

13

FRANCE

‘The Republic needs scholars!’ A rapid history of making science public in 20th-century France

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Reading *Ouest-Eclair* on the 31 May 1937, the readers of the Breton daily newspaper learned about a ‘crowd of young folks gaping at the mysterious machines used by modern scholars and at the tremendous machine generating stunning lightnings and artificial thunderstorms’ and about their presumed fear in front of such powerful forces that ‘meekly obey to the order of a human being’ comparatively so small. This lyrical description related to the Paris international exposition *Arts et techniques dans la vie moderne* [Arts and technics in modern life] and described the first visitors to the Palais de la découverte.

The creation of the Palais de la découverte was the first step toward *modern* (Kargon et al., 2015) science communication in France, in both form and content. Designed within the framework of the international exposition (Ory, 1991) by prominent scientists led by the Nobel laureate Jean Perrin, the Palais became permanent in 1938 after the rest of the international exposition was dismantled.

1. A genuine founding act

The preparation of the 1937 international exposition has a long and eventful history (see e.g. Kargon et al., 2015; Ory, 1994). It was prepared during a period of international tension and, in France, of serious political crises of the late Third Republic. Increasing threats of war and growing unemployment was the background on which the exhibition was built.

The theme eventually selected¹ by the government—International Exposition (modern decorative and industrial arts, working and peasant life, intellectual cooperation)—allowed for intellectual cooperation and intellectual work. This choice fell in line with the interests of the International Institute of Intellectual Cooperation (then considered the arm of French diplomacy) and of the powerful Confederation of Intellectual Workers (Confédération des Travailleurs Intellectuels, CTI).² The first general commissioner of the future international exhibition, Aimé Berthod, was a member of the Intellectual Workers' Defence Group at the Chamber of Deputies. He put the vice-president of the CTI, the painter André Léveillé (later the first director of the Palais de la découverte), in charge of the section devoted to intellectual cooperation. Léveillé proposed to split this into 'three groups on the manifestation of thought': Expression, Training and Diffusion. Expression of Thought aimed at the promotion of diverse facets of the work of mind: science, literature, museums, theatre, music and dance, cinema, and congresses. The idea of 'reserving a place for science' in an exhibition in part dedicated to thought very much fitted with the conceptions of the CTI (Bergeron and Bigg, 2015), and this first proposal explicitly included a class dedicated to science as early as 1933. By the time Perrin and his colleagues³ joined the project in 1934, 'science' was already constituted as the first class of the first group 'Expression of Thought' (including literature as the second class, the museum as the third, etc.).

The dedication of a significant section to a subject that was *a priori* difficult to exhibit, the activity of the mind—or in the exhibition's terminology, the Expression of Thought—was considered by many (such as Paul Valéry, who became in charge of the first group) as a 'great and paradoxical novelty'. What was supposed to be shown was not the product of thought but intellectual labour as such that had then to be made materially observable. The challenge was to represent (in an exhibition, with objects, visuals, etc.) this very immaterial thing (thought at work) so that a visitor could observe it. For science that was done by means of experiments; for literature, by means of manuscripts. For Valéry, this fundamental challenge was the very same for literature and for mathematics:

1 Décret relatif à la création à Paris d'une exposition générale internationale (arts décoratifs et industriels modernes, vie ouvrière et paysanne, coopération intellectuelle), *Journal Officiel de la République Française. Lois et décrets*, 17 January 1933, p. 491. The 1937 world fair was the first one to be organised according to the new regulation established by the Convention Relating to International Exhibitions, signed in Paris on 22 November 1928. Among other things, the convention defined new rules for exhibition frequencies: facing three proposals, the government went for the compromise.

2 On the CTI see Chatriot (2006).

3 Let us just mention the two vice-presidents: the physicist Paul Langevin and the mathematician Emile Borel. It is worth noting that the board included a significant number of CTI officers: Emile Borel (founding vice-president); André de Sainte-Laguë (president); Charles Marie (treasurer). Many scientists involved in the creation of the Palais had clear political commitment (Bensaude-Vincent, 2013).

how was it possible to ‘put before the eyes what exists only through the mind and in the mind’ (Valery, 1960). The option selected was, for any domain of the Expression of Thought, to stress ‘the immediate creations of the mind’, the *act of creation* rather than the *product*, on *modern* thinking rather than the *repertoire* (Bergeron and Bigg, 2019).

