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## Queries and Questionnaires. Collecting Local and Popular Knowledge in 17th and 18th Century Europe

### Introduction

In the last decades, historians have stressed the role of travels, travel narrative, and questionnaires as practical tools used by scholars to explore exotic, but also local, territories, to collect and exchange data on nature and natural history. This was a long-term process favoured by two parallel developments. First, the necessity – for several countries – to extend the political, economic and commercial control on their colonies and to improve the knowledge of natural resources which could be exploited. Secondly, this trend was led by increased scholarly curiosity for the newly discovered territories and for exotic countries, with the ambition to collect as much as possible information and observational material and to pursue wide-ranging, inductive, empirical natural history research, as Francis Bacon (1561 – 1626) strongly suggested in his works.

Through the multiplication of the communication channels, scholars could establish contact with persons of different social background, sometimes without academic training, with “amateurs”, merchants, diplomats, clergymen and, occasionally, also with artisans and the common people. Considering these multiple networks which allowed to collect natural history data and information during the early modern period, we can say that research in this field was actually quite polyphonic and multifarious: a combination of different “cultures of natural history”, learned as well as popular, which come into contact through different research practices and that were finally combined in scholarly publications. It was a multi-layered, non-linear process, a “collective” enterprise that involved diverse institutions and different actors. Different projections and ideals formed the notion of “nature”.<sup>1</sup>

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1 See, for example: Nicholas Jardine et al. (eds.): *Cultures of Natural History*. Cambridge 1996; Pamela H. Smith, Paula Findlen (eds.): *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe*. New York 2002; David Philipp Miller (ed.): *Visions of Empire: Voyages, Botany, and Representations of Nature*. Cambridge 1996; Londa Schiebinger, Claudia

After the discovery of America, a flood of information poured into Europe, which played an important role for research in natural history and for the implementation of an empirical approach in this field. This event represented a further occasion for a critical re-reading of Aristotle and others classical texts: Renaissance scholars shared the view that the natural world was still largely unknown and that a lot of “secrets” were waiting to be investigated.<sup>2</sup> A renewed curiosity for exotic and local nature arose; especially for exotic and local flora and fauna, but also for minerals, local characters of the terrain, orology and hydrology.<sup>3</sup> Travels and travel narrative were often the only way to gather information about still unknown and little explored territories: “travel across the globe was a major means for extending experience and for testing the adequacy of scientific generalizations”.<sup>4</sup> “Queries” or “general heads” became a useful tool to pursue the systematic collection of empirical data of a region, in order to improve knowledge of it and to make possible broader comparisons between different territories.<sup>5</sup> Their use originated in similar systems of data collection, which spread after the discovery of the Americas and – in the Church – after the Council of Trent.<sup>6</sup> The Spanish “Cuestionarios”, on the one hand, and pastoral visits on the other, were both designed to achieve better administrative communication between centres (of the Spanish Empire or of a diocese) and their

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Swan (eds.): *Colonial Botany: Science, Commerce, and Politics in the Early Modern World*. Philadelphia 2005; Jorge Cañizares-Esguerra: *Nature, Empire, and Nation: Explorations of the History of Science in the Iberian World*. Stanford 2006.

- 2 For this process in botany: Brian W. Ogilvie: *The Science of Describing. Natural History in Renaissance Europe*. Chicago, London 2006. See also: Regina Dauser et al. (eds.): *Wissen im Netz. Botanik und Pflanzentransfer in europäischen Korrespondenznetzen des 18. Jahrhunderts*. Berlin 2008.
- 3 Alix Cooper: *Inventing the Indigenous: Local Knowledge and Natural History in Early Modern Europe*. Cambridge MA 2007.
- 4 Steven Shapin: *A Social History of Truth. Civility and Science in Seventeenth-Century England*. Chicago, London 1994, p. 245.
- 5 On “factual testimony” and the reliability of travellers’ tales or travel narrative: *Ibid.*, pp. 243 – 253; Daniel Carey: *Compiling Nature’s History: Travellers and Travel Narratives in the Early Royal Society*. In: *Annals of Science* 54 (1997), pp. 269 – 292. On questionnaires and scientific method in seventeenth-century England, see Barbara J. Shapiro: *A Culture of Fact: England, 1550 – 1720*. Ithaca 2000, pp. 72 – 76; ead.: *Empiricism and English Political Thought, 1520 – 1720*. In: *Eighteenth Century Thought* 1 (2003), pp. 1 – 33.
- 6 The use of “questions”, of “queries” played an important role also in the scholastic exercises in the university’s life during the 17th century. On Spanish “cuestionarios”: See e.g. Howard F. Cline: *The Relaciones Geográficas of the Spanish Indies, 1577 – 86*. In: *Hispanic American Historical Review* 44 (1964), pp. 341 – 374; Arndt Brendecke: *Informing the Council. Central Institutions and Local Knowledge in the Spanish Empire*. In: Wim Blockmans, André Holenstein, Jon Mathieu et al. (eds.): *Empowering Interactions. Political Cultures and the Emergence of the State in Europe 1300 – 1900*. Farnham, Surrey 2009, pp. 235 – 252; Simona Boscani Leoni: *Creazione e circolazione del sapere nell’Europa del Settecento*. In: *Rivista Storica Italiana* 124/2 (2012), pp. 581 – 613.

peripheries. Improved knowledge in geography, natural sciences, politics, and anthropology of a region – through a systematic collection of data – underpinned a more effective organisation and centralisation of the political and religious powers.

In the first part of my paper, I'll focus my attention on the role played by "queries" and "questionnaires" for travellers as an example of the implementation of Bacon's empirical method: Questionnaires became one of the preferred ways adopted by the Royal Society to collect novel, popular or local knowledge. In the second part, I'll investigate the transfer, the reception, and the adaptation of this research strategy in the German-speaking area. In the third part, I'll show the impact of the use of questionnaires to collect local information and data, and of the role of local correspondents (who replied to these queries and were considered trustworthy by the naturalists) in this process, an aspect that, until now, has been little investigated by scholars.

### Collecting Local Knowledge: Bacon, the Royal Society and the "Queries"

The role of travels and travel narrative as an (almost) reliable source for compiling a comprehensive natural history played a central role in the early years of the Royal Society.<sup>7</sup> Francis Bacon (1561 – 1626) in his *Novum Organon* already emphasized the role of travel explorations that allow to overcome the ancient knowledge of the world and the importance of travels and travel reports to get first-hand information about newly discovered territories and – more generally – about exotic countries far from Europe.<sup>8</sup> In his *Parasceve ad historiam naturalem et experimentalem* (1620), he not only gave a series of suggestions about how to write a natural history text, but also named a series of topics underlining their usefulness for achieving such a commitment: "As soon as we have the leisure for the task, we plan to give detailed instructions by putting the questions that most need to be investigated and written up in each

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7 On the history of the early Royal Society: Michael Hunter: *Establishing the New Science. The Experience of the Early Royal Society*. Woodbridge 1989.

