulation of biologically active products, or even of cells? Can molecular guides be made to stimulate the plasticity of cerebral tissue, based on the discovery of Alain Prochiantz and his team, concerning a new mode of signalling between cells?

Without any doubt, all these efforts will bear fruit. It is no exaggeration to say that with these renovated infrastructures and this large-scale re-organization, it is really the dawn of a new age of research at the Collège de France. On behalf of our institution, I would like to thank the many people – at the Collège and amongst its partners and service providers – who, in one way or another, have contributed to the success of this operation that has created an exceptional working environment for the researchers at the Collège de France. ■

Professor Pierre Corvol
Administrator of the Collège de France

From left to right:
Pierre Corvol, Administrator of the Collège de France
Valérie Pécresse, Minister of Higher Education and Research
Jean-François Dehecq, Sanofi-Aventis
Liliane Bettencourt, Liliane Bettencourt Foundation

Table of contents

Selected papers

pages

The papers published in this issue of the Letter of the Collège de France in English were originally published in the *Lettre du Collège de France* n° 24, 25 and 26 (academic year 2008-2009).

Institutional News

Facts and Data

Selected Papers

Reopening Ceremony of the Renovated Buildings of Chemistry and Biology, and of the General Library of the Collège de France - 26 May 2009

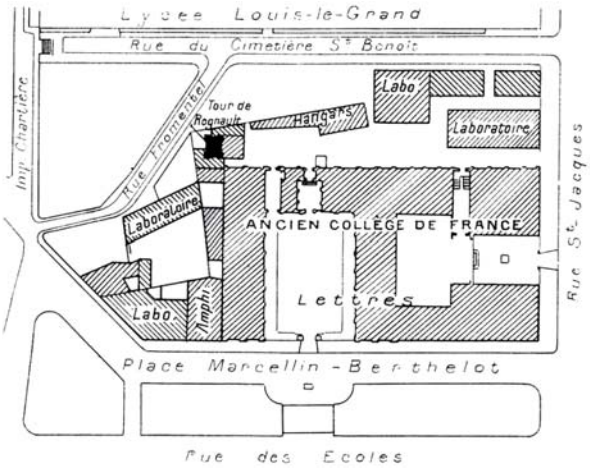
History of the Marcelin-Berthelot site

The Collège Royal was founded in 1530 by François I. "Initially the Collège consisted of four professors or royal lectors: two for Greek, and two for Hebrew. Almost immediately a professor in mathematics joined them, followed by a third lector in Hebrew. In 1534 a seventh lector was appointed to teach Latin. François I subsequently expanded his work and added a Chair of oriental languages, a Chair of Greek and Latin philosophy, two Chairs of medicine, …".

During the 16th century lessons were given in the halls of several Parisian schools, including Cambrai and Tréguier, situated on the site of today's Collège de France. It was not until the reign of Henry IV that the project of a building for all the lectors and the royal library was launched. But as the first stone of the "elegant buildings designed by Chastillon" was laid, the king was assassinated.

The construction was finally undertaken under the reign of Louis XIII but only the east wing of the building was completed, and "according to plans of far lesser splendour". In 1773 the architect Chalgrin resumed the project. He designed lecture halls, the *salle des actes*, a fence and a gate, and created in its entirety what is now the main courtyard.

In the middle of the 19th century, the architect Letarouilly designed an extension of the buildings between the main courtyard and the Rue Saint-Jacques, organized new working areas around the two courtyards, and gave the "old college" the shape that it has today.



Overall plan of the buildings before the beginning of the construction and renovation work in the 1930s.

The 1930s: a grand project for a building to house the exact sciences

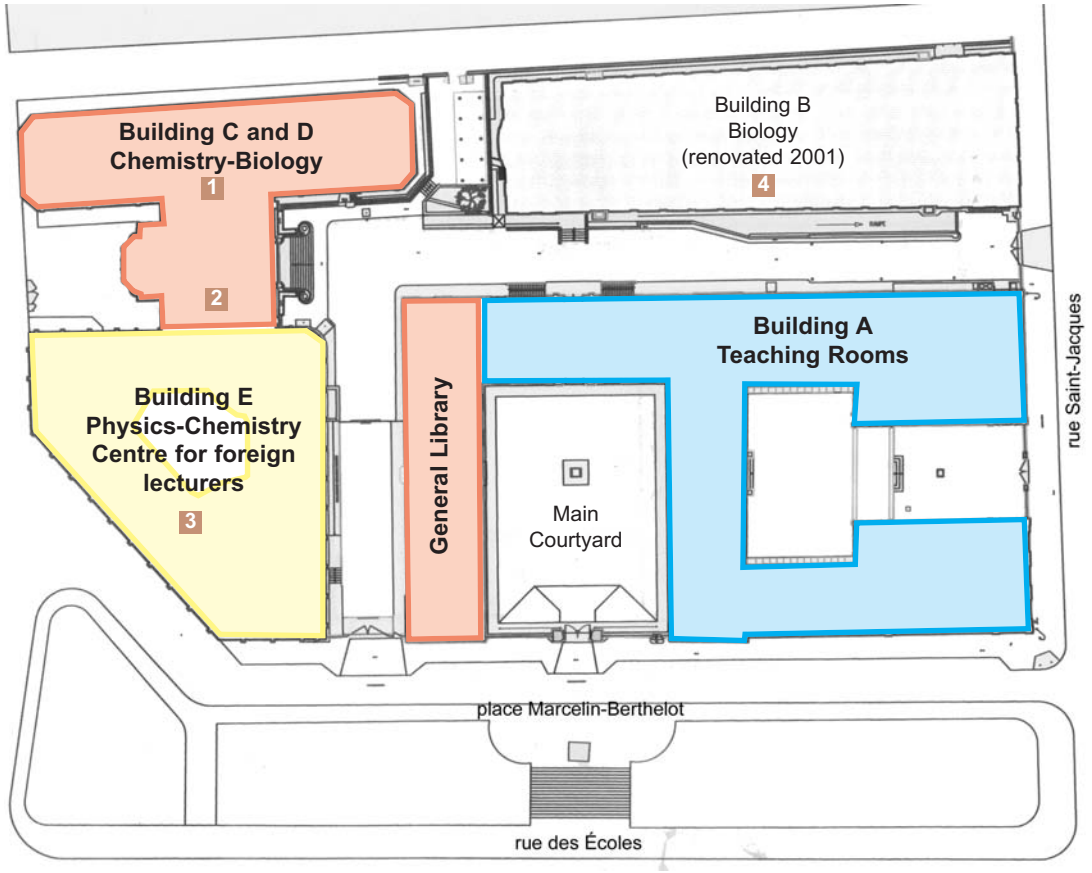
Physics lecture hall.

In the early 20th century the architect Guilbert designed the four buildings adjacent to the "old college" on the south and the east.

The first one, built in 1929, was allocated to chemistry; the second, built in 1933, consisted of lecture halls; the third, built in 1939, was allocated to physics; and the fourth, designed and built by the architect Leconte in 1959, was allocated to biology.

During the same period, Guilbert converted the "old college", transforming former laboratories into offices, converting lofts, and altering the roof on the east and south sides.Since then, various changes and renovations have been made to the existing buildings (conversion of laboratories and offices, transformation of lecture halls) from time to time and as needed. In 1939 the Chairs of Physics were housed in a third building whose renovation will be started at the end of 2009.

Layout of the Collège de France buildings
11, place Marcelin-Berthelot - Paris 5e

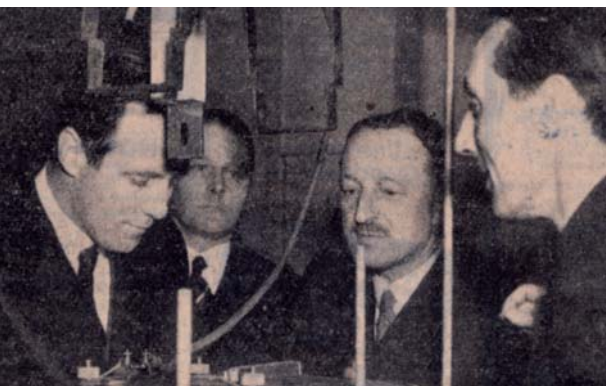


- First phase of the construction work inaugurated in 1998.
- Second phase inaugurated in May 2009.
- Third phase, inauguration scheduled for 2012.

Dates of construction of the buildings.

1. 1929
2. 1933
3. 1939
4. 1958

A long research tradition



The Frédéric Joliot cyclotron, 1938 (on the right, F. Joliot).

Some professors who have occupied the buildings devoted to the exact sciences:
- Jean Nageotte, Comparative History, from 1912 to 1937
- Justin Jolly, Histophysiology, from 1925 to 1940
- Marcel Delépine, Organic Chemistry, from 1930 to 1941
- Jacques Eugène Duclaux, General Biology, from 1931 to 1948
- Léon Brillouin, Theoretical Physics, from 1932 to 1949
- Frédéric Joliot, Nuclear Chemistry, from 1937 to 1958
- Francis Perrin, Atomic and Molecular Physics, from 1946 to 1972
- Jean Roche, General and Comparative Biochemistry, from 1947 to 1972
- Étienne Wolff, Experimental Embryology, from 1955 to 1974
- Alain Horeau, Organic Chemistry of Hormones, from 1956 to 1980
- Louis Leprince-Ringuet, Nuclear Physics, from 1958 to 1972
- François Morel, Cellular Physiology, from 1967 to 1993
- Pierre-Gilles de Gennes, Physics of Condensed Matter, from 1971 to 2004
- Marcel Froissart, Corpuscular Physics, from 1973 to 2004
- Alfred Jost, Physiology of Development, from 1974 to 1987
- Jean-Marie Lehn, Chemistry of Molecular Interactions, from 1979 to 1997

Renovation of the Collège de France (1991-2012), by Jacques Glowinski

Since 1991 the renovation has gradually been extended to all the Collège de France sites.

The renovation project was initiated at the end of 1991 with a decision by François Mitterrand, President of the Republic, to include the renovation of the Marcelin-Berthelot site in the framework of the Mission des Grands Travaux du Président de la République ("President's Grand Building Project Mission"). This decision followed an initiative taken by the Administrator of the Collège de France, Mr André Miquel, who had met Mr Émile Biasini, Chairman of the Mission, and Mr Jack Lang, Minister of Culture.

Mr Jacques Glowinski, Vice-president of the Assembly of the Professors (1991-1999), Administrator (2000-2006), and then Honorary Administrator, was appointed by his colleagues to head this renovation project.

Initially intended for the Marcelin-Berthelot site, this project was extended to the Cardinal-Lemoine and Ulm sites, to the Meudon and Nogent-sur-Marne stations, and to the Hugot Foundation of the Collège de France. It resulted in the reorganization of the location of the Institution's various activities on these three Parisian sites, with a view to promoting its scientific policy, ensuring a more coherent functional organization, and cutting infrastructure and maintenance costs. The renovations already completed have contributed substantially to the development of the policy of openness and the Collège de France's national and international image.

The modalities of use of the different sites or stations warrant a description.

- Marcelin-Berthelot: teaching premises and reception (entrance hall, lecture halls, conference rooms), administrative services, general library, cafeteria, offices of the professors of the literature Chairs, laboratories of the biology, chemistry and physics Chairs and hosted teams, and centre for the holders of international Chairs. The renovation of this site is expected to be completed in 2012.

- Ulm: Chairs of the professors of mathematics and of earth sciences, and the Institute of the Contemporary World (contemporary history, sociology, economics, law). The renovation of this site was completed in 2005.

- Cardinal-Lemoine: specialized libraries, Chairs of the professors of the Oriental Institutes and Chair of social anthropology. The renovation of this site was started in 2007.

- In 2008 the Marcelin-Berthelot station in Meudon was transformed into a residence to house researchers from abroad (58 one-roomed flats).

- After its renovation in 2008, the former Nogent-sur-Marne embryology station was rented out to INALCO, a partner institution of the Collège de France.

- The foreign professors invited to lecture at the Institution are housed at the Hugot Foundation of the Collège de France, the renovation of which was completed in 2008.

The different phases of the renovation of the Marcelin-Berthelot site: a long adventure (1991-2012) and many actors

The renovation of the Marcelin-Berthelot site has involved three main phases of work, financed mainly by the state. In the first phase the Mission des Grands Travaux was appointed as contractor; in the second phase this role went to the EMOC (Établissement public de maîtrise d'ouvrage des travaux culturels). M.L. Tessier, N. Boulay and, more recently, M.L. Maunoury, were responsible for these missions.

- The first phase devoted to the renovation of the teaching quarters (ground floor and first-floor of the basement of building A) and financed by the Ministry of National Education and the Ministry of Culture, was inaugurated in 1998 by the then President of the Republic, Mr. Jacques Chirac. It required a major archaeological campaign and extensive work in the basement to build the Marguerite de Navarre and

Views of the Marguerite de Navarre lecture hall.

Budé lecture halls, conference rooms, the foyer and its outbuildings.

- The second phase, consisting in the renovation of the biology and chemistry laboratories (buildings C and D) and the cafeteria (building D), and the construction of the general library (building A) and of its reserve collections (buildings C and E) was delayed for a long time, for administrative and financial reasons. The intervention of the then President of the Republic, Mr. Jacques Chirac and a decision by the then Prime Minister, Mr. Lionel Jospin, put an end to the deadlock. The operation was financed largely by the state under the State-Region Plan and a subsidy was granted by the municipality of Paris. The Collège de France also received a subsidy from the Pierre et Marie Curie University to host Professor J. Livage's team, and support from the Bettencourt-Schueller Foundation, Sanofi Aventis, and Mr. David-Weill. The Ile-de-France Region contributed to the conversion of the animal house and the library.

After a long period of design, the construction work was finally launched in 2005 and ended in February 2009. The renovated premises were inaugurated on 26 May by Ms Valérie Pécresse, Minister of Higher Education and Research.

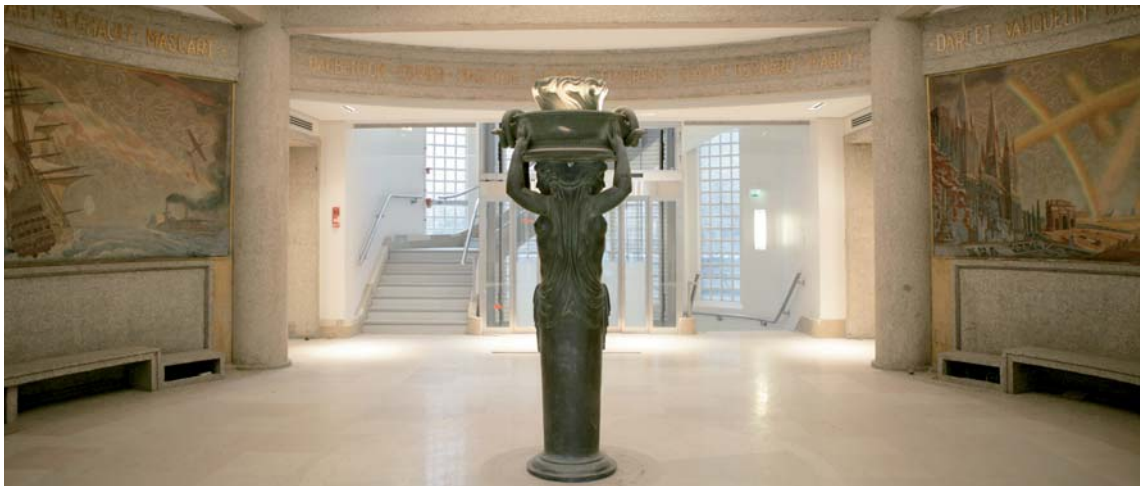
- The third and last phase will consist in renovating the physics laboratories and creating a centre to host the holders of the international annual Chairs (building E). The design work was financed from 2006, and this phase was included in the State-Region project contract for 2007-2012 after the intervention of the advisers of Prime Minister Dominique de Villepin, and a decision by the Ministers of National Education, Research and Technological Innovation, Mssrs. Gilles de Robien and François Goulard. The construction work will start at the end of 2009 and will be completed in 2012.

Several additional renovations financed by the Collège de France were undertaken from 1999 to 2005, in which the contractor was the Collège de France. These consisted in the renovation of the Assembly of the Professors' hall, administrative premises, the reception hall, the literature professors' offices, and the Maurice Halbwachs lecture hall built on the site of the former general library (building A). Building B, in which the biology Chairs and hosted teams are housed, was renovated extensively during this period, with funding from the state and the Collège de France.

Initially all the renovation work of the site was awarded to architects B. Huet and J.M. Wilmotte, in 1992, with P. Mauger of the firm Wilmott as the project leader. For administrative reasons these architects contributed to the execution of the first phase only, and a second call for tenders was put out in 2000 for the second and third phases. This time architect Jacques Ferrier from the firm Technip TPS was awarded the contract (Director: J. Falleur; Project Manager: B. Bellan). Several architects responsible for the project participated in the design and construction: G. Saunier, J. Bernhart and J.-M. Coustère for Phase 2 and F. Marquet and M. Robert for Phase 3.

The additional operations were entrusted to the firms of Mssrs J.-M. Wilmotte, J. Bernhart, Mrs M. Robert.

For these operations, the architects took into account the recommendations of the Bâtiments de France's architects in charge of patrimonial architecture restoration and the objectives set in the programmes of the Collège de France: homogeneity of the architecture inside, legibility of movement and spaces to favour interaction, transparency and clarity of premises, sobriety and solidity of materials (wood, stone, metal frames, etc.).



Entrance hall of the chemistry and biology building.

The second and third phases of the work: an integrated architectural project

The organization of the three buildings C, D and E, situated side-by-side, was particularly complex. These premises were very run-down and failed to meet safety standards. Due to a difference of levels and the presence of two lecture halls in building D, the laboratories were separated into two main blocks, with few possibilities of communication between them.

The guiding lines of the Collège de France's programme were as follows:

- to create an area to receive deliveries, post and maintenance workers in the Impasse Chartière courtyard and the ground floor of building C;
- to locate the biology and chemistry laboratories respectively on the lower and upper floors of building C and the physics laboratories in building E; the first-floor basements of these buildings were to be used for common services (animal house, imagery centre, large equipment, workshops, computer service);
- to group together in the central part of building C the mezzanines of the various floors situated in the wings of the building, to create easily accessible technical spaces for the laboratories; the researchers' offices would be distributed under these mezzanines;
- to use building D as a place of convergence with the conference rooms and common rooms, the secretariats of the biology and chemistry laboratories, and a seminar hall intended for all the laboratories;
- to extend the cafeteria in building D and create a terrace for this cafeteria on building E;
- to reduce the central courtyard of building E to enlarge the physics laboratories, with the experimental rooms facing the outside road and the offices facing the inside road;
- to create a set of offices for the holders of the international annual Chairs and foreign lecturers on the fifth and last floor of building E;
- finally, to create a general library in the east wing of building A (ground floor, first floor and basement floors) with its reserve collection in the second-floor basements of buildings C and E, and a museum area for the Institution's historical objects.

In their summary pre-project, J. Ferrier and his team set out their project to entirely renovate buildings C and E and to create the general library under the east wing of the main courtyard of building A, with its reserve collections in buildings C and E, as well as a museum walkway situated under the inside road and directly connecting the library with buildings C, D and E.

"The different parts of the programme have been treated as a global project with continuities between them. Through the distribution of [spaces for] circulation, a space has been created where one is welcomed, where one can easily find one's bearings, and where one can grasp the organization of this complex of buildings and the research activities taking place in them. As the main entrance on the inside road, building D is the heart of this design. It links up the other buildings and for the first time establishes continuities between each level. This project obviously resonates with the first phase already completed, but it emphasizes the living and functional aspect of this part of the programme. Intended to receive few members of the public, the spaces are above all designed for work, reflection, interaction between scholars, and innovation. This reflects the fact that apart from being a secular institution, the Collège de France is a factory for intellectual ideas."

Functional organization of the renovated parts of buildings C and D

Even though there were changes in this second phase of the work, the main lines of the original programme and the summary pre-project were maintained. The two parts of building C were united to create continuous luminous spaces. The laboratory rooms are located in the wings of the building and the offices and mezzanines at the centre. The different floors and mezzanines are served by an interior staircase and an easily accessible goods lift from the department on the ground floor of the east wing of the building, along the Impasse Chartière courtyard, that receives deliveries, post and maintenance workers, and provides reprography services. The rotunda and the large stairway in building D have been preserved and renovated. The two new panoramic lifts serve all the floors, affording easy access to the biology and chemistry laboratories (and later the physics laboratory of building E), the cafeteria with its different annexes and, in the basement, the common services of the laboratories and the general library with its carrel room, its museum walkway, and its vast store rooms for the reserve collections.

This highly complex renovation necessitated infrastructural ground-work and technical installations of ventilation, air-conditioning and electrical equipment (high- and low-voltage) on the mezzanines of building D, on the terraces of buildings C and D, and in the third-floor basement of building D. Some of these installations are in preparation of the third phase.

The total surface area of these renovations is 9,277m² (8,376m² net floor area) and the overall cost will be 38 million €.

The biology and chemistry laboratories, their technical premises and their common services

These laboratories are located in buildings C (ground floor and first four floors) and D (first, third and fourth floors). The spaces in building C are devoted to experimental rooms and to the researchers' offices, and those of building D to the offices of the directors, the secretaries, the common rooms and the conference rooms. The ground floor and first two floors are for biology and the third and fourth floors for chemistry. About 150 people can be accommodated in this section.

These different laboratories have a common seminar room on the second floor of building D. In building C, with the exception of the fourth floor, all the laboratories have mezzanines used as technical areas (cold room, measurement room, machine room, storage room, etc.).

The common services of the laboratories (animal rooms, image centre, large equipment) are located in the first-floor basement of building C, while the areas for storing solvents, gasses and chemical products are in building D under the Impasse Chartière courtyard. An underground passage is planned to reach building B.

Chemistry laboratory

The cafeteria and its annexes

The cafeteria, with a stunning view of Paris, is located on the fifth floor of building D. It has been enlarged considerably and has a mezzanine which can be reached by an inside staircase. The self-service restaurant and its annexes are situated on the fifth floor of building C in which there is also a reception hall. When the third phase of the renovations is complete, this cafeteria will also have a huge terrace situated on building E. The cafeteria with its mezzanine and reception hall will be able to seat about 150 people.

Cafeteria on the 5th floor of the chemistry and biology building.

The general library and its reserve collections

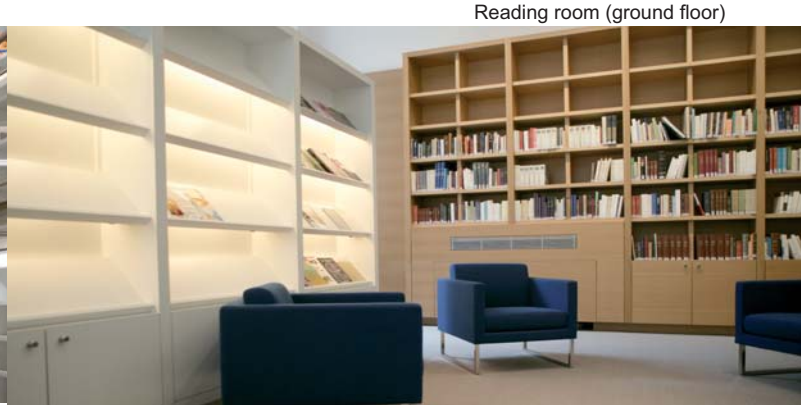
The creation of the general library required major construction work in the basement. The library is arranged on the two sides of a staircase situated at the centre of the eastern wing of building A. Two reading rooms are on the ground floor and two others on the second-floor basement with a mezzanine on the side. These four reading rooms can comfortably accommodate 58 people. From the main courtyard, the main entrance and reception area of the library are situated on the right side of the central stairway.

The offices of the conservators and librarians, which have a view over the main courtyard and Marcelin Berthelot Square, are situated on the first floor, from where one can also reach the hall of the Assembly of the Professors, containing a valuable collection of the Institution's historical works.

One of the basement reading rooms leads onto a carrel room (i.e. with individual reading booths) and onto a long museum walkway with showcases in which various historical scientific instruments of the Collège's collection are exhibited. Situated under the inside road, this museum walkway leads to the landings of the first- and second-floor basements of building D, thus allowing for a direct link between the general library and the biology, chemistry and physics laboratories. The walkway also leads onto technical areas (binding room and material handling) and to several rooms with the library's reserve collection, located on the second-floor basement of building C and in a large area of the second-floor basement of building E (the latter reserves will be created in the third and last phase of the renovation work). ■

Reading room in the basement of the library

Reading room (ground floor)



Multidisciplinarity: a specific feature and an asset of the Collège de France

A multidisciplinary biological research centre

Biological research has always required interaction between different disciplines, especially chemistry, physics and mathematics. In imagery, for example – which plays an important role in biology –, signal analysis, the production of molecular waves, and the development of optical tools clearly all depend on this interaction between disciplines. Examples abound in pharmacology, largely based on in-depth interaction between chemists and biologists. Less intuitively, it is within biology itself that the fields of expertise are necessarily complementary, for physiological questions are so complex that they cannot be illuminated from a single point of view. Cellular and molecular biology, physiology, genetics, evolutionism, development biology, etc., all have to interact, and researchers in these different disciplines have to learn to understand one another better.

This is why it has been decided to take advantage of the new premises made available for research, to create a multidisciplinary research centre on the Marcelin-Berthelot campus of the Collège de France. This centre will and already does bring together independent teams from these different disciplines. With the support of its supervisory authorities, the CNRS and INSERM, this Centre will enable researchers to share tools, to compare points of view, and to create an intellectual community that is in keeping with the Collège de France's tradition and contributes to its influence. ■

Chemists, biologists, physicists: fruitful collaboration

"This building has the privilege of hosting an equal number of biochemistry and biology researchers, which is conducive to extensive collaboration between teams from the two disciplines. Interaction will furthermore be facilitated by: the longstanding tradition that the Chair of Chemistry has of working on biological models such as the morphogenesis of the silica skeleton of diatoms, whose beauty Ernst Haeckel marvelled at; and the Chair of Biology's equally longstanding custom of collaborating with chemists, without whom work on penetrating peptides, vectors of cellular addressing, a speciality of this laboratory, would not have been possible."

Professor Alain Prochiantz

Siliceous envelopes of diatoms

"'Bio-inspired materials' developed by chemists also have remarkable physical properties. These optical, electronic, ionic or magnetic properties pave the way for further developments in nano-materials, communications technologies and renewable energies. They will be able to serve as 'seeds' for future collaboration with the teams of physicists who are going to move into the new buildings."

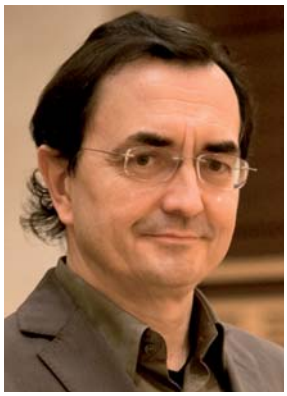
Professor Jacques Livage

Interface Chairs such as the Chair of Chemistry of Biological Processes

"The cell is a chemical factory that can be understood with the specific molecular tools that synthetic chemistry and analytical chemistry produce. At the same time, during several billion years of evolution, living beings have developed molecules with exceptional properties that fascinate chemists. A fine example is enzymes and metaloenzymes which endow cellular reactions with unequalled characteristics of efficiency and selectivity, and which can have biotechnological and industrial applications in the fields of health, the environment and energy. It is these processes that biological chemistry studies and exploits in multicultural and varied collaboration between biologists, doctors and physicists."

Professor Marc Fontecave

CHAIR OF ARTISTIC CREATION – ACADEMIC YEAR 2008-2009



Pianist, Professor at the *Conservatoire national supérieur de musique de Paris* and at the *Hochschule für Musik* in Cologne. Artistic Director of the Aldeburgh Festival

The inaugural lecture is available from Editions Fayard and on DVD (Collège de France/CNED/Doriane co-production) The lectures and seminars are available online in english on the Collège de France's website

Pierre-Laurent AIMARD

gave his inaugural lecture on 22 January 2009.
His course entitled "Parameters and dimensions of musical interpretation" began on 18 February 2009.

Extracts from the inaugural lecture:
"Is it justified to entrust a performer with a Chair of Artistic Creation? Is this not over-estimating the role of a servant of composers and their works? Is it not giving in to the all-too-common tendency to put the performer, whether brilliant or insignificant, in the foreground – a habit that spurs the sensational and all its consequences? On the contrary, I believe that it is a way of taking advantage of the performer's highly singular position as an interface between the secret world of creation and the public world of social interaction. The performer's gift of ubiquity makes him or her particularly well-suited for taking the pulse of artistic creation, and for being an ideal observer of changes in musical cultures, continually underway in a plural society.
[…] For decades, the deepest strata of our past were the subject of abundant work by musicologists and performers. Brought back to life, they sometimes generated marvellous moments of discovery or re-discovery – but also empty modes or dogmatisms. In parallel, what was considered as ***the*** repertoire of so-called classical music (ranging roughly from Viennese classics to the last post-Romantics) was interpreted more and more impeccably, but perhaps generally with less inspiration. Finally, ensembles devoted to music of their period were created and gradually achieved a high quality. This situation corresponded to a world of specialists, sometimes with a high level of competence, but compartmentalized into periods and categories. Thus compartmentalized, musical society resembled – and still resembles far too much – the juxtaposition between other categories, exegetes of Baroque, Romantic heroes and technicians of Contemporary. This situation has nevertheless changed, thanks to the widely diverse actions of many different actors. An antidote to hyper-specialization consists in wanting to embrace everything, often mixing a desire for universality with a fantasy of ubiquity. But assimilating a style or a work with a view to a performance worthy of the name requires time, and poorly-channelled broad-mindedness can easily turn into inconstancy. This danger is evident not only in performing but also in programming: there is a proliferation of programmes where often uncontrolled eclecticism easily results in catch-all 'menus'.
[…] Should the first and most natural priority for a performing musician not be the relationship with the creators of his or her day? The rich contribution of their unorthodox thinking, the "disturbance" caused by the singularity of their approach, the inspiration induced by their original perception, all have an initiatory value. […] They are the visionary architects of a future still to be built.
[…] Yet, throughout the world, the majority of student instrumentalists […] are still being trained according to schemas and especially mentalities that have evolved little or insufficiently since post-Romanticism. The fact that certain temples of world musical teaching are also sanctuaries of conservatism says a great deal in this respect. Stagnation is endemic in certain Far-Eastern countries where outdated Western models are copied. A quasi-industrial policy of teaching music is applied, one as ambitious and impressive in terms of its quantitative and competitive results as it is obsolete in terms of content. […] The world of teaching has a promising future when it proposes a vision in phase with our polycultural environment, turned towards the future and not fixed on nostalgia for another age…
[…] Each performer's repertoire is the reflection of his or her artistic thinking and profound convictions. This connectedness of works is not only a manifestation of his or her identity – tell me what you play and I'll tell you who you are – but also the result of his or her critical view of the musical world: shortcomings to compensate for, educational act. The collective repertoire, a framework of reference in which a musical society lives, is the sum of individual repertoires. How can one build one's own repertoire today? Certainly not by copying models that have had their day but no longer correspond to our multicultural world. It would be more fruitful to organize a network of complex works, attesting to a certain view of history, current events and compositional permanence." ■

Chair of Chinese Intellectual History

Anne CHENG

Former Professor at the National Institute for Oriental Languages and Civilizations (*Institut national des langues et civilisations orientales*) from 1997 to 2008, Senior member of the French Academic Institute (*Institut universitaire de France*)

gave her inaugural lecture on 11 December 2008.
Her course entitled "Confucius revisited: ancient texts, new discourses", began on 14 January 2009.

