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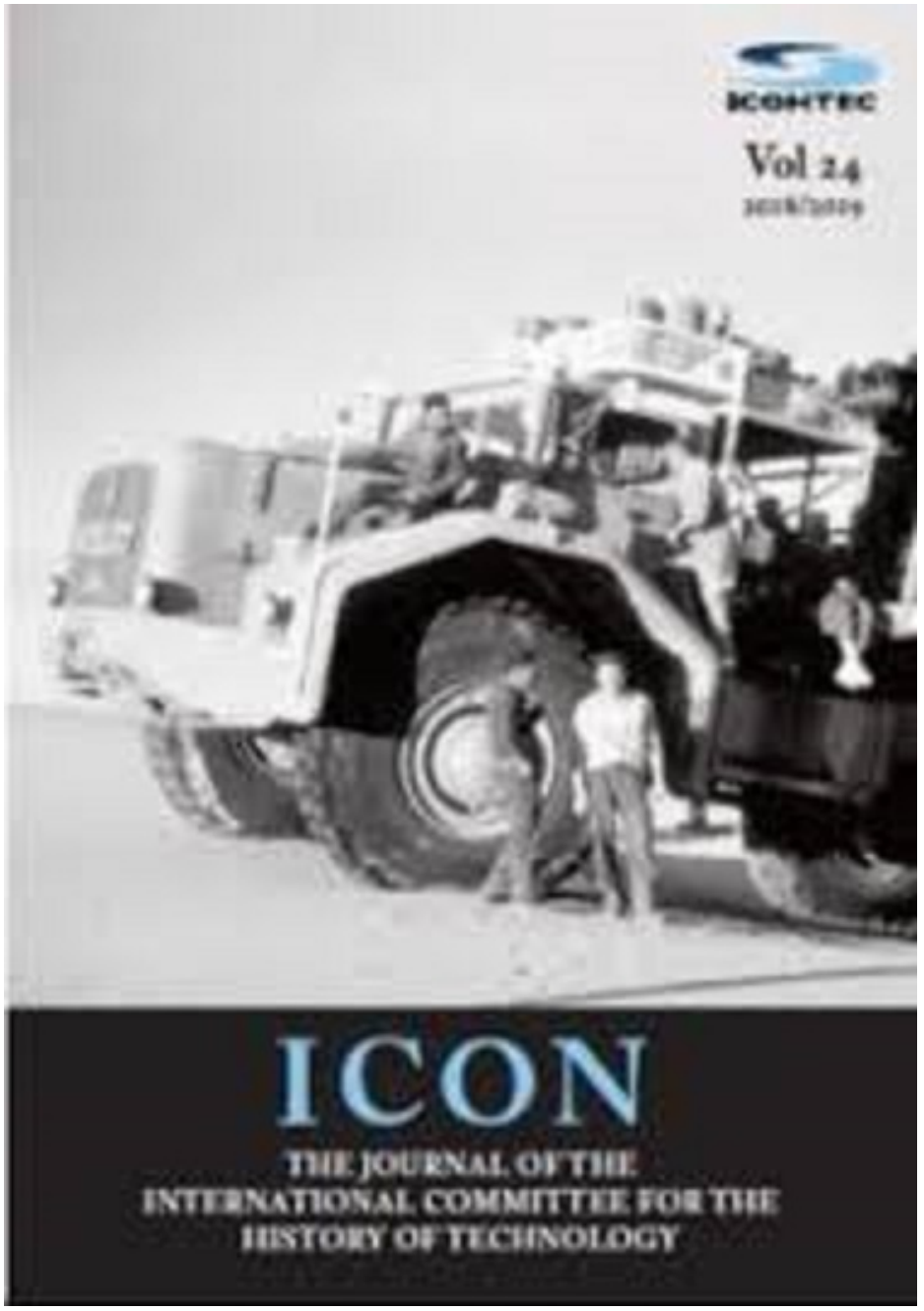

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THE INTERNATIONAL COMMITTEE FOR THE HISTORY OF TECHNOLOGY (ICOHTEC)

ICOHTEC was formed in 1968. In 1993, the Constitution was amended to allow for individual membership. At the same time, it was decided to publish an annual journal which would help to promote the study of the history of technology on the broadest possible basis. Volume 1 of *ICON* was published in 1995.

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TRIBUTE TO MAURICE DAUMAS AND PETRE SERGESCU

Alexandre Herlea

This essay is based on a talk given at the 50th ICOHTEC symposium in St. Etienne. Translations of titles, where needed, can be found in the footnotes.

It is an honour to open this commemoration volume celebrating half a century of ICOHTEC's existence by paying tribute to Maurice Daumas who played a leading role in its birth and development and to Petre Sergescu one of the main founders, in 1947, of the International Union of History of Science (IUHS). The IUHS is the predecessor of the International Union of History and Philosophy of Science and Technology (IUHPST), in which ICOHTEC is a Scientific Section within the Division of the History of Science and Technology (DHST). ICOHTEC (The International Committee for the History of Technology) was created in 1968, at the sixteenth congress of the Division of History of Science (DHS). The congress took place in Paris, at the Conservatoire National des Arts et Métiers (CNAM), and was hosted by Maurice Daumas who, on this occasion, was elected General Secretary of ICOHTEC. Two years later, in 1970, he organized in Pont-à-Mousson its first symposium on the theme "The acquisition of technologies by non-initiating countries." He published the proceedings.[1]

Maurice Daumas, founding father of the History of technology in France, is one of those personalities whose role and influence were strong in many fields: in science and in teaching, in the dissemination of knowledge, in social and political life. He belonged to an open and generous French intelligentsia, deeply opposed to all forms of totalitarianism, who contributed not only to the development of science itself, but also to the establishment of its institutions.[2]

Daumas was born in the South of France, in Béziers, on 11 December 1910, in an old family of Languedoc. Both his parents were teachers and his family

1 *Actes du Colloque International sur l'Acquisition des Techniques par les Pays non-initiateurs* (Proceedings of the International Symposium on the Acquisition of Techniques by Non-Initiating Countries) (Centre National de la Recherche Scientifique, Paris, 1973).