8 "Rursus vero homines a progressu in scientiis detinuit et fere incantavit reverentia anti-quitatis, et virorum qui in philosophia magni habiti sunt autoritas, atque deinde consensus. [...] Neque pro nihilo aestimandum, quod per longinquas navigationes et peregrinationes (quae seculis nostris increbuerunt) plurima in natura patuerint, et reperta sint, quae novam philosophiae lucem immittere possint." Francis Bacon: *Novum Organum*, Part 1, LXXXIV. In: *The Works of Francis Bacon, Baron of Verulam, Viscount of St. Albans, and Lord High Chancellor of England*, collected and edited by James Spedding, Robert Leslie Ellis, Douglas Denon Heath. 14 vols. London 1857 – 1874, at vol. 1, pp. 290 f.

history because they help to fulfill our purpose, like certain particular *Topics*”.<sup>9</sup> Bacon also pointed out a range of queries (“*topica particularia*” or “*Articuli Inquisitionis*”) in his *Historia naturalis et experimentalis ad condendam philosophiam* (London 1622), published as Part III of his *Instauratio magna*, intended to define the state of research in the natural sciences and at the same time to promote new ones.<sup>10</sup>

Bacon’s scheme for gathering data is reflected in the early years of activity of the Royal Society. The struggle to gain information in a more systematic way led the Society to draw up a series of “articles of inquiry”, which provided a set of topics around which to organize observations. In 1661, the Society created a committee, formed, among others, by Sir Robert Moray, William Petty, Laurence Rooke, Thomas Povey, Robert Boyle, John Wilkins, John Evelyn and Henry Oldenburg (first secretary of the Society and editor of the *Philosophical Transactions*) with the goal to consider “proper questions to be inquired of in the remotest part of the world.”<sup>11</sup> Thomas Povey himself (1613/14–c. 1705), colonial entrepreneur who held several administrative appointments, in 1661 sent Edward Digges (1620–1674/75), Colonial Governor of Virginia, a series of questions designed to steer his observations towards interesting and original aspects to be found in the Bermuda Islands and in Virginia.<sup>12</sup> A year later the Society also commissioned Laurence Rooke (1622–1662), Gresham Professor of astronomy and later Geometry, to prepare a series of “*Directions for Sea-men going into the East & West Indies*”. The text was published by Oldenburg in January 1666 in the *Philosophical Transactions* with this programmatic introduction, which con-

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- 9 Michael Hunter: Robert Boyle and the Early Royal Society: Reciprocal Exchange in the Making of Baconian Science. In: *The British Journal for the History of Science* 40 (2007), pp. 1–23, at pp. 6 f. Bacon, Works, vol. 2, p. 44: “Accedit etiam illud, quod coeptis nostris vix dignum esse aestimemus ut in re tali quae fere omnium industriae pateat nos ipsi tempus teramus. Quod autem caput rei est ipsi nunc praestabimus; ut eiusmodi historiae modum et descriptionem, qualis intentioni nostrae satisfaciat diligente et exacte proponamus [...]”. English translation in Francis Bacon: *The New Organon*, ed. by Lisa Jardine and Michael Silverthorne. Cambridge 2000, p. 232. For the list of topics: Bacon, Works, vol. 2, pp. 61–69.
- 10 Bacon, Works, vol. 3, pp. 217–224; Hunter, Robert Boyle, 2007, pp. 14 f.; id. (ed.): Robert Boyle’s “Heads” and “Inquiries”. In: Robert Boyle Project Occasional Papers, no. 1, 2005 (downloadable in the researchers’ area of the Boyle website: <<http://www.bbk.ac.uk/boyle>> [22 Nov 2012]). Peter R. Anstey: The Methodological Origins of Newton’s Queries. In: *Studies in History and Philosophy of Science* 35 (2004), pp. 247–269, at pp. 249–253 (about Bacon and Boyle).
- 11 Carey, Compiling, 1997, p. 274.; Thomas Birch: The history of the Royal Society of London for improving of natural knowledge: from its first rise, in which the most considerable of those papers communicated to the Society, which have hitherto not been published, are inserted in their proper order, as a supplement to the Philosophical transactions. 4 vols. Bruxelles 1967–1968 [1756–1757], here vol. 1, p. 15. See also Hunter, *Establishing*, 1989.
- 12 “Enquiries concerning those severall kind of things which are reported to be in Virginia & the Bermudas, not found in England”, see: Hunter, Robert Boyle, 2007, pp. 14 f.



firms the interest and the utility of queries for voyagers to investigate natural history:

“It being the Design of the *R. Society*, for the better attaining the End of their Institution, to study *Nature* rather than *Books*, and from the Observations, made of the *Phænomena* and Effects she presents, to compose such a History of Her, as may hereafter serve to build a Solid and Useful Philosophy upon; They have from time to time given order to several of their Members to draw up both *Inquiries* of things Observable in forrain Countries, and *Directions* for the Particulars, they desire chiefly to be informed about. And considering with themselves, how much they may increase their *Philosophical* stock by the advantage, which *England* injoyes of making Voyages into all parts of the World [...].”<sup>13</sup>

Rooke’s nine questions covered several themes: the variations of the compass and in the needle, the latitude and longitude of a place and the observation of tides. He recommended mapping coastlines, promontories and their distances, registering the change of winds and weather, all extraordinary events (meteors, lightning, thunder) and to collect seawater samples in pint-sized bottles with indication of the latitude and calendar date. A longer version of the questionnaire was published a year later in the *Philosophical Transactions* by Robert Moray and Robert Hooke. A separate version of the text was additionally printed and delivered to sea captains, along with instruments for the experiments, hoping to get numerous answers to the queries.<sup>14</sup>

*General Heads for a Natural History of a Countrey, Great or Small* of Robert Boyle (first published in 1665/66) is to be seen in this context; in these years, Boyle dealt with the documentation of the effects of cold and confronted himself with the problem of travellers’ testimony.<sup>15</sup> By contrast with Rooke’s text, which was thought for travellers by sea, Boyle’s questionnaire was addressed also to travellers overland:

“The things, to be observ’d in such a [natural] History, may be variously (and almost at pleasure) divided: As, into Supraterraneous, Terrestrial, and Subterraneous; and

13 Laurence Rooke: Directions for Sea-men, bound for far Voyages. In: *Philosophical Transactions* 1 (1666), Nor. 8, pp. 141 f.; C. A. Ronan: Laurence Rooke (1622 – 1662). In: *Notes and Records of the Royal Society of London* 15 (1960), pp. 113 – 118, 115.

14 Robert Moray, Robert Hooke: Directions for Observations and Experiments to be made by Masters of Ships, Pilots, and other fit Persons in their Sea-Voyages. In: *Philosophical Transactions* 2 (1667), pp. 433 – 449; Birch, *The history*, vol. 2, p. 122.; Carey, *Compiling*, 1997, p. 272.

15 Boyle admitted that he must “either make use of other men’s testimony, or leave some of the remarkablest phaenomena of cold unmentioned”: Thomas Birch (ed.): *The Works of the Honourable Robert Boyle*. Vol. 2. London <sup>2</sup>1772, pp. 462 – 734, at pp. 476 f., quoted from: Shapin: *Social History*, 1994, p. 248. For the “General Heads”: Robert Boyle: *General Heads for a Natural History of a Countrey, Great or Small*. In: *Philosophical Transactions* 1 (1665 – 1666), pp. 186 – 189. See also: Cooper, *Inventing*, pp. 119 f.

otherwise: but we will at present distinguish them into those things, that respect the *Heavens* or concern the *Air*, the *Water*, or the *Earth*.”<sup>16</sup>

Like Rooke, the first part contains a group of questions relating to problems of the right determination of a geographical place (i. e. the coordinates of a place, its climate, “what fixt stars are and what not seen there”<sup>17</sup>), about the air (i. e. weather, climate, winds, diseases related to the weather); the third question is about water and fishes, their variety and the methods used to catch them. The last group of questions is related to the earth, its configuration (dimensions, orology, the nature of soil), and its production. In this field, Boyle asked about the inhabitants: “And in particular their Stature, Shape, Colour, Features, Strength, Agility, Beauty (or the want of it), Complexions, Hair, Dyet, Inclinations, and Customs, that seems not due to Education”; then about “external production” (grasses, grain, flora, fauna), and “internal” (minerals, quarries, and stones).<sup>18</sup>

This partition evokes Bacon’s approach in his *Parasceve*, where he identified a group of topics to be investigated, like lightning and thunder, air and winds (Boyle’s “supraterraneous” subjects), then “Shape and Compass” of the Earth and sea, earthquakes, fossils, plants and animals (Boyle’s “terrestrial” themes), and then mines, gems and precious metals (Boyle’s “subterraneous” questions).<sup>19</sup> Boyle also followed Bacon’s suggestion to establish a set of “Histories of Man”.<sup>20</sup>

To these “General Heads” Boyle added a list of queries concerning sea and mines.<sup>21</sup>

Boyle’s questionnaire saw remarkable success; it was reprinted in 1692 with some addition of queries by other authors and during the eighteenth century in collections of travel writings, like Jean-Frédéric Bernard’s *Recueil des voyages au nord: contenant divers mémoires très utiles au commerce & à la navigation* (Amsterdam, 1715–1727).

