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Lauri Myllymaa

Two Sources of Knowledge

Origin and Generation of Knowledge in Maine de Biran and Henri Bergson

UNIVERSITY OF JYVÄSKYLÄ
FACULTY OF HUMANITIES AND SOCIAL SCIENCES

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ABSTRACT

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It is important for the theory of knowledge to understand the factors involved in the generation of the capacities of knowledge. In the history of modern philosophy, knowledge is generally held to originate in either one or two sources, and the debates about these sources between philosophers have concerned their existence, or legitimacy. Furthermore, some philosophers have advocated scepticism about the human capacity to understand the origins of knowledge altogether. However, the developmental aspects of knowledge have received relatively little attention both by past philosophers and in current philosophical discussions. This dissertation provides a historical approach to this developmental problem of knowledge by interpreting the developmental theories of knowledge of Maine de Biran (1766–1824) and Henri Bergson (1859–1941) from the perspective of a theory of the 'generative factors of knowledge.' It first studies the philosophies of Maine de Biran and Bergson separately and then brings together and compares the metaphilosophical aims drawn from these philosophers. The dissertation's novel analysis, provided by its theory and structure, has far-reaching consequences. From a wide point of view, it fills in considerable scholarly gaps and provides great opportunities for future research in the study of the history of philosophy. From more specific points of view, it provides its most decisive contributions in such metaphysical and epistemological topics as the nature of causality, self-generated activity, the role of effort in knowing and learning, the complementary relationship between philosophy and science, and the non-conceptual basis of knowledge.

Keywords: Bergson, Henri (1859–1941), cognition, creativity, development, generation, history of philosophy, history of science, knowledge, learning, Maine de Biran (1766–1824), metaphilosophy, metaphysics, metascience

TIIVISTELMÄ (ABSTRACT IN FINNISH)

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Tietoteorialle on tärkeää ymmärtää tietokykyjen kehittymiseen liittyvät tekijät. Uuden ajan filosofiassa tiedon on yleensä nähty saavan alkunsa joko yhdestä tai kahdesta lähteestä, ja useat kiistat tiedon lähteistä filosofien välillä ovat koskeneet tiedon lähteiden olemassaoloa tai pätevyyttä. Lisäksi jotkut filosofit ovat kannattaneet skeptisismiä koskien ihmisen kykyä ymmärtää tiedon alkulähteitä. Tiedon kehitysteoreettiset näkökulmat ovat kuitenkin jääneet melko huomiotta sekä menneillä filosofeilla että nykyisissä filosofisissa keskusteluissa. Tämä väitöskirja tarjoaa historiallisen tulokulman tiedon kehittymisen ongelmaan tulkitsemalla Maine de Biranin (1766–1824) ja Henri Bergsonin (1859–1941) tiedon kehitysteorioita "tiedon generatiivisten tekijöiden" teorian näkökulmasta. Ensin se tutkii Maine de Biranin ja Bergsonin filosofioita erikseen, jonka jälkeen se tuo näistä kahdesta tutkimuksesta johdetut metafilosofiset tavoitteet yhteen ja vertailee niitä keskenään. Väitöskirjan teoriaan ja rakenteeseen perustuvalla uudenlaisella analyysilla on kauaskantoisia seurauksia. Laajasta näkökulmasta katsottuna se täyttää merkittäviä tieteellisiä aukkoja ja avaa uusia suuntia filosofianhistoriallisessa tutkimuksessa. Täsmällisemmistä näkökulmista katsottuna se tarjoaa merkittävimmät panoksensa erityisesti kausaalisuuden luonnetta, itselähtöistä toimintaa, ponnistuksen roolia tietämisessä ja oppimisessa, filosofian ja tieteen toisiaan täydentävää suhdetta ja tiedon ei-käsitteellistä perustaa koskevissa metafyysisissä ja epistemologisissa aiheissa.

Asiasanat: Bergson, Henri (1859–1941), filosofian historia, generatiivisuus, kehittyminen, kognitio, luovuus, Maine de Biran (1766–1824), metafilosofia, metatiede, metafysiikka, oppiminen, tieteen historia, tieto

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PREFACE

I have always preferred the world in which we live, move, and have our being over the words we use. Nonetheless, I have become a researcher of philosophy, with nothing but endless piles of books full of dead letters in front of me. However, these dead letters, if I may use a judicial term, are the estates of spirits that have once lived. Every living philosopher has held in their mind a specific understanding of reality, which they have tried to express using language as clearly as they could. Therefore, philosophy faces an interesting dilemma. On the one hand, it is a discipline whose most apparent data are philosophy books and articles; on the other hand, this apparent data can never be fully equated with its actual substance, that is, the thoughts of philosophers themselves, of which the apparent data is only a translation.

For a decade, I have been interested in studying the nature of philosophy itself. My interest has increasingly focused on developmental and evolutionary explanations of thinking and cognition in general. I want to know the very origins of philosophical and scientific thought. In short, I want to go *ad fontes* from which the highest human intellectual capacities well up. I believe that a clear knowledge of the principles, or the facts we are sure about, in the way we are sure about our own existence for instance, is indispensable for philosophical research. A variety of philosophers have sought the origins, genesis, or foundations of knowledge. Out of this variety, I found two prominent philosophers.

My motivation for the realisation of this dissertation appeared to me in three steps. First, I started focusing on Maine de Biran and Bergson because they are still little-known philosophers in the history of philosophy, and their historical context of nineteenth-century French philosophy is largely unknown for much of the philosophical research community and for the general public. In studying these two philosophers, my attention was drawn to their views on the developmental aspects of knowledge, thought, and cognition. During this second step, I realised that there are not many developmental approaches to the nature of knowledge in philosophical discourses. The second step provided me a third, assuring step according to which I abstracted the idea of the *generation* of knowledge from Maine de Biran and Bergson. Proceeding through these steps, I was increasingly assured of the necessity to realise this dissertation. It provides an elaborated interpretation of two nowadays little-known philosophers from an approach left mainly unheeded.

It is not up to me to decide what is important for others, or for philosophy, but here are certain elements I find important to mention here that are more or less explicitly expressed in the main chapters. First, this dissertation provides an

interpretation of Maine de Biran and Bergson that bring forth their aim at clarity and explicitness. We find in both philosophers a profound sense of analyticity, a mastery of reformulating and positing problems, and tracing the causes of perennial problems in philosophy into their originating sources, which requires painstakingly deep intellectual effort. I believe that these skills should be the primary virtues of philosophical research. The second important element is the conservative optimism found both in Maine de Biran and Bergson. If philosophy and science are to be understood as two distinct cognitive activities, and if the origin and generation of these cognitive modes are clarified, the division of and relationship between philosophy and science is based on a positive foundation. This cognitive approach also clarifies the nature of different scientific fields. Both Maine de Biran and Bergson were developers and defenders of the independence and positive nature of the life sciences and human sciences. In addition, both philosophers hold that there is no rivalry, but a *complementarity* between philosophy and science – provided that the disciplines are well-defined. They give us the assurance that, if we understand their nature clearly, philosophy and science do not threaten each other's existence but instead one complements the other. Finally, both Maine de Biran and Bergson have solid confidence in the capacities of human intelligence and intersubjective collaboration.

This study will reconstruct the philosophies of Maine de Biran and Henri Bergson according to their developmental approach to knowledge. It will utilise several discussions and themes in the history of philosophy and the history of science, as well as show their deep interconnectedness. It will also deliver several metaphilosophical insights that it draws from Maine de Biran and Bergson.

Even though Bergson was aware of Maine de Biran's philosophy, the two philosophers began their philosophising from rather different circumstances. Hence, we should anticipate familiarity but not a straightforward influence between them. For is there not something inviting when two paths, starting independently from each other, close in, and perhaps meet at some point?

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While working on my dissertation, I have received the first-rate supervision from professor Jari Kaukua, Dr. Jussi Backman, and, in the first stages of the process, academy professor Sara Heinämaa. I owe you my deepest gratitude for your contribution. I honourably thank the reviewers of the dissertation manuscript, Dr. Alessandra Aloisi and Dr. Mark Sinclair. Furthermore, I appreciate Aloisi's decision to willingly act as my opponent. I am grateful to Emily Herring, who, as a Bergson scholar herself, I was lucky to have proofreading the manuscript.

Finally, there are those who generate the deepest intellectual effects in one's personality through love and admiration. I thank two of my colleagues and closest friends, Katariina Lipsanen and Ronny Puustinen, who have partaken in my intellectual development for almost a decade. More recently, but by no means less importantly, I am grateful for the intellectually important friendships I have established especially with Tiia-Mari Hovila, as well as with Olli-Pekka Paananen and Hanna-Kaisa Paananen. Moreover, I cannot fail to thank Niko Aaltonen, who has been my longest standing friend since childhood. There are several persons who are not mentioned here and rightly deserve my recognition, and I hope they feel my gratitude in their hearts. Finally, my deepest, unconditional respects go to my parents, Leena and Tapio.

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PART I: INTRODUCTION AND THEORETICAL FRAMEWORK

INTRODUCTION

Origins of knowledge

Human knowledge must originate in or develop from something. On the one hand, knowledge needs some source of data; on the other hand, knowing needs the faculties of cognition. This dissertation studies the philosophies of two eminent French philosophers, Maine de Biran and Henri Bergson. To understand the philosophical significance of this topic, I am focusing on developmental theorisations in these philosophers. To accomplish this task, I have developed a theory that I call *generative factors of knowledge*. Lastly, I will bring together the metaphilosophical aims that I have abstracted from Maine de Biran and Bergson and compare them with one another. To introduce this central topic of the dissertation at hand, let us start with a concise historical explication of the philosophical theories of the origin of human knowledge.

In the beginning of modern philosophy, one prominent approach has been René Descartes's (1596–1650) rationalist approach that maintains that there are innate principles in human thought that do not derive from external sensation. Another prominent approach has been John Locke's (1632–1704) empiricism, in which the sources of knowledge are external sensation and internal reflection, but that all mental representations originate only from sensation. In his answer to Locke, Leibniz appears to state his and Locke's shared view on the duality of human cognition by complementing the Peripatetic axiom: to *nihil est in intellectu quod non prius fuerit in sensu*,[1] Leibniz added *nisi intellectus ipse* (Leibniz [1765] 1966, 2.1.2).[2] I find it credible to state that there never was a consensus between the early modern philosophers about the nature and status of the innate factors of knowledge.

It is thus possible that because of the lack of an early modern consensus about the innate factors of knowledge, an increasing number of eighteenth-century philosophers aimed to explain the origin of knowledge from merely one source, namely the senses, which even Locke did not consider to be the only source. As one of the most prominent eighteenth-century philosophers, Étienne Bonnot de Condillac (1714–1780) reformulated Locke's empiricism by stating that the ideas of reflection originate from external sensation, as well. This meant that there is only one source of knowledge, and Condillac tried to prove that even the Lockean ideas of reflection originate in external sensation.

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[1] 'there is nothing in the understanding that was not earlier in the senses'

[2] 'except the understanding itself'

After Condillac, the most influential philosophers, who have maintained the validity of only one source of knowledge in the nineteenth century, have been Auguste Comte (1798–1857) and Herbert Spencer (1820–1903). For instance, Spencer recognised that there appeared to be two differing views on human knowledge that he called *relative* and *absolute*. However, knowledge can only be based on relative knowledge because thought always conditions the subject matter of thought (Spencer [1862] 2009, 74–76). *Absolute* for Spencer means knowledge that attains the thing in itself, as such, unconditioned by the human capacity of knowledge. Science is the project that aims towards the perfection of relative knowledge, and there is no legitimate place for absolute knowledge among intellectual disciplines.

The division of human knowledge into relative and absolute has been one of the essential subject matters under debate throughout modern philosophy. For Descartes, knowledge is either absolute (*absolutum*) or relative (*respectivum*) according to the aims of human cognition (AT X, 381, cf. 381–387; CSM I, 21, cf. 21–24).[3] The object of knowledge is absolute when it is thought in itself and relative when it is thought through other things. This definition was used in slightly different contexts in certain key eighteenth-century philosophers, such as Condillac and Immanuel Kant (1724–1804) (Condillac [1749] 2014, 146; Kant [1781/1787] 1998, A234/B380–A236/B382).

In the nineteenth century, the critique of absolute knowledge was especially important for Comte, William Hamilton (1788–1856), John Stuart Mill (1806–1873), and Spencer. Comte shared the view of many earlier philosophers, according to which there is an essential distinction between absolute knowledge and relative knowledge (Comte 1844, 13–14; cf. Grange 1996, 53–56). However, he denied the validity, or the very possibility of absolute knowledge. Mill put Comte's central idea as follows:

> We have no knowledge of any thing but Phenomena; and our knowledge of phenomena is relative, not absolute. We know not the essence, *nor the real mode of production*, of any fact, but only its relations to other facts in the way of succession or of similitude. (Mill 1887, 7, my emphasis.)

From Mill's reading, we can see that Comte had two forms of explanation that are connected with two forms of knowledge: 1) an explanation by succession and similitude results in relative knowledge, and 2) an explanation by production, that is, development or generation, results in absolute knowledge. However,

[3] I use established abbreviations of Descartes' standard editions by Adam and Tannery (AT), *Œuvres de Descartes*, 11 vols, and Cottingham, Stoothoff, Murdoch, and Kenny (CSM/CSMK), *The Philosophical Writings of Descartes*, 3 vols. See bibliography for further details.

according to Littré (1864, 44), a matured science in Comte's regard does not search for essences of things, which belong to 'absolute metaphysics' and not to science. Matured, positive sciences rely only on the association of phenomena either by their observed succession or by their perceived resemblance. Hamilton largely shared Comte's view on the nature of knowledge:

> [A]ll human knowledge . . . is only of the relative or phænomenal. In this proposition, the term relative is opposed to the term *absolute*; and, therefore, in saying that we know only the relative, I virtually assert that we know nothing absolute, . . . that is, in and for itself, and without relation to us and our faculties. (Hamilton 1860, 136–137.)

Hamilton classified different approaches to absolute knowledge. Absolute knowledge is attained either suddenly or gradually; cognition of absolute knowledge is either in opposition to conceptual reasoning or takes part in conceptual reasoning; this cognition either coincides with its object or coincides with some absolute entity with, for instance, God; either the knowledge or the knower is absolute; absolute knowledge either is something other than knowledge proper or takes part in knowledge proper (Hamilton 1860, 683–684). Hamilton's concise classification is comprehensive, and it gives us the idea of the equivocal nature of absolute knowledge. Nonetheless, we can abstract one important common property from all these different definitions: *absolute* means that knowledge attains something *in itself*, unconditionally. This unconditional nature of absolute knowledge was denied by Hamilton and others.

For Spencer, the impossibility of absolute human cognition was provable. 'Proof that our cognitions are not, and never can be, absolute, is obtainable by analysing either the *product* of thought, or the *process* of thought' (Spencer [1862] 2009, 69). The critique of Spencer, Hamilton, and others was elaborate, and I have not the opportunity to analyse them further in this context. For now, let us accept that their conclusions about the impossibility of human thought to attain absolute cognition were legitimate, if we consider human thought to comprise only concepts and phenomenal perceptions. However, we have good reasons to doubt that human cognition comprises only conceptual thoughts and phenomenal perceptions. Thus, what if human thought was instead proved to comprise two different forms of cognition, providing two types of knowledge, of which the second was not restricted by the characteristics of conceptual knowledge? What if there was a form of thought or cognition that would not condition its subject matter? If the existence of this unconditional knowledge, and its operations in actual human cognition, could be proved, would we not hold the exact basis on which metaphysics, the study of things in themselves, should be established?

These are completely valid questions. In fact, before making judgments about the nature of absolute knowledge, should we instead put the very concept of *absolute knowledge* under scrutiny? Or should we consider everything that we hold as true under doubt, starting our study by abandoning all that is given to us as knowledge, starting from an empty table? Doubting everything may appear as naïve scepticism, but, in it, I find the essence and the necessary condition of philosophy. As Ritchie (1894, 16–17) has put it, 'if we raise the question "How is knowledge possible?" or even the sceptical question "Is Knowledge possible at all?" we are *ipso facto* dealing with the question "What is reality – the only reality we ever can know or intelligently talk about?"' (Cf. Hocking 1946, 367–368). In fact, should we not acquaint ourselves with the fact that we can call something 'knowledge' in the first place, and, consequently, that the question of the origin of knowledge necessarily leads us to questions in which epistemology and ontology become inseparable from each other? That which cognises and knows exists in a certain way, and so does its cognition and knowledge, as well as the objects of cognition and thought.

This dissertation does not claim to resolve all the above problems at once. Instead, it presents questions and proposes answers from the same intellectual tradition from which the aforementioned points of view on knowledge were presented.[4] Out of the problems raised by this tradition, one question arises, and it concerns the general accuracy of the problems of the origin and nature of knowledge: *Have philosophers paid enough attention to the* development *of the human cognitive capacity* (Cf. Giere 1997, 8–9, 12–14)? In fact, some philosophers have, and their answers are the subject matter of this dissertation. I am referring to two French philosophers, Maine de Biran and Henri Bergson, whom I will present next.

Maine de Biran

François Pierre Gontier de Biran (1766–1824), better known as Maine de Biran, was the first of these two philosophers to offer plausible answers to the stated question. Maine de Biran elaborated a well-defined theory of the origin and development of knowledge and its consequences to the nature of philosophy and the relation of philosophy to science.

Maine de Biran was born to a family of renowned physicians in Bergerac in southwestern France. His father was the physician Jean Gontier de Biran and his mother Marie Camille (née Deville). He studied civil and canon law at the

[4] By tradition, I only mean a continuity of certain philosophical problems, which have drawn attention to several philosophers in various times.

University of Poitiers. (Marx 1998; Société historique et archéologique du Périgord 1921, 48:275–278.) At the age of 18, he joined the Garde Écossaise, the personal guard of the French monarchy, and in 1789, participated in the defence of the palace during the March on Versailles. After the guard was disbanded in 1791, Maine de Biran retired to Grateloup near Bergerac, after which he departed to the Netherlands. In 1797, he was elected in the Council of Five Hundred as a member of the royalist Club de Clichy but was soon discharged in the Coup of 18 Fructidor, a *coup d'état* instigated by the fear of the monarchists' increasing popularity. Maine de Biran again returned to Grateloup. From then on, the statesman with an inclination to natural sciences and mathematics turned to a life of philosophy and introspection. (Copleston 1994, 21–22; Marx 1998.)

Maine de Biran became a remarkable but little-known actor in the nineteenth-century theatre of philosophy. He nevertheless continued to be an important figure as a civil servant, and his scientific and philosophical influence was substantial. He left an undeniable mark on French philosophy both directly and indirectly, through his posthumous followers and adversaries. Maine de Biran had only three actual philosophical publications during his lifetime: *Mémoire sur l'influence de l'habitude sur la faculté de penser* (*Treatise on the Influence of Habit on the Faculty of Thinking*, 1803), *Examen des leçons de philosophie de M. Laromiguière* (*Exposition of the Philosophical Doctrine of Pierre Laromiguière*, 1817), and *Exposition de la doctrine philosophique de Leibniz* (*Exposition of the Philosophical Doctrine of Leibniz*, 1819). All other works, such as *Mémoire sur la décomposition de la pensée* (*Treatise on the Decomposition of Thinking*), *Essai sur les fondements de la psychologie* (*Essay on the Foundations of Psychology*), and *Rapports des sciences naturelles avec la psychologie* (*The Relation of Natural Sciences to Psychology*), were published posthumously.

The best-known self-proclaimed continuator of Maine de Biran's philosophy was probably Victor Cousin (1792–1867). He established the French eclectic school, which was said to combine elements from the Scottish common-sense philosophers, such as Thomas Reid (1710–1796) and Dugald Stewart (1753–1828), through F. W. J. Schelling (1775–1854) to that of Maine de Biran. At the height of his career, Cousin was perhaps the most influential philosopher in France, and his name is still known, particularly in historiographical discussions or in the so-called 'philosophy of history' (cf. Kelley 2001). Some nineteenth-century thinkers criticised or even dismissed Maine de Biran, the most important figure among them perhaps being the critic and historian Hippolyte Taine (1828–1893) (cf. Taine 1860, 47–74). The second self-proclaimed disciple of Maine de Biran was Félix Ravaisson (1813–1900), an important figure in French philosophy of the second half of nineteenth century, who taught several generations of

philosophers. This must have contributed to spreading some of Maine de Biran's ideas, through Ravaisson's interpretation.

The classification of Maine de Biran's philosophy has been difficult, with widely ranging interpretations, depending on different emphases of his work and the background of the commentator.[5] There are at least four traditions of interpretation of Maine de Biran: spiritualist, rationalist, empiricist, and a tradition that concentrates on Maine de Biran's theory of *human science* (*science de l'homme*).

Let us first concentrate on the spiritualist interpretation. *Spiritualism* comes from the French word *esprit*, meaning *mind* or *spirit*. It could also be translated as a certain *psychologism*. The spiritualist interpretation is still strong, and it is generally considered to gather into one tradition several nineteenth-century French philosophers, such as Jules Lachelier (1832–1918), and Émile Boutroux (1845–1921). Here is one reference which captures the generally held opinion: 'French spiritualism is . . . a vast movement that, in its classical definition, started . . . with Maine de Biran . . . and culminated in Bergson' (Clauzade 2020, 2–3).[6]

The rationalist interpretations have mainly concentrated on Maine de Biran's relation with Leibniz or Kant. According to Vancourt (1941, 137), Maine de Biran's aim in philosophy was 'analogical to that of Kant:' to "legitimate metaphysics in determining its object and limits." Jeremy Dunham has defined Maine de Biran as a 'Leibnizian' philosopher in his two articles (2015, 2016). In his dissertation *Leibniz et Maine de Biran* (*Leibniz and Maine de Biran*, 1925), Robef has compared Maine de Biran's philosophy with the philosophy of Leibniz and searched for the Leibnizian influences in Maine de Biran's philosophy.

Some commentators have seen Maine de Biran as a unique continuator of British empiricism. Philip Hallie has offered an interpretation of Maine de Biran's empiricist connections in his work *Maine de Biran: Reformer of Empiricism, 1766-1824* (1958). He has also written two articles from the same point of view, 'Maine de Biran and the Empiricist Tradition' (1951) and 'Hume, Biran and the Meditatifs Interieurs' (1957). Hallie's work is comprehensive in its focus area. However, he regularly refers to the philosophers of his time, such as A. N.

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[5] The earliest study focusing solely on Maine de Biran's philosophy is perhaps Jules Gérard's *La philosophie de Maine de Biran: essai suivi de fragments inédits* (1876). However, a great deal of the research on Maine de Biran was written at a time when philosophical interest in France was focused on Bergson's philosophy and its supposed origins, roughly between 1900 and 1950.

[6] On nineteenth-century discussions about spiritualism, see Leblais (1865); Ribot (1873); Magy (1877); Vacherot (1884); Blanc (1885); Ferraz (1887); Salomon (1902).

Whitehead (1861–1947) and F. C. S. Schiller (1864–1937) in a way that brings anachronistic conceptual content into his interpretation that does not do justice to Maine de Biran's philosophy. Half a century before Hallie, Nathan E. Truman published *Maine de Biran's Philosophy of Will* (1904). For Truman, Maine de Biran's philosophy is neither empiricism nor rationalism, but a 'continuation' of the former: it is 'a development of the Locke-Condillac school, yet a development that is still on the same epistemological plane' (Truman 1904, iv). The philosopher, psychologist, and evolutionist James Mark Baldwin (1861–1934) recognised Hume's relevance for Maine de Biran (Baldwin 1913, 50–52).

The last of the four traditions of interpretations of Maine de Biran's philosophy concerns Maine de Biran's aim to develop a multidisciplinary *human science*. According to Copleston (1994, 22–23), Maine de Biran 'planned to produce one major work, a science of human nature or a philosophical anthropology, incorporating revised versions of early essays.' Pierre Tisserand has interpreted Maine de Biran from the point of view of the philosopher's concepts of *anthropology* and *human science* in *L'anthropologie de Maine de Biran: ou La science de l'homme intérieur* (*Anthropology of Maine de Biran: or the Science of the Inner Human*, 1909). He was also the editor of the first series of the collected works of Maine de Biran, published by Félix Alcan (Maine de Biran 1920, 1922, 1924a, 1924b, 1925, 1930a, 1930b, 1932a, 1932b, 1937, 1939b, 1939a). The earlier collections, first edited by Victor Cousin and the second by Ernest Naville, were not complete collections. The manuscripts that Naville edited were the ones that Cousin never published. In his book *Maine de Biran: la science de l'homme* (*Maine de Biran: The Human Science*, 1995), François Azouvi makes a biographical exposition of the development of Maine de Biran's idea of "human science," and he has edited many volumes of the second edition of the collected works of Maine de Biran, published by Vrin (Maine de Biran 1998, 1987b, 1988, 1995, 1984a, 1984b, 2001, 1986, 1989b, 1987a, 1989a, 1990b, 1993a, 1990a, 1999b, 1999a, 1993b, 1996a, 1996b). It is now the standard critical edition of Maine de Biran's work. According to Azouvi, Maine de Biran's knowledge of the sciences of his time, for instance the physiology, neurology and other life, natural, and moral sciences (which nowadays might be called 'behavioural' sciences) was 'admirable' (Azouvi 1995, 10–11).

Some commentators have concentrated on certain key concepts or themes, instead. For instance, Franziska Baumgarten, in her *Die Erkenntnislehre von Maine de Biran* (*Maine de Biran's Theory of Knowledge*, 1911), has concentrated on the epistemology of Maine de Biran. Couailhac (1905) and Michelet (1906) have both written books titled *Maine de Biran*. Michelet's work was published in the series *La Pensée chrétienne*, and of the book's three parts the last one is dedicated to the presumed Christian thought of Maine de Biran. Couailhac has extensively

analysed the role of "notions" in Maine de Biran's philosophy. Notions seem to be Maine de Biran's own solution to the problem of the role of general ideas – a problem which has haunted both empiricist and other philosophies, as well as early psychology (Couailhac 1905, 175).

Here are the general lines of earlier approaches to Maine de Biran's philosophy. The purpose of this dissertation is not to evaluate or choose from different earlier approaches to Maine de Biran's philosophy. Instead, it aims to find the best possible approach to Maine de Biran's philosophical aims. I propose that Maine de Biran's aims are found, in addition to what he explicitly states in his works, from the exterior motivations according to which he designed many of his main works. According to Bréhier ([1930] 2012, 1263), Maine de Biran had the opportunity to write technical essays by participating in the public writing competitions organised by the Academies of Paris, Berlin, and Copenhagen. A short introduction to one of these Academies gives us important information on Maine de Biran's philosophical aims.

The Prussian Academy of Sciences (Ger. *Königlich-Preußische Akademie der Wissenschaften*, Fr. *Académie royale des sciences de Prusse*), established by Leibniz,[7] was perhaps the most important institution in which Maine de Biran operated because of its general importance and authority for Francophone philosophers, scientists, and mathematicians in the eighteenth and early nineteenth centuries.[8]

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[7] There is not an extensive body of literature on the Berlin Academy of Sciences. However, Charles et al. (2001) have written about certain key themes that must have been important for Maine de Biran. There is also an old historiographical monograph about the Academy, *Histoire philosophique de l'académie de Prusse depuis Leibniz jusqu'à Schelling, particulièrement sous Frédéric-le-Grand* (*Philosophical History of the Prussian Academy from Leibniz until Schelling, particularly under Frederick the Great*; 1850) written by Christian Bartholmèss (1815–1856). Another important monograph is *Geschichte der Könlich Preussischen Akademie der Wissenschaften zu Berlin* (*History of the Royal Prussian Academy of Sciences at Berlin*; 1900a, 1900b) by Adolf Harnack. Also informative is 'La métaphysique de la nature à l'Académie de Berlin' (The Metaphysics of Nature in the Berlin Academy; 2015a) by Christian Leduc as well as 'La méthode philosophique en question: l'Académie de Berlin et le concours pour l'année 1763' (The Philosophical Method in Question: The Berlin Academy and the Competition for the Year 1763; 2015) by Tinca Brunea-Bretonnet.

[8] In the first period of its existence, the most important participants of the Academy were the mathematicians of the famous Bernoulli family, Jakob Bernoulli (1654–1705) and Johann Bernoulli (1667–1748), the philosopher Michelangelo Fardella (1650–1718), and Nicolaas Hartsoeker (1656–1725). The second period consisted, for instance, of the controversy between two members from the University of Halle, philosophers Christian Wolff (1679–1754) and Johann Joachim Lange (1670–1744). The second period occurred under the rule of Frederick William I (1688–1740). The third period occurred under the rule of Frederick II the Great (1712–1786), and he contributed to the flourishing of the institution. During this time,

According to Laitko (2000, 5), the 'demand "to bring theory and practice [*theoria cum praxis*] together" is certainly the most cited phrase from the founding program of the Berlin Academy.'[9] Leduc and Dumouche characterise the origin of the Academy in the following way: 'In choosing the motto Theoria cum praxis, Leibniz wanted the knowledge produced by its members to have a practical impact, but he also wanted to create *an institutional space for dialogue between contemplative and applied research*.'[10] The Prussian Academy of Sciences was one of the institutional hearts of philosophy during the eighteenth and nineteenth centuries, and I find that Maine de Biran's work expressed the aims of the Academy. In several of his works, Maine de Biran enquires into the nature of science and philosophy and their division of labour; science being more oriented towards *praxis*, philosophy more towards *theoria*. In the early nineteenth century, the Academy was interested in the origin of human knowledge (cf. Maine de Biran 2001, VII/1–2:1). Maine de Biran took on this challenge by developing an elaborate theory of the origin of human knowledge. Indeed, Maine de Biran aimed for multidisciplinary research of the human being with what he called the *human science* (*science de l'homme*). In Maine de Biran's own words from the *Essai sur les fondements de la psychologie*, a study in which he answered the Academy's commission, 'practice is clarified only by *theory*, just as theory is justified and confirmed by practice' (Maine de Biran 2001, VII/1–2:59).[11]

I argue that the preceding state of things corroborate my approach: Maine de Biran should be considered as a researcher who drew much of his motivation from the development and clarification of contemporary state of things, in

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the most crucial members of the Academy were the French mathematician Leonhard Euler (1707–1783) and the multidisciplinary naturalist and mathematician Pierre Louis Moreau de Maupertuis (1698–1758). During that time, the *de facto* official language of the Academy shifted from German to French, although it was highly bilingual. (Leduc 2015, 7–10.) In addition to Leibniz himself and Wolff, Academy included several most important philosophers of the eighteenth and early nineteenth centuries, such as Voltaire (1694–1778), Étienne Bonnot de Condillac (1714–1780), Denis Diderot (1713–1784), Jean le Rond d'Alembert (1717–1783), Immanuel Kant (1724–1804), and F. W. J. Schelling (1775–1854).

[9] '[d]ie Forderung, "theoria cum praxis zu vereinigen," ist sicher die meistzitierte Wendung aus der Gründungsprogrammatik der Berliner Akademie.' All translations are mine, unless otherwise specified. However, all quotations from secondary philosophers, if I quote their collected or edited works, are not my translations.

[10] 'En lui choisissant la devise Theoria cum praxis, Leibniz souhaitait que les savoirs produits par les membres aient certes une incidence pratique, mais il voulait aussi créer un espace institutionnel pour que les recherches, aussi bien contemplatives qu'appliquées, puissent dialoguer' (Leduc 2015, 7, my emphasis).

[11] 'la pratique ne s'éclaire que par la *théorie*, comme la théorie se justifie et se confirme par la pratique'

contemporary institutions, and with both contemporary and historical evidence. He wanted to develop a multidisciplinary research field he called *psychology*, *human science*, or *anthropology*, and everything we find in general from his works ultimately converge towards this aim.

Henri Bergson

Henri Bergson (1859–1941) was the second philosopher to give plausible answers to the aforementioned question. His theorisation of the nature of philosophy, the role of philosophy among the diversified scientific disciplines, and the analysis of the generative sources of human knowledge, offer answers to the problematics of this dissertation.

Bergson is perhaps the most important French philosopher in the early twentieth century. His father was Michael Bergson, a Jewish composer from Poland, and his mother an Englishwoman, Katherine Bergson (née Levison). After he graduated from the École normale supérieure in 1881, he taught two years in the lycée d'Angers, after which he moved to teach in the Lycée Blaise Pascal in Clermont-Ferrand in 1883. In Clermont-Ferrand, Bergson began to ponder a subject for his doctoral dissertation and occupied himself with the fundamentals of mechanics. He was already engaged in the works of theoreticians such as Antoine Augustin Cournot (1801–1877), Paul Janet (1823–1899), Jules Lachelier, and Herbert Spencer. *Infini et quantité* (*Infinity and Quantity*, 1880) by François Evellin (1835–1910) had recently been published, and Bergson was probably inspired by its treatment of the paradoxes of Zeno of Elea (c. 495 – c. 430 BCE). During the semester of 1885–1886, Bergson held lectures on the theme 'Aristotle and his influence upon the development of science,' which perhaps led him to examine Zeno's paradoxes in detail, and to recognise the difficulty of explaining time in terms of physical motion. As he examined these questions, Bergson seems to have become convinced that a scientific understanding of time in itself was impossible. (Soulez and Worms 2002; Greenberg 1976; Chambers 1974.) This discovery must have radically revised his methodological approach to the idea of time and allowed him to see the resolution of this problem as a positive task for philosophy.

All of Bergson's major works deal with problems related to the difficulties encountered by human intelligence to symbolically understand natural differences of phenomena both in philosophy and in science. The first display of Bergson's philosophical point of view was his dissertation *Essai sur les données immédiates de la conscience* (*Time and Free Will: An Essay on the Immediate Data of Consciousness*, [1889] 2013), written between 1885 and 1888 and published in 1889. In this work, Bergson reformulated the old philosophical problem of freedom.

He elaborated several psychological questions, especially the nature of human perception, cognition, and memory, from the *Essai* in his next main work, *Matière et mémoire* (*Matter and Memory*, [1896] 2012). Just as the *Essai* was a reformulation of the problem of freedom, *Matière et mémoire* was a reformulation of the mind–body problem. After these two psychological works, Bergson started tracing the origin of human knowledge to its sources. This task took him to consider the evolution of human cognition, and thereby the study of the evolution of life in general, in *L'évolution créatrice* (*Creative Evolution*, [1907] 2013). His final work was *Les deux sources de la morale et de la religion* (*Two Sources of Morality and Religion*, [1922] 2013), a philosophical contribution to several anthropological, sociological, and moral problems such as obligation and the nature of social cognition.

Bergson's reputation during and after his lifetime has been perhaps as multi-faceted as a philosopher's reputation can be. Bergson had a relatively ordinary life and career as an academic worker and civil servant. He published a considerable amount of philosophical works. He also taught much and attended different academic affairs. Interest in Bergson's philosophy has been wide and complex, and his thought has given rise to many philosophical discourses among different generations of philosophers. There have been at least three waves of renewed interest in Bergson's philosophy.[12]

According to Mark Sinclair, it has been difficult to label Bergson's philosophy into a specific tradition. One possible reason is that nineteenth-century French philosophy is not well-known. Those who know nineteenth-century French philosophy probably find Bergson as a continuator of the French spiritualist tradition, as Sinclair maintains. (Sinclair 2020a, 3–4.) According to him, *Matière et mémoire* 'can appear to fall from the skies, and this is one reason why it

[12] In the early twentieth century, there were long debates and many interpretations of his philosophy in journals and in some monographs. At the time of Bergson's death, an annual collection of articles *Les Etudes bergsoniennes* (*The Bergsonian Studies*) was launched. After the Second World War, perhaps the most influential work in reviving interest in Bergson's philosophy was Gilles Deleuze's (1925–1995) *Le Bergsonisme* (*Bergsonism*; 1966). In the twenty-first century, there has been a strong renaissance of interest in Bergson's philosophy, especially in France, which culminates in the following influential interpretations, such as Camille Riquier's *Archéologie de Bergson* (*Archaeology of Bergson*; 2014), David Lapoujade's *Puissances du temps* (*Powers of Time*; 2010), and the works and events edited, written, and organised by Frédéric Worms. Worms is perhaps the most important singular factor in the recent renaissance of Bergson studies. Also, in 2002, the successor of *Les études bergsoniennes*, *Annales bergsoniennes* (*Bergsonian Annals*) was established. It currently comprises nine volumes (Abiko, François, and Riquier 2013; Fagot-Largeault and Worms 2008; François and Riquier 2014, 2017; Worms 2002, 2004, 2007, 2012), and which are a cornerstone of the contemporary Bergson studies.

is a difficult book, but, in truth, Bergson's ideas respond to his nineteenth-century context, and they develop the French spiritualist tradition' (Sinclair 2020a, 4). Bergson as a continuator of spiritualism is widely endorsed (Sinclair and Antoine-Mahut 2020; Bianco 2020; Dunham 2020; Sinclair 2018; Janicaud 1998). However, as Kanteraki (2014, 25) has remarked, Bergson is critical towards spiritualism (cf. Bergson [1896] 2012, 75–76). In contrast, contrary to the spiritualist interpretation, Spencer's importance for Bergson's philosophical motives has been recognised (Barreau 2008; Verdeau 2007; Deledalle and Dewey 1965). Bergson's response to Kant has also been recognised to play an important part in his philosophy (Riquier 2011; Worms 2001; Jordan 1912). Nevertheless, it is important to recognise that Boas (1959) had already pointed out all the aforementioned influences in Bergson's philosophy.

A critique of these interpretations of Bergson's philosophy would need another place; it is not within the scope of this dissertation. This dissertation proposes another approach to Bergson's philosophy. In fact, Bergson's works *already* contain everything they participate in – why should it be otherwise? I do not deny the importance of gathering additional information of philosophers' intellectual background – that is also what I do myself. The most important factor, however, is to understand the aims of the works in themselves. Reading Bergson as closely and sensitively as possible is the only approach I am committing to.

Now that we have a clear picture of the general aims of both Maine de Biran and Bergson, I will elaborate my approach I find necessary to understand both philosophers' aims from the outset. It is time to present the theory of this dissertation.

Sources and generation of knowledge

I found in both Maine de Biran and Bergson a similar depth in attesting to the importance of explaining the developmental factors of knowledge, which could both aid in this developmental explanation and clarify the nature of philosophy and philosophy's relationship with science. They both held that knowledge springs from two cognitive faculties, which for Maine de Biran are *attention* and *reflection* and for Bergson *instinct* and *intelligence*, and that the generation of this duality can be proved. For both philosophers, the two sources of cognition and the generation of these sources could explain both the duality of relative and absolute knowledge and the relationship between science and philosophy. The explanation, both in Maine de Biran and Bergson, seems to share a common aim, which I propose to be called a *theory of generative factors of knowledge*. By the word *generative*, I mean that, in addition to philosophical reflection, philosophy takes into consideration the developmental and evolutionary factors according to

which the cognitive capacities have developed or evolved in explaining the nature of knowledge.

I will briefly elaborate the sources from which I have abstracted the theory of the generative factors of knowledge. In the middle of the eighteenth century, Étienne Bonnot de Condillac (1714–1780) argued that intellectual operations cannot be understood properly if their generation is not known. He asserted that his generative explanation was first of its kind (Condillac [1749] 2014, 80). In the beginning of the nineteenth century, Joseph Marie Degérando (1772–1842) explicitly and systematically formulated the problem of knowledge to be the problem of the generative origins of knowledge, especially in *De la génération des connaissances humaines* (*On the Generation of Human Knowledge*, 1802). Throughout his work, Maine de Biran endorses the necessity of generative explanation (cf. Maine de Biran 1987b, II:129–31). In addition to Condillac, Degérando, and Maine de Biran, the word *génération* can be found in other French philosophers and scientists of their time, such as Charles Bonnet (1760, xxi).

Why am I not using the concepts of *development* or *evolution* instead of *generation*? My idea is to abstract the explanatory role of every kind of generative explanation, whether developmental, phylogenetic, ontogenetic, or generative. I have found the concept of generation to be the most neutral terminological choice. For instance, the word *genetic* is largely appropriated by genetics, and the word *developmental* by developmental biology and developmental psychology in their respective domains.[13]

Close to *generation* are *evolution* and *genetic*. For instance, Herbert Spencer (1820–1903) used the concepts of *evolution*, *development*, and *genesis* (Spencer 1890, 308, 313, 322–23). Jean Piaget's (1896–1980) *genetic epistemology* (*épistémologie génétique*), or the *developmental theory of knowledge* is a cornerstone of developmental psychology. Piaget developed his theory in several publications (Piaget 1950b, 1950a, 1973, 1970). There are certain recent use cases of *generative explanation* in scientific disciplines that are worth mentioning. Robert Reid has analysed biological theories according to their generative character (Reid 2007). According to him, the theory of natural selection must be 'reappraised' or complemented with a causal model that he calls a 'generative causation' (Reid 2007, 23). Joshua Epstein has developed a discipline of *generative social science* that brings together computational agent-based modelling and social science (Epstein and Axtell 1996; Epstein 2006, 2013). Epstein's central idea is that by computational simulations, researchers can discover how the set of individual agents can generate social phenomena that are considered as emergent

[13] About the difficulties in the nomenclature in this context, see an illuminating example of Baldwin (1902, 2–4).

(cf. Epstein 2006, 8–9). Recently, Greco (2021, 1) has made a distinction between the 'generation of knowledge' and the 'transmission of knowledge.'

The aforementioned cases of the use of *generativity* are mutually highly heterogeneous, but there are also striking similarities. What connects the idea of Condillac with that of Epstein is that explanation requires the understanding of the generative causal factors: from what and how a thing has evolved, or how certain things can generate something that differ in nature from them. It is neutral to both the subject matter of development and the perspective and method of explanation. Thus, a philosophical reflection about the development of generalisation can be a generative explanation, or it can be an agent-based modelling simulation of social cognition in an urban environment. The importance of the generativity lies in the explanation of the subject matter by its generative factors. Interestingly, Charles Darwin's (1809–1892) theory of natural selection is not a completely generative explanation because it does not provide a serious causal explanation of heredity and variation, the two factors that *generate* the selected individuals, but only adaptation (cf. Reid 2007, 19; McShea and Brandon 2010, 1).[14] Prominent biologists, such as August Weismann (1834–1914) and Hugo de Vries (1848–1935), aimed to complement the theory of natural selection by providing explanations of heredity and variation, two key subject matters of genetics, a biological field that developed into an independent scientific discipline in the twentieth century.

However, there is one difference of generativity in this dissertation and in the previous examples. Bergson, and Maine de Biran before him, recognised that neither pure science nor pure philosophy could understand the generation of cognition and knowledge without each other. Philosophy cannot have the precision, systematicity, and the scope of observation of science; science cannot have the absolute cognition of the phenomena of reality. Science requires philosophy in order to understand the proper active nature of cognition. The understanding of the thing's proper nature, the absolute understanding of the thing in itself, can be called ontology. Thus, all the intellectual ways to control and analyse knowledge (epistemology) and to observe, classify and generalise phenomena (science), need ontology. However, ontology is nothing without the matter of science and the critical precision of epistemology. Thus, it seems that the generative sources of human knowledge condition all actual human knowledge, which aims to understand those generative sources in themselves. There appears to be a vicious circle, which I will attempt to clear in the subsequent chapters. Nevertheless, the philosophical approach to generativity is necessarily a metaphysical one, which holds in itself both epistemological and

[14] In fact, I analyse this problematic situation in the sixth chapter.

ontological considerations. These considerations distance philosophical approach to generativity from any scientific approach to generativity.

Let us recapitulate the preceding according to the context of this dissertation. Relying on the evidence from both Maine de Biran and Bergson, as well as the empiricist and rationalist traditions, and taking in account the use of the concept of *generative* in both philosophy and science, I will propose a theory that I call the *theory of the generative factors of knowledge*. According to this theory, it is necessary to understand the generative reasons of knowledge in order to understand the nature of knowledge itself. In the context of this dissertation, it also addresses the dual nature of knowledge in Maine de Biran and Bergson.

This dissertation clarifies the key aims of Maine de Biran and Bergson with the help of the stated theory. However, there are no systematic expositions that would come close to this theory in the research traditions of Maine de Biran and Bergson. *This surprising contrast between the clarity and ubiquity of the problem of generative explanation of human knowledge in Maine de Biran and Bergson on the one hand, and the lack of its explicit research on the other, is one of the reasons for the realisation of this dissertation*. Although I concentrate systematically on just two philosophers, it appears to open an important research approach to the history of philosophy and metaphilosophy more widely. This exceeds the possibilities of a dissertation. Thus, I will deepen and expand the scope of my research in the future. Nevertheless, this dissertation should stand on its own as an independent study.

Finally, I want to point out one contextualising remark about the stated theory, because every study follows its own theoretical approach. I characterise the theoretical approach of this dissertation in two ways: it is both historical and metaphilosophical. The philosophical systems of the two philosophers under investigation call for a specific historical approach, which merges the history of philosophy and the history of science into one intellectual history. I will outline this intellectual history as "history of problems," better known in the German context as *Problemgeschichte* and in the French context as *histoire des problèmes*. In this dissertation, history of problems means that the history of philosophy comprises a long-lasting, albeit not perennial, continuity of specific theoretical problems. Philosophers, then, have offered unique reformulations and solutions to these common problems. Bergson himself is a good example: his first book, the dissertation *Essai sur les données immédiates de la conscience*, begins by clearly stating the relevance of problems for philosophy, Bergson himself concentrating on the problem of liberty (Bergson [1889] 2013, vii–viii). This dissertation, taking into consideration the philosophies of Maine de Biran and Bergson, concentrates on *the problem of the generation of human knowledge*.

AIMS, QUESTIONS, AND HYPOTHESES OF THE RESEARCH

Aim of the research

'Knowledge can be adequately explicated only in relation to its sources' (Audi 2002, 71). Robert Audi begins his chapter 'The Sources of Knowledge' in *The Oxford Handbook of Epistemology* with this sentence, and it perfectly depicts the aim of the dissertation at hand. This dissertation systematises Maine de Biran and Henri Bergson's philosophical theories according to the proposed theory of the "generative factors of knowledge." By focusing on Maine de Biran and Bergson, my aim is to 1) explain the sources and generation of human knowledge, 2) show the former's consequences for Maine de Biran and Bergson's understanding of the subject matter of philosophy, and 3) clarify how Maine de Biran and Bergson relate philosophy with science. With these three stages fulfilled, the dissertation 4) abstracts relevant philosophical aims from both Maine de Biran and Bergson and brings them together to show their possible convergences. The aims are classifiable as *metaphilosophical*.[15]

Although I study two philosophers in this dissertation, my aim is not to deliver a general comparative analysis of their philosophies or to contextualise them in any specific philosophical tradition.[16] I compare Maine de Biran and

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[15] By metaphilosophy, I mean what Nicholas Rescher has aptly put in the following terms: 'Metaphilosophy is the philosophical examination of the practice of philosophizing itself. Its definitive aim is to study the methods of the field in an endeavor to illuminate its promise and prospects.' (Rescher 2006, 1.)

[16] In the introductory chapter, we saw different ways in which Maine de Biran and Bergson have been classified. However, I did not elaborate on the idea of continuity in which Maine de Biran and Bergson are considered to take part. There are two works that portray continuity in the nineteenth-century French philosophy. Maine de Biran and Bergson have important positions in both reconstructions. The first work is Lizzie Susan Stebbing's *Pragmatism and French Voluntarism, with Especial Reference to the Notion of Truth in the Development of French Philosophy from Maine de Biran to Professor Bergson* (1914), 'written from a so-called 'intellectualistic' standpoint diametrically opposed to M. Bergson's' (Stebbing 1914, 13:v). The second is Gabriel Madinier's dissertation *Conscience et mouvement: essai sur les rapports de la conscience et de l'effort moteur dans la philosophie française de Condillac à Bergson* (*Consciousness and Movement: Essay on the Relationship Between Consciousness and Motor Effort in French Philosophy from Condillac to Bergson*; 1938). Both works rely on certain key concepts they think are shared by the philosophers under study and seem to presuppose that this approach is sufficient to systematise a tradition and establish continuity between the philosophers. Thibaud wrote a dissertation *L'effort chez Maine de Biran et Bergson* (*Effort in Maine de Biran and Bergson*; 1939) in which she compares Maine de Biran and Bergson's

Bergson only in a limited sense, according to the fourth aim. My approach is partly in accordance with Marguerite Thibaud's account of the relationship between Maine de Biran and Bergson. While Thibaud sees many shared characteristics between the two, she asserts that Bergson is not a 'disciple' of Maine de Biran, nor does he continue Maine de Biran's philosophical work. '[Bergson's philosophy] meets up [with Maine de Biran's philosophy], *as two different routes meet up in a new land*' (Thibaud 1939, 75, my emphasis). What she saw as the core idea shared between Bergson and Maine de Biran was the 'metaphysical experience' which was 'founded on introspection' (Thibaud 1939, 1).

My aim is to provide further evidence for Thibaud's claim, which I find to be somewhat unsubstantiated. In Maine de Biran's case, my investigation leans more towards historical accuracy and a historical body of evidence; in Bergson's case, it leans more towards the empirical corroboration of Bergson's philosophical arguments.

Research questions

The underlying main question of this dissertation is the following: *How does the generation of knowledge condition the articulation of intellectual disciplines in Maine de Biran and Bergson?* This main question divides into four more specific questions, by means of which I will structure the dissertation and answer the main question:

1) *How are the origin and generation of knowledge articulated by Maine de Biran and Bergson?*

2) *What is the subject matter of philosophy in Maine de Biran and Bergson?*

3) *How does philosophy relate to science in the light of the sources and generation of knowledge in Maine de Biran and Bergson?*

4) *Which metaphilosophical aims converge in Maine de Biran and Bergson?*

Research hypotheses

I hypothesise that for both Maine de Biran and Bergson, philosophy is best understood as a form of intellectual activity that take advantage of a cognitive form that is peculiar to philosophy and distinguishes philosophical research from scientific research. This cognitive peculiarity, I hypothesise, gives us evidence for

interpretations about the concept of effort. Dunham (2020) has made a recent contribution in following the aforementioned interpretations.

1) a simple and positive suggestion for the definition of philosophy, and 2) a differentiation of philosophy and science by virtue of the *generative factors* of human cognition.

I hypothesise that the central metaphilosophical aims in Maine de Biran and Bergson have such similarity that they are directed towards common goals, so that they eventually overlap, if they are abstracted and compared with each other. The results of this overlapping are obtained by the comparison of the aims of both philosophers in accordance with the stated theory. I expect to discover convergent aims in the three following metaphilosophical topics: 1) the origin and generation of human knowledge, 2) the consequences of the origin and generation of knowledge for the subject matter of philosophy, and 3) the relationship between philosophy and science in the light of two previous topics.

METHODS

Methods are the tools with which the researcher acquires knowledge and produces his or her answer to the formulated problems. In historical and metaphilosophical study, which aims at cogent interpretations, I find the *sensitivity to the research subject* to be the focal point of any methodological consideration. My study utilises historical and argumentative methods that aim at cogent interpretive reconstructions. The first method is comparative textual analysis of the relevant philosophical texts. The second method is the abstraction of philosophical ideas. The latter specifies the study as properly philosophical and not merely historical.

My strategy is to first study both philosophers in themselves without comparing them with each other. However, in the fourth part of the dissertation, I will compare Maine de Biran and Bergson with regard to specific metaphilosophical questions. This means that I will not compare the whole of one philosophy with the other, illuminating one with the other; I will only show how they may converge in terms of specific metaphilosophical aims, which in turn yields insights concerning the nature of philosophy itself. Methodologically, my aim is to minimise the risk of the false equivalence. In addition, I am avoiding making any false analogies between the systematised elements.

Another strategy is to corroborate my interpretation with modest and controlled additions from the history of philosophy, the history of science, and contemporary evidence from the empirical sciences. The closeness of philosophy and science follows from my theoretical approach, which sees in the history of philosophy and in the history of science an inseparable intellectual history.

The first type of corroboration, *historical* corroboration, resembles historical contextualisation. However, it is more exact in its scope: with historical corroboration, I will back up my interpretations by means of evidence from the history of philosophy and the history of science. For instance, I will give an exposition of Maine de Biran's idea of two different causalities, which I will back up with references to relevant philosophers and scientists. However, my purpose is not only to contextualise Maine de Biran's ideas on causality – contextualisation naturally coming along with the corroboration. My purpose with corroboration is to increase the cogency of my interpretation of Maine de Biran. Due to this kind of attention to details, I call my method 'corroboration' and not 'contextualisation.' In short, my *aims* are metaphilosophical and not historical, but historical contextualisation is a necessary constituent of historical corroboration. Another example: when I give an exposition of Maine de Biran's idea of the distinct stages of cognitive functions, I will back my interpretation

using material from the history of the physiological sciences. In Bergson's case, for example, I will give a concise outline of the history of the theories of instinct, which helps us not only to contextualise but to corroborate the interpretation of Bergson's theory of instinct itself.

The second type of corroboration is *empirical* corroboration. By this I mean that certain arguments in Maine de Biran and Bergson are sufficiently close to the problems or discussions in contemporary scientific research that they can be enhanced with updated empirical evidence and scientific theorisation. For instance, when Bergson characterises the nature of intelligence, I will back up his arguments with relevant empirical evidence. Such empirical corroboration resembles Peter Godfrey-Smith's "methodological naturalism," which for him means that 'philosophy can use results from the sciences to help answer philosophical questions' (Godfrey-Smith 2003, 148–149, emphasis removed).

In *Part II* and *Part III*, I implement my methodology individually to Maine de Biran and Bergson. There are methodological reasons for the individual interpretation of philosophers. The first, most general reason is that I find philosophers and their approach to other philosophers to be so idiosyncratic, that it is, as I see it, advisable to give every philosopher room for their own interpretation without the interference of other philosophers' point of view. In addition to every philosopher's idiosyncrasy, they may have extrinsic differences, such as different historical circumstances, or other factors that need to be addressed. One such extrinsic difference appears if we consider some philosophers as *classical*, others as *contemporary*. I see Maine de Biran as a classical philosopher while Bergson is a contemporary philosopher. By this I mean that Maine de Biran's philosophy is sufficiently far removed from our contemporary ways of thinking that a study of him requires more historically oriented methods. Bergson's philosophy, on the other hand, has not *aged* in the sense that many of his problems have parallels in contemporary philosophy and science. It is of course evident that there is some historical dust on Bergson as well, and I will also address these problems in the dissertation.

STRUCTURE OF THE WORK

The structure of this dissertation comprises four main parts, of which the first is the current introductory and theoretical part. The consecutive parts concentrate on the main subject of the study. In short, each main part realises one key task of the study: *Part I* introduces the topic and states the aims and methods of the dissertation, after which *Part II* and *Part III* realise the interpretations of Maine de Biran and Bergson, respectively, and *Part IV* realises the final task of finding the converging metaphilosophical aims in Maine de Biran and Bergson's philosophies. I acknowledge that the length of the chapters in this dissertation vary significantly. This is because certain topics need longer elaboration and corroborating evidence, and some other topics need less elaboration and corroboration.

Part II concentrates in Maine de Biran's theory of the sources and generation of human knowledge. It comprises four chapters.

Chapter 1 starts with the clarification of the specific meaning of metaphysics in Maine de Biran's system. It reconstructs the meaning both from Maine de Biran's explicit definitions of metaphysics and from his commentaries on earlier philosophers. After a preliminary definition of metaphysics, the chapter will show the contributions of earlier philosophers concerning 1) the preliminary definition of metaphysics, 2) Maine de Biran's analysis of past philosophers about the subject matter of philosophy, and 3) Maine de Biran's central idea of human personality as the focal point at which philosophers must focus their attention, if they want to know the positive ground from which the generation of knowledge must be sought for.

Chapter 2 analyses the nature of causality, which for Maine de Biran is the principal problem of both metaphysics and epistemology. The point of view on causality seems to be the most explicit factor, which differentiates philosophy and science from each other, and the recognition of the relevance of the role of causality gives us an understanding of the starting point of philosophical reflection. Here again, the starting point is found from self-reflection of human personality.

Chapter 3 systematically reconstructs Maine de Biran's theory of the generative factors of human knowledge. The generative explanation of human knowledge mainly concentrates on the sources of knowledge. For Maine de Biran, there are two orders of cognition. The first-order cognition is instinctive, and it is the general mode of cognition of all animals. The second-order cognition is volitional, which gradually develops during the human life. It is precisely the development of volition that gives humans the self-conscious recognition of their

own activity. This volitional cognition develops into two different forms of thought: *attention* and *reflection*.

Chapter 4 explains Maine de Biran's theory of the division into science and philosophy according to the generative factors of human knowledge, systematised in the three earlier chapters. After explaining the proper nature of both science and philosophy, the chapter finally brings both disciplines together in Maine de Biran's theory of *human science*. The chapter clarifies the context and purpose of human science and shows Maine de Biran's solutions to the question of how the different forms of knowledge are brought together.

Chapters of *Part III* repeat the same procedure for Bergson's philosophy as the previous part did for Maine de Biran.

Chapter 5 begins by explaining Bergson's principal objects of criticism in the history of philosophy. In general, the criticism concerns the starting point of philosophical research and the neglect of the generation of two sources of knowledge. After the critical remarks, the chapter introduces Bergson's analysis of the most immediate subject matter of philosophical research: the nature of creative cognition and the nature of language and concepts.

Chapter 6 shifts attention to the groundwork in Bergson's explanation of the evolution of the sources of knowledge. However, in order for Bergson to construct a sort of evolutionary epistemology, he needs to know the proper nature of this evolutionary process and its *modus operandi*. Bergson's commitment in fact makes him launch a philosophical program which would amalgamate epistemology and evolutionary biology essentially together. The chapter begins by clarifying the nature of Bergson's philosophical idea of the *élan vital*, after which it explains its main aspects: the common source of all living organisms and its divergent developmental trajectories in the history of life.