Extracts from the inaugural lecture:
"The historical evolution of China over the past century forces us into a kind of increasingly participative observation (to borrow an expression from anthropology). Our perception of China can no longer afford to remain at a distance and to construct a fanciful object that can be apprehended as a quintessential whole. In many respects, we still entertain conceptions which were elaborated three centuries ago in the Enlightenment period but are no longer enlightened or enlightening. One cannot help being struck by the representations, both concomitant and contradictory, which prevail at the present time: how are we to reconcile the rationalistic and aesthetic picture of Voltaire's "philosophical China" on the one hand, and the autocratic and Machiavellian China emblematic of Montesquieu's "Oriental despotism" on the other? We must accept to observe and listen more closely, and thereby give up hasty generalizations, however brilliantly seductive and conveniently marketable they may be."
"China itself can no longer be considered as a static object of study, it has become a partner, we should even say an active participant in our debates. The simple reason is that, over the past thirty years or so (approximately one generation), the Chinese have been busy assimilating all the contributions of western social sciences and, even more recently, reappropriating their own intellectual and cultural traditions and patrimony, starting from the treasures underground. The archaeological discoveries which paradoxically started at the height of the Cultural Revolution can be compared, as to their impact and repercussions on our perception of Chinese antiquity, to the discovery of the Dead Sea scrolls: while confirming the authenticity of a number of traditional sources, they challenge many of our assumptions inherited from long accepted common views. At the closure of the Maoist period, the Chinese intellectuals have been seized by a frantic appetite for everything that was new and freshly imported from Western (mainly North American) academic circles. There ensued a succession of "fevers" which have left their imprint on the past decades: cultural, Weberian, pragmatist, structuralist, deconstructionist, post-modern… Since the beginning of the 21st century, the intellectual world has been agitated by yet another fever, that of the traditional revival, which means that China is by now endeavouring to assert full mastery on the reappropriation of its own past."
"To my mind, the intellectual history of China, already so eminently illustrated by Jacques Gernet in this very institution, constitutes *par excellence* a discipline capable of bringing out the continuities and ruptures between different periods, the crises but also the internal dialogues, the various processes of revival, revisit and successive reconstructions of the past, all of which end up drawing up a complete landscape with its highs and lows. Instead of comforting the still enduring preconception of a monolithic tradition of thought or an eternal repetition of the same, we should open up the history of ideas both in the diversity of their socio-political contexts and in the long term. By circulating thus between past and present, we should be first brought to perceive how deeply our reading of the past is conditioned by present presuppositions and how necessary it is to remain immune from the ever powerful temptation of retroprojection, but also to apprehend the importance of past debates for the present time. Eventually, we shall perhaps come to realize that by dint of patiently tracing a tradition in its own terms and reconstituting its own questionings, we may end up observing that some common processes are to be found in the historical trajectories of different cultures. Together with a long term historical perspective, it is just as essential to open up a space for the circulation of ideas and for the cross-fertilization of multiple conversations, of intellectual and textual negotiations, of borrowings and transfers."
"It should by now be clear to everyone that before jumping to comparisons, I like moving about; to pseudo-dialogues I prefer multifarious conversations; rather than otherness which freezes dualities, I search for ways of detecting differences which seize things in the very movement of life, life which is perpetually on the move and to which we must always revert." ■

The inaugural lecture is available from Editions Fayard and on DVD (Collège de France/CNED/Doriane co-production)

Chair Knowledge against Poverty – Academic Year 2008-2009

Esther DUFLO

Professor of Economics at the Massachusetts Institute of Technology, Founder and Director of the Abdul Latif Jameel Poverty Action Lab (J-PAL)

gave her inaugural lesson on 8 January 2009.
Her course entitled "Poverty and Development in the World" began on 12 January 2009.

Extracts from the inaugural lecture:
"In 2005, 1.4 billion people were living on less than a dollar a day; each year more than 27 million children do not receive essential vaccinations, 536,000 women die in childbirth, and 6.5 million children die before their first birthday; more than half the school children in India cannot read a simple paragraph.

Given the scale and complexity of such situations and the shock they provoke, it is tempting to either give up or else propose sweeping solutions that promise to end poverty. […] Under the auspices of the Chair "Knowledge against Poverty," I would like to propose a third approach, one that is ambitious but also cognizant of its limitations. […] I will try to outline the possible role of economics in the fight against poverty, introducing the experimental approach to development economics. [...] The experimental approach requires the researcher to work with the implementing practitioners before the program is launched. It involves randomly selecting a sample of participants from the pool of potential beneficiaries. [...] Not only does this allow us to evaluate a given program, it also allows us, when working closely with the implementing organization, to construct experiments to test one or more underlying theories. [...] Each experiment generates new understanding, sparking new thoughts and motivating additional experiments.

[...] Because of randomization, the experimental method is not based on potentially contestable hypotheses: if the experiment is conducted correctly, which can be easily verified, the results are what they are. If they are surprising, it is always possible to think that they are driven by chance or that they are only valid in that particular context. But the replication of the same experiment can remove this ambiguity. An experiment that yields surprising results catalyzes debate and further experimentation. Thus experiments are, better at testing economic theory. Certainly, theory inspires researchers and determines which experiments are eventually carried out. But, since the experiments can indeed contradict the theory, the validity of the experiment does not depend on the validity of the theory.

[...] Since the program always has the potential to have real consequences in the lives of the participants, field experiments must follow certain strictures. Besides adhering to ethical standards and to the limits set by the implementing organizations, experiments also have the obligation to propose high-quality programs, that have some chance of improving the lives of the participants. These structures hold field experiments within a firm boundary. Yet, unlike retrospective studies or laboratory experiments, field experiments have a subversive power: They force scientists and field practitioners to be contradicted and surprised. This, in my opinion, is their real strength, for it gives us an opportunity to advance both the science and the fight against poverty.

[...] General support for economic growth is essential. But unless the benefits of growth are shared, the support will not realize its end goal – a dignified existence for the greatest number of people. For this, money is not enough; it requires both the political will and the executive capacity to institute effective policy, which requires brave and radically innovative experimentation. [...] This approach is still developing. We can yet realize much richer models.[...] In all cases, the basic elements are microeconomic relationships. And the more we have confidence in our estimates of these relationships, the more we will understand which important elements to introduce into macroeconomic models and what weight to give them.

[…] Taking my part in the challenge of generating of knowledge to fight against poverty is my job and my purpose in life. I am deeply honored to have the opportunity this year to share this passion and this process at the College de France." ■

The Chair receives support from the Agence Francaise de Développement (AFD).

From left to right:
Michel Jacquier (AFD), Martin Hirsch (High Commissioner for Active Solidarities against Poverty), Prof Pierre Corvol (Administrator of the Collège de France, Prof Esther Duflo, Pierre Jacquet (AFD), Prof Philippe Kourilsky and Guillaume de Saint-Phalle (AFD).

The inaugural lecture is available from Editions Fayard. The video is available in French and English on the College de France website.

Chair of Technological Innovation - Liliane Bettencourt

Academic Year 2008-2009

Mathias FINK

Professor at the *École supérieure de physique et de chimie industrielles de la ville de Paris*, Director of the "Waves and Acoustics" Laboratory Winner of the Louis Néel *Grand Prix* of the *Société française de physique* in 2008

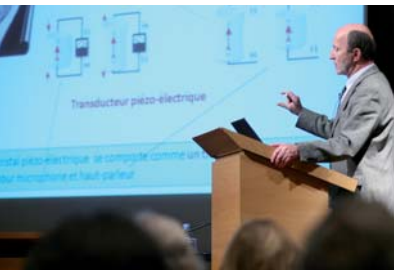
gave his inaugural lesson on 12 February 2009.
His course entitled "Waves and images" began on 2 March 2009.

Extracts from the inaugural lecture:
"I would like to show how a very fundamental research problem turned into a source of innovation. This research is situated at the interface of two main fields in physics: statistical thermodynamics, and waves. It is in statistical thermodynamics that the concepts of the inversion of time and reversibility are examined in the study of the behaviour of a large number of particles, whereas waves are generally studied in very different contexts: acoustics, electromagnetic fields, quantum mechanics, mathematics and engineering. Today I am going to talk about the transposition of particle thermodynamics to waves. The advantage of this thermodynamics is that the observer can become involved in the experience in a surprising way, for example to make a wave relive its past. […]

One of the fundamental findings on which statistical thermodynamics is based, is that we live in an environment which seems irreversible: we see people around us ageing, not getting younger; a drop of colouring that falls into water diffuses, and we never see it reappear in its initial position. This apparent irreversibility of the macroscopic world has always intrigued physicists, as the equations of microscopic physics and mechanics are perfectly reversible.

[…] To explain this tendency towards irreversibility, Ludwig Boltzmann introduced a concept of entropy which, in a sense, measures the disorder of a system of particles. He showed that, when we study a system of particles in interaction […] isolated from the rest of the universe, the natural tendency of all the particles is to evolve towards the greatest disorder; that is, towards maximal entropy. By introducing his famous H theorem, he was the first scientist to propose a microscopic explanation for the time arrow, but he had many critics […]. Some were very harsh: Poincaré pointed out that, if we waited for long enough, any isolated system would end up returning to its initial state. Other critics were more constructive, for instance his friend Loschmidt who proposed thought experiments involving little demons who, at time *t*, would be able to reverse the direction of the speed of every particle (without changing their size), which would enable a system to revert to its initial state. The debates were subsequently enhanced with the study of systems of unbalanced particles which can exchange particles and energy with the outside. This explained why, in certain conditions, the appearance of order was observed in these systems. This field has been explored in depth in recent decades, following the work of Ilya Prigogine. 'The problem of interest to us here is not passively to observe the natural evolution of a system but, from an *engineer's* point of view, to examine the possibility of creating a device that enables us to run experiments in both directions, from order to disorder and then, perfectly symmetrically, from disorder to order. What apparatus needs to surround our system of particles to be able to deliberately reverse the dynamics of these particles?'

To solve this problem one first has to understand what is meant by the statement: microscopic physics is reversible. This statement is linked to the fundamental principle of dynamics, set forth by Newton, which states that a particle on which a force is exerted moves with an acceleration proportional to that force. It is the acceleration of the particle, that is, *the second derived in relation to the time and position* of the particle, that is proportional to the force, and it is the presence of this second derived that induces the reversibility of the laws of mechanics. Reversibility implies the following property when one observes the trajectories of two particles in interaction: if two highly skilled physicists (Loschmidt's demons) were capable of stopping these two particles for an instant, after measuring their speed, and if later on they were capable of sending them back, at the same instant, by communicating to them opposing speeds, then these two particles would have no other possibility but to relive their pasts step by step, in other words, to cover their tracks in the opposite direction." ■



The inaugural lecture is available from Editions Fayard. The video is available on the College de France website.

Chair of Chemistry of Biological Processes

Member of *Académie des sciences*, Chairman of *Conseil scientifique de la ville de Paris*, Silver medal of the CNRS

Marc FONTECAVE

gave his inaugural lesson on 26 March 2009.
His course entitled « La chimie du vivant : enzymes et métalloenzymes, des bio-catalyseurs fascinants » began on 1 april 2009.

Extracts from the inaugural lecture:
"As discussed in the following, chemists have always been fascinated by the molecular nature of life. As a matter of fact, a living cell might just be seen as a very small drop of liquid, made of thousands of molecules displaying a variety of sizes and shapes and exchanging energy and matter with the environment. Small, a cell, but more and more visible, observable and thus objective, as is its molecular content as well, thanks to modern imaging techniques such as microscopy. Life is made from the "informed" matter resulting from the exquisite communication between these molecules, through fine interactions within complex networks, which can anyhow be described by the laws of physics and chemistry. Life also depends on the "transformed" matter derived from a dynamic interconnection of thousands of chemical reactions. So far these cellular reactions proceed with rates and yields with no equivalent in chemical laboratories but nevertheless they are not more than chemical reactions. Because chemistry is the science of "informed" and "transformed" matter, chemists have in their hands unique tools to provide insights into the understanding of the living world.

One important outcome of their studies is the evidence for a remarkable chemical unity of life. As a matter of fact, the same essential molecules and macromolecules, whose number is quite limited, are found in all living organisms, bacteria, mammals or plants. The diversity of the living world is thus not a consequence of a chemical diversity but instead a result of unlimited complex combinations of the finite pool of molecules. It is precisely this finiteness which makes chemistry a suitable science for the exploration of life. Through the prism, admittedly limited but obviously appropriate, of the molecular content of living organisms and with the language and the representations of chemistry, understanding life thus becomes an accessible project….The discovery and the characterization of a new biological reaction can immediately provide useful information regarding hundreds of related reactions. François Jacob, in his book "La Logique du Vivant", nicely raised this issue. It is a kind of economical logic consisting, once a chemical solution has been discovered for a given application, in an extensive exploitation of this solution in all possible applications, before trying to invent a new one…

Chemistry is what all living organisms of the universe have in common: same genes and same chemical components. As a consequence chemistry tells us that our neighbour, white, black or yellow, is not different from ourselves. It links us to the earth from which we all come, since we are just the chemical products of the transformations undergone by the food provided by that earth, and in which we end up, giving back to it, for a new life cycle, all the chemical elements of which we are made. In this return, there is no more life, no more complexity, and no more diversity, but only our cold and endless molecules, at last revealing our profound and obvious chemical identity.

Finally, chemistry provides a connection to our ancestors, the first living organisms on the earth, 3.5 billions years ago. Life exists because it discovered chemical solutions to start the flame and to sustain it and many of these primitive mechanisms have been surprisingly preserved and improved since then. It is chemistry which allows to ask ourselves: "how did it begin?" Finally, it is the molecular unity of life from the origins which gives us the permission to believe that we are eternal, to believe that men have an endless chemical destiny." ■

The inaugural lecture is available from Editions Fayard. The video is available on the College de France website.

Chair in Sustainable Development - Environment, Energy and Society – Academic Year 2008-2009

Henri Leridon, Emeritus Professor at the *Institut national d'études démographiques*

Henri LERIDON

gave his inaugural lecture on 5 March 2009.
His course, entitled "Demography, the end of the transition?" began on 18 March 2009

Extracts from the inaugural lecture:
"Exactly 40 years ago, we experienced an event that was both unique and decisive in the history of mankind […]: the world population growth rate reached an all-time high – 2% per year – before falling back again quite rapidly.

"[…] How can we be sure that a rate of 2% had never been achieved in the past? Because we can apply the laws of demography, most of which were established between 1920 and 1960. Let me begin with the simplest law. In a "closed" population, i.e. a population with no inward or outward migration (as is the case for the world population!) the growth rate is equal to the difference between birth and death rates. The question is therefore to determine these rates for human populations through history. To do so, we need either to have reliable statistics on these populations, or to make estimates based, among other things, on biological factors. We can also combine the two.

"[…] Another reason for believing that the recent demographic trend is historically unprecedented is that we now understand the mechanisms involved. In practically all societies, mortality has declined, but without an immediate corresponding decrease in birth rates. It is this process of *demographic transition* which will form the main thread of my lectures. In short, world population growth in the second half of the twentieth century – from 2.5 to 6 billion inhabitants – is a consequence of progress and economic development in today's most industrialized countries, which have "exported" a part of their success in combating mortality to the less developed world. Because the fertility decline in developing countries has sometimes been much slower (it has barely begun in some parts of Africa), the time lag between changes in mortality and fertility led to a period of rapid population growth that peaked in the 1960s.

"[…] World population trends over the last 100 years have thus been exceptional. If we reason in absolute terms, growth is following a potentially alarming pattern. Planet Earth counted an additional 75 million inhabitants each year in the years 1970-90, and this figure is only now starting to decline. For Africa, the continent which today posts the highest growth rates, the population will increase from 800 million to 2 billion in just 50 years, after doubling in 25 years. It was such figures that sparked the concerns first voiced in the late 1950s and in the following decade. The issue took a new turn with the publication in 1968 of *The Population Bomb* by the entomologist Paul Ehrlich and his wife Anne, and triggered global debate in 1972 with *The Limits to Growth* by Donella and Dennis Meadows. The central theme of these two works, and the focus of their concern, was the rapid and ultimately unsustainable pace of population growth.

"[…] But times have changed, and the debate must now shift away from the issue of "overpopulation". To start with, the 6.6 billion inhabitants of the Earth are here to stay. It is more urgent to feed them and offer them decent living conditions than to argue about numbers. Second, the fertility decline is already well advanced: the mean number of children per woman has fallen from 5 to 2.7. In other words, we are already 80% along the road towards the "replacement level" of 2.2, which may be reached by 2030. In fact, in many industrialized countries, there is a real fear of demographic *decline,* and debate about the risks of excessive population growth has become irrelevant.

"[…] But whether we accept an extensive or restrictive version of sustainable development, there is no doubt that our societies will need to adapt to new constraints and adjust their frame of reference. We will have to change our eating habits, our modes of consumption (of energy especially), drastically reduce pollution levels, and so on […]. And we must ensure that humankind remains central to the overall debate. We too often tend to forget that the economy exists to serve the needs of people and not the other way round. Development must be sustainable to enable future generations to live decently on our planet, not simply to restore the Earth to some indefinable and utopian 'natural' state." ■

The Chair is supported by Total.

The inaugural lecture is available from Editions Fayard. The video is available in French and English on the College de France website.

Chair of The Hebrew Bible and/in its Contexts

Thomas RÖMER

Professor of Hebrew Biblical Studies at the Faculty of Theology and Religious Science, University of Lucerne

gave his inaugural lecture on 5 february 2009.
His course entitled "The construction of an ancestor: the formation of the cycle of Abraham"
began on 11 february 2009.

Extracts from the inaugural lecture:
"[…] Unless I am mistaken, the Chair that you have entrusted to me is the first Collège de France Chair in which the word 'Bible' appears explicitly in the title. Why is this so? Is it simply fortuitous, or does academic France have a problem with the word Bible? Can this avoidance of the word Bible be explained by the idea that scientists can study Hebrew, Aramaic, epigraphy and Semitic antiquities, but that the Bible and its understanding are reserved for synagogues and churches? The Hebrew Bible is one of the great founding documents of the so-called Judeo-Christian civilization and at least of Western civilization. It is also a key element for grasping the birth of Islam and the Muslim civilization. How can history, literature, pictorial art and music be understood, along with certain current geopolitical conflicts, without in-depth knowledge of biblical texts and their meaning?

I am scarcely attracted to the sirens of post-modernity who proclaim the end of history or chant the wonders of subjective or synchronic readings, to the detriment of rigorous research. I am convinced that an understanding of the Bible requires historical study. Of course the danger of circularity is particularly great, for to reconstruct the historical context in which the texts of the Hebrew Bible were written, the most important document is the Bible itself!

As a result of the advancement of literary methods and archaeology, the construction of what can be called biblical historiography is called into question, from an historical point of view. Unlike Assyriology or Egyptology, disciplines which still have thousands of documents to decipher and publish, the Biblical sciences are dealing with a 'corpus clos', a 'canon'. This canon differs, depending on the religion based on the Bible – Judaism, Catholicism, Protestantism – but the books comprising it were published long ago, and it is unlikely that it will ever be amended. Yet the Biblical sciences cannot settle for this canon; they have to examine many other writings and documents without which the canonical texts would never have been written. The entire Fertile Crescent contributed to the constitution of the Hebrew Bible in one way or another. In fact the Bible explicitly shows this. Consider the beginning of Abraham's story in the Book of Genesis. The family of Abram (the first ancestor) is from Our Casdim. It then moves to Harran, where Abraham receives the divine call enjoining him to go to the Land of Canaan, which he covers from Sichem to the Neguev before going into Egypt. Thus, from the outset Abraham covers the entire Fertile Crescent. His initiatory travels describe the geographic space in which Judaism will be born during the Persian era, but also covers the different cultures and empires that influenced the writing of the Hebrew biblical texts.

It is up to the scholar of the Bible to pay justice to the text and to defend it against improper use or interpretations. This is a tricky exercise because the Bible, in its different versions, is the document on which Judaism and Christianity are based. In synagogues and churches, Biblical texts are read and interpreted from a religious perspective; they are intended to feed believers' faith and provide them with references. Scientific analysis is therefore sometimes perceived as a threat, even as hostile, by believers because they see it as challenging the verity of the Bible. The role of such analysis is however not to judge the spiritual value of these texts. Yet certain fundamentalist circles seem to want to turn the Bible into an ideological weapon to defend creationism, inequality between the races or the sexes, the death sentence and other reactionary ethical or political reactions. Faced with these abuses, Biblical scholars cannot escape their responsibility to society. They have to emphasize the fact that the Bible did not fall from the sky, and that these texts were written in very different historical circumstances to those of today." ■

The inaugural lecture is available from Editions Fayard. The video is available on the College de France website.

Chair of Microbiology and Infectious Diseases

Philippe SANSONETTI

gave his inaugural lecture on
20 november 2008.
His course entitled
"From microbes and men: War and Peace at mucosal surfaces"
began on 27 november 2008.

Member of *Académie des sciences*.
Director of the *unité de Pathogénie microbienne moléculaire* and *unité INSERM 786*, *Institut Pasteur*, since 2006.

Extracts from the inaugural lecture:
"As soon as living organisms became multicellular, they were faced with the need to socialize with microbes, the first to occupy the planet, and to establish with them a symbiotic relationship. Model multicellular organisms such as the worm Caenorhabditis, the fly Drosophila do host a resident microbiota and are sensitive to selected pathogens. The systems that govern the gestion of this interface, inherited from some of the most basic mechanisms of development, have remarkably been conserved throuthout evolution, from insects to higher primates. (…) The co-evolution between man and microbes cannot be summarized to the recognition and eradication of pathogens, it has also led to the tolerance of the commensal microbiota (…). As a matter of fact, man is a primate-microbes hybrid. We host ten times more bacteria on our surfaces compared to the number of somatic and germinal cells that altogether constitute our body. The intestinal tract alone hosts most of this microbiota . In this microbial environment, pathogens represent a minority, although their impact is immense: each year, infectious and parasitic diseases kill about 15 million individuals, among which 12 million children, some of them also causing devastating sequellae to the survivors. A disaster with major social and economic consequences in the developing countries that bear most of the burden with about 90% of infections occurring in these areas (…).

The conditions for future emergence of new infectious diseases persist primarily due to socio-economical, environmental and ecological factors. The most impoverished regions of the planet – 2 billion individual live nowadays with less than one dollar per day – will pay the highest toll to emerging infectious diseases in the future. Among the strongest risk factors is the steady growth of the world population (…), the increasing concentration of these populations at the periphery of expanding megapoles, in precarious conditions of hygiene and absence of education, the increasing invasion of forests in search of new resources that increases the chances of encounter of new vectors and wild animals that are reservoirs of innumerable new infectious agents. The steady increase of travels and international exchanges (2.1 billion passengers on airlines in 2006) has turned the planet into a global village where infectious agents travel as freely as individuals. It took little time for the SARS virus to disseminate from a remote region of China to Hong Kong, then Toronto.

The control of infectious diseases is an achievable goal only if we succeed in creating, at the level of the planet, the conditions of a true "sanitary transition" that will need to fulfill requirements as diverse as: the discovery of new infectious agents, the development and use of vaccines against the major endemic and emerging infections, the improvement of sanitary conditions in suburban ghettos, the strengthening of surveillance networks and implementation of quick reaction strategies, particularly in the "South". Internet likely saved us from SARS. The time ahs also come for a true anticipating surveillance, particularly in areas of the planet that are at high risk of transmission of infectious agents from wild animals. One should also consolidate a model of sustainable economy that takes the issue of infectious diseases into account. Private-public partnerships have been implemented over the last years with the aim to achieve very focused programs such as eradication of a disease in a country or zone. Some have met great success, however it is the role of the State leaders to take responsibility for disease eradication on the long term, particularly through major efforts in education and prevention. The necessary funds seem enormous, they are actually negligible with regards to the cost of a pandemics, once it has gone out of control. Research is the best investment that can be proposed (…).

To conclude, I would like to cite Charles Nicolle to whom this lesson is modestly dedicated "*la connaissance des maladies infectieuses enseigne aux hommes qu'ils sont frères et solidaires. Nous sommes frères parce que le même danger nous menace, solidaires parce que la contagion nous vient le plus souvent de nos semblables*". "Understanding infectious diseases teaches to man brotherhood and solidarity. We are brothers because the same danger threatens us, united because contagion often comes to us from our fellow men". ■

The inaugural lecture is available from Editions Fayard. The video is available on the College de France website.

History of India and Greater India

Himalayan and Central Asian Civilizations

First European Colloquium of the European Society for the Study of Himalayan and Central Asian Civilizations, 27-28 April 2009.

Professor Anna-Maria Quagliotti and Professor Gérard Fussman

This stele, found in Fajaz Tepa, a Buddhist monastery in Southern Ozbekistan, was made near-by that place or even at the spot. The subject is Indian: it represents the Buddha, sitting under the fig-tree, i.e. at the very place where he got Awakened.
The style makes it part of the Graeco-Buddhist art of Gandhara, the country whose head-town is now called Peshawar, in Pakistan.

The College de France chair of indology is called, during the time of my tenure, "chaire d'Histoire du monde indien". "Monde indien" is a French rendering of Anglo-Indian "Greater India", a concept not too much different from Sheldon Pollock's expression: "the Sanskrit cosmopolis", which refers to a set of countries whose political divisions cannot hide the much more important fact that all of them have or had at at a time a culture informed by Sanskrit language and literature. For no many people, indologists being no exception, are conscious that the India concept, either in its geographical (the Indian subcontinent bordered by the Arabian Sea, the Bengal Gulf and the Himalayan mountains) or geopolitical (today the Republic of India; at its biggest extent, British India as it was in 1914) limits, is significant for political history only. What we are used to call Indian civilization is a late-comer in many parts of the Republic of India. On the contrary countries which were never part of any «Indian» polity, e.g. Burma, Thailand, Indochina (mainly Cambodia), Śrī Lanka, some Indonesian islands, among them Bali, Java, Sumatra, during parts of the first millenium A.D. at least, were culturally as much Indian as Andhra Pradesh or Bangladesh during that very period. In these countries, non-Sankritic languages were spoken and local gods were worshipped. But the language of culture and politics was Sanskrit as in India proper, or Pali; Upper stratas' cults were Hindu or Buddhist, as in India proper; artists and architects followed the precepts of Sanskrit technical treatises.

North of the Himalaya and Hindukush mountains, Indian influence was linked with Buddhism. Tibet, despite the difference in languages, is the direct heir of Gangetic Buddhism. Many Tibetan monks used to know very well Sanskrit. In Afghanistan, Ozbekistan, Tadjikistan, many Buddhist monasteries were established : these countries were used as a kind of springboard for the monks who brought Indian Buddhist texts and images to China and (undirectly) Japan with much success. But the influx was both ways. From the 2sd c. BC till the 6th c. AD there existed kingdoms extending both North and South of the Hindukush mountains. The Muslim armies then put on the Delhi throne Afghan, Turk or Moghol Sultans. These and their followers during many generations kept to their own maternal language and were able to enforce their tastes on the population.

Having these facts in mind, and wishing to bring together the few European scholars whose subjects extend both on Central Asia and the Indian subcontinent, the European Society for the study of Himalayan and Central Asian Civilizations (http://seechac.org) was established in Paris in 2007. It can be easily understood why the Collège de France, where Sylvain Lévi and Jean Filliozat did so much to show that the frontiers of India extended at times much farther than than the frontiers of the Indian subcontinent, and the Chair of History of India and Greater India hosted the first international colloquium of the newly founded society. The subject of this colloquium was "Artistic creation confronted with political and religious constraints, from the Himalayas to Central Asia, from antiquity till now". Participants could thus choose to deliver a paper on religion (e.g. the creation and evolution of the images of the Buddha and gods) or politics

(e.g. painters and sculptors forced to follow courtly etiquette and conventions). They could on the other end treat contemporaneous subjects such as the modifications of lamaïc danses and traditional Tibetan theater confronted both with the normalizing tendencies of Chinese authorities and the taste of the European and American audiences for which they now often perform.

The colloquium was held on April 27 and 28, 2009. The audience numbered c. 100, among them many scholars. The number of speakers had been limited to 20, so as to give more time to discussions. These were followed with great interest by the audience. The speakers were from France, Italy, Great-Britain, Germany, Canada and the USA also, coming to Paris and staying there at their own expenses, an indication that the newly-founded SEECHAC (French acronym for *Société Européenne pour l'Etude des Civilisations de l'Himâlaya et de l'Asie Centrale*) rouses some interest even beyond the European borders, an indication also of its usefulness for scholars.

This Nepalese painting, bequested to the College de France by Dr. Anne Vergati, shows the King Pratapamalla in 1664 while presiding over a purely Indian ceremony, the weighing of his son against his weight in gold, to be distributed later to brahmins. The style of the building is himalayan, the manner of the painting and the dresses of the participants are reminiscent of the Indian Moghul imperial art. The founder of the Moghul Empire and many of its dignitaries were born in Central Asia.

