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The Amateur Scientist's Workshop (1800–1950)

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1 *The Amateur Scientist's Workshop (1800–1950).*

2 A History through Objects

3 Presentation of the Nuncius magazine dossier, *Nuncius* 39 (2024) 1–9.

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5 Hadrien Viraben, post-doctoral fellow for the ANR project “AmateurS

6
7 This special issue looks at the history of science as practiced by amateurs during the
8 nineteenth and twentieth centuries. Our approach to these scientific activities privileges objects
9 as material and visual sources. As readers will note from the articles, the topic is
10 interdisciplinary in nature: first and foremost, because the extremely varied field of amateur
11 hobbies appeals equally to historians of science, the arts, or sports, as well as to social and
12 cultural historians. Amateurs themselves are versatile enthusiasts with a wide range of tastes.
13 They may also assume different identities via their practice: as layman, a member of a learned
14 society, an independent investigator, or as one challenging professional science. The history of
15 scientific amateurism therefore extends the history of scientific production to socio-cultural
16 dynamics that go beyond the boundaries of legitimate science.

17
18 Regarding our choice of an object-based approach, the idea of apprehending the history
19 of science through its materiality emerged in the 1980s with science and technology studies,
20 and in contact with adjacent disciplines such as sociology and anthropology, as well as
21 archaeology and the history of art.¹ This is not the place to retrace the history of this endeavour
22 which broke with a history of science assimilated to that of ideas and concepts, and expanded
23 the field of enquiry to spaces, objects, and practices, in short to science considered as doing

¹ See for exemple Jérôme Lamy and Arnaud Saint-Martin, “Un dilemme pratique: sociologie et histoire des sciences au prisme des STS,” *Carnets de bord*, no. 14 (2007): 52–64.

24 learned work.² Nevertheless, among the various strands initiated by such approaches, mention
25 must be made of those of particular significance here.

26 Applied to learned objects, these lines of enquiry have renewed the traditional history
27 of scientific instruments,³ and unearthed hitherto ignored sources: laboratory and field
28 notebooks, and series of figures, graphs, maps, drawings, and photographs forming a scientific
29 imagery of ever greater scale, together with three-dimensional models, preparations, scientific
30 collections, and so on and so forth. These sources, no longer envisaged as unmediated
31 apprehensions of nature, thus point towards an extensive material of constructed objects,
32 artefacts, and images, whose epistemology needs to be considered.

33 In granting access to the ordinary routine reality of scientific work, and the multiple
34 interactions this generated with a world of objects, attention has also turned to scientists' bodies,
35 the issue of perception, that of technical gestures and the tacit knowledge they presuppose, or
36 that of processes to control scientists' behaviour.⁴ In parallel to this, these new perspectives
37 have also expanded the social spectrum of study. New actors have emerged, who were hitherto
38 all but invisible: technicians, laboratory assistants, illustrators, and so on, many of whom were
39 women. Additionally, study of circulations and of exchange circuits has brought to light new
40 networks and new communities structured by epistemological choices and to a large extent by
41 their appropriation of techniques and objects.

² Bruno Latour and Steeve Woolgar, *La vie de laboratoire. La production des faits scientifiques* (Paris: La Découverte, 1979); Christian Jacob, *Les lieux de savoirs, I Espaces et communautés, II. Les mains de l'intellect*, (Paris: A. Michel, 2007–2011).


³ Maurice Daumas, *Les instruments scientifiques aux XVII^e et XVIII^e siècle* (Paris: PUF, 1953); Marie-Noëlle Bourguet, Christian Licoppe and Otto Sibum, eds., *Instruments, Travels and Science. Itinaries of Precision from the Seventeenth to the Twentieth Century* (London: Routledge, 2002).