Chapter 7 continues from the previous chapter and emphasises its relevance to the generative explanation of the sources of human knowledge. While the previous chapter laid the groundwork for the philosophical understanding of the nature of evolution, the present chapter draws its results in explaining the generation of cognition. It shows how animal cognition has accentuated two tendencies of their common origin of cognitive capacity. By accentuating their proper traits, they have had to abandon certain traits of the other tendency. Bergson finds these accentuations in different animal orders such as in hymenopterans and primates. Bergson named these tendencies *instinct* and *intelligence*. The chapter will analyse the nature, differences, and complementarity of instinct and intelligence. Finally, it will show the epistemological relevance of this analysis.

Chapter 8 utilises the previous chapters in articulating the positive nature of philosophy, its difference from, and complementarity with science. The

difference and collaboration between philosophy and science are determined by the cognitive forms on which they are based. The chapter shows why collaboration between science and philosophy is necessary for both disciplines in order for research to attain the things in themselves.

Part IV comprises the central chapter, in which the two threads of research are drawn together as well as the conclusive chapter.

Chapter 9 gathers the converging elements of the studied philosophers. It engages with the final aim of this dissertation. It brings together the two individual analyses and finds *convergences* between them. By *convergence*, I mean the case of two or more philosophies having such metaphilosophical aims that point towards the same goal. It concentrates on the three key elements of this dissertation: 1) finding the origin and generation of human knowledge, 2) showing the consequences of the origin and generation of knowledge for the subject matter of philosophy, and 3) drawing from the two previous aims to clarify the relationship between philosophy and science.

Chapter 10 concludes the dissertation. It starts by recapitulating the results from the study of Maine de Biran's philosophy (chapters 1–4) and Bergson's philosophy (chapters 5–8) and their convergences (chapter 9). It then draws general concluding remarks from the study. Finally, it indicates the principal possibilities of future research.

PART II: MAINE DE BIRAN

1 THE EPISTEMOLOGICAL ROLE OF METAPHYSICS

In this chapter, I will explain Maine de Biran's idea of the relevance of metaphysics in the study of the origin of knowledge. First, we will turn our attention to the role and definition of metaphysics in Maine de Biran's philosophy, which I will briefly explain. Second, I will study merits and errors that Maine de Biran found in earlier philosophers concerning the origin of knowledge. Finally, we will move on to Maine de Biran's own account of the origin of knowledge, which he finds in the human personality itself.

1.1 Maine de Biran's definition of metaphysics

What is the role of metaphysics in the theory of knowledge? How does knowledge relate to metaphysics? In answering to these questions, I find certain passages from Maine de Biran to be instructive. In these passages, Maine de Biran explicitly qualifies the nature of metaphysics. For Maine de Biran, metaphysics is the "science of the faculties proper to the thinking subject" (Maine de Biran 1995, IV:8), or the "psychological history of sensing human being" (Maine de Biran 1987b, II:9). During his early career, when he was close to the ideologists for whom metaphysics meant the "analysis of sensations and ideas" (Delbos 1931, 35),[17] he gave the following definition for metaphysics: metaphysics is the 'science of our ideas' (*science de nos idées*; Maine de Biran 1988, III:8).

These definitions follow the general definitions of French empirical philosophers of the late eighteenth and early nineteenth centuries. This tradition of defining metaphysics may be interpreted as a result of the reception of Locke's philosophy in France. For instance, Maine de Biran occasionally refers to Jean-Baptiste le Rond d'Alembert (1717–1783) who said the following about Locke: 'One could say that he created metaphysics nearly as Newton created physics. . . . He reduced metaphysics to that which it indeed needs to be – the experimental physics of the mind.' (d'Alembert 1929, 103–4; Maine de Biran 1987b, II:20–21; cf. Hallie 1958, 12, 20.)[18] Maine de Biran returns to this point a

[17] Ideology was a *science of ideas*, coined by Antoine Destutt de Tracy (1754–1836). For de Tracy, *ideology* was a sort of natural philosophical approach to human intellectual faculties and human knowledge. In de Tracy's philosophy, ideology is mainly a zoological study of human intellectual faculties. According to de Tracy, Locke was the first to study human intelligence in the same way as a naturalist studies the properties of minerals or plants. (Tracy 1826, xii–xiv.)

[18] 'On peut dire qu'il créa la métaphysique à peu près comme Newton avait créé la physique. . . . Il réduisit la métaphysique à ce qu'elle doit être en effet, la physique expérimentale de l'âme.'

second time: 'Since metaphysics has been pulled out from chaos [and it] has become a real science and, as [d'Alembert] has said, a sort of *experimental physics of the mind*, all the questions, to which the progress of this science may give rise, hinge upon the *facts* taken in the domain of our thought and the resort to observation which we can make on ourselves' (Maine de Biran 1987b, II:30).[19] Maine de Biran clearly states that metaphysics requires an experiential, that is, non-conceptual, source of knowledge, and this source is found within and not from without human consciousness.

In light of the previous considerations, I find Maine de Biran's idea of metaphysics to be characterised as follows: *metaphysics is a study of human cognitive faculties*. Having said that, let me point out that there are certain earlier commentators corroborating this characterisation. Perhaps the most general, but also rather informative, definition is expressed by Delbos (1931, 35): metaphysics means something other than physics. According to Devarieux (2004, 31), for Maine de Biran, metaphysics is a 'science of reflected acts or sentiments;' it is a 'speculation' or a study of the human 'intellectual and behavioural faculties.' In other words, metaphysics is principally a science of consciousness or a science of the operations of human consciousness and intelligence (Devarieux 2004, 33). However, this characterisation is not peculiar to Maine de Biran, Locke, or other early modern empiricists, but it appears to suit most seventeenth and eighteenth-century metaphysical theories well, including Descartes himself.[20] Thus, we can assume that my characterisation of Maine de Biran's central idea of metaphysics was not a unique but a rather common idea of the nature of metaphysics, albeit not the only one, in the turn of the nineteenth century.

Nonetheless, prior to Locke, Maine de Biran underlines Descartes' role in the development of modern metaphysics. For Maine de Biran, Descartes is the father of modern metaphysics, a view that is generally shared among philosophers. He gives four factors that characterise the nature of modern metaphysics after Descartes. First, metaphysics relies on internal observation, in which the human thought turns its attention on itself. From itself, the human thought finds the principles of any possible knowledge. Second, this self-knowledge is distinct from the representation of any object. Third, things

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[19] 'Depuis que la métaphysique tirée du chaos, est devenue une science réelle et, comme l'a dit [d'Alembert], une sorte de *physique expérimentale de l'âme*, toutes les questions auxquelles peuvent donner lieu les progrès de cette science ne roulent plus que sur des *faits* pris dans le domaine de notre pensée, et du ressort de l'observation que nous sommes capables de faire sur nous-mêmes.'

[20] Unfortunately, we do not have the opportunity to elaborate on the nature of early modern metaphysics at length in the context of this work.

belonging either to the imagination or to the external senses differ in nature from immediate self-knowledge. Fourth, there are proper cognitive faculties producing the two forms of knowledge, interior and exterior, and these two faculties, as well as their products, differ from each other in nature. (Maine de Biran 2001, VII/1–2:81.)

However, Descartes's general scheme of metaphysics did not engender a consensus or make philosophical projects converge on common aims and principles. This was probably due to the lack of precision and clearness in Descartes' and later philosophers' philosophical starting points and their primary philosophical principles. According to Maine de Biran, past metaphysicians have in general taken exterior perceptions or interior ideas to represent absolute reality, whether it be the mind's reality or exterior reality in themselves. They have taken reality to be as it is perceived as such, after which they have established realist or idealist ontologies, depending on their emphasis either on external reality or internal subjective reality.

Reappropriating Descartes' original aim, Maine de Biran claims that all contradictions between different kinds of metaphysical principles would resolve, if the nature and the characteristics of the real starting point of philosophy were seen clearly and certainly (Maine de Biran 2001, VII/1–2:12–13, 17–18). From this perspective, the different metaphysical systems, such as rationalism and empiricism, cannot even challenge each other – they are more or less abstract interpretations of a deeper fact, of which their principal concepts are conceptual translations. Thus, if there are unresolved metaphysical conflicts, or antinomies, in philosophy, the conflicting antinomies are only incommensurate answers to common problems. In other words, conflicting antinomies are imprecise conceptual translations of common evidence, and the conceptual translations become incommensurate with other conceptual translations. Thus, the actual problem can be universal, accessible to every philosopher, but the philosophers' interpretations and conceptual translations of aspects of the common evidence vary. Nevertheless, for Maine de Biran, the resolution of a given philosophical problem is not to put the conceptual translations against each other, but to search for the common source, the common experiential origin from which these metaphysical concepts and systems are derived.

The misunderstanding of the two sources of knowledge and their generation have obfuscated things that would have otherwise been known clearly. Ultimately, it has led the philosophers' thought towards empty ideas. (Maine de Biran 1986, VIII:53.) For Maine de Biran, a clear articulation of the two sources of knowledge, their generation, and the products originating in them, is the key to solve the long-lasting philosophical problems. One reason for this

obfuscation has been the possibly insufficient understanding of the nature of language and the effects of language on philosophical thought.

Next, let us continue with a preliminary outline of the subject matter of philosophy, after which I will contrast it with the problem of language among the metaphysical theories before Maine de Biran. After this contrasting, I shall concentrate on Maine de Biran's reading of the key achievements and errors of past metaphysical theories.

According to Maine de Biran, there is one eternal fallacy, one 'eternal paralogism' of metaphysics, which consists in starting the philosophical inquiry from concepts, and proceeding to justify the existence of substances. A reasoning that starts from concepts naturally ends up in concepts. This is because conceptual knowledge cannot in itself access intuitive knowledge. (Maine de Biran 1986, VIII:103, 122.) According to Maine de Biran, the error of the metaphysicians who have tried to attain things in themselves has been to *establish* their philosophical systems on conceptual meanings. They have speculated on the nature of things by starting their reasoning from concepts, not from the things in themselves. These philosophers have taken their first principles from language, ready-made meanings, which cannot be the principal, primary foundations of knowledge of things in themselves. (Maine de Biran 1986, VIII:73; cf. 1995, IV:12.) Maine de Biran depicts the role and function of language and the problems it imposes on philosophy:

> The artificial forms of our languages, undoubtedly primitively imitating [*calquées sur*] the natural forms of thought, subsequently pass on their imprint as a sort of reaction, and contribute to motivating the systematic illusions which substitute the real order of natural things or of the primitive ideas of understanding with conventional orders and the logical forms of our signs (Maine de Biran 1995, IV:12).[21]

Thus, the articulation of signs in language and the order of things in reality differ in nature. Maine de Biran sees the linguistic syntax and semantics of individual concepts as specific kinds of reactions to received stimuli or self-generated

[21] 'Les formes artificielles de nos langues, primitivement calquées sans doute sur les formes naturelles de la pensée, lui communiquent ensuite leur empreinte, comme par une sorte de réaction, et contribuent à motiver ces illusions systématiques qui substituent un ordre conventionnel et les formes logiques de nos signes à l'ordre réel des faits de la nature ou des idées primitives de l'entendement.'

excitations. Indeed, one function of language appears to be a set of instructions for action.[22]

The role of language has caused numerous disputes in the history of philosophy, and philosophers have generally held suspicious attitudes towards language (cf. Hinton 2021, 37:136). One frequent desire of philosophers has been an improvement of natural language: if only the linguistic expressions were clear, the nature of things would correlate with these expressions. This was already the motive of Francis Bacon (1561–1626), who wanted language to merely transcribe things in themselves (cf. Dawson 2007, 99). The role of language is clearly accentuated in discussions between Hobbes and Descartes, as well. For Hobbes, 'the inferences in our reasoning tell us nothing at all about the nature of things, but merely tell us about the labels applied to them' (cited in Dawson 2007, 111). For Berkeley, close to Hobbes' stance, the nature of language consists in the 'articulation, combination, variety, copiousness, extensive and general use and easy application of signs' (Berkeley 1871, 512). For Descartes, reasoning operates with the things themselves, which consciousness has tagged with words (cf. Dawson 2007, 111). As Leibniz expresses the nature of words, referring to Hobbes' statement: *sunt nobis signa, sunt vobis fercula digna*: '[w]ords are like jettons for the wise and like money for the unwise. Because for the wise they serve as signs, whereas the unwise take them as causes and reasons.' (Leibniz 2008, 146–47.) As I have shown, Maine de Biran continues this line of thought on the nature of language and its role in philosophy.

From the preceding considerations, we can find two approaches to language in these philosophers: 1) natural language cannot attain things in themselves, and 2) thoughts of which the words are only signs, or 'jettons,' can attain things in themselves. However, we have yet to leave open the nature of these *thoughts*, to which the signs refer, and continue the analysis of the role of natural language for philosophy.

For Maine de Biran, the starting point of metaphysical considerations on knowledge that can be known with certainty is the *primitive fact* (*fait primitif*). Problems concerning its nature and the means of knowing it have given rise to various unsolvable metaphysical problems, or antinomies. Referring to a German philosopher Louis Frédéric Ancillon (1740–1814), Maine de Biran says that

[22] I will give a general characterisation of language in chapter 5. For now, let us note that the main general functions of language appear to be 1) the prediction of individual (cf. Goldberg 2006; Carey 2009; Spelke 2017) and socially coordinated (cf. Seyfarth and Cheney 2014) action and 2) the providing of representations for reasoning (cf. Spelke 2017; Arbib 2015; Perszyk and Waxman 2018).

philosophy must start from facts and not from arbitrary concepts (Maine de Biran 2001, VII/1–2:13). Ancillon writes almost analogically:

> [P]hilosophy must necessarily start from a fact and not from arbitrary notions. No matter how simple and obvious the notions may seem, one can always ask where they come from, how they were formed? Their validity can be questioned; they do not carry their own credentials, and one is always tempted to try to define them. *The primitive notion should at least*, to be worthy of admission, *announce itself as a primitive fact*. (Ancillon 1809, 80, my emphasis.)[23]

I interpret Ancillon as meaning that he wants a *generative* explanation of primitive facts of knowledge that are not found in given concepts, because he wants to know the origin and formation of every concept that is considered as evident. But what are these evident facts of philosophy whose origin and formation can be known? What is a metaphysical *datum*? I will answer to this question in the following paragraphs but let us first remark two criteria Maine de Biran gives for metaphysical facts. There needs to be 1) a 'natural foundation' of 'primitive facts' as 'principles' of knowledge, and 2) a specific kind of observation that is appropriate for the research of these primitive facts. (Maine de Biran 1995, IV:32.) Thus, the discovery of the source of knowledge proper to metaphysics needs specific, natural foundation, and this specific foundation requires a specific observation. Now that we have these criteria in our minds, I will first explain Maine de Biran's critique of former philosophers according to their view on the apparent duality of knowledge. From this critique, I can draw Maine de Biran's idea of the metaphysical datum.

In order to gain a better focus on the core idea of this epistemological duality, I will concentrate on the classical philosophical problem that nowadays is called the mind–body problem. In a certain sense, it is an ontological problem underlying the epistemological dualisms as well as monisms. Descartes left the problem open, and the philosophers of the consequent centuries have more or less taken this setting as granted, whether they have wanted to reformulate it or transform it into a monism. Maine de Biran does not use Descartes' concepts of *res extensa* and *res cogitans*, but we can clearly see that he aims to characterise the

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[23] '[L]a philosophie doit nécessairement partir d'un fait, et non pas de notions arbitraires. Quelque simples et évidentes que paraissent les notions, on peut toujours demander d'où elles viennent, comment elles ont été formées ? On peut révoquer en doute leur validité ; elles ne portent pas en elles-mêmes leurs titres de créance, et l'on est toujours tenté d'essayer de les définir. *La notion primitive devrait du moins*, pour mériter d'être admise, *s'annoncer comme un fait primitif*.'

basic setting of all theories of mind–body dualism – Descartes included. Maine de Biran remarks that there are three different approaches to the relationship between the *motor principle* (*principe moteur*) and the *thinking principle* (*principe pensant*). The first approach denies the identity between the principles, the second approach denies the natural difference between the principles, and the third approach maintains that there is a kind of identity between the principles. I call the first of these principles *incommensurate duality* and the second and the third *consolidated duality*. Let us begin with the first one of these.

1.2 Incommensurate duality

According to Maine de Biran, the incommensurability in certain philosophies originate in the duality of activity and passivity in the conscious experience (Maine de Biran 1995, IV:48). Maine de Biran recognises the incommensurate duality of knowledge to be present in all key early modern metaphysicians: Descartes, Locke, Malebranche, and Leibniz. According to Maine de Biran, Malebranche denied the relationship between the motor principle and the thinking principle (Maine de Biran 1995, IV:90–91; Malebranche 2006, 1.1.2). Leibniz maintained that there is a pre-established harmony 'between the perceptions of the monad and the motions of the body' (Maine de Biran 1995, IV:91–92; Leibniz 1989b, 8:637).

The objects of exterior experience, which have, according to Maine de Biran, a 'natural adjective form,' are transformed into 'conventional substantive form.' By *natural adjective form*, Maine de Biran means that all exterior perceptions are qualities that language and logic treat as attributes of substances, which are not given in the phenomenal perception. In other words, sense experiences are either subsumed under a substance, or they are themselves made into substances – they are nominalised.[24] We could easily say that the stream is glimmering and that the glimmering is beautiful. This turns partial elements of attributes into artificial wholes by making them subjects in sentences and in logical propositions. (Maine de Biran 1995, IV:12–13.) We can legitimately question the substantiality of the stream, not to mention the nominalisation of its attributes. Representational reasoning imposes its forms of cognition on the knowledge of things. In this way, the *form* of cognition conditions the *matter* of cognition.

[24] Nominalisation is a commonplace procedure in many languages, for instance in German. We could say, *Sie ist eine alte Frau*. However, we could also nominalise the adjective old (*alte*) to denote the old woman: *die Alte*, 'the elder [woman].' Nominalisation is interesting from the point of view of the relation between the objects of reality and their linguistic expressions, and it concerns a general habit of people to transform words from one lexical category to another. See, for instance, Liardét (2016).

Another controversial metaphysical topic in the history of philosophy is that of the relation between *matter* and *form*. Descartes, Leibniz, and Locke have all offered a twofold structure, which makes up complete sensation or an idea of sensation: matter as passivity and form as activity (Maine de Biran 1995, IV:47, cf. 54–55; 2001, VII/1–2:115). Maine de Biran was not content with the earlier theories of either the understanding of the concepts of *matter* and *form* or the conceptions of their interdependence. The most well-known theory of matter and form is Aristotelian *hylomorphism*. The general character in the philosophical duality of matter and form is that matter denotes the variable, changing, and multiple side of things whereas form denotes the unchanging and unitary side of things. However, Maine de Biran attests that without knowing the generative causes of this binary composition, one cannot postulate but only logical or nominal definitions of this duality. Furthermore, those who have attested the necessity of this duality have also recognised the interdependence of matter and form. (Maine de Biran 2001, VII/1–2:115.)

The formal, active, or at least the second part of this duality is considered to comprise the innate knowledge. The lack of sufficient understanding of the origin and generation of knowledge appears in the philosophical debate concerning the innateness of knowledge. Maine de Biran claims that past metaphysical principles for solving the generative sources of knowledge have only been *petitiones principii*, or explanations appealing to something that cannot be explained, which have had no means of verification (Maine de Biran 1986, VIII:124). Without sufficiently explaining the *generation* of knowledge, philosophers have had to invent unverifiable *principles*. Maine de Biran directs his criticism to the theory of innate ideas in Descartes, Leibniz, and their followers; thus, let us investigate this criticism in more detail.

For Descartes, innate ideas are in the human mind since birth. They are constituent parts of the human essence. They are also purely part of the incorporeal soul; thus, they are independent of the physiology of the human body and the whole material world (Maine de Biran 1995, IV:46–47). For Descartes, there are three kinds of *innate*, or *primitive notions*: notions that guarantee the knowledge of corporeal matter, notions that guarantee the knowledge of one's soul, and notions that guarantee the knowledge of the union between one's body and soul. Descartes discerns three different sources of knowledge: one for ideas coming from *outside* of him, another for ideas coming from *inside* of him, with the third origin of ideas being the imagination, which utilises these exterior and interior sources of ideas:

> Now these ideas, some of them seem to have been born with me, others to be foreign and to come from outside, and others to be made and

> invented by myself. For, that I have the faculty of understanding what is generally called a thing, or a truth, or a thought, it seems to me that I hold this to be only of my own nature. (AT VII, 37; AT IX, 38; CSM II, 37–38.)[25]

Although Descartes maintained that it *seems* that even those ideas that come from without are only of his 'own nature,' he never elaborated how it is so. In Maine de Biran's interpretation, Descartes relied overly on hypotheses instead of facts (Maine de Biran 2001, VII/1–2:186). Following facts instead of hypotheses was supposed to be Descartes' chief objective in his main works, and Maine de Biran argues that he did not undertake to follow his method precisely enough. He gives two reasons for Descartes' error. First, Descartes took the duality of body and mind as given and thought that the knowledge of their union is an innate idea (Maine de Biran 2001, VII/1–2:147). Second, Descartes thought that the necessity of the thinking being is separate from the body, which for Maine de Biran is not a justified inference (Maine de Biran 2001, VII/1–2:151).

Descartes's dualism continued in both Locke and Leibniz. Let us begin with Maine de Biran's reading of Leibniz. In Maine de Biran's reading, Leibniz's innate ideas are simple *dispositions*, *effective powers* (*virtualité*), or *forms*, which are 'attributes of the human monad,' and they are innate to human cognition 'in a germinal state.' They develop from their germinal state when the senses and consciousness develop following the pre-established laws of their generation. Finally, together with the perceptual and imaginary content of consciousness, these effective dispositions form complete perceptions and ideas in their actual sense. (Maine de Biran 1995, IV:46–47.) However, Maine de Biran sees a crucial mistake in Leibniz's philosophy. Leibniz has confused the 'active faculties or operations of intelligence' with signs. Signs are results of these operations and one must not assimilate them (Maine de Biran 1995, IV:49). In short, Leibniz has solved problems that could have been empirically solvable with logic and metaphysics (cf. Maine de Biran 1995, IV:50–51).

Primitive notions play an uncontested role in Leibniz's thought, especially in his theory of the 'alphabet of the human thought,' or the combinatory or computational nature of human thought. Leibniz also called the primitive notions as *protonoemata simpliciter*, which is a difficult expression to translate, but

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[25] Translated from French: 'Or ces idées les unes me semblent être nées avec moi, les autres être étrangères et venir de dehors, et les autres être faites et inventées par moi-même. Car, que j'aie la faculté de concevoir ce que c'est qu'on nomme en général une chose, ou une vérité ou une pensée, il me semble que je ne tiens point cela d'ailleurs que de ma nature propre.' The Latin version is a bit different: 'Ex his autem ideis aliæ innatæ, aliæ adventitiæ, aliæ a me ipso factæ mihi videntur: nam quod intelligam quid sit res, quid sit veritas, quid sit cogito, hæc non aliunde habere videor quam ab ipsamet mea natura.'

we could translate it as 'simple primitive cognitions.'[26] In short, for Leibniz, these *protonoemata* are 'those that are conceived through themselves' (cited in Maat 2004, 315). Primitive notions are *simple*; thus, they are not composed of other notions or concepts. Notions are the *matter* of thought whereas computation is the *form* of thought. To clarify this further, let us cite two passages from Leibniz's *Meditationes de cognitione, veritate et ideis* (*Meditations on Knowledge, Truth, and Ideas*, 1684):

> Thus, knowledge [*cognitio*] is either obscure or *clear*, and again, clear knowledge is either confused or *distinct*, and distinct knowledge either inadequate or *adequate*, and adequate knowledge either symbolic or *intuitive*: and, indeed, if knowledge were, at the same time, both adequate and intuitive, it would be absolutely perfect (Leibniz 1989a, 23).[27]

A primitive notion is at least clear and distinct: 'one has distinct knowledge of an indefinable notion, since it is *primitive*, or its own mark, that is, since it is irresolvable and is understood only through itself and therefore lacks requisites' (Leibniz 1989a, 24). In short, for Leibniz, a notion is primitive if it is not constituted of other terms (cf. Lenzen 1991, 88, 92). If the primitive notion can be understood only through itself and does not have any constituent parts, and if intuitive knowledge is knowledge of the object in itself, in its integrality, then primitive notions can only be understood intuitively because symbolic knowledge is compositional knowledge. 'There is no knowledge of a distinct primitive notion except intuitive, just as our thinking about composites is only symbolic' (Leibniz 1989a, 25).[28]

However, to have clear, distinct, adequate, symbolic knowledge, one must have clear, distinct, adequate, intuitive knowledge of primitive notions (Leibniz 1989a, 25). Without intuitive knowledge, the knowledge would rely only on *nominal definitions*, enumerations of particularities (Leibniz 1989a, 24). 'A nominal definition consists in the enumeration of signs or elements sufficient to

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[26] I use the term cognition simply because with it we can comprehend the most basic aspect of human thought. *Noema* could be understood as *thought*, *perception*, *understanding*, or *purpose*, but these already lead away from the sought meaning. I simply mean with *cognition* a psychological process through which the consciousness knows, recognises, or pays attention to its object.

[27] 'Est ergo cognitio vel obscura vel *clara*, et clara rursus vel confusa vel *distincta*, et distincta vel inadaequata vel *adaequata*, iten vel symbolica vel *intuitiva*: et quidem si simul adaequata et intuitiva sit, perfectissima est.'

[28] 'Notionis distinctae primitivae non alia datur cognitio, quam intuitiva, ut compositarum plerumque cogitatio non nisi symbolica est.'

distinguish the thing defined from everything else' (Leibniz 1978, 293).[29] In short, nominal definitions require intuitive notions so that they fulfil the requirement of knowledge proper. 'All derivative notions, moreover, arise from a combination of primitive ones, and the more composite notions from the combination of less composite ones' (Leibniz 1978, 293).[30] Symbolic knowledge is thus useful, but it is factual knowledge only if it derives from intuitive knowledge. As in Descartes, we cannot find any substantial difference between primitive notions and compositional concepts, except that the former are simple and the latter compositional. Nevertheless, even the simple primitive notions are more or less conceptual by their nature. In this sense, Leibniz shares his approach to the origin of knowledge with Descartes.

Because the primitive notions were conceptual in their nature, Leibniz kept his answers on a conceptual level. According to Maine de Biran, Leibniz answered the correct problems, but he gave wrong answers: he answered the problems not susceptible to logic *with* logic, instead of psychology.

> Despite all the essential services that metaphysics . . . owes to the genius of Leibniz, one cannot help but recognise that his doctrine, which is far from being *pure* or homogeneous in all its parts, had a marked tendency to overturn the natural limits that exist between diverse forms of knowledge and to bring them back to unity of *principle*, *method* and point of view. Thus, after having somehow transported physics and physiology into mechanics, and the latter into metaphysics itself, by populating the universe with *monads* or immaterial forces, he transported the whole of metaphysics itself into *logic* by bringing together and almost identifying the two great principles of contradiction and *sufficient* reason. (Maine de Biran 1986, VIII:304.)[31]

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[29] 'Nominalis definitio consistit in enumeratione notarum seu requisitorum ad rem ab aliis omnibus distinguendam sufficientium, ubi si requisita requisitorum semper quaerantur, veniendum erit tandem ad notiones primitivas quae requisitis vel absolute vel a nobis satis explicabilibus carent.'

[30] 'Porro omnes Notiones derivatae oriuntur ex combinatione primitivarum, et decompositae ex combinatione compositarum.'

[31] 'Malgré tous les services essentiels que la métaphysique . . . doit au génie de Leibniz, on ne peut s'empêcher de reconnaître que sa doctrine, qui est loin d'être *pure* ou homogène dans toutes ses parties, avait une tendance marquée à renverser les limites naturelles qui existent entre [des] sciences diverses et à les ramener à l'unité de *principe*, de *méthode* et de point de vue. C'est ainsi qu'après avoir en quelque sorte transporté la physique et la physiologie dans la mécanique, et celle-ci dans la métaphysique même, en peuplant l'univers de *monades* ou de forces immatérielles, il transporta toute la métaphysique elle-même dans la *logique* en

Leibniz confined himself to treat the existence of all things according to two logical principles; thus, he neglected the generative principle, which for Maine de Biran is the most important causal principle. For Leibniz, the sufficient reason of existence means that there is no other possibility for a thing to exist. Perhaps the generative principle, essential for Maine de Biran, did not occur to Leibniz because of his conceptual system.

The conceptual undertaking of early modern philosophers to solve the problems of the origin of knowledge was probably the most widespread approach of that time. Maine de Biran argues that Descartes and Leibniz's theories of primitive notions share some elements with that of Locke. Locke's philosophy is usually seen as an empiricist in opposition to the rationalism of Descartes and Leibniz. But according to Maine de Biran, Descartes and Leibniz share 'certain fundamental points' with Locke. The shared element is the identical view on the nature of ideas: if anything, Descartes and Leibniz pay even greater attention to the nature and character of primitive notions, or the primitive elements of simple reflection, which are frequently taken to be quintessentially Lockean concerns. (Maine de Biran 1995, IV:47.) Thus, let us direct our focus on Maine de Biran's reading of Locke's central points concerning the origin of knowledge.

In Maine de Biran's reading, Locke's merit was to depart from the two sources of the ideas of human understanding. In Maine de Biran's interpretation, Lockean forms of cognition are the following: 'the interior sentiment which accompanies the operations of the will or the free act of intelligence'[32] and 'the completely passive modifications of external or internal sensibility, depending on the activity of material objects or the projections of their organisation' (Maine de Biran 1995, IV:33).[33]

According to Maine de Biran, this enabled Locke to separate and analyse two sorts of elements, or *primitive facts*, that, combined, form conscious representations (Maine de Biran 1995, IV:32–33). For Locke, the first primitive fact is perception and the second is the conscious recognition of this perception, namely reflection (Maine de Biran 2001, VII/1–2:94–95). However, Locke never connected, or consolidated, these two sources of ideas. He did not show their generation from the same source. If Locke 'had pushed the analysis to its last

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rapprochant et identifiant presque les deux grands principes de contradiction et de raison *suffisante*.'

[32] 'le sentiment intérieur qui accompagne les opérations de la volonté ou les actes libres de l'intelligence'

[33] 'les modifications toutes passives d'une sensibilité externe ou interne, dépendant de l'action des objets matériels ou des saillies propres de l'organisation'

limits, perhaps he would have seen the two origins he gives to knowledge united in a single source, in one and the same primitive fact, whose elements would have to be recognised in order to explain the formation of all our ideas' (Maine de Biran 2001, VII/1–2:97).[34] In Maine de Biran's interpretation, Locke nearly succeeded where Descartes and Leibniz had failed: in showing the generative source of the two constituents of knowledge.

Maine de Biran maintains that Locke analysed the ideas of human understanding into their two sources from which they originate, but he did not analyse the sources themselves (Maine de Biran 1995, IV:38). According to Maine de Biran, three factors prevented Locke from going to the end of his analysis of the primitive facts, and ultimately seeing the two orders of ideas to unite. The first factor is that all exterior perceptions are passive, that is, they enter the subject's understanding without any activity by the subject. Instead, ideas of reflection are active. 'From there, this philosopher had to consider the two origins as absolutely separate from each other, without communication, without reciprocal influence, the superior source (reflection) never mixing with the lower (sensation), which could not itself rise to its height.' (Maine de Biran 1995, IV:33–34; cf. Locke 2008, 2.1.25.)[35]

The second factor for Locke's mistake was 'the equality, or the perfect analogy, of properties, characteristics, and nature, that he supposes to exist . . . between all these species of passive modifications, expressed by the generic term: sensation' (Maine de Biran 1995, IV:35; cf. Locke 2008, 2.1.3).[36] Here, Maine de Biran wants to say that Locke did not pay attention to the natural differences between different sense perceptions.

The third factor, which prevented Locke from proceeding to the proper analysis of primitive facts, was that he placed all activity of the thinking subject in the faculty of volition and excluded understanding from this activity. From this division, Locke had to separate activity from understanding; thus, he denied that volition could provide simple ideas (Maine de Biran 1995, IV:36). For Locke,

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[34] 'si [Locke] eût poussé l'analyse jusqu'à ses dernières limites, peut-être aurait-il vu les deux origines qu'il donne à la connaissance réunie dans une seule source, dans un seul et même fait primitif dont il s'agissait de reconnaître les éléments pour expliquer la formation de toutes nos idées'

[35] 'De là, ce philosophe devait considérer les deux origines comme absolument séparées l'une de l'autre, sans communication, sans influence réciproques, la *source* supérieure (la réflexion) ne se mêlant jamais à l'inférieure (la *sensation*), qui ne saurait d'elle-même s'élever à sa hauteur.'

[36] 'l'égalité ou l'analogie parfaite de propriétés, de caractères et de nature qu'il supposera exister . . . entre toutes ces espèces de modifications passives, exprimées par le terme générique : sensation'

volition equals the executed or prevented acts of an individual (Locke 2008, 2.21.29–30). The simple ideas are produced by reflection concentrating on the reflecting personality itself, finding two genera of ideas from two faculties of mind: perception, or thinking, and volition, or willing, of which the power or capacity of the former is understanding, and the latter will. Locke names some of the ideas: remembrance, discerning, reasoning, judging, knowledge, and faith. (Locke 2008, 2.6.1–2.) Thus, Locke separated thinking and willing from each other as two distinct powers of reflection.

Let us pause on the concept of *reflection* for a moment. The concept of *reflection* is common in the history of both modern and pre-modern philosophy, and it can be found in such medieval thinkers as William Ockham and Walter Chatton (Yrjönsuuri 2007), in Descartes (Lähteenmäki 2007), and in the active nature of attentive reflection developed by the early modern philosophers (Brown 2007). The concept has undergone considerable development in the history of philosophy, and Maine de Biran conducted a detailed study of this development. Charles-François d'Irwing had placed himself between Locke and Leibniz, emphasising less the senses as Locke and the interior activity as Leibniz. Maine de Biran recognises a deep analogy between d'Irwing's theory and his own. However, he found that d'Irwing did not address the active nature of intelligence sufficiently. (Maine de Biran 1990a, XI/3:117–118.) For Fichte, by contrast, thought signifies 'developing consciousness of one's own activity' (Maine de Biran 1990a, XI/3:105). Maine de Biran attests that his point of view is similar to Fichte's, but it differs from Fichte's in one essential point: Fichte's theory is highly abstract, whereas for Maine de Biran, reflection is based on organic facts (Maine de Biran 1990a, XI/3:103–4). According to Maine de Biran, Locke was too ambiguous with his theory of reflection. Locke's error was to exclude reflection from sensibility; by so doing, he made an insurmountable gap between reflection and sensibility (Maine de Biran 1990a, XI/3:240).

1.3 Consolidated duality

In this chapter, I will deal with two different approaches, discerned by Maine de Biran, that have tried to consolidate mental and physical realities, that is, thought and movement, together. The first one is a monistic approach that has explained both realities with only one given reality. The second approach is a specific duality that tries to explain thought and movement as necessarily identical with one another.

With monists, Maine de Biran refers especially to Claude-Adrien Helvétius (1715–1771) and Étienne Bonnot de Condillac (1714–1780). Helvétius, a follower of Locke's philosophy, derived all content of human knowledge from sensation

and imagination – even though he must have recognised that reflection had an important place in Locke's system (Maine de Biran 2001, VII/1–2:36). Helvétius as well as Condillac, two French promoters of Locke's empiricism, saw reflection as a mirror that reflects the exterior impressions. They downplayed the proper nature of reflection. As Condillac has explicitly stated,

> Locke distinguishes two sources of our ideas, the senses and reflection. It would be more precise to recognise only a single one, either because reflection is in its principle merely sensation, or because it is at least the source of all ideas. (cited in Lloyd 2018, 6, translation modified.)[37]

Condillac criticised Locke of the same incommensurate dualism as Maine de Biran, but Maine de Biran argues that his criticism ended up in deepening the original mistake. Condillac accused Locke of admitting the reflective faculties to be innate. Condillac did not accept any form of innate knowledge, and thus he renounced the innate capacity of knowledge altogether. For Condillac, there was but one source of knowledge, namely sensibility. Thus, in Maine de Biran's interpretation, Locke's ambiguity was passed on to Condillac as a fatal mistake. (Maine de Biran 2001, VII/1–2:23.) Locke did not explain the active nature of reflection. Condillac interpreted this vagueness as innateness and renounced the nature of reflection as an active cognitive faculty, distinct from external experience. According to Maine de Biran, Condillac was nevertheless consistent in his starting point. He deduced from his principle all that this principle contained, but he could not deduce anything that this principle did not contain. In addition, the 'active operations of the human mind' had no place in his system. While 'the nominal titles' *attention*, *reflection*, and *comparison* are included in his system, the activities themselves, which these concepts should denote, are excluded. (Maine de Biran 2001, VII/1–2:24.)

Let us move to the second approach. Maine de Biran takes the philosophies of Anaxagoras and Locke as specimens of the second approach to consolidate the problematic duality of knowledge. According to him, 'Anaxagoras . . . is the first [philosopher] who has remarked in animated beings the identity of the motor principle and the thinking principle.' (Maine de Biran 1995, IV:89, emphasis removed; 2001, VII/1–2:190.)[38] Other philosophers before him had perhaps forgotten or disregarded this identity (Maine de Biran 2001, VII/1–2:489).

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[37] 'Locke distingue deux sources de nos idées, les sens et la réflexion. Il serait plus exact de n'en reconnaître qu'une, soit parce que la réflexion n'est dans son principe que la sensation même, soit parce qu'elle est moins la source des idées.'

[38] 'Anaxagore . . . est le premier [philosophe] qui ait remarqué dans les êtres animés l'identité du principe moteur et du principe pensant.'

According to Maine de Biran, Anaxagoras made this remark purely by consulting his 'sentiment of existence,' 'evidence of principle,' and by abandoning all the preceding philosophical systems by relying only on his directing thought or judgment (*bon sens*; Maine de Biran 1995, IV:89, cf. 87). In short, the central idea of this approach, according to Maine de Biran, is that a *thinking being* is a *productive force* (Maine de Biran 1988, III:399). Thus, the general ideas of *thought*, *activity*, and *existence* are seen as conceptual expressions of the same generative source.

We are returning to Locke in this chapter, as well. This is because, according to Maine de Biran, Locke's philosophy had both a major problem, which I already explained, and a major discovery, into which we are proceeding in this chapter. For Maine de Biran, Locke recognised the unity of activity and thought in apperception in a way analogical to Anaxagoras' remark: 'the soul can be said to *sense* or *act* only insofar as it actually *apperceives* that it itself senses and acts, and nothing that is outside the limits of this actual or possible apperception can really be attributed to the soul.' (Maine de Biran 2001, VII/1–2:94–95.)[39] Maine de Biran attests that there are three elements relevant to apperception that he considers to be in accord with Locke's theory: 1) there are *interior facts* that are 2) *identical with* the cognitive capacities but 3) *distinct from* the objects of cognition (Maine de Biran 2001, VII/1–2:21–22; cf. Locke 2008, 2.1.4). For Locke, apperception is the evidence of personality.

Let us proceed a bit further into Locke's definition of personality. In the second draft of the *Essay* in 1671, Locke announced two 'simple primary ideas' or 'primary qualities' belonging inseparably to personality. These ideas were, somewhat ambiguously, perception, or knowledge, or thinking, and a power of voluntary motion (Locke 2008, 2.6.1–2; cf. Mattern 1980, 56–57). In short, something is a personality if it has the interdependent power of thinking and the power of activity (Mattern 1980, 59). Mattern (1980, 66) expresses Locke's idea as follows: 'voluntary initiation of motion and thought provide clear examples of active power.' In Locke's own words:

> *Volition*, or *Willing*, is an act of the Mind directing its thought to the production of any Action, and thereby exerting its power to produce it. . . . *Volition* is conversant to nothing, but our own Actions. . . . *Volition* is nothing, but that particular determination of the mind, whereby, barely

[39] 'l'âme ne peut être dite *sentir* ou *agir* qu'autant qu'elle *s'aperçoit* actuellement que c'est elle qui sent ou agit, et tout ce qui est hors des bornes de cette aperception actuelle ou possible ne peut être réellement attribué à l'âme'

> by a thought, the mind endeavours to give rise, continuation, or stop to any Action, which it takes to be in its power (Locke 2008, 2.21.28 & 30).

To be precise, for Locke, the concept of *will* signifies a capacity that a person has, and *volition* and *willing* signifies the exercise of that capacity (cf. Stuart 2013, 413). In short, will as a capacity to act is thus 'directed only to our actions and terminates there' (cited in Stuart 2013, 468). Stuart (2013, 466) remarks that in 'all of the Essay's [five] editions' Locke 'says that the only actions we can conceive of are episodes of thinking and bodily motions.'[40] Furthermore, '[w]ill terminates solely in our actions and cannot be further extended to anything else or directed to a remote and absent good' (Stuart 2013, 468). Locke holds that will, the capacity to produce volitions, is the initiator or inhibitor of both motor and cognitive acts. It is the capacity to either direct or control motor and cognitive acts. If the human consciousness is aware of its perception, the perception is active and produced by will. Although the actual perceptions of consciousness could appear as passive, they are nevertheless made possible by the active, volitional personality (Stuart 2017, 493–94).

The most important aspect of Locke is that he distinguished *volition* from *desire*. For Locke, desire is an affection, whereas volition is capacity, as we already saw (Locke 2008, 2.21.30). Similarly, to Locke, Maine de Biran stresses the importance of not confusing the idea of *desire* with the primitive fact of *volition*. This primitive volition, which coincides with activity and personality, does not resemble *desire* in any way. '[O]ne perpetually confuses the primitive act of *will* with the secondary feeling of desire, which tends towards an external object that imagination represents' (Maine de Biran 1989a, X/2:312).[41] Thus, will is equal with the exerted act, whereas desire means the fabrication of imagination. In short, will is action, desire is imagination. According to Azouvi (1995, 244), desire concerns the objects of imagination, whereas volition concerns exerted activity. Maine de Biran argues that Descartes, followed by Malebranche and Condillac, did not understand this active nature of volition, and they ended up confusing it with desire. According to Stanek (2004, 431), the problem with the philosophers Maine de Biran labels as 'Cartesians' – chiefly Malebranche and Condillac – is that they dissociated activity from volition and confused desire with volition. For instance, Condillac attributed the origin of all knowledge in sensation. In short, for Condillac, sensation sometimes gives anxiety, which gives the consciousness a desire to repel it. This desire fathoms a goal, or an object, to repel anxiety, which

[40] Cf. Stuart (2013, 413, 420); Locke (2008, 2.21.23, 2.21.4 & 8).

[41] '[O]n confond perpétuellement l'acte primitif du *vouloir* avec le sentiment secondaire du désir, tendant à un objet extérieur que l'imagination représente.'

volition in turn tries to attain (cf. Stanek 2004, 428). The difference between Locke and Condillac was that the latter derived volition from experience via desire, while the former assimilated volition with personality itself.

If personality, once generated, has features of its own, how does Maine de Biran elaborate the nature of personality in general? The evidence, as well as the significance, of personality comes from its invariability in human experience. First, personality is that which endures from one moment of conscious experience to another (Maine de Biran 1993b, XIII/1:10). It is thus *continuity*. Second, the change in personality is the enduring variation of its enduring substantiality. It is thus a *continuous variation*. But because it is continuity, it is unity, and because it is variation, it is multiplicity. Third, the principle of this change is a *force*. There is some kind of force, which means that there is an *effort* or a *tendency* in a conscious being to produce change. This force is thus the generative principle of the variable endurance of personality (Maine de Biran 1993b, XIII/1:22). Whatever varies in human consciousness, its capacity to act is invariable. Maine de Biran expresses the continuity and invariability of personality by assimilating it to a point in space that draws a trace behind while moving as follows:

> The identical and immediate feeling of personal existence, or of a duration which could be considered as a trace of effort *flowing* uniformly, just as a mathematical line is the trace of a *point* which flows (Maine de Biran 2001, VII/1–2:240).[42]

The feeling of effort from volitional acts endures identically and reveals the person to itself among the variable thoughts and changing perceptions. Personality is that which accompanies all the self-conscious intellectual operations, which all need a certain degree of effort and are thus voluntary. (Maine de Biran 1990a, XI/3:109.) In other words, personality is the enduring, unifying link that brings the past to the present. Thus, personality is a condition for every recognised present state; it is not only constituted *by* them but is *their* constituent, as well (Maine de Biran 2001, VII/1–2:6).[43] All variable phenomena in space and time are coordinated by the personal existence of the human being (Maine de Biran 2001, VII/1–2:264). If the volitional personality vanishes, then all perceptual, cognitive, and emotional phenomena also vanish. As Gérard (1876, 105) remarks, the same reasons that prevent or inhibit the exercise of volition can

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[42] 'Un sentiment identique et immédiat de l'existence personnelle, ou d'une durée qui peut être considérée comme la trace de l'effort *fluant* uniformément, de même que la ligne mathématique est la trace du *point* qui flue.'

[43] Cf. Locke (2008, 2.27.9).

also obscure the *self* or personality. This is the reason why Maine de Biran and certain physiologists of his time were interested in so-called mental alienation (cf. Gérard 1876, 105).

Mental alienation is the evidence of the indispensable role played by personality in human cognition. Maine de Biran refers to certain contemporary studies on mental disorders, *mental alienation* (*aliénation mentale*), or *personal alienation* (*aliénation personnelle*), and their influence on personality (Maine de Biran 1989b, IX:5–6). The definition of mental alienation is that a person lacks the *compos sui*,[44] that he or she lacks the capacity of being a self-conscious agent and cannot exercise active cognitive faculties in the proper sense of activity (cf. Maine de Biran 1989b, IX:5–6, 139–141).

Mental alienation means that there is no volition, apperception, or thought in an individual. The patient can be affected, and he or she can react to stimuli, but there certainly is no self-conscious thought. Maine de Biran points out two different forms of mental alienation: *dementia* (*démence*) and *delirious mania* (*maniaque avec délire*) (Maine de Biran 1989b, IX:139–140). Maine de Biran leans especially on *Traité médico-philosophique sur l'aliénation mentale* (*Medico-Philosophical Treatise on Mental Alienation*; 1809) by a French physician Philippe Pinel (1745–1826) in his discussions on mental illnesses. We can understand Maine de Biran's concept of *dementia* to signify that which nowadays is called dementia, as well. However, I propose that Maine de Biran most probably meant with *delirious mania* what the latest psychiatric classification calls *psychosis*, a concept coined by Karl Friedrich Canstatt (1807–1850) in 1841, a couple of decades after Maine de Biran's last philosophical works. Notwithstanding, the common trait in all psychotic disorders is that they weaken, or completely diminish, the *compos sui* of the patient. They inhibit the exertion of volition and reflection.

Mental illnesses provide indirect proof of the principal fact. If personality diminishes, so diminishes all volitional acts, including thoughts and ultimately the capacity of knowing, as well. In the next chapter, we will engage directly with this primitive fact that is the object of metaphysics in Maine de Biran's epistemological considerations.

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[44] *Compos sui* refers to the phrases *non compos sui* or *non compos mentis*, an old juridical jargon for people who cannot be juridically responsible of a crime or his or her actions. Here Maine de Biran inverses this phrase to denote a person "responsible" of his or her actions, recognising that he or she is the agent of his or her actions.

1.4 Generated duality

Metaphysical principles must derive from reality and not from abstract concepts, if we want knowledge to be knowledge about reality itself; thus, they should, at least in some sense, be empirical and not conceptual. Nevertheless, all symbolical systems comprise interdependent elements, but they have some basic axioms that are the basis for all the symbols of the system. One cannot prove these axioms right or wrong with the symbols of the system because symbols are derivations from these axioms themselves. One possible solution is that there is a source, which provides non-conceptual content, and a form of cognition, which enables evidence that is not conceptual. In fact, Descartes already aimed at systematising the basis of philosophy on such a solution.

In Maine de Biran's interpretation, the importance of Descartes culminates in his discovery of the interdependence of thought and existence. *Je pense, donc je suis* – I think, therefore I am – signifies the following for Maine de Biran: '[T]he being gifted with thought, or internal apperception, is the only [being] which can say *me* and give a meaning to this word. For it, to exist is to apperceive or to think, and to think is to exist.' (Maine de Biran 2001, VII/1–2:77.)[45] Maine de Biran notes that 'I think, therefore I am' comprises a premise and a conclusion, which are identical with each other; thus, logically it is a tautology. Thought does not reveal a general idea of *existence*; it reveals *an* existence, an existence which is inseparable from that which thinks. As Descartes remarks, the primitive fact of consciousness cannot be thought in general, or existence in general. It must be the specific thought and the specific existence together that he attests. The act of thinking is the only indisputable proof of any kind of existence, and there is thought only insofar as the subject recognises that he or she is thinking (AT VI, 32; AT VII, 27).

According to Maine de Biran, *thought* and *existence* must be understood as two conceptual translations, or expressions, of the same primitive evidence. But what do they translate? For Descartes, thought and existence are translations of the *intuitive cognition* of one's own being. Intuitive cognition of that which he translates as thought is such a distinct and clear intuition that it infers to another intuition of something he translates as existence. Thus, thought and existence are translations of distinct and clear intuitions.

According to Maine de Biran, Descartes's error was to substantialise the indistinguishable expressions of thought and existence. In the end of the second meditation, Descartes truly seems to abandon his elaboration of the primitive fact

[45] '[L]'être doué de pensée ou d'aperception interne est le seul qui puisse dire *moi* et donner un sens à ce mot. Exister pour lui, c'est apercevoir ou penser, et penser c'est exister.'

of the indistinguishable intuitions of thought and existence. After substantialising the thinking being as *res cogitans*, he made another substance. In fact, he suddenly admits that the human being understands *things*, extended things, *res extensa*, outside of the thinking being altogether. The primitive fact of Descartes's discovery went astray (Maine de Biran 2001, VII/1–2:78–79). As for Locke, he cemented the 'knowledge of things' as a proper science (Locke 2008, 4.21.2; cf. Maine de Biran 2001, VII/1–2:79).

Now, the knowledge of *things* was supposed to require the knowledge of *matter*, or of other such substance. Notwithstanding, nothing would be lost if philosophers did away with such concepts as *substance*, *soul*, *thing*, or *matter*. Nothing would be lost, except perhaps arbitrary concepts that only hinder the work of philosophers and scientists. (Cf. Maine de Biran 2001, VII/1–2:79–80.)

Maine de Biran attests that the same primitive fact that Descartes pointed out must be brought back into consideration, but it must be studied in different fashion. It must not be taken as a foundation of absolute knowledge as such but as a starting point of the search for the nature and possibility of absolute knowledge. In addition, the primitive fact must not be translated into different conceptual expressions but taken as it is. One of Maine de Biran's holistic expressions of this primitive fact is *personality*, the generative principle of knowledge. (Maine de Biran 2001, VII/1–2:80–81.)

For Maine de Biran, instead of asking right away whether a particular thing exists, the proper question to ask is *how something can begin to exist for a sensing and thinking human being in the first place*. If perceptions are taken merely as direct data from their source, it becomes difficult, if not impossible, to question the factors according to which the perceptual phenomena are engendered or generated in the actual perception. For instance, it is important to ask how some object of thought appears and why human consciousness thinks itself with the same cognitive devices as it thinks the objects of its experience. (Maine de Biran 1986, VIII:52–53.) It is important whether the questions concerning knowledge are posed in the light of the generation of knowledge. I argue that in Maine de Biran, the enquiry into the sources and generative factors of knowledge, the very basis of the existence of knowledge itself, needs to be the first step of metaphysical research.

Let us follow Maine de Biran's train of thought and see how he understands personality. According to Maine de Biran, human beings understand themselves as something that philosophers have called *substance*. Nonetheless, there are no representative ideas of such a substance, because, according to Maine de Biran, substances cannot be imagined or perceived things; the understanding of oneself as being a substance must be prior to the conscious representations (Maine de Biran 1986, VIII:63). However, Maine de Biran does not commit to the

metaphysical terminology of substances. Instead, he approaches the problematic nature of human being from a psychological point of view. He approaches the substantiality of the human being as a personality that actively cognises and perceives. This activity Maine de Biran calls *force*. 'Force is understood only in present action, but we understand that there is something which remains independent from the act, and which has in itself the possibility to act; and it is this that we call substance. The notion of substance is thus derived from the idea and the feeling of *force*.' (Maine de Biran 1986, VIII:268–69.)[46] Thus, the feeling of force is the immediate evidence of personality as a thing that can be called *substance*. However, *substance* is only a conceptual translation of the abstracted perception of this force. Maine de Biran states the epistemological importance of personality in his early letter to his close friend, the physicist and philosopher André-Marie Ampère (1775–1836): 'The great topic between us consists of knowing if there can be any *idea*, or *knowledge*, or *intellectual* operation properly said, before the feeling of the *self*, or personality' (Maine de Biran 1993b, XIII/1:9).[47]

Following Maine de Biran's own terminology, he shifts the emphasis of the origin and generation of knowledge from metaphysics to psychology. According to him, the psychological study of the generative origin of cognition reveals the key to the understanding the different modes of knowledge, such as presumed absolute knowledge. 'The *self* [*moi*] must be the starting point, footing, or at least an essential medium of all the notions to which the belief in an absolute reality attaches itself.' (Maine de Biran 1986, VIII:122.)[48] If there is a mode of knowledge that several metaphysicians have called *absolute*, it is provable only after psychological groundwork. The same condition applies to the arguments of its impossibility.

The psychological groundwork of the metaphysical and epistemological problems of the origin and generation of knowledge can be put in other terms, as well. The idea of the primacy of psychology over metaphysics and epistemology is apparent, if we consider Maine de Biran's criticism of earlier metaphysicians. First, the earlier metaphysicians did not consider the non-conceptual origins of

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[46] 'La force n'est conçue que dans l'action présente, mais nous concevons qu'il y a quelque chose qui reste indépendamment de l'action et qui a en soi la faculté, la possibilité d'agir ; et c'est là ce que nous appelons substance. La notion de substance est donc dérivée de l'idée et du sentiment de la *force*.'

[47] 'Le grand point entre nous consiste à savoir s'il peut y avoir quelque *idée* ou *connaissance*, ou opération *intellectuelle* proprement dite, avant le sentiment du *moi* ou la personnalité.'

[48] 'Le moi doit être le point de départ, l'appui, ou du moins l'intermédiaire essentiel de toutes les notions auxquelles s'attache la croyance d'une réalité absolue.'

their primitive concepts. Neither did they sufficiently consider the generative factors of perception and cognition. Without the analysis of these generative origins, all philosophical concepts are merely *petitiones principii*, or axiomatics, from which other conceptual knowledge is deduced. Maine de Biran depicts this setting as follows: 'the principles that serve as the foundations of knowledge must not be taken from the enclosure of ideas and facts *of which it itself is composed*.' (Maine de Biran 1995, IV:60, my emphasis.)[49] As I explained in the previous chapter, reasoning that starts from concepts can only end up in other concepts (cf. Maine de Biran 1986, VIII:103, 122). Such symbol play cannot be the foundation of knowledge (cf. Maine de Biran 1986, VIII:73; 1995, IV:12). However, empirical observation has one advantage over such logical reasoning: it is always open for the primitive source of reality by the medium of experience. If metaphysics is empirical in its own right, it has no need for the *petitio principii*, nor does it need to resort to either dogmatism or scepticism.

The primitive fact of metaphysics for Maine de Biran is *force* (cf. Maine de Biran 2001, VII/1–2:155), or, put in slightly more modern terms, *capacity*. It is the capacity that effectuates the act, of which an individual gets the feelings of effort and resistance, which in turn make the individual conscious of his or her personality.

Primitive fact as the source and the generative factor of knowledge is impossible to imagine because imagination itself is a faculty generated by the primitive fact, which differs in nature from the products of imagination. Reasoning that depends on representations cannot thus think this origin, its own origin, either. (Maine de Biran 2001, VII/1–2:158–59.)

According to Maine de Biran, it is true that one can never imagine, or represent, how the mind can move the body. However, what does it matter that those two different representations are discontinuous, or incommensurate? The only fact we can draw from them is that our representations, and not reality itself, have incommensurate elements. (Maine de Biran 2001, VII/1–2:172.) This duality is nonetheless *a posteriori* to the state of things. Conscious reasoning, in which this duality is present, is in fact the only thing in which the duality is present. It is not a question of consolidating mind and body but figuring out how consciousness can find itself as separate from the rest of reality. (Cf. Maine de Biran 2001, VII/1–2:154.)

[49] 'les principes qui doivent servir de fondement à une science ne doivent pas être pris dans l'enceinte même des idées ou des faits dont elle se compose.'

1.5 Summary

In this chapter, I started by clarifying the basic definition of metaphysics in Maine de Biran's philosophy. We saw that this definition of metaphysics was its most common definition around the end of the eighteenth century and the turn of the nineteenth century. In addition, I gathered material concerning the definition of metaphysics in philosophers relevant to Maine de Biran, especially in Descartes, who is generally considered the father of modern metaphysics.

After Maine de Biran's definition of metaphysics, we proceeded to explain the key problems of earlier metaphysicians. In short, they have not understood correctly, or they have flatly dismissed, the sources and generation of knowledge. Out of these problems concerning the subject matter of philosophy, we saw language and *a fortiori* concepts to be a major hindrance for philosophers. In addition, the dispute over innate ideas and their relation to experiential data appeared as a striking example of the problems in philosophy. We saw how Maine de Biran located the problem of innate ideas as originating in a misunderstanding concerning the nature and starting point of philosophical knowledge. For him, there are primitive *facts* that do not originate in the sense experience. Thus, rationalist philosophers had a good reason to assume their existence. However, they failed to properly understand the nature and origin of those primitive facts, because they took the ontological dualism as more or less granted. Those philosophers who did not take the dualism as granted took only the other half of the duality and tried to explain everything with it.

One reason for this failure was that philosophers have not sufficiently understood the nature of human cognition. Although past philosophers have utilised concepts, such as *apperception*, *intuition*, and *reflection* in their attempts to pin down the cognitive faculty specific to philosophical thought, they have not correctly understood its object (as we saw in the problem of innate ideas) or its proper nature. However, we saw that Descartes, Leibniz, and Locke had been very successful despite their errors, and that Maine de Biran was indebted to their discoveries. Although being in accord in several points with Descartes, Leibniz, and Locke, Maine de Biran clearly was not a 'Cartesian,' a 'Leibnizian,' or a 'Lockean.' Instead, he saw philosophy as one, clearly definable discipline. His predecessors developed philosophy in their stead committing to some errors in conducting their philosophical projects.