As Michael Hunter pointed out, the attention for “head and inquiries” was a leitmotif of the activities of the Royal Society in the earliest years after its foundation and maybe the most important common point of interest between the naturalist and the society:

16 Boyle, *General Heads*, 1666, p. 186.

17 *Ibid.*, pp. 186 f.

18 *Ibid.*, pp. 188 f.

19 Bacon, *Works*, vol. 2, pp. 61–69; Carey, *Compiling*, p. 273.

20 *Ibid.*, pp. 64–66.

21 Robert Boyle: *Other Inquiries concerning the Sea*. In: *Philosophical Transactions* 1 (1665–1666), pp. 315–316; *Id.*: *Articles and Inquiries touching mines*. In: *Philosophical Transactions* 1 (1665–1666), pp. 330–343.

“If one looks at the fledgling Royal Society, on the other hand, one finds an enthusiasm for such ‘heads of inquiries’ which could almost be seen as a leitmotif of the society’s activity in its earliest years, inspired by the Baconian imperative to data-collecting that was central to the society’s rationale. Here, it will be claimed that it was almost certainly due to the society’s stimulus that Boyle came to see the methodological value of such ‘heads’.”<sup>22</sup>

The essential role of these “queries” is clearly demonstrated by Henry Oldenburg’s soliciting the readers to provide answers to the questionnaires that were published in the *Philosophical Transactions* till 1667:

“That the *Queries*, scattered up and down in these *Tracts*, may not seem lost, or left unregarded, the *Publisher* intends to impart at convenient times such of the *Answers*, shall be sent in by observing men, as may be thought acceptable to the *Reader*.”<sup>23</sup>

Boyle’s questionnaire was quite influential in increasing this trend: a large quantity of publications followed him until at least the late 1690s. Worth mentioning are *Queries in Order to the Description of Britannia* published by John Ogilby (1600–1676) in 1673, as well as, some years later, a list of questions compiled by Robert Plot (1640–1696), author of a natural history of Oxfordshire, of Staffordshire, and first curator of the Ashmolean Museum, and the *Parochial Queries* devoted to Wales in 1696 by Edward Lhwyd, naturalist and palaeontologist (c. 1660–1709).<sup>24</sup>

Similarly, the Irish natural philosopher and political writer William Molyneux (1656–1698), one of the founders of the Dublin Philosophical Society and since 1685 member of the Royal Society, in 1682, set up a list of queries about the history, commerce and natural history of Ireland. His goal was to collect information for the *English Atlas* of Moses Pitt (c. 1639–1697). The aim of the *Atlas*

22 Hunter, Robert Boyle, 2007, pp. 4 f., quotation 20.

23 *Philosophical Transactions* 2 (1667), p. 525. After this comment of Oldenburg was published a list of answers concerning the Mendip mines that followed the questions about the mines formulated by Boyle in the first volume of the *Philosophical Transactions*, issue 19 (see note 21).

24 Simona Boscani Leoni: *Men of Exchange: Creation and Circulation of Knowledge in the Swiss Republics of the 18th Century*. In: André Holenstein, Hubert Steinke, Martin Stuber (eds.): *Scholars in Action. The Practice of Knowledge and the Figure of the Savant in the 18th Century*. Vol. 2. Leiden, Boston 2013, pp. 507–533, at pp. 515 f. Ead., *Creazione*, 2012. John Ogilby: *Queries in Order to the Description of Britannia*. S. l. [London] 1673; Edward Lhwyd: *Parochial Queries in Order to a Geographical Dictionary, A Natural History, & c. of Wales*. S. l. [Oxford?] s. a. [1696]. For Plot: *Royal Society Classified Papers*, 19, 93 and 94; Robert Plot: *The Natural History of Oxfordshire. Being an Essay towards the Natural History of England*. Chichelet 1972 (first edition: Oxford 1677); Id.: *The Natural History of Staffordshire*, Manchester 1973 (first edition: Oxford 1686). Interestingly, the answers to Lhwyd’s questionnaire were assembled and published: Rupert H. Morris (ed.): *Parochialia Being a Summary of Answers to “Parochial Queries”*. In: *Archaeologia Cambrensis, Supplements*, April 1909, April 1910 and April 1911.

was to offer descriptions of different regions, as well as information on climate, population, monuments, minerals, costume, trade and soil.

In order to collect data about Ireland, Molyneux printed the sheet of queries, which was available for free “at the shop of Mr Dudley Davis [...] in Dublin” and solicited replies by his countrymen.<sup>25</sup> Important was the intention to establish a correspondence network of informants to gather information about different topics, as Molyneux wrote:

“Whereas there is an accurate Account and Description of Ireland designed to be made Publick in the *English Atlas* undertaken by *Moses Pitt of London*, and in order thereto, some Gentlemen in Dublin have agreed to meet weekly for reviewing such an Account [...] This is earnestly to entreat all Persons that they would be pleased freely to communicate their Answers to these following Quaeries, or any them Directing them to Mr William Molyneux nigh *Ormonds Gate* in *Dublin* [...] not forgetting to specifie in their Letters the place of their Habitation that they may be again written to if Occasion requires.”<sup>26</sup>

The sixteen questions concerned the nature of soil, plants, animals, fruits, the waters, ports and historical events which took place in the region, as well as the peculiar “Customs, Manner or Dispositions” of their inhabitants. The final questions were about public, ancient and ecclesiastical buildings.

The same interest for making observations and collecting data is evident in the *Brief Instructions for Making Observations in all parts of the World* published by John Woodward (1665 – 1728) in 1696, a physician and Professor of Physics at Gresham College in London.<sup>27</sup>

Woodward’s questionnaire concentrated on the sea, the seashores and the land, with an appendix on queries about the “Natives of Guinea, Monomotapa, and other less known parts of Africa: of the East, and West Indies: Tartary, Greenland, or any other remote and uncivilized, or Pagan Countries”.<sup>28</sup> The last part of the text contains the “Directions for the Collecting, Preserving, and Sending over Natural things, from Foreign Countries”.<sup>29</sup> The section about the sea begins, like in Rooke and Boyle, with questions about latitude and longitude of a place, on the variations of compass (like Rooke), winds, storms and weather. The questions about the seashores concern the tides, marine flora and fauna.

25 Theodore H. Hoppen: *The Common Scientist in the Eighteenth Century*. Charlottesville 1970, p. 201. (Italic of Molyneux).

26 Hoppen, *The Common Scientist*, 1970, p. 200; id.: *The Royal Society and Ireland* William Molyneux, F.R.S. (1656 – 1698). In: *Notes and Records of the Royal Society of London* 18 (1963), pp. 125 – 135. Stefan Siemer: *Geselligkeit und Methode: Naturgeschichtliches Sammeln im 18. Jahrhundert*. München 2004, pp. 248 f.

27 John Woodward: *Brief Instructions for Making Observations and Collections, in order to the promotion of Natural History, in all parts of the World*. London 1696.

28 Woodward, *Brief Instructions*, 1696, pp. 8 – 10.

29 *Ibid.*, pp. 11 – 16.

Several queries are dedicated to the observation of the land. Woodward underlines the importance of noticing weather conditions, winds, the presence of rivers and lakes, of metals, mines, and grottoes. His attention focused on “Sea-Shells and Marine Bodies at Land” (i. e. fossils), as well as on the observation of diseases, earthquakes, and finally on plants, and animals.<sup>30</sup>

## The Royal Society as Model: Questionnaires in the German-speaking Area

Henry Oldenburg tried to export the model of the Baconian way to investigate local territories on the Continent, especially by exploiting his widespread correspondence network.<sup>31</sup> A strategy was to send a copy of Robert Plot’s *Natural History of Oxford-shire: Being an essay towards the Natural History of England* (Oxford, 1677) as a model for local investigations. His attempts remained unsuccessful.