For science, in the first place this meant to display modern science, contemporary rather than historical, and pure rather than applied. The philosophy of the Expression of Thought exhibit had consequences on the museological choices: creation had to be made visible, spectacular, lively. For the Palais’ founders, the obvious model was the Hall of Science at the Chicago exposition in 1933, ‘A Century of Progress’. This was considered a success in its combination of spectacle and pure science. In the end, as a comparison with the ephemeral Museum of Literature suggests (Bergeron and Bigg, 2019), the Palais should not so much be regarded as a unique museum—neither with respect to the history of science museums nor within the Paris 1937 exhibition—but as part of a recent line of exhibitions and the concrete expression for science of the principles of the Expression of Thought exhibit.

The Expression of Thought exhibit was intended to promote the cultural and social importance of intellectual labour, with the immediate benefit of remedying unemployment by engaging artists and scientists working on the exhibition. For the scientists involved in the preparation of the Palais, this held a particular relevance: it took place precisely when the same group had been wrestling with issues about the organisation of research (Picard, 1990), eventually leading to the creation of the National Centre of Scientific Research (CNRS). The parallels between the two processes are so convincing that in her pioneer work Eidelman (1985) suggests that the Palais could be regarded as a museum transposition of the CNRS.

The Palais de la découverte was a true success with more than 2,250,000 visitors. It became permanent after the end of the International Exhibition and reopened in April 1938, while the biology section reopened in August after being completely reconsidered. The exhibit included the famous ‘Lottery of heredity’ designed by Jean Rostand and Jean Painlevé. The first temporary exhibit at the Palais in 1938 was organised by the Carnegie Institute in Washington and focused on recent US advancements in biology and astronomy, presented with the support of the New York Museum of Science and Industry. The Palais continued its activities during the war. A commemorative exhibition on Lavoisier organised in 1943 was considered then and today (Beretta, 2004) as a genuine act of resistance.

2. Construction and reconstruction

The Palais was severely damaged during the Battle of Paris in 1944. Nonetheless, it resumed its activities and developed various initiatives very rapidly. As early as 1944, Lévillé began to work to develop international contacts⁴ that led to exhibitions (like the exhibition on penicillin organised with the support of the British Council and the US Information Service and with the collaboration of Alexander Fleming) or to lectures (like the series of lectures by English scientists including Dirac, Huxley, Florey and Bernal). Curiously enough for a place affirming its commitment to ‘living science’, a series of commemorative exhibitions was organised, beginning with Pasteur in 1946. Predictably, the Palais became a natural place for science communication in Paris, and can probably be considered as the foundation upon which the post-war science communication edifice in France would be built.

It was not the only science museum in France at the time. In Paris, the Muséum National d’Histoire Naturelle (Blanckaert et al., 1997) and the technical museum of the Conservatoire National des Arts et Métiers (CNAM) (Dufaux, 2013) had long histories. Paul Rivet’s Musée de l’Homme, designed as a museum/laboratory presenting ethnology, opened in 1938 (Conklin, 2013). And, of course, natural history museums existed in the main cities.

Science museums played their part in the first efforts to develop science clubs for youngsters in the early 1960s: the Palais had the Club Jean-Perrin, while the museum had its Clubs Naturalistes and the CNAM its Club des Jeunes Techniciens. Another association named Jeunes Sciences already existed, created in 1958 by the surrealist writer André Thirion. In 1962, the ANCS (Association nationale des clubs scientifiques [National association of scientific clubs]) was created, and subsequently became the Association nationale sciences techniques jeunesse (ANSTJ) in 1977 and Planète sciences in 2002 (Gautier and Las Vergnas, 2010). The keen interest of youngsters for space and astronomy impelled the Centre national d’études spatiales to draw on these associations to channel the activities of young people interested in rocket construction and propulsion (Radtka, 2016).