Thirdly, I approached the proper starting point of metaphysics, which for Maine de Biran is the active human personality itself. In fact, we saw that in personality, both the active faculty and the object of knowledge coalesce, or inversely, that philosophers can find out how they generate from personality.

Finally, I presented Maine de Biran's own formulation of the problem of duality: instead of being either incommensurate duality or duality that can be consolidated, the duality is rather a *generated* duality. The most primitive fact for Maine de Biran was found from beyond this division, or in that which engenders this division. We saw it to be, namely, a *capacity* to act freely. In the third chapter, we will follow my interpretation of how Maine de Biran's theory builds up from its primitive setting until the development of the higher-order cognitive modes, generated from this primitive source.

2 CAUSALITY AS THE FIRST IDEA OF METAPHYSICS

The importance of the problem of causality for Maine de Biran's general definition of metaphysics appears in two ways. First, the division into science and philosophy is based on their differing models of causality (Maine de Biran 1986, VIII:159). Second, understanding the generative causality of a thing proves its existence (Maine de Biran 1986, VIII:350). These two ways give us an epistemological problem (differing causal explanations in science and philosophy) and an ontological problem (generative causal explanation as the proof of existence).

The problem of causality is perhaps the single most remarkable question concerning the division between philosophy and science. It belongs to the core ideas of the generation of knowledge. According to Louis Frédéric Ancillon (1740–1814), the principle of causality is the 'principle of all principles' (Ancillon 1817, 203–4; Maine de Biran 2001, VII/1–2:10–11, 159, 198; 1989a, X/2:40; 1986, VIII:284). The problem comes from the fact that even though causality is not an empirical concept, science and philosophy must rely on some form of causal explanation.

Maine de Biran probably vaguely refers to Hume, Kant, and others when he says that the concept of *cause* is 'taken for a *form* interior to our understanding' and its significance is thus 'to take a logical principle for a fact; it is to leave the circle of all practical reality; *it is to cut the knot of the question concerning the order of generation of our knowledge*, or rather to invert this order' (Maine de Biran 1995, IV:117, my emphasis).[50] Maine de Biran refers to the legend of the Gordian Knot, according to which a problem, that appears insurmountable, is spoiled by a hasty and blunt solution. In the legend of the Gordian Knot, Alexander the Great untangled the knot by slicing it open with his sword. In the same fashion, Maine de Biran accuses Hume and Kant of giving too hasty an answer to a difficult problem that requires much more patience and sensitivity to be resolved. In his more delicate and sensitive solution, Maine de Biran seeks for the *generative* reasons for the fact that human beings have a capability to recognise, or at least imagine or fabulate, causal factors in objects of cognition. It does not suffice to state whether causal reasoning is legitimate or not, or what kinds of causality are recognised and in what occasions.

[50] 'c'est mettre un principe logique à la place d'un fait ; c'est sortir du cercle de toute réalité pratique ; c'est trancher le nœud de la question sur l'ordre de génération de nos connaissances, ou plutôt intervertir cet ordre.'

The pivotal importance of the principle of causality for Maine de Biran is revealed in such passages as the following: 'It is this analysis which, taking all notions in their source, in the self or the consciousness, starting with that of *causality* which is their mother, manages thus to return the first problem of philosophy to a question of fact, which resolves when it is well posed' (Maine de Biran 1986, VIII:49).[51]

2.1 Two different models of causality

The problem of causality was an active topic of philosophical debates at the turn of the nineteenth century. The legacy of eighteenth-century philosophers appeared in a certain duality of causal explanations in early nineteenth-century philosophers. The importance of this duality is apparent in Kant and Dugald Stewart (1753–1828). In addition, Hume revealed the problems that follow from the misunderstandings of causal judgments.

Stewart has remarked that the common use of the concept of *causality* inherits two completely different, indeed incommensurate meanings, both in the common and in the philosophical use. The first meaning is what Stewart calls the *metaphysical* or *efficient* meaning of causality. A metaphysical cause is that which is a necessary condition to an observed change. The second meaning is that which the natural sciences utilise, and it means the expected constancy of a thing after another thing. Stewart calls these kinds of expected regularities the *physical causes*. (Stewart 1854, 1:97.)

The confusion between metaphysical and physical meanings of causality was already elaborately analysed by Hume. For Hume, all empirical knowledge is probabilistic. The necessary connection is an illegitimate translation of high probability into necessity. The function of reason is to generalise causes, effects, and their relations. (Hume [1748] 2008, 9.1.) In short, reason generalises group a into a nominal concept x and group b into a nominal concept y. Then, reason perceives that a thing belonging to group a is always followed by a thing belonging to group b. Taking the things as representatives of their proper concepts, reason can generalise their causal relation as $x \rightarrow y$. Hume's central concern was the confusion between two incommensurable facts: empirical probability was translated into a logical modality.

Hume's theory of the apparent causality perceived in nature was later conceptualised as the 'regular sequence theory' (cf. Merrill 2008, 76, 171). The

[51] 'C'est cette analyse qui, prenant à leur source, dans le moi ou la conscience, toutes les notions à partir de celle de *causalité* qui en est la mère, parvient ainsi à ramener le premier problème de la philosophie à une question de fait, qui est résolue dès qu'elle est bien posée.'

idea of necessity comes from the *generalisation* of constant conjunction, for which the ideas of freedom and chance are *negations*. The so-called 'freedom' is caused by a more primitive idea, namely volition, which is an undeniable fact. Thus, freedom and necessary connection have nothing to do with one another, because the first is the negation of the second, which in turn is an illegitimate *a posteriori* translation of constant conjunction. (Hume [1748] 2008, 8.1.23–25.) The core idea here is that the *generative source* of the idea of causality is not a perceived causality itself. As Cheng and Lu (2017, 21) have formulated Hume's theory: 'causal knowledge is induced from non-causal data.'

Hume's critique of the illegitimate translation of empirical probability into a logical modality does not consider the generative reason for the idea of causality itself. Even if Kant does not consider it either, he nevertheless locates the source from which the idea of causality wells up. According to Kant, human consciousness can find another form of causality from within, when it finds itself as an end in itself, that it can determine its own actions from within. Kant calls this self-determination *personality* (*Persönlichkeit*; Kant [1788] 1997, 5:87):

> Through the consciousness of our personality we see ourselves in the intellectual world and find ourselves free. Through our dependence on impressions we see ourselves in the sensible world and find ourselves determined. Our intuitions of bodies all belong to the sensible world; accordingly experiences agree with the laws of determining grounds of the sensible world. But our intellectual intuitions of the free will do not agree with the laws of the *phaenomenorum*. (Kant 2005, 17:467.)

Thus, for Kant, there is a strict mechanism in things as they appear but indeterminism and freedom in human activity. In the following, I will interpret this causal duality in Maine de Biran, which resembles the setting that Kant expresses in the preceding excerpt.

2.2 The mechanistic model of causality

In Maine de Biran's regard, the relation of cause and effect in mechanism is *succession*, not the proper *cause*, which is an operation of a volitional creature. Mechanistically put, the proposition *everything that has a beginning has a reason* appears to be identical with the proposition *all phenomena are preceded by another phenomena* (Maine de Biran 1986, VIII:33), because mechanism explains everything by means of preceding phenomena. However, the latter proposition is more informative: the objects to which it refers can legitimately be named phenomena, and the one can easily be said to precede the other. The former proposition presupposes that the preceding phenomenon is held to be the cause

of the following phenomenon, and this causality cannot be itself observed. It is a superficial, *metaphysical*, addition to the course of events. (Cf. Maine de Biran 1986, VIII:32.)

According to the physiologist Paul-Joseph Barthez (1734–1806), frequently cited by Maine de Biran, '[t]he phenomena of nature cannot make us know *causality*. . . . [They can] only show us the order in which they happen' (Barthez 1858, 10–11).[52] Science can understand only 'general experimental causes,' which Barthez explains as follows: 'one can know the general causes only with the laws that experience, reduced to a calculus, has discovered in the succession of phenomena. . . . All explication of natural phenomena can only indicate experimental causality.' [53] (Barthez 1858, 11–12.) Baumgarten (1911, 13) has characterised the physical succession in Maine de Biran's theory as an *experiential sequence* (*erfahrungsmässige Aufeinanderfolge*).[54] I find Baumgarten's expression to sum up clearly the idea of successive causality: all experienced events and things following each other during these events are a type of sequences that have an arbitrary beginning and an arbitrary end. From this arbitrariness comes the explanatory power of mechanism. Choosing a sequence of causal chains, human cognition can understand the courses of events and predict and manufacture things. The regularity of resembling sequences enables human cognition foremost to find resemblances and generalise.

Indeed, the generalisation of regular, arbitrary sequences enables human cognition to formalise them: it can give them linguistic symbols or put them into a mathematical formulation. In short, generalisation enables induction, which in turn enables the formulation of laws (cf. Maine de Biran 1989b, IX:11–12). Out of these laws, human cognition can deduce other laws, or find analogies between them, possibly uniting them under a more profound law. Mechanistic explanation gives the identity of the cause of phenomena. However, the identical cause can only be an *analogy* between the concrete phenomena (Maine de Biran 1988, III:27). The knowledge provided by mechanistic explanation is absolute in

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[52] '[l]es phénomènes de la nature ne peuvent nous faire connaître la *causalité*. . . . [S]eulement [peuvent-ils] nous manifester l'ordre dans lequel ils se succèdent.'

[53] 'on ne peut connaître les causes générales que par les lois que l'expérience réduite en calcul a découvertes dans la succession des phénomènes. . . . Toute explication des phénomènes naturels ne peut en indiquer que la cause expérimentale.'

[54] '[W]eil die physischen Ursachen, welche aufgefasst werden als eine bestimmte erfahrungsmässige Aufeinanderfolge, sich *tota natura* von den erzeugenden Ursachen unterscheiden, mit welchen sich der Psychologe (d. h. der Erkenntnistheoretiker) beschäftigt.' Interestingly, Baumgarten was not a researcher of philosophy but a psychologist, who wrote her dissertation thesis on the epistemology of Maine de Biran in the University of Zurich.

its domain of knowledge, but this domain forms only one half of complete knowledge, the quantitative identity of regularity. Mechanism can explain things only in terms of regularity and identity that are generalised from sequences arbitrarily cut up from the flux of experience. (Cf. Maine de Biran 1986, VIII:168–169; 1989b, IX:10.)

Maine de Biran describes the discovery of the law of universal gravitation by Newton as a paradigmatic case of mechanistic explanation, conceived as the formulation of laws instead of a search for causes. In his reading, Newton, by 'comparing the quantities of the curvilinear motions of the planets with each other and with the movement of bodies falling from different heights towards the centre of the earth'[55], discovered by induction that the planetary motion and the motion of falling bodies 'could not have been imagined to have any analogy between them, [that they] were subject to perfectly similar laws, and consequently belonged to the same *cause*, the same *force* of attraction or gravitation spread throughout the whole of nature'[56] (Maine de Biran 1986, VIII:169). Newton united in a single model Kepler's three laws of planetary motion, Galileo's law of constant acceleration of free-falling bodies, and other observed regularities (cf. Lenoir 1980, 84). According to Maine de Biran, Newton himself already answered the problem of the efficient cause: he did not claim that gravitation is a force, but that all gravitational phenomena, from planets to molecules, behave *as if* some common force was acting on them (Maine de Biran 1986, VIII:170).[57] Newton thus refrained from explaining things to be caused by a specific force called gravity, a name for a phenomenon, which could only be perceived indirectly by its effects. Kepler and Galileo's laws were based on generalised observations, and Newton combined these laws into one algebraic equation. Newton's law of universal gravitation does not *explain* gravity, but it enables us to calculate and predict the *effects* of bodies that are observed to behave *as if* there was a common force acting on them. The law itself remains agnostic about the *efficient* cause behind the attraction of bodies. This is evident, if we know what the nature of a physical law is. A physical law is a scientific law, whose function is to formalise observed, identically occurring set of phenomena

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[55] 'en comparant les quantités des mouvements curvilignes des planètes entre elles et avec celles du mouvement des corps tombant de différentes hauteurs vers le centre de la terre'

[56] 'qu'on n'aurait pas imaginé avoir quelque analogie entre eux, étaient soumis à des lois parfaitement semblables, et par suite appartenaient à une même *cause*, une même *force* d'attraction ou de gravitation répandue dans toute la nature'

[57] Kant drew a similar conclusion (Kant [1804] 1993, 22:282), holding that physics means the 'unity of moving forces' (Kant [1804] 1993, 22:325). According to Kochiras (2011, 175), Newton 'remains uncommitted and uncertain, denying knowledge of gravity's cause in his second letter to Bentley and much later in the General Scholium.'

into a mathematical equation, that symbolises the identity of phenomena. It enables scientists to predict future phenomena that are considered as identical with the symbols of the law. According to Newton, in his letter to Richard Bentley (1662–1742):

> [I]t is inconceivable . . . that inanimate brute matter should without the mediation of something else which is not material, operate upon, and affect other matter without mutual contact, as it must do, if gravitation, in the sense of Epicurus, be essential and inherent in it. And this is one reason why I desired that you would not ascribe innate gravity to me. *That gravity should be innate, inherent, and essential to matter, so that one body may act on another, through a vacuum, without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man who has, in philosophical matters, a competent faculty of thinking, can ever fall into it*. (Cited in Stewart 1854, 1:101–102, my emphasis.)[58]

The law of universal gravitation was one of the most important steps for physics to move from an anthropogenic concept of causality to the contemporary model of mechanistic laws. According to the mainstream scientific view today, neither action at a distance nor the mechanical idea of action depict the fundamental nature of physical reality. *Attraction* and *impulsion* are conceptual translations of observed phenomena that appear for ordinary human perception. Mechanistic explanation does not need them, and the law of universal gravitation shows how physical attraction and impulsion should be understood in the scientific terms of Newton's time. Several quasi-primitive notions, that are taken as explanatory principles of gravitational movement, are abolished, or their categorical misuse is fixed in the physical sciences. To conclude the explication of mechanistic causality, let us quote Maine de Biran himself:

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[58] In addition, Newton states, that 'I do not take Gravity for an essential Property of Bodies' (cited in Ducheyne 2014, 677). Both citations from Newton refer to a problem known as *action at a distance*. We are not going to the details of this problem but let us state that it was an essential problem inherent in Newton's theorisation of the universal gravitation. What comes to the law of universal gravitation itself, the gravitational force is not an explanatory factor but an *explanandum* which is calculated from other observed quantities. Newton's law of universal gravitation is generally stated in the following equation:

$$F = G\frac{m_1 m_2}{r^2}$$

It says that the gravitational force (F) equals with the division of the product of two masses (m_1, m_2) with the square of the distance (r^2) multiplied by the gravitational constant (G). Here, the gravitational force is explained by an equation which combines different measured quantitative data, which in turn are observed and quantified by appropriate means.

> In a word, in the exclusive use of physical causes to which the natural sciences, based on observation and exterior experience, are necessarily reduced, attraction and impulse are two phenomena or two general facts enjoying the same evidence, whose laws are equally proven and equally rigorously established by experience and calculation. There is nothing more to know or to ask beyond this. (Maine de Biran 1986, VIII:176.)[59]

Now that we have a clear idea of mechanistic causality, we also see that it is not causality in a proper sense of the word. This does not mean that mechanism would not have anything to do with proper causality, but, as I already stated, it remains agnostic to the causal reason that generates the regularity and predictability of phenomena. Moreover, it has no role in explaining the very fact that human cognition can infer that something causes another, or that something originates, or has its source, the cause of its existence, in something that precedes it and engenders its existence. The source of this causal mode, or the very possibility of causal cognition itself, must then be sought from that cognising being itself.

2.3 Personality as the source of causal cognition

Now that I have defined the mechanistic model of causality, let us turn to the second model of causality, which appears as the generative source of all causal cognition. This source is the human *personality* or the *self*.[60]

The agentive causality of personality is the origin of any sort of causal idea. Without searching for the generative psychological reasons for personality's self-generating activity, the study of knowledge itself will be impossible, because personality is the subject of knowledge. In short, knowledge is a product of active cognition, and causality is indispensable factor in knowledge. Ideas of causality originate in causal cognition, which originates in the active personality. (Maine de Biran 1986, VIII:5, 361.)

Maine de Biran's aim has relevant parallels with Hume's aim. According to Hume, the nature of causal relation depends on inference (Hume [1738] 2007, 1.3.14.30; cf. Kail 2014, 236). Human mind 'has a great propensity to spread itself

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[59] 'En un mot, dans l'emploi exclusif des causes physiques auxquelles les sciences naturelles, fondées sur l'observation et l'expérience extérieure, sont nécessairement réduites, l'attraction et l'impulsion sont deux phénomènes ou deux faits généraux jouissant de la même évidence, dont les lois sont également prouvées et aussi rigoureusement établies par l'expérience et le calcul. Il n'y a plus rien à savoir ni à demander au-delà.'

[60] To some extent, I will make use of the same considerations as in section 1.3, in which I explained Maine de Biran's idea of personality as the source of knowledge in general. This time, we consider the causal role of personality in greater depth.

on external objects, and to conjoin with them any internal impressions, which they occasion, and which always make their appearance at the same time that these objects discover themselves to the senses' (Hume [1738] 2007, 1.3.14.25). As Kail (2014, 236) notes, the concept of *causality* is only understood after one knows *why* human thought makes such an inference. However, an impression preceding another impression is one thing, but a thing being the producer of another thing is a totally different case. As Sinclair (2020b, 909) has pointed out:

> A fundamental element of Biran's rejection of Hume's account is his denial that the causal relation in agency is successive and thus that the effect of willpower can only be foreseen. The causal force or power in our action is not prior to the effect, but rather present in it.

All causal ideas have their origin in the human personality (Maine de Biran 2001, VII/1–2:10–11). In other words, causality is a mode of human reasoning to understand reality. Causality as human consciousness understands it is not a property of reality. The origin of this principle is thus the consciousness of one's own force or effort. The principle of causality and the experience of one's own activity coincide. From this source all the metaphysical ideas or principles such as unity, identity, and substance origin. (Maine de Biran 2001, VII/1–2:10–13.)

According to Baertschi (1993, xvii), Maine de Biran's reading of the previous authors who have written about causality is a Lockean reading: 'to be a cause is to act efficiently.' Locke had already thoroughly considered the role of volition as an efficient causality in human experience. 'The idea of the beginning of motion, we have only from reflection on what passes in ourselves, where we find by experience, that barely by willing it, barely by a thought of the Mind, we can move the parts of our bodies, which were before at rest' (Locke 2008, 2.21.4).

From the psychological point of view, a human being can understand and affirm that free acts are also the only acts in the proper sense of the term '[F]or a movement to qualify as an act, it must be initially determined by an intelligent and free force, which is conceived as the efficient cause of that movement' (Maine de Biran 1989b, IX:235).[61] Thus, in short, *an act is properly an act, only if it comes from the active being itself*. Physiologically, an effort is seen in acts which do not result from an external stimulus or excitation. It means that personality is capable of 'entering into action by itself' (Maine de Biran 2001, VII/1–2:121).[62] Thus, only proper activity are the self-generated acts of personality.

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[61] '[P]our qu'un mouvement puisse être qualifié d'action, il faut qu'il soit déterminé en son principe par une force intelligente et libre qui est conçue comme la cause efficiente de ce mouvement.'

[62] 'entrer en action par lui-même'

Self-generated act of thought is 'like a material symbol of a willed effort or of an act, which is not actually forced nor provoked by any sensible impression coming *from outside*, even produced in any part of the nervous system outside the centre [brain]' (Maine de Biran 2001, VII/1–2:121). [63] One of the key characteristics is that this self-generated activity can resist the ordinary course of events. If natural events always occur in the same way, in the same circumstances, the self-generated act, volition, is a force which can change that situation, and resist the ordinary or predictable course of events. Volition is the spontaneous capacity of personality. Maine de Biran takes as an example the legend of the Roman youth Mucius Scaevola who, humiliated and defeated by the Etruscan king Lars Porsena whom he had failed to assassinate, puts his hand inside a flame and keeps it there by his free will, until the Etruscan king makes him stop and releases him because of his temerarious youthfulness. (Maine de Biran 2001, VII/1–2:123–124.) Mucius Scaevola's volition must have encountered a huge amount of resistance from his body, but his personality resisted all these strong impulses that would have taken almost anyone into their possession. Maine de Biran's example of the Roman youth is only an extreme example; spontaneous activity encounters resistance whenever personality exerts volition. Regardless of the nature of activity, volition encounters resistance in all cases, whether the object of activity considers an exterior object, one's own body, or one's thoughts.

Maine de Biran's conception of self-generated activity resembles recent theories of 'self-generated thought' in neurology and the psychological sciences (cf. Andrews-Hanna, Smallwood, and Spreng 2014, 30). Self-generated thoughts are 'mental contents that are not derived directly from immediate perceptual input' (Fox, Andrews-Hanna, and Christoff 2016, 135). This enables an individual to detach themself from present environmental stimuli and to engender acts independent from the exterior conditions (Medea et al. 2018, 2469). The self-generated activity differs in nature from mechanistic explanation, as a recent scientific paper has pointed out:

> Good experimental design in psychology treats the brain or mind as a black box. Manipulating the input (stimulus) and measuring output (behavior) allows one to understand the mental function. However, *in volition, the input is, by definition, up to the participant themselves*. If the experimental design is based on a controlled input, then volition seem to disappear. Moreover, the behavioral output is not easy to reverse engineer: Any given motor action might be caused by a volitional process or by an

[63] 'comme un symbole matériel de l'effort voulu, ou d'une action qui n'est pas actuellement forcée, ni provoquée par aucune impression sensible venue *du dehors*, ni même produite dans aucune partie du système nerveux, hors du centre'

> involuntary process. The physical features of movement are largely silent about the movement's origins. For example, if an action is indeed volitional, then the agent might have initiated it for any of several reasons. (Haggard 2019, 17.6.)

Scientific experimentation can only observe the sequences of sensory input and behavioural output and generalise their regularities. As I already pointed out, it is clearer for mechanism not to use the non-empirical ideas of cause and effect and rather conceive all observable things as phenomena preceding, or succeeding, each other by various regularities, of which the scientific results can be generalised. If scientific experimentation cannot reach volitional action, could philosophical reflection reach it? At least the 'sense of agency refers to the subjective experience that one controls one's own actions and, through them, causes outcomes in the external world' (Haggard 2019, 17.14).

As several commentators of Maine de Biran have pointed out, for Maine de Biran, it is *irrelevant* whether personality is considered to be either necessarily free or to behave freely only apparently; its epistemological relevance rests on the fact that the consciousness believes that it is free and capable of spontaneous action (cf. Couailhac 1905, 110). The validity of this freedom is only attested by the free acts themselves that personality constantly feels producing. This recognition is the generative source of personality, freedom, and reflection.[64] 'Whenever effort is exerted . . . the human personality is revealed' (Boas 1925, 480).

2.4 Summary

The concept of causality has a pivotal role in the formation of knowledge. Notwithstanding, the idea of *causality* is problematic and ambiguous.

Several philosophers before Maine de Biran have pointed out that there are two different modes of causality, or at least two different ways to understand it. Out of these philosophers David Hume and Dugald Stewart are the most important for Maine de Biran. I corroborated Maine de Biran's theory by short examinations of Hume, Stewart, and Immanuel Kant's causal theories.

The first causal model is mechanism. It is the only form of causality applied in the natural sciences. In the end of the eighteenth century, mechanistic explanation started to gain the predominant role in the life sciences such as physiology. However, mechanism, in the strict sense, does not explain the causality of things at all. Rather, it generalises regular sequences that can be

[64] I will elaborate on this topic in the next chapter.

formulated into scientific laws. In itself, such a model does not take part in real causes but only in empirically observed and generalised regularities.

The *idea* of causality, as Maine de Biran, Hume, and certain other earlier philosophers knew, does not originate in sense experience, which can only provide a mode of cognition that is the basis of mechanism. The idea of causality itself, that is, a thing which produces a change in the course of events, is generated by the active, cognising personality itself. We saw how Maine de Biran directed his attention of the origin of causal cognition in the same source as in the generation of knowledge altogether: agentive personality.

My explanation of Maine de Biran's view on the nature of metaphysics and the key concepts underlying human knowledge has brought us twice at the primitive fact that lies under human personality: a capacity to produce free and creative acts. In the next chapter, I will make a systematic reconstruction of Maine de Biran's theory of the origin and generation of human knowledge.

3 THE GENERATION OF KNOWLEDGE

In this chapter, I will systematise the natural foundation of Maine de Biran's theory of two sources of knowledge. While the last two chapters concentrated on the preliminary definition of metaphysics and the achievements and errors of earlier philosophers, this chapter focuses on Maine de Biran's own positive definition of the sources of human knowledge. My strategy is to follow Maine de Biran's theory of knowledge through the generative steps of cognition. The order of procedure in this chapter is the following. First, the attempt to locate the sources of knowledge leads Maine de Biran to analyse the nature of animal life and the place of human being in the animal kingdom. Maine de Biran sees the motivation to cognition in the faculty of sensibility, in accordance with the physiology of his time. The first stage of cognition is instinct, which constitutes the cognition of animals in general. In human beings, the recognition of volitional action and free will yields the capacity to distance their acts from being mere reactions to received stimuli. Human volitional attention and reflection form the category of second-order cognition. Consciousness, freedom, personality, and apperception emerge from volitional activity.

3.1 Instinct

Let us begin by explaining Maine de Biran's theory of the necessary conditions of cognition universal to all living things. All things, both inanimate and animate, follow the constant and necessary laws of nature. Most living beings do not recognise that they are living. However, animals exercise some form of cognition, which enables them to act but not to consciously reflect on their acts. This form of cognition concerns the kind of harmony, the kind of law-like constancy of the behaviour of living beings, or the constancy between their existence and activity. They seem to act by a kind of unconscious belief, a belief which engenders their action. They strive for action, they act according to certain rules and regularities, and they pursue in performing and reperforming these actions without much deliberation of whether to execute a particular act or not. In other terms, what living beings *seem to* share is somehow *innate* – they seem to share innate principles which generate their acts from within, without any learning or aid, instinctively. In short, there are some innate principles or predispositions in the behaviour of living beings. Without these principles the living beings could not act, think, or feel, and this is the *principal fact*, which does not change, regardless of what concepts a philosophical or a scientific theory uses to articulate them – whether the theory explains them in a vitalist, a spiritualist, or a materialist fashion. (Maine de Biran 1986, VIII:70–71.)

From this, I infer three remarks. First, there are common principles of action in beings endowed with cognitive capacities. Second, this means that the cognising beings are not self-conscious of these common principles. Third, since human beings share animality with the rest of animals, they do not necessarily acknowledge these principles, because it is not necessary for a human being to know them; speculation about these principles is not necessary but merely possible. However, human beings have a reflective ability to realise these principles.

I already invoked the concept of *instinct* It appears to play an important role in the generative sources of knowledge in Maine de Biran. Thus, let us gather some explicit remarks from his works to gain a better understanding of the concept. There are two main aspects of instinct: 1) it is not conscious; 2) it is apparently but not absolutely deterministic in such a way that it, according to the first aspect, does not enable the organism to consciously think of its activity, which causes the apparently deterministic state of living beings in general. Let me further elaborate on both points.

First, Maine de Biran determines instinct as non-conscious (*inconsciente*) living (Maine de Biran 1989b, IX:134). In other words, instinct is animals' immediate capacity of affection and reactivity (Maine de Biran 1989b, IX:63; 2001, VII/1–2:224–227). This affective and reactive capacity operates without consciousness (Maine de Biran 1993b, XIII/1:121). It is the reactive behaviour of the nervous system to exterior excitation (Maine de Biran 2001, VII/1–2:226). However, different animals have different instincts: '[t]he human instinct is not that of the animal; even the monkey's instinct is not that of the oyster' (Maine de Biran 1987a, X/1:198).[65]

Second, even when an intelligent animal, such as a human, recognises that it is being affected, when it 'witnesses these inner scenes' of affection, it is often powerless to change their course of appearance or to stop them from appearing (Maine de Biran 1989b, IX:63). Instinctive life appears as a destiny, 'that *invisible agent of life which operates in us*, without us, and whose laws we would always be subject to' (Maine de Biran 2001, VII/1–2:214, my emphasis).[66] For instance, a new-born does not have the need for ideas of its body parts, it just knows how to use them, and it exercises them by will against the resistance it meets (cf. Maine de Biran 1989a, X/2:311–312).

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[65] '[l]'instinct humain n'est pas celui de l'animal ; même celui du singe n'est pas celui de l'huître'

[66] 'cet agent invisible de la vie qui opère en nous, sans nous et dont nous subirions toujours les lois'

According to Maine de Biran, because a living being has necessary relations with other things outside of itself, these things must have conditioned the development of its organs. Consequentially, this must apply to its cognitive faculties, as well.

> If organised, feeling, and thinking being must have necessary relations with the external world, it must have . . . received from nature a system of organs and faculties appropriate to this world either of phenomena, or of real beings external to it, and be led there immediately, or by the most immediate and simple result of the development of its organs, and even by the primordial exercise of his instinctive faculties. (Maine de Biran 1993a, XI/2:212–213.)[67]

Regardless of the nature of the objects of perception and cognition, the organisation of an individual is nevertheless determined by those beings of which the individual has perception and cognition. There is no danger of anachronism in assuming that Maine de Biran believes that living beings are adapted to their environment, a belief that was increasingly spreading among the naturalists of the late eighteenth century. Thus, according to Maine de Biran, the interest should be directed towards this determining relation between the thing that perceives and cognises and the things that are perceived and cognised. Instinct appears to be the first, and in a vast majority of animals the only, cognitive mode that develops.

Let us bring together all these definitions of the concept of *instinct*. Instinct seems to be the non-conscious cognition of a living being. It is tied to the vital needs of an individual and the execution of its actions. Instinct seems to signify the animal behaviour, according to which an animal acts and reacts, but it does not show conscious reflection on the executed actions. In short, it is a *reactive* and *executive* animal cognition without the capacity to self-reflection. Nevertheless, it puts a living being in action just because it is a form of cognition. This is why Maine de Biran refers to the Dutch physician Herman Boerhaave (1668–1738) and calls the instinctive animal life *simplex in vitalitate*, simple in vitality.[68]

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[67] 'Si l'être organisé, sentant et pensant, doit avoir des rapports nécessaires avec le monde extérieur, il doit avoir reçu . . . de la nature un système d'organes et de facultés appropriés à ce monde soit de phénomènes, soit d'êtres réels extérieurs à lui, et y être conduit immédiatement, ou par le résultat le plus immédiat et le plus simple du développement de ses organes, et même par l'exercice primordial de ses facultés instinctives.'

[68] About Boerhaave, see Cook (2000) and Underwood (1968).

3.2 Volitional cognition

Let us turn to the passage from instinctive, first-order cognition to volitional, second-order cognition. First, I will show how Maine de Biran argues for the birth of volitional activity and its developmental explication. Second, I will clarify the nature of volition as the principle of second-order cognition. Finally, I will bridge this chapter to the subsequent chapter in which I will conduct a detailed analysis of the modes of second-order cognition, namely *attention* and *reflection*.

Even though instinct is characteristic of animal intelligence, several animals execute movements that are not instinctive but deliberate (Maine de Biran 1989a, X/2:152). Deliberate action is most visible in humans. The human being has highly developed faculties of reflection and self-consciousness. It is a *sui generis* intelligent, willing, and thinking being, and these capacities lift its condition from a merely living being to a being which knows that it is living. The life of a human being is the same as that of any other animal, but it also has its proper life: it does not only sense, but it also senses that it senses, and it does not only cognise relations between things in nature, but it also reflects on these relations. Thus, it can voluntarily modify, extend, complicate, and create new relations by means of thought and imagination. Free and voluntary actions, characteristic to humans, free human being from the non-conscious reactivity of instinct (Maine de Biran 1989a, X/2:136). With these actions, the human being can detach from the *apparent* determinism of other physical and biological things (Maine de Biran 1986, VIII:24–25).

As I noted in the previous chapter, the living being, at the very beginning of its life, already has an instinctive cognition accompanying its reactive behaviour. However, free and deliberate acts do not develop from instinct. Instead, they are generated by a gradual awareness of the feeling of the production of free movements. Maine de Biran depicts the individual's gradually developing awareness of this specific kind of feeling as follows:

> To the exercise of spontaneous movements is added a particular and *sui generis* feeling, which, in its origin, is not yet accompanied by the feeling of a motor power, but to which this feeling immediately binds itself, as soon as the hyperorganic or uncontrolled force itself acts on this centre of motility. Then, and only then, is effort and the *self* born (Maine de Biran 2001, VII/1–2:227).[69]

[69] 'A l'exercice des mouvements spontanés se joint une sensation particulière et *sui generis*, qui, dans son origine, n'est pas encore accompagnée du sentiment d'un pouvoir moteur, mais à laquelle ce sentiment se lie d'une manière immédiate, aussitôt que la force

Thus, although instinctive behaviour provides the acts into which the feeling attaches, the feelings itself originates in personality. The feeling is the first and most primitive factor that reveals personality to itself. The feeling is dual: it simultaneously comprises the feelings of effort and resistance. Only by virtue of the volitional acts it can recognise the resistance of objects on which it imposes its effort. It will distinguish and separate the obstacles it encounters as beings other than itself. The objects remain outside of its power of freedom; they resist its freedom (Maine de Biran 2001, VII/1–2:127–28). Thus, the volitional personality starts to differentiate from instinctive activity. Maine de Biran characterises active personality as follows: 'As soon as it feels this power, it exercises it, making the movement itself. As soon as it does it, it perceives its effort with resistance; it is cause for itself and, in relation to the effect that it freely produces, it is *self*' (Maine de Biran 2001, VII/1–2:134).[70]

If instinct was the first-order cognition, tied to reactions engendered by the biological organism, the second-order volition is *hyperorganic*.[71] 'Thus, personality begins with the first complete act of a hyperorganic [*hyperorganique*] force, which is for itself, or as a *self*, only insofar as it knows itself, and which only starts to know itself insofar as it starts to act freely' (Maine de Biran 2001, VII/1–2:134).[72] The cognitive development is thus the elaboration of this self-conscious activity.

Maine de Biran approaches the second-order cognition from its developmental point of view. A child still acts instinctively, whereas an adult can reflect on his or her acts. After the ability to recognise one's own capacity to act freely and to execute conscious volition, an individual acquires indefinite possibilities of acting. The human being still lives largely the same kind of life as other animals, but now it can think, invent, and create, and reflect on anything that comes to its consciousness. Self-consciousness relieves human consciousness from the world of "intellectual automata" and gives it reflection: in the course of

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hyperorganique ou non commandée agit elle-même sur ce centre de motilité. Alors, et seulement alors, naît l'effort et le *moi*.'

[70] 'Dès qu'elle sent ce pouvoir elle l'exerce, en effectuant elle-même le mouvement. Dès qu'elle l'effectue, elle aperçoit son effort avec la résistance ; elle est cause pour elle-même et, relativement à l'effet qu'elle produit librement, elle est *moi*.'

[71] According to François Azouvi, Maine de Biran took the concept of *hyperorganic* from the French physiologist Charles-Louis Dumas (1765–1813), but the meanings of the concepts between the physiologist and the philosopher differ so greatly from each other that in this context there is no need to go into the details of Dumas' theory (cf. Azouvi 1995, 82–83).

[72] 'Ainsi commence la personnalité avec la première action complète d'une force hyperorganique qui n'est pour elle-même, ou comme *moi*, qu'autant qu'elle se connaît et qui ne commence à se connaître qu'autant qu'elle commence à agir librement.'

development, a human individual grows from a merely instinctive being into a being which has the capacity of self-reflection in addition to instinct. The human being is transformed from being *simplex in vitalitate* to being *duplex in humanitate*.[73] At its ground, human being is a simple living being, but with the development of volitional cognition, it doubles itself into something with an objective and a subjective aspect. (Cf. Maine de Biran 1989b, IX:134.)

The development of second-order cognition is present from the early stages of the ontogeny of human cognition. Even before the birth, a foetus encounters different shocks and contacts, to which it reacts by its own activity. All these exterior contacts resist its acts – they provoke its *effort*. To put this another way, all exterior contacts have one determinative experience in common: the contacts *resist* the foetus' exerted effort. Resistance and effort are thus indistinguishable already from the new-born baby's sense of being. As Maine de Biran expresses this primitive condition, 'the bridge of communication between the *self* and the outside world has been thrown by nature from the first moment of entering the river of life.' (Maine de Biran 1989a, X/2:311–312.)[74]

Volition is thus the *generative source* and not a *derivation* of ideas. It is not Maine de Biran's *petitio principii* from which he deduces metaphysical and epistemological concepts – instead, it is the generative explanation for human beings' capacity to act and think freely. It provides Maine de Biran with a generative origin of all that which originate in it, including, ultimately, concepts. In other words, the concept of *volition* provides empirical evidence of the generative source of knowledge and not a logical axiom. If we take volition as the *principle* of generative explanation of knowledge, it must not be considered as a logical principle. Maine de Biran puts the role of volition as a principle as follows: 'We recognise the principle according to its *value* to the character of necessity which it affects us or to the impossibility of thinking without having it present or of conceiving it other than it is; we recognise the principle to the impossibility of analysing beyond it. The word *principle* is no longer taken here in a purely logical sense.' (Maine de Biran 1986, VIII:284.)[75]

Therefore, contrary to certain interpretations of Maine de Biran's philosophy, effort is not the most primitive fact, for it is *a posteriori* to activity in

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[73] This, again, belongs to Boerhaave's terminology that Maine de Biran borrows.

[74] 'le pont de communication entre le *moi* et le monde extérieur a été jeté par la nature à l'entrée même du fleuve de la vie'

[75] 'On reconnaît le principe selon sa *valeur* au caractère de nécessité dont il nous affecte ou à l'impossibilité de penser sans l'avoir présent ou de le concevoir autre qu'il n'est ; on reconnaît le principe à l'impossibilité d'analyser au-delà. Le mot *principe* n'est plus pris ici dans un sens purement logique.'

general. Activity is the generative source of the double feeling of effort and resistance. This division is in its turn the source of the self and the non-self, given that the individual becomes self-conscious of himself or herself. We need to be clear and sensitive to this hierarchy of primitive facts. According to Azouvi (1995, 49), resistance *entails* effort, and effort *implies* apperception, that is, second-order cognition. However, both resistance and effort are interconnected feelings *a posteriori* of activity. Action engenders these feelings when the agent encounters an impediment. Effort and resistance occur simultaneously, they are not causes of each other – they are simultaneously generated by the common cause of activity. If I raise a heavy stone from the ground, I immediately recognise the sentiment of effort coming from myself as long as I hold the stone. The resistance of the stone behaves similarly: I feel that it resists me, but I have no idea *why* it does so. I only have the sensation of resistance coming from the stone. When I stop holding the stone, it falls to the ground, and my sense of effort from myself and my sense of resistance from the stone vanish. Only humans after a certain age have *apperception* of these kinds of events. To recognise themselves as an agent, a person must reflect on the action to find it necessarily generating the feelings of effort and resistance. The generation of effort and resistance as the most evident facts of the doubling of any act is so evident and concrete that Maine de Biran doubts whether any sceptic is ever able to doubt it sincerely. The volitional act followed by the feelings of effort and resistance are *firm enough evidence of the origin of the ideas of force and causality*. (Maine de Biran 2001, VII/1–2:167.)

As I already implicitly noted, the feelings of effort and resistance bring consciousness into existence. Consciousness is itself *a posteriori* to activity. Action *precedes* consciousness because it precedes the division into subject and object, which are the constituents of consciousness. In other words, consciousness is a relation between two outputs of action: effort and resistance. However, that which is the initiator of volitional action is not consciousness but the *self* or personality (Maine de Biran 2001, VII/1–2:201). Thus, personality is *a priori* to the consciousness of personality.

The generation of further effects from activity, relevant to human knowledge, do not only restrict to the double feeling of resistance and effort and the development of agentive personality. According to Maine de Biran, all the metaphysical concepts that are usually held not to originate in experience are further products of this generative origin. Out of these metaphysical concepts, *space* and *time* are perhaps the most significative. Maine de Biran agrees with Kant about the function of space and time as the modes of coordination of phenomena in imagination (Maine de Biran 2001, VII/1–2:264). However, Kant did not produce a generative explanation of space and time. Space and time are

the products of second-order cognition, and as such, they are engendered by active cognition. Even such formal elements of experience and knowledge are generated by the second-order cognition. According to Maine de Biran, habit (*habitude*) makes humans to take perceptions and formal elements in experience as passive, although all those elements are products of agentive personality (Maine de Biran 2001, VII/1–2:263–265).

Regardless of the philosophical, scientific, or ordinary use cases of such concepts as *space* and *time*, the very possibility of understanding anything as spatial and temporal origin from the fact that human cognitive capacities generate spatial and temporal cognition. This argumentation touches on general ideas related to psychological phenomena and mental faculties, as well. According to Maine de Biran, the concept of *memory* is ordinarily used in the sense of a faculty that stores mental images, ideas, or representations. It is evident that cerebral activity leaves traces in the brain. Consequentially, so does volition itself, although it is not definable merely by cerebral activity. On this account, memory is defined by something more than just cerebral traces that are its physiological consequence or condition; it is defined by the repetition of the exercise of recalling. (Maine de Biran 2001, VII/1–2:382.)

Self-conscious personality is required for recalling past events. Maine de Biran argues that without the linkage of representations and consciousness, there would be no memory, because the past 'is a relationship that carries with it the idea or the feeling of the present, and to judge and perceive what is at distance, in *time* as in *space*,'[76] a person must always start from the point, in which he or she is. A sensory perception can be said to have a memory image corresponding to it. The perceiver remembers this image as past and never confuses it with the present perception 'as long as it retains the character of memory.' (Maine de Biran 2001, VII/1–2:244.) *This is how the volitional personality enlightens its own past by means of its memory and can consciously utilise it*. Furthermore, the conscious representations of the object of recall are different from the recalled matter, because both the personality that remembers and the remembered things are different from those situations in which the memories were former or recalled last time.

According to Maine de Biran, there have been two different definitions of the concepts of *memory* in the history of psychological considerations: according to the first definition, memory is a storage of mental units, and according to the second, memory is a capacity. Maine de Biran attributes the former to Charles Bonnet's (1720–1793) theory of memory, whereas of the latter he gives a historical

[76] 'est une relation qui emporte avec elle l'idée ou le sentiment du présent, et pour juger et percevoir ce qui est à distance, dans le *temps* comme dans *l'espace*'

example of Neoplatonic philosophers, especially Porphyry (c. 234 – c. 305). Maine de Biran analyses the functioning of memory, and based on this analysis, he shows that the difference between two different definitions of *memory* can be reformulated by two different forms, of which the first form is the memory proper, and the second is imagination (Maine de Biran 2001, VII/1–2:382–386). He defines memory as the *memory of signs* and imagination as the *reproduction of images*. When an individual *remembers*, ideas are subordinate to voluntary signs used by the volitional cognition. When an individual *imagines*, signs automatically follow one another by habituated associations. (Maine de Biran 2001, VII/1–2:384.) Second, he discerns two modes of memory: an *intellectual memory* and a *mechanical memory*. Intellectual memory resembles the idea of memory as a capacity, and mechanical memory, that is, imagination resembles memory as a storage. If one wanted to study the cognitive aspect of memory itself as a faculty, one should concentrate on this intellectual memory. (Maine de Biran 2001, VII/1–2:385–386.) Characterising the intellectual memory, Maine de Biran refers to a passage from Porphyry on several occasions: 'Memory is not the storehouse of images, but the faculty of bringing forth again conceptions from things which had previously been conceived in the mind' (cited in La Forge 1997, 97; cf. Porphyry 1823, 206; Maine de Biran 1988, III:272; cf. 1995, IV:180).

Intellectual operations, such as reasoning and calculation, are not possible without symbolical knowledge. Symbols are representations provided by memory (Maine de Biran 1987b, II:265, 277).

According to Gabriel Madinier, for Maine de Biran, reasoning can act only with the aid of *signs*. However, signs are only a symbolical medium of knowledge (Madinier 1938, 77–79). Signs are generally representations that serve as the units of language. They enable logical operations according to syntax, namely *reasoning*. However, this is their ordinary use case. Also, reflection can utilise them (Maine de Biran 2001, VII/1–2:381). In short, *sings are names of concepts that volitional consciousness can differentiate from the ordinary use of generalisations that are the natural way of concept formation*.

The formation of signs presupposes the recognition of the multiplicity in unity, modes in substance, phenomena or effects originating from a single cause. In other words, this means that signs need general ideas. Signs presuppose that the objects of cognition are *aggregates* or *bundles* of properties that are assigned to their proper signs. Signs can develop, extend, and multiply these ideas as much as possible, but they do not affect the nature or amount of the ideas themselves. Signs would not even have any meaning without them (Maine de Biran 2001, VII/1–2:333). '[A] sort of instinct of the imagination is already carrying out blindly, as if by chance, and in a rather narrow circle, a work which the

intelligence will soon be called upon to develop and to extend indefinitely by means of the signs which it will create' (Maine de Biran 2001, VII/1–2:248).[77]

According to Maine de Biran, Condillac was the first philosopher who made an elaborate analysis of signs. In short, Condillac made it plain and simple that there are cognitive units that philosophers have called with concepts such as *ideas* and *images*, and signs are the symbols that refer to those things (Maine de Biran 1988, III:22). According to Maine de Biran, it is of primary importance to make this distinction in philosophical considerations (Maine de Biran 1988, III:298). We will return to consider signs, generalisation, and other cognitive factors in the upcoming chapters.

Because the human being is an indefinitely active and free being, it can indefinitely overcome the limits, which it faces and which resist its volitional activity, by either self-engendered or educational development. This indefinite progression of personality and its capacities by will and education is also the most crucial, if not the only, fact which differentiates humans from other animals. By will and education, an individual acquires new habits, on which ever new habits can be contracted and old ones deconstructed. (Maine de Biran 1989a, X/2:152.)

In the next chapter, I will concentrate on the two modes of second-order cognition. We will see that there are two inverse procedures that bring about two different modes of cognition. These modes of cognition are those which philosophy and science will be based on, namely *attention* and *reflection*. They are the two different modes of volitional cognition (Maine de Biran 2001, VII/1–2:58). The proper products of these faculties are general ideas, for attention, and reflective ideas, for reflection. As Tisserand (1909, 175) writes, '[t]he whole Biranian theory of ideas thus leads to the radical distinction between general and reflexive ideas.'[78] Both cognitive faculties also have their proper kinds of activity: attention *generalises* whereas reflection *abstracts*. Thus, they produce two orders of ideas, the distinction essential to Maine de Biran:

> One of the greatest abuses of this tendency to generalise, the one that seems to me to have most retarded the progress of philosophy, has been to confuse the *ideas of genera* and classes, which are based on *relationships of* phenomenal *resemblance*, with the abstract ideas of reflection, on which

[77] '[U]ne sorte d'instinct de l'imagination exécute déjà aveuglément, comme au hasard, et dans un cercle assez rétréci un travail que l'intelligence sera bientôt appelée à développer et à étendre indéfiniment au moyen des signes qu'elle se créera.'

[78] '[t]oute la théorie biranienne des idées aboutit donc à la distinction radicale des idées générales et des idées réflexives'

> is based all certainty of existences, which we neither see nor imagine, but of which we are no less firmly *certain* (Maine de Biran 2001, VII/1–2:329).[79]

Neither faculty is observable or recognisable outside of their actual use. Maine de Biran recites Locke and says that *either* their existence must be denied altogether *or* there must be a faculty that recognises them. And yet, Maine de Biran thinks that no one will deny that the human capacity of reflecting on things varies between individuals and between the stages of life of an individual person, depending on the person's experience in reflection. The active exercise of the faculty itself reveals its highest operations (Maine de Biran 2001, VII/1–2:39). In the following, I shall first explain attention and its products, after which I explain reflection and its products.

3.3 Attention and general ideas

Let us turn to analyse the faculty of attention in Maine de Biran's theory. As we already saw, the capacity of attention is the first of the two modes of volitional cognition. Maine de Biran's concise definition of attention is as follows:

> I call *attention* this degree of effort that is higher than that which constitutes the waking state of the various external senses, and makes them simply *capable* of perceiving or confusedly representing the objects that befall them. The higher degree in question is determined by a positive and express volition that applies itself to making an initially confused perception more distinct, by isolating it, so to speak, from all the collateral impressions that tend to obscure it. (Maine de Biran 2001, VII/1–2:265.)[80]

Out of this excerpt, we see the primary function of attention: it enables perception to discriminate qualities and focusing on these discriminated qualities. Furthermore, there are no perceptions or thoughts without some degree of attention; and there cannot be attention without some kind of comparison (Maine

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[79] 'Un des plus grands abus de cette tendance à généraliser, celui qui me semble avoir le plus retardé les progrès de la philosophie, a été de confondre les *idées de genres* et de classes fondées sur les *rapports de ressemblance* phénoménique avec les idées abstraites de la réflexion, sur lesquelles se fonde toute la certitude des existences que nous ne voyons ni n'imaginons, mais dont nous ne sommes pas moins fermement *assurés*.'

[80] 'J'appelle *attention* ce degré de l'effort supérieur à celui qui constitue l'état de veille des divers sens externes, et les rend simplement *aptes* à percevoir ou à représenter confusément les objets qui viennent les frapper. Le degré supérieur dont il s'agit est déterminé par une volonté positive et expresse qui s'applique à rendre plus distincte une perception d'abord confuse, en l'isolant, pour ainsi dire, de toutes les impressions collatérales qui tendent à l'obscurcir.'

de Biran 2001, VII/1–2:316). Sensibility is always partly an active perception. There is always some degree of attention in perception. In addition, attention is impossible without any comparison of present objects of sensation to those of memory. Conscious awareness is in other words a constant interrelation between the objects of sensibility, or imagination, and memories. Perceptions or representations invoke memory, and memory recognises and specifies the objects in consciousness.

Attention is a mode of intellectual memory in the sense that I defined it in the last chapter. It is a capacity and not only an association of past memories in the present (Maine de Biran 2001, VII/1–2:104). Attention is the cognitive faculty that provides the matter for reasoning (Maine de Biran 1984a, V:94). However, attention can only give relational ideas (Maine de Biran 2001, VII/1–2:363).

The ability to discriminate or analyse perception into qualities is followed by its most important result: the synthesis, or generalisation of these qualities. In what follows, I will explain Maine de Biran's theory of generalisation. Hume's theory of association according to resemblance and spatiotemporal contiguity is well known. Maine de Biran takes up Hume's associationist theory and adopts it into his theory of *attention*. He renames association as *coordination*, so that generalisation is produced by the coordination of representations by their resemblance and simultaneity. Repetition of their coordination engenders their association by consolidation.[81] Imagination provides a homogeneous medium for sense impressions. In imagination, all heterogeneous perceptions from the sense organs 'are arranged or juxtaposed, according to the laws of association, in a single more or less regular chart or table [*tableau*], of which a single feature is almost always enough to represent the whole table and complete the imaginary perspective.' (Maine de Biran 2001, VII/1–2:247.)[82]

Thus, perception is generally more like a represented table than real perception: its perceptual elements are already distributed by the recognising attention into discrete objects. Figuratively we could say that active perception is close to a kind of well-coordinated dreaming that corresponds to the states of things. From the first intelligent operations onwards, the human being starts to judge, reason, and associate in a more or less self-conscious fashion. The multitude of judgements, inductions, or analogies, which is associated in

[81] This kind of fact can be put in the following behaviouristic manner: 'if a behavior has been established responding to a stimulus, novel stimuli resembling the first one will usually elicit the same response' (Ghirlanda and Enquist 2003, 15).

[82] 'viennent se ranger ou se juxtaposer, suivant les lois de l'association, dans un seul tableau plus ou moins régulier, dont un seul trait suffit presque toujours pour représenter le tableau entier et compléter la perspective imaginaire'

sensibility or in imagination, ends up merging with imagination. (Maine de Biran 2001, VII/1–2:247.) The tendency of generalisation is thus the individual's effort to attain an equilibrium with his or her environment by facilitating and automating his or her actions with the surrounding environment – in a word, the tendency of generalisation is *habit*.

This tendency of habit is an organic and physiological phenomenon. Imagination and the senses have a 'natural inclination' to associate the represented data in some similar appearance such as in similar particular perceptual objects or signs, which function as mental representatives of variable data. The representatives have a common or shared character and not a proper or individual character. (Maine de Biran 2001, VII/1–2:324.) These common characters are based on what several particular ideas have in common.

First generalisations are non-conscious, spontaneous habituations in an individual's infancy. First general ideas are generated by regular associations. An infant is regularly exposed to toys that resemble each other. After a while, it can discern those objects that resemble the idea of a toy it has gradually learned. We can imagine an infant to have a large sum of similar generalisations. After a child has learned to speak, he or she has learned to give names, that is, vocal signs that represent these objects. He or she can ask his or her parents to give him or her a toy. However, there is no such a thing as *toyness* in reality, independent of the child's playful acts and desires. A child only needs analogous perceptions he or she has habituated with. Generalising the habit into a general idea and assigning to it the sign 'toy,' the child can recall objects they have habituated to recognise as toys. In addition, he or she can trust that his or her caregivers, or peers, also have the sign 'toy,' so that communicating absent objects between individuals is possible. Moreover, the development of language as the collection of words as signs gradually realises the possibilities of syntax in a developing child.[83]

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[83] Some biolinguistic studies provide us with interesting results on the function and nature of syntax. According to Boeckx (2011, 59), humans can detach reasoning from perceptions and lexicalise the data of consciousness, to 'create and easily understand symbolic representations of computation and sensory input.' Thus, humans have the ability to 'combine and recombine different types of information and knowledge in order to gain new understanding' and 'apply the same rule or solution to one problem to a different and new situation.' Second, one characteristic nature of language – which we can generalise to be the *modus* of all representational or symbolic reasoning – is characterised by the *compositional syntax*. Griesser, Wheatcroft, and Suzuki (2018, 7) define the concept of *compositional syntax* as follows: 'Meaning of the phrase is a function of the meaning of the elements and the way in which they are combined.' Thus, a singular meaning is expressed in a determinate series of symbols. The compositional syntax could be the universal attribute of linguistic expression wherever the use of language begins to complicate in animals, such as in three bird species,

In addition, human cognition inclines to believe in unity or substantiality of the things that it has generalised and discerned (cf. Maine de Biran 2001, VII/1–2:248). There is probably a more or less automatic tendency in the mind of a child to really believe in the objective reality of *toyness*, of which all the actual toys are specimens or expressions. As Maine de Biran puts it:

> That in the use of the most artificial genera of signs there is always a kind of forced return to real unity in thought, and from this comes the invincible tendency that we all have to *realise*, as it is said, *our own abstractions*, everything that finds itself nominalised in the form of a common noun (Maine de Biran 2001, VII/1–2:334).[84]

Human thought finds itself ill at ease with the artificial and arbitrary genera and is forced to seek the concrete unity of things.

Let us explicitly express the fact that the preceding elaboration strongly implies; *language bears in itself much more things than there exists in reality*. There is not an objective entity in reality that could be called toy. Toy is a convenience that is dependent on the child's playful activity – everything is dependent on this fact. The same fact applies to all general ideas. Let us only refer to words related to houses: 'table,' 'chair,' 'wall,' 'ceiling.' Whether we talk about the floor or the foundation of a building, they all return either to things relevant to living in houses or to instructions about how to build a house. By a large sum, *words, regarded as ideas or concepts, are conventions or instructions*. For instance, Couailhac (1905, 175) has pointed out this fact in Maine de Biran: in a strict sense, a general idea does not have a proper object. We could further clarify Couailhac's remark by saying that a general idea does not have an object independent of the acts of the cognising person.

Let us again refer to Locke's theory of general ideas, because it is important for Maine de Biran. According to Locke, general ideas serve human cognition by improving its power of knowledge (Locke 2008, 3.3.4). As Stuart puts it, the growth of knowledge is not only about the discovery of new things. It is largely about the analysis of the ways in which things are alike and unalike. Locke calls the classifying ideas *nominal essences*, and, according to Stuart, 'Locke thinks that

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Parus minor, *Turdoides bicolor*, and *Poecile montanus*. The observed individuals of the latter species 'have at least *11 different call elements*, which can occur in more than *170 different call combinations*' (Griesser, Wheatcroft, and Suzuki 2018, 7, my emphasis; cf. Suzuki 2014).

[84] 'Que dans l'emploi des signes de genres les plus artificiels, il y a toujours dans la pensée une sorte de retour forcé vers l'unité réelle, et de là vient la tendance invincible que nous avons tous pour *réaliser*, comme on dit, *nos propres abstractions*, tout ce qui se trouve substantifié sous la forme d'un nom conventionnel.'

a key aspect of scientific progress is the refinement of nominal essences' (Stuart 2017, 491; cf. Locke 2008, 3.3.16–18). Getting acquainted with phenomena a person edits his or her ideas according to what he or she becomes to think as natural, objective things in reality. According to Stuart (2017, 491), this is because consciousness hopes to increase the predictive and deductive power of thought. According to Locke, general ideas provided by attention constitute the majority of linguistic content (Locke 2008, 3.3.1), whose primary purpose is to serve communication (Locke 2008, 3.3.3).

Even though Maine de Biran considers general ideas as mere conventions, he admits their essentiality to human reasoning and action. Accompanying Locke's approach to the utility of general ideas, Maine de Biran remarks that general ideas, provided by signs, have an important role for human reasoning, especially for logic, that is, computation. Reasoning and calculation as computation would be impossible without signs (Maine de Biran 1987b, II:265). In addition, reasoning without verbal signs would be impossible without representative memory or imagination (Maine de Biran 1987b, II:277). In one passage, Maine de Biran characterises signs as *over-composed* (*surcomposé*; Maine de Biran 1986, VIII:15). This is an important characterisation, because it indicates that signs are compositional elements built on prior compositional elements. Signs are compositions built on general ideas as the coordinating units of the data of experience. General ideas are already compositional, because they are a coordinated multiplicity of sensations in one cognitive unit.