One of the first examples of making a natural history of the territory, following the inspiration of the Royal Society, is to be found in Switzerland, in the works of the physician and naturalist Johann Jakob Scheuchzer (1672 – 1733).<sup>32</sup> Scheuchzer is known, above all, for his leading role in the history of geology, palaeontology, and for his pioneering contribution to the advancement of naturalistic science and climatology in Switzerland and in the Alps.<sup>33</sup> He was born in Zurich into a family of the local bourgeoisie; he studied medicine and natural sciences (mathematics, physics, and astronomy) in Germany (Altdorf, near Nuremberg) and Holland (Utrecht). His interests, however, encompassed broader fields of knowledge, from history to geography, to numismatics. Having completed his academic studies, he returned to Zurich, where he was appointed chief medical officer of the Foundling Hospital in 1695; some years later he was appointed professor of mathematics in the city’s most prestigious college, the *Carolinum*, which trained theologians to enter the Reformed Church. He was also named curator of the *Bürgerbibliothek* and of the *Kunstkammer* and was member as an actuary of one of the early pre-Enlightenment societies of the city,

30 Ibid., pp. 6 – 8.

31 A. Rupert Hall, Marie Boas Hall (eds.): *The Correspondence of Henry Oldenburg*. 13 vols. Madison et al. 1965 – 1986.

32 Cooper, *Inventing*, 2007, pp. 121 – 139, especially pp. 131 – 139 for Scheuchzer.

33 For a comprehensive overview of his publications and activity, please see part one of the volume: Simona Boscani Leoni (ed.): *Wissenschaft – Berge – Ideologien. Johann Jakob Scheuchzer (1672 – 1733) und die frühneuzeitliche Naturforschung / Scienza – montagna – ideologie. Johann Jakob Scheuchzer (1672 – 1733) e la ricerca naturalistica in epoca moderna*. Basel 2010.

*Collegium der Wohlgesinnten*. Scheuchzer was a fellow of the most distinguished academies of science of his time, including the Royal Society. A matter of months before his death, he was appointed Physics professor in the *Carolinum*, a great distinction for it was the top chair for the teaching of natural history in Zurich, as well as the rank of senior town physician.<sup>34</sup>

Scheuchzer's aim was to continue the study of natural history undertaken by his predecessor in the position of doctor of the city's founding hospital and curator – as Scheuchzer was to become, too – of the *Bürgerbibliothek*, Johann Jakob Wagner (1641–1695). Wagner was the author of *Historia naturalis Helvetiae curiosa* (Zurich 1680), one of the first in Zurich to propound an empirical research method. In his book, he programmatically expressed his intention to follow Bacon in his commitment to write a novel natural history, applying the inductive method. In the first lines of his *Dedicatio*, he mentions Bacon as the most important person in this field and he admits the influence of his *De dignitate et augmentis scientiarum* on his personal work.<sup>35</sup> Three years later, Wagner's book was positively reviewed in the *Philosophical Transactions*; its Baconian leanings were recognised and appreciated by the reviewer.<sup>36</sup>

In the wake of Wagner and of the Swiss-German-speaking tradition, from Conrad Gesner (1516–1565) to Josias Simler (1530–1576), Scheuchzer focused his interests on the natural history of his land. He was one of the first scholars in a German-speaking country who adopted inductive and empirical methods in making a novel natural history of the territory. He used questionnaires, he travelled through Switzerland to make observations and collected samples for his natural historical and antiquarian collections, he did experiments (especially barometrical experiments and regular measurements of the temperature of the

34 Rudolf Steiger: Johann Jakob Scheuchzer (1672–1733). In: *Werdezeit (bis 1699)*. Zürich 1927; Hans Fischer: Johann Jakob Scheuchzer (2. August 1672 – 23. Juni 1733). *Naturforscher und Arzt*. In: *Neujahrsblatt der Naturforschenden Gesellschaft in Zürich* 175 (1973), pp. 3–168; Michael Kempe: Johann Jakob Scheuchzer. In: *Neue Deutsche Biographie*. Vol. 22. Berlin 2005, pp. 711 ff.

35 Johann Jacob Wagner: *Historia naturalis Helvetiae curiosa*. Zürich 1680: *Dedicatio* (not paginated) [p. 1 f.]: “Ad Scientiæ Naturalis exactam notitiam comparandam, multorum præclarorum Virorum, rerum naturalium maximè peritorum, judiciò, inter quos Magnus ille Angliæ Cancellarius, *Franciscus Baconus, Baro de Verulamio (de Augmento Sciètiarum Lib. II. C. 3)* facile principem obtinet locum, erè maximè foret, si *Historia Naturalis Inductiva* cujuslibet regionis, quantum fieri poterit exactissima adornaretur, quò ex variis Observationibus & Experimentis inde collectis Regulæ tandem certæ & indubitatæ elicit, Systemaque absolutum componi ac perfici queam.” (Italic in the original text).

36 The reviewer in the *Philosophical Transactions* (13 (1683), pp. 268–271) commented: “The Author professes that he undertook to write the *Natural History of Switzerland* upon the Invitation of my Lord Bacon, and with Intention thereby to promote a true *Experimental Philosophy*” (p. 268, italic in the original text), the only doubts about the reliability of the contents are expressed in the case of the descriptions of dragons (p. 270).

air), and he developed a wide correspondence network to exchange objects and information.<sup>37</sup>

Following the model of the Royal Society, in 1699 he published a questionnaire in Latin and German with approximately 190 questions to investigate the natural history of the Swiss Confederation.<sup>38</sup> Like Wagner, Scheuchzer's *Einladungsbrief* begins with a reference to Bacon and the English questionnaires; furthermore, it mentions the successful commitment of the members of the Royal Society to guide their countrymen and foreigners in making observations of all phenomena at sea and land, of air, animals, plants and minerals. As Wagner, Scheuchzer emphasises his interest in the "sweet Fatherland": England was a power at sea and in international commerce, Swiss naturalists had mountains and its wild nature to investigate.<sup>39</sup>

The aim of the *Einladungsbrief* was also to prove to any foreign visitor travelling through the Confederation that, despite the ragged landscape, his homeland was not "harsh and wild" [rauh und wild], a godforsaken country, but, on the contrary, it possessed "so many and such great beauties and such heart-warming gifts of Nature that you would not look for or find anywhere else".<sup>40</sup> This publication represents a crucial stage in the research strategy launched by

37 See: Cooper, *Inventing*, 2007, pp. 152–166; Simona Boscani Leoni: Johann Jakob Scheuchzer (1672–1733) et la découverte des Alpes : les "Itinera Alpina". In: Catherine Demeulenaere-Douyère (ed.): *Explorations et voyages scientifiques de l'Antiquité à nos jours*. Paris 2008, pp. 81–100; ead.: Johann Jakob Scheuchzer und sein Netz. Akteure und Formen der Kommunikation. In: Klaus-Dieter Herbst, Stefan Kratochwil (eds.): *Kommunikation in der Frühen Neuzeit*. Frankfurt a. M. 2009, pp. 47–67; ead.: *Vernetzte Welten: Das Korrespondenznetz von Johann Jakob Scheuchzer*. In: Urs Leu (ed.): *Natura sacra – Der Frühaufklärer Johann Jakob Scheuchzer (1672–1733)*. Zug 2012, pp. 130–165; ead.: *Zwischen Gott und Wissenschaft: Johann Jakob Scheuchzer (1672–1733) und die frühneuzeitliche Naturforschung*. In: Sophie Ruppel, Aline Steinbrecher (eds.): "Die Natur ist überall bey uns." *Mensch und Natur in der Frühen Neuzeit*. Zürich 2009, pp. 183–194.