During the 1950s and 1960s, science communication was also achieved by other means: in the press, on radio and on the nascent television. Specialised magazines (*de vulgarisation*) had existed a long time (like *La Nature*, created in 1873) or had been created after World War II. *Science et vie* had been

⁴ Lévillé also played a very active role in the creation of the International Council of Museums (ICOM). He was a long-lasting member of its board and chaired its ‘Science museums and planetaria section’ that he strongly contributed to set.

created in 1913 on the model of the American *Popular science* under the title *La science et la vie*. One could add *La Revue scientifique* (a magazine of *haute-vulgarisation*, created in 1863). Two new magazines were created in the aftermath of World War II: in 1946, *Atomes*, a ‘high-level’ monthly magazine that would have a promising future under another title (*La Recherche*) and, in 1947, *Sciences et Avenir* that, like *Science et vie*, is still published today.

Science on radio has a long tradition in France. Before World War II, renowned scientists used to give ‘lectures’ on various topics and a *Conseil supérieur de la Radiodiffusion* had been created in 1937, bringing together personalities close to the Union Rationaliste and the Popular Front. The Conseil included a scientific section: Emile Borel, Henri Laugier, Jean Perrin, Paul Langevin (all involved in the Palais’ foundation), Irène Joliot-Curie and Georges-Henri Rivière were members (Morelle and Jakob, 1997). In the 1950s and 1960s the main science broadcast on radio was *La science en marche* (1958–83) hosted by François le Lonnais, who was incidentally head (1950–58) of the Division of Science Teaching and Science Popularisation (Salon, 2016) at the Natural Sciences Department of UNESCO (then directed by the physicist Pierre Auger, who would a few years later host *Les Grandes Avenues de la science moderne* (1969–86), a program on the State radio channel *France-Culture*).

In this post-war period, television⁵ was still in its infancy. Science had nonetheless its place, either through specific programs such as *Les bâtisseurs du monde*, a series of biographies of famous scientists (Galiléo, Copernicus, Galois, Curie) directed by André Labarthe (1956–57); or, as for *La page des sciences* (1961–62), as part of the newsreels. *Les médicales* (1954–84) hosted by journalist (and former physician) Igor Barrère and the journalist Etienne Lalou is considered a pioneer program on medical communication (Mansier, 2014). It owed its longevity in part to the excellent relations maintained by its directors with the medical establishment (Marchetti, 2007). As concerns science, one of the most interesting programs was *Visa pour l’avenir*, a one-hour program broadcast once a month from May 1962 to July 1967. The producers were at first two journalists from the legendary news TV magazine *Cinq colonnes à la une*, Jean Lallier and Roger Louis; they were soon joined by two renowned print media science journalists: Nicolas Skrotzky (Agence France-Presse) and Robert Clarke (France-Soir). *Visa pour l’avenir* was

5 Until 1974, television in France was a public monopoly (Radiodiffusion-Télévision Française [RTF: French Radio and Television Broadcasting], and from 1964 Office de Radiodiffusion-Télévision Française (ORTF), the national agency charged, between 1964 and 1974, with providing public radio and television in France). A law voted on the 8 July 1974 dismantled the ORTF. The first private channel was a pay TV channel Canal+ in 1984 and the first free generalist private broadcast was Silvio Berlusconi’s *La Cinq* in 1986.

interested in technical progress and in the advancement of science, but it was foremost the result of journalism focused on science. Subjects like the thalidomide crisis (*Après la Thalidomide*: broadcast 19 October 1962) were quite controversial and the social responsibility of science and scientists could be openly questioned (*Faut-il tuer les savants*: broadcast 26 September 1963). In this period science on French television was mostly a matter of generalist journalists who might later specialise in scientific topics.

In March 1955, some journalists (primarily André Labarthe and Robert Clarke) created the Association des journalistes scientifiques de la presse d'information (AJSPI) (Clarke, n.d.), gathering together the nascent group of journalists specialising in science. Their objective was to gain legitimacy (Marchetti, 2007), externally among the scientific communities and internally to convince media owners to make more space for science. Later, in 1967, the AJSPI established 'the Club', bringing together the major research institutions and industries in order to encourage contacts between institutions and journalists (Chavot and Masseran, 2003).

Almost at the same time (June 1956), another association was created, this time under the aegis of UNESCO: the Association des écrivains scientifiques de France (AESF). The AESF brought together writers, journalists, popularisers and scientists. Its president was François le Lionnais. Members shared the view of a 'triumphant science, able to technologically catch up and to solve the underdevelopment of third world countries' (Laigneau, 1989). The members of AESF, Laigneau writes, were very committed to the literary quality of their writings and aimed more at the legitimization of scientific literature within the sphere of literature than at popularisation.