⁴ Mention must be made of Marcel Mauss' inaugural article, "Les techniques du corps," *Journal de psychologie normale et pathologique* 32, no. 3–4 (1936): 271–293, whose scope exceeds the history of science. Robert Halleux, *Le savoir de la main. Savants et artisans dans l'Europe pré-industrielle* (Paris: A. Collin, 2009); Michael Polanyi, *The Tacit Dimension* (Chicago: University of Chicago Press, 1966); Simon Schaffer, "Quand les astronomes marquent leur temps. Discipline et 'équation personnelle'," in *La fabrique des sciences modernes* (Paris: Seuil, 2014), 259–296; Richard Sennett, *Ce que sait la main. La culture de l'artisanat* (Paris: A. Michel, 2010); Heinz Otto Sibum, "Working Experiments: A History of Gestural Knowledge," *The Cambridge Review* 116, no. 2325 (1995): 25–37.

42 Initial overviews of this literature have thus altered our way of envisaging the production
43 of scientific knowledge, at far remove from grand overarching narratives.⁵ These overviews
44 have nevertheless shown a marked tendency to privilege institutionalised science. Yet such a
45 programme may equally well be applied to amateur scientists. In this regard, our approach is
46 also enriched by contributions from social and cultural history, for which the practical and
47 material turn has proved equally fruitful. For instance, the history of material culture, the history
48 of consumption, and biographies of objects shed new light on amateur scientists' workshops.⁶
49 Our special issue follows on from this multidisciplinary literature, while focusing on a
50 particular set of men and women of learning: amateur scientists. Our aim is to explore what it
51 means to do science as an amateur, drawing on the resources of the history of science and of
52 social and cultural history.

53
54 A few words are needed about the complexion of this group, which was socially plural
55 and shifting over time. Although better known for the early modern period, as indicated in a
56 previous issue of *Nuncius* about amateurs, or through the history of *sociétés savantes*, amateur
57 scientists of the nineteenth and twentieth centuries have been studied in recent works, placing
58 them in the context of the contemporary emergence of citizen science.⁷ It is hence possible to

⁵ Jean-François Bert and Jérôme Lamy, *Voir les savoirs. Lieux, objets et gestes de la science* (Paris: Anamosa, 2021); Christian Jacob, *Qu'est-ce qu'un lieu de savoir?* (Marseille: OpenEdition Press, 2014); Françoise Waquet, *L'ordre matériel du savoir. Comment les savants travaillent XVI^e-XXI^e siècle?* (Paris: CNRS éditions, 2015).

⁶ Manuel Charpy, "Le théâtre des objets. Espaces privés, culture matérielle et identité bourgeoise, Paris, 1830–1914" (PhD diss., Université de Tours, 2010); Thierry Bonnot, *La vie des objets. D'ustensiles banals à objets de collection* (Paris: Éditions de la MSH, 2002); Thierry Bonnot, *L'attachement aux choses* (Paris: CNRS Éditions, 2014); Igor Kopytoff, "The Cultural Biography of Things: Commoditization as Process," in *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986), 64–92. For a recent literature review, see Jean-François Bonhôte and Laurence Guignard, "Épistémologie en débats: Matérialité et histoire culturelle" dossier, *Revue d'histoire culturelle (XVIII^e-XXI^e siècles)*, no. 4 (2022), <https://journals.openedition.org/rhc/1260>, latest access 15-12-2023. 

⁷ On the amateur from the sixteenth to the eighteenth century, see: Lisa Skogh, ed., "The Varied Role of the Amateur in Early Modern Europe," special issue, *Nuncius* 31, no. 3 (2016); Charlotte Guichard, *Les amateurs d'art à Paris au XVIII^e siècle* (Seysse: Champ Vallon, 2008); Krzysztof Pomian, *Collectionneurs, amateurs et curieux: Paris, Venise: XVI^e, XVII^e, XVIII^e siècles* (Paris: Gallimard, 1987). For the contemporary period, see especially: Hervé Guillemain and Nathalie Richard, "Towards a Contemporary Historiography of Amateurs in Science (18th-20th Century)," *Gesnerus* 73, no. 2 (2016): 201–237; Nathalie Richard, ed., "Amateurs et amatrices du XIX^e siècle," special issue, *Romantisme*, no. 190 (2020). On the history of learned societies: Robert Fox,

