Introduction – Towards a Contemporary Historiography of Amateurs in Science (18th–20th Century)

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The last few decades have seen considerable growth in the role played by amateurs in the sciences. With the development of new techniques for collecting information, new virtual networks and the emergence of new problematics calling for the participation of citizens, this role has also become more visible, while the modern boundary between professionalism and amateurism, first erected in the 19th century, has been shaken. These contemporary developments have changed our perspective on amateurs in science and brought forth questions and analyses that sometimes coincide with recent inflections in the history of science.

Thus it is now possible to take a new approach to the historical study of amateurs in contemporary science. This introduction hopes to demonstrate this, while the essays brought together in this volume, some of which explore extreme cases, reveal the very relative nature of the definition of the “amateur” category and how complex and fertile its implementation has been in the history of science.

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A contemporary issue

The recent growth in the role and visibility of amateurs in science has prompted a number of analyses in the sociology and anthropology of science¹ as well as a reflection within scientific disciplines and institutions on the resources afforded by crowdsourcing and by networked sciences, and on the place of the co-construction of research projects and protocols.²

In order to follow the way biodiversity is quickly adapting to climate change, for example, volunteers were recruited with the aim of spreading civic awareness while extending the scope of observation to terrains that neither scientific institutions nor state departments are able to cover on such a large scale.³ In the observation of nature, environmentalist networks have increasingly taken the place of conventional academic networks since the 1960s. In the United States this form of participatory science applied to the natural sciences, which has been known as citizen science since the 1990s, has become a mass phenomenon. For example, the Christmas Bird Count instituted in 1900 by the ornithologist Frank Chapman now benefits from the work of nearly 70,000 observers, thanks to the network and modern resources deployed by the Audubon NGO.⁴ In France Vigie-Nature has been working for more than twenty years with a national network of associations, teachers and students on biodiversity observation programmes coordinated by the Muséum National d'Histoire Naturelle.⁵ As it became increasingly institutionalised, so participative science perfected its methods for collecting and processing data on a massive scale. New ways of valorising amateur practices and recording the results of volunteer research have been invented. In the last few years, participatory methods have entered many new fields.⁶ Where once they were represented in the natural sciences and astronomy, they are now developing in areas that had previously been unaffected, notably health as well as human and social sciences.⁷

These emerging configurations conjure up the figure of an amateur who, rather than aiming to replace professionals, builds up an “ordinary” expertise in his leisure time, in relation to a community that is sometimes virtual. His practice, an important characteristic of which is its freedom, is inscribed

1 Charvolin 2010; Hodges 2013.

2 See for example the synthesis made in 2015 by the ethics committee of the CNRS in France (COMETS 2015).

3 Bœuf/Allain/Bouvier 2012.

4 “Christmas Bird Count: Citizen Science for the birds,” *The Guardian*, December 6, 2014.

5 <http://vigienature.mnhn.fr/>

6 Newman/Wiggins/Crall/Graham/Newman/Crowston 2012.

7 The Reading Experience Database 1450–1945, www.open.ac.uk/Arts/RED/; Inventory of French war memorials, <http://monumentsmorts.univ-lille3.fr/>; Artigo, www.artigo.org.

in a wider movement of the construction of individual identities and benefits from favourable social conditions such as the accelerated dissemination of available knowledge and the growing opportunities in self-training.⁸ But while these new “pro-am”⁹ forms of collaboration undoubtedly constitute a horizon of expectation and a structuring element for many amateur groups, they should not be allowed to overshadow the continuation of more individual forms of amateurism which seek nothing more than the satisfactions of a “serious leisure” activity.¹⁰

Another development observed since the 1960s is the way amateurs have formulated more contestatory and structured discourses and have built up networks working with greater independence from academic institutions. Within these activist movements, the most important of which are concerned with atomic energy and health, amateurs, invoking their new practices and new ideals, call for an autonomous role in the production of knowledge. They want to have their say in the orientation of research, public policies and technoscientific choices. They are putting themselves forward – sometimes under the banner of “citizen science” – as a democratic counterpower to counterbalance academic knowledge and the institutional expertise associated with it. For example, the fifteen years that followed the outbreak of the AIDS virus were marked by the determined intrusion of laymen in the making of scientific knowledge.¹¹ Within a scientific field that was new, unstable and unusually open to public debate, patients, with the help of general practitioners, were able to contest the conditions in which clinical tests were carried out, to make changes in the rules determining the effectiveness of therapies, and to contribute to the creation of alternative laboratories such as Boston’s Community Research Initiative (1987). In this particular context this new form of activism, forged in the contestation of academic science and its methods, contributed to a reassessment of the balance of power between doctor and patient. As a result, the aspiration to the democratic control of science or an individual reappropriation of health gained legitimacy. Since the 1980s, the role of laymen in the health system has grown, leading to a diversification in the way amateurs relate to the medical institution and academic knowledge. Many patients’ associations now help define research priorities, raise new issues based on their experiences, and recruit volunteers for therapeutic studies and epidemiological

8 Weber/Lamy 1999.

9 Leadbeater/Miller 2004.

10 Stebbins 1992

11 Epstein 2001, 225.

surveys. It can be argued that their action has “professionalized” them.¹² In the field of mental illness, for example, some patients’ associations advocate a reinterpretation of the classic scientific analyses of auditory hallucination while others are making their experiential expertise available to psychiatric institutions.¹³ From the survivor to the peer helper, the profiles of patients involved in care and in redefining the priorities and methods of science are far from homogenous, but their role is certainly valorized today.

The potential of the web as regards lay practices, collective content creation (wikis) and activist mobilisation is a factor in the emergence of new forms of association or collaboration between professionals and amateurs. Observers of the digital realm have been both optimistic and worried, engaging in lively controversies. Some have pointed to the threat to culture from the generalization and overvaluing of the figure of the amateur, shaking up the hierarchy of legitimacy among producers of knowledge and the hierarchy of values,¹⁴ while others have emphasised the richness and fecundity of these recent evolutions.¹⁵ What is being weakened through the emergence of “citizen science” and “participative science” within numerous disciplines, which is generating diverse configurations of coexistence, is thus the clear separation of roles between amateur and professional: “it is the question of ‘each according to their role’ that is being overturned.”¹⁶

Amateurs in the age of professionalization: reconsidering a “metanarrative”

What contemporary sociologists describe as the “coronation of the amateur”¹⁷ is part of a pattern present in syntheses concerning the evolution of sciences in developed societies, revealing a disqualification of amateur practices in the 19th and early 20th centuries, combined with the assimilation of certain aspects of popular knowledge within the academic, scientific canon.¹⁸ This pattern centres on the professionalization of the sciences, on the emer-

12 Akrich/Méadel/Rabeharisoa 2009. For an example, see the work by the “Groupe de réflexions avec les malades” (Patient-Staff Discussion Group, GRAM) set up by INSERM (France) in 2003, www.inserm.fr/associations-de-malades/groupe-de-reflexion-avec-les-associations-de-malades.