It is worth noting that the location of UNESCO's premises in Paris as well as the personalities of the first officials of UNESCO and of its Natural Sciences Section (Nielsen, 2018) may have played a role in the active development of science communication in post-war France. Léveillé had very good relationships with Huxley and Needham,⁶ both of whom were invited to give lectures in the Palais before the creation of UNESCO. The Palais played a leading role in UNESCO in the late 1940s to early 1950s: organisation of the *Month of UNESCO* in 1946; participation in expert panels on the popularisation of science in 1947; commissioning of a report on scientific museums in 1949 (Bergeron and Bigg, 2015). After Needham returned to Cambridge, Pierre Auger, headed the Science Department; shortly after, Le Lionnais joined the division of Science Teaching and Science Popularisation. Both were members of the science committee at the ORTF and hosted a scientific broadcast.

6 Respectively the first director-general and the first director of the Natural Sciences Section of UNESCO (1946–1948).

What has been described testifies that, in late 1950s France, science communication was active in multiple forms and was already quite well organised. From the early 1950s until the mid-1970s, science communication repeatedly appeared as a matter of public concern to politicians, industrialists and scientists. To sum up a long history, let us begin in 1953 when the prime minister-to-be Pierre Mendès-France, probably persuaded that a strong and ambitious science policy was a prerequisite to the reconstruction of the country (Crémieux-Brilhac, 1986) by his many discussions with the scientist, diplomat and former director of the CNRS Henri Laugier, declared in a programmatic discourse in 1953: ‘The Republic needs scholars!’ Mendès-France became prime minister in 1954. He created the position of Secretary of State for Scientific Research and appointed Henri Longchambon (who, like Laugier, was one of the Palais’ founders). Mendès-France only remained in the position for eight months, but a new momentum had been imparted to the field. Soon after, with his support, a group of scientists mobilised to promote the ‘expansion of scientific research’. Their efforts led in 1956 to a major event: a National Conference on Scientific Research in Caen, which brought together the *élite* of French public and private research, politicians, industrialists and journalists. Known today as the Caen Colloquium, it is considered a milestone in French public research during the post-war years (Chatriot and Duclert, 2006). Similar conferences followed, like the colloquium entitled ‘The Relations between University and Industry’ in 1957 in Grenoble, at the precise moment when the success of Sputnik was made public. Discussions at both colloquia emphasised the assertion that the development of research was the indispensable condition for the recovery of the standard of living of the French people and the place of France in the world. This would only be possible, so the theory went, through a radical increase in the number of technicians, engineers and scientists. Therefore, the massive development of science communication (or *propaganda* to use the term employed at that time) using modern techniques (such as cinema, television and records) was fundamental: it was considered as the most powerful means to encourage young boys and girls to enter the scientific and technical professions. These were considered as the best methods for ongoing professional training, allowing technicians and engineers to acquire or maintain scientific and technical knowledge (Bergeron, 2020).

The French public research system was implemented gradually years (Chatriot and Duclert, 2006). Science communication remained a matter of interest to ministers and heads of the research administration. Important reports, like the Boutry report (1963), argued for more efficient science communication, to maintain public attitudes in favour of science and to keep professionals informed of current scientific developments. But this official support did not translate into practical action or achievement, even though interest persisted

through the 1960s and the early 1970s. One of the main reasons is that science communication policy depended on the Bureau National de l'Information Scientifique et Technique (BNIST), the state service given the job of dealing with 'scientific information', i.e. information flows and infrastructures, documentation, computer development, implementation of databases and training of documentation professionals. While an urgent issue for science, for industry, for the army and the country, science communication was such a low priority that it worked as an adjustment factor in the face of tight budgets and a limited number of staff (Bergeron, 2020). Better times would soon come.