2 René Taton, "Nécrologie Maurice Daumas (1910 -1984)," *Revue d'histoire des sciences* 37, no. 3-4 (1984): 334-338.

Maurice Daumas and Petre Sergescu.

background developed his taste for culture and excellence. He went to high school in Montpellier, where he received his "baccalauréat", and studied chemistry in Paris, at the Faculté des Sciences of the Sorbonne, where he obtained the French "license" in 1935.[3]

For nine years, from 1935 to 1942, he worked as a chemist in the Laboratoire Municipal de la Préfecture de Police de Paris and then for another two years in the Research Laboratory of the Doiteau Society, a chemical factory in Corbeil, near Paris. At that time, Maurice Daumas had already expressed major interest in scientific and technical culture, which he deemed an integral part of culture, in the tradition of the encyclopaedists. At this time, he wrote his first articles popularizing science and was noticed for his organizational skills. In 1941, he was one of the founders of the book collection Que sais-je? published by the Presses Universitaires de France (PUF). In the same year, he published his first book in this collection: *Les Matières Plastiques*.[4]

3 Alexandre Herlea, "Maurice Daumas," *Technology and Culture* 26 (1985): 698-702; Maurice Daumas, Curriculum vitae, *Procès-verbaux du Conseil de Perfectionnement - CNAM*, 1969, 00022-23 (Archives du CNAM).

4 Maurice Daumas, *Les Matières Plastiques*, Que sais-je? (Paris: Presses Universitaires de France, 1941).

In 1944, Daumas became editorial secretary to the Fondation Française pour l'Etude des Problèmes Humains, also called Fondation Alexis Carrel, which would become, after the war, L'Institut National d'Etudes Démographiques. He remained at the institute until 1947, when he was appointed Deputy Curator at the Musée National des Techniques of CNAM, where, in 1960, he became Curator. He kept this position until his retirement, in 1976, being also, since 1969, Professor and holder of the first Chair of the History of technology in France, created for him within the Conservatoire National des Arts et Métiers (CNAM).[5]

It is also noteworthy that, at the beginning of his career, Maurice Daumas participated in the trade union movements linked to the Front Populaire, as well as in several cultural movements, and he published some articles in the newspapers of the time.

From the early 1940s on, he carried out his interest in the History of science and technology, as made obvious by his two biographies published by Gallimard: that of Antoine Lavoisier, in 1941, and that of François Arago, in 1943.[6] In these books, based on a rich bibliography and which target quite a broad audience, the protagonists are presented in the context of the scientific and social life of their times.

Between 1945 and 1948, Daumas had a regular column in the prestigious journal *Combat*, edited by Albert Camus, in which he addressed topics related to scientific and technological culture, including history and epistemology, ideology and politics. He wrote on many subjects, namely the progress of technology and its consequences; the role of wars in this progress; science-technology relationships; and research and training in science and technology across the world. He later developed these topics in his work as a historian of science and technology.[7]

After 1946, Maurice Daumas collaborated with the Centre International de Synthèse, which housed the International Academy of History of Science, in Paris. There, he met both René Taton, the French historian of science and Petre Sergescu, the vice-President of the Academy. At this time, Daumas also collaborated closely with the famous philosopher Gaston Bachelard, whose influence is visible in his work. In his book *L'acte chimique. Essai sur l'histoire de la philosophie chimique* published in 1945, Daumas shows that chemical principles have evolved considerably, so those of the eighteenth century are very different from those existing at the beginning of

5 Charles Gillispie, "Éloge of Maurice Daumas," *Isis* 76 (1985): 72-74.

6 Maurice Daumas, *Lavoisier* (Paris: Gallimard, 1941); Maurice Daumas, *Arago* (Paris: Gallimard, 1943).

7 Robert Belot, organizer of ICOHTEC's 50th Congress in Saint-Etienne, has recently started to research Maurice Daumas's work as a journalist at *Combat*.

the Second World War.[8] The same vision is developed in his later 1955 book entitled: *Lavoisier théoricien et expérimentateur*, in which he analyses the work and experiments of the prominent scientist, taking into consideration the state of knowledge of his time and highlighting its importance to the birth of modern chemistry. In this study based on first-hand sources, Daumas raises relevant and courageous issues and reconsiders some approaches.[9]

As Curator of the CNAM Museum, Maurice Daumas was carrying out thematic research related to the museum collections and to the permanent and temporary exhibitions that he organized. In the late 1940s, the museum's exhibition on clocks and watchmakers in the eighteenth century prompted his interest in the History of scientific instruments. This theme would become the topic of Daumas' 1952 PhD thesis, undertaken under the supervision of Gaston Bachelard, which gave rise to the publication of two books that made Daumas known around the world: *Instruments scientifiques aux XVIIème et XVIIIème siècles* of 1953[10] and *Lavoisier, théoricien et expérimentateur* of 1955.