13 Crossley 2006; Fromentin 2013; Beetlestone/Loubière/Caria 2011.

14 Keen 2007.

15 Flichy 2010.

16 Charvolin 2010, 83.

17 Flichy 2010, 88–89.

18 Carnino 2015.

gence of a salaried research sector in the service of the state and industrial capitalism and on the concomitant development of institutionalized expertise. Political and/or industrial revolutions would thus mark the relegation of a “subaltern and anecdotal form of production of knowledge”,¹⁹ usually confined to collecting and subordinate to the classificatory, experimental and theoretical model of the professional scientist.²⁰ One side effect of this double abstraction of knowledge by a professionalized elite and by theory was to legitimize the rise of scientific popularization as a process of translating a form of science that without mediation had become inaccessible to the general public.²¹ This development is said to have established a clear frontier between producers and consumers of knowledge, thereby opening up a new commercial space that was soon largely filled by professional publicists and/or new publishing genres.²² Hemmed in between the science of the elites and the “science for all”, amateurs lacked space and became marginalised, reduced to the most incongruous objects, constrained to the simplest actions of the collector or confined to a handful of rare disciplines outside the bounds of the academic canon. For some historians, the 19th century marked the death of the amateur scientist. In which case, the technological, political and sociological events to have taken place since the 1960s have marked their resurrection.

There can be little doubt that the image of modern science has to a large extent been built on the demotion of amateurism.²³ Nevertheless, we can observe, well before the contestation of the 1960s and the emergence of militant “citizen science,” forms of collective mobilisation that resisted or opposed the academic world and restored the prestige of the layman and of the knowledge that he possesses or produces. From the “sans-culotte” astronomic science of the Revolution²⁴ to the popular movement for reform of the natural sciences that developed in Germany in the late 19th century,²⁵ the many examples range over a variety of disciplines. In England during the early 19th century, artisans involved with the radical movement enlisted evolutionism to their cause.²⁶ In 1863, Mathieu de la Drôme appealed to all amateur observers in Europe to help prevent the monopoly of academic researchers and build an alternative, popular and republican form of mete-

19 Bonneuil/Joly 2013, 95.

20 Pestre 2006, 53.

21 Bensaude-Vincent 2000.

22 Bensaude-Vincent/Rasmussen 1997, 123; see also Béguet 1990, Belhoste 2006, Chappey 2004, Cooter/Pumfrey 1994, Shinn/Whitley 1985.

23 For a recent example of contestation, see Conner 2005.

24 Bensaude-Vincent 2000, 67.

25 Nyhart 2007.

26 Desmond 1987.

orology.²⁷ Twenty years earlier, François Vincent Raspail called for a profound transformation of the people's relation to medicine by the democratisation of scientific research. He urged individuals to take back control of their own health and encouraged the emergence of a new generation of nonprofessional home nurses.²⁸ Far from disappearing in the 19th and 20th centuries, self-medication was enriched by new theories and practices stimulated by the reaction to the advent of professionalized, technical and commercialised medicine.²⁹ The popular astronomy of Flammarion, as embodied by the Société Astronomique de France, brought together amateurs and professionals and championed an alternative practice to that of the Paris Observatory.³⁰ In France, on the eve of the First World War, amateur archaeologists and prehistorians, organised in learned societies, waged an effective campaign of opinion and lobbied in order to prevent the passing of a law regulating excavations, which would have limited their freedom of research and thereby initiated professionalization in the field of prehistoric archaeology.³¹ The movement to professionalize or restrict the sciences to the academic framework was contested from the outset. As of the early 19th century there were groups that called for participation in the construction of knowledge, the autonomy of subjects and, sometimes, the democratization of science as a correlate or prefiguration of political democratization.

Field sciences, sciences of inventory and observation conducted outside the laboratory always maintained various, complex forms of association or complementarity between amateurs and “professionals”. All were engaged in the production of legitimate knowledge, prefiguring what we now call “participatory science”. To give only one example, the professionalization of meteorology did not lead to the extinction of amateurism in this field, but rather to the renewal of its forms.³² Furthermore, the rise of states, which was conducive to professionalization in the sciences, was also accompanied by the development of “hybrid” sciences, or “action research” sciences in which academic protagonists (“professional” scientists) were often in the minority compared to “experts” who came from other worlds, such as civil servants, members of the associative sector and media people, whom they might consider to be amateurs. This was the case, for example, in the 20th century in the field of the political sciences and opinion studies.³³ As for med-

27 Locher 2006, 69.

28 Blanckaert 1992.

29 Aziza-Shuster 1972; Guillemain 2010.

30 Bensaude-Vincent 1991; Chaperon 1997.

31 Hurel 2007.

32 Morris/Endfield 2012.

33 Blondiaux 2002; Payre/Pollet 2010.

ical and psychological sciences, their particular process of professionalization generated the development of “peripheral” categories — sometimes grouped under the “paramedical” heading — that can, in certain respects, be considered as amateur.³⁴ Generally speaking, it would seem that the new boundaries created by academia also opened up new frontiers for amateurs and led to new confrontations. The parapsychological experiments promoted by spiritist circles in the early 20th century partook of both the movement for lay science and the emergence of places where renowned academic scientists could come together with amateurs.³⁵ Around the year 1900 cosmogony was on the front line of astronomical research and theories formulated by amateurs from military or religious backgrounds strove to compete with the hypotheses formulated by professionals while at the same time breaking free of their norms.³⁶

Analysis of these different aspects of the history of amateur practice developed since the 1960s and the studies are so numerous and so scattered that we would not presume to offer a synthesis. The most that can be offered is a subjective and partial exploration which emphasises the degree to which most of the recent developments in the history of science have opened up prospects for the renewal of a historical subject that may, for a while, have seemed rather old-fashioned.

Bourgeoisie, professions and modern states

In the field of academic history, the first general studies of amateurs in late modern science date from the 1960s. They emerged from two currents of social history: on one side, the history of the “middle classes”, which became a central player in the new economic, political and cultural world that began to emerge in the second half of the 18th century; on the other, the social history of scientific institutions.