38 Johann Jakob Scheuchzer: *Einladungs=Brief/ zu Erforschung natürlicher Wunderen/ so sich im Schweitzer=Land befinden*. Zürich 1699; reprinted in Hansjörg Küster, Ulf Küster (eds.): *Garten und Wildnis. Landschaft im 18. Jahrhundert*. München 1997, pp. 14–31. There is also a Latin version of the text: *Charta invitatoria, quaestionibus quae historiam Helvetiae naturalem concernunt*. Zürich 1699. See: Simona Boscani Leoni: *La ricerca sulla montagna nel Settecento sotto nuove prospettive: il network anglo-elvetico-alpino*. In: *Histoire des Alpes 12* (2007), pp. 201–213.

39 "Es gelte bei uns, was dorten Ulysses ausgesagt [...], nihil sua patria quamvis aspera & inculta videri dulcius: Es seye nichts angenehmer als das eigene Vaterland, ob es schon sonst rau und ungebaut liege." Scheuchzer, *Einladungsbrief*. In: Küster, Küster: *Garten*, pp. 14 f. (also for Bacon and the Royal Society); "Et certè, nescio quomodo insitum cuique etiam cum Ithaco fumos patriæ amare; ut mirari nemo sapiens possit, quòd in laudes domesticorum Naturae secretorum maximorumque illorum munerum, quæ Orbis Conditor nobis negata noluit, feramus." Wagner, *Historia*, 1680, "Dedicatio", p. 4.

40 "... so viel und große Wunder und herrliche Gaben der Natur sich finden, als man kaum anderstwo wird suchen oder finden können." Scheuchzer, *Einladungsbrief*. In: Küster, Küster: *Garten*, pp. 15 f.

the Zurich scholar, first because it confirmed the close ties with Britain's scientific circles, and secondly because it generated – especially in the outlying regions – fresh interest in the study of local history and natural history. There was a need to involve as many inquisitive (curious) people as possible in his project; a requirement expressed in the introductory pages, in which the naturalist appeals not only to the noble and the learned classes, but also to those who lived in direct contact with nature, fishermen, shepherds, alpine farmers, mountain dwellers:

“Here I appeal to [...] everybody, also to ordinary people who live close to nature and derive their food from her, whether as fishermen, shepherds, alpine farmers, alpine dwellers, farmers, herbs and roots gatherers, so that all – for their own honour and that of their homeland – may collect diverse facts and information about nature and [naturalistic] observations coming from anywhere, at least those that come into view and do not occur as man-made or unnaturally contrived, and that they communicate them [to me] even unsolicited, provided they care about it as much as I find it useful and convenient.”<sup>41</sup>

Like Molyneux, Scheuchzer hoped for numerous answers to his *Einladungsbrief* by his friends and correspondents and promised to name his sources in his publications.<sup>42</sup>

The genre of questionnaire was imported by him and adapted to the geography and the economy of his country. Scheuchzer follows Boyle's organisation of the questions in “Supraterraneous, Terrestrial, and Subterraneous” topics, but he also adds about fifteen queries about milk, dairy produce and cheese at the end of the text, which he saw as very typical Swiss products and basic nourishment of his countrymen.<sup>43</sup> Alps and mountains are mentioned almost twenty-five times in the *Einladungsbrief*, fourteen questions concerned snow, glaciers, avalanches or the ice.<sup>44</sup> In several cases, Scheuchzer relies on the earlier English questionnaires. For example, the first group of questions concerns the coordinates of a place, the quality of air and climate, like Boyle's did. Other questions concerning observation of local inhabitants, the weather forecast and the mountains' height, their changes and the presence of snow can be interpreted as

41 “Ich will hiemit ... auch gemeiste Leut, so mit der Natur viel umgehen und durch sie ihre Nahrung suchen, als da sind Fischer, Hirten, Sennen, Einwohner der Alpen, Baurseut, Kräuter-und Wurzengraber, daß alle zu ihrem und des Vaterlands Lob allerhand Gattungen natürlicher Begebenheiten oder Observationen von allen Orten her zusammensuchen, aufs Wenigste dasjenige, was ihnen ungefähr aufstoßet oder umsonst zukommet, auch umsonst mitteilen, wann es ihnen so lieb als mir angenehm ist.” *Ibid.*, pp. 15 f.

42 *Ibid.*, pp. 16 f.

43 *Ibid.*, questions number 175 – 189, pp. 30 f.

44 *Ibid.*, questions number 22 – 28, 34 – 36, 47, 55, pp. 19 – 21.



examples of an intertextuality between Boyle's and Woodward's questionnaires and Scheuchzer's one.<sup>45</sup>

We must not underestimate the impact of Scheuchzer's questionnaire on the regions of the Old Swiss Confederation and allied territories, particularly in the Alpine regions: here, especially in The Three Leagues (today Canton Grisons) between 1698 and the final years of his life Scheuchzer could rely on some thirty contacts (mainly with the local religious and political elites) which – if we look more closely at his works – turn out to be inexhaustible sources of information.<sup>46</sup>

The chronological evolution of contacts in this region is a clear demonstration of the domino effect produced by the invitation letter – the *Einladungsbrief* or *Charta invitatoria*.<sup>47</sup> Before its publication Scheuchzer was able to resort to only one contact, the evangelical reformed minister Giacomo Picenino, with whom he had been exchanging letters regularly since 1698. It was to be another few years before the number of the doctor's contacts – also thanks to Picenino's mediation<sup>48</sup> – rose to 15, prominent among them being clergymen and men of learning.

45 Ibid., pp. 17 f., questions number 1–15 (air, weather), pp. 97 f., questions number 97–99 (mountains, their height), p. 125, questions number 118–123 (inhabitants); see: Boyle, *General Heads*, 1666, pp. 186 f. (air, weather), 188 (inhabitants); Woodward: *Brief Instructions*, pp. 3 (weather), 6 (weather forecast). Woodward became one of the most important correspondents of Scheuchzer in London. The contacts between the two men remained very close from 1701 till 1726, on account of Scheuchzer's keen interest in the diluvial theory advocated by the English doctor in his *Essay toward a Natural History of the Earth* (1695), which Scheuchzer translated into Latin: John Woodward: *Specimen geographiae physicae*. Zürich 1704. On Scheuchzer and the diluvial theory: Michael Kempe: *Wissenschaft, Theologie, Aufklärung*. Johann Jakob Scheuchzer (1672–1733) und die Sintfluttheorie (Frühneuzeit-Forschungen 10). Epfendorf 2003. See also: Boscani Leoni: *Men of Exchange*, 2013.

46 So far researchers have considered the *Charta invitatoria* as rather inadequate, cf. Fischer, Scheuchzer, 1973, p. 76; Simona Boscani Leoni: *Tra Zurigo e le Alpi: le "Lettres des Grisons" di Johann Jakob Scheuchzer (1672–1733)*. Dinamiche della comunicazione erudita all'inizio del Settecento. In: ead., Jon Mathieu (eds.): *Die Alpen! Zur europäischen Wahrnehmungsgeschichte seit der Renaissance/ Les Alpes! Pour une histoire de la perception européenne depuis la Renaissance*. Bern, Berlin, Bruxelles 2005, pp. 157–171.

