
Contents

Acknowledgments	xi
Introduction	xiii
Émilie KOHLMANN	
Part 1. Extending Links through Digital Devices	1
Chapter 1. Benchmarks: Biodiversity, Participation and Digital Technology	3
Émilie KOHLMANN and Catherine GAUTHIER	
1.1. 20th century: the pioneers	4
1.2. 2000–2009: obtaining reliable data accessible to all	7
1.3. 2010–2014: technological acceleration and international expansion via global observation programs.	9
1.4. 2015–2022: optimized exploitation of big data by the scientific community versus hijacking of observation devices by the “general public”	11
1.5. Conclusion	12
1.6. References	13
Chapter 2. The Documentary Links of Herbarium Collections and Their Communicative Stakes	15
Lisa CHUPIN	
2.1. Introduction	16
2.2. The constructive documentary and social links of herbaria	17
2.2.1. Intra-documentary and inter-documentary links between collections	17
2.2.2. Inter-documentary links at the heart of knowledge production	19
2.2.3. Documentary links as traces of social ties between botanists	20

2.3. Databases as vectors of new documentary, social and symbolic links	21
2.3.1. Creation of a new reference system between image, field and specimen	21
2.3.2. Hypertextual enhancement of inter-documentary links in collections	22
2.3.3. Stronger links between naturalist institutions and their users	26
2.4. The new sociabilities of Internet users enriching herbarium data	26
2.4.1. Hyperlinks linking herbaria, contributors and collection enrichment	26
2.4.2. The quest for quality in participatory data at the origin of the creation of new social ties	28
2.4.3. Herbonauts' links with naturalist sociabilities and motivations	30
2.5. Conclusion	31
2.6. References	32
Chapter 3. Investigating the Relationship with Nature in the Animation of Wineries' Facebook Pages	35
Marie-Caroline HEID and Catherine DE LAVERGNE	
3.1. Ethnographic analysis of the Facebook pages of the Pic Saint-Loup estates	37
3.2. Standardization of publishing on Facebook	38
3.3. Cross-sectional analysis of actants related to nature	40
3.3.1. Pic Saint-Loup and Hortus: nature, terroir and territory	40
3.3.2. Vines: nature personified	41
3.3.3. The heath and wild and cultivated flora: between admiration and use	41
3.3.4. Shrubs and olive trees: biodiversity and crop diversification	41
3.3.5. Farm and domestic animals: main characters or extras	42
3.3.6. Wildlife (birds, frogs, insects): between wonder, beneficial cohabitation and respect for wild nature	43
3.3.7. Soil, earth: the matrix	43
3.3.8. Materials and techniques: a behind-the-scenes look at the trade, between tradition and modernity	44
3.3.9. The weather: nature's giver and taker	45
3.4. Diversity of relationships with nature, valuation principles and underlying values	45
3.5. Conclusion	49
3.6. References	50
Chapter 4. Forms of Linking with Nature and with Others through a Digital Device: "Let Them Know and Participate"	53
Émilie KOHLMANN	
4.1. The presupposition of digital technology as a link-builder: the Nature-Isère project	55
4.1.1. The Nature-Isère project: a digital dynamic to create links	55

4.1.2. The digital injunction for partners: linking data	58
4.2. Analysis of the system: creating links through digital technology?	60
4.2.1. A platform that embodies the implicit link between digital devices and contributions in the field	61
4.2.2. A platform that creates links between contributors?	63
4.3. Institutions, representations and digital technology: the limiting link.	66
4.3.1. Partnership links and institutional expectations	66
4.3.2. The link between knowledge and participation.	67
4.3.3. The materiality of the digital link	68
4.4. Conclusion	69
4.5. References	70
Part 2. Link Materiality and Structure: Generating Data on Nature	73
Chapter 5. Explainable Artificial Intelligence for a Better Understanding of Naturalist Data	75
Ikram CHRAIBI KAADOU	
5.1. The need for explainable artificial intelligence for naturalist data.	76
5.2. Artificial intelligence, machine learning and deep learning definitions and challenges.	78
5.2.1. Definitions.	78
5.2.2. More efficient but less transparent	81
5.3. Explainable AI: general presentation.	84
5.3.1. Explainable AI: human-centric AI.	84
5.3.2. Target audience and explanation in XAI	85
5.3.3. Dimensions and strategies in explainable AI: a technical aside.	87
5.4. Explainable AI for naturalist data: concrete examples	90
5.4.1. Explainable AI and biodiversity	90
5.4.2. Explainable AI and the impact of climate change on biodiversity	92
5.4.3. Explainable AI and smart farming.	94
5.5. Discussion: XAI to empower everyone in the field of naturalist data.	97
5.6. References	98
Chapter 6. Pooling Biodiversity Databases: Linking Data, Linking Actors	103
Camille BERNARD	
6.1. Database developments in the field of biodiversity.	106
6.1.1. Increase in the volume of biodiversity data due to evolving practices and tools	106
6.1.2. From quantity to quality: the need for data standardization?	107
6.1.3. Towards open and linked data on the Web	110