3. Protests and state affairs

The late 1960s were a time of protest in France. May 1968 was the most conspicuous event (Gobille, 2009). The movement born in the universities was joined by workers and then the whole country, and France was paralysed by weeks of strikes. There were days of intense contestation, but also days of multiple reflections and speeches (Certeau, 1997), and these contests, reflections and speeches pertained to science as well. During the 1960s and 1970s, groups of 'critic scientists' (Debailly, 2015) organised (often in connection with similar groups in Britain, Belgium, etc.), convened meetings and published bulletins like *Impascience* or *Labo-Contestation*. The functioning of scientific communities and institutions was questioned: issues like the low status of women and technicians and social hierarchies as well as the connection of science with the military sector and financial interests were raised. Popularisation of science came under scrutiny. Some social scientists (Jurdant, 1973; Roqueplo, 1974) highlighted its paradoxical effects: popularisation created the gap it was supposed to fill but stood a long way from the empowerment it was supposed to enable. Popularisation was indeed a major problem for those radical scientists looking for new means to present science in a less authoritative way, showing that the knowledge produced by science was less categorical than contingent.

One new approach was proposed: to 'put science into culture'. Jean-Marc Lévy-Leblond, a major figure in the 'science critic' movement and main theorist of the *mise en culture de la science*, took over leadership of the series of books *Science Ouverte*⁷ at the Editions du Seuil. It had just published *(Auto)critique de la science*, the book he co-authored with Alain Jaubert in 1973. What was then called *action culturelle scientifique* [scientific cultural

7 The series still exists today and is still directed by Jean-Marc Lévy-Leblond. More than 220 titles have been published in this collection.

action] offered another means. Since the mid-1960s, science was one of the many domains treated in the Maisons de la culture (Bergeron, 2009), in the same way as theatre, music and literature. The Maisons de la culture was the cornerstone of André Malraux's policy at the Ministry for Culture. The idea was to create reception structures across France to 'give access to the major cultural works of humanity' not only in Paris, but to the widest public. Since the first one opened in Le Havre in 1961, they developed polyvalent cultural projects that often dealt with scientific themes (as in Le Havre, Bourges, Reims, Nanterre, Chalon-sur-Saône, Grenoble, Saint-Étienne, etc.). Science was presented in the Maisons de la Culture by means of exhibitions and conferences, etc. Its presence in such cultural institutions seemed then self-evident, fitting very well with Malraux's doctrine.

Unexpectedly, science in these cultural institutions attracted new publics that would probably not have come for the theatre or music. The Ministry for Culture doctrine was 'cultural action' (Urfalino, 1996), and what concerned science was named 'scientific cultural action'. In 1974, the main actors (scientists or sociocultural coordinators) met in Grenoble and created the Groupe de liaison pour l'animation culturelle scientifique (GLACS) [Liaison group for scientific cultural animation] to facilitate mutual information. GLACS was headed by the physicist Michel Crozon and its main activity at the time was Sciences dans la rue [Sciences in the street]. The principle was simple: at scientific conferences (e.g. in Aix 1973, Poitiers 1974, etc.), events were organised for the general public, and scientists engaged in conferences or public demonstrations (often 'in the street'). The Science dans la rue series was a big success and received financial support from the State that (as we will see below) began to engage concretely in the domain.

Contestation was also about ecological matters, technological choices and, above all, a highly strategic matter for France: nuclear energy (Hecht, 1998). Some scientists played an active role in the anti-nuclear movement, particularly the Group of Scientists for Information on Nuclear Energy (Groupement des Scientifiques pour l'Information sur l'Energie Nucléaire, GSIEN). Against what appeared to them as a strong tendency of nuclear officials to turn information into propaganda and to maintain secrecy, they published in *La Gazette Nucléaire* arguments informed by academic literature to counter the official information of the electrical public agency Électricité de France (EDF) (Topçu, 2008, 2013). The GSIEN was created at the end of 1975 as a reaction to a program known as 'Messmer's Plan'. The plan was made public in 1974 and generalised the use of nuclear power through the construction of 13 nuclear plants. 'Information' was a crucial issue: Messmer's Plan had never been discussed in parliament and political opponents declared it was presented as a *fait accompli*. In May 1975, in a declaration on energy policy delivered in parliament, Michel

d'Ornano, Minister for Industry and Research, announced a new strategy of the government: to publish scientific information and leave nothing in the shadows. To inform 'all citizens' became, in this respect, as important an issue as developing computers or databases: the time had come for the State service devoted to science information at large (BNIST) to take seriously this part of its mandate, a job that until then had been on standby (Bergeron, 2020). To this end, a 'scientific and technical cultural action' sector was created with Lucie Degail recruited to head it. From 1976, actions were developed including the participation in the youth fairs, support for the program Science in the street, regular support to the monthly *La Recherche*, and commissioning studies on French attitudes to science.