Two years later, in 1957, Maurice Daumas edited *l'Histoire de la Science* in the collection l'Encyclopédie de la Pléiade at Gallimard. The volume contains several personal contributions, including a remarkable introductory study of nearly 200 pages entitled: *Esquisse d'une histoire de la pensée scientifique (Sketch of a history of scientific thought),* which highlights the extent of his awareness of culture.[11]

In parallel, Daumas wrote many articles on a wide range of topics related to the History of science and technology which appeared in *Revue d'Histoire des Sciences, Revue de Synthèse,*[12] *Isis, Technology and Culture, Archives internationales d'Histoire des Sciences* (he was editor-in-chief of this magazine from 1954 to 1959) and *Documents pour l'histoire des techniques*. He also wrote introductory studies for several books. One of these was "L'Invention et le progrès industriel au XIX siècle" ("The Invention and industrial progress in the nineteenth century") for *Brevets d'invention français, 1791 – 1902. Un siècle de progrès technique*, published in 1958. The study was highly valued by François Caron, the well-known economic historian who emphasized the deep interdependence between the History of technology and the Economic history.

8 Maurice Daumas, *L'acte chimique: essai sur l'histoire de la philosophie chimique* (Brussels: Sablons, 1945).

9 Maurice Daumas, *Lavoisier, théoricien et expérimentateur* (Paris: Presses Universitaires de France, 1955).

10 Maurice Daumas, *Instruments scientifiques aux XVIIème et XVIIIème siècles (Scientific instruments in the 17th and 18th centuries)* (Paris: Presses Universitaires de France, 1953).

11 Maurice Daumas, ed., *l'Histoire de la Science,* l'Encyclopédie de la Pléiade (Paris: Gallimard, 1957).

12 The journal of the Centre International de Synthèse.

Caron spoke about the "modèle technique" ("technical model") defined by him as a synthesis of the technology and the economy.[13]

But, from 1960, when he was appointed Curator of the CNAM Museum, as we have already mentioned, Maurice Daumas was mainly devoted to the History of technology and to the enhancement of the museum collections. He directed the *Histoire Générale des Techniques*, a reference work in the History of technology[14] and carried out many studies on the collections of the museum (mechanics, metallurgy, scientific instruments, various scientific & technical equipment) while working on the renewal of a few exhibition halls and on the organization of several temporary exhibitions. Maurice Daumas also assumed responsibilities in international organizations, including that of Treasurer of the International Council of Museums, between 1958 and 1971.

As soon as he was appointed Curator of the CNAM Museum, Daumas created the Centre de documentation en histoire des techniques (CDHT), whose director he remained until his retirement, when this responsibility was taken over by his main collaborator, the distinguished and erudite scholar Jacques Payen.[15] Placed under the triple patronage of the CNAM, the Centre National de la Recherche Scientifique (CNRS) and the Ecole des Hautes Études en Sciences Sociales (EHESS), the CDHT carried out important documentation and research activities linked not only to the CNAM museum collections, but also to the History of technology in general.

Under the auspices of the CDHT were published, starting in 1961, nine issues of the journal *Documents pour l'histoire des techniques*. The last one, published in 1975 entitled *Etudes pour un traitement automatique des sources en histoire des techniques* documented the results of a six-year project, carried out by a team of five to six persons led by Daumas, into computerizing sources.[16] The decision to work on such a topic highlights Daumas' desire and ability to keep up with technological progress.

I was part of this team since the autumn of 1972 when Daumas hired me as research assistant at the CNAM – CDHT where I prepared my PhD thesis, on the history of the internal combustion engines, under his direction. I defended it in March 1977.[17] Working closely with Daumas gave me the opportunity to appreciate his leadership skills as well as his human qualities, in particular his generosity.

Maurice Daumas' dynamism and deep involvement in research were boundless; his know-how in finding funding sources was also remarkable. Thus, in 1973, he established another working group at the CDHT, which was formed by recruiting four young researchers; three of them (Claudine Fontanon, Gérard Jigaudon and Dominique Larroque) would remain, like myself, for many years at the CNAM. Under the leadership of M. Daumas and J. Payen, they carried out research work on the socio-economics of technological development. Their work lead to books edited by the CDHT, between 1976 and 1980: *Evolution de la géographie industrielle de Paris et de sa proche banlieue au XIXème siècle*,[18] *Analyse historique des transports en commun dans la région parisienne 1855-1939*[19] and *Infrastructure de transport et développement urbain. Le cas des petites villes enclavées 1842-1975: compte rendu de recherche*.[20]

In 1976, after a serious heart attack, when he was sixty-six years old, Maurice Daumas retired. Yet, he didn't slow down his activities, quite the opposite. Thus, he undertook, inter alia, the launch of Industrial archaeology in France. He felt particularly concerned with and even responsible for the protection and enhancement of French industrial heritage; moreover, this responsibility was inscribed in the statutes of the CNAM. The demolition in 1969 of the Machine de Marly[21] affected him deeply.

As early as 1975, Daumas, as the head of a team of several people, started a survey, based on standardized questionnaires, about French industrial buildings. This

13 *Brevets d'invention français, 1791–1902. Un siècle de progrès technique (French Patents, 1791 - 1902. A century of technical progress*) (Paris: Institut national de la Propriété Industrielle, 1958).

14 Maurice Daumas, ed., *Histoire Générale des Techniques*. 5 volumes (Paris: Presses Universitaires de France, 1962 – 1978) = vol. I : *Les origines de la civilisation technique*. (1962), vol. II : *Les premières étapes du machinisme XVe – XVIIIe siècle* (1965), vol. III : *L'expansion du Machinisme 1725 – 1860* (1968), vol. IV : *Les Techniques de la Civilisation Industrielle; Energie et matériaux* (1978), vol. V : *Les Techniques de la Civilisation Industrielle; Transformation, Communication, Facteurs Humain* (1978).

15 Gérard Emptoz, "Jacques Payen (1931-1993)," *Bibliothèque de l'école des chartes* 152-3 (1995): 599-602; Alexandre Herlea, "Hommage à Jacques Payen," *Bulletin de la Société Française d'Histoire des Sciences et des Techniques* 36 (1995): 10-14.