59 tease out certain characteristics. The term “amateur” designates, first, an autonomous
60 practitioner, frequently a member of the elites, modelled on the figure of the aristocrat or
61 eighteenth-century gentleman amateur, which held good at least until the interwar period.
62 Alongside this first figure, more modern forms of amateurism took root in the democratisation
63 of knowledge occurring throughout the nineteenth century. The latter stimulated a taste for
64 science among new social categories: employees, schoolmasters and mistresses, priests, and,
65 even the upper ranks of skilled workers.⁸ Such amateur practices were more a matter of “serious
66 leisure” as theorised by Robert Stebbins.⁹ They were non-professional practices by protagonists
67 who were additionally in paid work.

68 Entailing greater commitment than a mere hobby, scientific amateurism sometimes took
69 the form of a genuine career, bordering on professional worlds in complex ways. While the
70 disinterestedness of amateur science lovers was universally proclaimed, the drive of the *libido*
71 *sciendi* was in fact probably more complex and ambivalent. Amateur practice in scientific fields
72 no doubt gave rise to distinction, symbolic remuneration, and could at times be indirectly
73 monetizable. It could become a means of social promotion, and while not providing a way of
74 integrating elites, which remained largely inaccessible, at least offered the possibility of contact.
75 Conversely, there were many cases of disappointment and even disillusionment among those
76 who aspired to reach the circles of scientific authority. In addition to the two groups already

“Learning, Politics and Polite Culture in Provincial France: The Sociétés Savantes in the Nineteenth Century,” *Historical Reflections* 7, no. 2–3 (1980): 543–564; Jean-Pierre Chaline, *Sociabilité et érudition. Les sociétés savantes en France, XIX^e–XX^e siècle* (Paris: CTHS, 1995); Jean-Pierre Chaline, “Les sociétés savantes en Allemagne, Italie et Royaume-Uni à la fin du XIX^e siècle,” *Histoire, économie et société* 21, no. 1 (2002): 87–96; François Ploux, “L’estime et la vertu. Culture scientifique et identité bourgeoise dans la France provinciale au XIX^e siècle,” *Revue d’histoire du XIX^e siècle*, no. 57 (2018): 21–38. On citizen science and its links to amateurs, see Florian Charvolin, André Micoud and Lynn Nyhart, ed., *Des sciences citoyennes? La question de l’amateur dans les sciences naturalistes* (La Tour d’Aigues: L’Aube, 2007); Vinciane Despret, *Habiter en oiseau* (Paris: Actes Sud, 2019).

⁸ Volny Fages and Laurence Guignard, ed. “*Libido sciendi*. Le goût du savoir 1840–1900,” special issue *Revue d’histoire du XIX^e siècle*, no. 57 (2018). There are still few works on amateur practice among the working classes, see however Ann Secord, “Science in the Pub: Artisan Botanists in Early Nineteenth-Century Lancashire,” *History of Science* 32, no. 3 (1994): 269–315.

⁹ Robert A. Stebbins, “Serious Leisure: A Conceptual Statement,” *Pacific Sociological Review* 25, no. 2 (1982): 251–272. See too Antoine Hennion, Sophie Maisonneuve and Émilie Gomart, *Figures de l’amateur. Formes, objets et pratiques de l’amour de la musique aujourd’hui* (Paris: La Documentation française, 2000).

77 mentioned—gentlemen amateurs and practitioners of serious leisure—, we may add women,
78 who were normally denied any access to a career in science due to their gender, and were thus
79 necessarily restricted to being categorised as amateurs.¹⁰

80 Despite their many varied situations, this disparate world had a few points in common.
81 The first was their access to science via personal, direct, and empirical practice, often without
82 much theoretical training, and sometimes as genuine autodidacts. This set amateurs apart from
83 professionals, as well as from the public who accessed knowledge via the rapidly expanding
84 number of books and public talks on popular science. Amateurs' practical relation to science
85 was a fundamental component in their positioning, for the sharing of practice and the requisite
86 technical mastery and skills fostered a sense of belonging to a community similar to that of
87 professionals. As noted by Florian Charvolin, an amateur is still a “third party in the world of
88 science,” lying somewhere between the professional and the layman. As learned practitioners
89 distinct from laymen, their socio-cognitive action also differed from that of professional
90 scholars.¹¹