47 Correspondence from the Grisons Three Leagues accounted for 20 per cent of Scheuchzer's Swiss correspondence, while Basle (a university canton) came first, with 25 per cent of Swiss contacts, the most substantial communication axis at home. On Scheuchzer's network: Boscani Leoni, Scheuchzer und sein Netz, 2009. References to the *charta invitatoria* appear for example in the letters of Johannes Leonhardi to Scheuchzer, 12.12.1699 (Zentralbibliothek Zürich (ZBZ), Ms H 327, pp. 11 f.), 8.2.1700 (ZBZ Ms H 327, p. 30); Rudolf von Rosenroll to Johann Jakob Scheuchzer, 11.2.[1700] (ZBZ Ms H 326, pp. 361–366); Giovanni Donato Marlianico to Johann Jakob Scheuchzer, 21.8.1700 (ZBZ Ms H 327, p. 99). See also: Simona Boscani Leoni (ed.): *Vernetzte Welten. Wissenschaft, Religion und Politik in der Korrespondenz von Johann Jakob Scheuchzer. Eine Edition ausgewählter Schweizer Briefe (1695–1730)*. Basel 2013.

48 The central role played by the minister Picenino is testified in the letter he wrote to Scheuchzer thanking him for sending him many copies of his questionnaire: "Invitorias tuas accepi, quas Ill.<sup>mis</sup> Proceribus meis Aliis communicavi. Herculeu[m] tu Hercules aggraderis opus. Faveat conatibus tuis clementissime Clementissimus." [I have received your

These informants often referred to the *Charta invitatoria* in their own letters, replying quite articulately, and enclosing sketches of mountain outlines, alpine plants, minerals, crystals or again transcriptions of tales about dragons encountered by shepherds, hunters, and valley dwellers in the Alps. The 1699 questionnaire seems to have acted as a stone dropped into a pond: the circular ripples set off by the impact spread outwards to encompass friends of friends, other hunters and shepherds, in a word the voice of the local community. It is therefore a complex network that grinds into motion: the local correspondents stir into action, looking for new informants and gather unpublished material of natural history and local history.

## Natural History as Collective Task

Striking examples of this transfer of popular knowledge can be found in the correspondence of one of Scheuchzer's major informants, namely the minister of the Reformed Church Johannes Leonhardi (1655 – 1725).<sup>49</sup>

Leonhardi is among the top ten correspondents of Scheuchzer altogether: Leonhardi's *corpus* comprises, in fact, over 300 letters (purely in terms of numbers he is the most active correspondent over a 12-year period, from 1699 to 1711).<sup>50</sup>

He was active in the Three Leagues as a reformed church minister, but also as a political activist. His political commitment was aimed at strengthening the axis between the reformed churches of his country and those of England and Holland, which he had visited on various occasions. In addition to that, he was a tireless publicist in German, English and Dutch, which remains largely unknown.

From Leonhardi, Scheuchzer got a long reply to his *Einladungsbrief*: the letter is interesting in that it confirms the enthusiasm aroused in local elites by the *Einladungsbrief* or *Charta invitatoria*.<sup>51</sup> The letter is interesting, as it confirms

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questionnaires [chartas invitatorias, SBL] which I have passed on to Illustrious and influential fellow noblemen in my neighbourhood. Like Hercules indeed, you have undertaken a 'herculean' feat. May the most merciful Lord look benignly on your efforts.] Giacomo Picenino to Johann Jakob Scheuchzer, 30.10.1699, ZBZ Ms H 326, p. 101.

49 Erich Wencker: Art. Leonhardi (Linnard), Joahannes Christian. In: Biographisch-Bibliographisches Kirchenlexikon. Vol. 19. Nordhausen 2001, col. 887 – 891; his correspondence is preserved at ZBZ Ms H 327. See also: Thomas Maissen: 'Die Gemeinden und das Volck als höchste Gewalt unsers freyen demokratischen stands'. Die Erneuerung der politischen Sprache in Graubünden um 1700. In: Jahrbuch der Historischen Gesellschaft von Graubünden 131 (2001), pp. 39 – 84.

50 For an edition of Scheuchzer's correspondence: Boscani Leoni, *Vernetzte Welten*, 2013.

51 See: Boscani Leoni, *Tra Zurigo e le Alpi*, 2005.

the enthusiasm aroused by the questionnaire in the local elites. Leonhardi replies to almost thirty questions in a 15-page manuscript, devoting special attention to questions nos. 24–29, regarding what causes avalanches, their different typologies, the damage they bring about, means of avoiding them or their degeneration and to queries about milk, its conservation and possible uses also as medicine (nos. 143–144, 176–180, 184).<sup>52</sup>

Leonhardi describes the different types of avalanches (“Staublawine”, dry powder avalanche or “Windlawine”, avalanches caused by winds) and reports on several natural catastrophes due to such events, which brought death and destroyed houses, haylofts and stables. Leonhardi tells a story that was reported to him by somebody from the village of Tschierschen in the Churwalden district, a region situated near the town of Chur, a number of kilometres to the north of the village where Leonhardi resided (Nufenen, in Rheinwald, on the road that climbs up to the alpine passes of Splügen and S. Bernardino). Scheuchzer was interested in this story because it showed empirically how – by creating a thin layer of air – one could survive under the snow of an avalanche:

“At this point we cannot help mentioning the story that happened a few years ago in Tschierschen in the jurisdiction of Churwalden; there two men wanted to take home the milk that was still warm from their *salvo honore* [sic] cows in the basket that they carried on their back and they were run over by an avalanche. The first man’s basket overturned and the milk spilled out and poured over his head and neck; it created some room in front of his mouth and nose, allowing him to breathe; so he was pulled out from under the snow alive, and he lived on for years after the event. The second man, whose basket had not overturned, was found dead.”<sup>53</sup>

Scheuchzer came back to these themes in his *Natur-Geschichten des Schweizerlands* where the naturalist dwells on the description of various types of snow slides, what causes them, as well as what preventive measures have been put in place in the mountains; here, again, we see a subject to which he devoted ample space in his questionnaire. The question of how to survive under an avalanche of fresh snow was discussed by Scheuchzer in a chapter devoted to “Schnee-Lauwen” (snow slides), with an advanced reference to the Tschierschen event, and later narrated in detail in the section entitled “Historical ac-

52 Johannes Leonhardi to Johann Jakob Scheuchzer, 23.11.1699, ZBZ Ms H 327, pp. 6–10c.

53 Johannes Leonhardi to Johann Jakob Scheuchzer, 23.11.1699, ZBZ Ms H 327, p. 4: “[...] hierher/ gehört eine geschickt, welche sich vor etliche jahren zu Tschierschen, im Churwaldengericht begeben; da zwey männer ihrer S[alvo, SBL] H[onore, SBL] kühen warme milch nacher Haus tr[ugen] wolten in rückküblen; (die mann auff den rücken tragen thut) und beide von einer sneelöuwenen eingewicklet wurden; da gienge dem einte der rückkübel auff, und den milch rin[n]ete ihme über den hals und kopff hinab, und machete ihme ein wenig weite vor dem mud [sic] und nasen; den er athem holen möchte; der wurde lebendig außgegraben und hatt noch seithero zimlich lang. Aber der andere, welchem der rückkübel nicht auffgegangen, wurde tod außgegraben.”

count of all the damage caused to this day in the Helvetic lands". Here he was going back to a series of accounts of catastrophes caused by avalanches, in order to prove both the regularity and the dangerous nature of such phenomena, not be interpreted as a "mere figment of one's imagination" ("leeres hirn-gedicht"). The repertoire of natural disasters that have marked the history of the Old Swiss Confederation began with the episode of the onslaught in 1478 of the Confederate troops on Ticino's territory, which was still under Milan's rule. It took place on the St. Gotthard Pass. The Confederates were caught up in an avalanche that swept away 60 men. The list of catastrophes ended with contemporary events (namely in 1700).<sup>54</sup>

A further example illustrates the intense exchange between Scheuchzer, his correspondents and the British cultural circles close to the Royal Society.<sup>55</sup> The circulation of data based on Woodward's questionnaire is worth mentioning. Scheuchzer and Woodward were in contact since 1701. The questions formulated by the English physician in his *Brief Instructions for Making Observations* concerning the configuration of mountains and caves, also draw attention to the impact of rainfalls on the erosion of mountains and to the problem "whether their *Tops* be not covered with a *Fog*, or *Mist*; especially *before Rain*".<sup>56</sup> In an undated letter, but certainly sent between March and May 1702, Woodward posted another list of "queries concerning fogs upon the tops of high hills" to Zurich, with the aim of collecting all possible information in the field of meteorology.<sup>57</sup> To answer the questions, Scheuchzer needs to refer to his correspondents, and use their letters as a starting point for his comments:

"On the question whether before great rains and storms clouds or fogs are not observed arising out of the tops of the highest mountains, I am beholden to mountain dwellers who (alone) can determine the arrival or onset of rains or bad weather. Please accept

54 The sources mentioned by Scheuchzer are historical sources, often manuscripts: Fuesslin: *Chronicon Helveticum*, MS; Michael Stettler: *Chronic oder gründliche beschreibung [...] Nüchtlandischen Chronic*. Lib. VI, p. 274; Bullinger: *Hist. Helv.*, Lib. IX, MS; Johann Heinrich Rahn: *Eydenössische Geschichts-Beschreibung*. Zürich 1630; Johann Jakob Scheuchzer: *Beschreibung der Natur-Geschichten des Schweitzerlands*. Vol. 1. Zürich 1706, no. 39 (4 Nov 1705), no. 40 (11 Nov 1705), pp. 147–160; Georg Sulzer (ed.): *Johann Jakob Scheuchzer, Naturgeschichte des Schweitzerlandes, samt seinen Reisen über die Schweitzerische Gebürge*. Vol. 1. Zürich 1746, pp. 303–307.

55 Cf. Michael Kempe: *Die Anglo-Swiss Connection. Zur Kommunikationskultur der Gelehrtenrepublik in der Frühaufklärung*. In: Robert Seidel (ed.): *Cardanus. Wissenschaftshistorisches Jahrbuch der Universität Heidelberg*. Vol. 1: *Wissen und Wissensvermittlung im 18. Jahrhundert. Beiträge zur Sozialgeschichte der Naturwissenschaften zur Zeit der Aufklärung 1* (2000), pp. 71–91; Simona Boscani Leoni, *La ricerca*, 2007.

56 Woodward, *Brief*, p. 6. Italics are Woodward's.

57 John Woodward to Scheuchzer, undated (but March–May 1702), ZB Ms H 294, p. 85. About this topic: Katharine Anderson: *Predicting the Weather: Victorians and the Science of Meteorology*. Chicago 2005.

this time [illegible word] this observation on rain. At Filisur in Rhaetia they have this proverb in Rhaetic language: *Cura ch'il pitz da Stiervi fo chiapi, schi lascha der la fotsch, et piglia il rasti* (this Rhaetic language, in common parlance called 'Romantsch', is a corrupt form of Italian dialect). The proverb means: When the top of Mount Stierwis [Stierva/Stürvis] (two miles to the west of Filisur) is shrouded in fog or cloud, cast aside your scythe, with which one cuts the grass, and pick up the rake, with which one gathers in the corn crops, because the rain is coming.<sup>58</sup>

The quotations are from a letter of the pastor of the reformed church Johann Leonhardi dated February 1700:

"In answer to question 9 of the charta invitatoria: here at Nufenen when the mountain (called Cucarnil) that towers over the village is wrapped in fog, or clouds, one may expect rain or bad weather the same evening or on the following day. Indeed I remember that a popular proverb in Filisur warns: "*Cura ch'il pitz/ da Stiervi fo chiapi, schi lascha dar la fotsch et piglia il rasti*", in other words: when the top of Mount Stierwis [Stierva/Stürvis], which stands some three to four hours' walk to the west, is covered or hidden behind clouds, you should abandon your scythe and pick up your rake because it will be raining soon."<sup>59</sup>

The same reflections return in *Itinera alpina* of 1708, a book published with the financial support of the Royal Society, which contains the accounts of his alpine travels:

"The issue of early-warning signs for rain I am not going to forget, but will demonstrate it later, with further new observations made by mountain dwellers. At *Filisur* in Raethia one can hear the following proverb: *Cura ch'il pitz da Stiervi fo chiapi, schi lascha dar la fotsch et piglia il rasti*. In Rhaeto-romantsch, which is an Italian dialect, it means: *When the top of Mount Stierwis, located two miles to the west of Filisur, is shrouded in clouds*

58 Johann Jakob Scheuchzer to John Woodward, 8.6.1702, ZBZ Ms H 150a, pp. 116 f. "Ad questionem whether before great rains and storms clouds or fogs are not observed arising out of the tops of the highest mountains, scias, inde certissium alpicolis desinui pluviarum et tempestatum Indicia. Accipe hâc vice [...] eamque pluviosam observationem. Filisurij in Rhaetia [restitas] viget Proverbium lingua Rhaetica: Cura ch'il pitz da Stiervi (lingua haec est Rhaetica Romana vulgò dicta Italicae corruptae dialectus) fo chiapi, schi lascha der la fotsch, et piglia il rasti. Sensus hic est: *Quando cacumen montis Striewis quo duobus circiter miliaribus distat Filisuris versus occasum capitium facit, id est nube veluti pileo cingitur abyf falcem, qua secatur foenum, et accipe Rastrum, instrumentum aliud quo foenum in cervos colligitur: quod instet pluvia*", *ibid.*, p. 116.

59 Johannes Leonhardi to Johann Jakob Scheuchzer, 8.2.1700, ZBZ Ms H 327, p. 32: "Ad quaest. 9. chartae invit: Wann mann hier zu Nuffenen einene kleinen Nebel, oder wolken, auff einen berg, so grad gegen dem dorff über ligt, und Cucarnil genen[n]et wird, sieht, so hatt mann gemeinlich an des selbigen tags abend, oder am anderen tag einen starke/ regen, oder ungewitter zu erwarten – So errinneren ich mich/ auch daß zu Fillisur ein gemein Spruchwort ist: *Cura ch'il pitz/ da Stiervi fo chiapi, schi lascha dar la fotsch et piglia il rasti*. das ist: *wann der Spitz zu Stiervis [Stierva/Stürvis] (so 3. oder 4. stund von fillisur, gegen abend ligt) kappen macht; oder mit einem wolklein bedeckt/ wird, so lasse die Sägesen fallen, und nim[m]e dem rachen: anzeigende/ es volge gemeinlich bald ein regen darauff.*"

*or fog, get rid of your scythe, which you use to cut the hay, and pick up your rake which you use to gather and stack it up, because it is about to rain. In Nufenen, too, a village close to the source of the Rhein, if you notice fog patches or clouds on or around the mountain, you can predict rain.*"

A couple of lines below, he remembers the belief of the inhabitants of Nufenen, which says that if clouds cover the top of the mount Cucarnil a stormy rain will afflict the region. The reference to Leonhardi's letter in *Itinera alpina's* text is integrated in a section dedicated to the rain forecast. Scheuchzer mentions here different popular proverbs collected during his travels or through correspondence; he compares them with other observations found in literary sources like Jean Du Choul's *De varia quercus historia: accessit Pilaty montis descriptio* (Lugduni 1555) and Johann Leopold Cysat's *Beschreibung dess Berühmbten Lucerner See* (Luzern 1661).<sup>60</sup> Scheuchzer indicates the contradiction between the different (popular) traditions, and promises the readers an accurate research in the field, as John Woodward had suggested to him.<sup>61</sup>

Another topic attracting a good deal of debate, which was also discussed in *Historia naturalis Helvetiae curiosa* by Johann Jakob Wagner (Zurich 1680), was the presence of dragons.<sup>62</sup> In his book, Wagner mentioned several dragons observed in Switzerland; he reports different sources of information (from letters) from people he considered trustworthy.<sup>63</sup> It was rumoured that there were a number of them inhabiting the Alps, and Scheuchzer argues the question at

60 Jean Du Choul : *De varia quercus historia: accessit Pilaty montis description*. Lugduni 1555; Johann Leopold Cysat: *Beschreibung dess Berühmbten Lucerner oder 4. Waldstaetten Sees und dessen Fürtrefflichen Qualiteten und sonderbaaren Eygenschaftten*. Darinnen gemeldet wirdt Der Ursprung dess Flusses Ursa oder Reuess, dessen Lauff jnn- und auf dem See: dess Sees länge breite tieffe und wie mancherley herrlicher guter Fisch in demselben zufinden. Luzern 1661.