In the 1960s social historians began to study the new categories of the urban bourgeoisie, including their specific forms of sociability. In France, the work of Adeline Daumard on the Parisian bourgeoisie³⁷ inaugurated a tradition. Then, in 1977, Maurice Agulhon laid the foundations for a social history of the cultural.³⁸ The learned societies that replaced the academies

34 Edelman 1995.

35 Plas 2000.

36 Fages 2012.

37 Daumard 1963.

38 Agulhon 1977.

and networks of learned sociability characteristic of the Ancien Régime³⁹ were studied as forms of association specific to the middle classes, or in which they were at least strongly present. One of the first synthesis was produced by Jean-Pierre Chaline, a specialist of the Rouen bourgeoisie.⁴⁰ In the same decades, the articulation of the social history of the urban bourgeoisie and the history of amateur scientific practice was also developed in studies of British cities, notably in the industrialized North, where Manchester may in a sense be taken as a historiographic laboratory for these questions.⁴¹ Similar work was later done on other geographical spaces.⁴²

More recently, taking a literal approach to the expression “parliament of science” coined to describe the annual meetings of the British Association for the Advancement of Science in the 19th century and drawing on Habermas’s work on the invention of public space in the 18th century⁴³ while echoing contemporary reflection on the political dimension of participatory or citizen science movements, studies have considered learned societies as places for the structuring of “civil society” and of experimentation with democracy. This reading, which articulates the social history of politics and the history of sciences, has been applied by Philip Nord to the Société d’Anthropologie de Paris under the Second Empire⁴⁴ and by Joseph Bradley to the Russian Empire.⁴⁵ The image of learned societies as the crucible or laboratory of political liberalism is qualified, however, by other studies, which show that these associations could also be a refuge for an aristocracy whose economic and political power was waning as well as the cradle of a backward-looking, politically reactionary discourse. This was the case in the French Société des Antiquaires de Normandie (1824) and the national organisations that it spawned (Société Archéologique de France, 1834; Institut des Provinces, 1839).⁴⁶ This would also seem to have been the case on the other side of the Channel with the Royal Archaeological Institute.⁴⁷

Many monographs on learned societies fit this frame. Special attention has been paid to societies that, in the 19th and early 20th centuries, performed the function of providing national coordination for learned activities. The work done on the British Association for the Advancement of Science is exemplary

39 Roche 1978; Lilti 2005.

40 Chaline 1995.

41 Schofield 1963; Kargon 1977.

42 Sakurai 2013.

43 Habermas 1962.

44 Nord 2013.

45 Bradley 2009.

46 Bercé 1986; Gerson 2003.

47 Vyner 1994.

in this regard.⁴⁸ Similar studies have been made on the Association Française pour l'Avancement des Sciences in France and on the *Versammlung Deutscher Naturforscher und Ärzte* in the Germanic world.⁴⁹ They have revealed very diverse situations, reflecting different national contexts and social hierarchies. Within learned societies there were considerable differences in terms of practice, legitimacy and reputation between amateur elites that enjoyed national and even international recognition, and practitioners whose reputation was strictly local. These differences were in large part a reflection of social class. The learned societies of the 19th century were closed to many amateurs, such as the weaver-botanists studied by Anne Secord,⁵⁰ the self-taught workers analysed by McLaughlin-Jenkins⁵¹ and the modest learned French priests who wrote local monographs, studied by François Ploux.⁵² In the British context, the role of the “gentlemen of science”, which remained a factor well into the 19th century, has been amply documented,⁵³ as have the networks of influence and sociability particular to this learned aristocracy.⁵⁴ The figure of the “grand amateur”, which was in part a creation of the 18th century continued into the 19th.⁵⁵ Some of these remarkable figures left records (printed publications, manuscripts, collections) sufficiently rich to warrant specific studies that, like historical biographies of “ordinary men”⁵⁶, use the portrait as the medium of a “thick description” of a social and cultural milieu, and of its values and practices.⁵⁷

The historiography of the new urban elites can be related to the perspectives developed within the social and political history of the interconnected development of modern states and scientific institutions. Here, the interest in amateurs proceeds from analyses of the professionalization of science.⁵⁸ The explanatory model put forward is formulated, as we have seen, in terms of the extension of the field of state action, of the rise of institutionalized expertise, and of the development of capitalism and the techno-industrial society.⁵⁹ The chronology of these combined developments varies geographically: for example, the movement began early in France, during the Revolu-

48 Morrell/Thackray 1981; MacLeod/Collins 1981.

49 Gispert 2002; Schipperges 1968; Querner/Schipperges 1972.

50 Secord A 1994.

51 McLaughlin-Jenkins 2003.

52 Ploux 2011.

53 Rudwick 1985.

54 Barton 1998; Snyder 2011.

55 Chapman 2011; Guignard 2014.

56 Duby 1984.

57 Cohen/Hublin 1989; Kaeser 2004; Patton 1997.

58 Morrell 1990; Mody 2016.

59 Bonneuil/Joly 2013; Galison/Helvy 1992; Pestre 2015.

tionary and Imperial period,⁶⁰ but appeared later in the United Kingdom and United States, where it started to become evident in the 1880s.⁶¹ But whatever the chronology put forward, these processes confirmed the valorization and professionalization of academic careers, the identification of the “scientist” with the university professor or researcher, and the eminence accorded to the laboratory model.⁶² Since the 1970s many disciplines have been studied on the basis of this schema,⁶³ establishing national and discipline-based chronologies with their turning points and periods of intense activity. In France, for example, the period of the First Empire,⁶⁴ the time of the social, higher education and hygienist reforms of the late 19th century⁶⁵ as well as the creation of the CNRS in 1939⁶⁶ constitute significant moments in most of these histories.

Although distinct, the social history of urban elites and the sociopolitical history of institutions both take as their overall framework of analysis the categories of amateur and professional, the definition of which was forged and stabilised in the very processes they describe. Since the 1980s this bias has been criticised and new perspectives have been opened up. These have been stimulated by fresh developments in social and cultural history, by the development of Science studies and the emergence of Gender studies. The way sociologists and anthropologists view the current emergence of new types of amateurs has also contributed to a change in our approach to the past.

History from below and the spatial turn: local knowledge

Adopting a point of view “from below”⁶⁷ or “at ground level”,⁶⁸ attentive to the representations and agency of amateurs themselves, a new social history of science insists on the need to consider opposing pairs such as “amateur/professional”, “layman/scientist”, “popular/academic” not as overarching categories implicit from the start in any analysis, but as the product of conflicts, negotiation and compromise between categories of actors in a given

60 Geison 1984; Fox 2012.

61 Reader 1966; Sanderson 1972; Reingold 1976; Lucier 2009.

62 Ben-David 1977; Engel 1983; Fox/Weisz 1980.

63 For example, Allen 1976 [1994], Chapman 1998, Keeney 1992, Levine 1986, Price 2006, Saint-Martin 2008, Williams 2000.

64 Dhombres 1989.

65 Keylor 1975; Bourdelais 2001.

66 Picard 1990.

67 Thompson 1963; Hobsbawn 1985; Cerutti 2015.

68 Ginzburg 1981; Revel 1989 and 1996.

context. Also inspired by Science studies and notably by Bruno Latour's propositions about science as a social construction resulting from interactions between highly diverse actors,⁶⁹ this conception focuses on the construction of the demarcation between antagonists – “boundary work”⁷⁰ – and puts forward new concepts, such as theoretical or material “boundary objects” around which conflicts and collaborations crystallise.⁷¹ In this volume, this problematics is at the heart of the reading of the “Chacornac affair” proposed by Volny Fages. It is also evident in Loïc Casson's text about the careers of several French entomologists around the year 1900, in Philippe Le Vigouroux and Gabriel Gohau's study of Wegener and his theory of continental drift, and in Claire Gantet's analysis of German psychology in the late 18th century.