Many papers were of great quality, dealing with the Oxus Civilization or BMAC, symbols of power in India, Khorezm and Iran, changes in iconography in Tibet and Dunhuang, political circumstances when some important Tibetan monasteries were founded etc[1]. The audience was also impressed by the vitality of studies on Tibet, both ancient and contemporary. By contrast, some important subjects and fields seem now less fashionable. Young scholars would gain at being more interested in them. The emergence of a new generation of young and enthusiastic anthropologists specializing in Tibetan contemporary subjects and diaspora was also a salient feature of these very busy days.

In any case, concerning its main goal, the colloquium was a success: it enabled scholars with subjects and conceptions at first sight very different to meet together and thus benefit in the future from the ideas, methodologies and problematics they could hear being expressed in the papers read out, during the discussions with the audience and in personal talks with colleagues whose names they only knew before. The aims of the colloquium were to break the limitations of specializations; give young and experienced scholars a chance to meet together, get acquainted and confront their views; gather colleagues from every European country with a view to enable them to establish research groups on an European scale, for, considering the small number of scholars and the magnitude of the field, we are in need of constituting such groups for better research and also because European multi-national groups only would be financed by the European Commission.

The next SEECHAC colloquium will be held in Roma, in 2011 most probably for SEECHAC is a truly European association. ■

1. A detailed program of the colloque can be found on www.college-de-france.fr and http://seechac.org.

From left to right: Prof A. de Ricqlès, G. Lecointre (Professor at the Muséum National d'Histoire Naturelle) and G. Boeuf (Director of the Muséum).

150 years after *The Origin of Species*: from Darwin's Darwinism to contemporary evolutionism

Symposium organized by the Chair of Historical Biology and Evolutionism, Prof Armand de Ricqlès, 10-12 June 2009.

"Evolution has been and still is the cornerstone of modern science. More generally, evolution is a key concept of biology, based on the study both of organisms in the past, and of the diverse organisms existing today and the relationships between them. The rapid progress currently being made in the life sciences and medicine is based on principles derived from our understanding of evolution. This understanding stems from the study of increasingly abundant data derived from fossils and, equally importantly, from the application of modern molecular and biological techniques, to the study of evolution. Of course, as in all active domains of scientific research, many fascinating questions remain open, and it is important to highlight certain particularly active aspects of research currently under way, concerning evolution…".

This enthusiastic profession of faith in the evolutionary sciences and their fundamental importance opens a very recent book published by the prestigious Academy of Science and the US Medical Institute, entitled *Science, Evolution and Creationism*. The title of this volume emphasizes certain worrying paradoxes existing presently in our human society which is undergoing rapid globalization. The idea of taking these circumstances into account inspired the organization and content of the present symposium, in the framework of Darwin Year.

A video version of the symposium will be available on the website of the Collège de France as well as on the site CERIMES/ Canal U.

We wanted to open the symposium with a brief look at the history of evolutionism, through the work of historians of science, epistemologists, and biologists. Well before Darwin, some ideas related to what we now call evolution were already in the air and fiercely debated. As Philippe Huneman has shown (Paris I-IHPST), these ideas have taken widely diverse forms within various pre-Darwinian transformism theories. Historiography made Lamarck the real founder of scientific evolutionism, especially in France. St. Tirard (Nantes) showed how interpretations must remain qualified in certain respects. The follow-up of the history of evolutionism, up to the inclusive 'classical synthesis', was related according to a generally chronological but also thematic order by J. Gayon (Paris I-IHPST), Th. Hochet (Paris Ouest), L. Loison (Nantes), J. Deutsch (Paris VI) and G. Periquet (Tours).

These talks have strengthened my conviction that, to adequately conceive of (and teach) the present state in which a scientific question is raised, it is extremely useful to take into consideration its historical development, a fundamental source of understanding. The history (and philosophy) of science has another asset: it facilitates the development of a veritable scientific culture, the utility of which, for the citizen, is becoming fundamental as a critical tool, as the applications of scientific knowledge constitute increasingly vital social issues.

The second part of the programme is longer. The idea was to create an 'inventory' of some of the main aspects of

contemporary evolutionism. Here again, the aim was not to produce some kind of exhaustive list, but only to shed light on certain themes that we saw as being of particular interest, either because of their general scope (J. van Helden - ULB, Brussels) or because they concern a particular current issue (M. Morange - ENS). In a way that may be somewhat questionable (S. Samadi - IRD Paris, A. Barberousse, IHPST), a 'patterns' approach, pertaining to the reconstruction of the historicity of evolution, was distinguished from a 'process' approach focused on the mechanisms underlying this history. This distinction was articulated to reflection on the 'levels of integration' of life forms, from a structural and functional point of view. From the DNA molecule (N. Galtier - Montpellier II, R. Debruyne - Mc. Master, V. Barriel - MNHN) to genomes (M. Veuille - EPHE, D. Higuet - Paris VI, O. Jaillon - Evry-Genoscope) to clades (N. Vidal - MNHN, J-Y. Dubuisson - MNHN), ecosystems (Ph. Grandcolas - MNHN) and their spatial contexts (F. Cecca - Paris VI); from the single cell (P. Furla - Nice) to human beings (E. Heyer - MNHN) and their languages (P. Darlu - INSERM); from the fossilized (D. Goujet - MNHN, I. Rouget - ParisVI) to the present (S. Mazan - Orléans), through the species (A. Dubois - MNHN), M. Laurin - CNRS) and speciation (J-N. Wolff - Lyon I, J. Cubo - ParisVI) or symbiotic complexes (M. Poirié - Nice, M-A. Selosse - CEFE Montpellier), valuable and varied contributions illustrated some highly topical themes and research studies.

From all these talks we can conclude that today evolutionism is, more than ever before, a research field which is active, immense and diversified, as well as profoundly structuring and giving mutual value and meaning to all aspects of biology. From this point of view it is remarkable to observe the constantly renewed heuristic value of the 'research programme' offered by evolution. One of the most encouraging current aspects is the remarkable perception, now shared by all the actors, that all the levels of integration (from the molecule to the ecosystem) are simultaneously indispensable for an understanding of the living world, and that research is therefore legitimate at all these levels. Longstanding (and fierce) oppositions between 'structuralists' and 'functionalists', between 'naturalists' and 'molecularists', etc. will thus be healed, to the benefit of the advancement of knowledge.

It may seem surprising that the theme of the third and last part, 'Teaching evolution today', has its place at this symposium. Only thirty years ago it would have seemed unthinkable, in a country like France, for voices to be raised in protest at the teaching of scientific evolutionism in French schools (O. Baudouin and C. Brosseau). All this poses a series of problems that are not only scientific but also pedagogical (C. Fortin – INRP, A. Mamecier and D. Rojat – General Inspectorate, Ministry of National Eduction), societal and, in the final analysis, political, in the best sense of the word. The question is raised not only in France, as we have seen (K. Padian - Berkeley), it is also a globalized issue (G. Lecointre - MNHN). A refusal of scientific evolutionism by many cultures or human communities could have disastrous practical consequences. This 21st century is effectively going to be one of unprecedented crisis on the scale of human history, affecting all aspects of biodiversity and the earth's environment (A. Dubois - MNHN). Faced with such challenges, now more than ever before the full integration of the evolutionist perspective ought to be a fundamental issue in education throughout the world." ■

Professor Armand de Ricqlès

Gilbert KAENEL
Professor, Head of the Cantonal Museum for Archaeology and History in Lausanne (Switzerland),
invited by the Assembly of the Professors
on the proposition of Prof Christian Goudineau.

He gave four public lectures in January and February 2009 entitled:
The Archaeology and History of Ancient Switzerland: Recent Developments.


© Ph. Maeder/24H

The extraordinary development of archaeology, in particular preventive archaeology, in the last thirty or forty years, has yielded a considerable amount of material documents and contextual information which need to be approached and analysed from a historical perspective. Focusing on the study of contemporary Switzerland, more specifically the Middle Land between the Jura mountains and the Alps, these lectures situated Switzerland and its arbitrary borders within a wider research dynamics which included France and Germany, among others. They drew on research currently in progress, most of it unpublished, whose authors were properly acknowledged.

The Celts, the Helvetii and their Neighbors

The first lecture opened with an overview of the history of research in Swiss archaeology since the middle of the 19th century and its indisputable achievements (dendrochronology, Celtic burial sites from the 5th to the 2nd century BC, eponymous site of La Tène…). It stressed the continuous occupation of the territory for about a thousand years, from the Late Bronze Age to the beginning of the Roman period. Although the presence of a Helvetian is attested by a graffiti in Mantova (Italy), his origin cannot be determined: Did he come from Southern Germany, as some ancient sources (e.g. Tacitus) indicate? Or from the Swiss Plateau if we favor archaeological data? "Material culture" (funeral rites, costume, decorations, archaeological objects…) allows us however to distinguish in the 1st century BC between the alpine people of the Valais (Nantuates, Veragri, Seduni, Uberi), the southern alpine people of Graubünden and Ticino (Raeti, Lepontii), the Helvetii of the Swiss Plateau and even their neighbors from Geneva (Allobroges) and the Basel region (Rauraci). The archaeology of the territory assigned to the Helvetii in Caesar's *Bellum Gallicum* has brought to light two concentrated areas with distinct finds: a western one which we may attribute to the *pagus* of the Tigurini, and an eastern one, both distinguished by the remarkable absence of any connections between them.

Helvetii oppida

The first Helvetii towns were the subject of the second lecture. In the course of one generation, the scope of reflexions on this topic has been considerably broadened by excavations and research: four new ramparts, two new *oppida*, and a profound overhaul of existing interpretations… The finer chronological sequences of the second half of the 2nd and 1st centuries BC (about 25 years) are no stranger to these reappraisals. A few examples will suffice. Situated in the western part of the Plateau, Bern (Brenodurum according to a zinc plate unearthed in 1984), is without doubt the Helvetii's main *oppidum* with 140 hectares, a rampart made of frontal posts, several settlement layers, areas reserved for worship (deposit, sanctuaries), and a few clusters of tombs outside the walls. By contrast, Mont Vully, a large stronghold of about 50 hectares established about 120 BC overlooking the lakes of Morat and Neuchâtel (and La Tène directly below), remained practically unoccupied. Yverdon-les Bains, on a shoreline at the other tip of Lake Neuchâtel, is a smaller site of about 3 to 4 hectares settled as of the 4th century BC and fortified in 80 BC with a formidable rampart made of frontal posts, as in Mont Vully. This *oppidum* (Eburodunum) would become a vicus, like that of Bern, during the first centuries AD. In eastern Switzerland, we should mention the double *oppidum* of Altenburg (Germany) and of Rheinau on the Rhine, as well as Zurich where recent finds at the heart of the medieval town have established without a doubt that, contrary to what had been written for decades, there did exist a Late La Tène settlement under the vicus of Turicum. Moreover, the rampart of the *oppidum* at Windisch was uncovered as late as 2003 after more than a hundred years of excavations in the Roman camps of Vindonissa! By contrast, little is known about agricultural complexes and farms on the territory attributed to the Helvetii: if we follow the figures given by Caesar, we can identify about a dozen oppida, but we are very far from the 400 vici and numerous privata aedificia!

Tombs and places of worship: breaks and traditions

This was the subject of the third lecture. Information provided by the world of the dead, in spite of the paucity of

tombs, opens the door to an understanding of persons and their identity within the group by studying changes in costume and ornaments. A break in the occupation of burial sites can be observed during the first half of the 2nd century BC together with the revival of cremation rites. As with dwelling places, archaeology enables us to divide the Swiss Plateau according to funeral practices but we should not rush to assimilate *de facto* such changes in these practices to breaks in the settlement (although we wish archaeology could have helped us corroborate ancient sources which alluded to the "arrival" of the Helvetii on the Swiss Plateau from Southern Germany….).

As far as the broad sphere of worship is concerned, new investigations and discoveries have added to an expanding body of knowledge: the La Tène site, on the banks of the Thielle River at the easternmost tip of Lake Neuchâtel, whose 150th anniversary of the discovery was celebrated in November 2007, played a central role, on a par with Alésia and later Bibracte, in the definition of the Late Iron Age which bears its name. La Tène is viewed today, like the sanctuaries of Belgian Gaul (especially Gournay-sur-Aronde), as a sacred spot where war trophies were being displayed in the late 3rd century BC, together with an array of ornaments and objects of domestic life (over 4000 items) whose inventory and analysis are under way. Horse skulls on spears, human craniums showing traces of violence and *peri-mortem* handling are also part of this elaborate display. The exceptional site at the top of the Mormont hill, between the Jura mountains and Lake Geneva, was discovered in the Summer of 2006 and is still being excavated: some 300 pits dug deep to receive offerings have yielded dozens of sacrificed animals which were either hurled headlong into the pits or quartered beforehand. About thirty human skeletons, some buried in a crouching position inside trunks (as in Acy-Romance in Picardy), others showing traces of dismemberment or whose flesh had been removed, are strewn among animal bones and archaeological objects which probably stood for offerings. Among the ornamental objects (fibulae, glass pearls…), the metal and ceramics containers, the tools for agriculture or craft, and the nearly hundred grindstones, not a single trace of weapon was found! What event(s), what fervor could account for such extensive sacrifices, a mere generation or two before the Conquest of Gaul, as the Cimbri and the Teutones were raiding the land? What God, what divinities were being worshipped there? Chtonian? Fertility? It is difficult to answer in the absence of historical sources.

The site of the Mormont (Canton of Vaud, Switzerland)
Bronze situla with iron clips and handle
© Archéologie Suisse 30, 2007.1.

After the Conquest of Gaul: Gallo-Roman "Switzerland"

The final lecture dealt with the end of Helvetii independence and the gradual fall of their territory into the orbit of Rome. The various political and administrative breaks cannot obscure the existence of an indisputable cultural continuity which can be observed in particular in religious practices. We shall only mention here the exemplary case of Aventicum-Avenches, the future capital of Roman Helvetia. Latenian evidence has mushroomed in the last twenty years, especially in a wide area where numerous temples would be erected: cremations from the second half of the 2nd century BC, bodies buried in a crouching position under the eastern entrance of what would become a circular temple, Caesarian vestiges probably related to banquet practices, in short numerous traces that testify to the persistence, as of the Late La Tène period, of the sacred vocation of this sector, east of which the Gallo-Roman city would develop. The *oppidum* of Bois de Châtel overlooking the plain near Avenches has yielded a coin bearing the name of Vatico which can be traced back by its coinage to an earlier find; these point no doubt to a Helvetian (Tigurian?) nobleman, such as the famed Divico of history books.

As far as military aspects are concerned, surveys in 2007-2008 at the Col des Etroits, the Jura pass that connects Pontarlier and Yverdon, have uncovered nails from the *caligae* of legionnaires (Roman and/or auxiliary), some weapons and various objects dated between the defeat of the Gauls at Alésia and the beginning of the Augustan age, namely in the third quarter of the 1st century BC. Their presence will need explaining. In eastern Switzerland, at the foot of the Alps and along the Rhine, the current re-evaluation of the dates and meaning of towers and camps known for centuries leans toward viewing them as strategic advance posts for Augustus' planned German campaigns. In the Alps, among the Raeti, evidence of the crossing of Roman troops which took part in the campaigns of Drusus and Tiberius in 15 BC has been confirmed by shoe nails, a handful of weapons and ornaments, and catapult balls from the third, tenth and twelfth legion. Fights there involved a local population unable to oppose the might of the Roman army.

The revisions of history induced by archaeological discoveries of the past thirty or forty years are thus far from insignificant; they illustrate the necessary dialogue between different yet complementary aspects and approaches of the sciences of Antiquity. ■

Dinesh PAI

Professor at the University of Vancouver (Canada),
invited by the Assembly of the Professors
on the proposition of Prof Alain Berthoz.
He gave in May and June 2009 four lectures entitled:

Computational Models of Human Movement

1. Creating virtual objects that look, feel, and sound real
2. Automated capture of human movement and object behavior
3. What robots teach us about human movement
4. Modeling the neurobiology of human movement

The theme of this lecture series is how we can understand human movement by exploiting new developments in computing. In the course of the four lectures I will show how computer science has embarked on an exciting new journey to understand physical and physiological reality. Specifically, new computer simulation methods with unprecedented levels of realism, combined with new imaging and measurement methods that allow us to create virtual environments in which the complexity of human movement could be understood.

Lecture 1: Humans move and experience the real world by exploiting all their available senses, including vision, touch, and hearing. This is because real objects respond to human interaction in a multisensory manner, by resisting touch, moving, changing shape, and making sounds. Therefore, virtual environments should also provide such correlated multisensory information that is both realistic and responsive to human interaction. This first lecture will introduce recent developments in my laboratory and elsewhere for creating multisensory virtual worlds with computer graphics, haptics, and auditory displays. I will describe the dramatic changes in computer hardware, and the efficient new algorithms for interactive simulation of contact between humans the physical environment. In addition to applications in computer games and movies, these developments allow realistic study of how humans interact with their environment.

Lecture 2: To build computer simulations that are realistic and useful it is essential measure real behavior. Traditionally these types of measurements were tedious and time-consuming. In this second lecture, I will describe modern imaging and measurement systems that make measurement-based modeling much more tractable. Medical imaging techniques, particularly MRI, make it possible to acquire accurate anatomical and behavioral models of human subjects in unprecedented detail. High speed motion capture systems enable accurate measurement of complex human movement such as facial expressions. Finally, new robotic systems that can probe physical objects can automatically acquire behavioral models. I will give examples from work in my laboratory to illustrate how this is done. The examples include the UBC Active Measurement Facility (ACME), a telerobotic facility for ``reality-based'' modeling physical properties of objects, including its shape, appearance, deformation response, sound, and surface roughness.

Lecture 3: Much of our current understanding of human movement is descriptive. To have a deeper understanding, it is important to appreciate the physical constraints on any organism, whether human or robot, that must successfully interact with the physical world. As Horace Barlow observed: "A wing would be a most mystifying structure if one did not know that birds flew". Indeed, classical qualitative knowledge about feathers and flapping, known to Icarus, did not provide the keenest insight; rather, it was the modern quantitative knowledge of aerodynamic lift, turbulence, stability, and control. The third lecture will describe how building robots can give us similar insights into the requirements for successful movement, and provide a rigorous test of our understanding of human movement. Using robotic hands and walking robots as examples, I will describe how the successes and failures of robotics are teaching us what is really important about human movement.

Lecture 4: The final lecture will describe computational models of the complex interplay between neurons, muscles, bones, sensors, and other tissues that produce human movement. Combining recent developments in multisensory computer simulation, novel measurement techniques, and the insights from robotics described in the previous lectures, I will show how we can build detailed models of the human sensorimotor system and its interaction with the physical world. I will describe the beginnings of this quantitative approach, focusing on two areas of my current research: the control of eye movement and manipulation with hands. These computational models promise not only deeper insights into how the brain controls movement but also new applications to human health. ■

Clément Sanchez
Head of "Matériaux hybrides" (UMR 7574),
laboratory Chemistry of Condensed Matter

Spray synthesis of nanomaterials for catalysis, a wind of change

Aluminosilicate zeolites are microporous crystals used as heterogeneous catalysts for petroleum transformation. Most part of time their porous networks present microporous restrictions of size below 1 nm, which limits their application to small molecules. Since their first industrial application 45 years ago, an alternative low-cost material presenting similar acidic properties, high surface area and larger pores is needed for using at the best the huge volume of heavy oil available made of high molecular weight molecules. A first part of the problem was solved in 1992 with the first preparation of mesostructured aluminosilicate materials presenting periodically organised pores at mesoscale.

Although, their amorphous nature reduced their potential activity, as a result of their moderate acidity, and hydrothermal resistance. A solution to this problem was found by a research team of the Laboratoire de Chimie de la Matière Condensée de Paris leaded by Clément Sanchez (UPMC/Université Pierre et Marie Curie-CNRS-Collège de France), in collaboration with researchers of the Institut Français du Pétrole.

By coupling sol-gel chemistry with a very low-cost and environmentally benign aerosol shaping process, LCMCP researchers successfully produced spherical submicronic particles which internal porous cavities are at the same time tunable between 4 and 50 nm and exhibits a very high Bronsted acidity. For synthesizing such materials named LAB (for Large pores Aluminosilicates prepared with Basic solutions), they use a spray generating a mist of micron size droplets containing silica and alumina molecular precursors, and two organic structuring agents. Upon heating, droplets solvents (mainly water and residual ethanol) are evaporated and non volatile organic and inorganic components spontaneously self-assemble and form in a few seconds a dry powder exhibiting a mesostructure with periodically organized organic and inorganic nanodomains. This physico-chemical quench allows the "freezing" of materials with new chemical compositions in metastable states which are hardly achievable by the usual precipitation method that favors usually the thermodynamical products. In a second time, the calcination of organic agents allows producing micro and mesoporous catalysts microspheres exhibiting amorphous and very acidic walls.

At the difference of the classical precipitation pathway, aerosol process involves a very limited number of preparation steps, produces material continuously,

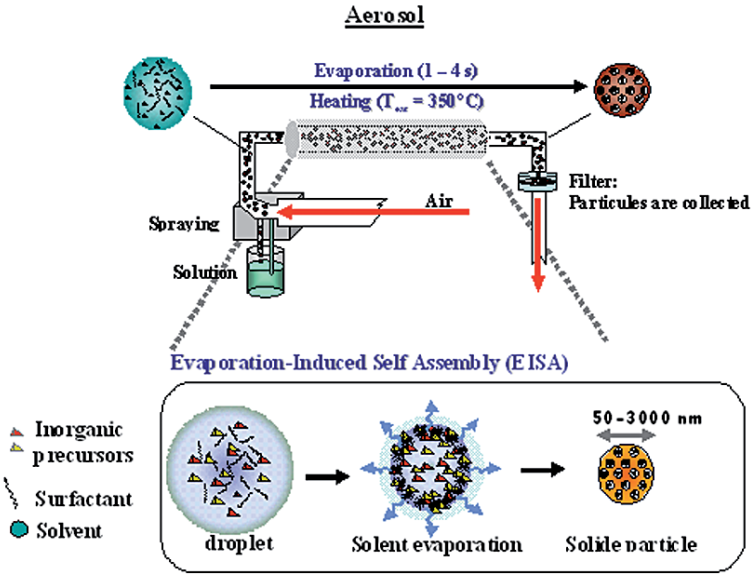


Figure 1: Scheme of the aerosol process used for the production of mesostructured LAB particles. The precursors solution is (i) sprayed to form micron-size droplets, (ii) droplets are dried in a hot zone for promoting their mesostructuration by EISA, (iii) dry particles are simply collected onto a filter.

allows a simple continuous collection of the powder and generates the strict minimum of wastes (vapors). The so-prepared catalysts exhibit exceptional catalytic activities. Moreover, these activities are maintained much longer than classical zeolites and need thus to be recycled less often. When one knows that it is possible to integrate within the porous structure some organic functions and/or some functional nanoparticles, one understands that this aerosol / sol-gel coupling may give birth to a broad range of innovating catalysts with unexplored properties.

Finally, this strategy is not limited to the synthesis of catalysts but is already developed for the synthesis of new bioceramics and therapeutic vectors which hybrid organic/inorganic structure allows integrating several collaborating functions such as enhanced contrast MRI imaging, hyperthermia and controlled drug delivery. Let's spray ! ■

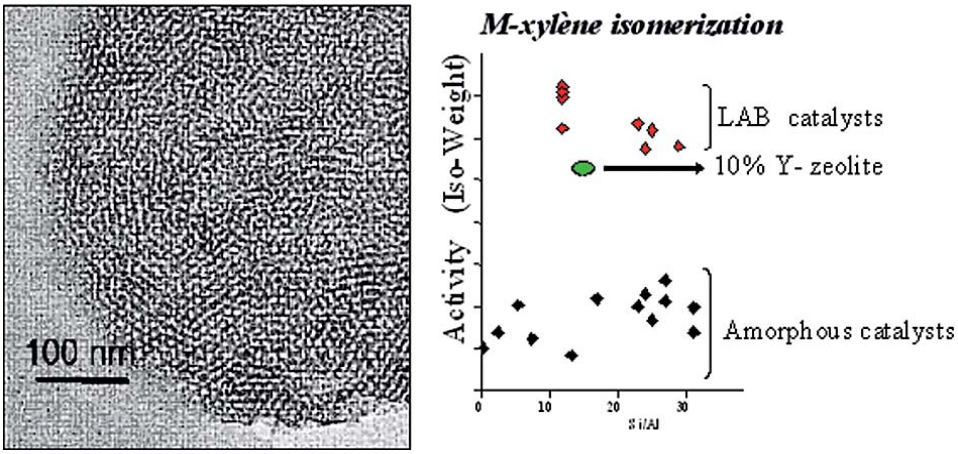


Figure 2: (left) TEM picture of one LAB particle. The porous network is evidenced by the periodical appearance of dark and white zones. (right) Graphic plotting the iso-weight activity of some LAB catalysts of different structures and chemical compositions. They are compared with the activities of industrial zeolitic and amorphous catalysts.

Some References:
1. Beck, J. S.; Vartuli, J. C.; Roth, W. J.; Leonovicz, M. E.; Kresge, C. T.; Schmitt, K. D.; Chu, C. T. W.; Olson, D. H.; Sheppard, E. W., Journal of the American Chemical Society 1992, 114, 10834-10843.
2. Inagaki, S.; Fukushima, Y.; Kuroda, K., Journal of the Chemical Society: Chemical Communication 1993, 680-682.
3. Pega, S.; Boissiere, C.; Grosso, D.; Azais, T.; Chaumonnot, A.; Sanchez, C., Angew. Chem. 2009, 48, 2784-2787.
4. Julian Lopez, B.; Boissière, C.; Chaneac, C.; Grosso, D.; Vasseur, S.; Miraux, S.; Duguet, E.; Sanchez, C., Journal of Materials Chemistry 2007, 17, (16), 1563-1569.

At the Origins of Human Dialogue: Speech and Music

Collège de France autumn symposium

16 and 17 October 2008

Introductory talk by
Professor Stanislas Dehaene

A single figure will suffice to introduce my subject: 40 billion dollars. That is the size of the world's music market. Everyone is prepared to spend large sums of money on hi-fi systems, portable devices and discs whose only function is to dispense sound waves – but sound waves capable of moving us to the depths of our soul. The mythical pianist Glenn Gould explained that he could never have imagined his life without total immersion in music, and that he would have been profoundly unhappy in the 19th century when musical moments were rare and often reserved for the elite. Today everyone creates and transports their own digital library, and every hour spent travelling thus becomes an hour of music.

The powerful attractive force that music exerts on us remains unexplained to this day, and the question of the origins and role of music in human communication is at the centre of this symposium. Where does the sense of harmony come from? Why do we perceive certain chords as consonant and others as dissonant? Why do major scales sound lively and joyful to us, while minor scales seem subdued and introspective? Do these musical messages vary depending on the culture and age, or are they linked to a small number of constant and universal elements such as the octave or the fifth? Are these elements peculiar to the human species or are they present, at least in embryonic form, in the communicative behaviours of other animal species, such as birdsong or the high-pitched cries of mice? Have our brains evolved for music and, if so, what is the main purpose: communication without language, delimitation of the social group, strengthening of emotional bonds? Or else is music, as cognitive psychologist Steven Pinker suggests, simply a recent cultural human construction, a sort of "auditory cheesecake", an artifice whose only aim is to tease the most sensitive spots of our mental faculties?

An appealing assumption is that musical competence stems from the faculty for language peculiar to the human species. Speech and music share many common features, the most obvious being a hierarchical organization through which simple elements – notes or phonemes – combine to form structures of words, phrases and sentences, at several successive levels. The origin of language is actually no less controversial than that of music – to the extent that this question has officially been banned from debate at the Société de Linguistique in Paris. However, new tools spawned by cerebral imagery and molecular genetics enable us to analyse it in a new light, and above all to compare the evolution of music with that of spoken language. Can one really talk of a musical language? Is there a connection between sounds emitted and processed by one or the other system, or can we on the contrary agree with Richard Wagner that music starts where the power of words has ended? After the first steps of acoustic processing, linguistic and musical messages follow partially different paths in our brain. Yet poetry, song and especially opera combine language and music in the same work. Does this mean that a single universal grammar governs the organization of both spoken language and music?

While I hope that the talks proposed here will shed new light on these questions, I know for sure that they will not solve them. Neither musical emotion nor the difficult question of the origins of human communication are easily put into equations. That is why Christine Petit and I wanted this symposium also to be an opportunity simply to hear music and to feel it vibrating within us. Naturally we have chosen song, for

that is where speech and music meet, and I wish to thank soprano Donatienne Michel-Dansac for having agreed to en-*chant* us with the strange musical declamations of Hector Parra and Georges Aperghis. I also wish to thank the IRCAM (Institut de Recherche et Coordination Acoustique/Musique) for installing some of its famous computerized musical equipment at the Collège de France, so that we may have a glimpse of what speech and music might be when machines become involved. ■

Closing talk by Professor Christine Petit

Because the various speakers have endeavoured to treat the theme of the symposium – "At the origins of human dialogue: speech and music" – with rigour, what might have been no more than an assemblage of scattered touches has been naturally organized by the play of interesting encounters between different disciplinary fields: science, literature, philosophy and artistic creation, and music and poetry in particular.

In addition to the physiological and molecular bases of hearing and spoken language ("Hearing: the physiological bases of the auditory system", Christine Petit; and "Mice, chimpanzees and the molecular basis of language", Wolfgang Enard), we have noted the continuity of our questions and reflection compared to those of our predecessors. In 1862, in his book *Théorie physiologique de la musique fondée sur l'étude des sensations auditive*, Hermann von Helmholtz examined the necessity attached to music, and its corollary, the persistent need for a physiological theory of music ("Helmholtz et la théorie physiologique de la musique", Jacques Bouveresse). This theme currently inspires highly fertile research.