4. Institutionalisation and professionalisation

A few years later, in 1981, another political event had major repercussions on science communication matters in France.

In May 1981, François Mitterrand was elected president of the Republic. For the first time since the immediate post-war period, a left-wing government came to power. From the outset, the new government showed a keen interest in science and technology, considering it the most useful mechanism to help France find a way out its economic crisis. The new Minister for Research and Technology, Jean-Pierre Chevènement, rapidly organised a series of regional conferences for 'Research and Technology', bringing together scientists, industrialists and politicians. The regional conferences culminated in the national conference 'Research and Technology' in Paris on 13–16 January 1982. The general idea was to involve the nation's scientific communities in the definition of a future science policy. The conference was a national event and received wide media exposure. As noted by a TV report: 'Almost all members of the government were there [...] Science truly became a political object!' (Journal télévisé d'Antenne 2, 1982). In a closing statement, Chevènement emphasised the necessity to 'integrate a scientific dimension into the culture by means of the development of (scientific) formation, information and animation', and called for more actions in the domain of 'scientific and technologic culture'. As noted by Petitjean (1998), one of the minister's personal priorities was to fight anti-science, though the theme had never been raised in any working group of the conference. The consequences for science communication were concrete: it was from then on a State priority and funds were made available.

Centres for scientific, technical and industrial culture (Centre de culture scientifique, technique et industrielle, CCSTI) were then considered as the best way to communicate science, and their development became a priority. These

were based on the model of the ‘science cultural centre’ opened in Grenoble in 1979 by a group of scientists who wanted to continue scientific cultural animation independently from the local Maison de la culture. Two months after the national conference, a second CCSTI, the Fondation 93, opened in Montreuil. It was directed by Alain Berestetsky, formerly responsible for cultural action in the nearby town of Bagnolet. In 1984, more than 16 CCSTI projects were running in the main cities of the country. Since the very beginning, the CCSTI could take rather different forms: some (such as La Casemate in Grenoble) were true science centres, with dedicated spaces for exhibitions and public events, while others (such as Fondation 93) preferred not to have any space opened to the public and worked as resource centres for cultural institutions, associations, schools, etc. in their geographic areas. Their diversity of forms, sizes and styles was linked as much to the importance of the local context in which they originated (and in which they would later strongly integrate) as to the different philosophies of the founding teams (Bergeron, 2016b). Very little detailed historical analysis of those local science centres exists in the literature, with the remarkable exception of the Lorraine Region studied by Choffel-Mailfert (2002). Her analysis shows that the simultaneous creation of science centres and of heritage and craft-oriented structures in Lorraine can be understood in the context of the severe deindustrialisation of the region. The diversity in the styles of museumification can be regarded as the results of different ways of thinking of the (local/regional/national) stakeholders. Her conclusion is that in the Lorraine region, the development of ‘scientific, technical and industrial culture (*la culture scientifique, technique et industrielle*) allowed a shift in social struggle, replacing social struggle by cultural struggle’. This conclusion is consistent with other analyses, such as Debary’s (2003, 2004), interpreting the creation of the Creusot ecomuseum as a (cultural) art to use up the (industrial) leftovers. This coincides with a growing interest in France toward its industrial heritage (Gasnier, 2016).

When all this was happening, what was to become in 1986 the main institution for scientific and technical culture was under construction in Paris. The project of a ‘national museum for science, technology and industry’ dates back to 1977, when the architect Roger Taillibert suggested converting the site of the unfinished abattoir at La Villette into a major museum. Two years later, the physicist Maurice Lévy, former president of the National Centre for Spatial Studies, issued a report outlining the contours of what would later be the Cité des sciences et de l’industrie [City of sciences and industry].⁸

8 With more than 2 million visitors in 2016, the Cité is still today the largest scientific and technical centre in France. In 2010, it merged with the Palais de la découverte to form Universcience.