Leibniz already elaborated on the computational character of human reasoning. According to Spruit and Tamburrini (1991, 2), 'purely combinatorial operations on characters are the only operations involved in human reasoning.' In fact, human 'reasoning is nothing but connection and substitution of characters, whether these characters are words, marks, or finally images' (Spruit and Tamburrini 1991, 12). For Leibniz, too, the signs used for computation must be based on *primitive notions* without which any knowledge would be impossible. Reasoning as computation is only a formal operation, and without the cognitive material as input, there would be no output. As I already considered the non-conceptual cognition in the first chapter, we return here to face the same problem. Continuing the ongoing reference, Leibniz characterised the primitive notions as *intuitive* whereas the signs were *symbolic* (Spruit and Tamburrini 1991, 6–7):

> Demonstrative knowledge is only the stringing together of intuitions in all the connections of intermediary ideas, because often the mind is unable to join, compare or apply immediately ideas to each other. This forces one to use other (one or more) intermediate ideas to discover the agreement or disagreement one is searching for, and this is what is called reasoning (Spruit and Tamburrini 1991, 13).

Leibniz himself characterises symbols in this way:

> [A]ll our thoughts can be pictured, . . . fixed, abridged, and ordered; pictured to *others* in teaching them, *fixed* for ourselves in order to remember them; *abridged* so that they may be reduced to a few; *ordered* so that all of them can be present in our thinking (cited in Maat 2004, 304).

Now that I have explained Maine de Biran's view on the origin of general ideas, we need to stress the importance what this imposes on the analysis of general ideas themselves. Generally, when one pays attention to an object of thought that is conceived as general idea, he or she would discriminate the object's attributes with another generalisations. We could call this kind of analysis an *analysis according to the laws of association*. For instance, a table is composed of 'top' and four 'legs.' The legs are composed of 'wood.' In short, the function of analysis is nothing else: with it, generalities can be dissolved into other generalities, which is a useful skill. According to Maine de Biran, the formulation of scientific laws originates in the same cognitive procedure. (Cf. Maine de Biran 2001, VII/1–2:326–327.)

Why does human cognition need to analyse and synthesise using general ideas? It is because attention can only hold one attribute of a thing in the focus of consciousness at a time. This is why it needs to distribute knowledge into different attributes and form an idea of substance, which provides permanence and consistency to individual properties. I noted already in section 1.2 that language automatically either subsumes the perceived qualities into properties of substances or considers the qualities as substances of their own by nominalising them. Maine de Biran compares the operation of attention to the operation of touch: as a hand can only touch one section of a solid object at a time, attention can only represent one attribute at a time. To put this in verbal terms, the informational content of saying 'this is a chair,' is much poorer than saying 'I observe in this object wood, four legs, ornamentation, and a capability of being sat on.' In order to *comprehend* the whole object, attention has to review the range of relevant attributes, just as the sense of touch has to successively touch each side of the object. However, when consciousness compares the present tactile stimulus to the earlier ones, it does not refer to the earlier acts of touching as such, but to *memories* of them. Ultimately, every act of comparison is the working of memory. (Maine de Biran 2001, VII/1–2:319.) Thus, every synthetic judgment is a work of memory. They are series of memory images.

Now that I have explained Maine de Biran's theory of attention and general ideas as attention's products, let us draw attention to some interesting points. It is as if I constantly ended up in considering attention and its products as memory.

In fact, I previously made this assimilation once. I have nonetheless structured the previous chapters around volition and argued for its importance and primitivity in contrast to other elements of personality and intelligence. Of course, I still maintain that volitional activity is the generative source of higher cognitive operations and products in Maine de Biran's theory. However, we must remain sensitive to the nature of general ideas, or concepts, because, regardless of Maine de Biran, or any other philosopher's theory, general ideas have their proper function, of which Maine de Biran and Locke's theories should be accepted at least as the approximations of truth.[85] The problem that general ideas cause for understanding was explained in this chapter: general ideas can only operate according to the laws of association, which makes the improper in understanding the generative causality of things. Living phenomena from physiology to psychology have several generative stages, as I have pointed out, so that the productions of the generative processes are difficult to express with general ideas. Thus, the general ideas of *volition*, *memory*, *cognition*, or *perception* are not things in themselves, and relating them with each other, or with other ideas, has meaning only if we speak of them figuratively, as linguistic artefacts. If we consider the reality of which they are generalised, we see their conceptual rigidity melting away and mixing with each other. It is practical to use *memory* and *volition* separately, but they are only relative conceptualisations. In addition, because they are *translations*, we should not aim at *synthesising* them into unity that we would then call *personality*, *soul*, or *mind*. Personality indeed exists for Maine de Biran, this should be evident, but its proper nature must not be sought from its artificial, conventional generalisations. However, there is another intellectual operation in addition to attention, which has its own cognitive products. Let us now turn to consider reflection as the second mode of second-order cognition and its products.

3.4 Reflection and reflected beliefs

For Maine de Biran, attention is not the only mode of second-order cognition, and general ideas are not the only cognitive products. In addition to attention, second order cognition comprises reflection. Attention cannot understand the productive causes, that is, the generation of things. The understanding of the generation of things is the task of reflection (Maine de Biran 2001, VII/1–2:367–

[85] In fact, in the sixth chapter, in which I explain Bergson's theory of general ideas and corroborate it with recent scientific evidence, the results, while not to be taken in this context as explanations of Maine de Biran's theory, increase my subjective approximation of the nature of general ideas. Maine de Biran and Bergson's theories will be compared in the ninth chapter, and the theme of language and concepts in philosophy will be considered there.

368; Truman 1904, 59). All the non-empirical notions denoting *unity*, such as the notions of *cause*, *force*, or *time*, originate in personality, whether philosophers have been conscious of their generation or not (Maine de Biran 2001, VII/1–2:366).

First, reflection must clarify the active nature of cognition and its role in the formation of general ideas. Because attention cannot understand the generative reasons of general ideas, it distributes, by analysis and synthesis, the generated representational matter according to their resemblance. Reflection must first discriminate between the active, personal side and the objects of imagination that the matter has generated altogether (Maine de Biran 2001, VII/1–2:367–369).

As we saw in the first chapter, Locke's idea of reflection was important for Maine de Biran. Let us briefly return to Locke before continuing with Maine de Biran's idea of reflection. 'Locke thought we do experience the causal process itself when we reflect on the volitional activity by which mind sets body into motion' (Mattern 1980). As Locke has remarked, while "all things that exist are only particulars" (Locke 2008, 3.3.6), 'there must be some real Constitution . . . on which any Collection of simple *Ideas* co-existing . . . must depend' (Locke 2008, 3.3.15). Locke, after outrightly dismissing the non-empirical, abstract categories, by turning over different options for the general ideas to achieve the essences of things, ends up denying their access to the 'real essence' of things. For Locke, ideas are immutable, unchangeable; reality, on the other hand, is movement and change. (Locke 2008, 3.3.17–19.)

But if reality is movement and change, does this not mean that the absolute knowledge of reality must cognise this movement and change in itself, as well? It appears to be the case. According to Maine de Biran, reflection is not concerned with objects of spatial movement, or spatial localisation (Maine de Biran 1984a, V:50). We could say that reflection is concerned with that which is temporal, but Maine de Biran understands, as we saw in section 3.2, time as a mode of coordination of representations, just as Kant has understood time. I do not want to confuse this clear terminology, but if we understand time as change and movement, then reality, and that which concerns reflection, is in its foundation temporal. Nevertheless, the nature of reflection becomes clearer when we have seen its generative explanation, which I will provide next.

Reflection has its origin in the recognition of the invariability of non-perceptual factors in experience. As we have already seen, the first two of these invariable factors are the resistance to person's exerted motility and the volition of personality that initiates the exertion of self-generated motility. These factors generate that which reflection recognises as exteriority and interiority in relation to consciousness, respectively. Reflection originates in the 'internal apperception of effort,' or in movements determined by volition. (Maine de Biran 2001, VII/1–2:365–368.) If attention was the utilisation of volition in imagination, reflection is

turning volition from its usual, natural milieu of imagination towards *itself*. Thus, *reflection is an act of attending to the generative source of the act itself*.

However, the invariable objects of reflection are veiled by variable perceptions and general ideas (cf. Maine de Biran 2001, VII/1–2:366, 368). Usual thinking, conditioned by external circumstances and habitual responses, benefits from habits, because they facilitate the exerted cognitive effort and enable the prediction of future events. In fact, habits are the main utility that elevates human action and thought in ever higher forms of execution. However, habits generally emerge from various conventional responses to external circumstances. Thus, they generate a mass of general ideas and their signs that mixes the primitive facts with mutually arbitrary general ideas. This mixing and diffusion of primitive facts confuses the discernment of what is the product of either passive receptivity or active volition in consciousness. (Maine de Biran 2001, VII/1–2:368.)

Maine de Biran locates the generative origin of reflection in the interrelated coupling of hearing (*ouïe*) and voice (*voix*). Hearing comprises the perception of auditory sensations or qualities. Speech comprises the production of auditory qualities that unite the capacity to move one's voice organs and the capacity to engender thoughts. From the very beginning of child's self-expression, his or her ability to express his or her thoughts and intentions is essentially limited to his or her ability to vocal articulation. However, a person, to utilise their vocal organs, must hear the products of vocalisation to monitor the execution and predicted outcome of expression. (Maine de Biran 2001, VII/1–2:369–370.) A new-born has not yet connected the sense of hearing to the instinctive motor actions of its cries. After it is able to connect them, it can utilise the cry as a tool of reclamation – it starts to recognise that producing a sound will engender certain behaviour outside of itself (Maine de Biran 2001, VII/1–2:371). This recognition is the rudimentary force of reflection, which begins to consolidate and become internalised. The internalisation is the following: The vocal organs exert acts of which they have no idea only to transmit the sounds these exerted acts have produced back to the ears that receive them. This motor exertion and receiving sensibility generates a loop for the child to *reflect on* his or her exerted acts. By virtue of these kinds of loops, the person gradually internalises this duality of speech and hearing into purely mental activity by abstraction. The loop of input and output is abstracted into *thought*. (Cf. Maine de Biran 2001, VII/1–2:370.)

Now, an infant, who does not yet have an idea of *thought*, recognises itself as a *cause* of the changing course of perceptions and movements whenever it exerts its volitional acts. In short, an infant recognises its acts and the immediately changing course of perceptions; it exerts acts and perceives sensations simultaneously. It notices the cause (volitional exertion) in the effect (changing course of perceptions) and the effect in the cause (generative reason for the

changing course of perceptions). It 'has the distinct feeling of the two terms of this fundamental relationship, in a word it reflects . . . by merely emitting or articulating voluntary sounds.' (Maine de Biran 2001, VII/1–2:371–372.) [86] Reflective thought is the first and only mode of cognition that develops into an independent capacity from any exterior stimulation (Maine de Biran 2001, VII/1–2:372). It is the highest mode of the self-generated capacity of volition.

In other words, the receptivity of hearing is taken into the control of speech, which already was an exertion of volition. Now, when this whole loop is internalised, consciousness can use it for volitional cognition of attention and memory. It can dress all its recollections into suitable, cognitively useful signs – the general ideas. Hearing, as generated from the aforementioned loop, is the proper sense of reflection, or the sense of understanding (Maine de Biran 2001, VII/1–2:373). After the internalised loop, active cognition can rely merely on the signs of general ideas. It becomes relatively self-sufficient in producing motor and cognitive acts.

Now, human reflection is developed, and an individual can think independently of the external determinations. What is its epistemological relevance? It has a basis which it can elaborate to reflect on objects that are non-empirical in the same fashion as its own origin. Consciousness already bears a tendency to understand several general ideas as having more in them than a mere coordination of particular perceptions. Reflection finds its subject matter in the supposed unity of any generalised genus or species. [87] Reflection acts on the genera produced by attention and aims to abstract their unity – if there only is anything that yields itself to abstraction. If reflection does not find any real unity in a generalisation, it is only an artificial unit, relative to other ideas or ways of action (Maine de Biran 2001, VII/1–2:324–325). '[F]or what constitutes the individuality of a thing, or a being, is the last in the order of knowledge, since to obtain this knowledge' is to look 'at the *thing itself*' (Maine de Biran 2001, VII/1–2:324). [88] Thus, *if there was anything that cognition attained as thing in itself, it would be revealed by reflection*.

If attention produces and uses general ideas, is there a proper product of reflection for Maine de Biran? There is, and it resembles the reflected notions of conceptualists. By reflection, human consciousness can work its way towards products that differ in nature from the general ideas of attention. The way leads

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[86] 'a le sentiment distinct des deux termes de ce rapport fondamental, en un mot il réfléchit . . . par cela seul qu'il émet ou articule des sons volontaires'

[87] About the development of such tendency towards unity, cf. Au (1994).

[88] '[C]ar ce qui constitue l'individualité d'une chose ou d'un être est le dernier connu, puisque pour obtenir cette connaissance . . . la *chose elle-même*.'

towards simple and absolute instead of generalised cognitions. The essential difference between general ideas and products of reflection is that the first have an artificial unity, induced from a multiplicity of sensations, whereas in the second, reflection reveals the proper unity of the object of cognition, that is, in itself, absolutely (Maine de Biran 2001, VII/1–2:332). Starting from this unity, the generative causes of multiplicity and variation become understandable. This is the epistemological starting point for the real understanding of the *causality* of *things*, instead of the mere *regularity* of *phenomena*.

The unity of a thing is not a quantitative, or conceptual unit. Instead, it is the generative causality of a thing. Let us recall what I said about the nature of personality in the end of section 3.3. I said that the concepts, such as *memory*, *volition*, and *cognition*, are only conceptual translations of certain generalised aspects of personality, and that personality is not another generalisation synthesised from these conceptual aspects. However, personality can reflect on its own development, and it can abstract its reflections into the proper sense of causality, the generative causality of which it is itself the most intimate and indispensable proof. Confusing generality with generativity has been one of the most difficult impediments of the progress of metaphysics in the history of philosophy. Maine de Biran develops his claim as follows:

> One of the greatest abuses of this tendency to generalise, the one that seems to me to have most retarded the progress of philosophy, has been to confuse the *ideas of genus* and class, which are based on *relationships of* phenomenal *resemblance* with the abstract ideas of reflection, on which is based all certainty of existences that we neither see nor imagine, but of which we are no less firmly *assured* (Maine de Biran 2001, VII/1–2:329).[89]

Maine de Biran has several signs, or conceptualisations, for the products of reflection. Locke used the concept of *objects of reflection*, but there have been other conceptualisations, as well. Depending perhaps on the context and the philosopher under discussion, Maine de Biran's terminology concerning the products of reflection has some equivocality.

Let us start the analysis of the products of reflection by stating their philosophically most controversial aspects: the products of reflection are not conceptual, although they can be translated into concepts (Maine de Biran 2001,

[89] 'Un des plus grands abus de cette tendance à généraliser, celui qui me semble avoir le plus retardé les progrès de la philosophie, a été de confondre les *idées de genres* et de classes fondées sur les *rapports de ressemblance* phénoménique avec les idées abstraites de la réflexion, sur lesquelles se fonde toute la certitude des existences que nous ne voyons ni n'imaginons, mais dont nous ne sommes pas moins fermement *assurés*.'

VII/1–2:330–331). This is a difficult idea to explain, so we must pause on it for a moment. First, let us recall how Locke defines the objects of reflection: the objects of reflection are reflection's 'own Operations within it self [*sic*]' (Locke 2008, 2.1.4, cf. 2.1.5). For Locke, reflection develops later in life, at least after childhood (Locke 2008, 2.1.6–8). Reflection appears to be an active work, by which consciousness is gradually able to put its volitionally exerted cognition under the inspection of itself (cf. Locke 2008, 2.1.8). Here, it is relevant to invoke Descartes's metaphor of intuition as a 'mind's eye' (*acies mentis*). However, instead of discussing the products of reflection following Descartes, Maine de Biran focuses on his immediate predecessors, generally classified as empiricists, or close to empiricists.

In one of his most elaborated studies on the products of reflection, Maine de Biran calls the product of reflection *belief* (*croyance*). Reflection provides a belief in the unity of a generalised multiplicity of perceptions. The belief is more or less consciously translated into primitive notions from which conceptual knowledge is excluded, but which is founded on a necessary *belief*, instead (Maine de Biran 1986, VIII:116).

On the one hand, the simultaneous appearance of the positive references to Thomas Reid (1710–1796) and the crucial importance of the concept of *belief*, a concept with crucial epistemological importance for Reid, in *Rapports des sciences naturelles avec la psychologie* gives us the reason to assume that Maine de Biran took Reid's theory into serious consideration in his investigations. On the other hand, as I have already stated, Hume's criticism of causality concentrated on the illegitimate translation of the constant conjunction into a necessary connection, that is, an empirical or inductive inference into a logical necessity. This illegitimate translation, according to Hume, followed from the human *belief* in the necessary connection. In addition, Reid is mostly known as one of the ardent critiques of Hume, being even more recognised until the eighteenth century than Hume himself. Let us briefly examine Hume's theory, after which I will examine Reid's theory. After these historical considerations, we come back to Maine de Biran's theory of belief.

According to Hume, the regularity of a phenomenon gives birth in consciousness a belief in the absolute existence of such phenomenon.[90] It is a kind of instinct. (Hume [1748] 2008, 5.8.) He argues that the belief in the existence of an object does not add any new ideas to the idea or the components of the idea of an object. This is because the belief in the object differs from the idea of that object in the 'manner' of understanding, not in the way one idea differs from

[90] In addition to the concept of *belief*, Hume uses a concept of *assent* by denoting the same meaning, as well.

another (Hume [1738] 2007, 1.3.7). It is rather a feeling of force, vivacity, solidity, firmness, or steadiness (Hume [1748] 2008, 5.11; [1738] 2007, 1.3.7).[91] In short, belief gives consciousness a feeling that the object of cognition is not merely, by Hume's terms, 'fiction,' but rather something real, having its own independent existence. Because belief provides ideas with the aforementioned feeling, it renders the feelings united with ideas as the governing principles of all human actions (Hume [1738] 2007, 1.3.7). Thus, there is a necessary importance in belief. As Schulthess (2005, 257) has pointed out, for Hume, *belief is the basis on which human beings act*.

Reid, an avid critic of Hume, paid attention to the conception of belief as a second form of knowledge besides conceptual reasoning. For Reid, there is a form of knowledge that he calls *instinctive belief* or *intuitive judgment* (Reid 2010, 86; cf. 2012, 238). From the beginning of his or her life, a human being has a *conviction*, or a *belief* concerning some degree of active power in himself or herself, which is not a conscious belief (Reid 2010, 9). However, all the volitions and efforts to act, deliberations, the 'purposes and promises,' *imply* a belief in active power in one's own personality, and all the 'counsels, exhortations and commands' imply a belief in active power in those to whom an individual address them (Reid 2010, 17–18). Reid takes it as probable that this form of cognition extends to other animals. At least some operations of animals look like they have this same kind of cognition. 'If there be any instinctive belief in man, it is probably of the same kind with that which we ascribe to brutes, and may be specifically different from that rational belief which is grounded on evidence; but that there is something in man which we call belief, which is not grounded on evidence, I think, must be granted.' (Reid 2010, 86.)

As we saw in the first chapter, there is an important connection between action and thought. In addition, we saw in the second chapter that, for Maine de Biran, instinct is the cognition that exerts involuntary acts. Now, according to Hume and Reid, belief is something that brings acts and thoughts together, instinctively. Furthermore, this solidity of act and thought seems to have a crucial epistemological significance. Indeed, for Maine de Biran, they are the matter of reflection. Now, let us pause for a moment. We have ended up in a situation that makes us remark an unavoidable relationship with such apparently differing things as action, belief, instinct, and reflection. There are thoughts, actions,

[91] It is appropriate to reproduce here Hume's clarifying remark considering the feelings of belief. 'This variety of terms, which may seem so unphilosophical, is intended only to express that act of the mind, which renders realities more present to us than fictions, causes them to weigh more in the thought, and gives them a superior influence on the passions and imagination' (Hume [1738] 2007, 1.3.7).

conscious activity, and non-conscious activity, operating simultaneously in human behaviour. One option to untangle this coil of concepts is that we accept this conceptual diversity and just proceed further. In fact, what if we could provide passages in Maine de Biran's works that gives us such articulations of these concepts, according to which we could sensitively sort out the coil?

Let us group some definitions of the concept of *belief* from Maine de Biran's work. First, belief is itself a 'principal fact of the intimate sense' (Maine de Biran 1995, IV:156). Thus, it is the starting point of reflection that Maine de Biran requires. Second, it is an 'intimate persuasion of the independent and separate real existence of objects, which affect our senses while awake' (Maine de Biran 1984a, V:101–102). As we saw in the previous section about attention, there is in consciousness a tendency to believe in the unity behind general ideas, and as I already explained in this chapter, reflection, the explicator of beliefs, that which makes beliefs as the objects of volitional cognition, takes this tendency as its subject matter. Thus, could we say that belief is a kind of *intellectual* instinct (cf. Maine de Biran 1990a, XI/3:164)? In human cognition, there is a necessary belief in 'absolute reality of existences, . . . like a natural law, instinct' (Maine de Biran 1986, VIII:100).[92] I find it plausible to propose that reflection is an intellectual instinct, and belief is its product. Instead of being merely a mode of first-order, non-conscious cognition, intellectual instinct is a mode of cognition that volition can elaborate and bring into conscious consideration.

For Maine de Biran, belief is emotive, and the concept of *emotion* has a technical meaning. Emotions are those states of consciousness where affections are joined with beliefs, which start to dominate (*prennent un ascendant*) the matter of imagination (Maine de Biran 2001, VII/1–2:253). Laws of association are the coordinating factors of representations in imagination, as I have already explained. However, beliefs deliver another kind of coordination, which does not play with the rules of resemblance and simultaneity but with emotions. Emotions are the guiding, organising factors of reflection. In infancy, imagination is not yet developed, so beliefs and acts are in more immediate connection with each other (Maine de Biran 2001, VII/1–2:254). However, as imagination develops and becomes a default state of human consciousness, the role of emotions for thought should not be dismissed.

These emotive beliefs are nevertheless part of human thought, and their dismissal could have dire consequences on one's intellectual development. Let us state the evident: *beliefs are not true by themselves, nor do they reveal the absolute existence of things as such*. Beliefs may be illusory, as it is seen in mental illnesses or strong physical influence on consciousness (cf. Maine de Biran 2001, VII/1–

[92] 'réalité absolue des existences, . . . comme une loi naturelle, instinct'

2:253–254). Thus, as Maine de Biran indicates, beliefs that are not reflected on are a kind of credulity or gullibility, that is, *naivety* (Maine de Biran 2001, VII/1–2:254). Such profound emotions should not be considered as biasing factors of thought in themselves – they are the foundation of human knowledge, whether we like it or not, and the only option to get rid of the naivety and biases they cause is to reflect on them.

In view of the above, belief appears to be *a posteriori* to generalisation, but Maine de Biran seems to understand them as the veritable foundation of knowledge (cf. Maine de Biran 2001, VII/1–2:204). How can a thing that comes after some other thing be the latter's foundation? The truth is that this paradox arises from a misunderstanding or from a lack of precision, and that is what we see here. That is to say, we need to state Maine de Biran's perhaps most counterintuitive argument: *general ideas are not knowledge as such*. General ideas are in themselves habits, or conventions, without reflection. I propose that *general ideas have epistemological value only if they are subsumed under reflected beliefs*. This is what we already saw with the role of emotions that accompany beliefs.

However, Maine de Biran also states that belief is not knowledge in itself (Maine de Biran 1989a, X/2:99). Belief is not itself knowledge about something, but it is *something*. It is a reflecting cognition that gives general ideas the real value of knowledge. Tisserand (1909, 128) has remarked this argument in Maine de Biran. Reflection can provide the means for cognition to detach certain beliefs from general ideas, to *abstract* them. What does the act of abstracting mean? Maine de Biran refers to Kant's remark about the ambiguity of the concept *abstract*. Kant, in his dissertation, writes the following:

> It is, however, necessary to notice here the extreme ambiguity of the word 'abstract,' and I think that it would be better to eliminate this ambiguity beforehand lest it spoil our investigation into that which belongs to the understanding. Properly speaking, we ought, namely, to say: *to abstract from some things*, but not: *to abstract some thing*. *The former expression indicates that in a certain concept we should not attend to the other things which are connected with it in some way or other*, while the latter expression indicates that it would be given only *concretely*, and only in a way that it is separated from the things which are joined to it. . . . *Perhaps an abstract concept of the understanding would more rightly be called abstracting rather than abstracted*. (Kant 1992, 386, 2:394, emphasis modified by both Maine de Biran and me.)[93]

[93] 'Necesse autem hic est, maximam ambiquitatem vocis abstracti notare, quam, ne nostram de intellectualibus disquisitionem maculet, antea abstergendam esse satius duco. Nempe proprie dicendum esset: *ab aliquibus abstrahere*, non *aliquid abstrahere*. *Prius denotat: quod in*

We do not have a need to elaborate on Kant's definition of the concepts of understanding, but in this passage, Kant clearly states that these concepts are not things but *acts*. Moreover, it is clear that, for Kant, which is also the reason why Maine de Biran refers to him, abstracting something is not its generalisation. Abstraction is something quite opposite to generalisation. We could call this opposite cognitive act 'singularisation,' but this would be quite a conceptual stretch. Nevertheless, abstracting means the act of discerning the product of reflective cognition from things as they appear. As we saw, general ideas are relative to their generation as habits and conveniences. However, by attention, consciousness can analyse or synthesise general ideas by will. This brings another, more intellectual relativity to general ideas. (Cf. Maine de Biran 2001, VII/1–2:109; cf. 1993b, XIII/1:130.) In any case, general ideas are always conditioned by human action, regardless of how intellectual, or how self-conscious, the action is. Now, reflected belief, just like analysis and synthesis but differing from them in nature, becomes an active cognitive factor that subsumes general ideas under its own purpose.

However, this purpose is not finalistic purpose. According to Robef (1925, 53), reflection means two things for Maine de Biran: 1) apperception of one reason or substance in a multitude of effects or phenomena, and 2) free activity and thought in that which makes consciousness think in the first place. Reflection is at the same time a pursuit of knowledge and intellectual self-creation. To increase knowledge by reflection means that one increases one's reflective capacity. Personality thus 'elaborates its own growth' (Robef 1925, 54–55). I include one addition to Robef's interpretation: developing reflection means that one's capacity to comprehend higher and novel forms of abstracted objects becomes more powerful.

3.5 Summary

In this chapter, I systematised Maine de Biran's theory of the origin and generation of human knowledge.

First, we saw how Maine de Biran divides human cognitive modes into two orders. He calls the first-order cognitive mode *instinct* and the second-order cognitive mode *volition*. We saw that Maine de Biran subsumes all non-conscious and reflective behaviour of animals under instinct. It is a cognitive capacity according to which organisms execute reactions to received stimuli. Even though

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conceptu quodam ad alia quomodocunque ipsi nexa non attendamus, posterius autem, quod non detur, nisi in *concreto* et ita, ut a conjunctis separetur. . . . *Hinc conceptus intellectualis abstrahit ab omni sensitivo, non abstrahitur a sensitivis et forsitan rectius diceretur abstrahens, quam abstractus*.'

instinct characterises the automatic reactivity of organisms, many animals behave in ways that are conscious and show the exertion of volition, at least to some degree. Humans are the most evident case of volitional cognition.

For Maine de Biran, volition is the generating factor for all second-degree cognitive capacities, and it cannot develop from instinctive behaviour. Volitional cognition begins when an individual recognises his or her capacity to change the course of instinctive reactions. In humans, education and self-reflection enable individuals to rise higher in the utilisation of volitional capacities. We saw that Maine de Biran strictly differentiates will from desire, the confusion which had led certain philosophers astray.

I argued that in Maine de Biran's theory, volition develops into two opposite modes. These modes are attention and reflection. We saw that attention enables the analysis of properties and their generalisation into general ideas, that is, concepts. Concepts enable reasoning with symbolical representations according to logic, or computation. Reflection is opposite in relation to attention. If attention is a faculty of analysis, synthesis, generalisation, and reasoning, reflection is a faculty of the understanding of generative unities. By virtue of reflection, human thought can understand the generative reason of things by abstraction, which attention only grasps as relative conceptualisations.

I argued that Maine de Biran's theory of cognitive modes unites nominalism and conceptualism by attributing nominal concepts to general ideas and conceptual concepts to objects of reflection, provided that these objects of reflection are not considered as concepts but as sorts of *belief*. Notwithstanding, both concepts and beliefs are two different cognitive units.

I proposed that Maine de Biran had Thomas Reid's theory of belief in his mind, which in turn was indebted to David Hume's theory of belief. I shortly explained Reid and Hume's theories. Regardless of his predecessors, Maine de Biran's theory of belief stood on its own. In short, if general ideas coordinate cognitive content according to the laws of association, beliefs coordinate cognitive content according to emotions, or according to what Maine de Biran characterises as *intellectual instinct*.

We have now a systematised reconstruction of Maine de Biran's theory of the origin and generation of human knowledge. In the next chapter, we will proceed to its consequences on the nature and division of the human intellectual disciplines, that is, philosophy and science.

4 PHILOSOPHY AND SCIENCE

This chapter concentrates on the consequences of the generative explanation of philosophy and science in Maine de Biran's philosophy. Philosophy and science are two intellectual fields of research, resting on two modes and their products of human cognition. The differences between the philosophical and scientific disciplines culminate in their different methodologies and points of view on their research subjects. Out of these differences, as we already saw in the second chapter, different causal explanations distinguish philosophy and science from each other.

In this chapter, I concisely explain Maine de Biran's idea of the *modus operandi* of science. Second, I define Maine de Biran's theory of the method and subject matter of philosophy. After the definition of these principles for philosophical and scientific disciplines, I show how Maine de Biran constructs a kind of multidisciplinary program for the study of the human intellectual faculties, which he calls the *human science*. In this program, the symbolisations of each point of view differ in nature from those of the other, but the two can complement and aid each other's progress.

4.1 The subject matter and method of science

Now, we will turn to the basic principles of scientific inquiry according to Maine de Biran. In short, science is mainly a method, so I will explain Maine de Biran's theorisation of the scientific method.

Maine de Biran formulates three stages of the scientific method. These stages are 1) observation, 2) classification of observations, and 3) postulation of mathematical laws drawn from the classifications (Maine de Biran 1988, III:29; 2001, VII/1–2:26).[94] This kind of method does not seek the efficient causes of things. Instead, it gathers observations together and generalises them by means of induction, after which they are formed into laws and subjected to calculation (Maine de Biran 1986, VIII:179).

Let us remember what I said in the previous chapter about general ideas. Maine de Biran maintains that scientific classification starts from these non-conscious and non-reflected generalities (cf. Maine de Biran 2001, VII/1–2:248). In this context, Maine de Biran refers to Paul Joseph Barthez's (1734–1806) theory

[94] Maine de Biran took and modified this formulation from Pierre Prévost (1751–1839), whose four stages were slightly different: 1) observation, 2) generalisation, 3) discovery of reasons, and 4) search for final causes (Prévost 1804, sec. II; cf. Azouvi 1995, 104). Maine de Biran dropped the fourth stage of Prévost's formulation.

of science. According to Barthez, every natural science more or less shares the same set of generalisations and mathematical laws (Barthez 1858, 12–15). The scientific method operates by inducing from analogical or similar phenomena. It analyses, that is, discriminates particular observations according to their general characteristics and synthesises, that is, creates generalisations out of these analysed observations (Barthez 1858, 19–21). According to Azouvi, this idea was predominant at the time: from the influence of *Novum Organum* ([1620] 2000) of Francis Bacon (1561–1621) to Jean le Rond d'Alembert (1717–1783) and Condillac, everyone accepted 'the idea of a science moving continuously from the observation of particular facts to the discovery of general principles' (Azouvi 1995, 110).[95]

Induction, analogy, resemblance, and generalisation – all of these are the foundations of empiricism and modern science. In a general sense, Maine de Biran's idea of the methodology of science, and his idea of how scientific research should be conducted, is identical with our contemporary views on scientific methodology and conduct. On this basis, it is easy to pin down the scientific point of view, which Maine de Biran had in mind and from which philosophy is distinguished. In short, science is the generalisation of phenomena and the calculation of their quantifications by means of the formal language of mathematics. This is the nature of its epistemology, and it does not take part in the explanation by means of either generative or agentive causes, because its method cannot include them. The exclusion of generativity and agency from the scientific methodology is the moment at which philosophy steps in. Philosophy does not utilise the scientific methodology or mathematics. As François Azouvi puts it, the world of science comprises only effects that befall observation, that is, phenomena. 'The method of analogies, or *induction*, governs the chain of operations of experimental science from one end to the other, and neither the position of the laws nor the determination of causes breaks the wise generalisation which begins from observation. Thus, the perfect continuity, which inspires the exposition of the method, is justified' (Azouvi 1995, 107–108).[96]

Maine de Biran speculates that in the future, there will be perhaps one unique science, a science that utilises uniform methods of observation,

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[95] 'l'idée d'une science passant de façon continue de l'observation des faits particuliers à la découverte des principes généraux'

[96] 'La méthode des analogies, ou *induction*, gouverne d'un bout à l'autre la chaîne des opérations de la science expérimentale, et ni la position des lois, ni la détermination des causes, ne brisent la sage généralisation commencée dès l'observation. Ainsi se justifie le parfait continuisme qui inspire l'expose de la méthode.'

experience, reasoning, and calculation. He refers to the findings of his close friend, the physicist André-Marie Ampère (1775–1836), who was one of the naturalists that traced electric and magnetic phenomena back into one electromagnetic family of phenomena.[97] There would not be distinct mechanical, physical, and chemical natural sciences, but only *one* science. This one science would have one principle as the trunk from which the different special sciences (physics, chemistry, physiology, and such) would stem as divergent branches depending on the different natural phenomena respective to each special science (Maine de Biran 1989a, X/2:318–319). But how can the special sciences be distributed according to the natural articulations of reality, if the scientific method does not itself include the possibility to find their proper subject matter? Here, it seems, Maine de Biran raises the role of philosophy.

4.2 The subject matter and method of philosophy

Let us turn to the subject matter and method of philosophy. In short, reflected beliefs are the subject matter of philosophy, and the methods of philosophy comprise the elaboration of the reflective mode of cognition.

Philosophy is the discipline that explains the generative causality of things. This is why it is not wrong to call metaphysics as the first philosophy, because it gives the metaphysical basis of the first data of every science. It gives the 'conditions of objectivity' of every science (Maine de Biran 1986, VIII:213–214). These conditions of objectivity are those principal facts that the scientific method itself cannot include in its subject matter. By providing knowledge of knowledge, philosophy is able to turn relative scientific knowledge into the knowledge of things in themselves, even though science itself only deals with generalised effects.

The most important result of the discovery of the developmental and psychological origin for all metaphysical concepts, as I have explained in chapter 3, is that *the common source and generation of metaphysical knowledge is now known*. This means that philosophy has found its clearly demonstrable and confident source of knowledge. Thereby it has become a positive discipline. (Cf. Maine de Biran 2001, VII/1–2:31.)

Maine de Biran compares his discovery of the generative principle of knowledge to that of Antoine Lavoisier's (1743–1794) discovery of oxygen (Maine de Biran 2001, VII/1–2:31). Lavoisier, choosing a name for the chemical substance – discovered by Henry Cavendish (1731–1810) and experimentally proved by

[97] Another important early researcher in this field was Charles-Augustin de Coulomb (1736–1806).

him and Pierre-Simon Laplace (1749–1827) – that composes water by reacting with oxygen, named it as hydrogen after *ὑδρο* (water) and *γεἰνομαι* (I bring into being), that is, hydrogen, which is the 'generative principle of water' (*principe générateur de l'eau*; Lavoisier 1789, 94). Thus, when hydrogen burns, that is, becomes oxidised, it generates water. For Maine de Biran, Lavoisier's proof and his discussion about the proof were profound. Maine de Biran writes as follows:

> As before the discoveries of Lavoisier on the decomposition of air, that is, before true generative principle of acids, there was no fixed and determined chemical method. One could have disputed eternally and without ever agreeing on whether acids were simple or compound, whether acidity was either innate to certain substances or whether it was not accidental to them, whether the principle of combustion resided either in the bodies that burn or came to them from outside. Similarly, as well, there will perhaps be no fixed method in psychology, no complete system on the origin of ideas and the generation of the faculties, until, imitating to a certain extent the example of the pneumatic chemists, the metaphysicians will be able to recognise or establish in a positive way the first element, the fact, or the generative principle of knowledge, to study it in itself and in its various combinations, to coordinate with it all the facts of the same kind; thus, analysing and forming anew the binary or ternary compounds, classifying them in accordance with a fixed and regular method, and finally, to produce the principles[98] of knowledge. (Maine de Biran 2001, VII/1–2:31.)[99]

[98] I have translated the French word *élémenter* as the 'production of principles.' *Élémenter* had a technical meaning in the turn of the nineteenth century. It meant the teaching or learning the very basics of things. The English word for the primary school, the elementary school, catches this meaning clearly: in elementary school, the children learn the basics of knowledge. Another clarifying example is the ancient classic of mathematics, Euclid's *The Elements* (*Στοιχεῖα*), whose Latinised name is *Elementa*.

[99] 'Comme avant les découvertes de Lavoisier sur la décomposition de l'air, et sur le véritable principe générateur des acides, il n'y avait point de méthode chimique fixe et déterminée, et qu'on aurait pu disputer éternellement et sans jamais s'entendre pour savoir si les acides étaient simples ou composées, si l'acidité était innée à certaines substances ou si elle ne leur était pas accidentelle, si le principe de la combustion résidait dans les corps qui brûlent, ou leur venait du dehors, – de même, il n'y aura peut-être de méthode fixe en psychologie, point de système complet sur l'origine des idées et la génération des facultés, jusqu'à ce que, imitant jusqu'à un certain point l'exemple des chimistes pneumatiques, les métaphysiciens aient pu reconnaître ou constater d'une manière positive le premier élément, le fait ou le principe générateur de la science, l'étudier en lui-même et dans ses diverses combinaisons, ordonner par rapport à lui-même tous les faits de même espèce, analyser ainsi et former de

Just as Lavoisier and others' discoveries rendered the phlogiston theory, which aimed to explain the oxidation with a specific kind of matter, obsolete, Maine de Biran believed that the generative principles of knowledge would render the preceding metaphysical theories obsolete. Maine de Biran was confident in his theory, because it also proves the reasons why, and the precise point at which, previous philosophical schools have gone astray. Thus, Maine de Biran's generative explanation of knowledge reveals, according to him, the *reason* for the divergences of philosophical theories. Without the common generative source of the products of reflection, philosophers are never able to speak the same language, remaining forever in an incommensurable state. (Maine de Biran 2001, VII/1–2:41.)

According to Maine de Biran, this incommensurate state results from the following situation. He calls metaphysical dogmatism as the 'retroactive march of human spirit' (*la marche rétroactive de l'esprit humain*; Maine de Biran 1995, IV:45). This means that the metaphysicians, after taking primitive concepts and principles as *petitiones principii*, begin to explain knowledge, which notwithstanding has its proper generative origin, with those derivations, or translations, that they have created. This is why conceptual thought is *retroactive*, and the movement of thought from concepts to things must be inverted, so that the cognition of things in themselves can give rise to conceptual meanings.

Reflection is the cognitive mode that supplies the generative explanation for philosophy (Maine de Biran 1984a, V:50; 1986, VIII:22). Maine de Biran explains his method of using reflection in philosophy as follows:

> My method . . ., emerging from reflective observation to know what can be preceding in the order of time the species of phenomena with which it is concerned and serving as a basis for it, joins up with a new system of facts where it meets the physiological point of view. Relying in turn on these two modes of observation, it grasps the parallelism or the coincidence of their results, without identifying or confusing them, without even wanting to penetrate the *how* of their connection, since this connection cannot itself be given as a mixed fact, which belongs to two methods of observation and as to two different meanings. (Maine de Biran 1988, III:77.)[100]

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nouveau les composés binaires ou ternaires, les classer suivant une méthode fixe et régulière, enfin élémenter la science.'

[100] '[N]otre méthode . . ., sortant de l'observation réfléchie pour connaître ce qui peut précéder dans l'ordre du temps l'espèce des phénomènes dont elle s'occupe et lui servir de base, se rejoint à un nouveau système de faits où elle rencontre le point de vue physiologique. S'appuyant tour à tour sur ces deux modes d'observation, elle saisit le parallélisme ou la

Furthermore, Maine de Biran takes support from mathematics in explaining how philosophy should understand the metaphysical significance of the products of reflection. Mathematics has a reality of its own; in a sense, it is self-sufficient. Mathematical knowledge extends far beyond the reach of sensible ideas into abstract forms. It is also an indispensable tool for measuring and predicting phenomena. With mathematics, science can make inferences and hypotheses of things that are out of the immediate and tangible reach of researchers. Maine de Biran maintains that as a form of knowledge, metaphysics is analogical to mathematics: it 1) is deeply connected with the faculties of human knowledge and 2) transcends the perceptual conditions of imagination. (Maine de Biran 2001, VII/1–2:46–47.) But while it is undeniable that mathematical knowledge corresponds well to the quantitative articulation of reality and can help to predict and confirm facts, can metaphysical knowledge really reach beyond experiential facts? Why would there not also be metaphysical evidence as opposed to the clarity of imagination as in mathematics?

> Despite this great line of demarcation which will always separate the two evidences, the mathematical and the metaphysical, it is easy to see that they are closer to each other by virtue of the principal fact, in which they have their common source, namely that neither of them is of the kind of clarity that imagination demands (Maine de Biran 2001, VII/1–2:48).[101]

In fact, metaphysical knowledge and mathematical knowledge are the purest abstractions from the primitive duality of active personality and resisting objectivity. Mathematics originates in the relations between sensible phenomena, whereas metaphysics originates in the absolute cognition of agentive personality. Neither the relations between phenomena nor the absolute agency are empirically perceivable, but their roles in knowledge are indispensable.[102]

Geometry has its origin likely in sense expressions, from which its principles were first abstracted. After these first steps of abstraction, the

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coïncidence de leurs résultats, sans les n'identifier ni les confondre, sans vouloir même pénétrer le *comment* de leur liaison, cette liaison ne pouvant elle-même être donnée que comme un fait mixte, qui appartient à deux méthodes d'observer et comme à deux sens différents.'

[101] 'Malgré cette grande ligne de démarcation qui séparera toujours les deux évidences mathématique et métaphysique, il est facile de voir qu'elles sont plus rapprochées l'une de l'autre par le fait primitif où elles ont leur source commune, que chaque d'elles ne l'est de l'espèce de clarté que demande l'imagination.'

[102] Mathematics as the pure science of relations gained firmness every time it invented a representational system of signs, for instance geometry and algebra. Later innovations, such as differential calculus, were constructed using the tools from geometry.

invariable factors of geometry were given permanent signs. Now, geometry was completely abstracted from its natural milieu, and geometricians internalised the understanding of pure geometricity, becoming pure intellectual creativity, which enabled the creation and invention of ever more complex and refined forms of geometrical reasoning. (Cf. Maine de Biran 2001, VII/1–2:47.) However, as Maine de Biran notes, no observation, or an indefinite synthesis of observations, provides human cognition with the abstracted equation of the circumference of a circle as the product of its diameter and the constant π. Observation and reasoning can reveal the factors easily by tracing the circumference as a definite line that is curved into a circle, and by figuring out π by dividing the measured circumference by the diameter of a circle. These are operations that the imagination can comprehend, as well. However, at the turn of the nineteenth century, mathematics had progressed to a situation, in which mathematicians provided an ever-increasing number of mathematical cases that were mathematically proven and robust, but which imagination could not comprehend. Maine de Biran refers to the asymptotic curve, in which the asymptotic curve and its tangent meet up when the abscissa and ordinate tend to infinity. (Maine de Biran 2001, VII/1–2:48–49.) For instance, if $f(x) = \frac{1}{x}$, abscissa and ordinate are the asymptotes of the line it draws. This operation, impossible for the imagination to comprehend, is relatively simple to comprehend in abstracted relational fashion. More interestingly, incompatible with imagination it nevertheless is suitable in modelling events and relations in reality Furthermore, this relational pureness suits well in reality of things when applied (Maine de Biran 2001, VII/1–2:50). In addition, mathematics develops independently from within and extends to ever higher levels of abstraction and complexity *from itself, on itself* (Maine de Biran 1988, III:1). However, Maine de Biran argues that this development would not have occurred without the utility of geometry for physics (Maine de Biran 1988, III:3). From this point of view, mathematics enables human thought to cognize things in reality without imagination.

Mathematics, circumventing imagination, reveals an interesting analogy with metaphysics. In short, mathematical knowledge abstracts pure relations; metaphysics abstracts the act of abstracting itself, neither of which belong to the realm of imagination. Yet, there is one essential difference between mathematics and metaphysics. While mathematics can assign a sign to the abstracted factor, metaphysics cannot, at least not in such a straightforward fashion, because the evidence from the reflection of reflection is immediate. The evidence of reflection is meaningful and present only in the reflective apperception of the reflective cognition itself. The philosopher can only use conventional signs to help

themselves evoke the same act, or process, of abstraction. The act, the cognitive process, is philosophy itself. However, once created, the understanding can only be reproduced in artificial, or reminiscent, fashion. Once the creative learning, or understanding, has happened, one cannot recreate the creation, or learning, itself ever again identically to the original event. The same kind of learning effort can of course be *exerted* again, but then it needs a new object of resistance that is in similarly proportioned to the exertion of cognitive effort (Maine de Biran 2001, VII/1–2:48).

This kind of setting reveals the difference between metaphysics and mathematics. To repeat itself, reflective effort, a capacity that learns and grows, needs constantly changing circumstances. In order to be constant, it effectuates and requires change. Mathematical permanence is the inverse: in order to repeat itself, a mathematical quantity needs to be identically the same in every moment and on every occasion. (Cf. Maine de Biran 2001, VII/1–2:503.) In short, the invariability in metaphysical knowledge is a *tendency* to grow and develop; the invariability in mathematical knowledge is a *constancy* of repetition.

Let us shortly consider what incommensurability this kind of difference in nature between mathematics and metaphysics causes for some fundamental general ideas. From the set of different general ideas, I choose the concept of *time*, beloved by both metaphysicians and physicians alike. For the sake of brevity, let us stay in an abstract treatment of the concept. In short, time in physics is a base unit (t) of measurement, which is usually represented as the x-axis of the geometrical representation of equations in the Cartesian coordinate system. In metaphysics, understood in Maine de Biran's sense, time could mean the generative process itself, during which learning and creativity develop. I said that time could mean this to Maine de Biran, because he himself used the concept of *time* in Kantian sense to denote the intuition of the succession of phenomena. From this comparison, we can nonetheless clearly see the incommensurate meanings of *time* if we depart from either the basis of physics or the basis of metaphysics.

In any case, the most important analogy between mathematics and metaphysics is that they both provide something that differs from the clarity of imagination and perception. The classical example of the power of understanding over the power of perception and imagination was the Copernican Revolution, according to which several early-modern astronomers proved the heliocentric model of the solar system over the geocentric model by using mathematical proofs.

According to Maine de Biran, metaphysical evidence or data would be as clear as mathematical evidence, if it only had a clear and expressive language of its own (Maine de Biran 1995, IV:192). Does this mean that philosophy or

metaphysics as a science of reflection needs its own formalism? How could that be possible? Formalisation serves the purpose of reasoning and calculation, but neither of them is the method of philosophy. We can instead assume that the metaphysical knowledge would be easier to comprehend, manipulate, and communicate, if it had a proper terminology, or a shared lexicon.

All perception and activity are moments of development, an individual always creates something out of itself (cf. Maine de Biran 1989a, X/2:64). The object of knowledge in itself, the absolute nature, is the creation of the active subject that cognises. This is the first problem of philosophy. This is done by abstraction, and it is in the core of philosophical methodology. (Maine de Biran 1989a, X/2:288.)

As I have explained, philosophy is a discipline that elaborates the products of abstraction. Philosophy, in short, is a form of cognition. How could we create methods for a mode of cognition? Perhaps we should understand philosophical methods as Descartes has understood his method:

> By 'a method' I mean reliable rules which are easy to apply, and such that if one follows them exactly, one will never take what is false to be true or fruitlessly expend one's mental efforts, but will gradually and constantly increase one's knowledge till one arrives at a true understanding of everything within one's capacity (AT X, 371–372; CSM, 16).[103]

If we understand philosophical methods as rules to direct philosophical thought, I believe that the following explication of Maine de Biran's methods is much easier for us to comprehend. Maine de Biran seldom explains his method. However, in two specific passages (Maine de Biran 1988, III:77–78; 2001, VII/1–2:69–70), he explains his method of the *decomposition* of human experience. He gives the following five heuristic rules.

First, do not associate the particular observed phenomenon with an immediately suitable class. Instead, distinguish specificities, or individualities, before generalising them (Maine de Biran 1988, III:77; 2001, VII/1–2:69). Consciousness usually associates perceived qualities with already-known generalisations (Maine de Biran 2001, VII/1–2:401).

Second, do not commit to the hylomorphic distinction between the passive elements and the active elements of experience without aiming at bringing them into a common generative origin. Nonetheless, decompose the observed

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[103] 'Per methodum autem intelligo regulas certas & faciles, quas quicumque exactè servaverit, nihil unquam falsum pro vero supponet, & nullo mentis conatu inutiliter consumpto, sed gradatim semper augendo scientiam, perveniet ad veram cognitionem eorum omnium quorum erit capax.'

phenomena into objective impressionability and into voluntary, active cognition. Thus, understand the formal part of the dichotomy as positive evidence of the nature of personality, in which behaviour (*morale*) and knowledge coincide. This is executed with reflection. (Maine de Biran 1988, III:77; 2001, VII/1–2:69.)

Third, delimit the domain of this positive evidence to that in which its activity is limited by the organs that execute it. Thus, do not separate from this exercise the organic instruments or conditions which are used to carry it out and thus mark the limits of its capacity. (Maine de Biran 1988, III:77; 2001, VII/1–2:70.)

Fourth, in this delimited domain, bring physiological evidence and reflection together. Physiology gives the material for reflection that it cannot itself seek. (Maine de Biran 2001, VII/1–2:70.) Apply the external senses and imagination to the general ideas in consciousness. Apply physiological observation to the knowledge of the instruments that contribute to the production of the sensations of objects, or their transmission into ideas. Apply the immediate feeling to the affections that arise from the functioning of these instruments. (Maine de Biran 1988, III:77–78.)

Fifth, assign the scope of every special science according to the previous operation, and bring reflection together with every special science. Never let the relative knowledge of the special sciences to interfere with one another, or, in other words, never mix the concepts of different sciences either with one another or with reflected beliefs. (Maine de Biran 2001, VII/1–2:70.) For instance, geometry was able to develop just because it was given a proper symbolical language (Maine de Biran 1988, III:2).

Points of view (*points de vue*) are needed to understand the natural differences between signs, especially in cases where the same sign refers to two things differing in nature. One of the crucial examples is the concept of *activity*, which has different references in different sciences (Maine de Biran 1988, III:36–37). The differences can be traced back to different points of view, points of view, of which the 'orders of facts' and the disciplines are the results. Without the recognition of natural differences between the objects of knowledge, the objects are most certainly misinterpreted. Inductions based on misinterpreted objects become abstract from the very beginning of the progress of induction. (Cf. Maine de Biran 1989b, IX:116; cf. 2001, VII/1–2:128–129, 438.) However, the point of view of one discipline can suffice to assist the other in the strive towards increased precision (cf. Maine de Biran 2001, VII/1–2:242).

Here is an apparent problem: if philosophy is one point of view, how can it be a clarification of itself and all other points of view? However, the problem is only apparent: there is nothing in this idea that imposes problems if the nature of points of view are understood properly. Philosophy and science are not merely perspectives, but there is an important division of labour, or even a necessary

complementarity between them. Philosophy and science are two systematisations of two different cognitive modes, namely attention and reflection. Bringing the products of these two cognitive modes into a complementary, mutual solidarity is another task – it is the task of what Maine de Biran calls *human science*.

4.3 A multidisciplinary human science

I will now show how Maine de Biran brings together the disciplines of both sources of knowledge in his project he called a *human science* (*science de l'homme*). In his last manuscripts, he calls this human science *anthropology*.[104] The terminological variety in the decades around the turn of the nineteenth century was wide. In a sense, the terms *philosophy*, *ideology*, and *human science* denoted a system, or the philosophical part of a system, that aimed to study the human intellectual, behavioural, and social faculties that were called during that time *moral*. The general aim of many different authors was to explain how human knowledge develops, and its origins.

However, Maine de Biran recognised that the project to unify the diverse disciplines under the single label of *human science* had not delivered great results:

> [D]escending from this first general distribution into the particular divisions peculiar to each of the parts of the human science, we still find an extreme variety in the points of view relating to the same subject, and a proportionate diversity in the means, the procedures and the goal of analysis, when it is a question of observing phenomena of different orders, of classifying them, of laying down their laws, of assigning their causes (Maine de Biran 1984a, V:49).[105]

Here, Maine de Biran regrets the ambiguous situation of the efforts to establish the unified, multidisciplinary human science. Let us summarise some key events and figures behind these efforts to which Maine de Biran was referring.

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[104] This reminds me of Kant's terminological development. In 1798, Kant published a work *Anthropology from a pragmatic point of view* (*Anthropologie in pragmatischer Hinsicht*, 2006). During that time and during the first decades of the nineteenth century, anthropology was anything but a commonplace concept. However, *human science* was widely used in the eighteenth-century French philosophy, as we will see.

[105] '[D]escendant de cette première distribution générale dans les divisions particulières et propres à chacune des parties de la science de l'homme, nous trouvons encore une extrême variété dans les points de vue relatifs au même sujet, et une diversité proportionnée, dans les moyens, les procédés et le but de l'analyse, quand il s'agit d'observer les phénomènes de différents ordres, de les classer, d'en poser les lois, d'en assigner les causes.'

According to Chappey (2006, 44), the human science was a product of the ideal of the Enlightenment. It aimed to 'confer coherence to dispersed knowledge and practices.' The 'history of human science' was understood as research into the foundations of knowledge in order to reunite the different domains of knowledge that had convergent objects of interest. Its notable progenitors were Hume and Buffon, and interest in this project swept from Scotland through France to Germany.[106] According to Moravia (1966, 401):

> The object of philosophical investigation could no longer be ideas, but . . . the whole man, in his fundamental unity. From here arises the need, which was not only Tracy's, to overcome the narrow confines of traditional psychology, to extend the analysis on all aspects of the nature and activity of man, to constitute a new science that would be anthropology.[107]

For Jean-Baptiste le Rond d'Alembert (1717–1783), the whole system of human knowledge divides into three genera of sciences: theology, human science, and the natural sciences. Human science divides according to two human activities: *understanding* (*entendement*) and *will*. The study of understanding comprises all the studies of the intellectual faculties and operations of human beings. The study of will comprises all the studies of individual and social behaviour (d'Alembert 1929, 167–74).

Human science thus culminated in two problematic dualities: a duality between philosophy and science, and a duality between thought and behaviour. For Maine de Biran, the physiological discipline comprises the study of the faculties of organised and sensing beings, or of the physiological elements of these faculties. The psychological discipline comprises the generation of human knowledge, and thus it is responsible for the formation of a theory of knowledge. (Maine de Biran 1984a, V:49.)

4.3.1 Physiology

Physiology is a science that studies living organisms and their vital functions. When applied to human beings, it understands humans as living and sensing beings (Maine de Biran 1984a, V:10; 1986, VIII:13; 1995, IV:60). However, Maine

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[106] Chappey (2006) gives a deep look into the political and societal aspects of the disputes surrounding the *human science* during the decades of the French Revolution and its aftermath.
[107] 'Oggetto dell'indagine filosofica non possono più essere le idee, ma . . . tutto l'uomo, nella sua fondamentale unitarietà. Nasce di qui l'esigenza, che non fu del solo Tracy, di superare gli angusti confini della psicologia tradizionale, per distendere l'analisi su tutti gli aspetti della natura e dell'agire dell'uomo, per costituire una nuova scienza che sarà l'antropologia.'

de Biran considered that physiology did not fulfil its task correctly. It had not yet matured as a positive science because it did not yet understand its own scientific principles. Maine de Biran wanted physiology to 1) become purely scientific, that is, a mechanistic discipline and 2) recognise its proper subject matter, which, although studied according to the cognitive mode of attention and with a mechanistic causal explanation, differed in nature from physical and chemical phenomena. The general critique of Maine de Biran towards the developers of physiology is that they confused *theoria* with *praxis*, the ontology of their research subject with epistemology, that is, the principles of scientific research methods. However, there were no mechanistic principles that were so unifying and universal as the law of universal gravitation.

Maine de Biran argues that the physiology of his time had not reached the level of maturity at which it would have its own Newton, that is, a scientist who would provide a unitary theory for the variety of phenomena classified as living.[108]

According to Barsanti (1994, 58), there were many theorists who tried to unite the sciences of living phenomena into one biological science, such as Abraham Trembley (1710–1784), Buffon (1707–1788), John Needham (1713–1781), Charles Bonnet (1720–1793), Peter Simon Pallas (1741–1811), Félix Vicq-d'Azyr (1748–1794), Jean-Claude Delamétherie (1743–1817), and Erasmus Darwin (1731–1802). According to Haigh (1975, 74), '[s]ince Newton's work on gravitation had given unprecedented coherence to the physical sciences, biologists in the seventeenth and eighteenth centuries had been searching for a corresponding conceptual basis upon which to build a biological theory.'