Another source of renewal was the importation into the social history of science of what has been called the “spatial turn” in historiography.⁷² The categories used to designate amateurs in science are considered to be by essence relative to a context that is not only historically but also geographically situated. The “pub botanists” studied by Anne Secord could exist only where public houses had a social function that had no equivalent outside the United Kingdom, and in a geographical zone that had an elite of educated workers enjoying the autonomous management of their time: the peri-urban zone around Manchester where the modern textile industry provided qualified weavers with work, based on the domestic system.⁷³ No doubt, the situation described in the environs of Manchester during the first two thirds of the 19th century could not have been transposed as it was to other British regions, let alone exported beyond national borders. “Pub botany” was indeed ephemeral and disappeared with the decline of the domestic artisan system and the emergence of new places for the circulation of scientific information and for the regulation of amateur practices that began to compete with the pubs. To take an example from another national context, in France during the same period the canuts, the silk weavers of Lyon, constituted a geographically concentrated milieu of master artisans and qualified workers. This group was well structured by mutual associations and had a high level of education conducive to the emergence not only of political causes and practices, but also of knowledge about political economy, which can be seen as an “amateur” discourse when compared with the ones produced by

69 Latour 1995.

70 Gieryn 1983 and 1999.

71 Griesemer/Star 1989; Trompette/Vinck 2009.

72 Livingstone 2003; Finnegan 2008.

73 Secord A 1994.

national scientific institutions such as law faculties, the Conservatoire National des Arts et Métiers and the Académie des Sciences Morales et Politiques.⁷⁴ The specificity of this working men's milieu, in space and in time, is just as great as that of the weaver-botanists around Manchester. In an article about the amateur naturalists and professional biologists in Yorkshire during the late 19th century,⁷⁵ Samuel Alberti regrets the lack of a transregional synthesis, while spotlighting the degree to which the situations described depended on the field that amateur natural scientists could explore and the way in which the professionalization of sciences came about at the local level.⁷⁶ Just as the conditions for amateur naturalists in the American West during the 19th century differed from those of naturalists on the East Coast,⁷⁷ so, Alberti points out, the relations between amateurs and professionals in the North-East of England was locally determined by the network of long-established learned societies (the Yorkshire Philosophical Society was founded in 1822), but also by the absence of an old university centre and by the belated emergence of places for the professionalization of biologists. In Leeds and Sheffield the creation of civic colleges was instigated by the same social categories and often by the same men as those who formed the elite of amateur learned societies. These individuals both oversaw and promoted amateur practise and argued for the development of theoretical teaching in establishments of a technical and professional nature that would, in the medium term, enable them to be transformed into universities. At the instigation of these amateurs, therefore, academic posts were created for professional biologists whose presence would make it necessary to redefine the frontiers of amateur practices and the legitimacy of the knowledge they produced.

Local amateur science thus took varying forms, depending on whether or not the territories where it developed were endowed with professional scientific institutions. It tended to prosper more in areas that were remote from academic centres of power.⁷⁸ For example, works on the sciences in colonial French Africa have revealed the contrast between the freedom for manoeuvre and the prestige enjoyed by colonial administrators when in the field, far from the metropolis, and the obstacles they came up against when they tried to gain recognition from scientific institutions in the metropolis.⁷⁹ In his study of the practitioners of electrotherapy in the late 18th century,

74 Frobert 2010; Bouchet/Bourdeau/Castleton/Frobert/Jarrige 2015.

75 Alberti 2001.

76 Naylor 2010.

77 Benson 1986; Kohlstedt 1976.

78 Matagne 2007; Hewitt 1988.

79 Sibeud 2002.

which seriously challenges the usual binary opposition of “irregular” and “official”, Zanetti clearly shows how the Abbé Sans established himself on the competitive medical market by moving to Versailles, out of reach of the medical faculty in Paris and the Société Royale de Médecine. His topographical trajectory was thus one with his scientific marginalisation.⁸⁰ The case of the Abbé Sans can be compared to that of Jean Chacornac, described by Volny Fages in this special issue. His withdrawal from Paris to the Lyon region can be seen as the geographical translation of his de-legitimation as an amateur in the sphere of French astronomy. Loïc Casson emphasises the numerical weight of provincials among the amateur members of the Société Entomologique de France around the year 1900. This geographical distribution of French amateurism, which points up the contrast between a more professionalised Parisian academic centre and provincial areas more conducive to amateur practices, can be observed in most of the national learned societies that were open to amateurs in the same period.⁸¹

Furthermore, recent studies show that amateur activity helped consolidate the sense of local identity⁸² and to articulate scientific discourse and political agendas at a regional or municipal level. In France, much is known about the role of learned societies in the invention of a Breton identity and in the emergence of a regionalist movement.⁸³ More generally, Gerson has shown the complex articulation of knowledge and political ideas at a local level.⁸⁴ Louise Miskell has demonstrated how the annual meetings of British learned societies helped strengthen urban identities in Victorian England,⁸⁵ and Finnegan has considered similar questions for Scotland.⁸⁶ For the United States, Thomas Bender has shown the importance of the promotion by urban elites, including amateurs, of places of science, education and culture in the long-term construction of a specific New York identity.⁸⁷ In showing how science is as much local as universal, these studies emphasise the fact that the dispersed nature of the historiography of amateurs, as evoked above, is as much a matter of structure as of conjuncture.

80 Zanetti 2011.

81 For a comparison, Soulier 1993.

82 De L'estoile 2001.

83 Guiomar 1987.

84 Gerson 2003.

85 Miskell 2013.

86 Finnegan 2009.

87 Bender 1987.

Intermediary knowledge and categories

The attention to various intermediary categories has also helped renew the historiography of amateurs.