The prospect of opening such a new and large museum, together with the emergence of scientific and technical centres in the country, motivated scholars to begin specific training for science communication (Devèze-Berthet, 1989). In 1984, Denise Devèze-Berthet set up the first training courses (bachelor's and graduate) focused on 'communication and scientific, technical and medical information'. One year later, in Tours, Jean Lagoutte and colleagues created bachelor-level training at the Institute of Technology (IUT) in Tours, focused more on scientific mediation. Other programs followed in the 1990s: in Strasbourg and Grenoble. During the same decade, the renovation of two major science museums (Muséum National d'Histoire Naturelle, 1993; Musée des Arts et Métiers, 2000) and a national project for the development of research in museology (REMUS, 1993) led to the development of new courses specialising in science museology in Lyon, Paris, St Etienne and other locations.

Science communication at this point had its specific places, trainings and scholars. It also had its own networks. Journalists and writers had become organised in the 1950s; in 1982, professionals and supporters of science centres and of scientific culture created the Association des musées et centres pour la promotion de la culture scientifique, technique et industrielle (AMCSTI) [Association of museums and centres for the development of the scientific, technical and industrial culture]. Its first general meeting was presided over by Hubert Curien, then president of the Centre national d'études spatiales (CNES). In 1989, Pierre Fayard, associate professor in information sciences at Poitiers, took part in the creation of another network: the Public Communication of Science and Technology (PCST) Network. The first meeting was held in Poitiers in 1989 and attracted international participants. The *Nuit des étoiles* [Night of Stars] was created in 1991 by a group of amateur and professional astronomers (Las Vergnas et al., 2010); of *La main à la pâte* [Hands-on], created in 1995 by the physicist and Nobel laureate Georges Charpak and other academicians to promote the use of a hands-on approach in science education and immediately supported by the Ministry for Education; and of the emergence of new publishers specialising in science, such as the Editions Odile Jacob created in 1986 by Nobel laureate François Jacob's daughter (Lemerle, 2007).

Between the early 1980s and the late 1990s, numerous initiatives⁹ contributed to the development of science communication in France in different forms: print, journalism, museums, cultural animation and heritage. Throughout this period two trends could be clearly observed:

9 In 2010 and 2012, two conferences were organised in Orleans in order to document the memories of 30 years (1980–2010) of 'scientific and technical culture' in France. The interested reader can find numerous stakeholder testimonies in the conference proceedings (Caillet et al., 2014; Bergeron et al., 2014).

- an increasing professionalisation (specialised trainings, specific jobs)
- an increasing institutionalisation with more specific structures, better organised at the national level, growing funding and recognition.

These efforts transformed ‘science communication’, which was then better known as ‘culture scientifique et technique’, as a true *dispositif* that was considered with a great deal of interest by the public authorities, particularly the Ministry for Research, as it performed various complementary functions: disseminating scientific knowledge; encouraging scientific vocations; creating areas for and engaging scientists in debates; and promoting local industries’ know-how. In 1992, Hubert Curien (Minister for Research and Technology, 1984–86 and 1988–93), really ‘invented’ the Fête de la science [Science Festival]. It was built on the model of the Fête de la musique [Music Day] established by the Minister for Culture, Jack Lang, in 1982; and its first occurrence took place in the ministry gardens, which were opened to the public for this occasion. This event was a success and the idea was soon adopted in several countries (Ledur, 2016).

In the mid-1990s, science communication in France can be regarded as consolidated in a form close to what we know today. Of course, nothing is set in stone and new modalities (science blogs, YouTubers) emerged in France as in other countries. One of the most conspicuous is the rapid implementation of FabLabs (Lhoste and Barbier, 2016) often hosted in the CCSTIs. Another major trend is undoubtedly the growing interest of universities in their heritage and its promotion (Boudia et al., 2009) that has transformed universities today in a major actor of scientific communication.

5. Meaningful words

All through this chapter, for a matter of homogeneity with the book, I strove to use the expression ‘science communication’ as a generic name for our topic. In actual fact, the wording ‘science communication’ (*communication scientifique*) was in use for a rather short time: around the 1980s, coexisting for a while with the broader ‘scientific (technical and industrial) culture’ (*culture scientifique [technique et industrielle]*).