61 Johann Jakob Scheuchzer: *Oyresiphonites Helveticus sive itinera alpina tria*. London 1708, pp. 16 f. "Materia hancce de *Signis Pluviarum* non ante dimitto, quam aliis homogeneis novisque Observationibus ab Alpicolis factis illustravero. *Filisurii* in Rhaetiâ usitatum est Proverbium: *Cura ch'il pitz da Stiervi fo chiapi, schi lascha dar la fotsch et piglia il rasti*. Sensus Linguae Rhaeticae, quae est Italicae Dialectus, hic est: *Quando cacumen montis Sterwis, qui duo circiter milliaria distat à Filisurio versus occasum, capitium facit*, id est, nube velut pileo cingitur, *abjice falcem*, quâ secatur foenum, & *accipe rastrum*, instrumentum, quo foenum in acervos colligitur, quod pluvia instet. Ita quoque *Novenae*, qui pagus haud longè distat ab origine Rheni, si conspiciatur nubacula vel nubes in monte *Cucarnil*, praedicunt Incolae pluviam procellosam." Italic in the original text. The same considerations come back in Johann Jakob Scheuchzer: *Der Natur-histori des Schweitzerlands*. Vol. 1. Zürich 1716, p. 268: "Von dem Cucarnil-Gebirg ist dieses auch ramarquabel, daß wann bey schönem Wetter ein Nebel-oder Wölklein fast im mitten im Berg sich sehen laßt, das gemeinlich am anderen Tag ein Regen folget." [Mount Cucarnil is remarkable in this, when in fair weather you happen to see some fog or a little cloud halfway up the mountainside, you know that as a rule there will be rain the day after.]

62 Wagner, *Historia*, 1680, pp. 245–254.

63 *Ibid.*, e. g. pp. 248, 251.

length in his *Itinera alpina*, providing a detailed description of Swiss dragons, canton by canton, “exactly as I have myself come across found in sources be they manuscript or in print, or as was reported to me”.<sup>64</sup> At the end of his long reply to the *Einladungsbrief*, Leonhardi mentioned an account by eyewitnesses who saw some dragons in the Alps.<sup>65</sup> He sent this account to Zurich some time later, as answer to Scheuchzer’s several questions about this topic in his *Einladungsbrief*.<sup>66</sup> The accounts mentioned eyewitnesses from the area, for instance the story told by the shepherd Bartolomeo Alegro da Ponte (a locality in the jurisdiction of Piuro in Valtelline), related to Leonardi by the minister of the reformed church Peter de Juvalta, at Stuls (near Bergün in Grisons). In his letter sent to Zurich on 12 December 1699, Leonhardi transcribed the account received from Bartolomeo Alegro to the clergyman (which the latter had forwarded to Leonhardi on 29 October 1699) of the encounter the man had had with a dragon on the mountain of Foppatsch, in the Alps of Stuls, three years previously. The dragon allegedly had the head of a ginger cat, its paws covered in fish scales, tongue like a serpent’s and a forked tail. The shepherd claims that he managed to kill the monster, whose carcass was reportedly eaten up by insects in the space of three days. An animal like that one, asserted Leonhardi, had supposedly been seen flying by the inhabitants of the region twenty years earlier in the skies above the mountain of Foppatsch. The Zurich scholar, in *Itinera alpina* as well as in *Naturgeschichten*, returns to this letter, stating as its source the letter from the reformed minister de Juvalta, dated 29 October 1699 (but postdating it, arguably by mistake, to 29 October 1702). Dragons with similar characteristics were, in his opinion, to be found in Georgia and in other European regions: this is borne out in the work of Paolo Giovio (1483 – 1552).<sup>67</sup>

These examples show that, for Scheuchzer, local testimony was sound and valuable and, being contextualised and compared with other kind of sources, could be reused in his books.<sup>68</sup>

64 “[...] wie ich dieselbe in gedruckten oder geschriebnen Urkunden gefunden, oder aus Erzählungen gehört habe.” Sulzer (ed.), Johann Jakob Scheuchzer, 1746, vol. 2, p. 221; Johann Jakob Scheuchzer: *Oyresiphonites Helveticus sive Itinera per Helvetiae alpinas regiones facta annis 1702 – 1707, 1709 – 1711*. Leiden 1723, pp. 378 – 397.

65 Johannes Leonhardi to Scheuchzer, 23. 11. 1699, ZBZ Ms H 327, p. 10c.

66 Scheuchzer, *Einladungsbrief*. In: Küster, Küster, Garten, 1997, p. 29, question no. 166: whether dragons have wings, feet, which form, colour and size they have, etc.

67 Sulzer (ed.), Johann Jakob Scheuchzer, 1746, vol. 2, pp. 235 f. (Journey through the Alps no. 5, 1706; German text); Johann Jakob Scheuchzer: *Oyresiphonites Helveticus sive Itinera per Helvetiae*. Leiden 1723, pp. 393 f. (Latin text), the inventory of dragons in the different regions of the Confederation begins on p. 37. Johannes Leonhardi to Johann Jakob Scheuchzer, 12. 12. 1699, ZBZ Ms H 327, pp. 11 f. See: Simona Boscani Leoni: *Johann Jakob Scheuchzer (1672 – 1733) et la découverte des Alpes*, 2008.

68 Boscani Leoni, *Men of Exchange*, 2013.

## Conclusion

The quoted examples suggest more general reflections on the spread of knowledge in the modern age. The success of “heads” and “queries” in early modern England can be understood as further proof of the influence of Bacon’s research strategies deployed by the early Royal Society. This success and the import of the genre to the Continent show how important it was to develop practical approaches to conduct empirical research of a territory and to gather new information and data, especially since this was a process, which involved people from different educational backgrounds. “Queries” or “general heads” became a useful instrument for the systematic collection of empirical data on a region, to allow broader comparisons between different territories and to test the adequacy of scientific generalizations.

The Swiss naturalist Scheuchzer seems to have played a central role in importing and adapting the Baconian science to the Continent. As an authentic historian of nature, he collected all information available from every possible source (eyewitnesses, letters, books, field research, travels), compared them and gave them space in his publications in a polyphonic, eclectic way.

The curiosity for a more practical knowledge was not only motivated by pure scientific interest. It was at the same time inspired by religious motivation, often combined with a physico-theological attitude, and by a patriotic economical interest. Discovering local nature and including popular knowledge in publications in the field of natural history was meant to not only show the beauty of a territory, as a region blessed by God, but also to show its economic, mercantile utility.

These examples prove that early modern questionnaires were sometimes successful: the answers via letters clearly show the existence of a sort of “horizon of expectations” common to the educated classes (both urban and not). From this point of view, the interest in collecting observations on natural history was an ideal that spread not only across the educated urban elites, but which overlapped with a patriotic mission of promoting knowledge of one’s homeland.

These considerations emphasize once more that the practice of natural history in early modern Europe was a collective enterprise, involving well-educated scholars as well as a larger group of “curiosi” (sometimes members of the elites, sometimes simple, less cultured people).

The stimulus for investigating local nature which had originated and was adopted from the cultural centres was echoed among local elites and not only there. These, in turn, by selecting topics according to their own priorities, and questions they chose to answer, defined and gave shape to the image of natural history of the territory which scholars – thanks their wide-ranging networks and their contacts with societies and academies – were subsequently to deliver and



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distribute on the international market of knowledge. How the “invention” of the local nature was also an invention of a local “anthropological identity” seems to me the next interesting question to be discussed.