6.2. Linking actors in order to link data	116
6.2.1. Linking actors	116
6.2.2. Aligning concepts in order to link data	118
6.2.3. Obstacles to the sharing and opening up of databases	121
6.3. Conclusion	122
6.4. References	123
Chapter 7. The Challenges and Implementation of the LPO Auvergne-Rhône-Alpes Naturalist Information System	127
Daniel THONON	
7.1. The evolution of naturalist data management	128
7.1.1. Data collection before computerization: 1973–2000.	129
7.1.2. The beginnings of computerization: early 2000s.	130
7.1.3. An initial centralized system: 2007–2009.	131
7.1.4. The current system: since 2009	132
7.2. Functions of the naturalist information system	133
7.2.1. General presentation	133
7.2.2. Animating observer networks: the human link	135
7.2.3. Gathering information: public input.	136
7.2.4. Validating data: the link between experts and observers	141
7.2.5. Data enhancement	143
7.2.6. Exchanging with other information systems: linking different databases	144
7.2.7. Managing repositories	146
7.3. Conclusion	146
7.4. References	147
Part 3. Gains and Losses: Questioning the Link to Nature.	149
Chapter 8. Complementarity of Big Data and Citizen Participation in Monitoring Plant Biodiversity	151
Pierre BONNET, Alexis JOLY and François MUNOZ	
8.1. Introduction	152
8.2. The Pl@ntNet platform	153
8.2.1. Origin and operation	153
8.2.2. Individual use	153
8.2.3. Pl@ntNet “groups”	154
8.3. Diversity of uses and implications	155
8.3.1. Quantitative analysis of Pl@ntNet “groups”	155
8.3.2. Qualitative analysis of uses	156

8.4. Discussion	157
8.4.1. Current limitations	157
8.4.2. Perspectives	158
8.5. Conclusion	159
8.6. References	159
Chapter 9. New Automatic Identification Tools: An Aid for Botanists and Nature Managers?	161
François MUNOZ and Pierre BONNET	
9.1. Introduction	162
9.2. Interviews and testimonials	163
9.2.1. Interviews	163
9.2.2. Social networks	165
9.3. Discussion	168
9.3.1. Challenges and opportunities of uncertainty	168
9.3.2. Diverse expectations and uses	170
9.3.3. Citizen science	170
9.3.4. Perspectives	171
9.4. Conclusion	172
9.5. References	173
Chapter 10. The Contribution of New Technologies to Our Experiences of Nature	177
Minh-Xuan TRUONG	
10.1. Introduction	178
10.2. From embodied experience to techno-mediated experience	180
10.3. The smartphone, a multifaceted mediator of our experiences of nature	181
10.4. Virtualized experiences of nature, from social networks to video games	183
10.5. What can be done with these experiences?	185
10.6. References	186
Chapter 11. Belonging to the World to Think of the Link: The Relationship with the Natural Environment as a Crucible of Relatedness	191
Amélie COULBAUT-LAZZARINI	
11.1. Introduction	192
11.1.1. A foothold: the mid-mountain region	193
11.1.2. Context: transitions, end of lockdown and links to the environment	193
11.1.3. Methods	194

11.2. Activities, environment and relationship to self	194
11.2.1. The natural environment as a medium for intrapersonal communication?	194
11.2.2. Physicality as a means of expressing a link	197
11.3. Collaboration and relationships with others	198
11.3.1. Collaboration, interaction and sharing among leisure users	198
11.3.2. Territorial communication supported by the regional natural park: co-developed tools for a shared vision.	200
11.3.3. Human territorial communication	202
11.4. Experiences of connection and relationships with the world	203
11.5. Relatedness, the link between links?	205
11.6. Openness: the missing link	206
11.6.1. From bodies to thoughts	206
11.6.2. In search of imaginary worlds	206
11.7. References	207
Conclusion	209
Émilie KOHLMANN	
List of Authors	215
Index	217