The permanence of the question of the relationship between "sung" and "spoken" in opera ("Speech-song: the opera", Claude Hagège), as in popular song ("Speech, Speech, Speech", Peter Szendy), was illustrated in the evening in Hector Parra's Strette and Georges Aperghis' Recitations, performed by soprano Donatienne Michel-Dansac. We listened to the audible thoughts of the poet ("Poetry and music", Michael Edwards) and the respiration of texts ("Capturing speech live: notation of the music of speech", Roger Chartier). We followed the alliance of language and music through the drummed music of Central African tribes ("Between speech and music: the drummed languages of Africa", Simha Arom) and the comparison of the physical characteristics of the sounds of speech and music and of their modes and sites of treatment in the cortex ("Synthesis of the spoken and sung voice", Xavier Rodet). In so far as the two are set in different hemispheres – music on the right, language on the left – how does joint perception of the sung-spoken or drummed-spoken operate? We have seen emerging the premises of a scientific understanding of the learning of acoustic communication, the learning of vocalization by songbirds for example, with the importance of environmental conditions for their development ("The learning of song by birds: the importance of social influences", Martine Hausberger), and the learning of spoken language by babies ("How do children learn their mother tongue?", Ghislaine Dehaene-Lambertz). These recent developments are based on multidisciplinary approaches: behavioural studies, cerebral imagery and genetics. For instance, can genetics, by revealing the molecular bases of the elective achievement of the recognition of pitch ("Amusia and cerebral mechanisms of musical perception", Isabelle Peretz), of the production of language or of psychiatric diseases affecting communication ("The reasons for autism", Monica Zilbovicius), make it possible to illuminate the following: the passage from emotional phonology to voluntary phonology ("Emotion in musical language", Emmanuel Bigand); the mechanisms of recognition of others through the perception of their voice; the links that exist between the treatment of speech sounds or musical sounds; and the way in which the genome and the social environment interact in the ontogenesis of the production and perception of music and language. Digital synthesis offers a wide sound spectrum, so that a huge variety of

sounds can be created and altered at will ("Music and speech, from acoustic to digital", Jean-Claude Risset), and is a powerful tool in the exploration of their psycho-acoustic dimension. Computer modelling of the establishment of language, based on the principle of auto-organization of life forms was proposed ("Auto-organization in the evolution of speech", Pierre-Yves Oudeyer). The threats to human dialogue caused by impaired hearing in the ageing subject were pointed out, as was the fact that the problem is first manifested in noise and gradually constrains the person to social isolation ("On speech and noise: the organization of oral comprehension", Christian Lorenzi). How did language develop during evolution within the constraints of a noisy environment? How does music participate in the creation of the social link? These subjects warranted lengthy discussions. The neuro-physiological bases of musical emotion were nevertheless discussed, and the contribution of music to the development of young children's capacities for attention were emphasized ("Variability in brain plasticity: how can musical training improve cognition?", Helen Neville). Moreover, a new approach in linguistics was presented ("How to formalize the diversity of languages?", Luigi Rizzi). Thus, the mistakes that young children make when learning a language can illuminate the steps of syntactic ontogenesis. Finally, in Darwin Year, the symposium was naturally concluded with some questions. With what sounds, perhaps what cacophony, was the living world buzzing when it was teeming with a proliferating biological diversity? Where can the line between dialogue and cacophony be drawn? On what dialogue can humans base their future? ■

Program

- Christine Petit (Collège de France)
  Hearing: the physiological bases of the auditory system
- Jacques Bouveresse (Collège de France)
  Helmholtz and the physiological theory of music
- Wolfgang Enard (Max-Planck-Institute of evolutionary Anthropology, Germany)
  Mice, chimpanzees and the molecular basis of language
- Pierre-Yves Oudeyer (INRIA)
  Auto-organization in the evolution of speech
- Luigi Rizzi (University of Sienna, Italy)
  How to formalize the diversity of languages?
- Simha Arom (CNRS)
  Between speech and music: the drummed languages of Africa
- Roger Chartier (Collège de France)
  Capturing speech live: notation of the music of speech
- Michael Edwards (Collège de France)
  Poetry and music
- Xavier Rodet (IRCAM)
  Synthesis of the spoken and sung voice
- Concert by Donatienne Michel-Dansac
- Martine Hausberger (University of Rennes)
  The learning of song by birds: the importance of social influences
- Ghislaine Dehaene-Lambertz (CNRS, NeuroSpin Centre)
  How do children learn their mother tongue?
- Helen Neville (University of Oregon, USA)
  Variability in brain plasticity: how can musical training improve cognition?
- Isabelle Peretz (University of Montreal, Canada)
  The failure of dialogue between speech and music in song
- Monica Zilbovicius (INSERM, CEA)
  The reasons for autism
- Christian Lorenzi (ENS, CNRS, University Paris Descartes)
  On speech and noise: the organization of oral comprehension
- Claude Hagège (Collège de France)
  Speech-song: the opera
- Jean-Claude Risset (CNRS – LMA)
  Music and speech, from acoustic to digital
- Peter Szendy (University Paris X Nanterre)
  Speech, speech, speech
- Emmanuel Bigand (CNRS, University of Burgundy
  Emotion in musical language

The talks delivered at the symposium will be available on video at: www.college-de-france.fr (tab audio/video)

Claude Lévi-Strauss: a Career spanning a century

Symposium organized by the Collège de France, the École des hautes études en sciences sociales, and the École pratique des hautes études
25 November 2008

In this last week of November 2008, Claude Lévi-Strauss is celebrating his hundredth birthday. This is a private event, of no concern actually to anyone beyond the circle of his close admirers, friends and family. But this date is more than a sign of the man's great age, it is also a symbol of the longevity of his work which marked the greater part of the lengthy twentieth century. Claude Lévi-Strauss' first publication dates back to 1926. It was a thin booklet on Gracchus Babeuf, published in Brussels by the Belgian labour party's publisher and written by an eighteen-year-old socialist student who criticized ownership, praised the eighteenth century communist utopias, and exuded an admiration for Rousseau apparent in all his subsequent work as well. Lévi-Strauss' most recent book was published barely a few months ago: it is a volume in the Bibliothèque de la Pléiade collection, consisting of a selection of his work which he chose himself and which afforded him the opportunity to revise Chapter 8 of *La Pensée sauvage*, concerning Auguste Comte. He attributes Comte with the merit of having sought, like him, to reduce the gap between logical reasoning and the expression of sensibility. In the last pages of *Le Système de politique positive* he even identifies the idea that *"la pensée sauvage"* (fetichism, in Comte's terms) is – as he himself affirms – a dimension of any thought, even that which science has domesticated. These two dates of publication – of the reflection on Babeuf and that on Comte – spanned a period of eighty years, that is, nearly a century punctuated by thirty books and over four hundred articles which reshaped anthropology in France and oriented it in different directions. It was a long period of reflection on the nature of social life, on the destiny of peoples, on the process of knowledge, and on aesthetic emotion. The value of this reflection is only starting to be exploited. Some philosophers have taken it up to examine its consequences on the order of a reshuffling of concepts that we use to understand the world and its glittering diversity. In short, this week in honour of Claude Lévi-Strauss' hundredth birthday is an opportunity to re-examine the intellectual career of an author who became a classic long before 'entering into the Pléiade', and whose writings, albeit attached to an uncompromising scientific austerity, have nevertheless appealed to a far broader readership than the scholars for whom they were intended.

Professor Philippe Descola

There are many ways of seeing this career but none of them would truly have paid justice to it. The approach chosen for this symposium has been to propose a sort of geological cross-section of the different types of material that Claude Lévi-Strauss has contributed to intellectual thought over the decades. He drew this material primarily from ethnography, especially the ethnography of a part of the world where his vocation was fortified by experience in the field, and whose indigenous peoples he knew admirably well for having read just about everything on them that had ever been written. We therefore naturally opted for the effects of Lévistraussian anthropology on knowledge of Indian peoples from the two Americas, as well as the major role played by these people's cultural peculiarities in the definition of the problems that this anthropology has endeavoured to solve.

But it was throughout the entire world that Claude Lévi-Strauss gave free rein to this appetite for facts, this meticulous attention to the complexity of the real, this taste for sometimes strange singularities that imbue institutions, techniques and narratives with incomparable flavour; for it was throughout the world that he wanted ethnography to be meaningful by putting seemingly unrelated data back into subtle and sometimes grandiose analytical constructions. These constructions not only made it possible to account for sometimes enigmatic ethnographic features, through the relations that they maintain within a model; in doing so they often also contributed to

shedding new light on an aspect of the human condition neglected in the West. The questions that structural anthropology has wanted to solve are therefore not specifically American; from the status of bonds of affinity in Melanesia to the logic of marital systems in the uplands of Burma, through the symbolism of head-hunters in Indonesia or the effects of cognatic filiation in Africa, there are few classical problems in ethnology that Lévi-Strauss has not addressed – problems that the scientific community is constantly discussing and which give it a feeling of shared identity. This is also what we wanted to talk about at this symposium.

Claude Lévi-Strauss is recognized above all by anthropologists for his contributions in two key domains of the discipline in which he caused a total upheaval. Whether one is in agreement with him or not – moreover, in most cases it is never more than partial agreement or disagreement – it has become impossible not to situate oneself in relation to him when it comes to studying myths or lineage systems. He revolutionized the approach to the latter by developing a theory of marriage systems, ordering them systematically, and examining their structuring effects on other aspects of parentage. This was in contrast with former perspectives, at the time hardly known in France, which emphasized the socially structuring functions of the various types of filiation and the organization of the social sphere through parentage nomenclatures. As for myths, the way of studying them that he developed was so original, so unlike the habits of specialists of folklore and oral literature in studying documents of this nature that, until today, very few have dared to follow in his footsteps. The structural analysis of myths requires a set of qualities rarely found in one person: a penetrating intuition of the contrastive properties of the characters, events and materials in the narratives; an immense knowledge concerning not only myths from diverse countries but also characteristics peculiar to the culture and environment of the peoples who produced the myths; and, finally, an ability to switch from one myth to another, following the flimsy thread of a pattern that is not substantive, as in traditional mythology, but logical, operational and undergoing perpetual transformation due to the changes that the analyst's thinking reveals within him- or herself as he or she moves about in this space. Thus, it is no longer the theme of the changeling or the origin of fire that is in the foreground, but a particular way of shifting from the continuous to the discontinuous, or of effecting an inversion between substance and form.

Professor Pierre Corvol

Hence, we are far from the formal typology of patterns – an undertaking that probably has its uses, but that produces little meaning. We are even further from the vain quest for archetypes in which so many mythologies have gone astray. All those who have read the four volumes of *Mythologies* have unquestionably been amazed by the skill with which Lévi-Strauss constructed his tools and selected his objects as he went along, like a craftsman adapts his instruments and project to the nature of the material on which he is working. When executed with such mastery and brio, the analysis of myths is an art – but one that is so difficult that it is virtually impossible to emulate. It was thus inevitable that we should also discuss myths and lineage.

Reflection on art is a fundamental dimension of Lévi-Strauss' project, illustrated not only by his analyses of Amerindian art in Brazil and North America but also by his essays on some of the great works in painting, music and literature that Western civilization can legitimately be proud of. But such reflection on art is relevant only because each of the works studied, irrespective of how modest or transient it may be, is treated with the rigour of the scholar trying to define the properties which he or she isolates, by means of the ethnologist's tools and erudition when extra-European images are concerned, and those of the historian of art when Clouet, Poussin or Delvaux are concerned. It is only at this price that a science becomes possible and that the properties of an object, image or piece of music can illuminate other features of a culture with which they form a system. Their networking and the contrasts that they offer with similar networks in related cultures contribute to a better understanding of how societies differ from one another in a systematic and reasoned way. Even though it may not be self-evident for a superficial reader of Lévi-Strauss, this is the same method that he uses to illuminate technical and economic choices, possible combinations in an ideal repertoire on which every society draws according to the resources that it can actualize and the other

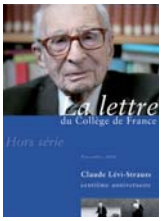
choices that it has made elsewhere in the treatment of humans and non-humans. And if this dimension is less visible in the work of Lévi-Strauss, it is so because he chose to use the same vocabulary as that of Marx, thus distinguishing between the study of infrastructures and that of superstructures – a distinction that facts throughout his entire work nevertheless belie. It was therefore also art and economics that had to be discussed at this symposium.

Finally, and although Lévi-Strauss always refused the title of philosopher, his work has had a philosophical impact that was rapidly recognized and with which the great names of twentieth century philosophy – Merleau-Ponty, Sartre, Ricoeur, Levinas, Foucault, Deleuze, Althusser or Derrida, to mention only his immediate contemporaries – engaged in an often impassioned dialogue, sometimes abrupt and almost always tainted with misunderstandings. His conception of social life as a symbolic exchange, his original way of accounting for the shift from the sensible to the intelligible, his opinions on history and contingency, his original way of renewing Kantism by injecting the experience of phenomenology into it: all this could not possibly leave the philosophers indifferent. It was therefore also about philosophy that we had to talk.

Many scholars could have made a relevant contribution to discussion on one or another of the subjects mentioned here. In my choice of personalities invited to talk at this symposium I therefore have to admit to random privilege, nevertheless tempered by old complicities and especially by the high esteem in which Claude Lévi-Strauss holds each of them.

I mentioned above that Lévi-Strauss became a classic long before his present consecration. Now, a classic work is one that is sufficiently disengaged from the historical circumstances of its creation for it to seem timeless, so that it can carry on influencing thinking without any risk of anachronism. By paying homage to a great mind we are not fossilizing it or putting it in a museum of accepted ideas. On the contrary, we are identifying the upheavals that the person's work has already caused and, perhaps above all, will continue to cause. Eduardo Viveiros de Castro recently highlighted one of Claude Lévi-Strauss' favourite expressions: "that's not all". We find it repeatedly in *Les Mythologiques*, at the apparent end of a generally brilliant argument in which Lévi-Strauss brings in a host of disparate facts, treasures of erudition and unequalled ingeniousness, to explain why a particular plant species or constellation was related to the origin of musical instruments or the flooding of rivers. "Congratulations to the artist!", we would think. And there's how the expression "that's not all" enabled the analysis to carry on in unexpected directions; and then the magician would pull out his handkerchief of new relationships between phenomena, new correspondences between secondary qualities, conjuring up before our dumbfounded eyes a rainbow, bells, storms, and who knows what else. I would like the dominant theme of this symposium to be "that's not all", like a series of switches on the tracks that Lévi-Strauss opened up, the continuation of which we could explore thanks to him and with him; an exploration of the paths of understanding that he pointed out to us. ■

Professors Philippe Descola and Françoise Héritier



The Collège de France has devoted a special issue of *La Lettre du Collège de France* to the hundredth birthday of Claude Lévi-Strauss (Paris, November 2008, 80 p., 8€).

On sale at the Collège de France reception desk or by correspondence from: patricia.llegou@college-de-france.fr

Report on the auditing of social and economic science textbooks and syllabuses for French high schools

The Commission set up to audit social and economic science textbooks and syllabuses for French high schools was chaired by Prof Roger Guesnerie, holder of the Chair of Economic Theory and Social Organization.

▼ *Education Minister Xavier Darcos entrusted the Commission with the task of "examining the content of social and economic science textbooks for high schools, to ensure that they were consistent with the objectives and content of syllabuses and with the plurality of currents of thinking constituting the field of social and economic science, and to verify the quality of the educational tools used". The Minister's letter requested that "particular attention" be paid to "the approach to the study of the market and enterprises".*
The Commission, composed of fourteen members[1] – individuals involved in the teaching of social and economic sciences; outside observers; academic representatives of the disciplines concerned; economists, sociologists and historians; and representatives of the economic world and government administration – undertook an in-depth examination of all aspects of the teaching of social and economic sciences likely to inform its reflection and enhance its audit[2]. ▲

The report is in two parts: the first is an overview while the second consists of recommendations. The following is simply a brief summary; the interested reader is referred to the full report[3].

The Commission highlighted the positive aspects of the teaching of social and economic sciences in high school. Two excerpts of the report set out the reasons for a globally favourable judgement: "students' appetence for understanding the social world, a world that is both close and mysterious, is at the source of the motivation produced by this teaching and from which it draws its strength". Therefore,

1. **Academics**: Antoine d'Autume, *Professor at the University of Paris I, Maison des Sciences Economiques,*
Jérôme Gautié, *Professor at the University of Paris I, Centre for Economics, Sorbonne,*
Jean-Yves Grenier, *"Directeur d'études" at the EHESS, Centre for Historical Research,*
Jacques Lautman, *Professor Emeritus of Sociology, University of Provence,*
Catherine Paradeise, *Professor at the University of Marne-la-Vallée, Department of Sociology,*
Sandrine Spaeter-Loehrer, *Professor at the University of Nancy II, BETA.*
Professors of CPGE: Isabelle Waquet, *Senior teacher at the Janson-de-Sailly high school, Vice-President of the AP-HEC,*
Gilles Martin, *Senior teacher at the Lakanal high school, Editor-in-chief of the journal IDEE.*
Qualified personalities: Michel Charpin, *General Inspector of Finance*
Sylvain David, *Chairperson of the Association des Professeurs de Sciences Economiques et Sociales (APSES),*
Jean Etienne, *General Inspector of National Education, senior member of the Social and Economic Science Group,*
Michel Pébereau, *member of the Haut Conseil de l'Education.*
The Commission also benefited from the efficient and diligent assistance of Michelle Huart.
2. The Commission met 8 half-days, from February to June. It interviewed 14 outside personalities, who provided information and enriched the reflection on a large number of issues: history of the branch and its performance, future of the students, genealogy and content of the syllabuses, discussion of the educational objectives, analysis of the textbooks, international comparisons, etc. The examination of the textbooks was based on a systematic reading plan which also benefited from discussions on the syllabuses.
3. Available on the site http://ses.ens-lsh.fr/.

"both the subsequent success of students who took these options, and honourable academic success rates in the basic disciplines[4] argue for this branch". This conclusion is largely grounded and supported in the report, which emphasizes the merits of the work of those teachers who keep it alive.

Criticism has however not been avoided. Even though, as the report points out, "the fiercest outside criticism, especially of the textbooks, reflects a feeling among the authors of a break in 'symbolic neutrality' (for instance through caricatures that stigmatize actors and institutions)", the Commission's focus was broader, on "the quality of the presentation of the intellectual debate, … the balance between arguments concerning questions of social and economic policy, in particular ". Its conclusions are based on a significant investment by its members in a systematic comparative reading of the textbooks. "The textbooks are designed to be tools for active educational methods, … most often consistent with the syllabus and rich in information." But "while some are good, overall, other are not; the information that they provide is sometimes remarkable but is not always of the same quality". The Commission also noted that compliance with the "demand for intellectual secularity" is "most often present" although "exceptionally but unacceptably absent", and "somewhat awkwardly implemented". For instance, it is regrettable that a "presentation of major intellectual debates in the past does not fit them adequately into the dynamics of accumulation of knowledge", and that there is "a tone which can systematically be negative and peremptory". In fact, criticism of the textbooks is often linked to the syllabus design: "it is partly the extent of the field covered, and the complexity of the questions under discussion compared to the time devoted to them, that explains the inequality of content and the difficulty of attaining objectivity". This first strong and unanimous conclusion of the Commission proved to be a subject of broad consensus among teachers and other participants in this debate.

The first finding – "grasp all lose all" – is worth considering in more detail and putting back into a more general perspective, i.e. that of the objectives assigned to the teaching of social and economic sciences (SES) in high school, and of the means deployed to meet them.

The report states that the teaching of SES "is designed to contribute to educating students and to preparing them for higher education and, in some cases – but this is not an immediate function – for professional life. These two objectives are so to speak common to all high-school education. The specific nature of the SES section is that it involves not only one but several academic disciplines and primarily economics and sociology, as well as political science. It starts with the study of 'objects' of the social and economic world, which the disciplines view from different angles".

The report therefore questions the existing tension between the objectives of general education and intellectual training. "The former suggests a broad coverage and tends towards a sort of rapid journey though the main issues of the contemporary world, but one that is as exhaustive as possible". The latter objective calls for "the learning of intellectual approaches, of which some are common to the social sciences (the status of evidence, the probabilistic interpretation of facts) while others are peculiar to the disciplines". Learning to know the world and learning to think the world are not contradictory injunctions, says the report; on the contrary, they are complementary. They can and must be reconciled.

The second strong conclusion by the Commission, on which there was broad consensus within the Commission but less so outside of it, is that this reconciliation is not properly achieved: the encyclopaedism of syllabuses goes hand in hand with an insufficient assimilation of the basics and the cultures of the disciplines. General knowledge and intellectual training suffer as a result: "by studying all the major problems of society, and by being unable to use more than a very small number of the available tools[5] […], one takes the risk of teaching and concluding on them very superficially, and of not making the distinction – often difficult but necessary – between differences on the understanding of mechanisms, and differences of objectives". I cannot go into the details of the other points of the Commissions' argument, which emphasizes the reality of disciplinary knowledge as well as its equally real intellectual autonomy, currently far from the ideal of a "reunified social science". The social and economic sciences are no different from other scientific knowledge. Their study is based on the knowledge of conceptual and analytical tools, of methods, and must eventually lead to the assimilation of disciplinary

4. Especially, says the report, "if one assesses it unconditionally, that is, assuming a successful pass-rate at the end of the second year of university.
5. The report stresses empirical studies here.

reasoning, here sociological, there economic. "The legitimacy of the mobilization of knowledge in social and economic science and *a fortiori* the fecundity of the disciplines' different views of the same subject, is related to the scientific relevance of each of these disciplines."

Based on this analysis, the Commission proposes to revise the syllabuses which, while emphasizing the purpose of education to provide an opening onto the contemporary social and economic world, must make the acquisition of "fundamental[6]" knowledge and competencies their core function. The idea is not to organize education around a corpus of abstract knowledge, but to combine description – non-exhaustive but in-depth and educationally attractive – with access to explanations. In other words, it is necessary to combine knowledge on "objects" and acquisition of tools, both rigorously and effectively, that is, modestly and without encyclopaedism. To obtain this combination of objects and competencies with the best that each discipline has to offer, the report proposes a sort of reform algorithm. It recommends putting out a vast appeal for contributions from teachers of SES and academics, which exploits as fully as possible the abundance and richness of reflection on this issue in many countries. The Commission believes that a reform of the syllabuses made in this spirit would provide additional arguments for the introduction of compulsory teaching of SES in high school.

Two points to conclude, which are, I suppose, simply the amazement of a layperson when it comes to communication.

First, this report, which many attentive readers have deemed moderate and fair, has sometimes been presented in the press under provoking titles that reflected neither the content of the report nor even – and no less surprisingly – the articles that the titles announced. The mysteries of information! Second, it is true that the report proposes an aggiornamento of education that has not faulted, far from it, but which almost every member of the Commission felt can be modernized and substantially improved. It is perfectly understandable that these proposals triggered many debates with considerable disagreement. Some of the ulterior motives that the Audit Commission was accused of having are, however, surprising. For instance, to take only one example relating to my discipline, albeit not the most astonishing one: the Commission was accused by some of being anti-Keynesian. A very strange affirmation indeed for anyone familiar with the intellectual work of the economists who sat on the Commission! The mysteries of reading and interpretation! ■

Professor Roger Guesnerie

6. For example, for economics, elementary concepts and knowledge on markets, types of goods, rents, formation of income, risks, determination of global level of activity, and innovation.

End of the fourth International Polar Year

Symposium organized by the Collège de France and OPECST (the French parliamentary committee for the evaluation of scientific and technological choices, Senate and National Assembly (OPECST)
14-15 May 2009

Professor Édouard Bard

The fourth International Polar Year (IPY) officially came to an end on 14 and 15 May 2009 with a symposium organized jointly by the Collège de France and OPECST (the French parliamentary committee for the evaluation of scientific and technological choices). Many scientists and political actors, invited by Professor Édouard Bard and Senator Christian Gaudin, emphasized the success of the IPY, including the creation of at least 200 international multidisciplinary research projects, entirely devoted to the study of the polar regions. The topics of the first day of the symposium, held at the Senate, were "Humans and their environment" and "Governance of the poles". On the second day, held at the Collège de France, participants discussed the scientific progress resulting from the various projects initiated within the framework of the IPY. This progress concerns the understanding of changes in the physical environment of the polar zones, which are particularly sensitive to current climate change, as well as their multiple consequences on polar biodiversity.

After an introduction by Pierre Corvol, Administrator of the Collège de France, in which he reminded the audience of his institution's commitment, Claude Lorius (Chairman of the French Committee of the Academy of Science, for the organization of the fourth IPY) reviewed the history of the IPYs, pointing out the steps that it constituted in the advancement of the understanding of the polar regions. He mentioned his first trip to Antarctica in 1956, on the eve of the third IPY, when the magnetosphere was discovered and permanent observation stations were established there, along with the first continuous measurements of the concentration of carbon dioxide (CO_2) in the atmosphere. In international politics this event facilitated the signing of the Antarctic Treaty in 1959, thanks to which this continent became a haven of peace devoted to science. Since then, extensive coring in Greenland and Antarctica has enabled scientists to study past and present climate change. The European Project for Ice Coring in Antarctica (EPICA), in which France is one of the main partners, has revealed that over the past 800,000 years, CO_2 concentrations have never been as high as they are now. Édouard Bard pointed out that, in parallel with the recent anthropogenic increase of CO_2, the average global temperature has risen by 0.5°C since the 1970s, and that this increase has been the steepest in the polar regions. Studies of current, past and future climates show that the Arctic will be the most affected, with temperature increases that are double or even triple than those in the rest of the world. Polar amplification has major consequences, especially on polar sea ice. As Thomas Stocker (Professor at Berne University and Co-Chairman of Group I of the IPCC, the Intergovernmental Panel on Climate Change) and Jean-Claude Gascard (Director of Research at LOCEAN, a climate and oceanographic laboratory) noted, the polar sea ice forms every winter. In the Arctic region, some of this ice remains frozen even in summer, sometimes for as long as ten years. Recent observations reveal a shrinking of the surface and thickness of this ice, particularly in 2007 and 2008. The Tara, a ship that was caught in Arctic ice, took only one year to reach the North Pole in 2006, whereas the Fram took three years to do a similar journey in 1894. At first "victims" of climate change, the polar regions will become its "actors", for the disappearance of the polar sea ice triggers a disturbance of radiation levels and thus an amplification of global warming. Recent melting of the Arctic ice has been even faster than the IPCC's worst forecasts. Another important consequence of polar amplification is a reduction of the mass of the ice cap in Greenland and the Antarctic, as revealed by altimetric and gravimetric satellite observations. Finally, the melting of the permafrost could release large

H.R.H. Prince Albert II of Monaco

quantities of carbon in the form of methane and carbon dioxide, thus exacerbating global warming.

One of the challenges of this IPY is to understand and forecast the amplitude of the polar regions' response to current climate change. Jérôme Chappellaz (Research Director at the LGGE, the Glaciology and Environmental Geophysics Laboratory of Grenoble) pointed out the contribution of the various coring projects in Antarctica and Greenland, and emphasized the need for international cooperation if they were to be successful. The IPY has thus made it possible to set up a project to compare the last two glacial-interglacial transitions in the northern hemisphere. It has also made it possible to federate all the national spatial agencies that have contributed to the creation of a database of images of Greenland and the Antarctic. As Frederic Rémy (Director of Research at the LEGOS, the Spatial Oceanographic and Geophysics Research Laboratory of Toulouse) has shown, this coordination has led to the production of a snapshot of the polar regions.

Rollon Mouchel-Blaisot, Prefect of the French Terres Australes and Antarctic territory, opened the afternoon devoted to research on global biodiversity and its recent evolution. Yvon le Maho (Director of Research at the IPHC, the Hubert Curien Multidisciplinary Research Institute in Strasbourg) illustrated the most recent research on marine birds in the polar regions, with particular attention to the penguins of Adélie Land. Françoise Gaill (Director of the CNRS Ecology and Environment Institute) presented an overview of the various research projects undertaken by French teams, especially on marine mammals whose movements are studied from the South Sea Islands to the Antarctic sea ice. Michael Stoddart (Scientific Director of the Australian Antarctic Division) noted that close to 9,000 marine

Dr Yvon Le Maho and Mr Rollon Mouchel-Blaisot, Prefect of the French Southern and Antarctic Lands

Speakers:

Humans and its environment
Dr Claude Birraux
Prof Jean-Claude Etienne
Dr Christian Gaudin
Dr Catherine Bréchignac
Dr Michel Jarraud
Prof Philippe Descola
Prof Michèle Therrien
Dr Sylvie Beyries
Dr Bruno Goffé
Mr Erik Orsenna
Dr Jean Malaurie

Polar politics and diplomacy
Mr Michel Rocard
Dr Jean Jouzel
Pr Jean-Yves Le Déaut
Dr Gérard Jugie
Dr Karl Erb
Mrs Valérie Pécresse

Climate, ice and oceans: short- and long term evolutions
Prof Pierre Corvol
Prof Édouard Bard
Dr Claude Lorius
Pr Thomas Stocker
Dr Jérôme Chappellaz
Dr Jean-Claude Gascard
Dr Frédérique Rémy

Global change and polar biodiversity
Mr Rollon Mouchel-Blaisot
Dr Yvon le Maho
Dr François Gaill
Dr Michael Stoddart
Prof Nigel Yoccoz
Dr Yves Frenot
H.R.H. Prince Albert II of Monaco
Mr Jean-Louis Borloo

Mr Jean-Louis Borloo, French Minister of Ecology, Energy, Sustainable Development and Marine Affairs

species have been recorded in the Antarctic, but that this huge biodiversity has undergone change recently and that it is particularly sensitive to the consequences of increasing CO_2 levels: not only global warming but also the acidification of seawater, which alters the capacity of many kinds of plankton to form their calcareous shells. The focus then switched to the Arctic: Nigel Yoccoz (University of Tromso in Norway) considered the vegetation and animals living on the continent (mammals such as reindeer, lemmings, red foxes and polar foxes, or birds such as snow geese and snowy owls). He explained that to detect environmental changes, it is necessary to have a sound understanding of interactions and competition between species, in the context of food chains that can lead to natural cycles. Research shows that these cycles can be highly sensitive to climatic changes. Yves Frénot (Deputy Director of the IPEV, the French Polar Institute) also spoke about a deterioration of the biodiversity of the sub-Antarctic and Antarctic regions. In parallel with the physical environmental changes, several sub-Antarctic islands like Kerguelen are experiencing the invasion of "exotic" species deliberately or involuntarily introduced by humans. This colonization sometimes has disastrous and irreversible consequences on the indigenous fauna and flora. Tourism on the Antarctic Peninsula is also becoming a subject of concern, with a tenfold increase in the number of visits over the past decade. This tourism has to be controlled because it is bound to be the source of contamination by plant and animal species that do not yet exist in this fragile region.