One attempt to find the 'universal law of gravitation of physiology' was called *vitalism*. The concept of *vitalism* has a bad reputation, and I find three different meanings in its use: it means 1) an appellation for an *aim* to develop an independent biological science; 2) a theory of a vital principle in living beings; and 3) an accusation used by the adversaries and opponents of the so-called 'vitalists.'[109] In this context, vitalism is used in the first meaning, although it partly overlaps with the second meaning. Nevertheless, *vitalists were those who wanted to give a positive subject matter, or a unifying principle, for the study of living*

[108] Cf. Haigh (1977, 2): 'At the beginning of the eighteenth century, speculation concerning the fundamental nature of life owed a considerable debt to seventeenth-century physical science. In particular, Newton's immensely successful work in the field of physics and astronomy had dramatically demonstrated that henceforth the physical sciences were firmly rooted in a sound theoretical and methodological foundation. Understandably every student of the life sciences dreamed of achieving a similar coherence in his discipline. That impulse gave birth to theoretical systems which sought to unify the data of physiology and anatomy.'
[109] Cf. Jennings (1913).

phenomena. Vitalism appeared to be a serious attempt to construct a positive biological science on the basis of physiology and medicine, before the time biology had yet to elaborate into an independent scientific field.[110]

In Maine de Biran's regard, the most important vitalists in the turn of the nineteenth century were Paul Joseph Barthez (1734–1806), Pierre Jean Georges Cabanis (1757–1808), and Xavier Bichat (1771–1802). Precursors to vitalism were the English philosopher Ralph Cudworth (1617–1688) and the German physiologist Georg Ernst Stahl (1659–1734). Stahl is considered as the father of physiology.

In order to better understand Maine de Biran's critique, let us briefly consider three of the most popular vitalist concepts in early modern physiology. The first of these is Cudworth's concept of *plastic nature*. For Cudworth, who belonged to the Cambridge Platonists, plastic nature meant the lowest level of animate substance. It enabled activity for the sake of ends or an 'orderly motion of matter,' but it was not conscious (Lähteenmäki 2009, 15; Allen 2013, 344). In other words, plastic nature was the 'vital energy of nature' or 'mental causality,' although unconscious (cf. Hutton 2017, 6) or 'inconscious' (cf. Leech 2017, 965).

The second concept is the *soul* (*anima*) of Stahl. Until Stahl, European physiology and medicine was mainly directed by Galen's (129 – c. 210) doctrine. [111] According to Rather (1961, 42), Stahl's contribution to the development of physiology was rendered possible by three key factors: 1) a 'declining Galenism,' 2) a 'rising mechanical philosophy,' and 3) a 'reinvigorated and flourishing corpuscular theory now linked with mathematical analysis,' all of which were 'attempts to banish final causes' and to transform nature 'from organism into mechanism.' Already in the early seventeenth century, the four Aristotelian causes (Gr. *aἰτία*, Lat. *causae*) had been reduced to two causal principles: *mechanism* and *teleology* or *finalism*.[112] Stahl himself granted that many organic phenomena could be studied as if the organisms were machines, but their goal-directed behaviour needed finalistic explanation. As Rather (1961, 43) summarises the core idea of Stahl's critique, '[n]o one would deny that a mechanical arrangement was a necessary feature of every organism, but it was necessary to bear in mind as well the manner in which pure mechanism was subordinated to organismic ends.' Different organs can be understood only in

[110] About the history of vitalism, see Normandin (2013); Wolfe (2013); Benton (1974); Meyer (1937); Myers (1900).

[111] Two exceptions to this were Paracelsus (1493–1541) and Jan Baptist van Helmont (1579–1644), cf. Rather (1961, 39).

[112] The second part of Kant's *Critique of the Power of Judgment* consists mainly of an analysis of this fact.

relation to their functions: sense organs as organs of sensation and muscles as organs of movement. The material body inclines towards rapid dissolution, but during its life, it renews itself and strives to stay alive. The vital functions are thus subordinated to the concept of *anima*, or soul. The soul is a thing that enables movement (*ens movens*) – or better the direction (*directio*) of the movement – and a thing that understands (*ens intelligens*) (Rather 1961, 43–46).

According to Azouvi, Maine de Biran argues that Stahl, establishing physiology as an independent science, 'denatured' it from the start. This happened because Stahl avoided reducing physiology to physics. He confused the epistemological tools of science with the nature of organism itself. Stahl confused mechanism and organisation and presumed that mechanism could never understand the complexities of organism. Thus, for Stahl, physiological phenomena were too complicated and difficult for the scientific method. (Cf. Azouvi 1995, 118–119.)

The third concept was Barthez's *vital principle* (*principe vital*). According to Haigh (1977, 1), '[t]he theory of the vital principle was a departure from the type of vitalism which had been evolving particularly among Barthez' older contemporaries at Montpellier.'

Barthez was inspired by Newton's unificatory law. He thought that because scientific observation could only study the succession of phenomena, it must impose generative causal factors to the observed series of phenomena from without. Inspired by Newton, Barthez thought that physiology should also assign the studied phenomena into a small number of causes. The progress of physiology would thus consist of an ascent towards increasingly unified laws. Barthez speculated that electricity and magnetism, regarded as two distinct phenomena by his contemporary physicists, would probably become united under a law, which would explain both electricity and magnetism. (Haigh 1977, 9; cf. Huneman 2008, 620.) Barthez's speculation turned out correct, as I have already remarked: the observations and theories of Coulomb and Ampère laid the foundation for the unified theory of electromagnetism in the early nineteenth century.

In physiology, Barthez proposed that the principle analogical to the law of universal gravitation in physics would be the *principle of life*. With the principle of life, Barthez aimed to provide a unified law of physiology. According to Haigh (1977, 8), Barthez dismissed his predecessor Théophile de Bordeu's (1722–1776) theory of organic sensibilities 'as a vain multiplication of causes for the purpose of explaining the functions of life.' Barthez thought that all vital functions could instead be attributed to a single *vital principle* (*principe vital*). For Barthez, the vital principle was the cause of all physiological motion. However, the analogy

between Barthez's vital principle and the physical law of universal gravitation was not sound, as George Cuvier (1769–1832) soon pointed out:

> [Cuvier] wrote that gravity was defined precisely in terms of its effects and connexions, and the motion of bodies towards each other is due to a specific law. The vital principle, on the other hand, was described only in the most general terms. Cuvier questioned the validity of postulating this system which was neither material nor immaterial, neither mechanical nor intelligent. To say that the phenomena of muscular contraction, sensibility, curing of wounds, formation of the foetus, reproduction of the species are all effects of a simple, single principle is merely to enumerate phenomena but not to explain them (Haigh 1977, 13–14, my emphasis).

The difference between the concepts of *gravity* and *vital principle* is that gravity denotes a mathematical law, an equation, whereas vital principle denotes only a nominal group of phenomena. Thus, Barthez's analogy was unfounded.

Despite these problems in the physiological theories that aimed to establish physiology as an independent science, Maine de Biran saw the promising developments of the principles of physiology in the works of Pierre Jean Georges Cabanis (1757–1808) and especially Xavier Bichat (1771–1802).

Cabanis stressed the importance of the concept of *instinct*, which Condillac had overlooked in his *Traité des animaux* (1755). According to Cabanis, the first instinctive tendencies and habits follow from the development of organs and are rather independent from conscious volition (Joussain 1958, 391–392). Organism's behaviour originates in instinct and not in volition (cf. Istria 1911, 178). As Cabanis writes, '[i]n animals in general, and in human in particular, there are two quite distinct kinds of impressions which are the source of their ideas and moral determinations, and these two kinds are found, but in different relationships, in all species' (cited in Istria 1911, 184). [113] As we saw in chapter 3, Cabanis' setting is the general framework of Maine de Biran's division of cognition into instinctive and volitional.

According to Barbara (2017, 360), Bichat founded the discipline of *anatomie générale* in 1800, and soon after 'it was taken as a model throughout Europe for the study of medicine, human anatomy, and pathology.' According to Haigh (1975, 73–74), 'Bichat took great care to explain to his readers why he did not believe life sciences could be properly treated as a branch of physical ones.'

[113] '[d]ans les animaux en général et dans l'homme en particulier, il y a deux genres bien distincts d'impressions qui sont la source de leurs idées et de leurs déterminations morales, et ces deux genres se retrouvent, mais dans des rapports différents, chez toutes les espèce'

Regarding the problematic nature of the concept of *vitalism*, Agutter and Wheatley put Bichat's position towards vitalism in the following way:

> It seems unhelpful and even misleading to describe Bichat as a 'vitalist.' He used the adjective 'vital' only to denote those properties of organisms that distinguish them from the inanimate world (sensitivity and contractility). He did not presume a hypothetical 'vital cause' of such properties. His approach to physiology was similar to [Johann] Reil's [1759–1813]: the distinctiveness of organisms lies neither in the matter from which they are made nor in any mystical 'vital force,' but in the organisation of their components. This view has been echoed repeatedly during the two centuries since Bichat and it is more or less what we believe today. (Agutter and Wheatley 2008, 110–111.)

In addition to Cabanis' setting, I propose that this organising approach has worked as a model for Maine de Biran in his theorisation of the development of human cognitive capacities. In both Cabanis and Bichat, there were hints of right directions for physiology to become a mature science in Newton's sense, that is, a science that does not rely on unwarranted hypotheses and assumptions and does not exceed the boundaries that it should commit into. Maine de Biran praised Newton of being almost 'superhuman' in his commitment to not claim any hypotheses. For Maine de Biran, the making of hypotheses is natural to human thought, but it obfuscates the rigorous research – therefore Newton was almost 'superhuman' (Maine de Biran 1986, VIII:419). With the expression 'hypothesis,' Maine de Biran does not mean scientific hypothesis as such but a derogatory expression of making assumptions without the needed empirical proof, from which the hypothesis is ought to be postulated. He refers to Newton's expression *hypotheses non fingo*, 'I do not feign hypotheses.' Even though hypotheses could have heuristic value, they could also hinder the scientific progress (cf. Maine de Biran 1986, VIII:20, 57–63). I find this to be the case of physiological *principles* Maine de Biran accuses of being purely hypothetical. Thus, unsound hypothesis is analogous to metaphysical *petitio principii*. This is the main reason Maine de Biran calls Stahl a metaphysician in a derogatory fashion and sees the promise of physiology in the works of Cabanis and Bichat.

4.3.2 Psychology

According to Maine de Biran, psychology is a philosophical science (Maine de Biran 1993b, XIII/1:91–92). It is that part of philosophy that focuses on the cognitive operations of human beings (Maine de Biran 1989a, X/2:8). One may think that psychology overlaps with philosophy. Maine de Biran himself opposes psychology to metaphysics (Maine de Biran 1986, VIII:14). By metaphysics,

Maine de Biran means such philosophies that have tried to provide the principles of knowledge in purely conceptual means. Psychology, instead, provides the principles of knowledge in empirical means. Thus, the question is about the starting point of philosophy: Maine de Biran opposes his empirical project of psychology against the conceptual projects of metaphysics. Here, the concept of *metaphysics* is used in a derogatory sense. In the first chapter, I defined Maine de Biran's own positive conception of metaphysics. Now it seems that I am claiming that Maine de Biran abandoned metaphysics altogether and replaced it with psychology. This is mainly correct, but we must acknowledge that we are dealing with an extensive body of manuscripts that are Maine de Biran's written documents of his developing and vivid thought.

We should not take the ambiguity between psychology and metaphysics as a major problem. In fact, the problem is only a matter of nomenclature. If we define *metaphysics* as the study of things in themselves, as it is generally defined, it will not get metaphysics very far. We may question the methods it uses, or whether it uses any, to achieve its object. Maine de Biran claimed that metaphysicians in general supposed to achieve their subject matter by concepts. According to Maine de Biran, this is nonetheless impossible, as we saw in the first chapter. In any case, metaphysics must presume *something* prior to itself, or as its medium, to proceed towards its object. Now the role of psychology emerges. For Maine de Biran, psychology is that which precedes the study of things in themselves. Psychology is the science that studies human cognitive capacities that enable philosophers to think even the possibility of absolute knowledge in the first place. (Cf. Maine de Biran 1986, VIII:14–15.) I acknowledge that psychology appears to cover most of philosophical research. As a result, one can easily mix philosophy and psychology up in reading Maine de Biran. However, I assume that I have now sufficiently explained the problematic situation of the concepts of *philosophy*, *metaphysics*, and *psychology*.

From these considerations we can approach psychology from a slightly different angle. Psychology is a part of philosophy, or it is its application. Psychology is applied because it is inseparably tied to physiology. Maine de Biran remarks that there is a 'science of soul' (*science de l'âme*), which understands human mind in a religious fashion, distinct from the organism and dealing with such issues as its eschatology. This is not the case with philosophical psychology, tied with physiology (Maine de Biran 1989a, X/2:1–2; 1986, VIII:68–69). To study the primitive facts of knowledge, philosophy needs physiological evidence. This application, or mixture, of philosophy and science makes it relevant to call this applied philosophy *psychology* (cf. Maine de Biran 1986, VIII:14; cf. Azouvi 1984, 163).

Some commentators have approached Maine de Biran's theory of psychology as a specific analysis, or decomposition, of human thought. For instance, Truman (1904, 42–43) and Couailhac (1905, 185) have divided Maine de Biran's psychology according to psychological phenomena into four distinct parts: affective, sensitive, perceptive, and interior, or reflective. However, I do not find such a classification to capture the proper idea of Biranian psychology. In relation to physiology and the given divisions in existing psychological research, psychology must adjust to ready-made distinctions and divisions. In fact, Maine de Biran's work aims to dispel unnecessary, arbitrary classifications and to find the common generative source.

While overemphasising the role of distinct psychological categories, Truman (1904, 22) has remarked Maine de Biran's unique method to formulate them: Maine de Biran's aim was to 'derive rather than postulate epistemological principles' from psychological facts. I accept Truman's expression with slight revisions. If *postulation* means the formulation of *petitio principii*, or unsound hypotheses, without the necessary proof, then Truman is correct when he says that Maine de Biran was not aiming at a postulation of principles. If *derivation* means a theory that explains something by generative explanation, Truman is again correct when he says that Maine de Biran aimed to derive the epistemological principles. In the light of Truman's remark, we could say that *psychology is a philosophical discipline that aims at the analysis of human knowledge by means of its generation*.

Now that I have distinguished psychology from metaphysics and defined it as a philosophical science, let us turn our attention to Maine de Biran's explicit characterisations of psychology. First, psychology is the 'science of the interior facts of human consciousness' (Maine de Biran 2001, VII/1–2:25). Expressed in the terms of the Prussian Academy of Sciences, psychology is the *science of principles* (Maine de Biran 2001, VII/1–2:2).[114] In such a psychological study of principles, Maine de Biran strove to overcome the divergences and apparent antinomies between philosophical schools (cf. Maine de Biran 2001, VII/1–2:11–21).

As a philosophical science, psychology utilises reflection (Maine de Biran 1993b, XIII/1:91–92). This means that psychology is *synthetic* and *rational* because it abstracts the principal fact of the interior sense from its association with the conscious perceptions or representations that accompany it. But psychology is

[114] Maine de Biran's main work on the idea of psychology was the *Essai sur les fondements de la psychologie*, which was his answer to the commission from the Academy (cf. Maine de Biran 2001, VII/1–2:1–11). For a short presentation of the Prussian Academy of Sciences, see the introductory chapter.

also analytic and experimental (albeit in a sense different from physical experimentation) because it needs to depart from composite facts of experience and arrive at their principles. Because its subject matter are the principles of human knowledge, it mainly delimits itself to the analysis of representations, ideas, and language, which are the matter of consciousness and thought. It is only through the reflection on the activity of consciousness that psychology can proceed to the principles of human knowledge. (Maine de Biran 1986, VIII:15.)

According to Maine de Biran, the methods that the empiricists had utilised apply well to physical objects but not to the interiority of human consciousness (cf. Maine de Biran 1995, IV:6–8). Bacon had divided psychological research into three divisions: 1) science of the soul or its substance; 2) science of the faculties of the soul; and 3) science of the usage and the objects of the faculties of the soul (Maine de Biran 2001, VII/1–2:21–22). Only the last two divisions make sense as cases of empirical science, because the psychological substance can be observed only via its manifestations. Thus, the first division would always be subordinate to the last two divisions in empirical inquiry. Bacon was one of the founding fathers of modern natural sciences, and his methodology of induction and analogy has played a crucial role in the development of the experimental natural sciences (cf. Maine de Biran 1986, VIII:163). However, this methodology is applicable only on science, not on philosophy (Maine de Biran 2001, VII/1–2:93–94).

According to Maine de Biran, it is futile to transport the methods of natural sciences to psychology, because 1) their subject matter of natural sciences differs in nature from psychological subject matter; 2) the classifications of the spatial properties of objects by analogy and resemblance do not apply to psychological capacities; and 3) the mechanical causal explanation differs from the generative causal explanation of psychology. (Maine de Biran 1986, VIII:5.)

As we saw, physiology is the study of organic nature; it studies human consciousness and cognitive faculties from the organic point of view. By contrast, psychology is the study of the *supra-organic* nature, or the nature of volitional activity and the highest cognitive faculties generated by volitional activity. (Maine de Biran 1986, VIII:13.)

I find it important to notice that the psychological study of one's *personality* imposes crucial ethical commitments. Psychology is closest to human personality of any field of research. The peculiarly personal nature of psychology commits the researcher to educate and cultivate his or her reflective cognition and its complementarity with scientific evidence. In addition, the researcher's typical vices are the inattention to and imprudent treatment of his or her research subject.

(Maine de Biran 2001, VII/1–2:59.)[115] The development of reflection is the development of one's personality, as well.

> One cannot in fact learn to master one's attention by fixing it on objects, by seeking to penetrate the bottom of things, to see all sides clearly, without thereby acquiring this empire of the self which is the source of all the great qualities of the soul, and of all the virtues that constitute the ornament of our species (Maine de Biran 2001, VII/1–2:59).[116]

Acquiring the 'empire of the self' is precisely the by-product of the development of reflection. In addition, references to Seneca's expression *imperare sibi maximum imperium est*,[117] and to Augustine and Antoine Arnauld's expression *certissima scientia et clamante conscientia*[118] enliven Maine de Biran's idea of the importance of psychological study. Reflection obligates the researcher to be right and just (Maine de Biran 2001, VII/1–2:61). In other words, he or she must, in a certain sense, become one with the object of cognition. Because he or she cannot depend on anything external, such as socially shared words, he or she must be one with himself or herself. He or she must be consistent, content with himself or herself. As Maine de Biran quotes a line from Horace: it is the restless life "that reconciles you with yourself" (Maine de Biran 2001, VII/1–2:61).[119]

4.3.3 Mixed sciences

Both physiology and psychology are *mixed sciences*. First, the subject matter of both sciences needs philosophical reflection to be properly understood. This makes physiology a slightly philosophical mathematical science and psychology a slightly mathematical philosophical science. Second, they need each other in understanding the cognitive and behavioural phenomena in humans and other animals.

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[115] This reminds me of Kant's definition of the 'pragmatic point of view' to the knowledge of a human being: the pragmatic point of view to human knowledge concerns 'the investigation of what he as a free-acting being makes of himself or can and should make of himself' (Kant 2006, 7:119). These remarks perhaps hint at the reason why philosophers (or psychologists, in Maine de Biran's sense) are considered as the voices of consciousness in their societies, having proficiency in the ethical, social, and educational issues (cf. Hansson 2008).

[116] 'On ne peut en effet apprendre à se rendre maître de son attention en la fixant sur les objets, en cherchant à pénétrer le fond des choses, à en voir nettement toutes les faces, sans acquérir par la même cet empire sur soi qui est la source de toutes les grandes qualités de l'âme, et de toutes les vertus qui font l'ornement de notre espèce.'

[117] 'The greatest power is to have power over oneself'

[118] 'by the most certain knowledge and a calling conscience [*sic*]'

[119] 'quid te tibi reddat amicum'

Before proceeding further, let us pause for a moment in Maine de Biran's definitions of *mixed* and *pure* disciplines. Considering mathematics, Maine de Biran defines *pure mathematics* as that which 'enjoys a degree of certainty or evidence relative to the perfect simplicity of its object' (Maine de Biran 2001, VII/1–2:50). [120] The nature of its objects 'puts it beyond the reach of the imagination and the senses' (Maine de Biran 2001, VII/1–2:50).[121] By contrast, *mixed mathematics* 'admits various heterogeneous elements, and loses in certainty what it gains of a sort of clarity relating to the sensitive phenomena, to which it applies' (Maine de Biran 2001, VII/1–2:50).[122]

The relationship between pure and mixed psychology is the same as between pure and mixed mathematics (Maine de Biran 2001, VII/1–2:50). However, I just defined psychology itself as a mixed science. Here, we must recall what I said in the previous section: Maine de Biran's use of the concepts of *philosophy*, *psychology*, and *metaphysics* is somewhat ambiguous. Here, pure psychology appears to mean philosophy – but does it, really? To clarify this problematic meaning of *mixed*, let us briefly consider the concept's more general history.

According to Maine de Biran's contemporary Pierre Prévost (1751–1839), the term *mixed science* means that reasoning and facts are so intermingled that '*these two means of clarity* accompany each other throughout the course of the research in which these sciences engage' (Prévost 1804, 14, my emphasis).[123] *Mixed* thus means that in order to clearly understand the observed facts, human thought needs to mix and bring together several modes of knowledge. In other words, the clarity of objects conditions the theoretical or disciplinary clarity. From this we can imply two ideas. First, pure science and pure philosophy have no clear objects. Second, certain clear facts need highly *impure*, or *mixed*, disciplines. The appearance of the concept of *mixed* dates quite precisely to the early modern period. Today, we would perhaps talk of applied instead of mixed sciences. For instance, there are clear facts, such as learning, that need several different theoretical and practical disciplines to become well understood, such as psychology, neuroscience, and didactic methods. Thus, there is a multidisciplinary element in the human science and in mixed or applied sciences.

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[120] 'jouit d'un degré de certitude ou d'évidence relative à la simplicité parfaite de son objet'

[121] 'le met hors de la portée de l'imagination et des sens'

[122] 'admet divers éléments hétérogènes, et perd en certitude ce qu'elle gagne une sorte de clarté relative aux phénomènes sensibles à qui elle s'applique'

[123] '*ces deux moyens de clarté* s'accompagnent mutuellement dans tout le cours des recherches auxquelles ces sciences se livrent'

The usage of the term derives from Bacon, and it was tied to the pure mathematics and its application (Brown 1991, 82; cf. Slavov 2017). According to Brown,

> some eighteenth-century 'geometers' advocated a view of how to apply mathematics to solve problems in areas that included mechanics, astronomy, and the 'moral sciences.' This view, extended to the notion of 'rational thinking' and how individuals can be 'enlightened,' was called 'mixed mathematics.' The term 'mixed mathematics' seemed to have its origins around 1600 and appeared in [Jean-Étienne] Montucla's [1725–1799] *Histoire des Mathematiques* (1799). The term seemed to decline in usage during the nineteenth century and was replaced by 'applied' mathematics in the ninth edition of the Encyclopedia Britannica. (Brown 1991, 82.)

After Bacon, d'Alembert, an important developer of the *human science*, was the most important figure in the development of *mixed mathematics* (cf. Brown 1991, 84). In the nineteenth century, the term *mixed mathematics* was replaced with *applied mathematics*, for intellectual and political reasons (Brown 1991, 100–103).[124]

Considering the wider usage of the concept of *mixed* throughout intellectual history, I find Maine de Biran's own use of the concept to follow its widespread use at that time. Maine de Biran deals with four different factors: 1) pure discipline, 2) mixed discipline, 3) imagination, and 4) pure abstraction. The object of a pure discipline are pure abstractions. The object of a mixed discipline are the objects of imagination. Whether the phenomenon is clear for imagination, such as an organ, it may not be clear for human knowledge as such. It needs coordinated multidisciplinary research that adapts itself to the object.

There is some imprecision in previous scholarship concerning Maine de Biran's theory of the two orders of disciplines. According to Azouvi (1995, 138), physiology itself is a mixed science situated between pure science (physics) and psychology (philosophy). For Truman (1904, 66) and Tisserand (1909, 164), the pure forms of reason are psychology and mathematics. These conflicting divisions need to be refined slightly. Physiology indeed is a mixed scientific discipline, but it is a mixed form of mathematics and metaphysics resting on the ontological basis of living organisms. Furthermore, physics and psychology are not pure science and pure philosophy, respectively; only pure disciplines are mathematics and metaphysics. (Cf. Truman 1904, 66.) Although the purest

[124] For example, 'the first periodical for mathematics, *Annales de mathématiques pures et appliquées*, edited by [Joseph] Gergonne [1771–1859], was published in 1810 and had obviously replaced the word "mixed" with the word "applied"' (Brown 1991, 100).

empirical disciplines are physics and psychology, they have already 'descended' from mathematics and metaphysics in order to accommodate to observed phenomena.

Azouvi (1995, 155) nevertheless is almost correct in noting that the goal of human science is to minimise the natural difference between physiological and psychological orders of phenomena between special sciences. I find it useful to note that the point of minimising the natural difference between physiological and psychological phenomena is slightly misleading characterisation, because the question indeed is about natural differences and not about differences in degree; thus, the task of human science cannot be the minimisation of distances but a sort of harmonisation, or consolidation of different forms of knowledge under common object. In other words, human science as a multidisciplinary project brings together the results of its constituent special sciences and coordinates their work on the common research subject, that is, the human being. (Cf. Maine de Biran 1986, VIII:25–26; 1990, XI/3:83.)

Human science as a research program that brings together and coordinates knowledge and research is Maine de Biran's answer to a problem of finding the starting point for philosophy. With such a research program the danger of committing to an unsound hypothesis, or a *petitio principii*, is diminished (Maine de Biran 1986, VIII:68–69). But how and where do the different forms of knowledge, produced by different fields of research, meet? At the term of these four chapters on Maine de Biran, it is clear that no system of concepts fulfils this unitary, communicative, and consolidating task.

I propose that the meeting place of symbolically incommensurate knowledge is the reflective cognition of philosophers. Maine de Biran depicts the task of a philosopher as follows:

> The sciences are only made up of our ideas and their various *relationships*. These ideas form like an immense and infinitely varied country, divided into a multitude of districts, cut by a greater number of communicating routes. While the traveling scientists disperse in these districts, come and go along these roads, the ideologist, placed on a beacon as if stationary, observes their directions and takes notes to *map*. From there, he sometimes knows the paths better than the travelers themselves, that he can provide them with useful indications and, in a way, *guide* them. But all these roads have an origin; most of them even start from a common point and then diverge. It is this origin, these common points, usually ignored by

travelers, that the ideologist deals with in order to teach [the travelers]. (Maine de Biran 1988, III:8–9.)[125]

Without someone tracking the cognitive thread of Ariadne, so to speak, the different special sciences would become incommensurate by mixing their symbols with one another. For Maine de Biran, science needs philosophy as much as philosophy needs science. Philosophy, 'which has the task of reaching to [the] origin, to [the] truly *generative* forms, alone can . . . deepen and strengthen the faltering foundations of certainty, . . . replaces the definitions of words with the definitions of things, paralogisms with rigorous demonstrations.' (Maine de Biran 1988, III:10.)[126] The necessity of philosophy depicted here was the task of this part of the dissertation.

4.4 Summary

In this chapter, I developed to Maine de Biran's ideas on the nature of philosophy and science and their complementary relationship.

I clarified Maine de Biran's general scheme of scientific knowledge formation, which we saw as a modified version of Pierre Prévost's theory. For Maine de Biran, the scheme of scientific knowledge formation comprises three steps: 1) observation, 2) classification, and 3) postulation of laws. As we saw, Prévost attributed one further step for science, that is, the search for final causes, which Maine de Biran reserves exclusively for philosophy.

As I hinted in the first chapter, the subject matter of philosophy coincides with the reflective activity of the philosopher's personality. The methodology proper to this kind of research necessarily differs from scientific methodology. I pointed out that Maine de Biran was not explicit in his theory of philosophical

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[125] '[L]es sciences ne se composent que de nos idées et de leurs divers *rapports*. Ces idées forment comme un pays immense et infiniment varié, partagé en une multitude de districts, coupé par un plus grand nombre de routes de communication. Pendant que les savants *voyageurs* se dispersent dans ces districts, vont et viennent dans ces routes, l'idéologiste, placé sur une éminence et comme immobile, observe leurs directions, et tient note, en dresse la *carte* : de là, il arrive que souvent il connaît mieux les chemins que les voyageurs eux-mêmes, qu'il peut leur fournir d'utiles indications et en quelque sorte les *orienter*. Mais toutes ces routes ont une origine ; la plupart même partent d'un point commun pour diverger ensuite ; c'est cette origine, ces points communs, ordinairement ignorés des voyageurs, que l'idéologiste se charge d'apprendre [les voyageurs].'

[126] 'qui a pour fonction de creuser jusqu'à [l']origine, jusqu'à [les] formes vraiment *génératrices*, pourra seule . . . approfondir et raffermir les bases chancelantes de la certitude, . . . substituer des définitions de choses à des définitions de mots, des démonstrations rigoureuses à des paralogismes'

methodology, and his terminology shifted between the methods of philosophy, psychology, and metaphysics. I clarified this conceptual ambiguity by assigning psychology as the empirical part of the starting point of philosophy, replacing the logical and conceptual basis of philosophy.

Finally, I dealt with Maine de Biran's multidisciplinary theory of human science, which gathers and coordinates the scientific and philosophical disciplines especially concerning the human cognitive capacities. I found certain issues to address and clarify in Maine de Biran's theory of human science, such as the definition and the division of labour between psychology and philosophy. The first of these issues was the nature of and the relationship between physiology and psychology. The second issue was the elaboration of the concept of *mixed science*, which in Maine de Biran's time was roughly equivalent with our concept of applied science. This chapter completes the aims of this dissertation considering Maine de Biran. In the next part of the dissertation, I will explain Bergson's theory of the generative explanation of knowledge.

PART III: HENRI BERGSON

5 NATURAL DIFFERENCES OF COGNITIVE CONTENT

In this chapter, I will lay out the key preliminary topics related to the proper understanding of philosophy and its problems in Henri Bergson's theorisation. I start by locating the main problems in the history of philosophy that touch upon the nature of metaphysical knowledge. For Bergson, all the main problems in philosophy have originated in the neglect of two sources of knowledge. This neglect has caused philosophy to be placed into the same mode of knowledge-formation with science. I will explain this problematic with the help of an analysis of the nature and function of the human mental content and by showing the nature and function of language and general ideas in Bergson's theorisation. This helps us locate the proper starting point of the philosophical knowledge.

5.1 The starting point of philosophy

I will start by explaining Bergson's idea of the starting point of thought on which philosophy rests. Bergson's general scheme is that there are no primitive or ultimate principles in reality, or that such principles cannot be taken for granted, and that although immediate experience is the only concrete experience humans have, it needs to be understood correctly. Let me first explain the role of immediate experience by starting from a classical philosophical set of paradoxes.

It is generally recognised that Bergson locates the birth of metaphysics in the paradoxes of Zeno of Elea (c. 495 – c. 430 BCE). He states his point clearly as follows: 'Metaphysics dates from the day when Zeno of Elea pointed out the inherent contradictions of movement and change, as our intellect represents them'[127] (Bergson [1934] 2013, 8, cf. 156–157; cf. [1907] 2013, 308). He returns to this point several times in his work (cf. Bergson [1896] 2012, 213–214; [1889] 2013, 84; [1922] 2013, 72; [1919] 2017, 156). Bergson probably had in mind the three most important paradoxes of Zeno: the dichotomy paradox, the paradox of Achilles and the tortoise, and the arrow paradox.

The idea of the dichotomy paradox is the following: to finish the running track, a runner needs first to run a half of the track. But to run half, she needs to run a quarter of the track, and before that, one-eight, and so on. Ultimately, in order to finish the running track, her progress ends up in an infinite regress right from the start, because in order to run even an infinitesimal length, she needs to run a half of it, ending up in a situation in which the first aimed movement is already divided by infinity.

[127] 'La métaphysique date du jour où Zénon d'Élée signala les contradictions inhérentes au mouvement et au changement, tels que se les représente notre intelligence.'

The paradox of Achilles and tortoise repurposes the same logic in a similar setting as in the dichotomy paradox. Achilles can never catch up and run ahead of a tortoise who starts the running contest from the halfway point of the track. When Achilles has reached the tortoise's starting point, the tortoise has already moved forward a small distance. Thus, in any given moment T_n, Achilles needs to reach the tortoise's old position, resulting in an infinite regress in which Achilles merely closes in on the tortoise by approaching an infinitely small distance to it, but never reaching the tortoise entirely.

The arrow paradox is a bit different from the other two paradoxes. According to LePoidevin (2002, 57), the arrow paradox 'presupposes . . . that there are instants, as well as periods, of time; and that things move, if at all, at instants.' Thus, if an arrow moves from an instant (T_1) to another (T_2), it ends up proceeding through an infinite number of instants. Whatever is the rate of movement from one instant to another, movement could not occur, because the arrow should proceed through an infinite number of instances between any given duration.

There is no dispute that these paradoxes are not depicting the matters of fact: runners are finishing their tracks, objects pass each other, and arrows hit their target. Why then did Bergson credit Zeno as the founder of metaphysics, if these examples are so self-evidentially false? According to François (2013b, 309), Zeno's importance lies in the fact that metaphysics began at the moment when intelligence, which is the cognitive capacity for action, was taken as a cognitive capacity for speculation.

According to Bergson, insurmountable problems in metaphysics were caused by a confusion which consisted in speculating about temporal phenomena by the means of their spatial expressions. This insurmountable difficulty made metaphysicians regard movement and change as degradations of some immutable, perfect reality, and they erected metaphysical systems that would achieve the eternal nature of true reality. (Bergson [1934] 2013, 8.) Unfortunately, from the philosophical systems' point of view, time and experience started to gnaw at them from the very moment they were erected, regardless of their monumentality, or detailed ornamentation. Instead of wasting its time on conceptual monuments, could philosophy have an opportunity to follow the course of things in reality without abandoning its theoretical, or speculative, nature that has always more or less considered to characterise it? (Cf. Bergson [1934] 2013, 8–9.)

For Bergson, Zeno's paradoxes reveal the incommensurability between human understanding and concrete facts of experience. Zeno's paradoxes 'acquire a high value when one draws from them what is in fact there, the impossibility for our understanding to reconstruct *a priori* movement, which is a

fact of experience.' (Bergson 1908, 33.) [128] Thus, Zeno's paradoxes are a paradigmatic example of the pseudo-problems that the translation of temporal phenomena into spatial phenomena causes. Thus, the point of the paradoxes of Zeno of Elea are to give a comprehensive and intuitive example of the human intellect's natural incomprehension of time as movement and change (cf. Bergson [1934] 2013, 202–206). 'It is the philosophers who are mistaken when they transport into the domain of speculation a method of thinking which is made for action' (Bergson [1907] 2013, 156). [129] This translation has caused problems especially in philosophy and in the life sciences and psychological sciences. In other words, there has been a confusion between *epistemology* and *ontology*, *praxis* and *theoria*.

Bergson was not the only one taking an acute interest in Zeno's paradoxes in the late nineteenth century. In fact, Zeno's paradoxes were a topic of wider interest. Let us elaborate a bit on the historical significance of Zeno's paradoxes in the end of the nineteenth century. During that time, several philosophers and mathematicians interpreted Zeno's paradoxes, such as François Evellin (1835–1910), Charles Dunan (1849–1931), and Paul Tannery (1843–1904). Dunan briefly reviewed all the key discussions on Zeno's paradoxes in *Les arguments de Zénon d'Élée contre le mouvement* (*The Arguments of Zeno of Elea Against Movement*; 1884). Tannery clarified the central idea of the paradoxes in 'Le concept scientifique du continu: Zénon d'Élée et Georg Cantor' ('The Scientific Concept of Continuity: Zeno of Elea and Georg Cantor;' 1885). According to him, Zeno's central point was to argue against a Pythagorean idea that *a point is unity in position*. Cajori (1915) puts it as follows: 'According to Tannery, Zeno did not deny motion, but wanted to show that motion was impossible under the conception of space as the sum of points.'

Georg Cantor (1845–1918) has interpreted that Zeno's paradoxes are classical examples of arguments against plurality of things and movement (Cantor 1984, 2:455–456). Evellin has put Cantor's interpretation as follows:

> If the moving body at each instant of duration occupies a new point in space, it is at each instant in a space equal to itself, and yet it is moving; because it never has any interval to cross, because nowhere do we find it between two points, even infinitely close together. It therefore has no need to constantly extend itself, to expand according to our imagination, or

[128] 'acquièrent une haute valeur quand on en tire ce qui s'y trouve en effet, l'impossibilité pour notre entendement de reconstruire *a priori* le mouvement, qui est un fait d'expérience'
[129] 'Ce sont les philosophes qui se trompent quand ils transportent dans le domaine de la spéculation une méthode de penser qui est faite pour l'action.'

> rather to duplicate itself by simultaneously occupying, in order to move forward, several points in space. (Evellin 1880, 94.)[130]

Summing up the preceding considerations from the eminent mathematicians and philosophers, it seems likely that Zeno's idea in his paradoxes is a paradigmatic case of the most crucial antinomies in the history of philosophy, namely, unity and multiplicity, space and time, and quality and quantity.

As Cantor (1984, 2:455–456) had pointed out, one of the issues in Zeno's paradoxes was the problem of whether the objects of experience are unities or multiplicities. According to Bergson, some philosophers took the plurality of things, and reality as a whole, as the starting point of philosophy; others took the unity of things and reality as the starting point of philosophy. I will briefly consider these two groups insofar as they are relevant according to my present aim. The following should not be taken as an exegesis of philosophers mentioned by name; for Bergson, they are merely personifications of certain philosophical tendencies of thought. (Cf. Bergson [1907] 2013, 187–193.)

The first group of philosophers have taken reality to be fundamentally multiple. There is thus a gradual synthesis, that is, association, of parts towards increasing complexity. Bergson sees Herbert Spencer's philosophy as a specimen of the nineteenth-century *synthetic* philosophy, as Spencer himself called his philosophy. Bergson saw Spencer's theory to face its most challenging problems in biological evolutionary change. According to Bergson, Spencer's philosophical method consists in reconstructing evolutionary change from the already evolved, that is, the products of evolution generalised by human intelligence (Bergson [1907] 2013, 363). Furthermore, Spencer's philosophy takes intelligence and matter, the former being the form of thought cognising the latter as that which he considers being constituted every living phenomenon, that is, intelligence itself, as granted. He does not pay attention to the fact that those objects and relations of experience that he sees in matter are already processed by intelligence. (Bergson [1907] 2013, 189.)

The second group of philosophers have taken reality to be fundamentally a unity. Change, or evolution, was for them merely a gradual progression towards the realisation of this unity. Bergson argues that these philosophers also accepted the same idea of a single form of knowledge and a single form of existence. Such

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[130] 'Si, à chaque instant de la durée, le mobile occupe un point nouveau de l'espace, il est à chaque instant dans un espace égal à lui-même, et cependant il se meut; c'est qu'il n'a jamais aucun intervalle à franchir, c'est que nulle part nous ne le surprenons en l'air entre deux points, même infiniment rapprochés; il n'a donc nul besoin de s'étendre comme tout à l'heure, de se dilater au gré de notre imagination, ou plutôt de se dédoubler lui-même en occupant simultanément, pour avancer, plusieurs points de l'espace.'

monistic philosophy replaced the 'successive degrees of complication' of Spencer's synthetic philosophy of matter, life, and thought with the 'gradual realisation of an Idea,' or with the 'gradual objectification of a Will.' The former refers to G. W. F. Hegel (1770–1831) and the latter to Arthur Schopenhauer (1788–1860) (Bergson [1907] 2013, 361). Such philosophy operates with the degrees of realisation of a certain factor x, which, as an explanatory model, does not differ from the synthetic conception of gradual complication.

In short, it matters little, if evolution is understood to proceed either by ontological mechanism or by ontological teleology. By *ontology*, I simply mean that mechanism and finalism are taken as inherent properties of evolution and reality instead of being, for instance, scientific causal explanations. The scientific method has proved mechanistic causal explanation to be the *modus operandi* of scientific explanation, and teleology, or finalism, is by and large abandoned as a scientific explanation, although not entirely. It is not important here to discuss the role of teleological explanation; scientific explanations prove their importance by having explanatory power and reliability. In fact, it is not important here to discuss scientific explanations at all. Our present task is to consider philosophical explanations. Notwithstanding, it matters little, if a philosopher claims that evolution from its origins to human species is effectuated either through matter's tendency to come together and complicate or by a gradual realisation of a metaphysical Will, or divinity. Neither of these ontologies provide hardly any useful material for scientists, or other philosophers. In fact, scientists would nevertheless commit themselves to mechanistic causal explanation regardless of the ontological status of evolution expressed by a philosopher, because it is such a powerful method (cf. Bergson [1907] 2013, 361–362).

In fact, before we speculate about the things in reality, should we not focus first on the capacities which we use to speculate about the things in reality? According to Bergson, the problems caused by unity and multiplicity are the products of the nature of human intelligence that are projected onto things in themselves. In fact, what even is *matter*?

The objects we see as things, or relations between things, are a constant interaction of the reality within itself (Bergson [1907] 2013, 189–190). This is a highly general depiction of matter, but it should please our ordinary intuition of matter. However, philosophers have figured out different theories of matter, one of which is the so-called atomism. Atomism was a prevalent view on matter in the early modern period, and it continued to dominate the general scientific and philosophical picture of matter until the nineteenth century (cf. Einstein 1940, 488). One powerful doubt against atomistic theory of matter was expressed by Michael Faraday (1791–1867) in his article 'A Speculation Touching Electric Conduction and the Nature of Matter' (1844). Nevertheless, from Faraday's

doubt through Bergson's time (cf. Thomson 1909, 90–139) to the present day, one fact has become evident: matter, *a fortiori* atoms, are nothing like that which early modern atomists thought they were. Moreover, matter and energy are two different manifestations of the same physical reality (cf. Einstein 1905).

Another fact is indeed that atoms are not the primitive stuff of reality. However, Spencer understood them as such, and he began to synthesise reality starting from the common-sense view on atomic matter (Bergson [1907] 2013, 364). For Spencer, matter comprises indefinite solid particles, the simple bodies, which are disseminated throughout space. Spencer's error was to confuse useful schematic concepts with the products of nature, to confuse the convenient *tools* of understanding with the objects of understanding *themselves*. If Spencer had lived in the twenty-first century and committed to his method, what would his starting point be? He would have a hard time getting a grip of the present standard model of elementary particles. Moreover, biologists, even molecular biologists, may have no idea of the basic principles of elementary particles, and still, they proceed admirably in discovering the secrets of life in atomic level.

How is the success of biology possible without the knowledge of the primary basis of reality? The fact is that there is no primary basis of reality, or if there is, it is not yet known, and even though it is not yet known, science and philosophy of things apparently do not need such knowledge. Human thought does not start either from the beginning of things or from the understanding of their final purpose. It starts from the middle of things, from a multitude of phenomena. It continues by searching for the *whys* and *hows* of things. Being systematic and coherent, this search becomes increasingly more comprehensive and starts to reflect the states of things. This is the starting point of science (cf. Einstein 1940, 487). It is also the starting point of philosophy, but the direction of philosophy does not proceed to systematise observation. It proceeds towards the cognition that generates the intellectual capacities of observation. It is its first step. Bergson depicts the first step of philosophy figuratively as follows:

> Human intelligence, as I picture it to myself, is not at all what Plato showed us in the allegory of the cave. Its function is no more to watch vain shadows pass by than to contemplate the dazzling sun turning around behind it. It has something else to do. We are harnessed like oxen to a heavy task, we feel the working of our muscles and joints, the weight of the plough and the resistance of the ground: to act and to know how to act, to come into contact with reality and even to live it, but only to the extent that it is relevant to the work that is being done and the furrow that is being dug, that is the function of human intelligence. Yet a beneficial fluid bathes us, whence we draw the very strength to work and live. From this ocean of life, in which we are immersed, we constantly aspire to

> something, and we feel that our being, or at least the intelligence that guides it, has been formed there by a kind of local solidification. Philosophy can only be an effort to blend back into the whole. The intelligence, resorbing itself in its principle, will relive backwards its own genesis. But the enterprise will no longer be able to end all of a sudden; it will necessarily be collective and progressive. It will consist in an exchange of impressions which, correcting each other and also superimposing themselves on each other, will end up dilating the humanity within us and making it transcend itself. (Bergson [1907] 2013, 192–193.)[131]

The neglect of the existence of two sources of knowledge has caused philosophical theories to confuse the methodology and proper formation of knowledge between philosophy and science (Bergson [1934] 2013, 189–191). Bergson even attests that the philosophical schools and dichotomies are the *symptoms* of the confusion of philosophy and science (cf. Bergson [1934] 2013, 190). The methodological confusion in metaphysics arises from the illusion of the nature of human experience (Bergson [1896] 2012, 205). This illusion is that human consciousness confuses its spatial representations with real temporal movement or change (cf. Bergson [1934] 2013, 202). If human intelligence *represents* phenomena spatially, phenomena are *relative to that mode* of representation. If human intelligence could understand phenomena in another way, in themselves, this knowledge would not be relative but absolute. Thus, if the definition of philosophy is the science of absolute knowledge, then, by definition, philosophy is not representational knowledge.

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[131] 'L'intelligence humaine, telle que, nous nous la représentons, n'est point du tout celle que nous montrait Platon dans l'allégorie de la caverne. Elle n'a pas plus pour fonction de regarder passer des ombres vaines que de contempler, en se retournant derrière elle, l'astre éblouissant. Elle a autre chose à faire. Attelés, comme des bœufs de labour, à une lourde tâche, nous sentons le jeu de nos muscles et de nos articulations, le poids de la charrue et la résistance du sol : agir et se savoir agir, entrer en contact avec la réalité et même la vivre, mais dans la mesure seulement où elle intéresse l'œuvre qui s'accomplit et le sillon qui se creuse, voilà la fonction de l'intelligence humaine. Pourtant un fluide bienfaisant nous baigne, où nous puisons la force même de travailler et de vivre. De cet océan de vie, où nous sommes immergés, nous aspirons sans cesse quelque chose, et nous sentons que notre être, ou du moins l'intelligence qui le guide, s'y est formé par une espèce de solidification locale. La philosophie ne peut être qu'un effort pour se fondre à nouveau dans le tout. L'intelligence, se résorbant dans son principe, revivra à rebours sa propre genèse. Mais l'entreprise ne pourra plus s'achever tout d'un coup ; elle sera nécessairement collective et progressive. Elle consistera dans un échange d'impressions qui, se corrigeant entre elles et se superposant aussi les unes aux autres, finiront par dilater en nous l'humanité et par obtenir qu'elle se transcende elle-même.'

What if human cognition already had the capacity to understand temporal phenomena in such a way that conceptual intelligence could not? Here, the positive attributes of time, and the positive results of the modes of non-conceptual cognition, become interrelated. They reciprocally prove each other's existence, because the positive attributes of time cannot be cognised without the mind of non-conceptual cognition. I suggest that all Bergson's main works develop their specific point of view on the positive attributes of time that reveal themselves in specific themes that intersect perennial philosophical questions and scientific research: free will, mind–body problem, evolutionary change, and moral obligation. However, it is not the task of this dissertation to analyse these themes individually.

Somehow this form of cognition can understand *organisation*, that is, a certain unity in change, or a generation in development, so that, even though there is change, there is also, or because of this, some organising unity. These organising things are impossible to express in conceptual translations, but it is possible to obtain a distinct and assertive cognition of them. Thus, there must be another mode of cognition. To clarify this setting, let us analyse Bergson's views on active cognition and general ideas, which are the two most immediate examples of the duality of cognitive modes.

5.2 Non-conceptual intellectual effort

Bergson's theorisation of the intellectual effort gives us the precise context in which we can move forward in attesting the nature of knowledge according to its sources and generation.

The most immediate and obvious fact given to consciousness is conscious awareness itself. In fact, one's own enduring consciousness is the most immediate object in reality of which human consciousness can have a non-conceptual reflection (Bergson [1934] 2013, 182). Consciousness is both variety and unity; it is both continuity and discontinuity; it is accumulation and stretching. Bergson emphasises that '[t]he inner life is all [these images] at once, a variety of qualities, a continuity of progress, a unity of direction. It cannot be represented by images.' (Bergson [1934] 2013, 185.)[132] To be clear, it is not a problem that the essence of personality is not attainable with images – it is the whole point of its philosophical, metaphysical, and epistemological relevance, as we will see in the course of the following chapters.

[132] 'La vie intérieure est tout cela à la fois, variété de qualités, continuité de progrès, unité de direction. On ne saurait la représenter par des images.'

What is the origin of these non-conceptual aspects of consciousness? According to Bergson, it is memory. Consciousness entails the existence of memory, because consciousness is the preservation of the past in the present; consciousness is the continuous accumulation of memory. At the same time, consciousness is the anticipation of future, and anticipation entails the faculty of attention. (Bergson [1919] 2017, 5, 55.) Here are the generative elements of all the tenses of past, present, and future. Every concrete talk about the idea of past and future is, in other words, the present talk of memory and anticipation. Put in other words, attention is the utilisation of memory by conscious volition.[133] Thus, all the problems that involve the active use of mental content must be formulated taking into consideration both *memory* and *attention*. Let us summarise Bergson's theorisation of the function and purpose of human cognition with the analyses of attention and memory, of which the former is the most conscious cognitive activity, and the latter is the matter of all cognition.

Let us first consider *attention*. Attention means the act according to which memory-images are regularly united with present perception (Bergson [1896] 2012, 107). Bergson gives a more analytic definition, as well, drawing from several contemporary publications. First, the function of attention is to intensify perception and spread out its details, its role being the magnification of the intellectual state (Marillier 1889; Bradley 1886). On the other hand, there is an essential difference of form between the intensity of attention and the intensity of external stimulus. Bergson speculates that the intensity of attention seems to be a sort of intellectual attitude. However, Bergson notes, an 'attitude' of intelligence is an obfuscating expression, and there can be no distinct idea for that kind of phenomenon. Philosophers and scientists have tried to conceptualise this obscure idea by coining terms such as the *concentration of consciousness* (Hamilton 1860, 247–248), or the *apperceptive effort* (Wundt 1887) that brings the perception that is paid attention to into the distinct intelligence.

However, instead of approaching attention either as the association of memory images or their intensification, Bergson invokes an idea of *schema*. The schema is characterised by its progressive or developing nature: 'Here, the progress is obviously only a growing ability to make all ideas, all images, all words converge on a single point' (Bergson [1919] 2017, 161).[134] This point is like a piece of gold, of which all the words and representations are but cash. This point is what Bergson calls a *dynamic schema* (*schéma dynamique*; Bergson [1919]

[133] Cf. Benedek & Fink (2019, 117): '[T]hinking about the future recruits very similar brain regions as recalling past events.'

[134] 'Le progrès n'est évidemment ici qu'une aptitude croissante à faire converger toutes les idées, toutes les images, tous les mots sur un seul point.'

2017, 161). It differs in nature from those representations that express it. In other words, even if it is denoted by a sign that represents a concept, it still differs from conceptual knowledge. Bergson affirms that the dynamic schema is difficult to define, but he asserts that every person has some experience of possessing such schemas, especially in the cases of 'technical and professional memories,' such as those of chess players, as Alfred Binet (1857–1911) and Hippolyte Taine (1828–1893) have pointed out before him (Bergson [1919] 2017, 162–163).

Two essential factors of the dynamic schema are: 1) its tendency towards unity and 2) its richness, which comes from the intellectual effort. However, the direction of this tendency to unity is not abstract; it is 'the unity of life itself.' (Bergson [1919] 2017, 185–186.)[135] Ribot calls this 'unity' a 'master idea attracting all that is related to it . . . allowing associations to occur only within very narrow limits and on condition that they converge towards the same point' (Ribot 1889, 6). [136] He specifies that this convergence towards the same point signifies that the unity is only relative to the convergent movement. Bergson is generally in accord with Ribot. According to Bergson, the elements of schema are like 'directions of effort' that the cognitive process follows (Bergson [1919] 2017, 165). They develop a simple, or at least a concentrated, schema from more or less heterogeneous elements into an image without which the homogeneous images would only follow each other through preformed habits (Bergson [1919] 2017, 166).

I find it useful to pause on concisely elaborating the nature of the dynamic schema in neuropsychological and cognitive research. Even though the following definitions are addressed by cognitive neuroscientists, they help us contextualise Bergson's concept of *schema* in terms of current research on cognitive elements and introduce some essential remarks for our present task (cf. Frank et al. 2018, 352). The current general neuroscientific definition of the concept of *schema* is the following: '*A framework of acquired knowledge, skills or attitudes implemented within a network of connected neurons in which memory traces of associated information have been stored that, when activated, can alter the manner in which new information is processed, including memory encoding, consolidation and retrieval*' (Fernández and Morris 2018, 657).[137] Put in other words, schemas incorporate existing memories into meaningful and organised patterns (Hasan et al. 2019, 11758).

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[135] 'l'unité même de la vie'

[136] 'idée maitresse attirant tout ce qui se rapporte à elle . . . ne permettant aux associations de se produire que dans des limites très étroites et à condition qu'elles convergent vers un même point'

[137] However: 'Particularly lacking are insights into how schemas themselves are constructed and accommodated, as most research focuses on assimilation of new information' (Gilboa and Marlatte 2017, 629).

According to these definitions, a schema increases the flexibility of knowledge and skills, and thus it enables cognitive fluidity. According to King et al. (2019, 963), 'fast integration of new motor information into pre-existing memory is necessary for many daily activities.' Frank et al. (2018, 352) have observed that 1) the performance of memory improves when the memorised representations can be assimilated into an existing schema, and 2) representations gathered in a schema are better recognised and recalled than representations that are not gathered in a schema.[138] Moreover, eye-tracking studies have indicated that the consolidation of representations into a schema involves an increased cognitive effort. The schemata are 'stored in the neocortex that *encompass* knowledge abstracted from previous experiences' (King et al. 2019, 963, my emphasis). Schemata 'are sustained within a defined context' (Gilboa and Marlatte 2017, 622). In addition to flexibility and fluidity, a schema can also increase the accuracy of cognition. A schema can 'greatly impact the extent to which retained representations resemble the original events' (Gilboa and Marlatte 2017, 625).

The concept of schema reveals important aspects of the non-conceptual *substratum* of consciousness, which is memory. There are several lines of evidence that converge towards the fact that 'memory is a dynamic brain function that continues to be processed after encoding rather than being stored' (cf. Hasan et al. 2019, 11758). One supporting evidence of this dynamic function of memory is the observation that memory has a self-generating ability to 'dynamically create meaning by itself' (Hasan et al. 2019, 11758). As Benedek and Fink (2019, 117) put it, memory is a constructive and reconstructive process that generates novel representations. Further still, the study of King et al. (2019, 976) has indicated that 'new motor information can be incorporated into preexisting memory without any cost to the consolidated memory trace of the learned material. This is consistent with recent results showing that newly acquired and older motor memories can coexist.' (Cf. Szegedi-Hallgató et al. 2017.)

Indeed, this 'coexistence of memories' indicates that old and new memories can coexist in different configurations. Furthermore, same memories can function within indefinite reconfigurations. Bergson had similarly theorised about different 'systematisations,' or *planes of consciousness* (*plans de conscience*; Bergson [1896] 2012, 188–189). These planes of consciousness are particular experiential configurations of memory (Bergson [1919] 2017, 159). This concept highly resembles recent theorisations in cognitive neuroscience. The relevant aspect of these planes in our present task of analysing Bergson's concept of *schema* is that

[138] In fact, if attention disturbs, an experienced object, even though familiar, creates a distinct memory trace (cf. Sahakyan and Malmberg 2018, 153).

intellectual effort means movement between these planes of consciousness (Bergson [1919] 2017, 159). 'To work intellectually consists in leading the same representation through different planes of consciousness in a direction that goes from the abstract to the concrete, from the schema to the image' (Bergson [1919] 2017, 176–177).[139] Let us concentrate on this aspect of movement.

The intelligent activity that makes the effort 'consists in a movement of the mind back and forth between perceptions or images, on the one hand, and their *signification*, on the other' (Bergson [1919] 2017, 169). [140] However, the comprehension of this signification is not the comprehension of symbols, for instance words in a textbook, but the signification which the words *symbolise*. Only the cognitive content itself can have signification. By analogy, one really understands the mathematical equation, when one knows how and why the symbols are put like they are put in a textbook – what is to be done with them. (Cf. Bergson [1919] 2017, 169–170.)

Learning mathematics or doing mathematical calculations, clearly reveals the cognitive process among symbols. One cannot be said to understand a calculation without doing the calculation and providing the solution. All the symbols are signs that direct the actual thought process, but mathematical thinking itself happens in the calculating person's mind: the thinking itself is non-conceptual, but it uses concepts as its convenient tools. All the meaningful cognitive content must be engendered and recreated in every individual's consciousness. All symbolic knowledge functions similarly to mathematical symbols: they direct and give rise to memories, that is, the cognitive content that we already bear within us. In fact, ordinary situations in human life are so habitual and memories so consolidated, that the role of memory may hide behind the automatism of everyday actions. Nonetheless, human experience is almost entirely memory. (Bergson [1919] 2017, 169–171.)

Intellectual effort is the movement of the dynamic schema, that reconfigures the old configurations of memory (Bergson [1919] 2017, 173–174, 187). This reconfiguration needs a proper sign that Bergson calls *image*. Bergson puts it as follows:

> The image with the fixed contours draws what has been. . . . But to a flexible intelligence, capable of using its past experience by bending it along the lines of the present, a representation of a different order is

[139] 'Travailler intellectuellement consiste à conduire une même représentation à travers des plans de conscience différents dans une direction qui va de l'abstrait au concret, du schéma à l'image.'

[140] 'consiste dans un mouvement de l'esprit qui va et qui vient entre les perceptions ou les images, d'une part, et leur *signification*, de l'autre.'