16 Maurice Daumas and Jacques Payen, eds., *Études pour un traitement automatique des sources en histoire des techniques* (*Studies for a computerized treatment of sources in history of technology*) (Paris: CDHT - CNAM, 1975).

17 Alexandre Herlea, "La création, l'évolution technique et l'importance économique des moteurs industriels à combustion interne à piston jusqu'en 1914," (PhD diss., Paris, 1977).

18 Maurice Daumas and Jacques Payen, eds., *Évolution de la géographie industrielle de Paris et sa proche banlieue au XIXe siècle.* 2 Volumes (Paris: CDHT - CNAM, EHESS, 1976).

19 Maurice Daumas and Jacques Payen, eds., *Analyse historique des transports en commun dans la région parisienne 1855-1939* (Paris: CDHT - CNAM, EHESS, 1977).

20 Maurice Daumas, ed. *Infrastructures de transport et développement urbain. Le cas des petites villes enclavées 1842-1975* (*Transport infrastructure and urban development. The case of small, isolated cities 1842-1975 : complete research report*) (Paris: CDHT - CNAM, 1980).

21 The Marly Machine was a large hydraulic system built in 1681-1684 by Rennequin Sualem and Arnold de Ville to pump water from the river Seine to the palaces of Marly and Versailles. It was reconstructed several times, for the last time in 1855-1858.

led in 1978, to the publication by the CDHT of a study report entitled: *Les bâtiments à usage industriel aux XVIIIème et XIXème siècles en France*.[22] The same year, the Comité d'information et de liaison pour l'archéologie, l'étude et la mise en valeur du patrimoine industriel (Committee for The Study and Enhancement of Archeology and Industrial Heritage) was founded and Maurice Daumas was elected its first President. This happened during the third congress of the International Committee for the Conservation of the Industrial Heritage, held in Stockholm. After his return to Paris, he launched the biannual magazine: *l'Archéologie Industrielle en France*, initially published by the CDHT.

Two years later, in 1980, Daumas published *l'Archéologie Industrielle en France* at Robert Laffont, a reference book based on a rich and solid documentation, established at the CDHT.[23] I remember the long list of publications on Industrial archaeology which Daumas had asked me, in the summer of 1978, to bring him from England, the first country where Industrial Archaeology was established as a subject of study in the 1960's.

Towards the end of his life, Daumas also started research in Marc Seguin's archives, along with his close friend the American Professor Charles C. Gillispie, a work developed later by Michel Cotte.[24] He was also involved in the resumption of the publication of the *Œuvres de Lavoisier. Correspondance,* to which he collaborated in the early 1960s (editor René Fric) and in the early 1980's (editor Michelle Goupil). After 1993, this work was carried out by Patrice Bret.[25]

Maurice Daumas died on 18 March 1984. Nevertheless, research on the subjects launched by him at the CDHT was carried out not only after his retirement but also after his death. Hence, for example, two studies respectively entitled: 1) *Petites villes et infrastructures de transport 1851-1954*,[26] two volumes published in 1982 and 1985, a logical follow-up to the one called *Infrastructures de transport et développement urbain. Le cas des petites villes enclavées 1842-1975* already mentioned and 2) *L'industrialisation de la Région Parisienne dans la première moitié du XXème siècle; les sources de l'histoire des établissements industriels; commentaire critique et traitement cartographique*,[27] published in 1985, a follow-up to *Evolution de la géographie industrielle de Paris et sa proche banlieue au XIXe siècle*, also already mentioned. This work was also used outside the academy: files from the CDHT, made between 1973 and 1985, were used in 1998, by the French Ministry of the Environment, for the creation of a database of polluted sites.[28]

But Maurice Daumas was, above all, a major founder of the History of technology at international level and, in my view, the most important one in France. As a scientist and engineer, he understood that for the birth of a History of technology worthy of the name it is essential to open the black box of technology which has to be explained; for him this was a priority. Daumas said that he had "chosen to deal with the technical History of technology by skipping over almost silently the factors exogenous to the technology fields, although they were essential, to a large part, to its development".[29] It was only after achieving a competent technical History of technology that one could reflect on science-technology relationships and add context, integrating technological, economic, social, political and institutional history and thereby achieving a true History of technology. The discipline acquired its academic recognition only when its microcosm agreed that it was neither an internal history – a technical History of technology, nor an external one – an economic, social, political or institutional history, but a history integrating all these aspects that are interdependent and influence each other.

22 Maurice Daumas and Jacques Payen, eds., *Les bâtiments à usage industriel aux XVIIIème et XIXème siècles en France (Industrial buildings in the 18th and 19th centuries in France)* (Paris: CDHT - CNAM, EHESS, 1978).

23 Maurice Daumas, *L'Archéologie Industrielle en France* (Paris: Robert Laffont, 1980).

24 Michel Cotte, ed., *Le Fonds d'Archives Seguin: Aux origines de la révolution industrielle en France, 1790-1820*. (Privas: Archives départementale de l'Ardèche, 1997); Michel Cotte, *Le choix de la révolution industrielle, les entreprises de Marc Seguin et de ses frères (1815-1835)* (Rennes: PUR Fondation Carnot, 2007).

25 René Fric, ed., *Œuvres de Lavoisier. Correspondance*. vol. 3 (1776-1783) (Paris: Albin Michel, 1964); Michelle Goupil, ed., *Œuvres de Lavoisier. Correspondance.* vol. 4 (1784-1786) and vol. 5 (1787-1788). (Paris: Belin / Académie des sciences, 1986); Patrice Bret, ed., *Œuvres de Lavoisier. Correspondance.* vol. 6 (1789-1791) and vol. 7 (1792-1794) (Paris: Belin / Académie des sciences, 1997 and 2012); vol. 8 in progress.