In his closing speech, His Highness Prince Albert II of Monaco stressed just how fragile the polar regions are, and the extent to which scientists, policy-makers and the public need to pay close attention to them. The Prince had just returned from a long trip in which he had visited several scientific bases in Antarctica. Some excerpts of his film were shown as previews during the symposium. In his final speech, Mr. Jean-Louis Borloo, French Minister of Ecology, Energy, Sustainable Development and the Sea (MEEDDM), expressed his concern and emphasized the importance of this fourth IPY in the strengthening of international and especially European cooperation.

The various talks at the symposium showed that we have entered into a crucial period where the changes under way due to climate change are rapid and in some cases irreversible. The benefits of the IPY are already visible and will last for several years. ■

Mélanie Baroni, post-doctoral fellow
Guillemette Ménot, Senior lecturer,
Chair of Professor Édouard Bard


Dr Claude Lorius


Icebergs of the Illulisat Fjord, Jakobshavn Glacier (Greenland). © E. Bard

Stereocilin in top-connectors is a key element ensuring waveform distortion and suppressive masking, necessary for speech intelligibility and hearing in noise.

Christine Petit, Professor at the Collège de France, holder of the Chair of Genetics and Cellular Physiology

Several key properties of sound perception rest upon the pre-processing of sound by outer hair cells (OHC) in the mammalian inner ear, that is, one stage ahead of the mechanoelectrical transduction eventually achieved by inner hair cells. It has been acknowledged for two decades that OHCs mechanically amplify sound stimuli, which explains why the auditory system of mammals is sensitive enough to detect sound power levels hardly an order of magnitude above thermal noise. The fine tonotopy observed in the cochlea and reflected in the remarkable ability to discriminate two sounds with slightly different pitches, also results from OHC operation as it acts in a frequency selective manner.

Natural sounds pose an additional challenge: several frequency components are presented simultaneously instead of sequentially. For example vowels are characterized by a spectrum displaying a few specific harmonics. Spectral complexity increases in the presence of competing sound sources or background acoustic noise. In such cases, if applied indiscriminately to all spectral lines, gain would be inadequate because, acting equally on signal and noise, it would leave the latter swamp neural messages. Because the gain produced by OHCs is accompanied by filtering, but also because the nonlinearities it entails generate suppressive masking interactions, acoustic messages can be cleaned up.

The place of cochlear nonlinearities in the analysis of frequency mixtures deserves to be specifically examined. The concept of nonlinearity is very general, applying to any system whose response to two simultaneously presented signals is not the arithmetic sum of its responses to either signal when presented alone: instead, when mixed up, some components increase at the expense of others. Masking is a typically nonlinear psychophysical event defined by the fact that the loudness of one sound decreases or even vanishes when another sound interferes. Its cochlear correlate is suppressive masking whereby the mechanical or electrical response to a test tone decreases in the presence of a masking tone. This phenomenon, felt as a nuisance when it is the signal of interest that gets masked, globally turns as an advantage in that it allows the dominant frequency component at one place in the cochlea to become even more dominant by exerting a masking effect on competing, weaker signals. Therefore, suppressive masking can enhance contrasts.

There is now no doubt that cochlear mechanics is far from linear and it can express its nonlinearities in several ways. Besides suppressive masking, another example is that contrary to high-fidelity devices, OHC operation introduces conspicuous waveform distortions. These distortions are large enough to be heard although not being present in the initial sound stimulus (e.g., Tartini, 1754; Goldstein, 1968). In response to bitonal stimuli at frequencies f1 and f2, distortion of their waveforms generates combination tones at arithmetic combinations of f1 and f2 -hence the best known cubic difference tone at 2f1 – f2, assuming f2 > f1. Not only does the cochlea produce audible sound distortion, but it also reemits them in the external auditory meatus as one category of otoacoustic emissions, namely distortion-product otoacoustic emissions (DPOAEs – Kim et al., 1980). Otoacoustic emissions have become a prominent tool for screening hearing in neonates by way of a small microphone placed in the ear canal: when their absence signals OHC dysfunction, inner hair cells also happen to be

impaired in most cases owing to the structural and functional kinship of the two types of sensory cells. Sensorineural deafness is then a likely diagnosis.

In summary, there is strong evidence that high sensitivity and sharp frequency discrimination are two closely associated properties of the cochlea ensured by OHCs, and that their way of operating induces strong waveform distortions coming out as non-invasively detectable DPOAEs. Last, the very mechanism that leads to instantaneous distortion of sound waveforms is likely strong enough to also be able to contribute to suppressive masking. Although there is no doubt that OHCs and their nonlinear behaviour are at the heart of many perceptive phenomena, this does not prove that all nonlinearities produced by OHCs must have the same origin, that could be identified, for example, as some molecule or substructure of the stereocilia bundle or cell body. Indeed, although strongly nonlinear, the compressive circuits in current use in hearing aids are designed so as to never generate instantaneous waveform distortion. Conversely, other types of nonlinear electroacoustic devices generate waveform clipping even if the gain of their amplifier is turned off.

Until now the currently accepted picture was a holistic one, positing that at the core of OHC ability to produce gain, filtering, waveform distortion and masking was a common source, the intrinsic properties of the mechanotransduction channels in the membrane of stereocilia on top of OHCs and inner hair cells. These ion channels are opened and shut by stereocilia deflections due to sound vibrations, and when open, let

K^+ et Ca^{2+} ions enter into the cells. As a result, the modulations of the membrane potential of OHCs provide an instantaneous image of sound pressure changes. Electromotility, regardless of its exact mechanism, allows OHCs to mechanically react to their fluctuating membrane potential. By adding their motion to that of the acoustic wave at an appropriate time of the sound period, OHCs amplify the stimulation of their own stereocilia bundle according to Gold's proposal of a regenerative amplifier (1948). Since such an amplifier acts in a frequency-selective manner, electromotility in response to mechanotransduction channel activation provides a common background to gain and filtering properties afforded to the cochlea by OHCs.

A common explanation to the remaining characteristics of masking and waveform distortions might be inherent to the mandatory nonlinearity associated with the thermodynamics of the mechanotransduction channel. Acting as a gate, this channel exists in at least two states, open and closed. Its opening probability relates to stereocilia deflection according to Boltzmann's law accounting for the different energies associated with the opened and closed states. Boltzmann's law is a sigmoid instead of a straight line. Thus when stereocilia bundles are deflected by the sinusoidal pressure wave of a pure tone arriving from the ear canal, the current through mechanotransduction channels, proportional to the opening probability, is a flattened, distorted sinusoid: the ensuing electromechanical feedback injects distortion into the initially sinusoidal sound wave. It was thought that waveform distortion, Tartini tones and DPOAEs were produced in this manner by OHCs. Suppressive masking comes with the presence of waveform distortion regardless of their origin, since when mechanical responses of OHCs to a first sound saturate and tend to get clipped, the responses to a second, superimposed tone are all the more distorted that the responses to the first tone alone were already saturated. The presence of the first tone thus negatively influences –suppresses- the response to the second tone. Masking is reciprocal, yet the stronger of the two tones is bound to win the competition.

This view of mechanotransduction channel properties as a central player in all aspects of sound pre-processing by OHCs suggested that OHCs ensured, in a remarkably parsimonious manner, a whole set of functions sharing a common origin. As a counterpart, failure of this intrinsic property of channels should also result in the concomitant loss of all beneficial aspects of cochlear pre-processing of sound.

A recent study of a mutant strain of mice in which the gene coding for stereocilin is inactivated has shown that this holistic view is not valid. When these mutant mice are young enough (around 14-15 postnatal days, P14-15), their cochlear sensitivity is normal, despite some degree of neural immaturity also seen in wild-type littermates. Cochlear filtering is also normal in mutant mice. Mechanoelectrical transduction currents derived from indirect in vivo measurements of OHC activity are normal as well. These characteristics indicate the presence of a full supply of normally functioning mechanotransduction channels. Their thermodynamics thus obeys a normal Boltzmann law and the curve relating the transduction current to stereocilia deflection must be the same sigmoid as in normal ears. Yet in the absence of stereocilin, mice no longer distort waveforms, and for example their mechanotransduction currents in response to loud tones remain sinusoidal up to 100 dB SPL. Likewise, DPOAEs are totally absent, whereas at P14, they are already adult-like in wild-type mice. Furthermore, with even more significant perceptive consequences, when these mutant mice are exposed to a mixture of sounds,

suppressive masking is absent or strongly diminished. The level of a masking tone must be about 20 dB louder than in a normal ear to produce a measurable effect. Although some masking persists at the neural level, it is weak. Therefore, in the presence of a mixture of sounds, the mutant cochlea is no longer able to significantly act on the contrasts among components.

Stereocilin enters in the composition of fibrous links, the top connectors, bonding the apexes of stereocilia inside the hair bundle. In mutant mice, top connectors are absent and the tips of stereocilia in OHCs tend to splay apart, so that the stereocilia bundle has lost some of its normal cohesion.

So, suppressive masking and waveform distortion come with each other and can vanish even though OHC mechanotransduction channels provide normal amplification and filtering. This unusual experimental situation leads to conclude that the top connectors, and possibly the stereocilin-dependent connectors anchoring the stereocilia bundle to the tectorial membrane contribute to a major cause of distortion, larger than that in relation to the Boltzmann statistics of mechanotransduction channels. Stereocilin-dependent connectors could distort either as a result of an intrinsic property or indirectly by a constraint they might exert on the displacement of the stereocilia bundle or on the response to sound of some of its components.

In the model that we propose, in mutant mice as well as in normal ones, the operation of OHC mechanotransduction channels follows a displacement-to-current characteristics exhibiting a normal sigmoid shape because its becoming straighter would make the channel strongly insensitive, which was not observed. Likely, this nonlinearity, on its own, is not large enough to generate measurable distortion. In normal mice, it is the presence of top connectors that enables waveform distortions, DPOAEs and suppressive masking to show up in standard measurements. In mutant mice, the same measurements fail to detect these features even though mechanotransduction channels do exhibit their usual Boltzmann-related nonlinearity.

The next step of our research will be to directly measure the operating functions of the mechanotransduction channels of OHCs at mature stages of the organ of Corti, which requires technological development. It would be important to establish whether and how top connectors might regulate the way OHC operate and contribute to modulating the intensity of their distortions and of suppressive masking. Nonetheless, the dissociation between normal auditory thresholds and missing DPOAEs should lead to reassess the significance of the clinical test of DPOAE recording.

Perception of complex sounds and hearing in noise are likely perturbed in mutant mice. If one extrapolates this situation to man, one can anticipate that speech intelligibility be more affected than what is predicted from the elevation of hearing thresholds in patients whose deafness is due to lack of stereocilin (deafness DFNB16). The study of its murine model has stressed the importance of waveform distortion and suppressive masking, two sides of a nonlinearity involved in contrast enhancement, that the lack of stereocilin specifically targets. Such contrasts are an essential feature of sensory perception, for vision as well as audition, since in natural environments sensory messages are almost always mixed with competing signals. ■

Professor Christine Petit
Chair of Genetics and Cellular Physiology
Professor Paul Avan
University of Clermont-Ferrand

This work has been published in the following article:
Verpy E, Weil D, Leibovici M, Goodyear RJ, Hamard G, Houdon C, Lefèvre GM, Hardelin J-P, Richardson GP, Avan P & Petit C (2008) Stereocilin-deficient mice reveal the origin of cochlear waveform distortions *Nature*, 456, 255-8.

THE *PARQUET*, A KEY ISSUE IN PENAL REFORM

From left to right: Prof Mireille Delmas-Marty, Mssrs Michel Albert, Jean-Claude Casanova, Jean Mesnard (members of the Institut - Académie des Sciences morales et politiques). © Jean-René Tancrède

Mireille Delmas-Marty

Professor at the Collège de France, holder of the Chair of Comparative Legal Studies and Internationalization of Law

This text is an abridged version of a talk delivered at the Académie des Sciences Morales et Politiques on 25 May 2009 and published in *Le Monde* on 26 May 2009.

'Born' in 1808 with the *Code d'Instruction Criminelle* (criminal investigation code), the *juge d'instruction* (investigating judge) was for a long time the emblematic figure of the penal process. This situation stemmed from the fact that the phase in which a case was examined, between the discovery of a crime and the actual trial, often determined the outcome. Responsible for the investigation, like a police officer – and moreover qualified as an officer of the *police judiciaire* (criminal investigation department) and placed under the authority of the *parquet* (the public prosecutor's office) – the *juge d'instruction* was nevertheless still a judge and could use all means of restraint, including detention. At the time, when 40% of penal cases were examined by him, he was considered to be the most powerful man in France.

Today, 96% of all cases are out of the *juge d'instruction*'s hands. Does this mean that penal cases, which have become simpler, are immediately ready to be brought before court, without preliminary investigations? In the age of globalization, financial crimes and illegal trade on an international scale, this hardly seems likely.

So, why have things changed so much? That is a long story going back to the introduction of lawyer into the *juge d'instruction*'s chambers (1897). As the inquiry became more and more 'contradictory', the police investigation steered by the *parquet*, without the lawyer's participation, played an increasingly important role. Initially unofficial and then enshrined in the *Code de Procedure Pénale* (criminal procedure code) in 1958 under the term 'preliminary investigation', this situation enabled the *parquet* (which simultaneously lost the power to choose the judge) to directly refer a case to court for judgement without it being examined by a judge.

Gradually it became clear that the more the examination of a case was judiciarized, in line with constitutional and European principles, the more parallel procedures developed. This took place to the detriment of the investigation by a judge which in 1960 was down to 20% of penal cases, in 1989 to 8%, and in 2009 to 4%. The commission for penal justice and human rights pointed out this paradox in 1990, emphasizing that an overall reform had become necessary.

[…] Why reform?

Legal texts and practices have evolved over the past twenty years. Yet the main problems identified in 1990 have not all been solved, and reform is more necessary than ever before, for at least three reasons.

First, the incompatibility of the *juge d'instruction*'s two functions (both investigator and judge) is remedied only partly by the creation of a *juge des libertés et de la detention* (judge of freedom and of detention), and the strengthening of the right to legal defence. The Outreau affair showed that the *juge des libertés* had difficulties exercising real control, while the average duration of the examination phase doubled between 1990 and 2008. A law passed in 2007 was an attempt to solve the problem by

providing for the creation of a collegial system but its application was postponed for financial reasons (to 2010, then 2011). In the meantime, a decree has set up centres of investigation and the extension of co-referral of cases to court (assigning difficult cases to two judges), but the *juge d'instruction*'s marginalization is continuing.

Second, during the same period the *parquet* has grown considerably, thus aggravating the confusion of powers. In some instances this institution has the role of *juge d'instruction* and in others, through the play of 'alternatives to prosecution' and simplified procedures, that of an authority with quasi jurisdiction to pass judgement. Its powers of investigation are facilitated by the possibility of by-passing the *juge d'instruction* and directly requesting the *juge des libertés* to authorize coercive measures (searches, access to computerized data, security checks, etc.). Moreover, the creation of investigating departments in the various *parquets*, based on the model set up at the Paris court, makes it easier for these offices to take over the examination, but without a lawyer. This takes us back to the situation before the Legal Act of 1897. At the same time, the *parquet* remains the authority that decides on prosecution and can dismiss a case, not only for a lack of evidence but also as a matter of discretion. Traditionally, application of the principle of discretionary prosecution was the victim's possibility to associate in a court action with the *juge d'instruction*, but since 2007 the victim has had to refer to the *parquet* first. Moreover, in international criminal cases, the bill aligning French law with the statutes of the International Criminal Court (ICC), passed by the Senate in 2008, reserves the monopoly on prosecutions for the *parquet*.

The development of 'alternatives to prosecution' furthermore enables the *parquet* to substitute itself for the jurisdiction of a judge: first, with penal mediation, which is a sort of conditional ruling, and then with the 'penal compromise' which enables the prosecutor to propose to a person who has acknowledged having committed an offence, the option of paying a fine or other measures alternative to imprisonment. It is assumed that the person will accept, and that the proposal will be validated by the presiding judge, but the fact remains that here again the *parquet* has a new role which, in practice, is often decisive.

Finally, the major innovation (law of 2004) will be the 'appearance in court with prior acknowledgement of guilt'. Very close to the Anglo-American procedure of 'pleading guilty' and to its extension in the form of negotiation (plea bargaining), it is based on an agreement between the offender and the prosecutor on both the deed and the sentence, including imprisonment. The agreement has to be approved by a judge, but it is the prosecutor who collects the statements in which the offender acknowledges the offence and which determine the nature of the sentence. Now, it is proposed to apply this simplified procedure to all offences, irrespective of the sentence (Guinchard Report), and there have been proposals to adapt it to crimes as well (Léger Committee). Despite this extension of the *parquet*'s powers, guarantees have barely been increased, which is the third reason why reform is needed to enhance the impartiality and independence of public action – especially since practices have basically regressed. First, criminal policy, far from being limited to general directives, again comprises prosecution in particular cases. For a while several ministers of justice cancelled this type of prosecution and even announced that it would be banned. But the practice was resumed, confirmed by the law of 2004 which stipulates that the minister can enjoin the public prosecutor to institute proceedings or to have them instituted, or to refer to the judge's jurisdiction 'such written indictment as the minister deems appropriate'.

As for the statutory conditions of careers, the constitutional bill passed by Parliament in 1999 provided for a procedure of appointing public prosecutors on the basis of the opinion of the *Conseil Supérieur de la Magistrature* (CSM). However, this law was never submitted to Congress, and disciplinary authority is still exercised by the minister of justice. The constitutional law of 2008 does stipulate that the CSM will henceforth be consulted on all proposed appointments, including those of *procureurs généraux* (chief state prosecutors), but in practice it simply issues an opinion. In most cases the CSM's negative opinion is moreover ignored. In 2006, out of ten unfavourable opinions, only one was observed (five out of 14 in 2007).

The contrast is striking with European law, which has evolved in the opposite direction. Despite the diversity of statutes from one country to the next, it tends towards strengthening the guarantees of the *parquet*'s independence. The European Court of Human Rights recently condemned France in the Medvedyev case (judged on 10 July 2008 but an appeal is pending), pointing out that "the public prosecutor is not a 'competent legal authority' within the meaning the Court's case-law gives to that notion: as the applicants pointed out, he lacks the independence in respect of the executive to qualify as such". And the Council of Europe recently adopted a report that put forward the same argument (23 June 2009).

How to reform?

[…] It would be wrong to make the elimination of the *juge d'instruction* the key measure, when the most urgent reform is to rebalance the powers: between the executive and the judicial authority (the *parquet*'s status); between the *parquet* and the bench (judge's position); and finally between the court and the accused (rights of the defence and of the victims). Irrespective of the possible variants, the reform must respect four essential conditions.

1 – The *parquet*'s status: considering the increasing powers of the *parquet*, it is urgent, come what may, to reinforce the guarantees of independence and impartiality. This will be even more essential as the Léger Committee, responsible for reform proposals, concludes on the need to eliminate the *juge d'instruction* and to extend the procedure of appearance in court with prior acknowledgement of guilt.

The first guarantee consists in redefining the notion of criminal policy. The idea is not to jettison the principle by which this policy falls within the government's province but, on the contrary, to make it more legible by reviving the tradition of the *grandes circulaires* which are not simply paraphrases of new laws; they are based on quantitative and qualitative evaluations, indicate medium- and long-term objectives, and avoid responding to every minor event with a new law. It would also be necessary to organize an annual debate in parliament, on the basis of a model proposed in 1999, precisely to announce the objectives, evaluate the results and clarify a policy that is sometimes difficult to follow (e.g. the accumulation of texts concerning the repetition of offences, since the law of 2005).

On the other hand, injunctions in particular cases should be explicitly excluded, which would not prevent the government from making its point of view known in the few rare so-called sensitive affairs. Instead of putting the *parquet* in the delicate position of receiving a written indictment by order, while in principle retrieving its freedom during the hearing, the solution – running smoothly at the *Conseil d'État* (Council of State) – could be to request the services of a lawyer who openly defends the government's point of view before the judge. As for the *parquet*'s statutory guarantees, they would be reinforced by the transfer to the CSM of the power to decide on prosecutors' careers and to wield disciplinary control where relevant. Admittedly, this reform would highlight the proximity between judges of the *parquet* and those of the bench, confirming the constitutional view of a single body, whereas certain voices are raised in favour of their separation into two distinct bodies. But the *parquet*'s belonging to a single body of judges is a guarantee in its relationship with the police. This is confirmed by the fact that, in Common Law countries, where the separation is much stronger, the police are largely autonomous. It is better to maintain a single body and to reinforce the *parquet*'s control over the police.

2 – The judge's position: if we eliminated the *juge d'instruction* by creating a new *juge de l'enquête et des libertés* to control the *parquet*'s investigation, it would be essential for the judge in question to be able to effectively fulfil his or her role. As Geneviève Giudicelli-Delage wrote, it is necessary to find the 'right distance', for too close the judge is blinded, but too far he or she becomes blind.

The difficulties encountered by the *juges des libertés* show that it would be necessary to increase the material resources by creating enough positions so that each judge has only a limited number of cases to deal with and can make informed decisions. These positions must be at a high enough level for the judges to have authority over the prosecutor. It would also be necessary to reinforce the legal means for the judge to be able to intervene throughout the inquiry to settle disputes between the *parquet* and the defence, and particularly to control the choice between the two types of inquiry that the Léger Committee proposes to create. Finally, in case of serious dysfunctions, the judge should be able to request the appeal court to take the *parquet* off the case.

3 – The rights of the defence: essential for safeguarding the presumption of innocence, these rights should be reinforced and extended to all procedures, whether this means calling for acts of investigation, raising objections before the judge, appealing in the same conditions as the *parquet* or intervening in the closing of the inquiry. An amendment to legal aid would therefore be indispensable to ensure that inequalities between accused did not increase.

4 – Victims' rights: contrary to the system in place since 2007, the victim should be able to directly apply to the judge to request the opening of an inquiry, especially if the principle of discretionary prosecution is to be maintained. As necessary as it may be, screening for associating in a court action with the public prosecutor should be under the judge's and not the *parquet*'s authority.

Whether it is a matter of examination or judgement, the issue is not only technical but also political. The wish to simplify the procedure and to accelerate the judgement should not be reflected in a shift of powers to the detriment of the judges, whose independence is guaranteed by the constitution, and to the benefit of the *parquet*, which would remain under the orders of the ministry of justice. ■

Professor Mireille Delmas-Marty

2009: THE CONCARNEAU MARINE BIOLOGY LABORATORY CELEBRATES ITS 150TH ANNIVERSARY

by Yves Le Gal

Honorary Deputy Director of the Collège de France
Marine Biology Laboratory affiliated to the National Museum of Natural History
Concarneau Marine Biology Station

The Concarneau "fishpool-laboratory", later to become the Concarneau Marine Biology Station or Laboratory, was officially created in 1859. It is thus the oldest marine research institute in the world.

In the strong thrust of scientific activity in the 19th century, the development of marine biology was a general phenomenon throughout Europe and the Americas, and in which France played a key part.

Not that "scientists" showed no interest in marine life prior to that. Long before painters and tourists, naturalists went to discover the sea. They covered long distances by stagecoach, made contact with fishermen, and set up very basic facilities: "… all that we have found here are the four walls of three rooms in a dingy thatched cabin…" (Jean-Victor Audouin at Chausey in 1828). Their ventures sometimes took them to disreputable inns where the same table was often used for their dissections and for the evening meal. At Saint-Quay, the landlady, frightened by Lacaze-Duthiers' microscope, believed he was "a sorcerer who prevented the buckwheat pancakes, that were the main component of her menu from going off."

Victor Coste.
© Archives du Collège de France

The oldest marine station still operating is the one founded in the 1850s at Concarneau by Victor Coste.

Coste and Guillou

Originally Victor Coste, a renowned scholar, Professor at the Collège de France, medical doctor, and close to the ruling elite of the Second Empire, combined basic and applied research. Charged by Napoleon III with the mission of obtaining information on fishing and fish breeding on the coasts of France and Italy, with a view to improving techniques, he visited those areas[3] and planned to set up fishpools for studying the development, physiology and behaviour of marine animals, for breeding purposes. Today we would call this fish farming. After several trials, especially in breeding oysters in the Saint Brieuc Bay, Coste formed a partnership with the captain of the port of Concarneau, Etienne Guillou[4], who was to become a trader and consultant. As General Inspector of Fishing, personal physician of Empress Eugénie, and friend of the ruling elite, Coste easily obtained large grants as well as the support of the Brest arsenal, and commissioned the construction of the pools that are still there today. The fishpool-laboratory was operational in 1862. It is described in detail in the book by Reverent Davies, *Chasse aux loups en Bretagne*[5].

During the early years criticism was severe: "far from being an agricultural farm where the fish farmer and oyster farmer can obtain information, the Concarneau institution has remained a private reserve of fish and shellfish[11]". In fact the station was nearly closed down at one stage. By setting up his fishpool-laboratory on the concession requested by a private individual, Coste created a complicated situation that was only resolved in 1928, thanks to the efforts of the then director, René Legendre.

The Coste fishpool-laboratory, built in around 1859 with public funds and despite criticism (from rivals?), quickly became a centre of attraction for researchers from the Museum of Natural History and the faculties of Lille and Paris. Its creation was followed closely by

that of Roscoff (1871), Banyuls (1880), Arcachon (1883), Wimereux, Sète, Villefranche, and the Russian zoological station, among others. Lacaze-Duthiers, founder of the Roscoff and Banyuls stations, claimed that the "two laboratories [his own?] suffice, whereas they're building them all over".

The multiplicity and diversity of marine stations nevertheless continued to meet a scientific need, for long after the spate of new stations set up in the late 19th century (Plymouth, Dove, Woods Hole, etc.), others were still being founded throughout the world.

Research and its applications

A few personalities stand out amongst the host of renowned researchers who worked at Concarneau.

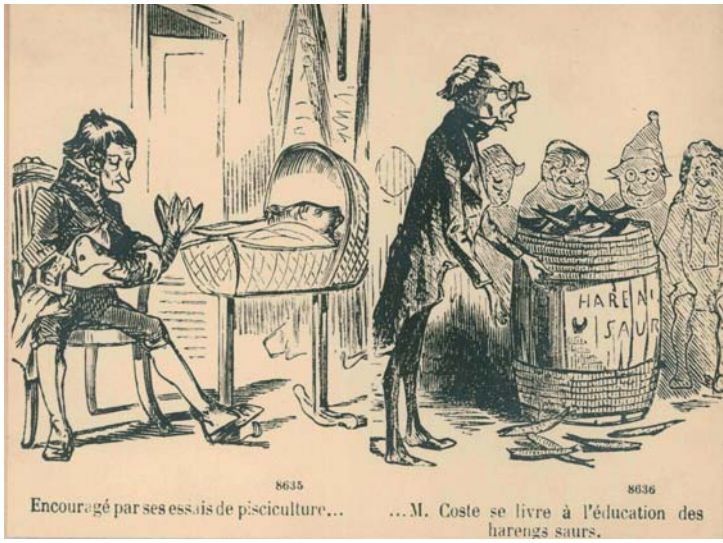
In the 1880s strong impetus was given to the station by Georges Pouchet, professor of comparative anatomy at the Museum, and author of a large number of publications on the vision of cirriped crustaceans, the mimicry of the cuttlefish, the histology of the amphioxus – the first link with vertebrates –, the biology of the sardine – a crucial subject for fishing and the economic life of Brittany's ports –, and on plankton. Pouchet was the first to describe and identify dinoflagellate species like Dinophysis, responsible for the production of toxins and the contamination of molluscs.

But Pouchet's presence at Concarneau is also interesting in another respect, for under his direction and that of his teacher Robin, Concarneau exerted an influence on French positivist thinking[1, 4]. It was Robin and Pouchet who obtained the material for Michelet's book on the sea. In 1875 Flaubert sojourned at Concarneau, where he took advantage of the tranquillity to write, and observed his friend Pouchet (Pécuchet) dissecting marine animals[6].

Cultivating the sea

Coste's laboratory was at least partly an applied research station, with the constant dream of becoming a substitute for nature, where marine animals could be bred.

After capturing oyster spat, the base of current oyster farming, he launched lobster and crayfish breeding, but less successfully. Lobsters and crayfish are predators that have to be fed and have complex stages of development. It is essential to be thoroughly familiar with their biology, their feeding behaviours, and so on. In short, one has to start with basic marine biology.



19th century caricature © Archives du Collège de France.

In the 1880s Fabre-Domergue and his colleague Bietrix achieved a remarkable technical feat by breeding sole. However, as for crayfish and many marine species, the complexity of the processes to implement was considerable, due to the conditions of development of the larvae (drastic alterations of their morphology with the migration of the eye) and their feeding habits. For each period in a sole's life there are very specific types of food, consisting mainly of live prey. The difficulties are such that, even today, it is more rational to directly manage the natural stocks of these species.

From physiology to biochemistry

Many scholars have marked the scientific history of Concarneau: among others, Pouchet, mentioned above, Laguesse, whose work laid the foundations for the discovery of insulin, and Arsonval, who studied the electric organ of the stingray and whose model is still used in neurobiology. But it is probably Laurent Chabry who earned Concarneau its renown in the international scientific community. This young director of the marine station wanted to understand why, in nature, embryos harvested in the plankton of the Concarneau Bay showed signs of abnormal development. With admirable patience and veritable experimental genius, he created the first tools of micromanipulation. These enabled him to establish, for the first time, the nature of the potential to evolve that the eggs of various different marine invertebrates have. Chabry showed that in ascidians (organisms that on the evolutionary scale can be situated between the Echinodermata and vertebrates), the destruction of a cell at an early stage can lead to the disappearance or deformation of whole organs. But Chabry's scientific genius was primarily evidenced when he pointed out that what is true for ascidians is not necessarily so for


Laurent Chabry

all animals. In other organisms, so-called "mosaic" development implies a gradual rearrangement, up to a certain point of information necessary for the development of the embryo. Chabry's thesis, in 1887, is considered as a founding element of experimental embryology. His name nevertheless remains relatively unknown in France. Yet when I introduced myself to a researcher at the large marine biology centre of Woods Hole in the US, during a visit in around 1990, he immediately replied: "Concarneau, Chabry's laboratory!"

For many years Concarneau was a reference in the fields of comparative and marine biochemistry. Current trends towards molecular systematics and biotechnologies are the consequence.

Biochemists invested in the Concarneau station from the 1930s, in particular Maurice Nicloux, who developed methods for gas assays in biologial fluids, later to be used in medical biology, and Jean Roche, whose work on iodine in marine organisms led him to identify the active thyroid hormone (T3 triiodothyronine) in 1952.