> needed alongside the image, always capable of being realised in images but always distinct from them" (Bergson [1919] 2017, 188).[141]

Creativity, or the production of something that an individual did not possess before, and whose emergence was at least partly unpredictable, follows naturally from the rehearsing of intellectual effort. According to Bergson, the highest form of the intellectual effort is creation, and as Ribot has remarked, creation is always the resolution of a problem. But the solution is given with the problem, and Ribot proposes that invention is to create the steps to the solution (Bergson [1919] 2017, 174). For Bergson, the problem as a whole gives a schema, and creativity is to transform this schema into an image (Bergson [1919] 2017, 174). The creative effort is the most important case of non-conceptual, intellectual effort (Bergson [1919] 2017, 182). Creativity here means something simple, and Ribot has expressed it clearly:

> Every normal human creates little or a lot. He can, in his ignorance, invent what has already been invented a thousand times; if it is no longer a creation for the species, it remains such for the individual. It has been wrongly said that invention 'is a new and important idea:' novelty alone is essential, it is the psychological mark; importance or usefulness are incidental, it is only a social mark. (Ribot 1901, 129–30.)[142]

If creativity is defined as creation according to its significance for the creator, it means that every individual human life is more or less constant creation. Growing in the sense of learning, adapting, and inventing assimilates with creativity from this point of view. What, precisely, is creativity? To clarify the meaning of the concept of *creativity*, let me gather certain of its aspects from the recent scientific literature. First, creativity is a production of novel and useful work (Pan and Yu 2018, 212). This production refers to solving, formulating, or reformulating problems (Benedek and Fink 2019, 116; Rominger et al. 2018, 257). What is a *problem*? I propose that, by the concept of *problem*, we mean an obstacle, an impediment, whose resolution enables more efficient, or powerful, activity,

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[141] 'L'image aux contours arrêtés dessine ce qui a été. . . . Mais à une intelligence flexible, capable d'utiliser son expérience passée en la recourbant selon les lignes du présent, il faut, à côté de l'image, une représentation d'ordre différent toujours capable de se réaliser en images mais toujours distincte d'elles.'

[142] 'Tout homme normal crée peu ou beaucoup. Il peut, dans son ignorance, inventer ce qui l'a été déjà mille fois ; si ce n'est plus une création pour l'espèce, elle reste telle pour l'individu. On a dit à tort que l'invention "est une idée nouvelle et importante" : la nouveauté seule est essentielle, c'est la marque psychologique ; l'importance ou l'utilité sont accessoires, ce n'est qu'une marque sociale.'

regardless of the nature of this activity, whether biological, psychological, or social.

Creative cognition requires effort (Benedek and Fink 2019, 118; Zabelina and Ganis 2018, 20), and habituation, or an organism's equilibrium with is surrounding milieu, decreases creative cognition (Benedek and Fink 2019, 117). Creativity is goal-directed (Benedek and Fink 2019, 118; Beaty, Seli, and Schacter 2019, 22). Creative cognition controls the arousing impulses by inhibiting them (Beaty, Seli, and Schacter 2019, 27; Pan and Yu 2018, 212–213), and it involves an important use of emotions (Rominger et al. 2018). Finally, as Benedek and Fink (2019, 116) put it, there is nothing 'mystical' in creativity, but it is an 'extraordinary result of ordinary processes.'

Now that we have a clearer idea of creativity, let us continue the analysis of Bergson's theory of intellectual effort and its relationship with creativity. The movement from the schema to an image is, according to Frédéric Paulhan (1856–1931), a movement from the abstract to the concrete (Bergson [1919] 2017, 175). Paulhan elaborates this as follows: 'In the beginning the intellectual tendency remains vague, abstract, general, and it is by the combination of this general tendency with a few precise details that the main lines of the concrete whole that will be the intellectual creation are first formed' (Paulhan 1901, 50).[143]

The product of creativity is primary, and the creative process producing it is difficult to understand in conceptual terms. One conceptual problem is the 'mereological' nature of creativity: does the creative process move from unity to multiplicity, or from multiplicity to unity? Ribot differentiates two forms of creative imagination: *intuitive imagination* and *reflective imagination*. The first goes from the unity to the details; the latter goes from the details to the unity. (Ribot 1901, 132.)

When a person learns new habits, the cognitive action of creativity is needed. This is necessary, because in order to create new habits, it is also necessary to break from old ones. The representation of a waltz is a sketch of visual and motor series in temporal relations, and a schema resembles this kind of representation. (Bergson [1919] 2017, 178–179.) To master the waltz is to execute this schema by a skilful dance. But there must already be motor habits that are contracted and composed into a skilful dance, they need to be thus reconfigured into a new unity, and the schema is the pre-form of the executed waltz. One of the difficulties comes from the fact that old habits, adopted to other executions, are resistant to reconfiguration. (Bergson [1919] 2017, 180–181.)

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[143] 'Au début la tendance intellectuelle reste vague, abstraite, générale, et c'est par la combinaison de cette tendance générale avec quelques détails précis que se forment tout d'abord les lignes principales du tout concret qui va être la création intellectuelle.'

The schema is not in itself invariable; it can change according to the influence of the images it incorporates or evokes, and this is why Bergson calls it as a *dynamic* schema. All the incompatibilities, difficulties of contraction of images or executions accentuate the feeling of effort (Bergson [1919] 2017, 181–182). The feeling of effort is an essential element of creativity, and Bergson locates it among the movement of representations in the act of intellectual effort, in a 'battle or an interference of representations with one other' (Bergson [1919] 2017, 183). Such an effort makes intelligence create something out of itself that was not there before. Effort makes intelligence to go 'beyond' memory, as Benedek and Fink (2019, 117) have put it. In short, the intellectual effort creates novelty out of existing configurations of memory.

Because of its creativity, the question about the nature of intellectual effort 'is a question that is not only within the competence of psychology: it is related to the general and metaphysical problem of causality' (Bergson [1919] 2017, 189–190).[144] Intellectual effort gives a mode of causality *sui generis*, which is neither mechanistic nor finalistic, but which intelligence can only translate into either mechanistic or finalistic models (Bergson [1919] 2017, 190).[145]

What if this intellectual effort is directed on one's own personality, on that which exerts the effort? How is this possible, and what kind of cognitive material would it produce? Bergson depicts the effortful reflection on one's own personality as follows:

> [M]any different images, taken from quite different orders of things, will be able, through the convergence of their action, to direct the consciousness to the precise point where there is a certain intuition to seize on. By choosing images as dissimilar as possible, any one of them will be prevented from usurping the place of the intuition it is instructed to call forth, since it would then be driven out immediately by its rivals. By seeing that despite their differences in aspect they all demand of our mind the same kind of attention and, as it were, the same degree of tension, one will gradually accustom the consciousness to a particular and definitely determined disposition, precisely the one it will have to adopt in order to appear unveiled in itself. (Bergson [1934] 2013, 185–186.)[146]

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[144] 'est une question qui n'est pas du ressort de la seule psychologie: elle se rattache au problème général et métaphysique de la causalité'

[145] We will go into the problems of different causal models in the seventh chapter.

[146] '[B]eaucoup d'images diverses, empruntées à des ordres de choses très différents, pourront, par la convergence de leur action, diriger la conscience sur le point précis où il u a une certaine intuition à saisir. En choisissant les images aussi disparates que possible, on empêchera l'une quelconque d'entre elles d'usurper la place de l'intuition qu'elle est chargée

Personality is multiple in its symbolical aspects, but it is simple in its proper nature. To reiterate the main point of this chapter, the knowledge produced by intellectual effort is the only really *simple* knowledge, because it provides the real unity which the concepts can never give (cf. Bergson [1934] 2013, 189–190). Only with this kind of effortful intellectual action is 'an absolute internal knowledge of the duration of the self by the self . . . possible' (Bergson [1934] 2013, 189–190). One crucial consequence of the existence of the schema is that consciousness cannot be completely representational, that is, conceptual. The functioning of the dynamic schema brings out both elements. (Cf. Bergson [1919] 2017, 188–189.)

5.3 The nature of language and concepts

What, then, is the role of language and consequently the role of concepts in human cognition? Because Bergson claims that the basis of philosophy cannot be founded on linguistic expressions (*a fortiori* on concepts), I need to give an exposition of the nature of language. What is language if it is a problem for philosophy?

Human beings have language, symbols, and signs at their disposal for specific reasons. There are probably several reasons for them to exist but let us state the most relevant ones for the present issue. The first reason why the human species possesses highly developed language is individual or cognitive, the second reason is social.

Let us gather relevant scientific results on the nature of language along with Bergson's own remarks. These results help us better contextualise Bergson's understanding of language. I discern three relevant aspects of language: 1) reasoning, 2) communication, and 3) representation.

First, language is a tool for reasoning. For Everaert et al. (2015, 729), language is first and foremost cognitive-computational, rather than communicative. For them, language is primarily the instrument of thought and only secondarily the tool for communication. They address the fact that each language shares basic computational procedures (Cf. Everaert et al. 2017). 'The computational procedure . . . must include a set of atomic elements that are unanalysable for the purposes of the computation' (Berwick et al. 2013, 92). The invention of language has probably enhanced individuals' use of memory and increased their learning (Lotem et al. 2017, 7919–7920).

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d'appeler, puisqu'elle serait alors chassée tout de suite par ses rivales. En faisant qu'elles exigent toutes de notre esprit, malgré leurs différences d'aspect, la même espère d'attention et, en quelque sorte, le même degré de tension, on accoutumera peu à peu la conscience à une disposition toute particulière et bien déterminée, celle précisément qu'elle devra adopter pour s'apparaître à elle-même sans voile.'

Second, language is a communicative tool. For Seyfarth and Cheney (2014), language is foremost communicative and social, because it has several homologous social functions between humans and other primates, and the evolution of sociality and social coordination has probably preceded the evolution of language. This point of view is corroborated by Stewart (2014), who argues that conceptual categories may have developed from social interaction.[147]

Signs and symbols are needed for communication within societies. '[I]t is hard to imagine a society whose members do not communicate with each other through signs' (Bergson [1907] 2013, 158).[148] Language exists 'to establish a communication for the purpose of cooperation' (Bergson [1934] 2013, 86).[149] Language orders and warns, prescribes and describes, prepares immediate and latent actions (Bergson [1934] 2013, 86). All social species communicate with the other members of society. According to Bergson, language, and communication in societies in general is an adaptation to the common action of the individuals in the same group (Bergson [1907] 2013, 158). The existence of sociality and language correlate with each other.

> [I]n a human society, making and action are variable in form, and, moreover, each individual must learn his or her role, not being predestined to it by his or her structure. What is needed, therefore, is a language that makes it possible, at any moment, to move from what we know to what we do not know. We need a language whose signs – which cannot be infinite – can be extended to an infinite number of things. This tendency of the sign to transport itself from one object to another is characteristic of human language. (Bergson [1907] 2013, 159.)[150]

The third aspect of language is its ability to represent. Language appears to be the 'master controller' of human representation. 'Evidence from deaf individuals

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[147] In this context, it is not so important to problematise the primacy of cognitive-computability or sociality of language. For us, the most important information is that *both* computation *and* communication are relevant aspects of language. Positive results in both points of view on language fortify and corroborate Bergson's view on language.

[148] '[I]l est difficile d'imaginer une société dont les membres ne communiquent pas entre eux par des signes'

[149] 'd'établir une communication en vue d'une coopération'

[150] '[D]ans une société humaine, la fabrication et l'action sont de forme variable, et, de plus, chaque individu doit apprendre son rôle, n'y étant pas prédestiné par sa structure. Il faut donc un langage qui permettre, à tout instant, de passer de ce qu'on sait à ce qu'on ignore. Il faut un langage dont les signes – qui ne peuvent pas être en nombre infini – soient extensibles à une infinité de choses. Cette tendance du signe à se transporter d'un objet à un autre est caractéristique du langage humain.'

deprived of language input from birth . . . [suggests] that *language is a causal force bridging otherwise distinct representations and representational formats*' (Perszyk and Waxman 2018, 10.8, my emphasis). According to Perszyk and Waxman (2018, 10.7), language enables humans to connect otherwise incompatible information, that is, language is the 'gateway to higher-order, abstract representations' (cf. Carey 2009; Spelke 2017). Thus, language offers a *symbolically* commensurate, homogeneous medium for otherwise heterogeneous elements. Language seems to augment representations of object, number, and space (Aguiar and Baillargeon 1999; Spelke 1990).

Language enables an individual to think, reason, and recall without all the corresponding sense stimuli. It thus enables the self-generated simulation of absent things and events. As Boeckx (2011, 59) notes, '[o]nce concepts are dissociated from their conceptual sources by means of a lexical envelope, the mind truly becomes algebraic and stimulus-free.' From the biolinguistic and evolutionary point of view, human intelligence gained a huge advantage over the present state of things when it became capable of mentally traveling in time and recalling things at will with the help of signs and symbols.

All the aspects of language appear to be tied to actions. Verbs differ by their neuronal mechanisms from other words such as nouns (cf. Rüschemeyer, Brass, and Friederici 2007, 855). For instance, 'verbs denoting hand actions elicit increased levels of activation in premotor and motor hand areas, whereas verbs denoting foot actions elicit increased levels of activation in premotor and motor foot areas. It has been proposed that the meaning of action words is thus represented in a cortical network including areas that typically play a role in the actual execution of the action described.' (Rüschemeyer, Brass, and Friederici 2007, 862.) However, 'the manipulation of simple verbs alone was sufficient to detect activation differences, whereas the manipulation of complex verb stems had no effect' (Rüschemeyer, Brass, and Friederici 2007, 863).

Rizzolatti and Arbib (1998) have postulated that, in terms of evolutionary development, the language system is based on the motor system (cf. Rüschemeyer, Brass, and Friederici 2007, 864). Arbib (2015, 12) gives an action-oriented insight into the role of language: language processing 'should not be analysed in terms of abstract processing of strings or trees of symbols (though this is, for some purposes, a useful abstraction), but rather should be seen as "lifting" more general processes whereby spatiotemporal patterns of sensory data are converted into one of many possible courses of action.' However, the more abstract forms of language and of conceptual thought have been found to function differently from the simple, action-oriented, concepts (cf. Rüschemeyer, Brass, and Friederici 2007). We could speculate that the more abstract levels of language retain the basic *modus* of action even though they do not evoke

primitive actions. We will dive deeper into the nature of the more abstract and general concepts in the next subchapter.

Let us summarise the recent scientific findings of the nature of language. The use of language in general points towards *action*. This action could be either mental or physical; either individual or socially coordinated; either simulated or executed. Jeannerod (2006, 4–8) has characterised the relationship between representation and action to be two inverse movements. This resembles Bergson's theorisation; let us therefore look at Bergson's theory of the birth, function, and classification of general ideas.

5.4 The problem of general ideas and generalisation

Now, we have a general preliminary picture of the functioning of language. Let us move to the use of general concepts or ideas, which are the basis of conceptual thought.

5.4.1 Nominalism and conceptualism

Let us move to Bergson's solution to the problem of the generation of general ideas. I divide the question into two different problems, a psychological and a natural problem, which follows Bergson's own division (Bergson 1972, 748). I will use the term *idea* instead of *general notion* or *concept* when I speak of this abstracted or generalised unit of cognition. I follow Bergson's usage of the term which has its background in the nineteenth-century philosophy and psychology. The term *idea* in this context mainly originates from British empiricism and the lines of development originating from it.[151]

An important context for Bergson's solution to the generation of general ideas was a psychological discourse at the end of the nineteenth century which culminates especially in the work *L'évolution des idées générales* (1897) by Théodule Ribot. The psychological problem of general ideas concerned mainly general ideas in the perception of resemblances and generalities (Bergson [1896] 2012, 173). While Bergson keeps his theory of general ideas on the psychological level, the solution of the problem has metaphysical aims and consequences. Bergson recognises that the psychology of his time had appropriated the philosophical dichotomy between generalisation and abstraction. He builds his psychological conception of general ideas on the critique of the points of view he has abstracted. These points of view are nominalism and conceptualism, and they are each

[151] Bergson follows the meaning of the British and French empiricist tradition in the spirit of Locke, Berkeley, Hume, Condillac and Rousseau among others (cf. François 2013b, 347 note 166).

other's antitheses. For Bergson, nominalism is personified by George Berkeley (1685–1753) and conceptualism by John Locke (1632–1704).

The problem of the generation of general ideas is close to the classical metaphysical *problem of universals*. However, we must again keep in mind that Bergson's context for this problem is tied to the philosophy and psychology of the nineteenth century; thus, there is no need for the treatment of *realism* in the first part, but only of the psychological framework of nominalism and conceptualism. We will go into the problem of realism in the second part.

In the nominalist theory, generalisation begins from the perception of an object which has a certain quality. The quality receives a name which serves as a representative symbol for the series of resembling qualities. The name thus becomes a general idea. In other words, perception synthesises together objects such as a white lily and a lump of snow and generalises the property of whiteness by the extension of resemblance. A remarkable proponent of nominalism for Bergson was George Berkeley who tried to refute John Locke's conceptualist conception of the general ideas (Bergson [1896] 2012, 174). As Berkeley writes, 'a word becomes general by being made the sign . . . of several particular ideas, any one of which it indifferently suggests to the mind' (Berkeley 2009, 13 §11). A bit further he writes that 'an idea, which considered in itself is particular, becomes general, by being made to represent or stand for all other particular ideas of the same sort' (Berkeley 2009, 13 §12). Bergson recognises a problem in the nominalist theory. Before the general idea can be assigned to other objects, the resemblance of their properties must already be known. There must already be in some way an abstracted definition of the quality because synthesising generalisation cannot operate without the already known qualities. Ultimately, nominalism must define the general idea with the intension of the attributed quality which is the starting point of conceptualism (Bergson [1896] 2012, 174).

Conceptualism, on the other hand, has already defined the quality of whiteness, which is abstracted from the lily and snow by the analysis of the intension of properties. These qualities in turn become representatives of the class they belong to. These classes do not consist of actually enumerated things but of the potentiality of suitable objects for the intension of the idea. According to Locke, the operation of abstraction means that 'the same colour being observed today in chalk or snow, which the mind yesterday received from milk, [abstracting consciousness] considers that appearance alone, makes it a representative of all of that kind; and having given it the name whiteness, it by that sound, signifies the same quality wheresoever to be imagined or met with; and thus universals . . . are made' (Locke 2008, 2.11.9). Bergson notes that the individuality of the actual qualities in objects causes problems for conceptualism. The individual qualities, the whiteness of the lily and the whiteness of snow, do

not give up their individuality without their generalisation with a symbol which has extension. Every time when a quality is abstracted from an object, the abstraction implies an extensive generality of the quality: the whiteness of the lily-white needs snow-white and milk-white to be abstracted from the lily-white. Conceptualism thus needs to take support from extension to effectively analyse the qualities from the objects, and so it gives in to the starting point of nominalism. (Bergson [1896] 2012, 174–175; cf. [1934] 2013, 187.)

Bergson recognises that 'to generalise, it is first necessary to abstract, but to abstract to any purpose, we must already know how to generalise' (Bergson [1896] 2012, 174). The antinomy between abstraction and generalisation seems to be a vicious circle, but Bergson shows that the problem lies in the starting points of the nominalist and conceptualist theories. Both have a common problem: they both suppose that the perceived individuality of things precedes the actual perception. However, distinct individual objects are the result of highly sophisticated perception, and the clear general ideas are the refinement of reason. Conscious perception needs highly advanced cognitive capabilities to reflect upon its object. The reflection on the individualities needs the capability to remember differences. Consciousness reflects by analysis and memory the milieu of immediate perception which it is about to apprehend. Bergson calls the object of immediate perception, following known Danish philosopher and psychologist Harald Høffding (1843–1931), a striking quality or resemblance (*Bekanntheitsqualität*; Høffding 1889; cf. Ash 1995, 84). The starting point of perception is not a perception of a quality as class or as individual, but something in between. Consciousness does not immediately associate the elements of the unorganised aggregate of perception but *dissociates* the whole into parts. Instead of analysing or synthesising the objects of perception, consciousness dissociates the whole of perception by reflecting it into a general idea or by discriminating memory into an individual object (Bergson [1896] 2012, 175–176, 184). Starting from this changed perspective, Bergson first gives us an analysis of the biological origin of the phenomenon of the general idea and, second, its vital function.

Bergson remarks that nominalists and conceptualists have excessively intellectualised psychological phenomena that have strong biological and evolutionary reasons (Bergson [1896] 2012, 183). Perception has a biologically utilitarian function as the mechanism of recognition of resemblances: an herbivorous animal is attracted to many grasses, and all the colours and smells of different grasses converge towards the need of grass in general as an alimentation. Hunger is the unity which imposes the generality upon different plants in the action of the herbivore. The herbivore could differentiate different shades of green or a field from another field, but it has no need for any unnecessary discrimination: the extinguishing of hunger, the utilitarian need, is

the only thing it wants to do. It generalises and discriminates the objects of its perception according to its sole need, the search for alimentation. Perceptions in animals are not 'intellectual' ideas in the human sense but, in Bergson's expression, more like forces that constitute their immediate data of consciousness (Bergson [1896] 2012, 176–177). Bergson wants to say that the psychological operations of even the highest human intelligence have vital and biological origins.

How, then, are general ideas formed in human intelligence? According to Bergson, perception contains an indefinite variety of data, but action is always one and simple – as we saw in section 5.1. Perceptions and memories vary, but action is invariable. Still, perceptions and action form a unity: the central nervous system shows the solidarity between the sensory and motor organs. Resemblances and generalities are first sensed and acted, and they are thought only *a posteriori*. Resemblance originates from an identical reaction to a variety of physical phenomena. (Bergson [1896] 2012, 177–178.)

There is some recent scientific evidence for Bergson's theorisation. According to Ghirlanda and Enquist (2003, 15), action or reaction is the primitive source of generalisation: 'The study of how external stimuli affect behavior has been referred to as the theory of stimulus selection in ethology and stimulus control in experimental psychology and has played a key role in both disciplines during the twentieth century. A key finding of such research is generalization: if a behavior has been established in response to a stimulus, novel stimuli resembling the first one will usually elicit the same response.' Generalisations also have *predictive value* (cf. Goldberg 2006, 103), which is important in preparing the reaction to the received stimuli. To repeat what I already concluded, the same effects follow from a variety of reasons.

In short, the same principle of generalisation is universal in all living beings, and it is also the source of general ideas in humans as the most intelligent animal species. More rudimentary living beings create unconscious and reflexive generalities. In human intelligence the similar is seen in the generation of general ideas. Nevertheless, all the generalising operations of living beings have a universal function, that is, the recognition of resemblances. This means that all living beings generalise, even though their capacities of generalisation vary. (Bergson [1896] 2012, 177–178.)

Bergson corrects the vicious circle between nominalism and conceptualism I introduced earlier: 'There really is no circle because the resemblance, from which the mind starts when it first begins the work of abstraction, is not the resemblance at which the mind arrives when it consciously generalises' (Bergson [1896] 2012, 178, translation modified). The first resemblance is immediately received or felt – it is mostly the result of attitudes, dispositions or habits which

sieve the whole of possible data of immediate perception. The second is intelligently perceived or thought experience. Human intelligence can thus detach from the immediate and determinate reaction to the given excitations. This intelligent detachment from immediacy is crucial for the birth of highly abstract thought. With the reflection on variety in a series of generalisations, the consciousness can form the general idea of generality. The abstracted idea of generality opens indefinite possibilities for consciousness to generalise because it now knows the idea of generalisation. The most important outcome of this freedom of generalisation is language, and the intellectual mechanism consists of different words instead of perceptions and motor actions. (Bergson [1896] 2012, 178–179.)

The ultimate problem for nominalism and conceptualism is that they do not see the internal movement of the idea which is its core function: an idea is not a fixed meaning but oscillates between memory and action. Its meaning can be fixed as an individual word, or it can be dissolved into an indefinite number of different shades. In the solution Bergson has given, nominalism and conceptualism seem to be two opposite directions of the movement of the general idea. 'General idea' is the name for a process of consciousness which tries to contract or dilute significations of particular acts that they could fit to the state of affairs. From the utilitarian point of view, the process means that consciousness tries to match the content of the signification of the idea into a present need. To be useful, an idea needs to have flexibility but also singular effectivity (Bergson [1896] 2012, 180–181; Riquier 2012, 398 note 40). However, does this kind of characterisation not overlook the epistemological nature of general ideas, that is, concepts? To see the result of Bergson's theorisation, we need to move to the natural problem of general ideas, which reveals the epistemological and metaphysical problematics of general ideas.

5.4.2 Realism

Let us proceed to the second part of the problem, beyond the psychological to the natural problem. It deals with the *realism* of general ideas. For Bergson, *there are real general classes in nature* which give a model for psychological generalisation and for the use of ideas and structuring reality (Bergson [1934] 2013, 57–58). These classes are, in Bergson's words, 'objective generalities, inherent in reality itself' (Bergson [1934] 2013, 58). Bergson divides these objective generalities into three classes: biological, material, and social. We leave the first and third classes aside and focus mainly on the second. In the natural problem of ideas, Bergson sees the classes as differing in nature from each other. They cannot be compared univocally – there are orders in nature that cannot be generalised on the same

symbolic plane of general ideas. As Bergson says, 'the important question for the philosopher is to know by *what operation*, for *what reason*, and especially in virtue of *what structure of the real*, things can . . . be grouped' (Bergson [1934] 2013, 53–54, my emphasis).

Bergson further divides the material class into vital and mathematical generalities (Bergson [1934] 2013, 58; cf. [1907] 2013, 228). Vital generalities are aesthetic in nature: they are qualities of sensibility such as colours. The structure of the presented psychological problem originates from these vital generalities and the utility they serve for the living being. Vital generalities have both an innate resemblance and the resemblance the living being itself imposes on them. Vital generalities are thus the basis for the psychological ideas I defined in the discussion of the psychological problem – they are the same phenomena that Høffding called *striking qualities*. Bergson remarks that the vital generalities can only bear resemblance to each other, but they do not form an identity. *Identity*, for Bergson, is by nature quantitative, and the living being has no use for measuring the qualitative phenomena. To smell an odour refers to the vital action, and the living being classifies odorous things according to vital resemblances. (Bergson [1934] 2013, 59–61.)

The second generalities are quantitative physical entities such as gravity, heat, and electricity, and other physical phenomena and chemical compounds that can be determined mathematically. These elementary phenomena form all the qualitative odours and colours of perception. Mathematical generalities are generalised by purely mathematical *ideas* – they denote the physical and chemical phenomena whose mathematical identities can be determined.

Bergson thus concludes that quantity and quality, which are the basis of identity and resemblance, are in fact opposite aspects of the same phenomena: fixity and continuity. Identity in nature means the persistence in time and a certain equivalence in space. In the scientific vocabulary, we should speak of functions and laws rather than ideas and classes. Nevertheless, in Bergson's interpretation, the mathematical generalities differ in nature from the vital generalities, which in turn are the starting point of the psychological ideas. (Bergson [1934] 2013, 63; [1907] 2013, 219.)

The division into quantitative and qualitative generalities is according to Bergson a difference of register or perspective. First, as I already noted, Bergson asserts that the natural sciences have followed the aspect of quantifiable reality. Natural phenomena are measurable because they can be quantified, and their quantification can be related to one another with the common formal language of mathematics. In natural sciences, nature is spatialised in the sense that it is measured and classified with the help of the universal symbolism of mathematics. Nevertheless, while accurate, it is symbolical knowledge and excludes other

aspects of reality. The experiential knowledge *lives in* the enduring nature of reality. While it can be determined by its wavelength, frequency, and energy, a green colour is seen as green because its existence endures. Moreover, also the perceiver endures. An experienced quality is an entity born of the solidarity of different durations – for instance, a colour is born from the relationship of the electromagnetic radiation and the visual sensory system. The physiological outcome of the perception of the colour green contains, even in the blink of an eye, an enormous amount of identical repetition of the electromagnetic wave. In a simplified but concrete expression, *the sensed quality is a contraction of a duration in another duration*. (Bergson [1934] 2013, 62–63; [1896] 2012, 279–280; [1907] 2013, 219.)

For the sake of clarity, we need an analogy for Bergson's cryptic expression. Let us refer to something that can be easily understood. Let us imagine a beat hitting once per second: 'tock, tock, tock.' Then, let us increase its rate from one beat per second (1 Hz) to 440 Hertz. What do we hear? We cannot discern a beat anymore. Instead, we are hearing a note A. A *beat* has transformed into a *pitch*. The difference in *duration* of a beat within the human duration is but a quantitative change in the frequency of the heard sound, but it renders a qualitative change in our experience. Of course, the passage from a beat to a pitch is a passage from a quality to another quality, but it nevertheless demonstrates the idea at hand. With this Bergson wants to say that there is no duality between quality and quantity, but a duality between the registers or perspectives through which the reality is perceived. The *ideas* of qualitative and quantitative generalities differ in nature from each other; thus, they are incommensurate.

We can elaborate a bit on the idea of the enduring nature of things. There is a vital reason for life to contract the material phenomena – maybe it is necessary for life to exist. Different sense perceptions are 'choices of certain orders of greatness for condensation.' With this expression Bergson means that life has adapted into the reality at a certain 'speed' or 'tension' (Bergson [1934] 2013, 62). As Bergson says of human sight, 'the choice that the individual eye makes of particular visual objects is superposed on the choice which the human eye has once made of a certain definite region of the spectrum in which it sees light'[152] (Bergson [1919] 2017, 146). Different animals have evolved to see other spectra, and different animals have different amounts of colour channels in their colour vision (humans have three, butterflies have five). In short, living beings live and act in a certain tension of reality. Everyday things are solid, colourful, heavy,

[152] 'le choix que l'œil individuel fait de tel ou tel objet pour le regarder se superpose à celui que l'œil humain a fait, une fois pour toutes, d'une certaine région déterminée du spectre pour y voir de la lumière'

tasty, and so forth, because they are contractions of the duration of certain elementary phenomena in another duration that perceives them. In the spectrum given for the rhythm of living beings, also the human being moves and lives and groups the qualities together. From these qualities it has begun to construct more complex ideas. But humans have become self-aware of the general idea of generalisation, as I already stated, so that intelligence has been able to break away from immediately perceived qualities and their vital classifications to maximally abstract imaginary ideas and concepts. This is to say that the freedom of creation of general ideas underlies any elaborated human action in any individual, but its importance and content is conditioned by societies, which hugely dispose the human mind and action (cf. Bergson [1907] 2013, 219, 158).

Now we have seen Bergson's overall solution to the question of the generation of general ideas. First, I introduced the problems Bergson saw in nominalist and conceptualist theories of generalisation and abstraction. Then we saw Bergson's solution to the potential vicious circle he saw between nominalism and conceptualism. We saw that Bergson's solution receives support from evolutionary and biological functions of human perception and action. After the psychological problem, we moved to the natural problem, in the context of which we concentrated on the material classes. Material classes were seen to divide into vital and mathematical generalities. With these classifications Bergson wanted to show the natural differences and classes contained in reality and the way in which the ideas of the living differ from ideas science can form of material reality.

5.5 Summary

In this chapter, I laid out my starting point from which we will proceed to Bergson's theory of generative explanation of knowledge in the following chapters. I started from three crucial factors that I saw as the most immediate problems for philosophising according to Bergson: 1) the core problem of past philosophers, 2) the nature of cognition, and 3) the nature of language and concepts.

We started first with a familiar case in philosophy, namely, with Zeno's paradoxes. We gave some historical contextualisation of these paradoxes, which revealed that Bergson's usage of them was not uncommon but highly instructive about Bergson's situation in the intellectual history. For Bergson, the paradoxes reveal the natural incapability of human intelligence to understand temporal phenomena and the problems that result from the translation of temporal phenomena into their spatial expressions.

After the clarification of the starting point of the necessity of metaphysics in epistemological considerations, I proceeded to analyse Bergson's ideas of the

active and creative elements of human cognition. We saw that human cognition comprises two inverse operations: a movement towards the spatial discrimination of representations and concepts and a movement towards a special kind of unity. Bergson conceptualised this tendency of thought towards unity as a *dynamic schema*, which I corroborated with recent scientific findings and theorisation.

The first movement of cognition especially led me to elaborate on Bergson's theory of language and concepts. In this context I concentrated on Bergson's theory of the formation of general ideas because general ideas mainly comprise the matter of language and discursive thought. We saw that for Bergson, nominalism and conceptualism are both partial expressions of the matter of facts, *if* the problem of general ideas is properly articulated.

Now we have the basic setting of relevant epistemological and metaphysical topics: thought and the products of thought, namely, the constituents of knowledge. Next, we will proceed to Bergson's theory of generative explanation of knowledge, which leads us to profound biological considerations.

6 THE PHILOSOPHICAL RELEVANCE AND ANALYSIS OF BIOLOGICAL EVOLUTION

If, as I suggested at the outset of this study, knowledge can be adequately explained only in relation to its sources, this stresses the importance of locating these sources. The second half of the nineteenth century gave a biological key to the task of locating the sources: the evolutionary framework of explaining the phenomena of life, cognitive capacities included. However, the causal factors of natural selection were under dispute at the turn of the nineteenth and twentieth centuries: rival theories claimed to explain the evolutionary processes from different points of view. In this chapter, we will see how Bergson sorted out these problems. First, I will concentrate on the relevance of biology and evolutionary theory for metaphysics and epistemology. Second, I will systematise Bergson's idea of the *élan vital* as a properly philosophical idea. Third, I will construct a relevant, philosophical picture of evolution. After this chapter, we then proceed to the following main chapter in which I show the consequences of the evolutionary and philosophical theorisation and classification on the theorisation of human cognitive capacities.

6.1 Complementary relationship between epistemology and biology

The general image of Bergson is greatly characterised by *life*. The motivation for Bergson's connection with the life sciences is clearly visible in the following two quotations: '[T]he *theory of knowledge* and the *theory of life* seem to me inseparable from each other'[153] (Bergson [1907] 2013, ix); 'The spectacle of the evolution of life suggests to us a certain conception of knowledge and also a certain metaphysics which participate in each other reciprocally'[154] (Bergson [1907] 2013, 186). Bergson's aim in the life sciences appears not to be about finding the 'principle of life' or giving an account of what life is (although, consequently, all theorisation about life is explaining what life is at least from a certain point of view). Rather, Bergson seems to lay out the evolutive or generative foundations of epistemological and metaphysical problems. Thus, Bergson aims to show the generative sources of knowledge, from which the capacities of knowing have originated in the first place.

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[153] '[L]a *théorie de la connaissance* et la *théorie de la vie* nous paraissent inséparables l'une de l'autre.'

[154] 'Le spectacle de l'évolution de la vie nous suggère une certaine conception de la connaissance et aussi une certaine métaphysique qui s'impliquent réciproquement.'

However, there are interpretations that put Bergson's project under doubt. According to Riggio (2016, 215–216), the 'explicit topic' of *L'évolution créatrice* 'is a critique of evolutionary theory that subsequent developments in biology have rendered obsolete.' We can make an inference and an implication from Riggio's claim. Because the situation of the scientific evidence and theories have developed and changed during the century between the present day and the publication of *L'évolution créatrice*, we can first infer that Riggio claims that Bergson's critique itself is rendered obsolete along with the outdated scientific theories that he criticised. Second, we can imply that Bergson's philosophical idea must be updated with the contemporary scientific evidence and theories so that we could see that if Bergson's philosophical theory *itself* is rendered obsolete. In my view, Riggio's claim is not sound before we know if Bergson's philosophical theory is outdated along with the scientific theories of his time. Let us formulate a hypothesis following the stated implication:

> *Bergson's arguments, instead of being rendered obsolete, are better understood in the light of contemporary scientific evidence.*

Considering the importance of the evolutionary explanation in understanding the nature and modes of human cognition, Bergson can easily state that "philosophy cannot and must not accept the relationship established by pure intellectualism between the theory of knowledge and the theory of the known, between metaphysics and science" (Bergson [1907] 2013, 195).[155] The relationship must be established on evolution *itself*, which at the same time is that which explains and that which is explained. Is there a circularity? If human intelligence is conditioned by evolution, and the scientific theory of evolution is the product of human intelligence, does this circularity not mean that intelligence aims to overcome itself by itself? Would this kind of task resemble an eye that tries to look at itself, or a body that pushes itself in order to thrust itself into movement (cf. Bergson [1907] 2013, 193)?

Here, the possible supporters of the legitimacy of this vicious circle forget that intelligence is only a tool used by the organism to act. In this sense, action precedes intelligence, and action being creative is incontestably true. As I have already noted, human life is more or less constant creation from its beginning to its end. Let us follow Bergson's example. A person who has never swum will probably never learn to swim without throwing himself or herself into water, and

[155] 'la philosophie ne peut pas, ne doit pas accepter la relation établie par le pur intellectualisme entre la théorie de la connaissance et la théorie du connu, entre la métaphysique et la science'

by gradual learning adapt himself or herself into moving in water that can be called swimming. Could there be any other way to learn swimming? If he or she only studied swimming, fluid dynamics, and physiology from books and manuals, could the person prepare himself or herself to throw himself or herself into water and swim? This is highly unlikely. In addition, all the manuals he or she read and watched were written and designed by those who already knew about swimming or things related to swimming. The only option for humans to learn how to swim, is to start swimming – the only option for such a change in a person's capacities is learning, that is, creation. (Cf. Bergson [1907] 2013, 193–195.)

One can classify and categorise only from the basis of learned meanings. Let us return to the present context of the vicious circle of overcoming the restrictions of intelligence by intelligence itself. The truth is that, as in intelligent thinking of swimming, the learned activity precedes the things that intelligence thinks of. Because human intelligence sees as evident the things that it frequently sees in objects, there is a danger of mistaking regularity with necessity. If constant regularity of certain properties of human cognition gives us reason to categorise it in certain generalisations, it does not mean that its nature could be induced from these generalisations. Moreover, such a synthesis does not give the *generation* (*genèse*) of human cognition (Bergson [1907] 2013, 190–91). Instead, I argue that human thought can *learn* its proper place in human cognition. This learning is possible by understanding the generation of human cognition in its entirety.[156]

If learning is creativity, does this mean that learning the nature of intelligence is creating the knowledge of intelligence? Yes, it does. In that case, how can we say that our knowledge of intelligence is true, or that it corresponds to the state of things in reality? We can say that it is true insofar as it produces cognitive results. Analogically, I truly know how to swim when I learn to swim; thus, I truly know how to know when I learn to know. This statement is by no means tautological. The knowledge of knowledge is more of the matter of experience than representation, as I will show in the chapter 8. Moreover, as I said in section 5.2, true learning is always the creation of something inside the learning individual. Intelligence should accommodate itself to this indisputable fact.

Let us summarise the preceding by hypothesising that *human cognition can overcome its limits by learning*. What should it learn? It should learn its origin and generation of which its capacities, limitations, and other characteristics are products. This kind of project considers epistemology and metaphysics as interrelated. '[T]he problem of knowledge . . . is at one with the metaphysical

[156] On the learning aspect of epistemology, see Kern (2017, 9–10).

problem, and . . . both are . . . a matter of experience' (Bergson [1907] 2013, 179).[157] This interrelation of epistemology and metaphysics absorbs science, as well: the interrelation of epistemology and metaphysics leads one to the other; 'they form a circle, and the circle can only be centred on the empirical study of evolution' (Bergson [1907] 2013, 180).[158] Moreover, this interrelation transforms the study of biological evolution itself. 'The spectacle of the evolution of life suggests to us a certain conception of knowledge and also a certain metaphysics, which are mutually implicated. Once this metaphysics and this criticism have been identified, they will be able to shed some light, in their turn, on the whole of evolution.' (Bergson [1907] 2013, 186.)[159]

Bergson's evolutionary approach to knowledge searches for *both* the gradual *modus vivendi* of the adaptational structure of intelligence *and* the mode of subdivision of the matter utilised by perception and intelligence. Both have evolved together and are inseparable. (Bergson [1907] 2013, 367.) In other words, theory of knowledge and evolutionary sciences are inseparable from each other. In fact, the inseparability of epistemology and biology characterises the whole of *L'évolution créatrice*.

Let us return to the 'pure intellectualism' which I mentioned in the beginning of this chapter. The explanation of the relationship between science and philosophy must be something non-intellectual in the sense that it needs empirical proof, empirical articulation of the functions of science and philosophy, and the explication of their usage of human cognitive faculties, which in turn are the products of biological evolution. But what is this purely intellectualistic relationship in the first place? Pure intellectualism means a philosophical approach that does not take into consideration the origin and generation of knowledge on which science and philosophy themselves are based. (Cf. Bergson [1907] 2013, 191.)

We can differentiate two approaches to the nature of philosophy as metaphysics and science and their relationship. Let us call them the *difference in degree model* (DD) and the *difference in nature model* (DN). DD relates to what Bergson calls 'pure intellectualism.' Almost all DD models locate metaphysics either *above* all science or *beneath* all science. Either metaphysical objects are *the*

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[157] '[L]e problème de la connaissance . . . ne fait qu'un avec le problème métaphysique, et que l'un et l'autre relèvent alors de l'expérience'

[158] 'elles font cercle, et le cercle ne peut avoir pour centre que l'étude empirique de l'évolution'

[159] 'Le spectacle de l'évolution de la vie nous suggère une certaine conception de la connaissance et aussi une certaine métaphysique qui s'impliquent réciproquement. Une fois dégagées, cette métaphysique et cette critique pourront jeter quelque lumière, à leur tour, sur l'ensemble de l'évolution.'

first principles of everything (metaphysics beneath science), or they are *the highest abstractions of everything* (metaphysics above science). Let us gather some examples of the DD model from the recent general characterisations of metaphysics.

Dyke (2012, 23–24) asks how metaphysics, if it investigates the nature and structure of reality, differs from science, which also investigates the nature and structure of reality. Dyke locates the difference between metaphysics and science in their difference of scope. Metaphysics studies 'reality as a whole' while the scientific disciplines study 'particular portions of reality.' Even when all scientific disciplines are put together, 'the scope of metaphysics is wider still.' The difference in scope falls into the DD model: it sees between science and metaphysics only different degrees of the same mode of knowledge. Koons and Pickavance (2015, 15) present the role of metaphysics in another but similar way: 'Metaphysics is, at bottom, an attempt to develop a true theory of the world's most fundamental things, a theory that describes the features of those fundamental things and the relations that they stand into one another and to fewer fundamental things. The categories that metaphysicians are interested to analyze are, therefore, abstract and general.' According to Marmodoro and Mayr (2019, 2), '[m]etaphysics aims at what is most general and fundamental, in terms of its questions as well as its answers: its domain is *what there is*, or we could say, *all there is*.'

It seems that among philosophers, there is a general agreement that reality is a unity, that *it* 'is out there' (cf. Marmodoro and Mayr 2019, 4–5). Lowe (2002, 3) puts it this way: 'truth is single and indivisible or . . . the world or reality as a whole is unitary and necessarily self-consistent.' The problem is, however, that we seem to have so many approaches and points of view on it: so many sciences, different causal explanations, different qualifications and experiences. Different scientists pursue truth 'according to their own methods of inquiry and within their own prescribed domain' (Lowe 2002, 3). Thus, Lowe prescribes the unitary role of different scientific knowledge-producing domains, that is, scientific disciplines, for metaphysicians. For Lowe (2002, 2–3), metaphysics has a role which we can easily discern to be a kind of cybernetics of science: metaphysics has an 'interdisciplinary role [between scientific disciplines] . . . because its central concern is with *the fundamental structure of reality as a whole*.' Also, metaphysics is 'the intellectual backdrop for every other discipline' (Lowe 2002, 3). What is left for metaphysics is a regulating and communicative role of scientific knowledge.

It seems also to be a typical view that metaphysics is the discipline that studies reality as such. Thus, *metaphysics is the science of absolute knowledge*. However, 'absolute knowledge' is only a linguistic expression if we do not

explain the subject and the object of knowledge. It does not help much to state the obvious – the human being is the subject of knowledge, and the reality 'out there' is the object of knowledge – because we, as living, acting, and cognising human beings, are *more* 'out there' than our concepts with which we represent and express our life, action, and thought. Should metaphysical inquiry not first concentrate on the differentiation and analysis of the faculties of knowledge and the explication of different modes of knowledge? Let us state some views that have been generally accepted since the second half of the nineteenth century. The human being is an extant product of biological evolution. Humans are intelligent animals that communicate, manufacture, and represent. Should metaphysical inquiry not start from these obvious facts? According to Bergson, the answer to this question is yes, and that is what he did. Bergson's theory belongs to the second of the models I laid out, the DN model. The DN model opens up a completely different landscape of inquiry, albeit its aim is the same: the aim is to understand the absolute nature of things. The DN model makes the research of knowledge circular, making the subject of knowledge, a metaphysician, for instance, reflect on both relative knowledge and absolute knowledge circularly.

Scientific knowledge about the sources of knowledge is at least achievable by philosophers. It is up to metaphysicians what they do with that knowledge and whether they find other modes of cognition.

The following chapters imply that the products and devices of different cognitive faculties can be studied as faculties conditioned by certain specific, even biologically general strategies of action. If philosophy is first and foremost the research of the fundamental problems of knowledge (epistemology) and existence (ontology), *and* because the cognitive faculties and their manifestations are evolutive innovations of the species to know things existing, it is paramount to understand how and for what purpose the different faculties have evolved. To search for the fundamental facts of things, it is necessary to recognise from which direction these things are to be found. They are not to be found from anything evolved for human use, such as logic and language, but from the most fundamental nature of the existence of the living beings, from biology and evolution. If we do not know why we have evolved such faculties to know things, how could we say anything about the possibilities or impossibilities of knowledge? If we do not know why we have evolved such faculties to know things, how could we say anything about the nature of things, not recognising the tools with which we cognise them? I will discuss these questions in detail in the following sections.

6.2 The *élan vital* as a philosophical idea

Let us now bring forth Bergson's famous idea of the *élan vital*. Although the translator of *Creative Evolution* has translated it as 'vital impetus,' I am retaining the French expression as is rather commonly done. I also call it an *idea* regardless of the term's possible ambiguity. In short, the *élan vital* is not a mere concept; *it is an idea of a philosophical intuition*. I will later explain Bergson's conception of doing philosophy, after which this fact, which I cannot yet explain in this context, will become clearer.

Bergson was interested in the development of evolutionary adaptations of the active cognitive faculties in the multicellular organisms with a view to explain human cognitive capabilities (cf. Bergson [1907] 2013, 50). This interest only needed a clear vision of the evolutionary process in general. It needed a concrete, singular idea, and this idea was the *élan vital*. The *élan vital* 'is in no way meant as an ornament of style, nor is it used to mask by an image our ignorance of the profound causality [of evolution]' (Bergson 1972, 1526).[160] As several of Bergson's commentators, such as Riquier (2008, 294) and Landeweerd (2021, 63), have noticed, the *élan vital* is a causal idea. In the following, we will see that it has an essential and positive philosophical role in Bergson's theory of the generative explanation of knowledge.

Life must be 'compared to an *élan* because there is no image, borrowed from the physical world, that could give us a more approximate idea of it' (Bergson [1907] 2013, 258).[161] Thus, the *élan vital* is an *approximative representation* of life in general. However, it conceals Bergson's profound approach to vital phenomena, as well. According to Bergson, there is only one reason to talk about life in general: the common evolutionary origin of all the living beings on the planet (Bergson [1907] 2013, 26).

Before continuing into further elaboration of Bergson's philosophical idea of the *élan vital*, let us concentrate on its interpretations in the secondary literature. I will consider both Bergson scholars and various authors who have commented on this philosophical concept. Both fields of secondary literature function as examples of the ambiguity that has haunted one of Bergson's most important central ideas.

According to Scharfstein (1943, 81), Bergson took the *élan vital* from André Lalande's (1867–1964) dissertation *La Dissolution opposée à l'évolution dans les*

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[160] 'n'est nullement pour l'ornement du style, ce n'est pas davantage pour masquer par une image notre ignorance de la cause profonde [de l'évolution]'

[161] 'comparer à un élan, parce qu'il n'y a pas d'image, empruntée au monde physique, qui puisse en donner plus approximativement l'idée'

sciences physiques et morales (*The Dissolution Opposed to Evolution in the Physical and Behavioural Sciences*, 1899). This may well be so, as Sinclair (2020a, 213) has remarked. According to Lalande, there is a kind of impetus in living beings that exerts itself only a certain amount after which it gradually diminishes. This *élan vital* is more like a thrown stone, which flies according to the exerted effort, instead of being a bullet flying in a vacuum (Lalande 1899, 123–24). It is a characterisation of the individual's biological *development*:

> The living being is characterised by a developmental course absolutely without example in the inorganic: germ, embryo, differentiation of tissues, adult condition, senility, and death. It fights for life, it deforms itself more or less in this fight. And in all likelihood, species behave in this [fight] as individuals, having a modest beginning, an *élan vital* that tends to multiply them without limits, finally a more or less complete triumph that is followed by a regression and a decadence. (Lalande 1899, 399.)[162]

As François (2013a, 491–92) has remarked, the *élan vital* may be a reformulation of the problem which Lalande poses against Spencer's idea of evolution: Lalande protested against Spencer's monism of living reality being definable as a process from homogeneity to increased heterogeneity.[163] For Lalande, reality as a whole is a progress towards complete dissolution which the living reality resists (François 2013a, 492). This dissolution resembles the widely known idea of the heat death of the universe in popular science.

For Mullarkey (2008, 591–593), the idea of an *élan vital* is a 'critical vitalism' and provides an 'explanatory principle' for all the life sciences, providing an explanatory meaning of life. For him, the *élan vital* is a 'performative metaphysics,' which for him means the 'intermixing of methodological practice and metaphysical content.' He contrasts explanatory and causal principles and denies the causal role of the *élan vital*. However, as, for instance, Riquier (2008, 294) has remarked, the *élan vital* is a deeply causal idea. Remarked recently by Landeweerd (2021, 63) as well, the *élan vital* is a causal explanation that is neither mechanistic nor finalistic. According to Miquel (2007, 217–219), the idea of the *élan vital* is to 'divinise life.' For Sinclair (2020a, 214), following the interpretations

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[162] 'L'être vivant est caractérisé par une course de développement absolument sans exemple dans l'inorganique : germe, embryon, différenciation des tissus, état adulte, sénilité et mort. Il lutte pour la vie, il se déforme plus ou moins dans cette lutte. Et selon toute vraisemblance, les espèces se comportent en cela comme les individus, ayant un début modeste, un élan vital qui tend à les multiplier sans limites, finalement un triomphe plus ou moins complet que suivent une régression et une décadence.'

[163] Ribot ([1870] 2002, 152–56) has made a clear explication of Spencer's idea of the progress from homogeneity to increased heterogeneity.

of Léon Brunschvicg and Vladimir Jankélévitch, the *élan vital* signifies force and will, and it continues the heritage of post-Kantian romanticism. Furthermore, according to François (2010, 97–98), the *élan vital* is an 'image' that represents the inexact nature of life. It is not a concept, because it does not function as a concept.

The contemporary reception among scientists around 1907–1925 was outright dismissive and does not need detailed analysis. An overview of such journals as *American Naturalist*, *Biologisches Zentralblatt*, *Mémoires de la Société zoologique de France*, *Nature*, and *Science* reveals the general approach to Bergson's theorisation: it was almost unexceptionally connected with Hans Driesch's (1867–1941) concept of *entelechy* and with other vitalist concepts. No reading analysed Bergson's actual theory, except for one descriptive essay on Bergson's work so far by Libby (1912). It is unnecessary to cite all these sources; thus, I will briefly focus on the most important and instructive commentators. For instance, Gayon (2008, 65–66; cf. Herring 2018) has divided the approach to Bergson's theorisation among the scientists of the Modern Synthesis[164] in three categories: the 'indifferent ones,' the 'hostiles,' and the 'critical admirers.' Of these we are in this context interested in the two latter categories, because it was perhaps the most influential group of evolutionary biologists from the 1920s to the 1940s.

The biologists, hostile to Bergson's theorisation, were Ernst Mayr (1904–2005) and George Gaylord Simpson (1902–1984). According to Gayon (2008, 67), their references to Bergson were generally highly stereotypical. According to Mayr, Bergson was a desperate anti-Darwinist and a supporter of Eimerian orthogenesis[165] (Mayr 2004, 40, 2003, 19). Teleology, which Mayr attributes to Bergson, meant three things for him: a 'religious attitude,' a 'progressivism,' and a 'hope for the better future' (Mayr 2004, 39–41). 'Even though', Mayr adds about Bergson, together with Hans Driesch, 'these authors sensed that vitalism was an invalid approach, they were unable to find a better solution' (Mayr 2004, 17). He adds to this conception of vitalism several concepts that cannot be found in the works of these authors, such as 'Lebenskraft' or 'the occult force of *vis vitalis*' (Mayr 2004, 17, 22, 23, 90). According to Simpson (1951, 131), Bergson was a finalist who did not want to explain evolution but thought that it was inexplicable. The *élan vital* was the name for this 'inexplicability.' Simpson assimilated Bergson's theory with other theorists that were considered as finalists. These two references cover the hostile approach to Bergson's theorisation. These hostile approaches had nothing to do with theoretical or scientific analysis but

[164] The Modern Synthesis was a movement of evolutionary biologists in the late first half of the twentieth century. The name 'Modern Synthesis' derives from Julian Huxley's book *Evolution: The Modern Synthesis* ([1942] 1974).

[165] We will engage with Eimer's theory later in this chapter.

were rather political or otherwise unscientific, and we have no need to dwell on any unscientific matter more than is necessary.

Let us make clear certain key facts. The *élan vital* is not a mysterious vital force or a force striving for perfection, as even the entries of 'Bergson, Henri' in two major philosophical dictionaries have claimed (Blackburn 2005; Bunnin and Yu 2004). François (2008, 96–97) correctly notes that Bergson's philosophical theory of the *élan vital* is not vitalist, nor does Bergson himself characterise his philosophical theory as vitalist. Classifying Bergson as a vitalist would in any case be historically vague or even misleading. Bergson himself was well aware of vitalist theories, calling the theories of Hans Driesch (1867–1941) and Johannes Reinke (1849–1931) 'neo-vitalist,' a term coined by Ernst Haeckel (1834–1919) (Bergson [1907] 2013, 42; François 2008, 97).[166] As we will see in the following chapters, Bergson mainly committed to the orthodox view on evolution in scientific matters. In addition, in his interpretation of Claude Bernard's (1813–1878) philosophical aspects, Bergson indisputably denies the relevance of vitalism (Bergson [1934] 2013, 232–34). Let us push straw men aside, stay close to the facts and arguments, and form a proposition:

> The élan vital *was and will be a philosophical idea that is conditioned by the same fallibilism as any other empirical hypothesis.*[167]

Before we proceed to my explication of Bergson's detailed analysis of evolutionary change, let me briefly further elaborate on Bergson's idea of the general characteristics of life. This will aid us in understanding the upcoming detailed explanation. Bergson attests that the more one concentrates on the continuity of life, the more it starts to resemble the continuation of consciousness *in so far as* every state of consciousness follows from the previous mental state bearing three features in them. First, every new state of consciousness is *incommensurable* with the previous state, the movement of consciousness is *irreversible*, and the change in consciousness is (at least to a certain extent) *unpredictable*. Similarly, evolutionary processes are incommensurable, irreversible, and unpredictable.

Bergson notes that James Mark Baldwin (1861–1934) had already pointed out these features (cf. Baldwin 1902, 324–327). According to Baldwin, these

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[166] A historically important study would be to compare the inventors of different theories and ideologies and their scientific approach to the subject matter, for instance evolution – would there be similarities with those who study systems scale phenomena and within those who concentrate on the molecular mechanisms of natural selection? In fact, August Weismann himself has hinted at a similar direction (cf. Weismann 2013, 192).

[167] Cf. Bergson ([1932] 2013, 119–120).

features belong to the problem of 'genesis' and not only of 'analysis,' with which he means that the knowledge of life requires the knowledge of developmental aspects of life, not only the formalisation of living processes in functions. The incommensurable, irreversible, and unpredictable history of life has produced 'new genetic modes' that are not only synthetic products of its constituents (Baldwin 1902, 324). Using the vocabulary of systems theory, we could also call this genesis *emergence*. The ontogeny of an individual and its death and decomposition are not inverse movements of the same process (Baldwin 1902, 324). When an organism dies, many different processes begin, which in turn enable the life of other organisms. Because there is a constant input of solar energy that plants gather, life in general increases the energy it contains. Several factors, such as the amount of energy and the duration of evolutionary process, amount to the fact that this process as whole is unpredictable.

'Continuity of change [and] conservation of past in the present'[168] are the common characteristics of living beings and consciousness (Bergson [1907] 2013, 23). Every birth and life of a species is an event which has never occurred before and will never occur again, and by progeny, all the lives of all the living species in all the passages of evolution in all the phyla are singular events.[169]

Armand de Ricqlès, a palaeontologist himself, has speculated that the *élan vital* refers both to the continuity of genetic information through the lines of evolution and the continuity of the flow of energy through the biological systems:

> [I]t would seem that the *élan vital* covers both *genetic continuity*, that is, the flow of information and its changes, and the *continuous flow of energy* incessantly crossing the living and allowing this information to locally reverse the course of entropy. Admittedly, it is easy, *a posteriori*, to thus dump Bergsonian thought with concepts that were undoubtedly in part foreign to it . . . , but at least from a . . . perspective of descriptive analogy,

[168] 'Continuité de changement [et] conservation du passé dans le présent'

[169] We come later to the explicit definitions of intelligence, science, and philosophy, but let us for now simply say that this singular and irreversible, in other words enduring, nature of evolution holds something that science cannot by definition attain, and philosophy can (cf. Bergson [1907] 2013, 29–30). However, as we already noted, the understanding of evolution is needed for the understanding of the nature and purpose of the human cognitive faculties. Here indeed is an essential circularity: science and philosophy are needed to understand evolution, but evolution is needed to understand the cognitive and epistemological foundations on which science and philosophy are based on.

> it is indeed the combination DNA and thermodynamic systems far from the equilibrium that the *élan vital* might suggest. (Ricqlès 2008, 126.)[170]

I argue that Bergson emphasises two features of the *élan vital* as its most important constituents. Bergson writes that life passes 'from a generation of germs to the following generation of germs by the intermediary of the developed organisms which form the hyphen between the germs' (Bergson [1907] 2013, 88).[171] This passing *élan* is 'the profound *cause* of the variations'[172] (Bergson [1907] 2013, 88 my emphasis). Citing Bergson directly, I call the first feature of this profound causality the 'hypothesis of a common *élan*' (Bergson [1907] 2013, 88) and the second feature the 'unstable equilibrium of tendencies' (Bergson [1907] 2013, 99).