26 Gérard Jigodon and Dominique Larroque. *Petites villes et infrastructures de transport 1851-1954. Les données* (Paris: CDHT-CNAM, 1982); Gérard Jigodon and Dominique Larroque. *Petites villes et infrastructures de transport 1851-1954. La France et sa région* (Paris: CDHT-CNAM, 1985).

27 Claudine Fontanon, *L'industrialisation de la Région Parisienne dans la première moitié du XXème siècle ; les sources de l'histoire des établissements industriels ; commentaire critique et traitement cartographique (The industrialization of the Paris region in the first half of the twentieth century; the sources of the history of industrial establishments; critical commentary and cartographic treatment)* (Paris: CDHT-CNAM, 1985).

28 "Service Géologique National BRGM," http://www.brgm.fr/site-web/basias (accessed April 2019). The files were used thanks to Gérard Jigaudon.

29 Maurice Daumas, ed., *Histoire Générale des techniques*. *Les Techniques de la Civilisation Industrielle; Energie et matériaux*, vol. 4 (Paris: Presses Universitaires de France, 1978), Introduction, 1 (VII).

Daumas thus rose to the challenge of creating a History of technology by first emphasizing the technological aspects of its subject. He followed the call of Lucien Febvre who, in an article published in the journal of the *Ecole des Annales* in 1935, argued for the establishment of this new branch of history,[30] defining the three stages that the creation such a history needed. Daumas followed as well the example of Charles Singer who directed the publication of the multi-volume *A History of Technology* at the Oxford University Press starting in 1954.[31] Under Daumas' direction, the five volumes of *Histoire Générale des Techniques* were published by the Presses Universitaires de France (PUF), between 1962 and 1978. They were followed by *Les grandes étapes du progrès technique* published in 1981, by the Presses Universitaires de France as well, in the collection Que sais-je? [32] and *Le Cheval de César ou le mythe des révolutions techniques*, which Daumas deemed his testament as historian of technology, published after his death by the Éditions des archives contemporaines.[33]

I will not comment on these works, which are well known, I will only remind very briefly of Maurice Daumas' vision on the evolution of technologies.

The main idea that Daumas introduced was that of the "complexe technique" (technological complex) in order to define what Bertrand Gille, the other founding father of the History of technology in France, called the "systeme technique" (technological system).[34] Maurice Daumas emphasised the interdependence between the technologies that form the technological complex whose evolution is due, he said, to an incessant quest for balance in the perpetual rupture of equilibrium caused by both factors internal to the complex and external to it. He argued that "the industrial civilisation is characterized by regular technical developments".[35]

30 Lucien Febvre, "Réflexions sur l'Histoire des Techniques," *Annales d'histoire économique et sociale* 36 (1935) : 531-535 ; Maurice Daumas, "L'Histoire des Techniques : son objet, ses limites, ses méthode," *Documents pour l'histoire des techniques* 7 (1969) : 5-32.

31 Charles Singer, ed., *A History of Technology*. 5 vols. (New York: Oxford University Press, 1956-58).

32 Maurice Daumas, *Les grandes étapes du progrès technique*, Que sais-je? (Paris: Presses Universitaires de France, 1981).

33 Maurice Daumas, *Le Cheval de César ou le mythe des révolutions techniques* (*Ceaser's Horse or the myth of technical revolutions*) (Paris: Editions des archives contemporaines - EAC, 1991).

34 Bertrand Gilles, *Histoire des Techniques*, l'Encyclopédie de la Pléiade (Paris: Gallimard, 1978); Alexandre Herlea, "Deux histoires des techniques," *Revue d'Histoire des Sciences* 35, no. 1 (1982): 57-63.

35 Daumas, *Le Cheval de César*, 1.

Daumas said that there were no revolutions (ruptures) in the evolution of technologies and stressed the fact that there was a single moment of acceleration of technological change at the time of the Industrial Revolution. This was the only time that the pace of the evolution of technological change was modified. Following the way opened by Lewis Mumford in *Technics and Civilization* in 1934,[36] Daumas made proposals for a timeline of history according to the evolution of technologies. In his books *Les grandes étapes du progrès technique* and *Le Cheval de César*, he defined five technological complexes, which he called: primitive, archaic, traditional, classical and scientific. In *Le Cheval de César* he wrote: "Innovation arrives in its time, made possible by a convergence of means tending towards a balance which controls the switch of a technological complex into another one".[37]

Science-technology relationships, the acceleration of the technological change by wars and many other subjects, to which Daumas gave a lot of attention, should also be mentioned.[38] But I shall stop here, in order to emphasise other aspects of Daumas' personality.

He was a brilliant professor. In the context of the process of recognition of the History of technology as an academic discipline in France, he led with determination and success the fight for opening an educational system in this field. During his curatorship at the Museum of CNAM, he started teaching at the Faculté des Lettres et Sciences humaines de l'Université de Nancy, where he delivered a course on the History of science and technology. This lasted for two years (1966-1968), during which Daumas worked for the establishment of a chair in History of technology at the CNAM.[39]

In 1969, the chair called Histoire des Techniques Modernes et Contemporaines was created through the transformation of the position of Curator into that of CNAM Professor.[40] A few years later, in 1972, Maurice Daumas also obtained the creation, at the CNAM, of a position of Maître de conferences (Lecturer) in History

36 Lewis Mumford, *Technics and Civilization* (New York: Harcourt, 1934).

37 Daumas, *Le Cheval de César*, back cover page

38 Daumas, *L'Histoire des Techniques,* 5-32; Maurice Daumas, ed., *Histoire Générale des techniques*. 5 vols. (Paris: Presses Universitaires de France, 1962 – 1978); Daumas, *Le Cheval de César*.