Histories of the codevelopment of states, industry and professional science reveal, among other aspects, the new importance of experts, a category which complexifies the division between amateurs and professionals, and about which much has been recently written.⁸⁸ Already evident in the early modern period, the role of experts has increased with the extension of domains of intervention by public authorities and the growing articulation of research and industry. In the 19th century their profile changed. Whereas during the first two thirds of the 19th century the experts who sat on national and local committees were mainly professional scientists, holders of academic positions, another body of experts was gradually formed in the industry and in the administration. These new experts were linked to the bureaucracy, their professional activity did not take place in universities or research laboratories, and their ethos and *habitus* differed from those of academic scientists.⁸⁹ Around the figure of the expert new collaborations developed, but also rivalries and contestations concerning either the legitimate production of theoretical knowledge or the legitimacy of expertise itself. In the first instance, these rivalries pitted academic scientists against bureaucratic experts, for example in the production of theoretical knowledge about the social. The holders of academic positions could, in this instance, claim sole ownership of the “professional” label and thus relegate the “experts” to the camp of illegitimate producers of theoretical science, alongside the “amateurs”. In the second case, the assertion of expertise itself became a territory of contestation between groups born of civil society (which can be described as amateur) and “official” experts in companies and administrations. Since 1950, the return to prominence of amateurs on the scientific and social scenes has been bound up with such conflicts of legitimacy. For example, the exposure of certain workers to poisons and chemical products – lead, asbestos, nuclear, pesticides – spurred much civic and scientific activism on the part of groups who thus acquired the status of a political opposition.⁹⁰ In such cases, the amateur/professional antagonism is less between amateur and professional scientists than between amateurs and professional experts.

88 Vandendriessche/Peeters/Wils 2015 is one of these recent examples.

89 Kohlrausch 2014; Rabier 2007.

90 Thébaud-Mony 2014.

Like ethnographic observation of “laboratory life”,⁹¹ the social history of scientific institutions and of major infrastructures highlights the contribution of numerous nonscientific agents to the production of academic science. Some of these are nonhuman (animals, instruments, etc.), others are the subjects of experiments, and still others constitute categories of intermediate actors who definitely come within the category of science “professionals” but are not considered as legitimate producers of scientific knowledge. On this point, attention has been focused, notably, on personnel in the big observatories⁹² and the way in which the autonomy and subjectivity of these human actors were reduced or denied in order to ensure – in theory, at least – the “objectivity” of the data that they produced and the reproducibility of the repeated operations that they carried out.⁹³ Although employed by scientific institutions, these intermediary agents have thus not been seen as professionals of science and have in most cases been consigned to its “invisible” margins.⁹⁴ The case of the entomologist Maurice Maindron, who was in charge of classifying collections at the Muséum national d’histoire naturelle and given the mission of collecting specimens, shows that access to these intermediary categories can represent a career opening or a promotion for amateurs (see Loïc Casson’s article in this volume). Conversely, when they venture onto the terrain of the autonomous production of theoretical or synthetic knowledge, the legitimacy of these intermediary agents is usually contested by academe and they are relegated to amateur status.

A number of these “assistants” employed by scientific institutions have come to the fore in recent studies, showing how difficult it is to draw the limit between amateur and professional scientists. Should specialists in embalming, morgue personnel or laboratory assistants be considered actors in the history of health on the same level as qualified doctors?⁹⁵ A recently studied example concerning field sciences and a specific category of “helpers”, that of illustrators, involves the German ethnographer Leo Frobenius, who went on numerous missions to Africa between the World Wars. On the field he was accompanied by artists, young women trained at art school who were paid by his Institut für Kulturmorphologie in Frankfurt. Their job was to make copies of prehistoric or ethnographic artworks. These copies constituted a collection for scientific and artistic use which was exhibited in major Western museums during the interwar years, from the Musée de l’Homme

91 Latour/Woolgar 1988.

92 Dick 2002; Lamy 2007; Aubin/Bigg/Sibum 2010.

93 Schaffer 1988.

94 Morus 2016.

95 Carol 2015; Bertherat 2002.

in Paris to the Museum of Modern Art in New York. However, the artists who produced these pieces are not seen as co-authors of Frobenius's ethnographic science.⁹⁶ Yet could they not ultimately be seen as amateur ethnographers?

Studies of the “scientific revolution” of the 17th century and of the interrelation between modern states and industry, highlighting the progressive emergence of “technoscience”,⁹⁷ have emphasised the porosity of the frontiers between theoretical science and applied science, a porosity such that trying to distinguish between them may be illusory. The circularity of the relation between practical and theoretical knowledge has made it possible to relate the two fields of the history of science and the history of technology and to put the emphasis on the contributions made to the elaboration of theories by craftsmen or technicians. The knowledge of artisans – what Robert Halleux has called the “knowledge of the hand” – has consequently been re-evaluated.⁹⁸ The crucial importance of the technical craft of instrument makers has been brought to light as well as that of gestural and experiential knowledge, known as the “techniques of the body”.⁹⁹ The histories that focus on these forms of knowledge often emphasise collaboration and circulation. The biographers of Charles Darwin, as well as the editors of his letters, have stressed the importance of his exchanges with breeders and horticulturalists in the elaboration of his concept of natural selection, inspired by that of artificial selection.¹⁰⁰ However, such smooth relations between field workers and technicians on one side and scientists on the other are not necessarily the rule.

The history of health practices, notably, is dotted with numerous conflicts between marginalised practical workers and other actors legitimised by their training, by their reference to a theoretical framework and by legal monopolies on remedies and caring.¹⁰¹ While dissidence towards medicalization generated a history of competitive and alternative practices,¹⁰² the more recent historiography nevertheless shows more clearly the convergences or interrelations between professionals and illegitimate or illegal practitioners. In his study of the new paths of medical history, Burnham suggested we consider the points of contact, the processes of imitation between the two groups, as much as the procedures of exclusion and the signs of the extinction

96 Georget/Ivanoff/Kuba 2016.

97 Pestre 2015.

98 Halleux 2009; Hilaire-Pérez/Simon/Thébaud-Sorger 2016.

99 Smith 2004; Schaffer 1997; Sibum 1998.

100 Desmond/More 1992.

101 Léonard 1980; Ramsey 1980; Porter 1988.

102 Faure 2016.

of nonacademic knowledge and practices.¹⁰³ Several studies emphasise that for a considerable part of the 19th century neither theoretical rationalisations nor practices clearly differentiated between doctors trained in the academic schools and the empiricals who were roundly condemned. Religious care workers, whatever their status – almoners or nuns – are now perceived by historians as auxiliaries rather than as competitors of medicalization, and the frontier between learned medicine and religion proves fairly porous.¹⁰⁴ By reconsidering the place of marginalized actors, the history of health practices thus plays an important role in restoring the centrality of intermediary categories that are sometimes relegated to the ranks of the amateurs.