In the following subchapters, I will analyse Bergson's philosophical theory of biological evolution with the help of these two features. I will use genetics and evolutionary-developmental biology to corroborate my reconstruction and interpretation of Bergson's idea of the *élan vital*. In fact, Miquel (2007, 221–223) has already used scientific results in his interpretation of Bergson's philosophy. As I have already implied, I do not see the history of science and the history of philosophy as two completely distinct intellectual histories; thus, I will consider Bergson's philosophical theory and the relevant scientific theories as constituents of one common intellectual history.

6.3 Heredity and evolution in the context of the pseudo-problem of convergence

Let us now turn to the first characterisation of the *élan vital*, according to which all living beings share within themselves the common origin that engenders both the individual and the evolutive development. First, we deal with Bergson's analysis of different evolutionary theories in the context that I call the 'pseudo-problem of convergence.' Second, I propose certain more recent theories that could corroborate our aim to clarify Bergson's idea of the *élan vital*.

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[170] '[I]l semblerait . . . que l'élan vital recouvre à la fois la *continuité génétique*, c'est-à-dire le flux d'information et ses changements, et le *flux continu de l'énergie* traversant sans cesse le vivant et permettant à cette information d'inverser localement la marche de l'entropie. Certes, il est facile, *a posteriori*, de plaquer ainsi sur la pensée bergsonienne des concepts qui lui étaient sans doute en partie étrangers . . ., mais au moins dans une perspective . . . d'analogie descriptive, c'est bien à la combinaison de l'ADN et des systèmes thermodynamiques loin de l'équilibre que pourrait faire songer l'élan vital.'

[171] 'd'une génération de germes à la génération suivante de germes par l'intermédiaire des organismes développés qui forment entre les germes le trait d'union'

[172] 'la *cause* profonde des variations'

'In the decades surrounding 1900, evolutionists debated and negotiated the explanatory power and evidential basis of various theories of evolution' (Ulett 2014, 125). Darwin did not provide a robust explanation of the profound cause of the variation that provided the material *for* natural selection. While the formulation of the theory of natural selection was a ground-breaking event in biology, it was just one stage in the progress of evolutionary theory, not its *cause*. This left the stage open in the second half of the nineteenth and the beginning of the twentieth century for new theories aiming to provide explanatory mechanisms to answer to the problems created by questions of heredity, variation, speciation, and evolutionary convergence (cf. Ricqlès 2008, 119).

Life as we generally fathom it is a kind of unity: all living beings have common ancestry, all living beings have evolved from the same origin according to the same laws of evolution. According to Bergson,

> [Evolution has] taken place through millions of individuals, on divergent lines, each ending at a crossing from which new paths radiate, and so on indefinitely. If my hypothesis is justified, *if the essential causes working along these diverse roads are of psychological nature, they must keep something in common despite the divergence of their effects*, as schoolfellows long separated keep the same memories of boyhood. Roads may fork or by-ways be opened along which *dissociated elements may evolve in an independent manner, but nevertheless it is in virtue of the primitive impetus of the whole that the movement of the parts continues. Something of the whole, therefore, must abide in the parts*; and *this common element will be evident to us in some way, perhaps by the presence of identical organs in very different organisms*. (Bergson [1907] 2013, 54, my emphasis.)[173]

Despite of all the divergence and variety, there are examples of convergence between remote species that have struck many scientists' attention. Bergson points out the remarkable fact that two species, being as remote as possible from each other, have ended up having similar organs (Bergson [1907] 2013, 54). He

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[173] '[L'évolution] s'est faite en réalité par l'intermédiaire de millions d'individus sur des lignes divergentes, dont chacune aboutissait elle-même à un carrefour d'où rayonnaient de nouvelles voies, et ainsi de suite indéfiniment. Si notre hypothèse est fondée, *si les causes essentielles qui travaillent le long de ces divers chemins sont de nature psychologique, elles doivent conserver quelque chose de commun en dépit de la divergence de leurs effets*, comme des camarades séparés depuis longtemps gardent les mêmes souvenirs d'enfance. Des bifurcations ont eu beau se produire, des voies latérales s'ouvrir où *les éléments dissociés se déroulaient d'une manière indépendante ; ce n'en est pas moins par l'élan primitif du tout que se continue le mouvement des parties. Quelque chose du tout doit donc subsister dans les parties*. Et *cet élément commun pourra se rendre sensible aux yeux d'une certaine manière, peut-être par la présence d'organes identiques dans des organismes très différents*.'

states an intuitively plausible estimation that 'the more two lines of evolution diverge, the less likely it will be that accidental external influences or accidental internal variations will have determined the construction of identical devices on them, especially if there was no trace of these devices at the time the bifurcation [of their last common ancestor into two divergent species] occurred' (Bergson [1907] 2013, 54–55). [174] However, Bergson argues that the evolutionary convergence is not strange at all even when two maximally remote species seem to converge, if the evidence is gathered and hypotheses are well-formed (Bergson [1907] 2013, 54–55).

Before continuing further, let me give a brief explanation of the concept of *convergence*. Ogura (2004, 1555) defines convergent evolution as 'the process by which independently evolved features that are superficially similar to each other can arise through different developmental pathways.'

The reason why Bergson took up the example of convergence, or *homoplasy*, as it is also defined, between the great scallop (*Pecten maximus*) eye and human eye was that it provided a classical problematic setting among biologists, especially favoured by finalistic theories (Bergson [1907] 2013, 61; cf. Fishman 2008).

Bergson's took another example from sexual reproduction, as well, present both in animals and in plants. Referring to Paul Guérin (1830–1908), Bergson attests that the fecundation in plants and animals is similar in two ways: 1) in both, fecundation is 'the union of two nuclei that differ in their properties and structure before their union and immediately after become equivalent to each other,' and 2) the 'preparation of sexual elements . . . consists essentially in the reduction of the number of chromosomes and the rejection of a certain quantity of chromatic substance' (Bergson [1907] 2013, 59–60; Guérin 1904, 144–148; cf. Delage 1903, 140ff). However, plants have had completely different circumstances and obstacles to overcome during their evolution. Bergson doubts that sexual reproduction could be caused purely by adaptationist pressure. He also attests, by referring to Martin Möbius (1859–1946), that there is no necessary utility in sexual reproduction for plants.[175] However, he admits that the facts on

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[174] '[p]lus deux lignes d'évolution divergeront, moins il y aura de probabilités pour que des influences accidentelles extérieures ou des variations accidentelles internes aient déterminé sur elles la construction d'appareils identiques, surtout s'il n'y avait pas trace de ces appareils au moment où la bifurcation s'est produite'

[175] 'Es ist aber nun zu bedenken, dass im Pflanzenreich die Sexualität gar nicht die hervorragende Rolle spielt, welche ihr im [Tierreich] zukommt,' Eng. 'But it must now be considered that in the plant kingdom sexuality does not play the prominent role that it plays in the [animal kingdom]' (Möbius 1897, 206).

which the theories of the evolution of sexual reproduction were based were heavily disputed (Bergson [1907] 2013, 60).[176] In any case, Bergson saw the convergence of the human eye and the great scallop eye to provide the best example to tackle the problem of convergence (Bergson [1907] 2013, 61). In addition, Bergson did not stress the importance of the minute detail of the physiological homology between the scallop eye and the human eye, as Balan (1996, 89) suggests;[177] neither did Darwin ([1876] 2009, 152).

According to François (2010, 68), Bergson concentrated on the analogy between their *functions* and abstracted two alternative points of view on the problem: 1) that the convergence is accidentally caused by random variation; 2) that there is a finalist cause that has engendered the convergence. The first point of view comprises the conceptions of evolution as mechanistic and gradual complication of beings by the accumulation of parts. The second point of view

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[176] Nowadays, Bergson's example of sexual reproduction could be sound because the scientific evidence of it has tremendously improved. Unfortunately, this is not a context in which we can develop this idea further. Notwithstanding, I find it illuminating to refer to certain recent scientific findings of the sexual reproduction in plants that highly resemble the analogous functions as in animal kingdom. As de Visser and Elena (2007, 139) have noted, '[s]exual reproduction, in one form or another, is present in all branches of the tree of life. The fact that sex is so phylogenetically widespread indicates that it comes with a simple and general advantage that explains its evolutionary success. In fact, sexual reproduction often comes with substantial costs.' These costs are avoided by asexual organisms (Kobayashi 2019, 135). However, over 99% of the eukaryotic species reproduce sexually (Thomas et al. 2019). According to Thomas et al. (2019), the most promising hypotheses for the beneficial effects of sexual reproduction are that 1) 'sex may rapidly generate multiple novel advantageous alleles,' that 2) it 'will also reduce the deleterious effects of Muller's ratchet, i.e., the build-up and accumulation of deleterious mutations in asexual organisms,' and that 3) 'probably the most famous hypothesis . . . suggests that recombination creates novel genotypes that are able to resist pathogen and/or parasite infections . . . thereby maintaining host fitness despite endlessly evolving virulent pathogens/parasites.' What we can infer from these three hypotheses is that sexual reproduction seems *both* to a) speed up *and* b) stabilise the evolutionary rate of species and makes individuals more resilient to the exterior (harmful) influences. While the literature indicates that the research on the evolution of sexual reproduction is being somewhat eluded, it is still being studied. In fact, there is a consensus that the last eukaryotic common ancestor (LECA) reproduced sexually (Fu et al. 2019, 70).

[177] In fact, Balan (1996) provides us here with an illuminating misinterpretation. It also reveals a considerable number of informal fallacies that haunted Bergson's reception in general. Balan (1996, 88) commits to a fallacy of quoting out of context. He takes excerpts from Bergson's work to debunk them, but instead of understanding Bergson's aims, he reads into Bergson's argumentation an aim that is not there. In his conclusion, Balan (1996, 101–2) commits to a fallacy of appeal to ridicule. Bergson was aware of the facts with which Balan aims to refute him (cf. Bergson [1907] 2013, 76).

comprises the conceptions of evolution as goal-oriented and gradual realisation of perfection. According to these two points of view, convergence is either a random happenstance or an effort to perfection. However, instead of two alternative points of view, Bergson discerned four points of view in total. These four scientific theories as different points of view on evolution are 1) a theory of insensible small variations, 2) a theory of sudden, sensible variations, 3) a theory of externally directed variations, and 4) a theory of internally directed variations. The four different theoretical approaches to evolution that Bergson discerned matches identically with those expressed by Peterson (2008, 271): 1) mechanistic–non-directional–internal–gradual theory (MNIG), 2) mechanistic–non-directional–internal–saltationist theory (MNIS), 3) mechanistic–directional–external theory (MDE), and the finalistic-directional-internal theory (FDI). I will follow the terminology used by Peterson (2008), because I find it to be an explicit terminological choice to comprehend the general view on the most important evolutive theories at the turn of the twentieth century.

Darwin left a legacy: the unresolved problem of the mechanisms of heredity. Let me elaborate this legacy in some detail before comparing it to Bergson's interpretation. According to Darwin, heredity is the generator of any trait that develops during several generations. In fact, heredity is the most essential empirically observable fact of evolution: it marks the movement of life from parents to descendants, and its mechanisms can be empirically observed. Darwin expressed a *provisional* hypothesis of *pangenesis*, according to which 'every unit or cell of the body throws off gemmules or undeveloped atoms, which are transmitted to the offspring of both sexes, and are multiplied by self-division' (Darwin [1871] 2009, 280).[178] Darwin's theory of heredity was Lamarckian in the sense that it committed to the heredity of acquired characteristics. He ultimately left open the mechanisms of heredity, and after him, the most important theorists of heredity, August Weismann (1834–1914) and Hugo de Vries (1848–1935) among others, proposed their more robust theories to fill the theoretical gap left by Darwin's provisional hypothesis. However, the problems did not concern the theory of natural selection; in fact, the mechanism of heredity was separate from natural selection. Originally, Darwin hypothesised that natural selection operates

[178] In pangenesis, 'universally present gradual deviations from the norm are transmitted to the offspring. To account for their transmission, Darwin supposed that in all parts of the body extremely small particles were produced which subsequently were transported to the reproductive cells, where they were added to the store of those that had been present from the beginning. These particles, for which he proposed the name "gemmules," would transmit the special character of the parent to the offspring, because they would reproduce in the latter the features of the parts from which they were derived.' (Heimans 1962, 95.)

with insensibly small variations from which the unfit are discarded (Darwin [1876] 2009).[179]

Contrary to Darwin's insensibly small variations, William Bateson (1861–1921) and Hugo de Vries (1843–1835) theorised that variation is sudden and visible by mutations, from which the unfit are discarded (Bateson 1894; de Vries 1901, 1903). For instance, Peterson (2008, 270) has argued that Bateson's theorisation was an important contribution to the theory of neutral, that is, non-adaptive or non-directed, evolution.[180] August Weismann had earlier differentiated the germline from the generation of the somatic cells; there was no Darwinian pangenesis. Following similar paths as Weismann, de Vries, before his *Mutationstheorie* (1901, 1903), introduced the theory of *intracellular pangenesis* (de Vries 1889; cf. Heimans 1962, 95; cf. Stamhuis and Meijer 1999).

Darwin's theory has been called *gradualist* and Bateson and de Vries' theories *saltationist* (Lat. *saltus*, a leap). However, for Bergson, neither gradualist nor saltationist theories provide the generative explanation of the variation itself (Bergson [1907] 2013, 64). If the development of an organ happens through insensible variations, the variations must be coordinated by the organism and not prevent the functioning of the organ. Therefore, variations, for Darwin, are *insensible*, and the cumulating variations can over time effectuate significant change (Darwin [1876] 2009, 135, 147, 164; cf. Bergson [1907] 2013, 64).[181] But if the insensible variations do not affect the functioning of the organ, nor do they ameliorate it. If in every actual developed individual, the variation is ineffective,

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[179] Darwin recognised the existence of the sudden variations that he called *sports*, but he did not consider them relevant to the natural selection, producing only 'monstrosities' (cf. Bergson [1907] 2013, 63).

[180] As Peterson (2008, 271–272) remarks, Bateson's scepticism regarding panselectionism – the idea that natural selection is the only mechanism of the genetic variation – was turned against him, and he was given an 'anti-Darwinian' label by R. A. Fischer and later Ernst Mayr. These kinds of labels, when contrasted with facts that Bateson was a fully scientific and evolutionist theoretician, only makes one speculate about their political nature.

[181] '[I]t is not necessary to suppose that the modifications were all simultaneous, if they were extremely slight and gradual. Different kinds of modification would, also, serve for the same general purpose.' (Darwin [1876] 2009, 145.) 'We must suppose each new state of the instrument to be multiplied by the million; each to be preserved until a better one is produced, and then the old ones to be all destroyed. In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years; and during each year on millions of individuals of many kinds.' (Darwin [1876] 2009, 146.)

it is ineffective for good. *There is nothing to select for*. (Bergson [1907] 2013, 64–65.)[182]

The saltationist theory fixes one problem of gradualism: variations are sensible; thus, there is something to select for. But the sensible variations face problems in the coordination and functioning of the organ and the organism as a whole. The coordination of multiple changes was supported by the existence of correlative variation, which Darwin called the 'mysterious law or correlation,' such as the fact that white cats that have blue eyes are generally deaf (cf. Darwin [1876] 2009, 9).

However, Bergson warns that *correlation* does not mean *complementarity*: the changes are not coordinated to ameliorate a certain function but are rather disadvantageous lesions. In fact, the specific 'modification of the germ' or, anachronistically but not incorrectly put, a mutation in the gene that regulates the development of similar organs or structures, naturally effects correlative variation, as Bergson points out referring to the observations of Brandt (1898). Bergson notes that the concepts of *correlation* and *adaptation* get mixed up in biologists' discourse. This is almost acceptable in botany, where the coordinated variation is not necessary for the functioning of the organs. In animals and in their most important organs, however, it cannot be legitimate (Bergson [1907] 2013, 65–69). Bergson expresses the problem of the correlation in the following way, maintaining that in biological discourse there are two different significations of the concept of *paralogism*.

> [O]ne would commit a true paralogism by adopting one of them in the premises of the reasoning, and the other in the conclusion. Yet this is what one does when one invokes the principle of correlation in detailed explanations to account for complementary variations, and then speaks of correlation in general as if it were just any set of variations caused by any variation in the germ. We begin by using the idea of correlation in current science as an advocate of finality might do; we tell ourselves that this is simply a convenient way of expressing ourselves, that we will correct it and return to pure mechanism when we explain the nature of the principles and move from science to philosophy.[183] We then return to the mechanism, indeed; but this is on the condition that we take the word

[182] According to François (2013a, 426), this was a generally accepted criticism against Darwin's gradualism at the turn of the century.

[183] This is not the meaning of philosophy for Bergson; here, philosophy signifies a supposed discipline that gives the theoretical principles to any specific empirical research. I have already classified this kind of definition for philosophy or metaphysics as the "axiomatics of the scientific knowledge" earlier in this main chapter.

> 'correlation' in a new sense, this time unsuitable for the detail of the explanations. (Bergson [1907] 2013, 69.)[184]

Let us then turn to Bergson's analysis of the mechanistic-directional–external theory (MDE). Considering the eye, the necessary condition for its evolution is the constant exposure of an individual to a lighted milieu. But that light is an external condition for the appearance and the evolution of an eye would presuppose that light itself makes the structure of the organ adapt to its form. Evolutionary convergence is thus explained by the identity of the cause. But what kind of 'cause' is a lighted milieu? How does an organism adapt to a lighted milieu? There appear to be two forms of adaptation in the evolution of the eye: first, a passive, perhaps random, adaptation of the nerve cells to acquire photoreceptive capacities; second, the active usage of an eye, after which the formation of the eye is conditioned by its use. Bergson remarks that between the most rudimentary receptive surface and the camera eye, there is a difference between passivity and activity: comparing these two different kinds of sensory organs would be like comparing a photography paper with a camera.[185] Considering the individual's active usage of its organ, it makes a difference in nature, not only a difference in degree, although the evolution of the eye has passed gradually from a photoreceptive surface to an elaborate camera eye. In fact, life appears to be prone to the passive and random reception of novel variations, of which it can later make use. (Bergson [1907] 2013, 69–72.) *There appears to be a difference in degree, but in reality, there is a difference in nature*.

The utility of the eye does not reveal itself in isolation; its utility is revealed by its role in the sensorimotor system. The old philosophical problem between mechanism and finalism – do we have eyes to see, or do we see because we have eyes – is a pseudo-problem which does not concentrate on the real causality of evolution. In addition, a living organism is not interested in the light itself but

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[184] '[O]n commettrait un véritable paralogisme en adoptant l'un d'eux dans les prémisses du raisonnement, et l'autre dans la conclusion. C'est pourtant ce qu'on fait quand on invoque le principe de corrélation dans les explications de détail pour rendre compte des variations complémentaires et qu'on parle ensuite de la corrélation en général comme si elle n'était qu'un ensemble quelconque de variations provoqué par une variation quelconque du germe. On commence par utiliser l'idée de corrélation dans la science courante comme pourrait le faire un avocat de la finalité ; on se dit que c'est là simplement une manière commode de s'exprimer, qu'on la corrigera et qu'on reviendra au mécanisme pur quand on s'expliquera sur la nature des principes et qu'on passera de la science à la philosophie. On revient alors au mécanisme, en effet ; mais c'est à la condition de prendre le mot "corrélation" dans un sens nouveau, cette fois impropre au détail des explications.'

[185] About the evolution of the mollusc and vertebrae eye, see Erclik et al. (2009).

the things it can obtain using the lighted milieu. (Cf. Bergson [1907] 2013, 72.)[186] But now we are not talking about the effectiveness of light anymore; we have moved onto a completely different factor: the activity of the organism itself. Before going into Bergson's analysis of the activity of the organism itself as an evolutionary factor, I must point out some features of one MDE theory that is generally misinterpreted as a finalistic theory, but which in fact is a mechanistic one. It is Bergson's example of the MDE theory, as well.

I am of course referring to Theodor Eimer's (1843–1898) orthogenetic theory. For Bergson, Eimer attributes all evolutionary causalities to external physical and chemical influences (Bergson [1907] 2013, 73). Eimer's central idea could summed up as follows: 'Eimer argued that new characters would develop if the physical or chemical environment changed an organism's development or growth process. . . . The chemical, physical, morphological, and physiological features of an organism would constrain and force novel features to take place in specific directions.' (Ulett 2014, 126.) According to Gould (2002, 356), Eimer in fact rejected vitalism or finalism from his theory of orthogenesis, contrary to the general view on his theory. Eimer (1890, 64) has put his aim clearly as follows: 'I repudiate any special internal force of evolution. According to my view, everything in evolution is due to perfectly natural processes, to material, physical causes.'[187]

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[186] Using genetic computational algorithms, certain researchers have obtained results suggesting that natural selection does not favour an 'objective' or a 'truthful' vision of the properties of the environment. It favours strategies that improve the individual's fitness. The faculty of vision must face several conditions. First, the obtaining of information requires energy and takes time. Effective activity with the minimal use of energy within the fastest duration are two important factors. Second, individual characteristics are dependent on other evolutionary, developmental, and environmental factors. Third, vision is dependent on cognitive factors such as prediction (Hoffman and Prakash 2014). As Hoffman and Prakash (2014) state, natural selection favours 'perceptions that are useful though not true. This might seem counterintuitive.' However, as also Bergson remarked over a hundred years earlier, this is not in fact counterintuitive at all from the evolutionary point of view. On the contrary, the belief in visual perception that aimed at 'truth' and 'objectivity,' whatever are meant by them, uses highly anthropomorphic concepts. Unfortunately, we cannot go into this problem of the concept of truth in this context.

[187] I am not going into the labels that different theorists have given of each other. However, to give an idea of Eimer's position, he was *rather* a 'materialist' and a 'determinist,' as Gould (2002, 356) has remarked: 'In fact, Eimer's philosophical defense of orthogenesis relies largely on its putative superiority over Darwinism as an evolutionary mechanics in the determinist tradition; for a discovery of law like order and direction in the key domain that Darwin had surrendered to chance – the origin of variation – would represent a notable triumph for a physicalist worldview.'

Suspicious toward Eimer's conception of biological causality, Bergson takes up the concept of *causality* and gives a short analysis of its equivocal meaning. He finds three different use cases of the concept, usually confused with one another: *impelling* (*impulsion*), *releasing* (*déclenchement*), and *unwinding* (*déroulement*). A billiard ball *impels* another billiard ball; the spark makes the gunpowder explode by *releasing*; the spring that turns the phonograph by a gradual relaxation *unwinds* the inscribed melody. These modes are differential according to the degree of solidarity between the cause and the effect. (Bergson [1907] 2013, 73–74.) According to Bergson, external causes should be understood in terms of releasing, and he asserts that this was what Eimer himself seems to intend (Bergson [1907] 2013, 74–75; cf. Eimer 1888, 1897). However, the releasing causal factor must have something it releases, and in the case of biological organisms, the question cannot merely be about a spark exploding a pile of gunpowder. The causal connection must be understood in terms of a living and acting being.

Considering the camera eye, what are the exterior circumstances that cause its evolution? It is highly probable that the photoreceptive organs developed from the presence of light. However, its explanatory power impoverishes as soon as one considers the evolution of more complex visual organs that do not merely receive different intensities of light but clearly are used by the organisms themselves to *see*. Both humans and great scallops actively see and not merely receive light – why would they otherwise even had camera eyes? The convergence of the camera eyes between humans and great scallops is not only phylogenetic; also, the ontogeny of both animals show convergence: the formation of human eye starts from completely different embryogenetic settings than the formation of scallop eye. (Bergson [1907] 2013, 75–77.)

The *cause* for the variation must be internal because external causes are not sufficient. Eimer's orthogenesis is the only *externalist* theory of the four theories we have here. We have already dealt with MNIS and MNIG; thus, we have one *internalist* theory left to consider. Instead of being non-directional, as the two earlier internalist theories, this one is directional.

If on many occasions the notion of psychological activity is invoked, then this psychological activity should probably be taken into consideration. Accepting the psychological activity of an organism as a factor of evolution is generally labelled as 'Lamarckism.' (Cf. Bergson [1907] 2013, 77.) According to Lamarckism in general, the direction of evolution is conditioned by the activity of an organism; hence, an organ can develop or atrophy through its use or disuse. Use or disuse signifies either an effort or a lack of effort on a particular organ. 'This effort [of the species] could on the one hand only be the mechanical exercise of certain organs, mechanically provoked by the pressure of the exterior

circumstances. But it could also imply consciousness and will' (Bergson [1907] 2013, 77).[188] According to Bergson, the latter point of view is supported by Edward Drinker Cope (1840–1897) (Bergson [1907] 2013, 77–78; Cope 1887, 437–457; 1896, 495–517).

According to Bergson, neo-Lamarckism is the only theory that can consider psychological, or cognitive, factors as part of the evolutionary development. Thus, it is the only one of the theories that can explain the development of those organs that are necessarily connected with the cognitive behaviour of organisms. According to neo-Lamarckism, the similar organs are the products of psychological, or cognitive, effort of individuals against the same exterior circumstance over the course of several generations. However, the concept of *effort* causes problems if it is not well defined (Bergson [1907] 2013, 78).

Neo-Lamarckism claims to explain transmutation through cognitive effort. However, varying intensity of exertion and change produced by effort are two different things. The evolution of the camera eye is not an intensification of the capacity of seeing – it is a qualitative change of a merely photoreceptive surface into a highly sophisticated organ used by an active animal (Bergson [1907] 2013, 78). What could this effort be? It cannot be anything like the transmission of acquired characters, as Bergson argues (Bergson [1907] 2013, 79–84). Based on several scientific findings, Bergson concludes as follows:

> In general, . . . the habits formed by an individual probably have no echo in its offspring; and when they do, the modification in the descendants may have no visible likeness to the original. Such, at least, is the hypothesis which seems to me most likely. . . . [W]e must keep to the actual results of observation. . . . [F]acts show us that hereditary transmission is the exception and not the rule.[189] (Bergson [1907] 2013, 84–85.)[190]

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[188] 'Cet effort [d'espèce] pourrait d'ailleurs n'être que l'exercice mécanique de certains organes, mécaniquement provoqué par la pression des circonstances extérieures. Mais il pourrait aussi impliquer conscience et volonté.'

[189] 'En général . . . les habitudes contractées par un individu n'ont probablement aucun retentissement sur la descendance : et, quand elles ont, la modification survenue chez les descendants peut n'avoir aucune ressemblance visible avec la modification originelle. Telle est du moins l'hypothèse qui nous paraît la plus vraisemblable. . . . [N]ous devons nous en tenir aux résultats actuels de l'observation. . . . [L]es faits nous montrent que la transmission héréditaire est l'exception et non pas la règle.'

[190] Why does Bergson refute Lamarckism so carefully? Based on the historical hypothesis of the 'eclipse of Darwinism' and the prevailing support of Lamarckism among the early twentieth-century French biologists, I suggest that Bergson was cautious of the political

Bergson maintains that the neo-Lamarckian theories, such as that of Cope, have not correctly understood the nature of consciousness and volition (Bergson [1907] 2013, 77–78). In short, the anthropomorphic idea of volition cannot explain variation and heredity; it cannot explain the ontogeny nor the phylogeny of an organ. Furthermore, it has no explanatory power in plant evolution (cf. Bergson [1907] 2013, 78–79). Although the evidence suggests that certain cytotoxins such as alcohol can alter the germ cells, the same criticism holds with the Lamarckian theory as with the saltationist theory (Bergson [1907] 2013, 79–85).

Bergson points out that all the considered evolutionary theories have their defects and merits, and all of them rest upon an enormous pile of observed facts. Each of them, although incommensurable with each other, must be partially right. This incommensurability reveals the positive role of philosophy, which I will discuss in chapter 8. Let us now put together how Bergson recapitulates these theories. He argues that Darwin, Morgan, and de Vries are right in attesting that evolution proceeds through the internal variation of the genetic matter; they are wrong in maintaining that the differences in the germ are purely random and separate from the rest of the hereditary matter. Although the differences are produced by chance, the *tendency* to change is not dependent on chance (Bergson [1907] 2013, 85–87). This leads to an orthogenetic hypothesis. According to Bergson, the orthogenetic hypothesis 'appears plausible to me, in the limits in which Eimer himself encloses it. Assuredly, the evolution of the organic world must not be predetermined in its entirety' (Bergson [1907] 2013, 87).[191] For Bergson, the spontaneity of life manifests itself 'by the continuing creation of forms succeeding into other forms' (Bergson [1907] 2013, 87).[192] But the indeterminateness is not complete. There must also be some determination. For Eimer, determination and convergence result from purely physical and chemical causes. While the Lamarckian theory stresses the importance of effort and volition, it is improperly anthropomorphic, and at most, it is tied only to those organs an animal can influence by its volition. (Bergson [1907] 2013, 87.)

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matters of the French scientific community of his time. We can always try to be smart afterwards, but we need to be sensitive to the political realities that have always resided in the academic world. It is a fact that the evolutionary theory was politicised in the early twentieth century and opposing the prevailing doctrine of Lamarckism must have been a risky position for Bergson. He ultimately burned his fingers, so to speak, with physicists several years later. This topic would require such a long treatment, into which this dissertation cannot unfortunately proceed.

[191] 'nous paraît plausible, dans les limites où Eimer lui-même l'enferme. Certes, l'évolution du monde organique ne doit pas être prédéterminée dans son ensemble.'

[192] 'par une continuelle création de formes succédant à d'autres formes.' Cf. Darwin's famous ending for *The Origin of Species* ([1876] 2009, 429).

6.4 The hypothesis of a common *élan*

The following paragraph concludes the interpretation of Bergson's analysis of the four different theories on variation and heredity:

> A hereditary change of definite meaning, which will accumulate and compose itself in such a way as to build an increasingly complicated machine, must undoubtedly relate to some kind of effort, but to an effort far more profound than the individual effort, and far more independent of circumstances, common to most representatives of the same species, *inherent in the germs they carry rather than in their sole substance, thus assured of being transmitted to their descendants*. (Bergson [1907] 2013, 88, my emphasis.)[193]

Here, Bergson explicitly states that the source of this effort is in the hereditary matter itself *as* a hereditary matter. Based on previous sections, I discern three characteristics of Bergson's idea of a common *élan*: 1) it signifies a specific kind of effort that is inherent in hereditary matter itself, 2) its heredity is rather Weismannian than Lamarckian, and 3) especially in animals, it nevertheless has something to do with learning and behaviour. The sum of these characteristics has been difficult for me to comprehend, so to clarify this problematic situation, I have found two ways to proceed forward. First, I argue that taking genetics into consideration clarifies Bergson's conclusion. Notwithstanding, genetics as a branch of biology has undergone a tremendous development during the twentieth and twenty-first centuries. Let me concisely explicate the history of genetics in order to make genetics as a corroborating topic for my argument. After genetics, let me suggest that James Mark Baldwin, whose name has already made several appearances in this dissertation, has proposed a theory that addresses the third characteristic of the common *élan*. With these two corroborations, I argue that Bergson's first half of the *élan vital* is sufficiently explained.

Nowadays, both heredity and variation are the subject matter of genetics. Before genetics, the biological sciences comprised heredity, taxonomy, embryology, and palaeontology. The data of these sciences have supported each other, overlapped, or converged. In fact, Bergson even hints that experimental

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[193] 'Un changement héréditaire et de sens défini, qui va s'accumulant et se composant avec lui-même de manière à construire une machine de plus en plus compliquée, doit sans doute se rapporter à quelque espèce d'effort, mais à un effort autrement profond que l'effort individuel, autrement indépendant des circonstances, commun à la plupart des représentants d'une même espèce, *inhérent aux germes qu'ils portent plutôt qu'à leur seule substance, assuré par là de se transmettre à leurs descendants*.'

genetics could even corroborate the biological science, so that it would rely less on inferences from palaeontology and more on the direct observation of those mechanics that engender the evolutionary change (Bergson [1907] 2013, 24).

The term *gene* was coined by the Danish naturalist Wilhelm Johannsen (1857–1927) in his work *Elemente der exakten Erblichkeitslehre* (1909, 124), two years after the publication of *L'évolution créatrice*. The first theory of the hereditary carriers as *pangenes* was proposed by de Vries in *Intracellulare Pangenesis* (1889), of which Johannsen's concept was a shortened version. The first explicit statement of the genetic information was the speculated "principle" stated by Frederick Griffith in his publication 'The Significance of Pneumococcal Types' (1928, 149). In 1941, Beadle and Tatum (1941) discovered that genes translate into proteins. In 1953, Watson and Crick (1953) discovered the double helix molecular structure of the DNA. According to Portin and Wilkins (2017, 1356), '[t]his was followed by demonstrations in the early 1960s that genes are first transcribed into messenger RNA (mRNA), which transmitted the genetic information from the nucleus to the protein synthesis machinery in the cytoplasm.' Discoveries were made throughout the 1950s and 60s, and the basic idea of the function of a gene was that one DNA sequence was transcribed into one mRNA strip, which was then translated into a polypeptide chain forming the primary structure of the protein. Here is an excerpt that concisely explains the development of genetics:

> It took approximately half a century to go from Johannsen's wholly abstract formulation of the term 'gene' as a 'unit of heredity,' to reach the early 1960s concept of the gene as a continuous segment of DNA sequence specifying a polypeptide chain. A further half century's worth of experimental investigation has brought us to the realization that the 1960s definition is no longer adequate as a general one. . . . *A gene is a DNA sequence . . . that specifies one or more sequence-related RNAs . . . that are both evoked by GRNs* [genetic regulatory networks] *and participate as elements in GRNs*, often with indirect effects, or as outputs of GRNs, the latter yielding more direct phenotypic effects. (Portin and Wilkins 2017, 1361–1362, emphasis modified.)

I find Portin and Wilkin's definition satisfying for those geneticists and bioinformaticians who work within the different fields dealing with genes and genetic information. The whole field of genetics has changed during the twentieth century, and a deeper understanding of the subject of genetics has also turned its emphasis towards the tools of information science (cf. Lamm 2014, 2285). While information processing is a metaphor and a scientific tool for observing and manipulating genetic information, it has proven to be a highly

effective approach. In addition, cognitive metaphors of genetic information systems started appearing.[194]

Another approach from genetics could be the deep homology of certain genetic networks. The genomic layout of all animals shares certain crucial deep homologies. According to Hall (2007, 475), 'while presence of a character may be discontinuous, the developmental basis for that character can persist uninterrupted for long periods of evolutionary time.' The *Hox* gene family is the master controller of the animal morphogenesis (cf. Pick and Heffer 2012), and the *Pax* gene family is the master controller of especially the sensorimotor and nervous systems (cf. Hill et al. 2010; Hall 2007, 477; Cvekl et al. 2017; Hou, Li, and Luan 2016; Yoshida, Yura, and Ogura 2015; Suga et al. 2010). Because the same genetic networks give the building blocks for adaptations, they are one of the main reasons for the convergence of adaptations in animals, and thus there is a common *gene network regulation* in these animals.[195]

Instead of making it obsolete, I argue that these genetic discoveries profoundly corroborate Bergson's theory. In other words, all the living beings, in this sense, have a common *élan* (cf. Bergson [1907] 2013, 51, 119–120). Based on this concisely reconstructed history of genetics, it is plausible to state that scientific theories had to wait for technological and theoretical advancements to study genomes as Bergson had philosophically theorised decades before. In short, scientific observation of genetic phenomena had to wait for powerful computing power and modelling tools that took advance of that power.

In this context, I want to point out one significant consequence of the deep homology of specific genetic regulatory networks on the development of cognition. As we know, the main task at hand is to study the development of cognition, under which Bergson's theory of evolution is subsumed. Nonetheless, the comparative neurological and evolutionary evidence point towards the fact that in the various phyla, *different* anatomical brain structures are evolved to deal with *analogous* circumstances. Certain insects have *mushroom bodies* (*corpora pedunculata*). These mushroom bodies are the cerebral location that generates cognitive and social functions in insects and in other arthropods. It is remarkable that the mushroom bodies have evolved apparently independently in butterflies (*Lepidoptera*), dragonflies (*Odonata*, *Anisoptera*), cockroaches (*Blattoidea*) and hymenopterans (*Hymenoptera*). Their sizes are also relatively large, and in

[194] Cf. Koseska and Bastiaens (2017); Mah and Leys (2017); Bonner (2000, 63–72).

[195] However, there is some evidence that the regulative gene families, although having a common origin, further evolved into similar directions independent of each other, cf. Jákely, Paps, and Nielsen (2015); Dunn, Leys, and Haddock (2015); Liebeskind et al. (2016); Ryan (2014).

honeybees (*Apis*), the mushroom bodies occupy about half of the volume of the brain (Roth 2015, 2).[196] In birds, such as crows (*Corvidae*), the relevant brain area, which is believed to execute the highest cognitive functions, is called *avian pallium*. In mammals, the functionally analogous brain area is called *cerebral cortex*. The different sub-structures of avian pallium and cerebral cortex are being observed to share correlative functions (cf. Roth 2015, 4–5).[197] In octopods, this analogous brain area is the *vertical lobe* (cf. Roth 2015, 3). It is remarkable that in both insect (*Insecta*) and cephalopod (*Cephalopoda*) classes the same brain area that controls the highest cognitive functions also controls the sensory data.[198]

Indeed, Bergson remarks that the difference between the simplicity of function and the complexity of mechanism that carries out the function bewilders the human mind. The mechanistic explanation can, in indefinite accuracy, reconstruct the model of the functioning of the organ, but it cannot answer to the correlation between the complexity of the organ and the simplicity of its usage. Finalism, which explains the organ as a realisation of an idea, or a plan is an explicitly anthropomorphic explanation and must as such be directly discarded. But if a mechanistic explanation wants to *explain* the *reason* of the functioning of an organ, it must borrow this anthropomorphic model from finalism (Bergson [1907] 2013, 89–90). However, *simplicity* and *complexity* are not the extremes of the same scale – they differ from each other in nature and not in degree. In fact, it is one of my central aims in this dissertation to show that the reason why human consciousness recognises simplicity and complexity is, in reality, due to its cognitive abilities, as we saw in the fifth chapter, and to which I will return in the seventh and eighth chapters.

The anthropomorphic error originates from human intelligence's attempt to understand the workings of *organisation* in terms of *fabrication*. By fabrication, Bergson means the process of combining parts into a whole, whereas organisation means the process of dissociating parts from the whole. From this point of view, it is not a surprise that there have been many metaphors of machines and mechanisms in the different life sciences (Bergson [1907] 2013, 93–

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[196] It is also telling that the Kenyon cells, the intrinsic neurons of the mushroom bodies, of the honeybee 'are the smallest ones found among insects, and their packing density is 15 times higher than the highest ones found in the vertebrate brain' (Roth 2015, 2).

[197] About the high cognitive abilities of birds, cf. Emery (2006).

[198] The future of comparative animal psychology will enlighten us with further evidence. As Sherry and Strang (2015, 59) note, '[m]emory, attention, concept learning, numerosity, spatial cognition, timing, social learning, and metacognition are standard topics in texts and reference books of animal cognition.' The amount of evidence in the turn of the twentieth century was minuscule in comparison with the present day. We must take this fact into account in considering the devices Bergson had at his disposal.

94). Mechanism and finalism are two causal models of human fabrication: one emphasises the end product (finalism), the other the means of production (mechanism). However, as Bergson emphasises, life is not fabrication but organisation. Out of these two anthropomorphic forms of causality, sciences use mechanism, because it has proved highly useful (Bergson [1907] 2013, 94).

It must be remembered that life in its everyday action, in the life of every species, is an activity that acts on its environment, and this environment presents itself to every species as matter. All the sensory, cognitive, and motor organs and faculties are disposed to act on matter. This action, and the situation in which the changing environment and evolutive movement itself lead the individual organism, is contingent, and the organism uses its sensorimotor and cognitive faculties to choose and deliberate in the varying and contingent environment. Choosing requires at least some kind of prediction and representation. Predicting and representing condition the cognition, which in turn conditions the contents of sight and senses. The relationship between reasons to act and the objects of action are rather similar in every highly intelligent species, and hence the canalisation of the analogous organs – whether they are eyes or brains (Bergson [1907] 2013, 97–98).

Bergson refers to Herbert Spencer Jennings' (1868–1947) definition of this psychology as a process of trial and error in his observations on *Infusoria* (Bergson [1907] 2013, 35).[199] According to Jennings (1904, 237–40), in Infusoria, 'the structure and the method of locomotion and reaction' permit the planning of trial and error simply and effectively (cf. Jennings 1906). While being rudimentary, the behaviour of the unicellular organism indicated hesitation and deliberation. The study of the behaviour of the unicellular beings is not restricted to eukaryotes, as the studies of Jennings (1906) demonstrate. A comparative genome analysis has revealed a 'vast system' of intracellular signalling in bacteria (Galperin 2005).

According to Bergson, life means above all an organism's tendency to act on its surroundings. This activity implies the presence of more or less *choice* (Bergson [1907] 2013, 97). What if individual organisms, and hence the whole populations they belong to, by effective learning, favour the selection of best learned individuals? To be clear, when it comes to the evolutionary development of an organism, it appears that Bergson's theory resembles that of Baldwin's. Next, I will corroborate Bergson's idea of the role of organisms' activity in their evolution by using Baldwin's theorisation.

James Mark Baldwin's (1861–1934) *organic selection*, nowadays known as the *Baldwin effect* coined by Simpson (1953, 111), is defined by the author as follows: 'The process of individual accommodation considered as keeping single

[199] *Infusoria* is a now obsolete term for certain unicellular organisms.

organisms alive, and so, by also securing the accumulation of variations, determining evolution in subsequent generations' (Baldwin 1902, 119). Baldwin's theory corroborates Bergson's theory insofar as they both share crucial similarities. By organic, Baldwin means that 'the organism itself cooperates in the formation of the modifications which are effected" and that "the organism is itself selected, since those organisms which do not secure the modifications fall by the principle of natural selection' (Baldwin 1902, 119). Considering the *artificial* selection of, for instance, horse breeders and the *natural* selection of species adapting to their environment that Darwin considered, *organic* selection added alongside the two former ones by Baldwin stresses the individual species' *learning* to increase their survival and adaptation (cf. Baldwin 1902, 119).[200]

The consequences of the psychological nature of life are crucial. First, competition, increased complexity and variability of environments and stimuli, and the interaction of the species with their environments forced divergent intelligent strategies to evolve (Richardson 2012, 591). A deliberate response to stimuli was an evolutionary advantage, and the deliberate response 'must involve the gathering and analysis of information of some sort. The simplest source of information for prediction is temporal association, in which a change in one variable is reliably correlated with change in another at some future time' (Richardson 2012, 591). Second, a 'deeper correlation structure within natural environmental change presents a definition of complex information.' In animal evolution, the increased complexity of sensorimotor systems has been able to abstract environmental change and render the experience of the surrounding environment more predictable (Richardson 2012, 592).

Now that I have explained the 'hypothesis of a common *élan*,' we can move on to the 'unstable equilibrium of tendencies.'

6.5 Unstable equilibrium of tendencies

In this chapter, I will deal with the *élan vital*'s feature of the 'unstable equilibrium of tendencies.' It is necessary to return to Bergson's motive, since it also motivates my analysis in this study: Bergson is not aiming at a complete reconstruction of natural history and of the purpose of life; instead, he aims to obtain a sufficiently approximative image of natural history and its causes in order to understand the generation of human cognition (cf. Bergson [1907] 2013, 106). This reconstruction has an important epistemological value because Bergson argues that it increases

[200] In contemporary philosophy, Daniel Dennett has turned his attention into the Baldwin effect, see (1991, 184–187; 2003; 1995, 73–80). Moreover, the central idea present in Baldwin and in later similar theories has become one of the key themes in computational biology and genetic algorithm research already decades ago (cf. Turney, Whitley, and Anderson 1996, v).

the probability of understanding the causes of extant evolutionary products – one of them being intelligence itself. Bergson remarks that the study of evolutionary change as he understands it:

> will have to unravel a certain number of divergent directions, and to appreciate the importance of what has happened along each of them – in a word, to determine the nature of the dissociated tendencies and estimate their relative proportion. Combining these tendencies, then, one shall get an approximation, or rather an imitation, of the indivisible motor principle whence their *élan* proceeds. (Bergson [1907] 2013, 102, translation modified.)[201]

Taxonomy treats different phylogenetic lines of evolution as different taxa. Bergson approaches phylogenesis from a philosophical point of view. Taxonomy is constructed with scientific methods, and philosophy requires another kind of comprehension. Bergson defines different taxa as different tendencies of accentuation. A taxonomist sees two different kingdoms: plants (*Plantae*) and animals (*Animalia*).[202] Bergson sees two different *tendencies* that are two different accentuations of the eukaryotic life form. Taxonomy is useful for science, as for philosophy, but philosophy requires more causal, or generative, mode of explanation of different phylogenetic lines (Bergson [1907] 2013, 107). I will soon show the natural history of life as Bergson reconstructs it according to his aim. Before Bergson's reconstruction of natural history, let us continue a bit further with the analysis of certain relevant concepts in this context: *adaptation*, *canalisation*, *direction*, *divergence*, and *dissociation*.

Let me define the concept of *adaptation* as the transmutation of a species by heredity that increases its fitness. This should be the most general acceptable definition of adaptation. According to Bergson, adaptation cannot explain the general evolutive directions, or the directionality itself (Bergson [1907] 2013, 103). Of course, Bergson does not claim that adaptation is insufficient explanation of the transmutation of species and their organs; he says that adaptation is evident (Bergson [1907] 2013, 102–103). Instead, Bergson argues that adaptation cannot explain its own origin, and neither does it explain the causal nature of the environment into which species adapt. The origin of the adaptation is the

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[201] 'consistera . . . à démêler un certain nombre de directions divergentes, à apprécier l'importance de ce qui s'est passé sur chacune d'elles, en un mot à déterminer la nature des tendances dissociées et à en faire le dosage. Combinant donc ces tendances entre elles, on obtiendra une approximation ou plutôt une imitation de l'invisible principe moteur d'où procédait leur élan.'

[202] About the recent taxonomic ordering, see Ruggiero et al. (2015).

common *élan* of organisms which I explained in the previous chapter. In this chapter, I will clarify the causal nature of the evolutive movement that itself modifies and creates its own environments.

The viable forms of life are highly restricted in many ways. They are canalised, as Bergson puts it figuratively (Bergson [1907] 2013, 95–96, 111–112, 126–127, 256). Instead of talking about canalisation in figurative terms, there are two scientific theories that I find to corroborate Bergson's point of view. The first theory is *niche construction*. I will not go into the problematics and disputes the various discourses hold with the whole theorisation of niche construction. I only want to underline that the genetic and phenotypic variation is remarkably conditioned by species' construction of their own ecological environment in which they adapt and which they modify so that the environments could be more fitting for them (cf. Laland, Odling-Smee, and Endler 2017; Saltz and Nuzhdin 2014). Secondly, there are several developmental and phenotypic factors that 'canalise' the gene expression, a theory coined by C. H. Waddington (1905–1975) in an incisive article 'Canalisation of development and the inheritance of acquired characters' (1942). In short, various scientific theories have proved that there are several developmental, phenotypic, environmental, and behavioural factors that canalise the possibility of viable variations (cf. Geiler-Samerotte, Sartori, and Siegal 2019; Hallgrimsson et al. 2019; Sato 2018; Levis and Pfennig 2019). The viability itself is a highly canalised factor. This is one of the reasons why it is so important for us to understand evolutionary theory and to recognise the mechanisms that *provide* the variation for natural selection to select for are so important.

Partly because of the restricting and canalising external factors, evolution is directional but not finalistic. Regarded retrospectively, evolution has followed directions, but these directions have not had aims. The *élan vital* is rather a *vis a tergo*, a propulsive cause. Life evolves forward, but it has no aims (Bergson [1907] 2013, 103–5). Notwithstanding, live does not proceed with mere adaptations.

Furthermore, evolution is not directional in one direction; instead, it has indefinite number of directions and tendencies (Bergson [1907] 2013, 99). In short, *divergence* means the *dissociation of tendencies*. While biological concepts signify the divergence of phenotypes or genotypes, Bergson's philosophical concept signifies the divergence of tendencies, which are not straightforward empirical ideas. Let us elaborate the concept of *tendency*. As I have already noted, the *élan vital* is an 'unstable equilibrium of tendencies' (cf. Bergson [1907] 2013, 99). *Divergence* for Darwin means the divergence of two species from the common ancestor (Darwin [1876] 2009, 87). In a word, divergence for Darwin means

speciation. Speciation, however, is not what Bergson is interested in.[203] According to Bergson, life

> is the continuation of one and the same impetus, divided into divergent lines of evolution. Something has grown, something has developed by a series of additions which have been so many creations. *This very development has brought about a dissociation of tendencies which were unable to grow beyond a certain point without becoming mutually incompatible*. (Bergson [1907] 2013, 53, my emphasis.)[204]

Thus, for Darwin, divergence means a hypothesis that is formulated from compared observations. Two species are hypothesised to have a common ancestor, because their anatomical comparison and already-existing taxonomical reconstruction provide an inference about their probable common ancestor. According to Bergson, divergence means incommensurate accentuations between two species that are hypothesised to have a common ancestor. Darwin's concept is generalised from observations; Bergson's idea is about the generative explanation of bifurcation itself.

I will go through the natural history in the way Bergson has reconstructed it in order to understand how and why evolution has ended up producing the human species (cf. Bergson [1907] 2013, 106). There are two great moments in natural history that Bergson takes as necessary moments of divergence and complementarity: 1) the divergence of eukaryotes into its two most successive kingdoms, plants (Plantae) and animals (Animalia), and their interrelated complementarity, and 2) the divergence of animal cognition into intelligence and instinct and their interrelated complementarity. I dedicate the rest of this chapter to explain the first moment, and I have reserved the whole next main chapter for explaining the second moment and its epistemological consequences. This chapter leads us to the doorsteps of the next chapter.

Life in general tends to grow and accumulate. Bergson speculates that unicellular life begun to evolve into multicellular organisms because of physical constraints. These constraints together with growth and evolutionary development forced life into multicellularity. (Bergson [1907] 2013, 100; cf. Veloso 2017.) It is generally recognised that the multicellular evolution was a

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[203] For instance, see Mayr (1992) for the criticism of Darwin's *principle of divergence*. The content subject to *divergence* is completely different than in Bergson's context.

[204] 'est la continuation d'un seul et même élan qui s'est partagé entre des lignes d'évolution divergentes. Quelque chose a grandi, quelque chose s'est développé par une série d'additions qui ont été autant de créations. *C'est ce développement même qui a amené à ce dissocier des tendances qui ne pouvaient croître au-delà d'un certain point sans devenir incompatibles entre elles*.'

necessary direction for the life in general to evolve, but it was a solution to a problem that had its trade-offs (cf. Leslie, Shelton, and Michod 2017; Niklas and Newman 2016).

The first great moment relates to different strategies of eukaryotes. According to Bergson, there are three different ways to differentiate plants and animals[205] from each other, which I name as follows: 1) metabolism, 2) motility, and 3) cognition.

Let us first consider metabolism. According to Bergson, it is possible that different accentuated strategies for gathering nutrition have caused eukaryotes to diverge into two different directions. There are two main problems that eukaryotes have had to solve, so to speak: 1) the problem of obtaining carbon and 2) the problem of obtaining energy. Plants obtain both carbon and energy by themselves by photosynthesis; they are thus *photoautotrophs*. Animals obtain both carbon and energy from other living beings; they are thus *chemoheterotrophs* (Bergson [1907] 2013, 107–109, 117).

However, metabolism does not completely explain these different tendencies. Different metabolic mechanisms imply different activities to obtain the nutrients that are being metabolised, as well. Thus, Bergson provides another way to differentiate plants and animals from each other: plants are sessile, whereas animals are motile. (Bergson [1907] 2013, 109.) Bergson speculates that it was possible that the first eukaryotes first tried to be both gatherers of solar energy and mobile – to be 'plants' and 'animals' in the same body plan. Certain extant unicellular eukaryote species of *Euglena* are examples of phyla that resemble animals and plants, that is, single-cell beings that use photosynthesis and are mobile creatures (cf. Wiegert, Bennett, and Triemer 2012).

The nervous system in animals and the chlorophyll in plants are analogous adaptations in the sense that they are both adaptations to gather energy. They have an analogous principle, but they diverge in their mechanisms and applications. (Cf. Bergson [1907] 2013, 115.) In fact, the organelles chlorophyll and mitochondrion can be seen as two poles of the same process. While the chlorophyll creates the chemical energy out from the electromagnetic energy, it stores it in the carbohydrates. A cell, especially a cell which consumes energy rapidly and in large quantities such as a myocyte or a neuron, to be able to use this energy stored in carbohydrates, needs to transform it into adenosine triphosphate (ATP). While almost all eukaryote cells have mitochondria, the mitochondrion's role in the animal tissues such as muscles and central nervous system is especially crucial. In this way we can see the 'animal function' of the

[205] Put precisely, Bergson mainly refers to multicellular land plants (Embryophyta) and multicellular animals (Metazoa).

mitochondrion and the 'plant function' of the chlorophyll. Before the animal body transforms the carbohydrates into ATP, they are conserved in glycogen (a polysaccharid molecule with glycogenin protein) located mainly in liver and in bone muscles.

However, sessility in plants and motility in animals are the effects of the third way to differentiate plants and animals from each other: cognition. Plants are generally non-conscious (*inconsciente*) and sessile; Bergson calls non-conscious plant cognition *torpor* (*torpeur*; Bergson [1907] 2013, 112–113). Sessility has probably been a conventional adaptation because there is an essential relationship between motility and consciousness. Rather, animals are conscious and mobile. (Bergson [1907] 2013, 111–113.) As they are non-conscious, plants do not use effort, but function more continuously.

Animals, on the other hand, are conscious, use effort, and act more discontinuously. They use effort to gain the needed alimentation or to avoid predators. This use of intensive and discontinuous system of muscles and nerves has conditioned the use and storage of energy to form into that which I just depicted. (Bergson [1907] 2013, 115.) We do not have to go deeper into plant cognition; it suffices to note that the plant kingdom has evolved their suitable strategies for cognition, and there has been no need for consciousness or faculties related to consciousness.

Let us concentrate on the evolution of the animal tendency. According to Bergson, the rest of the animal body is in the service of the sensorimotor system (Bergson [1907] 2013, 124–125; cf. Morat and Dufourt 1892a, 1892b).

The brain has evolved between the sense organs and the motor organs to elaborate motor reactions to the received sense stimuli – this is the universal function of all animals that have a brain or a concentration of nerve cells which fulfils the cranial functions (that is, not being only a nerve mat without a centre). The more this primary function of the brain intensifies, the more *indeterminate* and independent of the stimulus the *action* becomes. The brain is a 'reservoir of indetermination' (Bergson [1907] 2013, 126–127). The body plans of the first multicellular animals were probably indeterminate. Bergson speculates that the first animals were mobile and simple, not yet being specialised (Bergson [1907] 2013, 130–31). I corroborate Bergson's claim regarding the supposedly earliest vertebrate animal, *Pikaia gracilens*, an eel-like chordate less than four centimetres long that lived in the Middle Cambrian period. Its fossil was discovered in the famous formation of Burgess Shale in 1911.

Bergson attributes to arthropods (Arthropoda), and chordates (Chordata) the most successful realisation of animal tendency, contrasting them with other bilateral (Bilateria) phyla, such as echinoderms (Echinodermata) and molluscs

(Mollusca), which have not been as successful developmental paths.[206] A fossil of any hypothesised urbilaterian' animal, a common ancestor of all bilaterians, has not yet been found. Now, let us descend the taxonomic ladder of both arthropods and chordates to find their most successful specimens according to Bergson. By success, Bergson means 'an aptitude to develop in the most diverse environments, through the greatest possible variety of obstacles, to cover the widest possible extent of land' (Bergson [1907] 2013, 134).[207]

Among the extant chordates, the most successful specimen are us humans. Among the extant arthropods, the most successful animals are found in hymenopterans (Hymenoptera), which comprises bees (Anthophila), Sphecidae, and ants (Formicidae). As with other arthropods, the segments of the exoskeletal body of hymenopterans have adapted to specific functions, which they execute perfectly. In humans, especially the hands are not specialised in anything particular, but they can learn an indefinite number of skills (Bergson [1907] 2013, 133–35). The rigid body plan of arthropods and the flexible body plan of chordates have probably accentuated different modes of behaviour, that is, cognition. This difference is most accentuated in the most successful specimens of both phyla: hymenopterans and humans (Bergson [1907] 2013, 135). As I have already mentioned, I will give a detailed analysis of these forms of cognition in the next main chapter.

Now that I have explained Bergson's reconstruction of natural history from the point of view of evolution leading to humans, we can better understand his concept of *complementarity*. Many divergent lines of evolution help to complement one another after they have diverged by accentuating their proper tendency. Different evolutionary products, once diverged, benefit from one another (cf. Bergson [1907] 2013, 117). Bergson's concept of *complementarity* means the complementarity of evolutionary tendencies that are divergent accentuations of the tendency from which they have bifurcated.

To elaborate the concept of *complementarity*, let us take into consideration the aforementioned example of metabolism and elaborate it in the context of complementarity. Bergson remarks that plants have an analogous relation with microbes as animals have with plants: microbes gather nitrogen from the

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[206] Bergson writes about insects (Insecta) and vertebrates (Vertebrata) instead of arthropods and chordates, but I have taken the rights to increase the taxonomic accuracy of Bergson's point. Insecta is in fact a class of Arthropoda, and Vertebrata is a subphylum of Chordata, whereas Echinodermata and Mollusca are phyla. Now there is more coherence in talking about four different phyla of the common kingdom Animalia.

[207] 'une aptitude à se développer dans les milieux les plus divers, à travers la plus grande variété possible d'obstacles, de manière à couvrir la plus vaste étendue possible de terre'

atmosphere by nitrification, in which ammonia is oxidised into nitrite and nitrate, and provide it for plants, which need nitrogen compounds but cannot themselves produce them (Bergson [1907] 2013, 118). A similar mutualism exists between plants and fungi, as well: in a mycorrhiza, a fungus gives the plant water and minerals in exchange for carbohydrates (cf. Bergson [1907] 2013, 254; cf. Horton and Bruns 2001). To sum up, the most elementary inorganic resources are gathered into the whole biosphere by an elaborate and complex machinery, in which plants, bacteria, and fungi complement each other.