91 The second shared characteristic was their independence from professional institutions
92 of learning, granting amateurs a certain autonomy regarding legitimate practices, norms, and
93 knowledge. While this autonomy was sometimes channelled by centralised structures, such as
94 learned societies, it could also give rise to genuinely alternative discourse. This was the case
95 for the adepts of medical pendulums who distanced themselves from hospital medicine (Hervé
96 Guillemain), or the members of the Société Astronomique de France who scrutinised the
97 surface of the moon for traces of extraterrestrial activity (Laurence Guignard).

¹⁰ Margaret Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: John Hopkins University Press, 1995); Christine von Oertzen, Maria Tentetzi and Elizabeth S. Watkins, eds., “Beyond the Academy: Histories of Gender and Knowledge,” special issue, *Centaurus* 55, no. 2 (2013): 73–219.

¹¹ Florian Charvolin, “Comment penser les sciences naturalistes ‘à amateurs’ à partir des passions cognitives,” *Natures Sciences Sociétés*, no. 17 (2009): 145–154; Florian Charvolin, “Sortie nature, protocole et hybridité cognitive. Note sur les sciences participatives,” *Vertigo* 17, no. 3 (2017), <https://journals.openedition.org/vertigo/18684> latest access december 15th 2023.

98 This independence also affected matters of practical organisation, more specifically in
99 terms of material resources and places. While a very small number of amateurs managed to
100 attend observatories and state laboratories alongside professionals, and while they sometimes
101 benefited from the environment and resources of a learned society, their workshops also
102 expanded into more heterodox places than those of “normal science.”¹² a factory office in the
103 case of engineer Émile Belot, discussed by Volny Fages, or more frequently their domestic
104 setting at home.¹³ These “home-based” practices stand out not solely in terms of means (despite
105 entailing significant expenditure in certain cases), but also for inducing a specific familiarity
106 with the objects of study, which were embedded in amateurs’ daily life—almost their private
107 life even. Furthermore, the use of these alternative places broke with the laboratory and the
108 principle of enclosure specific to professional spaces for conducting observations and
109 experiments. Open air became the setting for an expansive swathe of so-called “amateur”
110 naturalistic sciences, linked to excursionist or ecological interests, and for collection-based
111 sciences in general involving countless instances of outdoor data gathering, performed with
112 specific mobile equipment such as travelling observation stations for ornithology, meteorology,
113 or astronomy.¹⁴

114 These many varied workshops housed the multitude of objects generated by amateurs’
115 learned practice. These are still little-known, being rarely conserved, rarely inventoried, and
116 rarely accessible, for most of them are held in private collections. These may be composed of
117 artefacts produced by amateur activity, together with countless visual productions, recordings,
118 and sometimes vast datasets, such as massive series of meteorological data, or giant

¹² Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

¹³ Donald L. Opitz, Staffan Bergwik and Brigitte Van Tiggelen, ed., *Domesticity in the Making of Modern Science* (Basingstoke: Palgrave MacMillan, 2016).

¹⁴ Charvolin, “Comment penser les sciences naturalistes ‘à amateurs’ à partir des passions cognitives”; Robert Kohler, “Finders, Keepers: Collecting Sciences and Collecting Practice,” *History of Science* 45, no. 4 (2007): 428–454; Patrick Matagne, *Aux origines de l’écologie. Les naturalistes en France de 1800 à 1914* (Paris: CTHS, 1999); Vanessa Manceron, *Les veilleurs du vivant. Avec les naturalistes amateurs* (Paris: La Découverte, 2022).