It was with the Belgian biochemist Marcel Florkin and then his colleagues Ng. Van Thoai and Yvonne Robin that Roche developed comparative biochemistry and identified structural differences in molecules that perform identical functions in different organisms: haemoglobin and phosphagens. This work spawned a view of evolution based no longer only on forms but on molecules. Biochemical evolution thus opened onto another domain: biochemical ecology.

For 150 years, under different supervisory authorities – the Collège de France, the National Museum of Natural History – the researchers at the station have explored the marine world from various original and often innovative angles: development biology, dynamics of marine species, and evolution of species. As a station for basic research, its activities have thus been increasingly relevant to economic activity: fishing, aquaculture, and biotechnologies.

Concarneau: scientific knowledge of the marine world

Today, the Concarneau marine biology station is a higher education and research institution. It has 25 permanent lecturer-researchers, researchers, engineers and technicians, and a total of over 40 researchers, PhD students and French and foreign under-graduate students who participate annually in its activity.

The laboratory's scientific publications in the fields of physiology, molecular biology, and marine population studies attest to the quality of its research and meet the highest international standards.

Two of its researchers – Alain Van Wormhoudt and Martine Fouchereau-Peron – have been distinguished by awards from the Academy of Sciences. PhDs trained at Concarneau 'export' their skills abroad, for example to the US, the UK, Portugal, etc.

The modest size of the institution is essentially an asset which facilitates the creativity and scientific production of work in dynamic specialized networks. In several sectors the marine station is an international reference. Its teams have initiated the creation of European marine biotechnology networks, in which they coordinate scientific cooperation on several international projects.

Concarneau: at the service of the economy

The results of research carried out at the Concarneau marine biology station are directly applied in the local and European economic contexts. Situated upstream from industrial innovation, the stations' research is at the centre of European technology transfer networks. Technological collaboration underway with several firms in Brittany, especially in the fields of heath, nutraceutics and cosmetics, bears witness to industry's recognition of the station's know-how.

Concarneau: scientific culture

Scientific culture is fully part of citizens' general knowledge. In this respect, both the National Museum of Natural History and the Collège de France offer


The marine biology laboratory, seen from the ocean © Laffaite, MNHN.

lectures and talks open to all. The Museum also fulfils this mission through its exhibitions and museums. At Concarneau, the Marinarium is the main vehicle of this dissemination of knowledge, in addition to the organization of lectures for all types of public, in partnership with local institutions.

The Marinarium, the laboratory's showcase since 1972, invites visitors to immerse themselves in marine life and to discover the importance of the oceans and their extraordinary biodiversity, the universe of plankton, the immense richness of the littoral, and the protection and management of marine resources. Its aquariums of local flora and fauna are ample illustrations. Through the numerous events offered, it plays an important educational role for both school children and the general public, to make them aware of the importance of respecting the natural environment. The Marinarium is firmly entrenched in local life and regularly collaborates with another marine cultural centre in Concarneau, the fishing museum. ■

The marine biology laboratory, seen from the continent
© P. Llegou, Collège de France.

Bibliography:
1. Paul Harry W., *From knowledge to power – the rise of the science power in France - 1860-1939*, London, Cambridge University Press, 1985.
2. Lacaze-Duthiers H. de, *Le monde de la mer et ses laboratoires*, Assn. Fse Avt. Sciences. Oran, 1st part, Masson, Paris, 1888, pp. 347-385.
3. Coste V., *Voyage d'exploration sur les côtes de France et d'Italie*, Imprimerie Impériale Paris, 1855.
4. Bouxin H. and Roche J., *Le Laboratoire de Concarneau et son centenaire*, Imp. Letendre, Concarneau, 1959.
5. Davies, E.W.L., *Chasse aux loups et autres chasses en Basse-Bretagne*. (1855) Re-published in 1985, Plougonven, Les Editions du bout du monde.
6. Flaubert G., *Correspondance*, Vol. III (1864-1876), Librairie de France, Paris, 1924.
7. Fisher J. L., "Experimental embryology in France", Int. J. Dev., 1990, 34 11-23.
8. Chabry L., *Embryologie normale et tératologique des Ascidies*, Paris, Félix Alcan, 1887.
9. Fabre-Domergue and Biétrix E., *Développement de la Sole. Introduction à l'étude de la pisciculture marine*, Paris, Vuibert, 1905.
10. Florkin M., *L'évolution biochimique*, Liège, Desoer, 1950.
11. Cf. "L'établissement de Concarneau", Le magasin pittoresque, 37e année, 1869, p. 301.

Édouard Laboulaye and the Statue of Liberty: Forging the Democratic Experience

Stephen W. Sawyer
historian, specialist of the history of urban policy in France and the USA,
American University of Paris

From the Treaty of Paris to Barack Obama's "bonjour" at the end of his first press conference, the United States and France have cast a friendship that has been at the heart of the democratic experience. The eminent French Historian, René Rémond, has outlined the three Frenchmen who, alongside the many great Americans, from Benjamin Franklin to Thomas Jefferson, were dedicated to this enduring friendship. From the 1770s to the 1830s, Franco-American relations were represented in France by the Marquis de Lafayette, the symbol of the France's direct support for the birth of the American Republic in the War of Independence. During the 1830s and 1840s, Alexis de Tocqueville's *Democracy in America* (published in two volumes in 1835 and 1840) generated a French fascination with the nature of political participation in a stable American democracy. It was then Édouard Laboulaye who began his courses on the American constitution at the illustrious *Collège de France* in 1849 and whose dedication to American democracy was finally realized through the towering achievement of the Statue of Liberty in 1886[1]. Like his predecessors Lafayette and Tocqueville, Laboulaye was a great observer and supporter of American democracy. Lafayette had fought alongside Washington during the Revolutionary War, Tocqueville had revealed the potent power of democratic participation, and Laboulaye uncovered the constitutional heritage of the United States for changing democracies. "May [my] voice at least find echoes in the country of Lafayette, and prove to the United States that France has always remained faithful to America and to Liberty."[2] This dedication to defending, observing and learning from American democracy spanned over 100 years and each was a testimony to the common democratic project driving these two nations.

But if the Statue of Liberty remains the most visible testimony to the enduring friendship between these two democracies; a symbol not only of American democracy, but of the shared values that have driven that experience and the generosity that has nourished it, the individual at the heart of its creation is far less well-known. Édouard Laboulaye, Professor of Comparative Law, who specialized in American Constitutional History was, along with the sculptor Frédéric-Auguste Bartholdi, the key figure responsible for the Statue of Liberty as he used his position at the head of France' s illustrious *Collège de France* (established in 1530) to bring forth a political symbol which remains to this day.

Laboulaye was born in 1811 and had an exemplary career rising to the highest academic and political positions in France. After an early career focusing on Ancient History, he was appointed to the *Collège de France* in 1849. The independence of the *Collège de France* from the French University system, and the intellectual freedom that has always been the institution's mark, allowed Laboulaye to develop a highly original fascination for the United States. His study of the United States was original in that until 1848, the chronological limit for all history courses in France was 1789 and in 1848 the limit was extended to 1814.[3] Thus until the late 1840s, the United States were not even on the scholarly program. But, as soon as he was nominated to his position at the *Collège de France,*

Laboulaye took advantage of the liberty that the institution offered to begin teaching a subject that he was convinced was of the utmost importance for a French nation which had also been among the founders of the democratic experience at the end of the eighteenth century. "Once appointed professor, my duty was clear. It was to make America known to France," he later remembered.(4)

His first class at the *Collège de France* was entitled, "De la Constitution américaine et l'utilité de son étude" and was subsequently published as the first chapter of his *Histoire des Etats-Unis*. Through these efforts, Laboulaye was among the first French scholars to make a career of studying the United States. He generated a new interest in the United States as he attracted an unprecedented number of students to his classes in the 1860s. As his fame grew, Americans in Paris joined the French students and general public to hear his lectures - the seminar rooms of the *Collège de France* were often so full that attendees were forced to stand or wait outside. Laboulaye was responsible for transforming American history and politics into a fascinating subject in mid-nineteenth-century France.

Throughout the 1860s, he wrote on American history and especially the history of its constitution. Laboulaye was in contact with many of the most prominent American scholars of the period such as George Bancroft, Francis Lieber, William Channing, and Horace Mann. While he never actually visited the U.S. his imagination brought him to the shores of New England in one of his most widely read works during this period, the highly original, *Paris in America*. Inspired by Montesquieu's *Persian Letters* – Laboulaye was a tremendous reader of Montesquieu and played a key role in revealing Montesquieu's influence on the American Founding Fathers – the story recounts the imaginary voyage of a Parisian to New England. The work was a thinly veiled critique of French and Parisian politics and society from an American perspective. During these years, he received many honorary degrees from American institutions such as Harvard University on July 20, 1864. He was also commended by the Loyal National League of New York. Upon reception of this award, he responded to Francis Lieber, the esteemed president of the League: "I have received many diplomas and degrees from academies and universities in my life but no testimony of esteem pleases or honors me more than the one that the Union League has just addressed to me. I will keep it as a legacy for my children so that they may know that the first article of faith for a Frenchman is to love France and the second is to love America."(5)

Laboulaye was one of the greatest nineteenth-century historians of the American constitution. Like many of his counterparts, Laboulaye was convinced that France's dialectic between revolution and reaction could be brought to an end by a constitution founded on principles similar to those of the United States. Only such a written constitution, he argued, could offer an example for the French. At a moment when the democratic project was evolving by leaps and bounds in the nineteenth century with expanded citizenship and new forms of state power, Laboulaye offered a vision of American democracy which he hoped could serve as a potential model for French democracy. In 1865, Laboulaye hoped to use his notoriety at the *Collège de France* to build projects for the public. He therefore created the Franklin Society, an association built on the original project of Benjamin Franklin's idea of subscription libraries.

But Laboulaye was not content with these public activities. The project for the Statue of Liberty had its origins in a famous dinner at Laboulaye's house in Versailles in 1865. The timing of this dinner was no accident, for the Statue of Liberty was not only designed to celebrate the common democratic experience of France and the United States, it was also designed to commemorate the end of the Civil War and the hope for a new age of American democracy. "This monument to independence will be executed in common by the two nations, joined together in this fraternal work as they once were to achieve independence. We

Illustrations:
p. 55: portrait of Édouard Laboulaye, Collège de France.
p. 55 to 57: 'Liberty illuminating the world' by Auguste Bartholdi, situated in the Luxembourg Gardens in Paris, is the bronze model that was used for the statue in New York. Pictures taken in the Jardin d'Acclimation to which the statue was temporarily moved in April-May 2009 for the event 'Americans in Paris'.
Archive images: p. 56: the Statue of Liberty under construction, rue de Chazelles in Paris in 1885, before being transported to New York. © D.R.
p. 57: the Statue of Liberty in the Gaget-Gauthier studios, rue de Chazelles, by Victor Dargaud, XIX century, © CAG of the Carnavalet Museum, Paris.

will thus affirm by an enduring souvenir, the friendship; between the two nations that was sealed in a former time by the bloodshed of our fathers."(6) From the beginning, the Statue of Liberty was to attest to the common project that had begun with Lafayette during the War for Independence and been renewed every step of the nineteenth century. Frédéric-Auguste Bartholdi who was already convinced by the project of a colossal statue saw this work as a material manifestation of Laboulaye's vision of American democracy: "I have reread and am still rereading your works on the subject 'liberty,' and I hope to honor your friendship, which will subsidize me. I will endeavor to glorify the Republic and liberty over there."(7)

While the project faltered due to the chaotic political situation at the end of the Second Empire and beginning of the Third Republic, the project was initiated once again by Laboulaye when he created the *Comité de l'Union Franco-Américaine* in 1875 to raise funds. Here, he brought together the families of those who had incarnated the Franco-American friendship. On the committee were the descendents of the prominent Frenchmen who had participated in the American Revolution, Lafayette, Rochambeau and Noailles as well as Alexis de Tocqueville's brother. These figures incarnated the shared ideals that were to be cast in the Statue of Liberty. Laboulaye's ambition was tremendous. France had just been sorely defeated in the Franco-Prussian War, had lost the large part of two of its wealthiest areas, Alsace and Lorraine, to Germany and was also forced to pay reparations to Germany throughout the early 1870s. As soon as the reparations were paid, Laboulaye set out on a fundraising campaign attempting to convince the French that they should participate in this gift to the United States and offer a testament to their common democratic vision. The initial goal was to raise enough funds by 1876 in time to announce the project for the 100th anniversary of the Declaration of Independence. Economic difficulties and the lack of a strong philanthropic tradition in France made fundraising in this context a Herculean task. The sums were only gathered in 1880 through Laboulaye's perseverance. The project was thus solidified and the construction site near the *Arc de Triomphe* became a great tourist attraction. President Grant, one of many American visitors to the workshop, sent a letter of support to Laboulaye after his visit in 1877. Laboulaye responded to the president: "Votre visite a été une sorte de consécration du monument qui doit attester aux generations les plus lontaines l'amitié de la France et des Etats-Unis."(8)

The image of "Liberty Enlightening the World" is drawn from a shared ideal, held by both Laboulaye and nineteenth-century American historians, that democracy is a shared vision. One of the founders of American history, and friend of Laboulaye, George Bancroft opened his own monumental multi-volume history of the United States with the statement: "The United States of America constitute an essential portion of a great political system, embracing all the civilized nations of the earth."(9) Laboulaye concurred when he argued for "studying the American Constitution, in detail, so as to penetrate its true character, to appreciate its spirit not only for purely speculative purposes, but in order to draw from it useful lessons."(10) Like Bancroft's claim for a "great political system", Laboulaye's dedication to learning from the American model and his generosity in attesting to the shared experiment of democratic govemance by supporting the Statue of Liberty suggested that neither Europe nor the United States could claim a monopoly on democratic experience. Then, as today, democracy was a common project to be built in concert. ■

1. René Rémond, *Les Etats-Unis devant l'opinion française*, 1815-1852, Paris, PUF, 1962.
2. E. Laboulaye, "Pourquoi le Nord ne peut accepter la séparation", in E. Laboulaye, *L'État et ses limites*, p. 391, cited by Walter Dennis Gray, *Interpreting American Democracy in France: the Career of Édouard Laboulaye, 1811-1883*, Newark, University of Delaware Press, 1994, p. 83.
3. See Gray, p. 56.
4. E. Laboulaye, *Histoire des Etats-Unis, Première époque*, Preface, p. IV. (Cf. W. D. Gray, op. cit., p. 55).
5. Letter by E. Laboulaye to Francis Lieber, president of the Loyal National League of New York, Paris, 31 July 1863 (Correspondance of E. Laboulaye, Lieber Papers, Huntington Library). Cf. Walter Gray, op. cit., p. 86.
6. W. D. Gray, op. cit., p. 114.
7. Ibid, p. 129. (Correspondance of Laboulaye, Bartholdi to Laboulaye, Colmar, 8 May 1871).
8. Ibid, p. 132.
9. George Bancroft, *A History of the United States from the Discovery of the American Continent (Boston: Little*, Brown and company, 1855), p. I.
10. Ibid, p. 58. ("Extrait de la Leçon inaugurale de Laboulaye au Collège de France, 4 déc 1849", in De la constitution américaine et de l'utilité de son étude : discours prononcé, le 4 décembre 1849, à l'ouverture du cours de législation comparée, M. Édouard Laboulaye, Paris, impr. de Hennuyer, 1850.)

A portrait of Édouard Laboulaye[1]

Marc Kirsch

Édouard Laboulaye (1811-1883)

Holder of the Chair of History of Comparative Legislation from 1849 to 1883
Administrator of the Collège de France from 1873 to 1883

Three to four million people visit the Statue of Liberty every year. This monument, one of the most well-known in the world, a symbol of friendship and political cooperation between France and the United States, was a private initiative. It stemmed from the passion of a few individuals – influential and visionary, to be sure – rather than from official relations between governments. The statue is generally associated with the name of Bartholdi, and it was unquestionably the sculptor who shaped the face and famous torch that welcomed so many generations of immigrants arriving in New York harbour in the days of maritime transport. But it is to Édouard Laboulaye that we owe the idea of the project, and it was his energy and love for America that made its realization possible.

The America of the time was that of the Union, the anti-slavery North of which Laboulaye was the champion in France, while the Second Empire, like England, seemed to lean more in favour of the confederated South, especially for economic reasons. In an article entitled "The United States and France", he wrote "Irrespective of the difficulties of industry, irrespective of diplomats' calculations, there is a prevailing fact, and that is slavery. The victory of the North is the redemption of four million men; the triumph of the South is the death sentence, the extension of servitude with all its miseries and all its infamies. […] With we French is it possible that the cause of slavery was ever popular? Our fathers were in America, with Lafayette and Rochambeau, to support liberty. That is one of our national glories; it is through this service rendered to the United States that over there we are brothers and friends. Will we be able to efface this memorable past? Will the name of France be associated with the triumph of the South, that is, with slavery eternalized, irrespective of what we do? That cannot be[2]."

That sums up Laboulaye, his passions and his energy. "The United States and France" was translated and sent to President Lincoln by John Bigelow, Consul General of the United States in Paris and friend of Laboulaye. Bigelow had the document reprinted at his own expense and announced that he had had a copy sent to every member of the French legislature, to all its diplomats, to the main press organs, and to France's leading industrialists. The text was reproduced in many North American newspapers. Laboulaye likewise engaged in the US electoral campaign and, at the request of his American friends, put his pen to the service of Lincoln's election as president. Thus, Édouard Laboulaye was far more than just an academic with a love for America. He was an influential personality whose action impacted on relations between France and the United States, and who played an important part in France's intellectual and political life from 1848 to 1883.

Who exactly was Édouard René Lefebvre de Laboulaye? It was initially as a jurist that he made himself known. His first book, *L'histoire du droit de la propriété foncière en Europe depuis Constantin jusqu'à nos jours* ('The history of property law in Europe from Constantine to the present') was celebrated by the Académie des Inscriptions et Belles Lettres, to which he was admitted on 17 January 1844. He travelled in Europe and studied German history and law. In 1849, at the age of 37, he became Professor of Comparative Law at the Collège de France. He was elected Administrator in 1873 and remained in the position until his death.

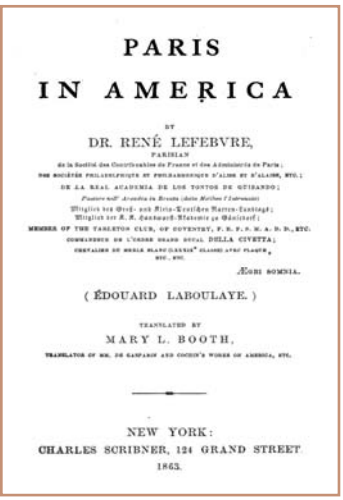
Laboulaye's beginnings were difficult: "the first time I spoke I saw everything in red; for ten years the fear of the public made my heart race[3]". Yet that was where he found his way. Although he had loved Germany and admired the Prussian model, from his first lectures at the Collège de France he turned towards America and never looked away. With America he also discovered a passion for freedom: it was the key to his engagement and his life.

Delivering a lecture on the United States was something unusual in 1850, as Stephen Sawyer points out[4]. Laboulaye was a catalyst of awakening public interest in America, aroused by the Marquis de Lafayette who reappeared in French political life in 1830. Victor Cousin had apparently encouraged Laboulaye to study America. Tocqueville had marked people's minds with *De la démocratie en Amérique*, published in 1835, and Guizot had written on Washington's life in 1839. The attention focused on America peaked in the 1850s after France's unfortunate experience with a republican presidential system fairly similar to the one established by the

US constitution – minus bicamerism, to Laboulaye's great regret. It was also a time of the beginnings of major industrial developments in America. All this interest was reflected in literature; for instance, Baudelaire published his translations of Poe in 1852, the year of *Uncle Tom's Cabin* by Harriet Beecher Stowe. Laboulaye was thus the precursor to a wave of opinion. The emphasis on the question of slavery and the way in which it was treated in the US furthermore revealed an important issue in French national politics: in the authoritarian period of the early Second Empire, the opposition felt deprived on its freedom, and criticism of slavery was seen as a veiled attack on the regime.

Events were to turn the shy professor into an engaged tribune. "The 1848 revolution destroyed all my plans and overturned all my ideas", wrote Édouard Laboulaye in the foreword to his *Questions constitutionnelles* published in 1872. He added: "it is revolutions that have made a political writer of me". To circumvent censorship and avoid dismissal – the fate of some of his colleagues – Laboulaye interrupted his lectures on the United States and chose less sensitive subjects such as religious history. But once again it was liberty, religious this time, that he defended, inspired by William Channing in particular. He supported the equality of religions but also the separation of church and state[5] – at the risk of displeasing the Catholics even though he was a believer and very attached to religion. After the liberal turn of the regime his criticism became less veiled. In 1868 he published a satirical tale *Le Prince Caniche* that caused a sensation.

At the time, Laboulaye was already a figure on the French intellectual and literary scene. He was a brilliant editorialist and pamphleteer, a regular contributor to the *Journal des Débats*, and published many articles in the press and in specialized journals. *Paris en Amérique*[6] published in 1863 under the name Doctor René Lefebvre – the part of his name that he did not usually use – earned him wide popular renown. The book had no fewer than 35 French and eight English editions. This philosophical novel, a satire of Parisian society and a plea for liberty and self-government based on the American model, was one of the major literary successes of the time. Apart from being a politician and jurisconsult, Laboulaye was also a talented story-teller, strongly attached to popular culture. Moreover, actively engaged in the subscription library and popular library movement, he was an ardent defender of the freedom of education. In this respect he fought against the state monopoly, with the main aim of education for all: "the primary condition of liberty is education for all citizens[7]".


PARIS
IN AMERICA
BY
DR. RENÉ LEFEBVRE,
PARISIAN
ÆGRI SOMNIA.
(ÉDOUARD LABOULAYE.)
TRANSLATED BY
MARY L. BOOTH.
NEW YORK:
CHARLES SCRIBNER, 124 GRAND STREET
1863.

In his inaugural lecture at the Collège de France in 1884, Jacques Flach, Laboulaye's successor to the chair of History of Comparative Legislation, described his predecessor. He saw the jurist as the founder of the historical school of law in France. He also paid homage to the politician who, in 1860, when the authoritarian empire loosened its grip, knew how to use the new strength of public opinion. "With growing energy, he calls for religious freedom, educational freedom, press freedom, municipal freedom, freedom of association and, above all, individual freedom."[8]

Laboulaye, elected member of parliament in 1871, became the leader of the centre left, the mainspring of politics at a crucial time when the country was wavering between a republic and constitutional monarchy. Flach pointed out that "even if Mr Laboulaye was not the father of the republic, he was at least the godfather". It was Henri Wallon who, on 30 January 1875, introduced the word 'republic' into France's constitutional law, with a majority of votes. But Laboulaye had contributed considerably to this success with the speech that he had made to table a similar amendment – refused on 29 January under pressure from the monarchists. As a moderate republican and conservative, attached to defending freedom and mistrustful of revolutions[9], he was elected irremovable senator in December 1875.

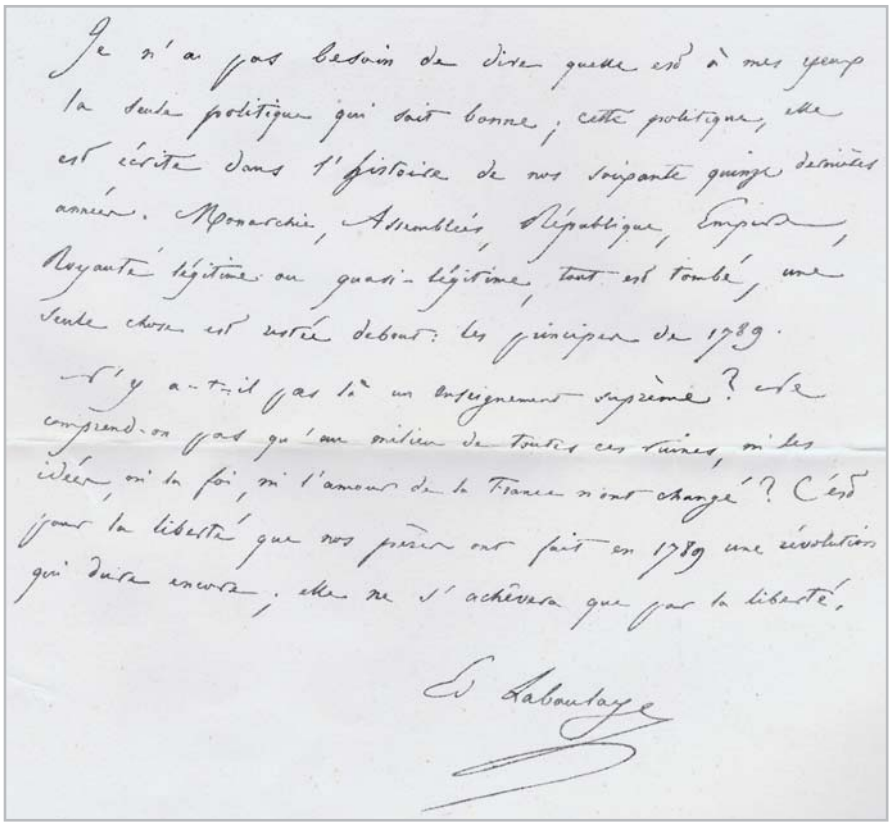
This man with an austere appearance, dressed like a Quaker, was described by those who knew him as a cultivated mind, affable and *forçant la sympathie*. The real crowning of the career and life of Laboulaye, refused membership of the

Laboulaye's inkwell

In 1866 Édouard Laboulaye, candidate for the opposition in Strasbourg, was defeated "by the campaigns", despite his popularity among the urban electorate. After this failure, voters in Strasbourg opened a subscription for a gift for him: a beautiful inkwell. But when the author of *Paris en Amérique* called for a 'yes' vote in the 1870 plebiscite, J.A. Lafont, a radical journalist, friend of the Strasbourg republicans and later councillor and Member of Parliament for Paris, considered that the donors in 1866 had been betrayed by this rallying in favour of the regime. Lafont published a letter in opposition newspapers, demanding that the inkwell be returned. At the opening of the summer semester of 1870, Laboulaye was met at the Collège de France with cries: "Return the inkwell!". Despite the support of a part of his audience, he ended up requesting the provisional suspension of his lectures.
Had Laboulaye betrayed his principles? In fact, he had clearly taken a stand in favour of the parliamentary regime, for example in *Le Parti liberal, son programme et son avenir* published in 1864. He was therefore loyal to his convictions but too moderate for the radicals who wanted to overthrow the regime. Laboulaye did not like revolutions.

Académie Française, was unfortunately posthumous: he who had studied and admired America so much without ever crossing the Atlantic, channelled his last efforts into ensuring the successful conclusion of a project to erect a monumental statue to the glory of friendship between France and the United States of America[10]. This was finally accomplished in 1886, three years after his death. It is fair to associate Laboulaye's name with this monument which, although a weighty allegory, is one that conveys an eternal ideal: the liberty that he made the goal of his lifelong struggle as a jurist, professor, politician and story-teller. ■

Marc Kirsch
Senior lecturer, Collège de France



Je n'ai pas besoin de dire quelle est à mes yeux la seule politique qui soit bonne ; cette politique, elle est écrite dans l'histoire de nos soixante quinze dernières années. Monarchie, Assemblées, République, Empire, Royauté légitime ou quasi-légitime, tout est tombé, une seule chose est restée debout : les principes de 1789.

N'y a-t-il pas là un enseignement suprême ? est-ce comprendre pas qu'au milieu de toutes ces ruines, ni les idées, ni la foi, ni l'amour de la France n'ont changé ? C'est pour la liberté que nos pères ont fait en 1789 une révolution qui durera encore ; elle ne s'achèvera que par la liberté.

Ed Laboulaye

Picture editing of *Judge*, 1886. © D.R.

Manuscript:

"I have no need to say which policy is, in my eyes, the only good one. This policy is embedded in the history of our past seventy-five years. Monarchy, Assemblies, Republic, Empire, Royalty, legitimate or quasi legitimate: all have fallen. One thing only has remained standing: the principles of 1789. Is this not a supreme lesson? Do we not understand that in the midst of all these ruins, neither the ideas nor the faith nor the love of France have changed. It is for liberty that our fathers fought the 1789 revolution, which is still on-going; it will end only with liberty."

Édouard Laboulaye, *Le parti libéral, son programme et son avenir*, 1863.
Preface, p. XVI

1. Most of the content of this article is drawn from the biography by Walter Dennis Gray, *Interpreting American democracy in France: the career of Édouard Laboulaye*, 1811-1883 (Newark, University of Delaware Press, 1994), from the archives of the Collège de France, and from the data collected by Mr Jacques Gaille.
2. E. Laboulaye, "Les Etats-Unis et la France", in *L'État et ses limites*, Paris, Charpentier, 1865, p. 349.
3. Cf. E. Laboulaye, "Horace Mann", *Revue des cours littéraires de la France et de l'étranger*, 27 février 1869, p. 202.
4. Cf. his text published in the present issue, pp. 55-57.
5. "The state does not know of the faithful, it only knows of the citizen", *Le Parti libéral*, 1863, p. 42.
6. This novel, like many of Laboulaye's books, is available on line on the Gallica site of the Bibliothèque Nationale de France.
7. E. Laboulaye, "L'instruction publique et le suffrage universel", in *L'état et ses limites*, 1865, p. 206. Cf. aussi "De l'éducation populaire", in *Le Parti libéral, son programme et son avenir* (1863), and his book on *La Liberté d'enseignement et les projets de lois de M. Jules Ferry* (1880), where he opposes Jules Ferry's ideas.
8. Jacques Flach, "Vie et œuvres de M. Laboulaye", Archives du Collège de France.
9. He wrote, for example: "The constant purpose of my studies is to show that freedom and revolution are two very different and often contradictory things. The youth listened to me, the old conservative party sometimes shared my opinion; but I cannot flatter myself for having convinced either monarchists or republicans of divine law. The monarchists believe only in authority; they accepted the Empire and the coup d'état to be rid of the men and institutions of 1848; the republicans of before are on their knees before the almighty republic. The most advanced of the party, the Montagnards, are Ultramontanists who believe in the infallibility of Robespierre or Babeuf. […] For these worshippers of the revolution, constitutional liberties are an invention of the monarchy; they are Jacobins and proud of it, and they understand one thing only: dictatorship exercised in the name of the people, that is, by them and for them. I love democracy, that is, government of the nation by the nation and for the nation; in no way do I worship revolution". *Questions constitutionnelles*, Paris, Charpentier, 1872, Préface, p. 11.
10. E. Laboulaye was at the heart of the subscription campaign for the Statue of Liberty, launched with a huge amount of publicity. On this occasion one of the first republican banquets was organized, in 1875, as well as a gala for which Gounod composed a work sung by a choir of 700 men.