How to name ‘popularisation of science’ is an old and seemingly unsolved problem in French. Jeanneret (1994) made this clear in the introduction of his now classical book: by choosing *vulgarisation*, the French language (or rather its speakers) created persistent discomfort due to the predictable links toward ‘vulgar’ and its derivatives. This partly explains the numerous attempts to introduce alternative designations all through the past century.

I have discussed elsewhere (Bergeron, 2016a) how none of these wordings is neutral. On the contrary, each of them is linked to a specific historical, social and epistemic configuration.

In the post-war period, scientists involved in the French public research system pleaded for more attention to be given to science, more scientists, engineers and technicians, more boys and girls embarking on scientific careers. ‘Propaganda’ (*propagande*¹⁰), using modern tools (television, records, etc.), was what they called for. In the 1960s, with the beginnings of the informatisation of society, access to information became a crucial issue. It was then referred to as ‘scientific (and technical) information’ (*information scientifique*) for the general public. In the late 1970s, the overall increase of ‘communication’ in society, together with growing contestation about technical choices such as nuclear, put ‘scientific communication’ (*communication scientifique*) at the forefront. In the 1980s, as a result of the ‘cultural turn’ of society and of the quest of critic scientists for new forms to communicate science, came the moment of the ‘scientific and technical culture’ (*culture scientifique et technique*) concept that would soon be adopted in several other countries, mostly (but not exclusively) Francophone (Delicado, 2010).

Presently, the wording ‘scientific mediation’ (*médiation scientifique*) is the most widely used. In the above-mentioned paper I identified three complementary movements to explain its genesis. First, when considered as the implementation of science for ‘cultural mediation’, it is linked to professionalisation issues. Second, considering its early emergence in the brand new Cité des Sciences et de l’Industrie, the genesis of which involved working groups in which researchers such as Bruno Latour or Isabelle Stengers participated, this wording indicates a renewed way to communicate sciences within a new framework of analysis. Third, considering the general rise of the notion of mediation at the time interpreted by many scholars as a new sort of soft-law device (Briant and Palau, 1999), this idea of ‘mediation’ should be set against the background of a new governmentality of sciences that promote participation.

This history, roughly sketched, led us from the interwar period to the late 20th century. All along this period, concerns for science communication remained active (Bensaude-Vincent, 2010). The term was reformulated, reframed and taken over by different groups depending on the prevalent context and concerns of the moment, to which its changing designation bears witness.

10 In French at that time the word commonly designated advertising.

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Timeline

Event	Name	Date	Comment
First interactive science centre established.	La Casemate, Centre culturel scientifique, Grenoble	1979	Also arguably the Palais de la Découverte 1937
First national (or large regional) science festival.	Aix pop	1973	
An association of science writers or journalists or communicators established.	Association des journalistes scientifiques de la presse d'information	1955	1956: Association des écrivains scientifiques de France (AESF) formed
First university courses to train science communicators.	Université Paris 7	1984	
First master's students in science communication graduate.	Université Paris 7	1984	
First PhD students in science communication graduate.	Perhaps B. Jurdant	1973	
First national conference in science communication.	Colloque de Nice (organised by AJSPI)	1969	1974: National meeting on scientific cultural animation, Grenoble
National government program to support science communication established.		1975	A new strategy to publish scientific information
First significant initiative or report on science communication.	Creation of Palais de la découverte	1937	
National Science Week founded.	Fête de la science (one weekend)	1992	
A journal completely or substantially devoted to science communication established.		19th century	Popular science magazines exist since the 19th century

Event	Name	Date	Comment
First significant radio programs on science.	Regular conferences of scientists	1930s	The <i>Conseil supérieur de la Radiodiffusion</i> , 1937, had a scientific section
First significant TV programs on science.	<i>Visa pour l'avenir</i> [Visa for the Future] was the most significant	1962	Others already existed (e.g. <i>Les bâtisseurs du monde</i> , 1956, or <i>Les médicales</i> , 1954)
First awards for scientists or journalists or others for science communication.	Prix Roberval	1987	
Date hosted a PCST conference.	The very first PCST conference was organised in Poitiers	1989	Organiser was Pierre Fayard
Other significant events.	The creation of AMCSTI	1982	This was the Association of Museums and Centres for the Development of the Scientific, Technical and Industrial Culture

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