39 Maurice Daumas, Curriculum vitae, *Procès-verbaux du Conseil de Perfectionnement - CNAM*, 1969, 00022-23 (Archives du CNAM); Conservatoire National des Arts et Métiers, *Livret annuel 1970–71*, 372-373 (Archives du CNAM).

40 Maurice Daumas, Candidat à un cours d'Histoire des Techniques Modernes et contemporaines, *Procès-verbaux du Conseil de Perfectionnement - CNAM*, 1969, 00014-15 (Archives du CNAM).

of technology for Jacques Payen. A brilliant researcher and graduate of Ecole Nationale des Chartes, he assisted Daumas both at the CDHT and at the Chair of History of technology. History of technology was taught for seven years, until September 1976, when Daumas retired. The courses aimed, as Daumas specified in the draft programme of courses presented to the Conseil de Perfectionnement (Advisory Council) of the CNAM in 1969: "to bring listeners to the concepts on the historical development of major scientific and technical disciplines that give to the civilization of the twentieth century its basic characters. The general knowledge that they will gain will help them overcome some drawbacks of too rigorous specialization and better understand the meaning and the interest of activities in their own field."[41]

This teaching, focusing primarily on the technical History of technology, without being confined there, responded to the expectations of students who were preparing a scientific or technical degree at the CNAM and were required to acquire socio-economic credits, as J. Payen pointed out.[42]

After his retirement, Daumas taught Industrial archaeology at the Université de Paris IV for two years, from 1978 to 1980.

Daumas' chair, Histoire des Techniques Contemporaines, was not renewed on his retirement, it was replaced by a Chair called Technologie et Société. Jean-Jacques Salomon was elected to this Chair in 1978; he was the head of the Political Science and Technology Division of the OECD and, since 1972, also Associate Professor of the "socio-politics of science" at CNAM. But the History of technology promoted by Maurice Daumas survived at the CNAM, both at the level of research and of training, first of all thanks to Jacques Payen, head of the CDHT, who obtained the title of Professor in 1987.[43] The same year, the position of Maître de conferences was also created in the field (I was nominated) and a second one two years later (for which Gérard Emptoz was nominated). The History of technology promoted by Daumas survived also partially in the Museum and in the frame of the new Chair, Technologie et Société and the Centre Science Technique et Société (CSTS) led by J.J. Solomon, assisted successively by Bruno Latour and Geneviève Schmeder and later also by Catherine Bertho-Lavenir.[44] I belonged also to the CSTS, where,

41 Maurice Daumas, Projet de programme de cours, *Procès-verbaux du Conseil de Perfectionnement - CNAM*, 1969, 00024 (Archives du CNAM).

42 Jacques Payen, *Chaire d'Histoire des Techniques Contemporaines. Rapport sur l'enseignement présenté à la commission le 7 mars 1977* (Archives du CNAM).

43 Gérard Emptoz, "Jacques Payen (1931-1993)," *Bibliothèque de l'école des chartes* 152-3 (1995).

44 Conservatoire National des Arts et Métiers, *Guide de l'élève 90-91*, 156 (Archives du CNAM).

inter alia, I directed the work of the physicist Jean-Paul Deleage on the Fourneyron turbine, for his degree Diplôme d'Etudes Approfondies (DEA)[45] in Science, technology and society awarded to him in 1983. It was an illustration of the survival of Daumas' vision of History of technology.[46]

Daumas' inheritance was even more manifest when the first Diplôme d'Etudes Approfondies (DEA) programme in the History of technology in France started in 1987. It was a joint initiative of the CNAM (Prof. Jacques Payen and myself, Maître de conferences), the Université de Paris IV (Prof. François Caron) and the EHESS (Directeurs de recherche: Louis Bergeron, Patrick Fridenson and Denis Woronoff).[47] In this framework was inaugurated at the CNAM the course entitled: "Histoire des structures et filières techniques" (History of technical structures and sectors) as one of the four fundamental courses of the diplôme. Two years later, in the autumn of 1989, the two-year course of Maurice Daumas, entitled "Histoire des techniques contemporaines," was also reopened for CNAM students.[48] PhDs theses, which followed DEA degrees, were also awarded, starting in 1993. For example, the doctoral works of Bernard Crugnola on chemical industries, directed by G. Emptoz (CNAM, 1993); Dominique Brisou on steam engines, directed by F. Caron (Univ. Paris IV, 1998); Georges Magnier on measuring instruments, directed by A. Herlea (CNAM, 1999).[49]

But the legacy of Maurice Daumas in the teaching of the History of technology also continued outside of CNAM, namely at the Ecole Centrale des Arts et

45 The DEA (Diploma of Advanced Studies) is a university degree that existed in France between 1964 and 2005. It prepared students for research and PhD projects and was often awarded for the feasibility study of a PhD project. DEA was the first level of the doctoral studies.

46 Jean Paul Deleage, "Benoît Fourneyron et l'invention de la turbine hydraulique" (DEA diss., CNAM, 1983).

47 CNAM, EHESS, Université de Paris IV. *Diplôme d'études approfondies en Histoire des Techniques*, VARAP, Paris, 1987 (Archives du CNAM).

48 Both courses were taught from 1987 (1989, respectively) till 1996 by Professor Jacques Payen (1987 to 1993, the year of his death), Gérard Emptoz (1989 to 1993) and myself during all this period. Conservatoire National des Arts et Métiers. *Guide de l'élève 89-90,* 120-121 (Archives du CNAM); Conservatoire National des Arts et Métiers. *Guide de l'élève 95-96,* 39 (Archives du CNAM); Conservatoire National des Arts et Métiers. *Recueil des programmes 90-91,* 244-246 (Archives du CNAM).