Studies of these highly diverse intermediary categories show just how problematic is the attempt to draw a clear distinction between amateurs and professionals in the history of science. Between these two extremes are numerous figures that may, depending on the situation or moment, tend towards one or the other of these categories. Noticed for his talents as a draughtsman, Chacornac, a self-taught amateur, joined the Paris Observatory, where he reached the grade of titular astronomer before again being demoted to amateur status (see the article by Volny Fages in this volume). In certain fields and in certain periods, like entomology in the early 20th century (Loïc Casson's paper in this volume), the categories of amateur and professional turn out to be so imprecise that it is almost impossible to make them effective.

A material history of knowledge

Another consequence of the interest in all the categories of actors engaged in scientific activity has been to draw attention to the material conditions of the production of scientific knowledge, to instruments, practices and gestures, as well as to the places where they are enacted. Each of these perspectives has repercussions for the history of amateurs.

The question of the instruments and the technical expertise that make it possible to fashion and use them leads to the consideration of forms of knowledge that appear as particularly favourable to the development of scientific amateurism. In astronomy, for example, the construction of instruments, which was a practice shared by amateurs and professionals in the 19th century, became typical of amateur astronomy after 1900 (see the article

103 Burnham 2005.

104 Guillemain 2006; Faure 2007; Léonard 1977.

by Volny Fages below). In the 19th century, as attested by the multiplication of journals dedicated to this subject, photography constitutes another of these technical areas privileged by amateurs. It proved its use in several scientific fields. Photography was, for example, a promising technology for recording historical and patrimonial traces and as such contributed to the development of archaeology and local history.¹⁰⁵ Astrophotography was an amateur invention and practice that played an important role in the development of this science since the mid 19th century.¹⁰⁶ Open to all kinds of practical inventions, electricity was also a field in which practical skills and theoretical knowledge were densely interwoven and in which large numbers of amateurs were involved. The same was true of radio at the turn of the 20th century. Several historians have thus underscored the connections between knowledge linked to DIY or gardening and the amateur practice of science.¹⁰⁷

In a similar perspective, studies of the laboratory environment have prompted analyses of field work and the specific practices that it marshalled.¹⁰⁸ These have brought to light two models for the practice of science – experiment and survey or collection –, but they also underline the distribution of roles in several disciplines between two hierarchized categories of producers of knowledge, with laboratory scientists usually being professionals and field investigators/collectors frequently being amateurs. This distribution began to disappear in the interwar period in a number of disciplines and national contexts.¹⁰⁹ In ethnography, for example, it disappeared when field experience was redefined as an initiatory step in the training of professionals.¹¹⁰ For metropolitan archaeologies, amateur field work declined with the inception of legislations that rendered excavations subject to administrative authorisation.¹¹¹ But it was maintained or reactivated in other instances (nature sciences, astronomy, national archaeology in certain countries such as the USA) in which the role of collecting mass data (big data) was delegated, usually in a standardised and institutionalised way, to amateur observers. Special attention has thus been paid to the history of amateur collecting and fieldwork¹¹² and to the collections resulting from these practices.¹¹³

105 Edwards 2012.

106 Guignard 2014.

107 Curry 2014.

108 Kohler 2002; Blanckaert 1996.

109 Debaene 2010.

110 Sibeud 2002.

111 Gaucher 2004; Hurel 2007; Price 2006; Smith 2009.

112 Coye 1997; Drouin 2011; Kuklick/Kohler 1997; Richard 1991.

113 Knell, 2000; Corsi 2008.

Amateurs in spite of themselves? Women and science

Work on gender has raised complementary questions regarding the invisible producers of knowledge, the barriers and social and cultural hierarchies within the world of science as well as know-how, practices and the places of scientific activity. Parallel to the development of the history of women and the publication of the first syntheses on the subject,¹¹⁴ the 1980s saw the emergence of studies on the history of women in science.¹¹⁵ Although the situations differ from one discipline and period to another – the Nazi regime, for example, promoted the integration of women into the academic professions¹¹⁶ –, these studies have revealed elements that have shed light on and renewed the debate on the role of amateurs in science, both men and women.

The first of these elements has to do with the difficulties encountered by women in several periods and in most Western countries in trying to enter academic institutions and attain professional status. Collective histories have shown just how exceptional were the careers of atypical figures such as Marie Curie and pioneers such as Madeleine Pelletier and Constanza Pascal in the field of psychiatry.¹¹⁷ The history of women in science is thus often a history of amateurs. More particularly, it shows the diversity of the situations experienced by amateurs both female and male: from an amateurism embraced for political or militant reasons, up to an “amateurism by choice” (as a hobby often related to class identity, or as a choice for independence from institutional constraints) and up to an imposed amateurism (“obligatory amateurism”).¹¹⁸ The article by Rémy Amouroux in this volume provides an illustration of this. Anne Berman, a pharmacist by profession, chose to become the personal secretary of Marie Bonaparte and devoted her activity to the dissemination of psychoanalysis in France. At the same time, her position prevented her from attaining the status of recognised translator of the works of Freud and she suffered the drawbacks of her status as an amateur, even though she had chosen it. For the politician Marcel Sembat, argues Jacqueline Carroy in this volume, psychology appears to have been a kind of hobby. He chose to practice it as a private activity and not to venture onto the terrain of the professionals despite requests for articles from scientific journals.

114 Duby/Perrot 1991–1992.

115 Abir-Am/Outram 1989; Kohlstedt 1999; Rossiter 1984–2012; Carroy/Edelman/Ohayon/Richard 2005.

116 Vogt 2005.

117 Gordon 2006 and 2013; Coffin 1992.

118 Bailey Ogilvie 2000; Smith 2000; Pomata 2013.

A second outcome of the study of women in science is that it brings out the many different categories of actors, often invisible and sometimes silent ones, who are involved in the production of knowledge. Some of these categories were recognised and integrated, as we have seen, into recent social histories of scientific institutions: women are more numerous among illustrators, among the collaborators of laboratories, among those tasked with collecting field data, among the practitioners in charge of disseminating norms and guidelines elaborated by scientific institutions, among the administrators of research.¹¹⁹ Some of these women belonged, however, to categories that were even more invisible, and contributed to science in more informal and private manners. While the central role of nuns and nurses in the field of care is well known, the role of women with very diverse statuses in medical data collection and in the elaboration of knowledge about illnesses is much less so.¹²⁰ Work on “couples in science” has revealed the role of spouses as collaborators and private secretaries.¹²¹ Anne Berman, discussed in this volume, occupied this kind of position. Private secretary to Marie Bonaparte, she also became the secretary of the French psychoanalytic association and played a not inconsiderable role by working “invisibly” alongside Marie Bonaparte,¹²² a practitioner who was herself a lay person, in a period when the Freudian movement was asserting its secular, lay character compared to doctors and religious orders.