Institutional News

Hosting PhD and post-doctoral researchers at the Collège de France

aOn 9 December 2008 a reception was held for PhD and post-doctoral researchers at the Collège de France. Professor Pierre Corvol, administrator, presented the Collège's policy in this respect. Professor Serge Haroche handed the Collège de France Hugo Foundation prize for 2008 to Igor Dotsenko.

The Collège de France's mission is to teach the professors' own original research. Lectures open to the public and available free-of-charge on Internet are one way of doing so. Another way is by involving PhD students and post-doctoral fellows in the research projects of the Chairs, laboratories and hosted teams. In 2009 the Collège de France has close to 250 advanced PhD and post-doctoral researchers, including a large proportion of foreigners.

The Collège de France would like to develop this aspect of its activity and to make it more visible, especially abroad. For this purpose a steering committee has been set up for the Collège's PhD and post-doctoral programme. The members are: Profs John Scheid (Religion, Institutions and Society in Ancient Rome), Alain Prochiantz (Morphogenetic Processes) and Jean-Christophe Yoccoz (Differential Equations and Dynamic Systems), assisted by Olivier Guillaume, Head of International Relations.

Various initiatives have been taken to build more cohesion between researchers hosted at the Collège de France, to nurture their feeling of belonging to the institution, and to structure and animate a network of alumni. The reception on 9 December afforded an opportunity for them to meet. On this occasion Igor Dotsenko, a Ukranian PhD student in Prof Serge Haroche's laboratory (quantum physics), received the Collège de France Hugot Foundation prize, awarded annually to a particularly promising researcher. A special Day to be organized next spring will be a new opportunity for PhDs and post-docs to meet and to interact. Finally, an e-newsletter addressed to the network of PhDs and post-docs who are currently at the Collège de France or were hosted there in the past is to be launched shortly.

Extensions have recently been made to the Collège de France premises with a view to accommodating more researchers. New laboratories (16,000m² devoted to physics, chemistry and biology) have been built, some of which will soon be inaugurated on the institution's historical site, and the Marcelin-Berthelot residence has been opened in Meudon, near Paris. Management of the rental of the 58 one-roomed flats in this residence has been entrusted to the non-profit organization ARPEJ (www.univercity.fr). Finally, one of the missions of the newly-created Collège de France Foundation will be to look for partnerships with enterprise, so that positions can be created to host PhDs and post-doctoral researchers. These positions could be allocated either to a specific discipline, or to a foreign country or region.

In 2009, to accompany this growth of the PhD and post-doctoral programme, the Collège de France will set up a procedure for recruiting foreign post-doctoral fellows that will be advertised widely abroad.

The Collège de France is thus actively involved in training tomorrow's scientific elite. ■

Prof Ian Hacking, winner of the Holberg Prize - 2009

The Holberg International Memorial Prize for 2009 for outstanding scholarly work in the arts and humanities, social sciences, law and theology has been awarded to Ian Hacking, holder of the chair of Philosophy and History of Scientific Concepts at the Collège de France (2001-2006). ■

Citation from the Holberg Prize Academic Committee: Ian Hacking's "combination of rigorous philosophical and historical analysis has profoundly altered our understanding of the ways in which key concepts emerge through scientific practices and in specific social and institutional contexts."

Creation of the Collège de France Foundation

The decree providing for the creation of the state-approved Collège de France Foundation was published in the *Journal Officiel* of 7 April 2008.

The aim of the Foundation, in keeping with the Collège de France's spirit of openness, is to support, develop and transfer teaching, research, training and knowledge in France and abroad.

The underlying idea that led to the creation of the Foundation was to institute management that distinguished clearly between research, training and private funding, by means of a structure that favoured flexible and reactive management-by-projects, while meeting strict management, control and evaluation criteria.

The private funds invested in the Foundation will enable the Collège de France to finance its research projects, to increase the resources required to nurture the scientific life of the Chairs, to modernize its laboratories, to acquire the most up-to-date technical equipment, to enhance young researchers' training, and to facilitate access to knowledge and to the most recent research undertaken by the Chairs and by the teams hosted. The funds will thus serve the demands of top-level research oriented towards society.

The Collège de France Foundation's endowment is 1,250,000 €. The contributions from the Collège's own funds and that of Mr Michel David-Weill have been decisive. They have been completed by support from the Bettencourt Schueller Foundation, the French company Laser and the Belgian company Solvay.

A governance open to civil society

The Advisory Board appointed Professor Pierre Corvol and Mr François Roussely respectively as President and Vice-President of the Foundation.

The Foundation is administered by a Board of 12 members (the college of founding members consisting of professors of the Institution, the college of qualified personalities which consults personalities from civil society and the academic world, and the college of donors). The composition of the Board reflects the Foundation's policy of promoting dialogue and interaction with civil society and economic actors. For patrons and donors it is also a guarantee of open and transparent management.
The Board is advised by a Scientific Orientation Committee consisting of 6 to 8 members, all professors at the Collège, under the direction of Professor Michel Zink.
In addition to its endowment, the Foundation opened its activity with a budget of 4,400,400 €. With the support of Mr Michel David-Weill, the Collège de France will thus be able to renovate and computerize the collections of its Institutes of Oriental Studies, some of the finest libraries in Europe.
The biology laboratories of the Chair of Morphogenetic Processes, scheduled to open shortly, will be equipped with state-of-the-art research technologies, thanks to the support of the Sanofi Aventis laboratory.
This support completes a contribution by the Bettencourt Schueller Foundation which made a large donation to the Collège de France, to be used to equip its laboratories.

Based on the highly efficient framework of the Collège de France's work and resources, in a multidisciplinary environment, these funds allow for the development of new perspectives and scientific challenges, and to further the growth and development of basic and applied research.

Development strategy

Apart from the efforts that will be made to raise awareness concerning donations and legacies, as well as the new measures pertaining to the payment of wealth tax, the Foundation has the mission of facilitating interaction between the academic and economic worlds. It will propose Research-Enterprise patronages or special donorships on identified development programmes: creation of a Chair or thematic series of courses (cf. the Liliane Bettencourt Chair of Technological Innovation created in 2006); renovation of premises; support for a research project or a specific action; promotion of an historical and cultural heritage; donations oriented by research domain (e.g. physics, chemistry, life sciences, economics, mathematics). A small fraction of each patronage is used to support research activities for which it is difficult to attract patrons' interest. Another purpose of the Foundation is the autonomous development of research projects.

The Foundation intends to increase its endowment to 12 million euros in the next four to five years. Income from investment will guarantee it an annual fund of some 500,000 € for research. The Foundation will appeal to big companies for support.

From left to right: Philippe Lemoine, Michel David-Weill, Gérard Le Fur, Philippe Kourilsky, François Roussely, Pierre Corvol, Yves-Thibault de Silguy, Pierre-Etienne Will, Pierre Rosanvallon, Patrice de Maistre and Jacques Reisse.

In order to develop annual collection for projects, the Foundation and the researchers will jointly examine projects likely to support the Collège de France's scientific objectives and development, and, more broadly, French science, while helping to spread them internationally.

Two projects were recently launched with the group Total and the AFD: support for the scientific animation of the newly-created thematic Chairs, "Sustainable development-Environment, Energy and Society" and "Knowledge against Poverty".

It is hoped that support will be obtained for the dissemination of knowledge via the Web, especially in view of the success that has already been encountered: 300,000 hours of lectures downloaded every month. Finally, it is also hoped that the Foundation will be able to support many projects related to the various activities of the Collège de France Chairs and involving outside teams and young post-doctoral researchers. ■

Members of the Governing Board

College of founders:
Prof Pierre Corvol, Chairman of the Board
Prof Pierre Rosanvallon, General Secretary
Prof Philippe Kourilsky
Prof Pierre-Etienne Will

College of qualified personalities:
Mr François Roussely, Vice-Chairman of the Board - CEO of Crédit Suisse
Prof Jacques Reisse, member of the COSS - ULB, Belgique
Mr Yves-Thibault de Silguy, CEO of Vinci
Mr Jean Paul Bailly, CEO of La Poste

College of donors:
Mr Patrice de Maistre, *Treasurer* – Managing Director of the Bettencourt Schueller Foundation
Mr Gérard le Fur, Managing Director of Sanofi Aventis
Mr Christian Jourquin, CEO of Solvay
Mr Philippe Lemoine, CEO of Laser

Government Commissioner:
Mr Jean-Richard Cytermann, ex officio member

Chairman of the Scientific Orientation Committee:
Prof Michel Zink

Director:
Ms Marie Chéron

Address:
Fondation du Collège de France
11 place Marcelin-Berthelot
75005 Paris
fondation@college-de-france.fr
(33) (0)1 44 27 11 78

Donations to the Collège de France Foundation are tax deductable: for private individuals up to 66% of the amount of the donation and up to 20% of the taxed income; for firms, 60% of the amount of the donation is deductable from company tax, within the limit of 5‰ of the company's turnover. As the Foundation is state approved, legacies are exempt from inheritance tax.

Dissemination of Knowledge

The multimedia platform of the Collège de France website

The Collège de France has been disseminating knowledge via the Internet since 2007. In keeping with its tradition, the institution is thus able to ensure the availability of its teaching free-of-charge to the widest public possible. Notwithstanding the difficulty and high scientific level of the content put on line, this initiative has been particularly successful: 1,463,255 files downloaded in 2007, and 3,350,682 in 2008. To cater for the constantly increasing volume of documents available for consultation on the Collège's website (over 600 audio and video files of lectures, seminars, symposiums and talks), an online media platform was set up in December 2008 on the recommendation of a steering committee chaired by Professor Jean-Christophe Yoccoz. The aim is to simplify access to on-line content: to reach the platform users simply click on the 'Audio/Video' tab on the home page of the Collège de France website, where they find all the available titles as well as a dedicated search engine and the option of automatic subscription via RSS feed (which enables a subscriber to be informed of the most recent updates without having to visit the site).

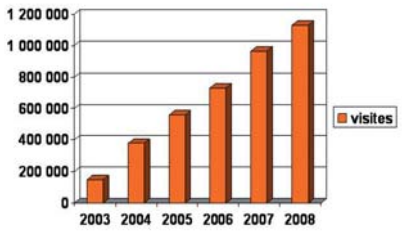
The resources available on the platform are classified under seven tabs. The first is dedicated to events, while the other six represent themes: mathematics; physics and chemistry; life sciences; human sciences; literature; and the annual Chairs.

All the disciplines are covered. The number of lectures and symposiums published on video is still limited due to the constraints and high costs of this medium. However, the contribution of images is often decisive, especially when lectures and seminars require extensive use of visual media. For instance, during a lecture on "Medium field game theory and applications", Professor Pierre-Louis Lions fills several blackboards, and to present "The cognitive subconscious and the depths of subliminal operations", Professor Stanislas Dehaene uses numerous diagrams and images. In these cases, dissemination via video has an obvious advantage. In addition, the annual Chairs' teaching is podcast in full via the new platform, with funding from patronage or various partnerships.

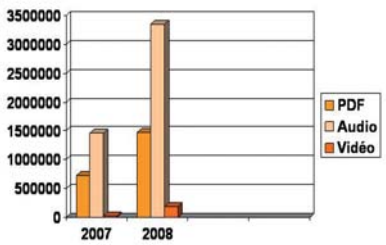
Since it was launched on 16 December 2008, the platform has received 123,200 visits. This very large public enables the Collège de France to fulfil its mission of disseminating knowledge way beyond the 5th district of Paris and the duration of the lectures within its walls. Messages from numerous Internauts across the world attest daily to the utility of this tool for transmitting its teaching.

Finally, for the first time this year, the lectures of three professors (Pierre-Laurent Aimard, Esther Duflo, and Henri Leridon) will be translated simultaneously into English. This is the first step towards a multimedia platform devoted exclusively to resources in English, planned for the near future. ■

Marion Susini, Webmaster



Frequentation of the site: 400 visits per day in 2003, up to 5,000 per day in 2008.



Number of documents downloaded.

Partnership between the Collège de France and the Agence Universitaire de la Francophonie

Esther Duflo, during the videoconference at the AUF, 13 January 2009.

On 8 January 2009, Professor Esther Duflo, holder of the new Chair "Knowledge against Poverty", delivered her inaugural lecture to a particularly large audience at the Collège de France. Thousands of kilometres away, in Antananarivo, Bamako, Rabat, Sofia and Yaoundé, academics and development actors gathered together on the "digital campuses" of the Agence Universitaire de la Francophonie (AUF) to follow this inaugural lecture live, on line, on the Collège de France website, and to debate amongst themselves.

A few days later, on 13 January, these digital campuses were linked up with Esther Duflo in a videoconference organized by the AUF. The conference was opened by the President of the AUF, Professor Bernard Cerquiglini, in the presence of Professor Pierre Corvol, Administrator of the Collège de France. Georges Malamoud, Director of the AUF programme "Take-up of ICT in higher education and research" chaired the debates, which lasted for nearly two hours.

Intense interest was shown in the experimental approach recommended by Esther Duflo for the evaluation of policies and programmes to eradicate poverty. The participants in the videoconference, with their wide-ranging hands-on experience in development, provided an enriching contribution to reflection on these issues.

This success confirms the relevance of the partnership between the Collège de France and the AUF, with the aim of promoting the dissemination of knowledge and intellectual debate in French-speaking countries.

Groups have been formed on digital campuses to follow Esther Duflo's lectures as they are put on line on the Collège de France website.

The next project concerned another newly-created Chair at the Collège de France: "Sustainable development – environment, energy and society", held by demographer Henri Leridon. His inaugural lecture, "From zero growth to sustainable development" was put on line, live (5 March at 6 p.m.), on the Collège de France website. It has been followed by a videoconference with a large number of French-speaking digital campuses.

The plan is for the partnership between the Collège de France and the AUF to concern far more than the development theme. It will extend to other disciplines represented at the Collège de France, likely to be of interest to the AUF and its 42 digital campuses in the vast network of 691 higher education and research institutions, in 81 countries, primarily in Africa, South-East Asia and Central and Eastern Europe. ■

Olivier Guillaume
Head of International Relations

Digital campus live: Antananarivo, Bamako, Rabat, Sofia and Yaoundé.

Facts and Data

Collège de France Organization Chart

Administrator of the Collège de France: **Pierre CORVOL**

The Administrator of the Collège de France is a Collège de France professor, elected by his/her colleagues to direct the institution for a period of 3 years.

Professors of the Collège de France

I – MATHEMATICAL, PHYSICAL AND NATURAL SCIENCES

- Analysis and Geometry — Alain CONNES
- Differential Equations and Dynamical Systems — Jean-Christophe YOCCOZ
- Partial Differential Equations and Applications — Pierre-Louis LIONS
- Number Theory — Don ZAGIER
- Quantum Physics — Serge HAROCHE
- Mesoscopic Physics — Michel DEVORET
- Physics of Condensed Matter — Antoine GEORGES
- Elementary Particles, Gravitation and Cosmology — Gabriele VENEZIANO
- Climate and Ocean Evolution — Édouard BARD
- Observational Astrophysics — Antoine LABEYRIE
- Chemistry of biological processes — Marc FONTECAVE
- Chemistry of Molecular Interactions — Jean-Marie LEHN
- Human Genetics — Jean-Louis MANDEL
- Genetics and Cellular Physiology — Christine PETIT
- Biology and Genetics of Development — Spyros ARTAVANIS-TSAKONAS
- Morphogenetic Processes — Alain PROCHIANTZ
- Molecular Immunology — Philippe KOURILSKY
- Microbiology and infectious diseases — Philippe SANSONETTI
- Experimental Cognitive Psychology — Stanislas DEHAENE
- Physiology of Perception and Action — Alain BERTHOZ
- Experimental Medicine — Pierre CORVOL
- Historical Biology and Evolutionism — Armand de RICQLÈS
- Human Paleontology — Michel BRUNET

II – HUMAN AND SOCIAL SCIENCES

- Pharaonic Civilization: Archaeology, Philology, History — Nicolas GRIMAL
- Assyriology — Jean-Marie DURAND
- The Hebrew Bible and/in its contexts — Thomas RÖMER
- History and Civilization of the Achaemenid World and of the Empire of Alexander — Pierre BRIANT
- Epigraphy and History of the Ancient Greek Cities — Denis KNOEPFLER
- Religion, Institutions and Society in Ancient Rome — John SCHEID
- Indo-Iranian Languages and Religions — Jean KELLENS
- History of India and Greater India — Gérard FUSSMAN
- Intellectual History of China — Anne CHENG
- History of Modern China — Pierre-Etienne WILL
- National Antiquities — Christian GOUDINEAU
- Turkish and Ottoman History — Gilles VEINSTEIN
- Contemporary Arab History — Henry LAURENS
- Writings and cultures in modern Europe — Roger CHARTIER
- French Mediaeval Literature — Michel ZINK
- Modern and Contemporary French Literature: History, Criticism, Theory — Antoine COMPAGNON
- Modern Literatures of Neo-Latin Europe — Carlo OSSOLA
- History of European Medieval and Modern Art — Roland RECHT

- Philosophy of Language and Knowledge — Jacques BOUVERESSE
- Anthropology of Nature — Philippe DESCOLA
- Economic Theory and Social Organization — Roger GUESNERIE
- Modern and Contemporary History of Politics — Pierre ROSANVALLON
- Rationality and Social Science — Jon ELSTER
- Comparative Legal Studies and Internationalization of Law — Mireille DELMAS-MARTY

III – ANNUAL CHAIRS – 2009-2010

- Chair of Artistic Creation — (not appointed yet)
- Chair of Information Technology and Digital Sciences — Gérard BERRY
- Chair Knowledge against Poverty — Peter PIOT
- Chair of Sustainable Development - Environment, Energy and Society — Nicholas STERN
- Chair of Technological Innovation - Liliane Bettencourt — Patrick COUVREUR

Emeritus Professors of the Collège de France

- Anatole ABRAGAM — Nuclear Magnetism
- Maurice AGULHON — Contemporary French History
- Etienne-Emile BAULIEU — Bases and Principles of Human Reproduction
- Georges BLIN — Modern French Literature
- Yves BONNEFOY — Comparative Studies of the Poetic Function
- Pierre BOULEZ — Invention, Technique and Language in Music
- Pierre CHAMBON — Molecular Genetics
- Jean-Pierre CHANGEUX — Cellular Communication
- Claude COHEN-TANNOUDJI — Atomic and Molecular Physics
- Yves COPPENS — Palaeontology and Prehistory
- François-Xavier COQUIN — Modern and Contemporary Russian History
- Gilbert DAGRON — Byzantine History and Civilization
- Jean DELUMEAU — History of Religious Mentalities
- Michael EDWARDS — Literary Creation in English
- Anne FAGOT-LARGEAULT — Philosophy of Life Science
- Marcel FROISSART — Corpuscular Physics
- Marc FUMAROLI — Rhetoric and Society in 16th and 17th century Europe
- Jacques GERNET — Social and Intellectual History of China
- Jacques GLOWINSKI — Neuropharmacology
- Gilles Gaston GRANGER — Comparative Epistemology
- François GROS — Cellular Biochemistry
- Jean GUILAINE — European Civilizations in the Neolithic and the Bronze Age
- Ian HACKING — Philosophy and History of Scientific Concepts
- Pierre HADOT — History of Hellenistic and Roman Thinking
- Claude HAGÈGE — Linguistic Theory
- Françoise HÉRITIER — Comparative Studies of African Societies
- François JACOB — Cellular Genetics
- Pierre JOLIOT — Cellular Bioenergetics
- Yves LAPORTE — Neurophysiology
- Jean LECLANT — Egyptology
- Nicole LE DOUARIN — Molecular and Cellular Embryology
- Xavier LE PICHON — Geodynamics
- Georges LE RIDER — Economic and Monetary History of the Hellenistic Orient
- Emmanuel LE ROY LADURIE — History of Modern Civilization
- Claude LÉVI-STRAUSS — Social Anthropology
- Jacques LIVAGE — Chemistry of Condensed Matter
- Edmond MALINVAUD — Economic Analysis
- André MIQUEL — Classical Arabic Language and Literature
- Philippe NOZIÈRES — Statistical Physics

- Jean-Claude PECKER — Theoretical Astrophysics
- Jacques PRENTKI — Theoretical Physics of Elementary Particles
- Daniel ROCHE — French History in the Age of the Enlightenment
- Jacqueline DE ROMILLY — Greece and the Development of Moral and Political Thinking
- Jean-Pierre SERRE — Algebra and Geometry
- Michel TARDIEU — History of Syncretisms in Late Antiquity
- Javier TEIXIDOR — Semitic Antiquities
- Jacques THUILLIER — History of Artistic Creation in France
- Jacques TITS — Group Theory
- Pierre TOUBERT — Occidental History
- Paul-Marie VEYNE — History of Rome
- Nathan WACHTEL — History and Anthropology of Meso- and South American Societies
- Harald WEINRICH — Romance Languages and Literatures

Administration

- Director of Cultural Affairs and External Relations: Florence TERRASSE-RIOU
- Director of Administrative and Financial Affairs: Jean-François RIGONI

Lectures Given by the Professors Abroad

AUSTRIA

- University of Vienna
  - Michel ZINK (holder of the Chair of French Mediaeval Literature)
    "Reading of the Grail".

BELGIUM

- Free University of Brussels
  - Mireille DELMAS-MARTY (holder of the Chair of Comparative Legal Studies and Internationalization of Law)
    Universal values in question: the 'European laboratory'.
  - Anne FAGOT-LARGEAULT (holder of the Chair of Philosophy of Life Science)
    Ontology of the future.

- University of Liege
  - Antoine LABEYRIE (holder of the Chair of Observational Astrophysics)
    Emergence of hypertelescopes to see the stars and distant universes better.
    Astrophysics.

BRAZIL

- Instituto de Matematica Pura e Aplicada – Rio de Janeiro
  - Jean-Christophe YOCCOZ (holder of the Chair of Differential Equations and Dynamical Systems)
    Some recent results in dynamic systems theory.

CANADA

- University of Quebec
  - Gilles VEINSTEIN (holder of the Chair of Turkish and Ottoman History)
    Introduction to the institutions of the Ottoman state.
    Study of documents in Ottoman archives (16th – 18th centuries).

CHINA

- City University of Hong Kong
  - Jean-Marie LEHN (holder of the Chair of Chemistry of Molecular Interactions)
    Molecular and Supramolecular Self-Organization.

- University of Beijing
  - Christine PETIT (holder of the Chair of Genetics and Cellular Physiology)
    Hereditary deafness – Molecular physiology of the cochlea.

CZECH REPUBLIC
- Charles University in Prague
  - Jean-Marie LEHN (holder of the Chair of Chemistry of Molecular Interactions)
    Molecular and Supramolecular Chemistry – Towards Self-Organization.
  - Michel ZINK (holder of the Chair of French Mediaeval Literature)
    What is the quest for the Grail?

GERMANY
- University of Bonn
  - Pierre CORVOL (holder of the Chair of Experimental Medicine)
    Tumoral Angiogenesis.

INDIA
- Indian Institute of Science – Bangalore
  - Marc FONTECAVE (holder of the Chair of Chemistry of biological processes)
    Biological chemistry: enzymes and metalloenzymes.

ISRAËL
- Institute for Advanced Studies – Jerusalem
  - Gabriele VENEZIANO (holder of the Chair of Elementary Particles, Gravitation and Cosmology)
    Transplanckian Scattering: A Gedanken Experiment for 21st Century Physics?

- Hebrew University of Jerusalem
  - John SCHEID (holder of the Chair of Religion, Institutions and Society in Ancient Rome)
    Civic status and religious obligation

ITALY
- University of Genoa
  - Alain Berthoz (holder of the Chair of Physiology of Perception and Action)
    Can we give an identity to a humanoid?

- University of Naples 'The Oriental'
  - Gérard FUSSMAN (holder of the Chair of History of India and Greater India)
    For a new history of India.

- Sapienza University of Rome
  - Jean KELLENS (holder of the Chair of Indo-Iranian Languages and Religions)
    Ancient Avestic in light of the recent corpus: Question of relative chronology.

- University of Sienna
  - Alain Berthoz (holder of the Chair of Physiology of Perception and Action)
    Cognitive bases and pathology of identity.

PORTUGAL
- University of Coimbra – Institute of systems and robotics
  - Alain Berthoz (holder of the Chair of Physiology of Perception and Action)
    Common problems between robotics and neurosciences: the relationship between perception and action.

SPAIN
- Complutense University of Madrid
  - Roger CHARTIER (holder of the Chair of Writings and cultures in modern Europe)
    "Written culture and literature in the Golden Age".

SWEDEN

- University of Uppsala
  - Jean-Marie LEHN (holder of the Chair of Chemistry of Molecular Interactions)
    From Supramolecular Chemistry towards Adaptative Chemistry.

  - Pierre CORVOL (holder of the Chair of Experimental Medicine)
    1) Angiotensin and hematopoiesis
    2) Angiogenic effects of vasoactive peptides.

SWITZERLAND

- University of Berne
  - Édouard BARD (holder of the Chair of Climate and Ocean Evolution)
    Sudden climate changes and glaciations.

TUNISIA

- University of Tunis
  - Jacques LIVAGE (holder of the Chair of Chemistry of Molecular Interactions)
    Soft chemistry and materials

UNITED STATES

- University of California – San Diego
  - Philippe DESCOLA (holder of the Chair of Anthropology of Nature)
    Complex relationships.

- University of Chicago
  - Philippe DESCOLA (holder of the Chair of Anthropology of Nature)
    The institution of beings.

- Harvard University
  - Philippe DESCOLA (holder of the Chair of Anthropology of Nature)
    The anthropology of images.

- Princeton University
  - Mr Philippe DESCOLA (holder of the Chair of Anthropology of Nature)
    Towards a monist anthropology.
  - Mr Pierre-Etienne WILL (holder of the Chair of History of Modern China)
    Are there Political Resources for Democratic Institutions in Chinese History.
    The Penal Code and its Commentaries in the Ming and Qing Dynasties.

- Reed College – Portland
  - Mr Philippe DESCOLA (holder of the Chair of Anthropology of Nature)
    Anthropology and ontology.
    New trends in the anthropology of nature.

- Stanford University
  - Mr Michel ZINK (holder of the Chair of French Mediaeval Literature)
    "Seeking God and the Grail"

- Woods Hole Oceanographic Institution – Massachusetts
  - Édouard BARD (holder of the Chair of Climate and Ocean Evolution)
    The last deglaciation.

- Yale University, New Haven
  - Michel DEVORET (holder of the Chair of Mesoscopic Physics)
    Quantum Noise in Mesoscopic Systems .

Lectures and Lecture Series by Foreign Professors
Invited by the Assembly of the Professors

State chairs reserved for foreign scholars

- Joseph Ayoub, Researcher at the University of Zurich (Switzerland)
  Motivic Galois Groups, Patterns and Achievements

- Maurizio Bettini, Professor at the University of Sienna (Italy)
  I is the other? On the traces of the double in ancient culture:
  The Iliad, or illusions of glory
  Heroic identities: the strength of "this one" and "that one"
  I will be the other, or philosophy
  Ghosts and shadows on the banks of the Simois

- Fernando Bouza, Professor at the Complutense University of Madrid
  Heterographies. Writing practices in the Iberian Golden Age
  1. Writing for the senses: touching, tasting, seeing and listening to writing
  2. From hand to hand: manuscript writing as a form of publication
  3. Books without authors: the informed biblioclast and the readers
  4. More author than the author: translation as a royal and aristocratic exercise

- Robert B. Brandom, Professor at the University of Pittsburgh (USA)
  How Analytic Philosophy Has Failed Cognitive Science

- André Carus, Professor at Cambridge University (UK)
  Reinventing Enlightenment:
  1. Two philosophical traditions
  2. The new politics of knowledge

- Demetrios Christodoulou, Professor at the Zurich Federal Polytechnic School (Switzerland)
  Curvature estimates and the causal structure of spacetime
  The short pulse method
  Gravitational collapse
  The formation of black holes by imploding gravitational waves

- Jonathan Cole, Professor at Columbia University, New York (USA)
  The Great American University: Its Rise to Pre-eminence, Its Threatened Future.
  1. The idea of a great university
  2. Steeples of excellence created
  3. Engines of discovery and innovation
  4. Threats to the university in comparative perspective

- Nicola Margot Courtright, Professor at Amherst College (USA)
  The 'Salic' queen: representation of her authority in Renaissance royal palaces in the Baroque era

- Michael Detlefsen, Professor at Notre Dame University (Indiana, USA)
  Proof, Creation and Freedom

- Julien Dubedat, Assistant Professor, Columbia University, New York (USA)
  Standard invariant systems: paths and fields

- Israel Finkelstein, Professor at Tel-Aviv University (Israel)
  Temple and Dynasty: Judah, Assyria and the Rise of the Pan-Israelite Ideology

- Stephen Harrap, Professor at Melbourne University (Australia)
  1. Applying epidemiological principles to clinical trials – lessons in stroke and diabetes
  2. Resetting genetic predisposition to hypertension
  3. Baldness genetics – more than skin deep
  4. Population genetics of cardiovascular risk

- Stephen Holmes, Professor at New York University (USA)
  "In case of emergency: how not to understand the war against terrorism":
  1. Two concepts of emergency
  2. Demystifying the liberty-security trade-off
  3. The paradox of secret intelligence
  4. The presumption of innocence and preventive war

- Daniel Innerarity, Professor at the University of Saragossa (Spain)
  Power and knowledge. Relations between two kinds of uncertainty.