49 Bernard Crugnola, "Les industries chimiques de Maurienne. Prémont - La Chambre - Epierre, 1890-1980," (PhD diss., CNAM, 1993); Dominique Brisou, "L'énergie vapeur dans la Marine militaire française au XIXème siècle," (PhD diss., Université Paris IV, 1998); Georges Magnier, "Histoire des Instruments de Mesures contrôlés par l'Etat, en France de 1790 à 1994," (PhD diss., CNAM, 1999).

Manufactures where, from 1982 to 1987, J. Payen and myself taught a course called "Histoire des techniques.". His legacy also persisted at the Université de Nantes, where Gérard Emptoz became Professor of History of technology in 1993 and at the Université de Technologie de Belfort Montbéliard, where I was myself recruited as Professor in this discipline in 1995. This university organised in 1999 the 26th ICOHTEC symposium (the third in France)[50] and has sponsored, since 2011, the "Maurice Daumas Prize for papers on the History of technology", created to encourage innovative scholarship in the field.[51]

Daumas' legacy can be found as well in the change of the name of the Division of History of Science (DHS), one of two divisions of the International Union of History and Philosophy of Science (IUHPS), into the Division of History of Science and Technology (DHST), a decision endorsed in 2005 at the IUHPS congress which took place in Beijing. This was achieved thanks to the joint efforts of Professor Juan José Saldana, the General Secretary of the DHS, and myself, as President of ICOHTEC.[52] Since the summer of 2015, the name of the IUHPS has been: International Union for History and Philosophy of Science and Technology (IUHPST).

Daumas' achievements were recognized both at the national and international level. He became a laureate of the Prix Pelloit (1953) and the Prix Freycinet (1957) of the French Académie des Sciences. In 1965, he received the Leonardo da Vinci Medal of the Society for the History of Technology.

His teaching performance was linked not only to his extensive knowledge and communication skills, but also to his capacity to listen and his human qualities. I remember with emotion the kindness with which he received me when I arrived as a refugee in France and he volunteered to supervise my PhD thesis, the confidence he invested in me when he proposed me to collaborate at the *Histoire Générale des Techniques*, introducing me to the Presses Universitaires de France, where I published

50 As Vice-president of ICOHTEC at the time, I took the initiative strongly supported by Jean Bulabois, the President of the UTBM. A selection of communications was published: Belot, Robert, Michel Cotte, and Pierre Lamard, eds, *La Technologie au risque de l'histoire, Actes du 26ème Symposium de l'International Committee of the History of Technology* (Belfort, UTBM /Paris: Berg International Editeurs, 2000).

51 The Maurice Daumas Prize was created, in 2009, at the initiative of Hans Joachim Braun, President of ICOHTEC and Timo Myllyntaus, Treasurer, and was for the first time awarded in 2011, sponsored by the Université de Technologie de Belfort Montbéliard, thanks to Pierre Lamard's involvement.

52 Alexandre Herlea, "ICOHTEC and the History of Technology in France," In *ICOHTEC, International Committee for the History of Technology 1968 – 2008*, edited by Wolfhard Weber (Bochum: ICOHTEC, 2009), 20-35.

also some years later *Les Moteurs*.[53] Also, he helped me greatly to prepare for my post-doctoral year in the United States in 1978-79. It was also thanks to his support (he made the proposal) that I became, in 1981, a member of the Executive Committee of ICOHTEC, replacing him as French representative. In 1990, in this capacity, I organised, at CNAM, Paris, the eighteenth ICOHTEC symposium (the second in France) on science-technology relationships, a theme to which Maurice Daumas had paid particular attention. Daumas had paid particular attention. I published the proceedings.[54]

I remember also that I took part, together with Maurice Daumas, in the Congress of the History Division of the International Union of History and Philosophy of Science in Bucharest, in 1981. At the end of this Congress, when he left Bucharest for Paris, Daumas had the generosity and courage to carry in his luggage documents that a friend of mine, a Romanian refugee in Paris, absolutely needed. I told him about the situation and he immediately offered his help in spite of the risks.

Let me share with you one last memory. When he received me at the *CNAM* in 1972, knowing that I am of Romanian origin, Maurice Daumas spoke to me about Petre Sergescu and, among other things, he said: "You know, we, French historians of science and technology, are all disciples of Pierre Sergescu." What a beautiful homage!

This allows me to say a few words about Petre Sergescu, too, as the title of my speech mentions. In 2018, as we celebrate the 125th anniversary of his birth, papers about his life and his work were presented at the Congress of the Comité des travaux historiques et scientifiques, which took place in April in Paris and at the Romanian Academy, in May.[55]

Born in Romania, in 1893, Petre Sergescu studied in France, where he lived for many years. He is one of those Romanians whose work is an integral part of the French and European culture.

A high-level mathematician, a Professor of analytic geometry, a science historian, he played a leading role in the institutional development of the History of science and technology and this is the reason why we are paying tribute to him today. Petre Sergescu was a committed intellectual throughout his life, promoting the great European values and was attached to his origins.

53 Alexandre Herlea, *Les Moteurs*, Que sais-je? (Paris: Presses Universitaires de France, 1985).

54 Alexandre Herlea, ed., *Science-Technology Relationships* (San Francisco: San Francisco Press, 1993).

55 Alexandre Herlea, "Petre (Pierre) Sergescu (1893-1954) Historien des Sciences et promoteur de la discipline," In *Actes du 143e Congrès du CTHS* (Paris: CTHS, in press); "Petre Sergescu – savant al Academiei Române," *Academica* 38, no. 5-6 (2018): 60-99.