The history of women in science also revealed the existence of niches where women’s practices and professional careers are considered more legitimate. These privileged, even exclusive spaces are linked to the collective representations of the feminine and the role of women in society. Thus, scientific specialities linked to children became a field open to women’s careers as of the late 19th century: leading figures could come to the fore in certain disciplines, such as pedagogy, in which Maria Montessori is an extreme case.¹²³ Now, these niches of activity are not found only in professional science, but also in women’s amateur practices. Several studies of the 19th century have thus brought out the complex cultural factors conducive in certain countries to female practice of the natural sciences, from the belief that women were closer to nature to Rousseau’s legacy of a moral pedagogy based on nature and to Protestant natural theology.¹²⁴

119 Fussinger 2005; Topalov 2015, p. 177–216 and 257–285.

120 Loison 2015.

121 Abir-Am/Pycior/Slack 1996; Lykknes/Opitz/Van Tiggelen 2012.

122 Amouroux 2012.

123 Babini 2014; Babini/Lama 2010.

124 Norwood 1993.

The historiography about women in science thus reveals the possible existence of “sciences for amateurs” in which the dependence on the collection of data or field surveys is crucial and for which, at the same time, this act of collecting and surveying can be delegated. These include astronomy, botany, zoology, geology and archaeology. In some of these fields, amateur practice was even institutionalised and monitored from a very early stage, either via learned societies led by professionals, which organised amateur collaboration,¹²⁵ or in the form of protocols put in place by scientific institutions or administrations. For example, in the 19th century the organisation of meteorological data collecting in France used the network of public teaching establishments.¹²⁶ For the transit of Venus in 1882 the main European observatories sent out expeditions and suitable equipment to sites where this astronomical phenomenon could be observed, and in some cases the equipment was left there and would be used to found new institutions. In certain places, however, “professional” expeditioners and local authorities also mobilised the general press in order to foster amateur contributions and increase the number of observations.¹²⁷ French entomological circles around the year 1900, as described in this volume by Loïc Casson, were structured in such a way as to favour the mobilization of numerous amateurs, brought together in the Société Française d’Entomologie. Claire Gantet’s and Jacqueline Carroy’s articles in this volume put forward the unusual hypothesis that psychology and, more generally the sciences of the mind, can also be viewed as a “science for amateurs” because of the emphasis it places on self-observation and experiential knowledge.

As the introduction to a recent publication points out, another consequence of the historiography of women has been to reveal that scientific activity takes place elsewhere than in public and academic contexts, in “surprising places” that are often private and domestic.¹²⁸ From the garden and the garage to the kitchen and the nursery, practices were founded on traditional forms of knowledge or on experience, sometimes enabling their protagonists to emerge as science amateurs, or even to constitute structured networks.¹²⁹ Treatises on self-medication, which continued a centuries-old tradition into the 20th century, delineated a form of family medicine organised by mothers, and were the work mainly of women who were not trained in academic medicine and who drew their legitimacy from their domestic

125 Diagre-Vanderpelen 2014.

126 Locher 2008.

127 Rieznik 2010 and 2010.

128 Von Oertzen/Rentetzi/Watkins 2013; Opitz/Bergwik/Van Tiggelen 2016.

129 Glazer 1990; Maines 2013; Von Oertzen 2013.

experience. These publications allowed them to occupy a terrain that had been left to them.¹³⁰ Several of the articles in this volume evoke amateur practices in private spaces. Jacqueline Carroy's text on Marcel Sambat contrasts the public figure of the politician and the private one of the amateur psychologist. Observing his own behaviour in the bedroom or at his work-table, Sambat formulated projects and scientific notations that remained in the register of the private self. When he was stripped of his functions at the Paris Observatory and relegated to amateur status, Chacornac continued to practice astronomy in private, at his home in Villeurbanne, where he built a powerful telescope (see the article by Volny Fages).

In the Anglo-American world, where from the outset popularisation was not the preserve of specialist authors, who were often men who had received a scientific education, the historiography of women in science also reveals that they may have been limited to forms of expression on the margins of science (popularisation, but also illustration, militant discourses in favour of the protection of nature). Most of them did not even have access to the publications of learned societies open to their male amateur counterparts.¹³¹ Works on women's writings in science place the emphasis on the hierarchy of publishing genres, but also on the styles of writing and on rhetorical choices: generality as opposed to speciality, analogy as opposed to comparison, layman's language as opposed to mathematical formalisation or technical vocabulary, linear narrative as opposed to nonnarrative description, "literary" style as opposed to the aesthetic neutrality of learned writing, first-person writing as opposed to the abstraction of the author, may all be signs or stigmata of amateurism.¹³² Studies of the writing of science and the circular relation between science and literature have addressed these questions,¹³³ but the role played by style in the construction of a demarcation between amateurs and professionals is to a large extent unexplored. Anne-Gaëlle Weber's article about ornithology in this volume centres on this problematic and reveals its resonance. Other texts here also address it. Jacqueline Carroy emphasises that autobiography can be a modality of amateur science writing. The example of Anne Berman's adds a genre, translation, to the list of types of discourse accessible to amateurs.

130 Guillemain 2013.

131 Gates 1998; Gates and Shteir 1997; Lightman 1997; Shteir 1997.

132 Plas 2014.

133 For example, Class 2014, Marchal 2013.

Scientific cultures

Since the 1980s, the history of amateurs has also benefited from the perspectives introduced into the history of science via cultural history. To the depiction of the socio-economic and political context of the production of knowledge has been added the study of science as a cultural phenomenon. The inclusion of the word “culture” in the title of several Anglo-American studies manifests this new dimension.¹³⁴ Bearing on learned practices and sociabilities, relating the production of knowledge to its cultural background, these works have given a new, wider meaning to the expression “science in context” first promoted by the new social study of science in the 1960s.¹³⁵ Putting the emphasis on the circulation and popularisation of knowledge, these works engage with the question of amateurs in a number of ways.