- Gilbert Kaenel, Professor, Director of the Cantonal Museum of Archaeology and History of Lucerne (Switzerland)
  Archaeology and history of ancient Switzerland: recent data

- Seishi Karashima, Professor at Soka University (Japan)
  A philological approach to early Mahayana scriptures

- Irving Lavin, Professor Emeritus, Institute for Advanced Study, Princeton (USA)
  Théodore Aubanel's "Les Filles d'Avignon" and Picasso's
  "Sum of Destructions"

- Marilyn Lavin, Professor Emeritus, History of Art, Princeton University
  The Joy of St. Francis in Giovanni Bellini's "San Francesco del Deserto"

- Bozhong Li, Professor at Tsinghua University (Beijing, China)
  Water and the Unity of China

- Michael E. Meeker, Professor Emeritus at the University of California, San Diego (USA)
  Between state and society: the practices of association in the Ottoman Empire and the Turkish Republic

- Michael Nylan, Professor at the University of California (Berkeley, USA)
  The birth of classicism in China

- Henry Ohlsson, Professor at Uppsala University (Sweden)
  Tax avoidance

- Saul Olyan, Professor at Brown University, Providence (USA)
  Disability in the Prophetic Utopian Vision

- Dinesh Pai, Professor at Vancouver University (Canada)
  1. Creating virtual objects that look, feel and sound real
  2. Automated capture of human movement and object behavior
  3. What robots teach us about human movement
  4. Modeling the neurobiology of human movement

- Philippe Van Parijs, Professor at the Catholic University of Louvain, Visiting Professor at Harvard University
  Linguistic justice in Europe and in the world

- Simo Parpola, Professor at Helsinki University (Finland)
  1. The god Assur
  2. The goddess Ishtar

- Jürgen Paul, Professor at Martin-Luther de Halle-Wittenberg University (Germany)
  State and society in Iran, from the year 1000 to the Mongolian conquest:
  1. Empire and loyalties
  2. The nomads: builders of empires? Failed states, short-lived states
  3. Towns: the politics of leading citizens
  4. The state in legal and political thinking in medieval Iran

- Michael Phillips, Professor at York University (Edinburgh, Scotland)
  William Blake, Lambeth and the Terror 1792-1793: In search of biography

- Sheldon Pollock, Professor at Columbia University (New York, USA)
  Hermeneutics and the Transformation of Aesthetics in Classical India

- Jeremy Popkin, Professor at Kentucky University (Lexington, USA)
  The press in the revolutionary era (1789-1799)

- Dag Prawitz, Professor at Stockholm University (Sweden)
  Deductive proofs – are they objective?

- Aldo Schiavone, Professor, Director of the Italian Institute of Human Sciences, Florence, Naples (Italy)
  1. Classical vocabulary of equality
  2. Equality and Roman Law
  3. Equality and modernity
  4. The new frontier: equality and global citizenship

- Renate Schlesier, Professor at the Institute for the Scientific Study of Religion at the Free University, Berlin (Germany)
  Dionysus and Plutarch's 36th Greek Question

- Marie-Christine Skuncke, Professor at Uppsala University (Sweden)
  Gustave III of Sweden and the opera

- Panagiotis Souganidis, Professor at the University of Chicago (USA)
  Stochastic Homogenization

- Karlheinz Stierle, Professor Emeritus at Constance University (Germany)
  1. Legends of absolute love. Remembrance and writing in the Lais of Marie of France
  2. Is Guillaume de Lorris' *Roman de la Rose* a fragment?

- Guy Stroumsa, Professor at Jerusalem University (Israel)
  Christian memoires and perceptions of Jerusalem in a Jewish and Islamic context

- Damdinsuren Tseveendorj, Professor, Institute of Archaeology, Mongolian Academy of Sciences
  The historical buildings of the Mongolian Bronze Age
  The Palaeolithic of Central Asia
  Rupestrian art of Mongolia
  The Culture of Chandmani (Iron Age)

- Biagio Virgilio, Professor at Pisa University (Italy)
  The correspondence of the Hellenistic sovereign:
  The king writes: historiographic perception and self-representation of the king
  Seventy-five years after the *Royal Correspondence* of C.B. Welles
  The royal letter of the Carian sanctuary of Sinuri at Kalinagil near Milas (Mylasa)
  From Kalinagil to Paris: the royal letter in the style of the engravings of the Louis Robert Fund

- Sylvain Vogel, Professor at Phnom Penh University (Cambodia)
  Language and literature of the Phnongs of Mondulkiri
  (field study)

- Shaoguang Wang, Professor at the Chinese University of Hong Kong
  1. The Great Transformation: The Double Movement in China
  2. Learning and Adapting: The Case of Rural Healthcare Financing in China

- Michael J. Williams, Professor at John Hopkins University (Baltimore, USA)
  Scepticism, Evidence and Entitlement

- Gerhard Wolf, Director, Institue for Art History in Florence – Max-Planck Institute (Italy)
  Stones, words, images. Four lectures on the Mediterranean topology (5th to 16th centuries)

- Michael Wörrle, Honorary Director of the Kommission für Alte Geschichte und Epigraphik des DAI, Munich (Germany)
  Aizanoi, city of the western highlands of Asia Minor
  1. Geographical, historical and epigraphic approach
  2. Around the local Zeus and other Aizanoi divinities
  3. Aizanoi and the Roman power at the end of the Republic
  4. Aizanoi and the Emperor

- Monika Zin, Professor at Munich University (Germany)
  Nagarjunakonda: its monasteries and school affiliations

Events at the Collège de France – 2008-2009

September
- FEZA 2008 Conference
- ENS Opening
- 11th General Congress of the International Association of Armenian Studies
- Symposium in memory of Mr Merleau-Ponty ANVIE symposium

October
- Symposium: The Middle-East, a French passion? From the Six-day War to Black September (Prof. H. Laurens)
- Symposium: Influence of Paul Pelliot (Prof P.-E. Will)
- Franco-Italian Epigraphics Meetings
- European Research Council Symposium
- Bernard Halpern Symposium
- Symposium: Rereading Jean-Pierre Vernant
- Symposium: Curie Institute
- Symposium: Speech and music: at the origins of huMayn dialogue
- IPSEN Foundation
- Médiapart literary conference
- Symposium of the École Nationale des Chartes: "May 68"

November
- Day devoted to the Louis Robert Fund of the AIBL (Prof. D. Knoepfler)
- Symposium: Teaching about evolution
- Symposium: The chemistry of condensed matter
- Symposium: Hommage to Jacques Livage
- Establishment of the IUF
- Symposium: Claude Lévi-Strauss

December
- Awarding of the INSERM Prize

Symposium: Books of men (Chair of Late Antiquity Syncretism)
- Day of the Society of Electricity and Information and Communication Technologies
- Awarding of the INRIA Prize for Applied Mathematics and Information Technology
- Symposium: The constituent power (Prof. J. Elster)
- Symposium: Figures and problems of globalization (Prof. M. Delmas-Marty)
- Symposium: The Ottoman conquest of Egypt (Prof. G. Veinstein)

March
- Symposium: forms, deformations, transformations (Profs. P. Descola and A. Prochiantz)
- Study Day: Physiology and psychology in the time of Auguste Comte (Prof. A. Fagot-Largeault)
- Symposium: Claude Bernard's students: continuity of thought and disciplinary evolution (Prof. P. Corvol)

April
- Reading an old text: from the Middle Ages to today (Prof. M. Zink)
- Leducq Foundation
- Symposium: The young hero (Profs. J.-M. Durand and T. Römer)
- Symposium: What is a religious landscape (Prof. J. Scheid)
- Annual concert
- Symposium: Seeing is believing: imagery of infectious processes *in vitro* and *in vivo* (Prof. P. Sansonetti)
- Symposium: Artistic creation faced with political and religious constraints (Prof. G. Fussman)
- Symposium: Mapping the brain (Profs. A. Berthoz and A. Prochiantz)
- Symposium: The Ile-de-France Region on innovation
- Symposium: Karl Buhler (Prof. J. Bouveresse)

May
- Symposium: Neuro-economics, evaluation and decision-making (Profs. R. Guesnerie and S. Dehaene)
- Symposium: Chemistry at the Collège de France (Prof. J. Livage)
- Symposium: From synthesis chemistry to synthesis biology (Prof. A. Fagot-Largeault)
- Symposium: Majorities (Prof. J. Elster)
- Symposium: Closure of International Polar Year (Profs. E. Bard)
- Symposium: Methods in the history of art: current review (Prof. R. Recht)
- Symposium: Avian Flue (Prof. P. Descola)
- Awarding of the Oberling Prize
- Symposium: Wilfrid Sellars: Science and Metaphysics (Prof. J. Bouveresse)

June
- Symposium: Institute of Circulation, Metabolism and Nutrition (INSERM)
- Study Day on William Blake
- Symposium: Population, behaviours and sustainable development (Prof. H. Leridon)
- Symposium: The administrative handbooks of Imperial china: conclusions and comparisons (Prof. P.-E. Will)
- Symposium: Security policy in light of 19th century penal doctrine (Prof. M. Delmas-Marty)
- Symposium: Evaluating Development Policies – Crossing Paths: Researches and Field Actors (Prof. E. Duflo)
- Symposium 150 Years after The Origin of Species (Prof. A. de Ricqlès)
- The Friends of Mozart
- *Le Monde-La Recherche* Forum
- Symposium: Metamorphoses of work, identities and occupations (Chair of Physiology of Perception and Action)
- Meeting to close the European "CompuVac" Project
- Meeting of the Directors of the CNRS Units

July
- Symposium: The role of third parties in protecting civilian populations in armed conflicts (Atlas Project)
- Assyriology international meetings

Research Teams Received

The policy of hosting research teams was implemented on the basis of an Assembly vote dated 18 March 2001 to contribute towards the training of young research teams and to enhance the Collège's scientific potential. In some cases it was a temporary solution for teams directed by a professor about to retire.

Space permitting, these teams, which have to obtain the approval of their parent institution and to receive on-going funds from it, can be officially hosted by the Collège de France team for a four-year contract, renewable once.

They receive a € 10,000 annual grant and may obtain ATER and lecturing posts, on the same basis as the laboratories of the Chairs.

The final decision to host these teams is taken by the Assembly of Professors, after evaluation by a commission of professors.

Teams currently hosted:

- François TRONCHE
  Molecular genetics, physiology and behaviour (UMR 7148)
- Christian ROBIN
  Orient and Mediterranean (UMR 8167)
- Lyne BANSAT-BOUDON
  Institute for Indian Studies (EA 518)
- Xavier JEUNEMAITRE
  Genes and blood pressure mineralocorticoid (U 772)
- Catherine LLORENS-CORTES
  Central neuropeptides and the regulation of body fluid homeostatis and cardiovascular functions (U 691)
- Jean-Michel DENIAU
  The dynamics and physiopathology of neuron networks (U 667)
- Boris GUTKIN
  Computational neuroscience
- Christian GIAUME
  Junctional communication and interaction between neuronal and glial networks (U840)
- Claude RANGIN and Pierre HENRY
  EGERIE (Team Geodynamics of Exchange Research-Industry-Learning)
- TRAN VAN NHIEU Guy
  Intercellular communication and bacterial infections (U971)

UMR: Unité mixte de recherche (Combined Research Unit)
U: Unité (Unit)

Temporary positions at the Collège de France – 2009-2010 (*Maîtres de Conférences* and *Ater*)

Temporary positions permit to receive yearly 37 Maîtres de conférences (Assistant Professors) and 13 ATER (Research Assistants and Post-Doctoral positions) in the chairs and research laboratories at the Collège de France.

Nationality	Number
American	1
Argentinian	1
Australian	1
Brazilian	1
Colombian	1
French	31
German	1
Greek	1
Italian	3
Japanese	2
Lebanese	1
Romanian	1
Spanish	2
Swiss	1
Ukranian	1

The Collège de France Institutes

The Collège de France has four Institutes: Biology; the Contemporary World; Literary Studies; and the Far East. These are informal structures with no official status from an administrative point of view. They group together Chairs and hosted teams.
The Institutes are created or closed on the initiative of the professors concerned, after a formal decision by the Assembly.
They promote and facilitate research by defining common projects and by pooling technical staff, equipment (technical facilities, libraries, etc.) and premises.
The modalities of these Institutes' organization may vary.

Institute of Biology

The Collège de France Institute of Biology, created in 1983 on a decision of the Assembly of Professors, includes the Collège's Professors of Biology (whether their laboratory is located at the Collège itself or elsewhere) and the teams hosted by the Collège. The incumbent President is Alain Berthoz.

Chairs whose laboratories are located at the Institute of Biology:
- Alain Berthoz – Physiology of Perception and Action (CNRS UMR 7152)
- Pierre Corvol – Experimental Medicine (Inserm U833)
- Alain Prochiantz – Morphogenic Processes

Chairs whose laboratories are not located at the Collège de France:
- Spyros Artavanis-Tsakonas – Developmental Biology and Genetics
- Stanislas Dehaene – Experimental Cognitive Psychology (Inserm-CEA 562)
- Philippe Kourilsky – Molecular Immunology
- Jean-Louis Mandel – Human Genetics (Inserm U596)
- Christine Petit – Genetics and Cell Physiology (Inserm U587)

Hosted teams located within the Institute of Biology (they benefit from all the Institute's resources):
- Jean-Michel Deniau – Inserm U667 – Dynamics and Pathophysiology of Neuronal Networks
- Xavier Jeunemaitre – Inserm U772 – Genes and Blood Pressure
- Catherine Llorens-Cortes – Inserm U691 – Central neuropeptides and the regulation of body fluids
- François Tronche – CNRS UMR 7148 – Molecular Genetics, Neurophysiology and Behaviour
- Christian Giaume – Inserm U840 – Junctional communication and interaction between neuronal and glial networks.

Prof Anne Fagot-Largeault, holder of the chair of Philosophy of Biological and Medical Science, and Prof Armand de Ricqlès, holder of the chair of Historical Biology and Evolutionism, also participate in discussions concerning the Collège de France Institute of Biology.

The aim of the Institute is to promote the research being done within the Collège de France, via several actions defined by the professors of the Institute and applied by its Coordination Committee.

Shared resources:
- animal facilities: conventional and transgenic
- technical platforms: confocal imaging and electron microscopy, neural imaging
- equipment for studying behaviour in rodents
- document library

Institute of the Contemporary World

The Institute of the Contemporary World was created in 2005.

It groups together six Collège de France Chairs, five of which are located on the Ulm site and one on the Cardinal Lemoine site:
- Mireille Delmas-Marty – Comparative Legal Studies and Internationalization of Law
- Philippe Descola – Anthropology of Nature
- Jon Elster – Rationality and Social Sciences
- Roger Guesnerie – Economic Theory and Social Organization
- Henry Laurens – Contemporary Arab History
- Pierre Rosanvallon – Modern and Contemporary History of Politics

The Institute is coordinated by a professor on the basis of a two-year rotating system. Pierre Rosanvallon is coordinator for 2006 and 2007.

The members of the Institute are currently all participating in a multi-disciplinary study on globalization, focused on the following three dimensions: democracy, the rule of law, and the market.

Three key topics are addressed:
- Management of global collective (public) goods
- National sovereignty in question and the question of governance
- Towards a global political society: law and politics in the constitution of an international order.

Institute of Literary Studies

The Institute of Literary Studies combines the Collège de France Chairs devoted to literature studies and related subjects (history of art, history of books):

Professors:
- Roger Chartier: Writing and cultures in modern Europe
- Antoine Compagnon: Modern and contemporary literature: history, theory, critique
- Carlo Ossola: Modern literatures of neo-latin Europe
- Roland Recht: History of european medieval and modern art
- Michel Zink: Literatures of medieval France

Emeritus Professors:
- Yves Bonnefoy: History of the poetic function
- Michael Edwards: Studies of literary creation in English
- Marc Fumaroli: Rhetoric and society in Europe (16th–17th centuries)
- Harald Weinrich: Romance languages and literatures.

Michel Zink is currently the Director of the Institute of Literary Studies.

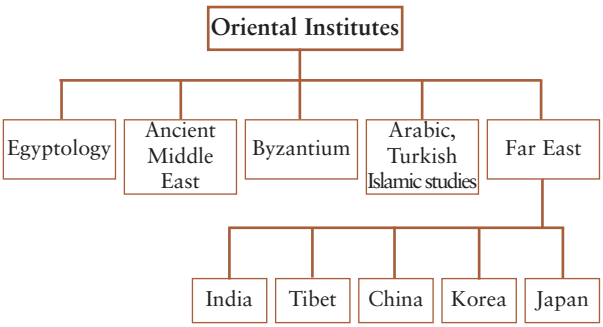
The Collège de France's Oriental Institutes

As a pioneer in oriental studies in France and in some cases in the world, the Collège de France has always had very rich libraries in this field. Its collections were enhanced by the transfer in 1973 of the oriental studies institutes from the former Sorbonne. To a large extent, these libraries had always been open to researchers from outside the Collège de France. But their statuses differed considerably, they functioned independently, and they did not belong to the French university library system, which cut them off from an essential source of funding (for staff and operating costs). The development of catalogues accessible via Internet also necessitated the choice and purchase of new management systems, the costs of which exceeded the means of individual libraries. Finally, most of the libraries were affiliated with a Chair and consequently depended on its existence. In such cases the Collège could be tempted to maintain a particular Chair to ensure the survival of its library, which was often the only one of its kind in France.

1. The Oriental Institutes now form a federation of five Institutes with a large degree of managerial independence and no legal ties with the Chairs:

2. The Oriental Institute's documentary collections are considered to be specialized sections of the general library. This will eventually lead to the unification of the catalogues and to a coordinated procurement policy. The collections are currently part of the university documentation system (SUDOC).

3. It is primarily the institutes, that is, institutions devoted



to research and managed jointly with researchers, most of whom are from outside the Collège, that use the libraries. These institutes have the means to publish. Each of them is run by a Director and a Scientific Committee appointed for three years. The Federation of Institutes is headed by the Council consisting of Collège de France professors and a Scientific Committee with diverse outside personalities.

4. Although the collections are considered to be 'classical', and the researchers are often specialists in Antiquity or the Middle Ages, the contemporary world falls within their research field. This is not only because classical India ended with the arrival of the British, and the chronological limit of China was the end of the Manchurian Dynasty (1912). The linguistic collections have no chronological limit and the Bible, the Koran, the Veda, and Buddhist and Confucian texts are all too often at the crux of contemporary issues or violence for their current importance to be denied.

5. This reform has been endorsed by agreements with the Collège de France's main partners (the Under-directorate of libraries of the Ministry for Higher Education and Research, the General Directorate of the CNRS, the BULAC (university library of languages and civilizations), the national institute for living oriental languages and civilizations, and the institute for research on the history of texts). The sharing of competencies and funding has thus been defined. ■

Publications – 2008-2009

The Collège de France has a partnership with the Editions Fayard and the Editions Odile Jacob for publishing the inaugural lectures of the professors, some lectures of invited professors and the proceedings of some of the Collège's colloquiums.

Editions Fayard

Collection "Leçons inaugurales"

- Michel Devoret, *De l'atome aux machines quantiques* (2008), n° 193.
- Gérard Berry, *Pourquoi et comment le monde devient numérique* (2008), n° 197
- Pierre Magistretti, *La neuroénergétique : De la synapse à l'image* (2008), n° 198.
- Michel Brunet, *Origine et histoire des hominidés*, forthcoming (2008), n° 199.
- Philippe Sansonetti, *Des microbes et des hommes* (2009), n° 200.
- Anne Cheng, *La Chine pense-t-elle ?* (2009), n° 201.
- Esther Duflo, *Expérience, science et lutte contre la pauvreté* (2009), n° 202.
- Pierre-Laurent Aimard, *Rôle et responsabilité de l'interprète aujourd'hui* (2009), n° 203.
- Mathias Fink, *Renversement du temps, ondes et innovation* (2009), n° 204.

Editions Odile Jacob

- Compagnon A. (éd.), *De l'autorité*, 2008
- Bouveresse J. et Wagner P., *Mathématiques et expérience*, 2009.
- Evers K., *Neuroéthique*, 2009.
- Compagnon A. (éd.), *Proust, la mémoire et la littérature*, 2009.
- Dehaene S. and Petit C., *Parole et musique. Aux origines du dialogue humain* (forthcoming October 2009).

Yearbook

- *Cours et travaux du Collège de France. Résumés 2007-08*. Annuaire 108e année.

DVDs (Coproduction Collège de France / CNED / Doriane Films)

- Michel Brunet, Origine et histoire des hominidés, 2008.
- Anne Cheng, *La Chine pense-t-elle ?*, 2009.
- Pierre-Laurent Aimard, *Rôle et responsabilité de l'interprète aujourd'hui / The Performer's Role and Responsabilities Today (french/english)*, 2009.

Audio/Video

The followings lectures, seminars and colloquiums can be downloaded, in english, on the website of the Collège de France. (www.college-de-france.fr, Menu audio/video):

- Prof P.-L. Aimard — Lectures (18 February, 11-18 March, 8 April, 6-13-27 May 2009); Seminars (5-14-25-28 May 2009)
- Prof E. Duflo — Inaugural Lecture (8 January 2009): Experiments, Science, and the Fight against Poverty; Lectures (12-19-26 January and 2 February 2009): Poverty and Development in the World; Colloqium (8-9 June 2009): Evaluating Development Policies, Crossing Paths: Researchers and Practitioners
- Prof H. Leridon — Inaugural Lecture (5 March 2009): From Zero Growth to Sustainable Development; Lectures (18-25 March, 1-8-29 April, 6-13-20 May 2009); Colloqium (4-5 June 2009): Demography, Behaviours and Sustainable Development

Collège de France Autumn Symposium – 2009-2010

Darwin is 200 years old

15 and 16 October 2009

2009 is the bicentenary of Jean-Baptiste Lamarck's zoological philosophy and of Charles Darwin's birth. It is also the 150th anniversary of *On The Origin of Species*. It was important for the Collège de France to contribute in an original way to celebrating this "evolution year".
Darwin is 200 years old – and fortunately still has all his teeth, one is tempted to add. For he certainly needs them in this age where, in various countries and not only the most scientifically backward ones, lawyer of the fallacy of "intelligent design" campaign, sometimes successfully, to have it taught on an equal footing with evolutionary theory.
If all species except humans had undergone an evolutionary process, the attack would be less violent and would trigger less credulity. But today, like yesterday, linking human beings to their animal nature is unacceptable to many.

This re-opening symposium is designed to answer the questions raised by contemporary debate. First, the history of evolutionism and our current conceptions will be reviewed. The theory of evolution, unlike dogma, is itself evolving and is the subject of many impassioned scientific discussions.
Human beings will then be explored from two angles, hominization and humanization, as a way of connecting biological evolution to its social and cultural dimensions. The examination of relations between science and art will be completed by an "installation".
The speakers are from various disciplines: biology of course, but also philosophy, law, sociology, and anthropology. The multiplicity of viewpoints, in keeping with the spirit of the Collège de France, is expected to further our understanding of the human phenomenon. It will be an opportunity for collective reflection on the past and future evolution of our species. ■

Programme

15 October
under the chairmanship of Jacques Reisse
Free University of Brussels

- Opening by Pierre Corvol, Administrator of the Collège de France
- Introduction by Jean-Pierre Changeux, Collège de France
- Armand de Ricqlès, Collège de France
History of evolutionism
- Anne Fagot-Largeault, Collège de France
Evolutionism as an historical science
- Isabelle Olivieri, University of Montpellier II, Institut Universitaire de France
Synthetic theory and saltationism
- Chris Bowler, École Normale Supérieure
Haeckel and evolution, the point of view of diatoms
- Vincent Colot, École Normale Supérieure
Epigenetics across the generations: simply an oddity or a driver of adaptation?
- Luis Quintana-Murci, Pasteur Institute and CNRS
Genetics, history of humans and natural selection
- Stanislas Dehaene, Collège de France
When neuronal recycling prolongs hominization
- Michel Brunet, Collège de France
Hominids…New paradigms of African origin

16 October
under the chairmanship of Françoise Héritier
Collège de France

- Jean Gayon, University Paris I Pantheon-Sorbonne
The origins of mental and moral faculties in Darwin's and Wallace's work
- Mireille Delmas-Marty, Collège de France
Hominization and humanization
- Miguel Nicolelis, Duke University
Computing with Neural Ensembles
- Jean-Michel Besnier, École Polytechnique
How to think the post-human
- Catherine Malabou, University Paris X and Buffalo University
Morphological transformations: programme, promise, or beyond?
- Lorraine Daston, Max Planck Institute, Berlin
Why does nature have moral authority – Even if it shouldn't?
- Allan Young, McGill University
The traumatic evolutionary history of human nature and sub-cortical brain
- Philippe Descamps, University Paris IV Sorbonne
The sacred of the human species
- Antoine Compagnon, Collège de France
Darwin in literature

The programme and lectures will be available on www.college-de-france.fr

History, through time

As the Renaissance spread throughout Europe, great minds started to explore subjects that had previously aroused no curiosity, and the invention of printing meant that the wealth of philosophy contained in the chefs-d'œuvre of Antiquity was becoming more widely available. Teachers capable of interpreting and commenting on these matters were in demand. Thus, the Collège Royal was set up, which later became known as the Collège de France.

1530

King François I, on the advice of Guillaume Budé, his «master of the library», appointed six «royal readers»: three for Hebrew (François Vatable, Agathias Guidacerius, Paul Paradis), two for Greek (Pierre Danès, Jacques Toussaint) and one for mathematics (Oronce Finé). Their lectures were free and open to anyone1551

1551

After requisitioning the Collèges de Tréguier and de Cambrai where he installed «royal readers» in 1551, Henri II extended the range of subjects taught by the Collège to philosophy. He created a chair for Ramus (Pierre de la Ramée), a notorious and controversial anti-Aristotelian philosopher, who then went on to teach mathematics from 1559 onwards.

1567

The Collège was mentioned for the first time in a document. It was a diploma awarded to Nicolas Goulu, certifying that he was qualified to teach Greek.

1610

On August 28, Louis XIII laid the first stone of a new building bearing the following inscription: «In the first year of the Reign of Louis XIII King of France and of Navarre, aged nine, and of the Regency of Queen Marie de Médicis his mother MDCX » (En l'an premier du Regne de Louis XIII Roy de France et de Navarre, agé de neuf ans, et de la Regence de la Royne Marie de Médicis sa mère MDCX).

1699

On January 18, 1699, the Collège Royal was granted its coat of arms: against a sky blue background there is a silver book lying open in which are written the words Docet omnia. The book is surrounded by three golden fleurs-de- lis, two at the top and one at the bottom.

1707

There were now twenty chairs: eleven for the arts, nine for scientific subjects.

1772

Louis XV entrusted the architect Jean-François Chalgrin with the construction of the Collège Royal. Chalgrin was a winner of the Grand prix de Rome and a member of the Académie d'architecture. On May 16, the Collège was incorporated into the University of Paris. It regained its independence in 1794. On March 22, 1774, the Duc de La Vrillière laid the first stone of the new buildings, which were completed in 1778.

1824

A picture portraying the establishment of the «royal readers » by François I (on display in the Assembly room). It was painted by G. Guillon Lethière.

1870

The Collège Royal then the Collège Impérial became the Collège de France. There were now forty professors.

1963

The creation of two new chairs brought to fifty-two the number of professors.

1976

The professors were allowed to give some of their teaching outside Paris.

1988

The professors were allowed to give some of their teaching abroad.

1989

Creation of the European chair.

1992

Creation of International chair.

1998

Inauguration of new Collège de France premises. The renovation was carried out by the architects Bernard Huet and Jean-Michel Wilmotte.

2005

Creation of the chair of Artistic Creation.

2006

Creation of the chair of
Technological Innovation - Liliane Bettencourt.

2009

Creation of the chair of
Information Technology and Digital Sciences

AGENDA

COLLÈGE DE FRANCE 1530

Academic Year 2009-2010

New Chairs Created

- Information Technology and Digital Sciences

New Professors

- Gérard BERRY, Chair of Information Technology and Digital Sciences, 2009-2010
  Inaugural lecture: 19 November 2009
- Patrick COUVREUR, Chair of Technological Innovation - Liliane Bettencourt 2009-2010
  Inaugural lecture: 21 January 2010
- Antoine GEORGES, Chair of Physics of Condensed Matter
  Inaugural lecture: 8 October 2009
- Peter PIOT, Knowledge against Poverty, 2009-2010
  Inaugural lecture: 7 January 2010
- Nicholas STERN, Sustainable Development - Environment, Energy and Society, 2009-2010
  Inaugural lecture: 4 February 2010

The Inaugural Lectures will take place at 6 pm in the Marguerite de Navarre Lecture Hall.

Guest Conference Speakers

- Lodovica BRAIDA, Professor, University of Milan (Italy)
- Juan CALATRAVA, Professor, Arquitectura de la Escuela de Granada (Spain)
- Noam CHOMSKY, Professor, Massachusetts Institute of Technology, Cambridge (USA)
- Souleymane Bachir DIAGNE, Professor, Columbia University, New York (USA)
- Tamar FLASH, Professor, Weizmann Institute of Sciences, Rehovot (Israël)
- Mark GARRISON, Professor, University of Trinity, San Antonio, Texas (USA)
- Andrée HAYUM, Professor, Fordham University, New York (USA)
- Roger HEACOCK, Professor, University of Birzeit, Ramallah (Palestine)
- Daniel HELLER ROAZEN, Professor, Princeton University (USA)
- Christian LEITZ, Professor, Agyptologisches Institut der Universität, Tübingen (Germany)
- Stephen MANN, Professor, University of Bristol (Great Britain)
- Yoshihiko NAKAMURA, Professor, University of Tokyo (Japan)
- John NORTH, Professor, University College London (United Kingdom)
- Isabelle PERETZ, Professor, University of Montreal (Canada)
- Eliezer RABINOVICI, Professor, Racah Institute of Physics, Jérusalem (Israël)
- Jörg RÜPKE, Professor, University of Erfurt (Germany)
- Jack SASOON, Professor, University of Vanderbilt, Nashville,Tennessee (USA)
- Marc TEISSIER-LAVIGNE, Doctor, Genentech Inc, San Francisco (USA)

WWW.COLLEGE-DE-FRANCE.FR

The Letter of the Collège de France
Directeurs de la publication : Pierre CORVOL, Administrateur du Collège de France et
Florence TERRASSE-RIOU, Directrice des Affaires culturelles et des relations extérieures
Direction éditoriale : Marc KIRSCH - Patricia LLEGOU
Traduction : Liz LIBBRECHT - **Conception graphique** : Patricia LLEGOU
Crédits photos : © Collège de France, PATRICK IMBERT - Reproduction autorisée avec mention d'origine.
ISSN 1958-1408 - Impression : ADVENCE

11 place Marcelin-Berthelot – 75231 Paris cedex 05

Prix : 5 €