After the second World War, a refugee in Paris, he devoted himself mainly to the History of science and to Romania.[56]

Sergescu was an early architect of international collaboration in the History of science, being the one who suggested the creation of the International Union of History of Science, which took place in Lausanne, in 1947, at the Congress of Science history. At this congress, Sergescu was elected Secretary General of the Union and President of the International Academy of History of Science, as well as editor of the journal, *International History of Science Archives*. A few years before his premature death he was elected Permanent Secretary of the Academy.[57]

In Paris, Sergescu developed many other activities in the field of science history, teaching and dissemination. He organised, starting in 1946, annual meetings of the section of Science history at the congresses of the Association Française pour l'Avancement des Sciences. He founded the Séminaire d'Histoire des Mathématiques at the Institut Henri Poincaré and created the annual cycles of Science history conferences which took place at the Palais de la Découverte. Here he also participated in setting-up several exhibitions.

Sergescu wrote more than 160 books and articles, especially in the fields of Mathematics and in the History and philosophy of sciences. One of his most popular books, published in Paris in 1951, was *Coups d'œil sur les origines de la science exacte moderne*.[58] Let us also mention here: *Gândirea Matematică*,[59] published in Romania in 1928, which was crowned by the Romanian Academy; *Les sciences mathématiques en France au 19ème siècle et au début du 20ème siècle* [60] published in Paris in 1933, which

56 Paul Montel, "Discours prononcé aux funérailles de Pierre Sergescu," *Archives Internationales d'Histoire des Sciences* 30 (1955): 3-7; *Pierre Sergescu 1893-1954* (Leiden: Brill, 1968); Alexandre Herlea, "Petre (Pierre) Sergescu (1893-1954), un artisan de la coopération internationale en Histoire des Sciences," *Bulletin de la Société Française d'Histoire des Sciences et des Techniques* 35 (1994): 14-19; Stavinschi Magda, *Petre Sergescu si Gândirea Matematică* (Bucuresti: EIKON, 2018).

57 René Taton, "Pierre Sergescu, son œuvre en Histoire des Sciences et son action pour la renaissance des Archives Internationales d'Histoire des Sciences," *Archives Internationales d'Histoire des Sciences* 37 (1987): 104-119; Taton, René. "Pierre Sergescu (1893-1954)," *Revue d'histoire des sciences et de leurs applications* 8, no. 1 (1955): 77-80; "Petre Sergescu – savant al Academiei Române," *Academica* 38, no. 5-6 (2018): 71-74.

58 Pierre Sergescu, *Coup d'œil sur les origines de la science exacte modern* (Paris: Société d'Édition d'Enseignement supérieur, 1951).

59 Petru Sergescu, *Gândirea Matematică* (Cluj: Institutul de Arte Grafice - Ardealul,1928).

60 Pierre Sergescu, *Les sciences mathématiques en France au 19ème siècle et au début du 20ème siècle (Tableau du XXème siècle)* (Paris: Denoël & Steele, 1933).

received a prize from the French Académie des Sciences; *L'évolution des sciences mathématiques et physiques*[61] published in Paris in 1935; and the study for the French pavilion in The World Expo in New York of 1939: *Some important dates in the evolution of French Mathematics*, which was published in tens of thousands of copies.[62]

Apart from science, Sergescu was interested in Romania's and the Romanian exiles' situation. He denounced the Soviet occupation and the Communist reign of terror in the country and led a campaign aimed at highlighting the European vocation of Romania. He was the president of l'Association des Roumains Professeurs des Universités in Paris and the director of Fundația Regală Universitară Carol I (known in Paris also as l'Institut Universitaire Roumain Charles I): the most important cultural institution of the Romanian exile. He also took part in the long and difficult debates about the political organization of Romanian exiles, including the structure, composition and role of the Romanian National Committee. He was dedicated to refugees' assistance.[63]

Let us also mention that with his wife, Marya Kasterska, a well-known writer of Polish origin, Sergescu, hosted a cultural salon, on Saturday evenings in their apartment in the Latin Quarter. Among the attendees were: Henry de Montherlant; the mathematicians Paul Montel and Emile Borel; the historians of sciences René Taton and Maurice Daumas; refugees from Eastern Europe, notably from Romania, such as Mircea Eliade or Nicolae Herescu; and young students.[64]

I will conclude with the words of René Taton on Maurice Daumas:

> "By the importance and diversity of his work, by the energy of his action, by the richness of the new orientations which he has endeavoured to promote, Maurice Daumas has contributed with great efficiency to the renewal and the development of the studies of science and technology history in France"[65]

61 Pierre Sergescu, *L'évolution des sciences mathématiques et physiques* (Paris: Flammarion, 1935).

62 Pierre Sergescu, *Some important dates in the evolution of French Mathematics* (New-York, 1939).

63 Stavinschi Magda, *Petre Sergescu si Gândirea Matematică*, 47-53; Alexandru Herlea, "Petre Sergescu, personalitate luminoasă a exilului românesc," *Buletinul Bibliotecii Române din Freiburg,* seria noua 6 (2019):128-135.

64 René Taton, "Petre Sergescu (1893-1954)," *Bulletin Scientifique Roumain*, 3 (1955): 3-12; "Petre Sergescu – savant al Academiei Române," *Academica* 28, no. 5-6 (2018): 81-85; Stavinschi Magda, *Petre Sergescu si Gândirea Matematică*, 43-44.

65 René Taton, "Nécrologie Maurice Daumas (1910 -1984)," *Revue d'histoire des sciences* 37, no. 3-4 (1984): 337.

and on Petre Sergescu:

> "The disappearance of this simple, friendly and devoted man, of this outstanding animator, honest and modest historian, was deeply felt as well among the Romanian emigrants whom he had helped with extreme dedication, among the many disciples and friends that he had been able to reunite and among the entire international community of science historians that he had helped to rebuild and animate".[66]

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66 René Taton, "Pierre Sergescu, son œuvre en Histoire des Sciences," (Brepols, 1987): 112.

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