119 herbariums.¹⁵ This material may be studied for the light it may cast on the technical means,
120 usages, or norms employed by amateurs, whether or not they conformed to academic standards.
121 Equally, one may look at what happened to this material, which tended to circulate among
122 amateur communities and so helped bind them together, but which could also move from one
123 world to another, such as “boundary objects” which could be taken up in professional
124 collections, or fail to be thus absorbed.¹⁶ Pierre Janet’s herbarium (Florent Serina) and the
125 works published by James Miln (Nathalie Richard and Hadrien Viraben) are examples of this.
126 Alongside singular productions, amateur workshops abounded in a second category of objects,
127 namely the manufactured objects provided by a booming market. This included whole kits of
128 measuring and optical instruments, tools for sketching or taking photographs, material for
129 preparing specimens and archaeological items, and all the paraphernalia found in the workshops
130 of amateurs who acquired the relevant techniques.

131 Investigating amateur workshops is primarily a means of casting light on this world of
132 objects. It also provides a way of envisaging various issues, such as initiation into scientific
133 amateur practice, its position vis-à-vis legitimate knowledge, or the meaning attributed to it.
134 Studying objects also provides a way of broadening our perspective to examine how amateur
135 practice, often over a long period of time, could structure identities, build skills, and even
136 construct specific subjective characteristics, modifying their “experience of the world and of
137 the self,” as Marie-Noëlle Bourguet and Christian Licoppe have argued.¹⁷

138

¹⁵ On meteorology, see Fabien Locher, *Le Savant et la Tempête. Étudier l’atmosphère et prévoir le temps au XIX^e siècle* (Rennes: Presses Universitaires de Rennes, 2008).

¹⁶ Susan Star and James Griesemer, “Institutional Ecology. ‘Translation’ and Boundary Objects: Amateurs and Professionals in Berkeley’s Museum of Vertebrate Zoology, 1907–1939,” *Social Studies of Science* 19, no. 3 (1989): 387–420.

¹⁷ Marie-Noëlle Bourguet and Christian Licoppe, “Voyages, mesures et instruments. Une nouvelle expérience du monde au Siècle des lumières,” *Annales. Histoire, sciences sociales* 52, no. 5 (1997): 1115–1151.

139 This brief dossier cannot cover the immense variety of material situations and the
140 learned practices to which they gave access. Each author examines a little-known material
141 corpus to apprehend the conditions in which it was made or acquired, together with the
142 amateur's often very intense connection to it, how they used it, and what it can tell us about
143 amateurs' particular relation to learned activity, together with their contribution to the history
144 of scientific knowledge. The articles cover a broad spectrum of scientific disciplines ranging
145 from the natural sciences (botany and geology) to the medical sciences, from archaeology to
146 astronomy, along with a broad range of amateur identities, from the traditional model of the
147 gentleman amateur to the contemporary amateur pursuing serious leisure, including amateurs
148 who worked alone and those who worked collectively. It thus throws light on variations in the
149 material and visual history of scientific amateurism.

150 The first case study takes us to the turn of the nineteenth century, focusing on the great
151 publishing project of Spanish amateur botanist José Celestino Mutis (1732–1808): the *Flora de*
152 *Bogotá*. Comprising over 20,000 pages and 7,000 drawn and painted folios, Mutis's work is
153 striking for its monumental ambition, which also explains why it was not completed during his
154 lifetime. Drawing on the history of science and on visual analysis tools, Maria Esmeral
155 Henriquez's study reconstitutes the epistemic context in which this herbarium was produced,
156 looking at how Mutis organised his workshop, gathering a hierarchised army of native
157 illustrators and assistants trained in European knowledge.

158 In his examination of Eugène Viollet-le-Duc's (1814–1879) amateur interest in alpine
159 study, Laurent Baridon likewise reveals a topic of interest to both the history of science and the
160 history of art. Viollet-le-Duc typified an individual amateurism characteristic of the nineteenth
161 century, combining eclectic taste with broad scientific reading, and partly channelling his
162 highly interdisciplinary practice via the sporting and learned activities of the Club Alpin
163 Français, of which he was a founding member. He produced nearly 800 sketches during

164 excursions in the Alps, using them to produce a map of the Mont Blanc massif, which he
165 presented to the Société de Géographie. As Laurent Baridon argues, Viollet-le-Duc's scientific
166 practice thus lay at the intersection between his leisure activity and his main activity as an
167 architect and restorer of historic monuments.