The focus on the circulation of knowledge has meant that closer attention has been given to “popular science”, to the media and to the public of science.¹³⁶ Many studies have thus looked at print media and the popularisation of science. They have studied the creation of specific discourses designed for lay readers and, relating the histories of publishing and reading, have addressed the question of literary genres, book series and the specialised press, in connection with editorial and commercial strategies.¹³⁷ In addition to the study of the print medium, research has looked at other means of bringing science to a broader public. Museums and exhibitions have attracted new attention while places long left outside the field of the history of science have been studied, among them zoos, fairground museums and theatres, from the most prestigious to the most modest and ephemeral.¹³⁸ The importance of these places was emphasised in relation to the effectiveness of visual devices in the large-scale dissemination of scientific information, in contexts of widespread illiteracy. But they have also been considered as crucial loci for the articulation and promotion of scientific and sociopolitical discourses.¹³⁹

Sometimes endorsing Michel Foucault’s legacy¹⁴⁰ and echoing studies of “political cultures” by political scientists and historians of politics, these works reconstitute specifically modern cultures that are historically, socially and geographically situated. Professional scientists, amateurs and members

134 Jardine/Secord/Spary 1996; Knell 2000.

135 Lightman 1997.

136 Topham 2009.

137 Bensaude-Vincent/Rasmussen 1997; Lightman 2007; Secord, 2016.

138 Blix 2008; Delbourgo 2006; Gere 2009; Gordon 2009; O’Connor 2007; Morus 1999; Pirson 2009.

139 Blanchard/Bancel/Boëtsch/Deroo/Lemaire 2002; Nyhart 2009; Spary 2000.

140 Jardine/Secord/Spary 1996.

of the general public all participate (in varying degrees and in modalities that are more or less pacified) in these “scientific cultures”, in which science helps structure common, political visions of the world and of society. Some have called these sociocultural configurations “ecologies of knowledge”.¹⁴¹ But whatever the vocabulary and theoretical framework chosen, these studies all emphasise the fact that the audiences are never passive receivers, that science is always appropriated and becomes part of an inseparably social and cultural dynamic of “meaning-making”, to borrow a phrase from the new cultural sociology.¹⁴² James Secord’s 2001 study of the publication, circulation and reception of a best-seller, *Vestiges of the Natural History of Creation*, in mid 19th century England, provides a striking illustration of the social and local diversity of interpretations and appropriations of science.

In the circulation of scientific information and in the meaning-making processes, the role of amateurs seems important. They form a socially and culturally intermediate category, between the elites and popular classes, between professionals and laymen, and they often play the role of mediator and intermediary. In order to encourage popular interest in science, they may sometimes be put forward as emblematic figures or as models.¹⁴³ In some areas, they are in close contact with groups that are remote from academic knowledge and can familiarise them with science. Starting, the role of primary school teachers since the 19th century, and that of secondary school teachers since the 20th, could be studied in this light. Lynn Nyhart’s study on the role of primary schools in disseminating a political message about nature in Germany at the end of the 19th century bears witness to this.¹⁴⁴ Likewise, Philippe Le Vigouroux and Gabriel Gohau’s article in this volume shows the importance of secondary school teachers in the reception and dissemination of a theory that was never fully accepted and was soon rejected by academic circles. Claire Gantet’s paper shows the links that existed in late 18th-century Germany between teachers and the promotion of a psychology open to lay practitioners.

However incomplete, this historiographical survey demonstrates, we hope, the richness and diversity of the perspectives that open up for a history of amateurs responding to the most recent advances in the history of science. Some of the themes put forward in this introduction have already been thoroughly explored; others can still be considered as directions to be pursued. Many of them, in any case, are evoked in the articles brought together in this

141 Pandora 2001.

142 Spillman 2002.

143 Pandora 2001.

144 Nyhart 2007.

volume. The very diverse situations that they describe inspire this conclusion which is also an overture.

Writing the history today – a subjective cartography of scientific amateurism

The case studies that follow show – if that were necessary – that it is impossible to talk about amateurs as if they were a unified group. Some of them – the astronomer Chacornac presented by Volny Fages, most of the entomologists discussed by Loïc Casson, several upholders of Wegener's theory, presented here by Philippe le Vigouroux and Gabriel Gohau – had their amateur status imposed on them, while others, such as Marcel Sembat (presented by Jacqueline Carroy) and, with a slight caveat, Anne Berman (presented by Rémy Amouroux) deliberately chose the layman's position and thus accepted semi-invisibility in the field of science. Moreover, whether victims of academicism, or pioneers of parasciences and explorers of new margins, or hobbyists, amateurs are also not socially static: as the articles by Claire Gantet and Volny Fages show, some of them moved quite freely within the scientific arena. These figures allow us to think about the range of possibilities, both synchronously and diachronically, from an amateurism induced by the professionalization of science and the tightening of disciplinary boundaries, on the one hand, to an amateurism closer to a militant commitment or chosen pastime, on the other. The quest for “missing links” in the historical narrative, notably for the period from the 1850s to the 1950s, could stimulate research and lead to the writing of a new diachronic narrative including all actors of science and transcending the division into disciplines.

The heterogeneity of the experiences evoked in this volume also argues for an approach “from below”. The reconstitution of the figure of the amateur resisting the hegemony of knowledge and academic institutions is paralleled by a new interest in “the forms and places of encounter and negotiation” between high and low.¹⁴⁵ The focus at the micro-historical level on situations of distinction between amateur and professional seems a fruitful method in order to objectify processes by which actors establish boundaries through micro-negotiations. Now, these boundaries, which as we have seen are extremely porous and mobile, are also founded on representations that a new history of amateurs could call into question. The way in which amateurs

145 Cerutti 2015, 943.

position themselves on a subjective map of the sciences could thus constitute a promising research focus.

Recreating the viewpoint of amateurs on the science they practice, on the social world that they inhabit, on their own identity as scientists as well as on their relations with those they define as professionals and with those they consider as illegitimate amateur scientists (tourists, suppliers of information or objects, producers of knowledge located lower in the social hierarchy, etc.) is a challenge which implies that historians revisit the classic sources and invent new ones. The documentation produced by learned societies (archives and publications) could be reinterrogated in this regard. Indeed, amateurs' discourses about themselves are as old as the social structures that enabled them to train, practice, publish and exist collectively since the mid- or late 18th century. Modern learned societies, like the most prestigious national institutions, have produced abundant memoirs and histories of their own activity and their members. Their journals are rich in obituaries whose function is similar, for amateurs, to those of academic eulogies.¹⁴⁶ These associations' anniversaries and jubilees also provided the opportunity to stage collective identities, while historical retrospectives constructed pantheons of founders and tutelary figures, often local, which only partially overlap with the national or international pantheons constructed within academe. As dispersed as the associations from which it emanates, this internalist and presentist literature has not been studied in depth. Yet, just like the discourse of the same kind produced by professional academic institutions, it constitutes a precious source for the study of ways in which amateur groups establish and stabilise, locally and provisionally, methods, ethos and *habitus*, normative ideals of the science practised, and collective identities.¹⁴⁷ However, reconstituting the history of amateurs by adopting their own viewpoint also implies inventing new sources and taking full advantage of correspondences and private writings – as Jacqueline Carroy does for Marcel Sembat and Anne Gaëlle Weber does for American ornithologists – in order to reveal, for example, the subjective part of amateur scientific work.

To write a history of amateurs in science today, reflecting recent developments in the historiography and sociology of the sciences and engaging with the contemporary challenges posed by the new “citizen science” movements, would therefore imply not only going back to little-known actors and putting their experience in context, but also, as much as possible, recapturing their voices.

146 Belanger 2002; Ribard, 2006.

147 Richard 2016.

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