168 As for James Miln (1819–1881), a contemporary of Viollet-le-Duc's, he embodied the
169 persisting model of the gentleman amateur, whose curiosity became a form of specialised
170 amateurism in the second half of the century. Miln drew on his knowledge as a sketcher,
171 watercolourist, and photographer, together with his social capital and private income, to support
172 his archaeological practice excavating in Brittany. This resulted in a very rich visual oeuvre
173 comprised of two abundantly illustrated books and a series of models, which Nathalie Richard
174 and Hadrien Viraben analyse from an interdisciplinary point of view. This body of work throws
175 light on a mobile amateur identity, and on the autonomy Miln enjoyed in his undertaking,
176 drawing on a network of peers and a group of assistants.

177 Volny Fages studies the scientific practice of Émile Belot (1857–1944) who likewise
178 produced models, only this time cosmogenic ones. In the second part of his life, Belot, an
179 alumnus of the École Polytechnique, set about demonstrating his theories about the creation of
180 the world. He drew on his training, knowledge, and relations as an engineer to conduct this
181 “experimental cosmogony” resisting disciplinary specialisation, producing reduced models in
182 the tobacco factory he ran. Despite being very socialised, and part of a genuine informal
183 network of cosmogonist engineers and a member of several learned societies, Belot remained
184 a marginal figure. Working alone, he carried out his original, heterodox project which failed to
185 receive the recognition he hoped for.

186 Florent Serina examines a typical example of amateur production since early modern
187 times, focusing on the herbarium of psychologist Pierre Janet (1859–1947). Janet, a central
188 figure in the history of psychology, worked throughout his life to assemble a large herbarium

189 of 3,230 individual pages, which has been conserved in accordance with his wishes. This
190 example provides a way of examining how amateur activity may relate to professional activity.
191 In particular, Florent Serina enquires into the meaning to attribute to this passionate, solitary
192 plant collecting, which necessarily acted as a “consoling” occupation, with the herbarium being
193 built up in his free time when Janet was not working, in lieu of a diary or travel journal. Serina
194 notes how this serious recreational activity formed an independent part of Janet’s life, but also
195 the effects of his bidisciplinarity, with the circulations between his categories and practices as
196 a naturalist and as a psychologist perhaps influencing Janet’s particular way of viewing things.

197 Two final articles examine the materiality of amateur scientific practice from a
198 collective viewpoint. Laurence Guignard analyses the astronomical observation practices of
199 members of the Société Astronomique de France at the turn of the twentieth century. She
200 reconstitutes the technical and social environment of their home-based practices and outdoor
201 workshops, drawing on images of amateur astronomers at work as well as their own visual
202 productions. Laurence Guignard then brings out their alternative epistemological and
203 methodological position, which broke with that of professional observatories on the issue of
204 extraterrestrial life.

205 The closing article looks at a second group of marginalised scientists, this time on the
206 sidelines of professional medicine, namely the association of medical radiesthesists, who took
207 up the pendulum as their emblem. In going over the particular history of this object in France
208 between the wars, Hervé Guillemain highlights the renewal of traditional dowsing practices as
209 these came into contact with the modern taste for the new technology of electromagnetic waves.
210 Paramedical usage of pendulums enabled a large community of practitioners, many from the
211 Catholic world, to construct an alternative position to that of modern hospital medicine, which
212 was partly recognised or at least received media coverage. Analysis also brings out two
213 contrasting material aspects of pendulums: the making of ever more sophisticated and singular

|
214 home-made models by a circle of amateurs, at the same time as ready-to-use equipment was
215 being marketed in response to growing demand.

216

217

218 Translated from the French original by Adrian Morfee.

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