Animals are highly dependent on the evolution and increase in the biomass of plants (Bergson [1907] 2013, 114). Animals are dependent on organisms that produce oxygen in the atmosphere. In fact, the biological oxygen cycle in the biosphere is perhaps the basis for all extant and extinct multicellular life on the planet. It is hypothesised that during the Great Oxidation Event (GOE) approximately 2.4–2.0 billion years ago, oxygen-producing cyanobacteria began to oxidate the seas and the atmosphere of the Earth, leading to the oxidation events and the extinction of a large sum of organisms. Oxidation made possible the form of life on which all multicellular organisms are dependent. The accentuation of one form of energy production (photosynthesis) made other organisms extinct and allowed oxygen-consuming organisms such as animals to take advantage of both the oxygen and the biomass of photosynthesising bacteria and later plants. (Cf. Schirrmeister et al. 2013.)

Before considering the divergence and complementarity of cognitive tendencies, let me remind ourselves one more time of the importance of complementarity. Even if diverged tendencies are completely opposite to each other, as with plants and animals, they 'retain between them an apparent kinship' (Bergson [1907] 2013, 117).[208] The complementarity of plants and animals 'brings life to more and more efficient acts through the manufacture and use of more and more powerful explosives' (Bergson [1907] 2013, 117, 247, 255).[209] In short, animals could not exist without plants, and the inverse is in many cases evident, as well. What if cognition, as a product of evolution, has a similar natural history to other evolutionary processes as I have explained in this chapter? This will be the task of the next chapter.

[208] 'conservent toujours entre eux un air de parenté'

[209] 'amène la vie à des actes de plus en plus efficaces par la fabrication et l'emploi d'explosifs de plus en plus puissants'

6.6 Summary

In this chapter, I explained Bergson's motivation for committing to the biological sciences.

As I explained, Bergson's core idea that makes biology relevant for philosophy is their interdependent relationship. Because knowledge is a product of evolution, knowledge is conditioned by its evolutive factors. However, for human intelligence to understand these factors, it needs to know *how* to know them.

This led me to tentatively compare Bergson's conception of the relationship between philosophy and science with other conceptions that have related philosophy with science in one way or another. I abstracted two different models of the relation between philosophy and science, difference in degree model (DD) and difference in nature model (DN). These models will help us better understand the role of philosophy among biological matters over the course of the following chapters.

Next, I presented and analysed Bergson's concept of the *élan vital* first by gathering different interpretations of the concept from both Bergson scholars and scientists. After examining these interpretations, I laid out my own interpretation of the *élan vital* as a specific causal idea of evolution.

After we reached a clear picture of the nature of the *élan vital*, I analysed its role in Bergson's philosophical theory of evolution. I divided the analysis into two main characteristics of the *élan vital*: into the 'hypothesis of a common *élan*' and into the 'unstable equilibrium of tendencies.' In the analysis of the first characteristic, I corroborated Bergson's theory through the historical contextualisation of and the recent findings and theorisations in genetics; in the second, I corroborated it with evolutionary-developmental and ecological findings and theorisations.

The obvious anachronism notwithstanding, it would not be a great stretch to think of Bergson's *élan vital*, being both the hypothesis of a common *élan*' and the 'unstable equilibrium of tendencies,' as follows: genetic material itself is an agent in such a way that it solves problems, and it creates even in adaptation (cf. Okasha 2018).

7 INTELLIGENCE AND INSTINCT

Bergson's main philosophical principles of evolution are the common *élan*, *divergence*, and *complementarity*. I explained these principles in the last chapter. For Bergson, these principles are present in the evolution of cognitive capacities of the living species, as well. Throughout intellectual history, cognitive faculties are generally divided into a hierarchy of vegetative, animal, and reasoning human stages. However, for Bergson, as for Darwin and others before him, the different cognitive strategies do not differ in degree; they differ in nature. Plant cognition (vegetative cognition), instinct (animal cognition), and intelligence (human cognition) are different cognitive strategies employing accentuated forms of the same primitive cognition. First, I will explain the general scheme of the cognitive duality of intelligence and instinct, after which I will analyse Bergson's idea of both intelligence and instinct separately.

For Bergson, philosophers and naturalists in the history of philosophy and in the history of science have generally misunderstood the relation between different cognitive faculties. This general misunderstanding holds that different cognitive faculties are specific stages of one and the same mode of cognition:

> The main error, which, transmitted since Aristotle, has tainted the majority of the philosophers of nature, is to see in vegetal life, instinctive life, and in rational life three successive degrees of the same developing tendency, whereas they are three divergent directions of an activity which became divided by expanding (Bergson [1907] 2013, 136).[210]

As we saw in the previous chapter, plants and animals are two divergent accentuations of their common ancestor. These accentuations have their proper mode of cognition: plants have mainly shut down their cognitive capacities, which Bergson calls *torpor*, and animals have accentuated the active role of cognition. This active cognition has in turn diverged into two different forms: intelligence and instinct. All three cognitive forms, torpor, intelligence, and instinct are caused by the same growth or intensification as with any other evolutionary event. They are incommensurable with each other because they cannot develop and intensify without compromises.[211]

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[210] 'L'erreur capitale, celle qui, se transmettant depuis Aristote, a vicié la plupart des philosophes de la nature, est de voir dans la vie végétative, la vie instinctive et dans la vie raisonnable trois degrés successifs d'une même tendance qui se développe, alors que ce sont trois directions divergentes d'une activité qui s'est scindée en grandissant.'

[211] About the primordial cognition from which all three multicellular cognitive tendencies have diverged, cf. Grant (2009).

How does Bergson's idea appear in the light of earlier interpretations of the nature of cognitive faculties? Let us compare the previous excerpt from Bergson to the following excerpt from Darwin:

> The fewness and the comparative simplicity of the instincts in the higher animals are remarkable in contrast with those of the lower animals. [Georges] Cuvier maintained that instinct and intelligence stand in an inverse ratio to each other; and some have thought that the intellectual faculties of the higher animals have been gradually developed from their instincts. But [Félix Archimède] Pouchet . . . has shown that no such inverse ratio really exists. Those insects which possess the most wonderful instincts are certainly the most intelligent. In the vertebrate series, the least intelligent members, namely fishes and amphibians, do not possess complex instincts; and amongst mammals the animal most remarkable for its instincts, namely the beaver, is highly intelligent. . . . *[T]he more complex instincts seem to have originated independently of intelligence*. . . . Although a high degree of intelligence is certainly compatible with the existence of complex instincts, . . . it is not improbable that they may to a certain extent interfere with each other's development. (Darwin [1871] 2009, 37–38 my emphasis; cf. [1876] 2009, 205–234.)[212]

For Darwin, instinct and intelligence are not antagonistic cognitive strategies but in fact complementary, or at least coinciding, cognitive forms. Nevertheless, neither of the cognitive tendencies is dependent on the other faculty. I name the model of the tendencies of cognition which Bergson criticises, and Darwin refutes, a 'hierarchic model of cognitive modes' (HMC), and Bergson and Darwin's theoretical model of the forms of cognition a 'divergent model of cognitive tendencies' (DMC). In addition to vegetal life, instinctive life, and intelligent life, there now exists the common, primordial cognition, from which the tendencies of multicellular cognition have diverged from one another by accentuating certain aspects of the primitive cognition.

We will leave plant cognition aside and concentrate on intelligence and instinct. Instinct and intelligence are two divergent developments of the same cognitive principle (Bergson [1907] 2013, 168–169). In other words, they are two divergent solutions to the same problem (Bergson [1907] 2013, 144). This

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[212] There is an old debate concerning the instinctive and reflexive behaviour of animals (cf. Diamond 1974; Blix 2016; Beach 1955). In the same passage, Darwin refers to Spencer's idea that 'the first dawnings of intelligence have been developed through the multiplication and co-ordination of reflex actions' (Darwin [1871] 2009, 38). The whole problem was perhaps caused by the equivocal use of instinct as, on the one hand, somewhat synonymous with the reflex behaviour and, on the other, as a distinct, elaborated mode of cognition similar to intelligence.

principle is a method of action on inert matter, that is, the reality which appears in the organisms' experience. Thus, intelligence and instinct are two different methods to execute this principle. These methods are radically incompatible with each other – just like the plant life and the animal life are radically incompatible (Bergson [1907] 2013, 137). This is due to the limitation of life – life had to choose between two forms of cognition as it chose between two forms of gathering energy: plants and animals. Animal life is determined by mobility and cognition, or there is overlapping with what is meant by *mobility* and *cognition*. Mobility is the mode of activity which we saw to differentiate the animal tendency from the plant tendency (Cf. Bergson [1907] 2013, 136). Bergson defines the two different ways of action in the following way:

> Thus, it has the choice between two ways of acting on the raw material. It can provide this action immediately by creating for itself an *organised* instrument with which it will work; or it can give it *medially* in an organism which, instead of naturally possessing the required instrument, will make it itself by shaping inorganic matter. Hence intelligence and instinct, which diverge more and more as they develop, but which never completely separate from each other. (Bergson [1907] 2013, 142–143.)[213]

It seems that the invertebrates, specifically insects and even more specifically the class Hymenoptera, have adapted towards the accentuation instinct; in vertebrates, specifically mammals, and even more specifically hominids, the species have adapted towards the accentuation of intelligence. In insects, the main 'psychic activity' (cf. Bergson [1907] 2013, 143) is instinct, but it is supported by intelligence, and in mammals, intelligence is supported by instinct.

Bergson's approach to cognitive tendencies resembles the motivation of the birth of modern cognitive science. While until the 1950s, psychological research was dominated by behaviourism, which studied only the relationships between sensory input and behavioural output, the pioneers of cognitive science wanted to focus on what mechanisms lie between sensory inputs and behavioural outputs. There is an organism in the middle of input and output, and the basis of its behaviour is the making of evolution. In this way, all evolutionary explanations of behaviour are innate, if 'innateness' means that behaviour has

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[213] 'Or, elle a le choix entre deux manières d'agir sur la matière brute. Elle peut fournir cette action immédiatement en se créant un instrument *organisé* avec lequel elle travaillera ; ou bien elle peut la donner *médiatement* dans un organisme qui, au lieu de posséder naturellement l'instrument requis, le fabriquera lui-même en façonnant la matière inorganique. De là l'intelligence et l'instinct, qui divergent de plus en plus en se développant, mais qui ne se séparent jamais tout à fait l'un de l'autre.'

anything that is not completely conditioned by the received stimuli. This fact has invoked the old debates of innateness in the scientific discussion. In fact, they recurred in Bergson's work (Bergson [1907] 2013, 148), as well as in one of the pioneers of behaviourism (Kuo 1921). According to Kuo (1921, 649), some have assimilated instinctive behaviour with the old philosophical theories of innate ideas. However, as Bergson notes, all cognitive behaviour is innate in a certain manner (Bergson [1907] 2013, 148). The innateness Bergson is referring to is precisely the evolutive factors of behaviour and cognition. Both cognitive science and the evolutionary animal psychology study these 'innate' mechanisms according to which a living being reacts to stimuli or engenders self-generated actions (cf. Arguello and Benton 2017; Blumberg 2017). We will return to the innateness of intelligence and instinct later in this chapter.

7.1 Intelligence

The concept of *intelligence* is ambiguous in different sciences and within philosophy, with numerous equivocal definitions (cf. Legg and Hutter 2007). However, there are several generally accepted key characteristics of intelligence (cf. Amodio et al. 2019, 45–46; van Gerven 2017; Rosati 2017; Burkart, Schubiger, and Schaik 2017; Roth 2015; Kanazawa 2012). In short, the key characteristics of intelligence are held to be reasoning, planning, problem solving, abstract thinking, complex idea generation, and learning from experience (cf. Saxe, Calderone, and Morales 2018, 2). I will nevertheless restrict the definition of *intelligence* to the sense in which Bergson uses it, which has many similarities with the generally accepted key characteristics of intelligence. Within the context of this definition, I will gather scientific results to corroborate Bergson's analysis of the different elements of intelligence.

7.1.1 The nature of intelligence

We will first go through the propositions Bergson presents about his theory of intelligence and test these propositions against valid scientific evidence.

> *Intelligence is 'an arithmetic difference between the virtual activity and the real activity. It addresses the gap between the representation and the action.'* (Bergson [1907] 2013, 145.)[214]

Arithmetic difference means here *difference in number*. The *capacity* (virtuality) of the representative possibilities outnumbers indefinitely the possible actions to be

[214] 'une différence arithmétique entre l'activité virtuelle et l'activité réelle. Elle mesure l'écart entre la représentation et l'action.'

executed. This proposition means that intelligence is characterised by choice, which in turn enables hesitation and calculation. Intelligence is most intense where many equal possibilities open up to consciousness without the necessity of deliberation. Inversely, when there is but one possible real action, there is no use for intelligence. Representation and knowledge are only relevant in the realm of possibilities, hesitation, and choice. (Bergson [1907] 2013, 145.)

The grade of the arithmetic difference between executable actions and the actually executed actions implies *flexibility*. 'Intelligent behavior needs to be distinguished from behavior that may appear intelligent but lacks flexibility. . . . Intelligent behavior in animals is often referred to as *behavior that shows some degree of flexibility and emanates from some kind of mental representation* rather than immediate perception only' (Burkart, Schubiger, and Schaik 2017, 3–4, my emphasis).

The ability to represent events and actions can be defined simply as *imagination*; it can be defined as the faculty 'by which scenarios and situations that are not currently available to perception are formed in the mind's eye' (Emery 2004, 1906). The advantage of conscious representation over immediate, unconscious action is that possible situations can be internally practiced or simulated before the action is executed. This may be important when an individual encounters novel stimulus within a familiar context (Emery 2004, 1906).

Intelligence is spatial.

Intelligence 'has for its principal object the inorganic solidity' (Bergson [1907] 2013, 154), it represents clearly only the discontinuity and immobility (Bergson [1907] 2013, 155–156). The objects of intelligence are solid, discontinuous, and immobile objects. These characteristics apply both to the objects of perception and the objects of thought. In addition, '[t]he more consciousness intellectualises, the more matter is spatialised' (Bergson [1907] 2013, 190).[215] In *Essai sur les données immédiates de la conscience* Bergson stated his agreement with Kant about the properties of human spatial intuition:

> So I have assumed the existence of a homogeneous space and, with Kant, distinguished this space from the matter which fills it. With him I have admitted that homogeneous space is a form of our sensibility, and I understand by this simply that other minds, such as those of animals, although they perceive objects, do not distinguish them so clearly either from one another or from themselves. This intuition of a homogeneous

[215] '[p]lus la conscience s'intellectualise, plus la matière se spatialise'

> medium, an intuition peculiar to human, enables us to externalise our concepts in relation to one another, reveals to us the objectivity of things, and thus, in two ways, on the one hand by getting everything ready for language, and on the other by showing us an external world, quite distinct from ourselves, in the perception of which all minds have a common share, foreshadows and prepares the way for social life. (Bergson [1889] 2013, 177, translation modified.)[216]

For Bergson, spatiality thus connects perception and action with language and representations. Let us corroborate Bergson's idea of the spatial nature of intelligence with relevant recent scientific evidence. Human cognition is defined as spatial (Mix, Smith, and Gasser 2010; Vecchi and Bottini 2006; ÓNualláin and Ireland 2000). 'Spatial cognition is the ability to perceive spatial patterns, organise action in space, and understand spatial relationships' (Wynn and Coolidge 2016, 204). Spatial cognition 'engages an array of neural resources, from basic pattern detection in the visual cortex to executive reasoning abilities in the prefrontal cortex' (Wynn and Coolidge 2016, 204). The brain interprets the spatial relations from the visual data and forms its basic features such as up, down, left, right, inside, and outside. It also interprets features such as balance, enclosure, and symmetry. '[S]patial cognition is important to more than just toolmaking and navigation,' for example, for 'creating models of the world; that is, how one imagines his or her own lifeworld' (Wynn and Coolidge 2016, 204–205). Indeed, two spatial functions comprise a remarkable part of brain activity. First, the human brain creates 'mapped representations of reality in its sensory cortices, such as visual, auditory or somatosensory,' and it permits 'the experience of those maps in the form of mental images.' Second, the brain creates memory records of the sensory maps and plays back an approximation of their original content during recall (Meyer and Damasio 2009, 376).

The resources that spatial cognition gives for thought and consciousness are also 'fundamentally important in mathematical thinking, where they supply the primary metaphors for mathematical relationships' such as number lines, curves, and regressions (Wynn and Coolidge 2016, 204–205). Thus, there indeed is a connection between spatiality and quantity (cf. Pinhas and Fischer 2008, 408).

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[216] 'Avec [Kant] nous avons admis que l'espace homogène est une forme de notre sensibilité ; et nous entendons simplement par là que d'autres intelligences, celles des animaux par exemple, tout en apercevant des objets, ne les distinguent pas aussi nettement, ni les uns des autres, ni d'elles-mêmes. Cette intuition d'un milieu homogène, intuition propre à l'homme, nous permet d'extérioriser nos concepts les uns par rapport aux autres, nous révèle l'objectivité des choses, et ainsi par sa double opération, d'un côté en favorisant le langage, et d'autre part en nous présentant un monde extérieur bien distinct de nous dans la perception duquel toutes les intelligences communient, annonce et prépare la vie sociale.'

According to Orrantia and Múñez (2013, 106), 'the representation of numerical magnitude may rely on a format also shared by other, nonnumerical magnitude dimensions.' Humans may possess a universal and unified magnitude or quantity representation system which renders the cognition of diverse quantifiable dimensions possible. The historical evidence of human thought attests to the important relationship between spatiality and number as well. As Dehaene (2011, 135) remarks, geometry and arithmetic were in close connection already in the works of Euclid and Pythagoras. He attests that a spatial number map is a 'fundamental operation' in the human brain. They are close even neurologically. Humans are 'born with multiple intuitions concerning numbers, sets, continuous quantities, iteration, logic, and the geometry of space. Mathematicians struggle to reformalise these intuitions and turn them into logically coherent systems of axioms, but there is no guarantee that this is at all possible.' (Dehaene 2011, 228.) Despite the difficulties stated by Dehaene, the comparative animal psychology has gathered evidence that many cognitive faculties are present in different animals in different phyla. Certain essential cognitive faculties seem to converge. The cognitively highly developed species 'have evolved in parallel over time, thereby acquiring very differently organised nervous systems. *Despite different neural substrates giving rise to cognitive capabilities, rudimentary numerical capacities seem to be ubiquitous in advanced animals*.' (Nieder 2018, 1, my emphasis.)

According to another study, there are common properties to linguistic and mathematical representations: these linguistic and mathematical representations 'exhibit recursive syntactic structure that can be interpreted compositionally, meaning that the interpretation of a complex expression is a function of the interpretation of its constituent parts' and that they must be abstract enough to be connected (Scheepers and Sturt 2014, 1643–1644). This further corroborates Bergson's theory of language that I analysed in sections 5.3 and 5.4. These solid, discontinuous, and immobile facts also imply elements such as homogeneity and spatiality.

Spatialisation also affects the conception of time. The experience of the passage of time requires some mechanism that represents the temporal relationship between events in the consciousness. Interestingly, Howard (2018, 124) refers to Bergson in his article: 'Bergson postulated that this neural code is in some sense spatial, in analogy to the representation of physical space.' Howard asserts that there is 'a growing body of evidence that suggests there is in fact a strong analogy between the neural representation for time and the neural representation for external space in the visual system and that this suggests a deep connection between the neural computations supporting memory and those supporting visual attention' (Howard 2018, 124). He notes that neurological

evidence increasingly confirms this: '[T]he mammalian brain seems to maintain a representation of time that is compressed in a way analogous to the compression of visual space' (Howard 2018, 124).

> *The spatial nature of intelligence enables it to analyse and synthesise the elements of perception and imagination.*

Intelligence is 'characterised by the indefinite power to decompose according to any law and to recompose with any system' (Bergson [1907] 2013, 158).[217] This power is enabled by the homogenisation and spatialisation of the cognitive content of intelligence, as I just explained. '[I]ntelligence is, above all, the faculty of relating a point in space to another point in space, a material object to a material object. It applies to all things but remains outside them, and it never perceives from a profound cause other than its diffusion in juxtaposed effects.' (Bergson [1907] 2013, 176.)[218] Perhaps the role of intelligence has increased because of its suitability for great number of novel circumstances with a restricted number of responses. While human needs have remained relatively constant, but the different objects and environments have varied, the most suitable way to adapt the cognitive capabilities to the human needs has been to make them generalise and classify.

Let us consider Bergson's idea of the 'success' of human species as I explained in the sixth chapter in the light of intelligence. As Kanazawa (2012, 91) remarks, the role of intelligence may have become enormously accentuated over the course of modern human life. He speculates this to be caused by the fact that the current environment of human life is almost entirely evolutionary novel. According to his theory, 'more intelligent individuals are better than less intelligent individuals at solving problems only if they are evolutionarily novel. More intelligent individuals are not better than less intelligent individuals at solving evolutionarily familiar problems, such as those in the domains of mating, parenting, interpersonal relationships, and wayfinding . . . unless the solution involves evolutionarily novel entities.' (Kanazawa 2012, 91.) This is an essential remark, and it is in accordance with Bergson's theory. Furthermore, according to Burkart, Schubiger, and Schaik (2017, 21), 'big brains are associated with greater behavioural flexibility and higher innovation rates' under real-life testing.

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[217] 'caractérisée par la puissance indéfinie de décomposer selon n'importe quelle loi et de recomposer en n'importe quel système'

[218] '[L]'intelligence est, avant tout, la faculté de rapporter un point de l'espace à un autre point de l'espace, un objet matériel à un objet matériel ; elle s'applique à toutes choses, mais en restant en dehors d'elles, et elle n'aperçoit jamais d'une cause profonde que sa diffusion en effets juxtaposés.'

Flexibility and innovation – in other words, the ability to adapt and create – are beneficial factors for animal life when the species face novel and unpredictable environments. According to Roth (2015, 1), '[a] number of comparative and evolutionary psychologists and cognitive ecologists converge on the view that . . . mental or behavioral flexibility or the ability of an organism to solve problems occurring in its natural and social environment are good measures of intelligence culminating in the appearance of novel solutions not part of the animal's normal repertoire.'

Spatiality, analysis, and synthesis enable intelligence to manipulate objects and manufacture instruments.

Intelligence 'is the faculty of manufacturing and employing non-organic instruments' (Bergson [1907] 2013, 141, emphasis removed).[219] The whole genus *Homo* can be defined as a manufacturing animal. It is debated whether stonecutting and sharpening began with *Homo habilis* or already in the australopithecines, but nevertheless it is a fact that the manufacturing of stone tools was a crucial step in human evolution. Manufacturing implies goals and steps. 'The development of any technical system involves an increasing number of steps. Each step consists of a chain of actions, underpinned by decision-making; the second step is a consequence of the first and allows the third and so on, until the anticipated goal is achieved' (Lewis and Harmand 2016, 2). Achieving a complex causal goal requires, according to Lewis and Harmand (2016, 2), three steps. Let us consider stonecutting. First, the manufacturer needs an understanding of the fracture mechanics of the available stones he or she uses as his or her raw materials. Second, he or she needs sensorimotor control over the force and accuracy involved in the percussive gestures required to strike off flakes from the stone block. Third, he or she needs a visuospatial understanding of the locations and angles at which to strike the core and detach flakes such that each removal does not alter the stone's morphology in an undesired manner. In addition, spatial cognition is needed to discern the elements of action and the coordination of the elements for the successful attainment of the goal (Wynn and Coolidge 2016, 204–205). Based on these considerations, we can assert that the idea of causality in human cognition is evolutionally strictly tied to the manipulation and manufacturing of the objects of experience.

Mechanism and finalism are both *two causal models of intelligence.*[220]

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[219] 'est la faculté de fabriquer et d'employer des instruments inorganisés'

[220] See Bergson ([1907] 2013, 164–165).

According to Lombard and Gärdenfors (2017, 219), causal cognition allows human consciousness to do three important things. First, consciousness can predict outcomes based on observations. Second, it allows affecting and controlling events around the person. Third, it enables consciousness to predict causes from effects even if the causes are not perceivable. According to the authors, chimpanzees and corvids cannot execute significantly more impressive causal reasoning than rats. The key advance in human cognitive evolution over other primates and corvids is that humans have a highly more advanced representational system that enables them to '"reinterpret'" the observable world by referencing unobservable physical and mental causes' (Lombard and Gärdenfors 2017, 220). This fact may be the secret of the efficiency of human mechanistic explanation, based on mechanism's far-reaching assumptions.

According to Lombard and Gärdenfors (2017, 223–224), manufacturing (and, consequently, the utilisation of the manufactured tools) may have been the driving force of human capacity for *inanimate causal reasoning* – in other words, the reasons for understanding mechanistic causality. Tools *indefinitely* extend the space of possibilities of action. They allow action at a distance with varying force, precision, and composition that the body could never perform without assistance. Let us merely think of a stone: it can be used for hitting, smashing, and tapping; it can be thrown towards something; it can be reshaped with another stone; it can be sharpened and tied into a stick; and thus, bigger animals can be hunted more easily and safely. In fact, as Lombard and Gärdenfors (2017, 223–224) remark, '[d]uring the evolution of the hominins, not only the shape of the hand but also the shoulder section changed in such a way that made throwing much more effective' (cf. Roach et al. 2013). The ability to act with accuracy and speed at a distance was then expanded by technologies that allowed a more concentrated form of the hitting force, such as the tip of a spear. Spear throwing can therefore serve as an example of an inanimate causal understanding which marked the advancement of human causal understanding (Lombard and Gärdenfors 2017, 223–24; see also Gärdenfors and Lombard 2018).

Goal-directed action, with which the actor understands the means to achieve the goal, requires an understanding of the goal itself. Thus, mechanism and finalism are two different modes or functions of cognition which prepare and define the execution of action. However, in action, the goal and the means are cognitively and representatively more important than the motor action needed to achieve it (Haggard 2019, 17.14). Everyone who has practiced sports can recognise how the executed action is almost unconscious while the conscious attention concentrates on predicting the next hits, kicks, or other movements. Nevertheless, the actor acting towards a goal needs both the *direction* of the action and the *steps* required to reach the goal.

Animal studies support the same considerations about intelligence. That a crow transforms 'a novel piece of wire into a hook-like tool suggests some appreciation of mechanical causation' (Emery 2004, 1905). The differentiation of sense data into discrete elements and the formation of relations between the elements require discontinuous, immobile, and solid elements. This seems to be a universal attribute of animals with high cognitive capabilities. In an experiment, a crow 'appears to be capable of reasoning by analogy with her previous experience with hooks, by modifying non-functional novel material (metal wire) into hook-like shapes to retrieve food in a bucket inside a vertical tube. Furthermore, she chooses the correct length or diameter of tool out of a "toolbox" containing tools of different lengths and widths to reach normally inaccessible food' (Emery 2004, 1903). New Caledonian crows (*Corvus moneduloides*) 'display extraordinary skills in making and using tools to acquire otherwise unobtainable foods,' using hooks and cut leaves. 'Observation of the crows' tool use in the wild suggest complex cognition. For example, there is potential cumulative evolution in the complexity of stepped tools (increasing the number of steps required to make a more complex tool), which are analogous to minor technological innovations in humans. There are also population differences in the types of tools manufactured, seemingly independent of ecological variability, which has been suggested as a form of culture in chimpanzees' (Emery 2004, 1903; cf. Roth 2015, 5.) Chimpanzees are known to 'fabricate and use a wide range of complex tools and have been shown to vary in their tool use at many levels, for example preparing twigs for ant and termite dipping. Tool kits consist of about 20 types of tools for various functions. Only chimpanzees appear to be able to use one type of raw material to make different kinds of tools, or to make one kind of tool from different raw materials. They use tool sets in a sequential order, make use of composite tools and combine tools to a single working unit.' (Roth 2015, 6.) Chimpanzees thus have some capacity to generalise.

All the preceding characterisations of intelligence lead Bergson to the following proposition:

> *'Intelligence is characterised by a natural incomprehension of life'* (Bergson [1907] 2013, 166).[221]

In short, because intelligence can only comprehend change according to mechanism and finalism, it cannot understand the proper causality of evolution; thus, it is characterised by a natural incomprehension of life. In fact, it is not the original function of intelligence to reason about the nature of living phenomena.

[221] 'L'intelligence est caractérisée par une incompréhension naturelle de la vie.'

In the very beginning of the fifth chapter, I showed how Bergson argued that the function of human intelligence is directed towards action. In this chapter, I further analysed Bergson's theory of intelligence and corroborated it with recent scientific evidence. By now, it should be clear that intelligence is not the cognitive mode that speculates; intelligence is the cognitive mode of action. In other words, intelligence substitutes the 'real and interior organisation' (*organisation réelle et intérieure*) of things with the 'exterior and schematic reconstruction' (*reconstitution extérieure et schématique*). The reconstruction is produced by intelligence's capacity to comprehend and utilise its object (Bergson [1934] 2013, 191).

Notwithstanding, action imposes its form on perceived reality, but reality, to be acted upon, imposes its form on cognition and perception. Because of this interdependence of intelligence and reality, Bergson can say as follows: 'Intellectuality and materiality are constituted, in detail, through reciprocal adaptation.' (Bergson [1907] 2013, 188.)[222] This means that on the one hand, the cognitive utilisation of external milieu conditions the perceived milieu, but on the other hand, this milieu imposes its nature on cognition itself (cf. Bergson [1907] 2013, 207).

7.1.2 Epistemological consequences of intelligence

'All the operations of our intelligence tend to geometry' (Bergson [1907] 2013, 211).[223] *Deduction* and *induction* are two functions of this geometry (Bergson [1907] 2013, 212). Bergson maintains that all intellectual operations tend towards geometry as their highest achievement, but geometry already precedes the operations themselves, being their condition. Both induction and deduction attest to this (Bergson [1907] 2013, 211–12). In fact, induction and deduction comprise intellectuality in its entirety (Bergson [1907] 2013, 217).

Let us first consider deduction. If I know that three angles of a triangle are equal, I know through deduction that the sides of the triangle are also equal – I need no further experience to prove this. In addition, one does not need an education in geometry to understand that whatever position the triangle takes, it is an identical triangle if its three angles are equal. In fact, this is a necessity, perhaps as strong a necessity as can be. This kind of reasoning is a reasoning with the *already obtained*. Deduction and logic are reasoning that deduces from the given premises a conclusion that was already there. This is emphasised in circumstances that involve qualitative change, as pure deduction can only

[222] 'Intellectualité et matérialité se seraient constituées, dans le détail, par adaptation réciproque'

[223] 'Toutes les opérations de notre intelligence tendent à la géométrie'

function in absolute, unchangeable space. If all the variables are seen to be identical at any moment, they will result in identical consequences. But if we take into consideration any psychological fact, we can already see the problem of induction: How could I deduce anything from such premises that I cannot verify as identical in time? (Cf. Bergson [1907] 2013, 212–214.)

Bergson argues that induction is bound to the same restrictions as deduction. One does not need much intelligence to intuitively expect that same conditions follow from the same facts. 'This is based on the belief that there are causes and effects, and that the same effects follow the same causes' (Bergson [1907] 2013, 214–215).[224] This belief requires an assumption that things or groups of things can be isolated from the rest of reality. Of course, they can be isolated, but with what purpose and at what cost? If I know that every time I heat a kettle on a stove, after a certain period it will boil, what and how do I know? The fact is that I treat all the factors of this closed system of induction as absolute identities, just as I necessarily treat the angles and sides of a triangle. The abstraction of a system from the rest of reality and the relative stableness of its constituents gives me an illusion of the identity of past and present things. Even if I did not think of my stove as absolutely identical and eternal as a geometrical object, in the inductive inference it behaves *as if* it was identical and eternal. This suffices for my everyday activity and inferences, and as such the induction is completely legitimate. (Cf. Bergson [1907] 2013, 215–217.)

All quantitative disciplines take this as-if *and elaborate it as their basis* (Bergson [1907] 2013, 217). We will continue its consequences for science in the next main chapter. Now, let us state that this *as-if* is for Bergson the natural form or, to use a contemporary term, the interface, of intelligence. It is the natural geometry or spatiality of human intelligence.

> Intellect being no longer dependent on anything, everything becomes dependent on it; and so, having placed the understanding too high, we end by putting too low the knowledge it gives us. Knowledge becomes relative, as soon as the intellect is made a kind of absolute. I regard the human intellect, on the contrary, as relative to the needs of action. Postulate action, and the very form of the intellect can be deduced from it. This form is therefore neither irreducible nor inexplicable. And, precisely because it is not independent, knowledge cannot be said to depend on it:

[224] 'Celle-ci repose sur la croyance qu'il y a des causes et des effets, et que les mêmes effets suivent les mêmes causes'

> knowledge ceases to be a product of the intellect and becomes, in a certain sense, integral part of reality.[225] (Bergson [1907] 2013, 153.)

In short, only the generative explanation of intelligence and knowledge reveals us their proper nature and the correct relation between them. The nature of intelligence, as we saw in chapter 6, is one evolutionary development of animal cognition aside instinct, and both intelligence and instinct are cognitive means to execute action. Furthermore, Bergson notes that the mere reference of the human intelligence to action is in itself only a *petitio principii*, if its generative origin is not explained (Bergson [1907] 2013, 153–154). Central in Bergson's argument is that intelligence and the appearing material reality are co-evolved. They are in a reciprocal relation: 'one cannot engender one without making the genesis of the other'[226] (Bergson [1907] 2013, 200, cf. 203–204).

7.2 Instinct

The intellectual history of the concept of *instinct* seems to be more difficult to define than that of the concept of *intelligence*. I find it impossible to just go straight into Bergson's theorisation of instinct without first contextualising relevant use cases and definitions of instinct.

7.2.1 The nature of instinct

Bergson has discerned two approaches to the evolution of instinct: 1) seeing instinct merely as a reflex, a complication of reflexes, or an automated habit; 2) seeing instinct as an evolutionary adaptation parallel to intelligence. According to Bergson, treating instinct either as a compound reflex or as an automated habit is a symbolic way in which intelligence tries to understand instinct in terms of its own nature. If, by contrast, we accept the second point of view, that intelligence and instinct are seen as divergent accentuations of the same primitive cognition, intelligence becomes blind to the nature of instinct, because instinct is just the cognitive aspect intelligence has had to abandon. (Bergson [1907] 2013, 175.)

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[225] 'L'intelligence n'étant plus suspendue à rien, tout se suspend alors à elle. Et ainsi, pour avoir place l'entendement trop haut, on aboutit à mettre trop bas la connaissance qu'il nous donne. Cette connaissance devient relative, du moment que l'intelligence est une espèce d'absolu. Au contraire, nous tenons l'intelligence humaine pour relative aux nécessités de l'action. Posez l'action, la forme même de l'intelligence s'en déduit. Cette forme n'est donc ni irréductible ni inexplicable. Et, précisément parce qu'elle n'est pas indépendante, on ne peut plus dire que la connaissance dépende d'elle. La connaissance cesse d'être un produit de l'intelligence pour devenir, en un certain sens, partie intégrante de la réalité.'

[226] 'on ne peut engendrer l'une sans faire la genèse de l'autre'

Theories of the first group see in reflex, instinct, and intelligence different degrees of complication or perfection of the same mode of cognition.[227] In this approach, intelligence and instinct differ in degree. Theories of the second group see instinct and intelligence as different cognitive strategies which means that they are two different modes of cognition: intelligence and instinct differ in nature. The latter model also denies that instinct could be a mere acquisition of habit. Darwin was one of the early proponents of the second approach, whereas Spencer was one of the proponents of the first approach. Let us cite Darwin himself. He notes that 'the most wonderful instincts with which we are acquainted, namely, those of the hive-bee and of many ants, *could not possibly have been acquired by habit*' (Darwin [1876] 2009, 206, my emphasis). 'Although the first dawnings of intelligence, according to Mr. Herbert Spencer, have been developed through the multiplication and co-ordination of reflex actions, and although many of the simpler instincts graduate into actions of this kind and can hardly be distinguished from them, as in the case of young animals sucking, yet the more complex instincts seem to have originated independently of intelligence' (Darwin [1871] 2009, 37).

In the history of science, no clear distinction has been made between these two approaches to instinct. It appears that the confusion of the nature of instinct and its relation to intelligence caused some disputes in the early twentieth century, during the time when behaviourism was gaining ground. In fact, Bergson perhaps engendered an increased interest in the instinctive behaviour among psychologists, as the third issue of the third volume of the *British Journal of Psychology*, and especially one of its articles (Carr 1910), reveals. In the nineteenth century, several psychologists and biologists observed, studied, and developed theories of instinctive behaviour, such as Charles Darwin, Alexander Bain (1818–1903), Herbert Spencer, Albert Lemoine (1824-1874), and Léon Dumont (1837–1877) (cf. Lévêque 1876). Much of the research on instinctive behaviour took place between 1870 and 1920.[228] In the 1930s, Konrad Lorenz (1903–1989) and Nikolaas Tinbergen (1907–1988) developed a new biological discipline called *ethology*. It created a new set of conceptualisations, in which *instinctive behaviour* was renamed as *innate releasing mechanism* (*Angeborener Auslöse-Mechanismus*; cf. Ronacher 2019, 34; Brigandt 2005, 590–591; Richards 1974, 113).

According to Beach (1955, 403), the concept of instinct was 'one cornerstone' of Darwin's theory of natural selection. In philosophy, Herbert Spencer's system

[227] Cf. Cosmides and Tooby (1994, 64).

[228] About longer history of the concept of *instinct*, see Diamond (1974); Blix (2016); Malkemus (2015).

showed parallel developments. Later, the importance of instincts was seen in the psychological theories of certain major researchers such as William James (1842–1910), William McDougall (1871–1938), Robert S. Woodworth (1869–1962), and Edward Thorndike (1874–1949). However, in the 1910s and 1920s the critique of theories of instinctive behaviour gained popularity, especially in the works of Knight Dunlap (1875–1949), Zing-Yang Kuo (1898–1970), and other behaviourists (Kuo 1921; cf. Beach 1955, 403–404).

Kuo's article "Giving up Instincts in Psychology" (1921) is a good source of the classification of the diversity of different conceptions of instincts. The most important division of the concept of *instinct* is that it is either an innate tendency to action or an inherited combination of reflexes. This resembles Bergson's division, as we just saw. The former definition is, in Kuo's words, accepted by the introspective and social psychologists, the latter by animal psychologists and behaviourists (Kuo 1921, 647). I see these two different approaches in different scientific field to be caused by their differing methods and points of view on their research subjects.[229] Second, instinct is seen as a teleological behaviour[230] (Kuo 1921, 648, 650–651; cf. Swift 1923, 369). Third, it is thought of being either fixed and stereotypical behaviour or behaviour capable of modification. Fourth, instinct is either a specific response to a specific stimulus or a general tendency to respond to a variety of stimuli. (Kuo 1921, 648–650.) According to Kuo, some have assimilated the conception of instinct to the conception of innate ideas (Kuo 1921, 649; cf. Geiger 1922, 96). He also asserts that the methods used in the empirical investigation of instincts have been unreliable (Kuo 1921, 652–653). According to Kuo (1921, 654), there have been at least two motives for psychologists to insist on the existence of instincts in human behaviour. The first motivation comes from the evolutionary adaptive function of instinct; the second motivation comes from the assumption that instinct is the driving power that leads the animal to act (cf. Swift 1923, 368).

Geiger (1922, 99) gives a minimum requirement for any behaviour of any organism: behaviour 'presupposes a minimum core or foundation in the inherited structures of the organism without which it could not have had a beginning.' This 'minimum core or foundation' could be the definition of instinct

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[229] In fact, the debates about the instinctive behaviour around 1920s were generally held between behavioural psychologists and social psychologists. These debates were probably one important reason for psychology to move towards behaviourism and social psychology towards the use of the concept of *culture*. Cf. Rodgers (2013); Herrnstein (1998).

[230] Kuo himself attempted to explain away teleological instinctive behaviour from the mechanistic point of view. On the problems raised by Kuo's attempt, see Geiger (1922, 98). On the problems of teleological judgments, see Ayres (1921, 565).

that even Kuo needs to subscribe to with his behaviourist principles (cf. Kuo 1921). But the truth is that acquired behaviour and social interaction influence human behaviour so much that this idea of a minimum core or foundation of behaviour becomes blurred (cf. Faris 1921, 189).

However, Swift (1923) and Geiger (1922) both maintain that the inflated classification of a concept does not mean that the concept itself, or the object the concept is supposed to designate, would not exist. According to Geiger (1922, 96), 'This lack of accuracy and completeness in enumerating and classifying the instincts is doubtless due in part to the relatively short period of time that instincts have been made the objects of scientific study. It may also be due to the specialised and partial points of view from which instincts have been considered.' Moving from these attempts to define instinct towards Bergson's theory, let us cite Swift (1923, 370):

> In an evolutionary process, with an enormous variety of environmental conditions for which to prepare, we should not expect sharp lines of demarcation. During the slow process of producing animals that could meet the vicissitudes of a rapidly changing world, organisms built on definite, rigid plans would have perished. . . . We classify, or should classify, for a definite purpose without assuming that our classification represents entities in nature. This is what we do when we speak of animals and vegetables. We are quite aware that the one can not be defined so as to distinguish it from the other. Our classification is only for convenience in discussion.

Following Swift (1923), let us note that if concept is well-defined and useful, it has its place in scientific and philosophical research. Bergson defined instinct clearly, and now I will analyse its nature in Bergson's philosophical approach.[231]

Instinct is an organisational cognition.

According to Bergson, instinct is a 'prolongation' of the ontogeny of an organism (Bergson [1907] 2013, 140; [1932] 2013, 123). By this he means that instinct signifies the same form of cognition that binds multicellular organisms together and engenders the eusociality in insects. 'The instinct that animates the bee is indistinguishable, then, from the force that animates the cell, or is only a

[231] I find it necessary to note that the scientific corroboration of Bergson's theory is instinct is difficult due to the problematic history of the concept of *instinct*. Scientific research has almost completely abandoned its use, whereas the concept of *intelligence* appears to be almost unchanged in over a hundred years.

prolongation of that force. In extreme cases like this, instinct coincides with the work of organisation.' (Bergson [1907] 2013, 167.)[232]

Bergson notes that there are certain analogical themes in the way which cells and animals dissociate inside the same unity: organs dissociate from other organs, and the castes of a beehive dissociate from other castes. A specific organ, or a specific caste is a constant theme which is executed or realised in varying ways. (Bergson [1907] 2013, 167–168.) Bergson argues that both share a similar cognition and ignorance. It is as if every differentiated, specialised cell and every member of a bee colony carries within itself the whole of the collective 'memory' and only 'recollects' those 'memories' that it needs (Bergson [1907] 2013, 168). From a contemporary point of view, we could say that a specialised cell expresses only those genes that it needs as a member of an organ and that a bee expresses only those modes of behaviour it needs as a member of the colony. The common element in both organisations is coordination, a tendency to unity. This tendency to coordinated unity is an element that is accentuated in instinct but incompatible with intelligence.

> I think rather, in many cases at least, of a circumference, of the various points from which these various varieties would have left, all looking at the same center, all making an effort in this direction, but each one of them approaching it only as far as its means allowed, also insofar as the central point was illuminated for it. In other words, instinct is everywhere complete, but it is more or less simplified, and above all it is simplified in *diverse* ways. (Bergson [1907] 2013, 172.)[233]

Bergson proposes that this tendency towards unity is a kind of effort, but not the kind that resembles ordinary human effort, for instance. Nor is it a property of the individual alone. 'The effort by which a species modifies its instincts and also modifies itself must be something much deeper that does not depend only on circumstances or individuals. It does not depend solely on the initiative of individuals, although individuals collaborate in it, and it is not purely accidental,

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[232] 'L'instinct qui anime l'Abeille se confond donc avec la force dont la cellule est animée, ou ne fait que la prolonger. Dans des cas extrêmes comme celui-ci, il coïncide avec le travail d'organisation.'

[233] 'Nous pensons plutôt, dans bien des cas au moins, à une circonférence, des divers points de laquelle ces diverses variétés seraient parties, toutes regardant le même centre, toutes faisant effort dans cette direction, mais chacune d'elles ne s'en rapprochant que dans la mesure de ses moyens, dans la mesure aussi où s'éclairait pour elle le point central. En d'autres termes, l'instinct est partout complet, mais il est plus ou moins simplifié, et surtout il est simplifié *diversement*.'

although accident has a large place in it.' (Bergson [1907] 2013, 171–172.)[234] In summary, a specific behavioural and cognitive mode is present everywhere where living units organise themselves in collaborative unity – from multicellularity to eusocial hymenopterans.

Instinct is sympathy.

Organisational cognition does not only limit to cells or eusocial insects. According to Bergson, the same form of cognition is in play in mutualistic relationships, such as in the relationship between certain orchids and wasps, and especially in parasitic wasps when they 'sympathise' with their prey. Bergson calls this aspect of instinctive cognition *sympathy* (Bergson [1907] 2013, 168, 171, 174–175, 177).

In human sociality and communication, sympathy ordinarily means the intimate sharing or correspondence of thoughts and feelings between individuals. The ordinary meaning of the word corresponds well to Bergson's more technical and philosophical meaning. According to Bergson, the feelings of sympathy and antipathy enable 'possible interpenetration of human consciousnesses' that he characterises as a 'psychological endosmosis' (Bergson [1934] 2013, 28). We could also call this kind of communication *intersubjective* in the sense that one engenders intended emotions and insights in another person.

According to Lee (2009, 151–153), earliest stages of the development of social cognition can be observed both in infant's behaviour as well as in its cortical development. Deprivation from care and interaction from its caregiver, the social behaviour and cortical development are severely disturbed. Conversely, good care and interaction enhance their development. The basis of social cognition for Lee is an *interactional instinct*, which 'motivates the organism to take action to achieve attachment and social affiliation with conspecifics who are initially caregivers and who are later members of the community at large' (Lee 2009, 6).

Instinct, as well as intelligence, is liable to err because both are susceptible to individual deviations. However, it makes mistakes differently than intelligence. Instinct does not learn from trial and error as does intelligence. (Bergson [1907] 2013, 174.)

The point in saying that instinctive knowledge is not learned is that it is imprinted in the individual by its ontogeny. In fact, in instinct, life and

[234] 'L'effort par lequel une espèce modifie ses instincts et se modifie aussi elle-même doit être chose bien plus profonde, et qui ne dépend pas uniquement des circonstances ni des individus. Il ne dépend pas uniquement de l'initiative des individus, quoique les individus y collaborent, et il n'est pas purement accidentel, quoique l'accident y tienne une large place.'

consciousness are in a way coextensive or identical. However, with its mode of cognition, instinct could not proceed far (Bergson [1907] 2013, 183). There have perhaps been cognitive or computational restrictions in animal brains that have given limitations to the instinctive cognitive development.[235]

The dual nature of cognition itself imposes problems on any form of intelligent activity – scientific study included. To really understand instinct, the researcher must sympathise with the mode of cognition itself. Intelligence cannot understand the *modus operandi* of instinct, nor can it be understood with the help of conceptual translations. Even though the researcher observes the behaviour of an animal, he or she cannot understand the psychological reason for the action insofar as the action is instinctive. This is because *instinct does not manufacture or discern elements, but is itself an organic instrument*.[236] Instead, the achieved instinct is a faculty of utilising and even constructing organic instruments' (Bergson [1907] 2013, 141, emphasis removed).[237] By contrast, instinct does not have the distancing and simulating capacity of intelligence that I explained in the previous section dedicated to intelligence.

The difficulty arises from the fact that scientific research manipulates knowledge about, for instance, the hymenopteran species with the concepts of intelligence. However, the instinctive act itself, instead of its behavioural manifestation or physiological basis, should be the primary object when one wants to understand instinct as such. Scientific research is not designed for a 'psychological' inquiry; it cannot sympathise with the psychology of action. Therefore, Bergson proposes that *either* philosophy has no role in the study of animal cognition, *or* its role begins where the role of science ends (Bergson [1907] 2013, 174–175).[238] Only philosophy can aim to understand the instinctive tendency towards unity.

7.2.2 Instinct as complementary to intelligence

The difference in nature between instinct and intelligence has epistemological consequences. In short, *because instinct and intelligence are divergent and*

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[235] About the different cognitive strategies and their functions and limitations, cf. Taatgen and Anderson (2008).

[236] Cf. Cosmides and Tooby 1994, 66.

[237] 'l'instinct achevé est une faculté d'utiliser et même de construire des instruments organisés'

[238] Cf. '[T]oute la difficulté vient de ce que nous voulons traduire la science de l'Hyménoptère en termes d'intelligence. . . . [La science] ne doit pas mettre l'action avant l'organisation, la sympathie avant la perception et la connaissance. Mais, encore une fois, ou la philosophie n'a rien à voir ici, ou son rôle commence là où celui de la science finit.'

complementary cognitive tendencies, human consciousness can elaborate instinctive cognition. The task is difficult and laborious, because human cognition is almost entirely dominated by intelligence, and the role of instinct is small. However, as Bergson has remarked (Bergson [1907] 2013, ix, 49, 179, 191, 268, 340), philosophical reflection can be 'dilated' with additional examples that give it evidence for increased comprehension. The cognitive behaviour of organisation from cells to bees have worked for Bergson as analogous evidence for this dilation.

However, human behaviour is more or less determined by instinct. Bergson's central idea seems to be that if epistemology became conscious of the role of instinct in human cognition, it would resolve many problems that the theorists of knowledge have tackled with.[239] Let us analyse the divergence and complementarity of intelligence and instinct by retelling Bergson's propositions.

> *Relations are the innate form of intelligent knowledge; things are the innate form of instinctive knowledge* (Bergson [1907] 2013, 149).

Bergson remarks that philosophers generally divide knowledge into its two constituents: form and matter (Bergson [1907] 2013, 149).[240] Here, Bergson clearly refers to Kant (cf. Bergson [1907] 2013, 205–207). Without diving too deep into Kant and his discussion of Leibniz's philosophy, let us state Kant's definitions for matter and form in a sentence: for Kant, matter is the brute perceptual content, originating from reality, coordinated by temporal and spatial intuitions, and systematised by understanding and reason – intuition, understanding, and reason giving systematised form to the perceived matter. In Kant's words, '[m]atter is *substantia phaenomenon*,' the substance of all perception and thus the substance of that which form systematises (Kant [1781/1787] 1998, A277/B333, cf. A266/B322–A268/B324). Reference to Kant and other philosophers may be a mere illustration by Bergson. The idea in this reference is that many philosophers,

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[239] Cosmides and Tooby (1994, 70) have called the dismissal of the role of instincts in psychological and cognitive research as *instinct blindness*, which, in the current context, resembles that which Bergson is also aiming at.

[240] According to Pollok (2017, 121), 'The dichotomy of matter and form, the Greek *hyle* and *morphe*, is so deeply entrenched in our daily thinking and, particularly, in our philosophical reasoning that it is likely to be overlooked. On closer inspection, however, we find hylomorphic elements in almost all philosophical accounts – from Plato's theory of the participation (*methexis*) of all changeable beings in some eternal ideas, up to present projects like [Robert] Brandom's *Making it Explicit*, where the inferential forms of our discursive practices, implied by our acknowledgment and attribution of commitments and entitlements to claims, are meant to be made explicit by logical vocabulary.'

who have utilised Aristotelian *hylomorphism*, or another duality of the same kind, have maintained that there is a passive receptivity of perceptual data and an active cognitive processing of that data; the former being the matter of cognition, and the latter being the rules or relations according to which the matter is cognised.

This duality is a historical reference from which Bergson develops the relationship between intelligence and instinct. For him, that which philosophers have distinguished as the form of thought is in fact innate to intelligence, and that which philosophers have distinguished as the matter of thought implies matter. For Bergson, instinct operates purely with matter, whereas intelligence subsumes matter under its formalisations and relations. Bergson's duality of cognitive tendencies is thus far from Kant's philosophical system, for instance. Nevertheless, instinct operates as if it knew only categorical propositions whereas intelligence operates as if it knew only hypothetical propositions (Bergson [1907] 2013, 149–150). In short, a categorical proposition declares something, such as 'trees have leaves,' or 'it is summer,' and a hypothetical proposition expresses condition or dependence between propositions, such as 'if trees have leaves, it is summer.' Here again, it is relevant to invoke Kant's division of propositions, or judgments into categorical and hypothetical. Let us first consider Kant's division into hypothetical and categorical propositions, after which we will concentrate on analysing both forms separately.

'Logic does not look at content . . . but rather only at the form of the relation' (Kant 2005, 16:638). 'The categorical judgment constitutes the material of the others. The matter of all judgments: either concepts or another judgment' (Kant 2005, 16:631). 'A judgment is the mediate cognition of one representation through other representations. The relation of mediate [crossed out: cognition] representation to the immediate one is (the relation in the judgment or) the form; the subject is the immediate representation, the predicate the mediate one' (Kant 2005, 16:631). For Kant, categorical propositions or judgments are the *matter* of cognition (Kant [1781/1787] 1998, A70/B95–A74/B99, 2005, 16:631, 17:645). The matter of propositions is a concept or another judgment (cf. Kant 2005, 16:631).

George Boole (1815–1864), the prominent logician, developed further the division into categorical and hypothetical propositions (cf. Boole 1854, 53). He named categorical propositions as *primary* or *concrete propositions*, and hypothetical propositions as *secondary* or *abstract propositions*. In short, concrete propositions express relations among things, whereas abstract propositions express relations among propositions. (Boole 1854, 52–54.)

Bergson accuses Kant of dismissing the generation of the capacity of intelligence to operate with relations (Bergson [1907] 2013, 205–207). Considering language and other symbolical systems of reasoning, Bergson's position can be

related to recent scientific theories of generative grammar, for instance, put forth by Noam Chomsky, and developed by several other researchers (cf. Chomsky 2013, 2017a, 2017b; Bolhuis et al. 2014; Yang et al. 2017). In addition, if human consciousness is mainly intelligent, and intelligent form of knowledge is so-called hypothetical knowledge, there should probably be scientific theories and conceptualisations of human cognition and perception as hypothetical. In fact, this is the case (Gregory 1980; Friston et al. 2012).

Let us now elaborate on the idea of the categorical proposition a bit further. The categorical proposition consists of two concepts that need to signify something real, because without the real, concrete matter, the concepts of the proposition have no meaning, and ultimately the proposition itself would make no sense. As we saw, a hypothetical proposition is indifferent to the matter of its constituent propositions if its form is valid. How are the concepts considered as true? Moreover, how do concepts get their matter and significance in the first place? Obviously, if concepts are defined by other concepts, there will be an infinite regression of references. Already in early-modern philosophy, rationalists, such as Descartes, Leibniz, and Spinoza, tried to clarify the validity of concepts from which other concepts and further propositions can be inferred.[241] One solution the philosophers invented was to search for the most fundamental, primitive concepts, notions, or facts. According to Descartes,

> I observe next that all human knowledge consists solely in clearly distinguishing these notions and attaching each of them only to the things to which it pertains. For if we try to solve a problem by means of a notion that does not pertain to it, we cannot help going wrong. Similarly we go wrong if we try to explain one of these notions by another, for since they are primitive notions, each of them can be understood only through itself. (AT VII, 665–666; CSM I, 218; cf. Flage and Bonnen 1997, 867.)

According to Leibniz, a thing can be known through itself (intrinsically) or through some other thing (extrinsically). As Leibniz writes, 'Whatever is thought by us is either conceived through itself or involves the concept of another' (cited in Lodge and Puryear 2006–2007, 178). Leibniz is probably referring to Spinoza. Knowing thing 'through itself' is a 'substantial knowledge,' as Spinoza writes: a substance is 'that which is in itself and conceived through itself' (cited in Garrett

[241] I considered this theme at length in the first chapter of this dissertation from Maine de Biran's point of view.

2019, 64).[242] 'Anything that cannot be conceived through another thing must be conceived through itself' (Spinoza 2018, Iax2).[243] We can rightly question what it means 'to conceive' (*concipere*) something. Ordinary English meanings, and perhaps usual ordinary intuitions of the word 'to conceive,' mean that one understands, grasps, or catches the meaning of a concept. However, these are merely figurative euphemisms of the cognitive operation *x* that takes place in human thought and is the genesis, the condition for conceptual knowledge. More technically considered, Kant understood *concipere* to be understanding through concepts (cf. van den Berg 2018, 8). This leads us to another proposition that deals with the divergent forms of intelligent and instinctive knowledge.

Intelligence is extensional knowledge; instinct is intensional knowledge.

Bergson notes that the development of cognition must have had some limitations or restrictions that have made it divide into – using the linguistic terms and conceptual knowledge as a metaphor – intensional (*compréhension*) and extensional knowledge (Bergson [1907] 2013, 150). As we saw, instinct cannot *relate* cognitive units together with rules, whereas intelligence can proceed from one symbol to another according to its relating capacity. Instinct can only increase the intensional knowledge of its object. If instinct is only the knowledge of things in themselves, and if the early-modern rationalist philosophers aimed at clarifying human knowledge by starting from things that are known only through themselves, could we find further similarities between them and Bergson, which could help us better understand the problems Bergson tried to solve?

According to Descartes, it is possible to enlarge, or *amplify* (*amplificare*) human intelligence or ingenuity (*ratio ingenii*) by bringing interrelated conceptions together to intuit them as if they were one, much larger conception that what is usually possible for human thought. It seems that, by proper methods of thought, human thought can integrate the units it conceives and increase its capacity of immediate cognition of its objects. Descartes calls this the *capacity of inference* (*capacitate illationis*).

Without signs of concepts, or without variable symbols of the signs of concepts, there is no reasoning, no logic or computation. But without *conceived* conceptual matter, there is no use for formal operations. In Bergson's terminology, intelligence and instinct are mutually dependent, although

[242] This is the idea against which Kant stated that only substantial in experience can only be phenomenal, not of the things in themselves (Kant [1781/1787] 1998, A277/B333, cf. A266/B322–A268/B324).

[243] "Id quod per aliud non potest concipi, per se concipi debet"

intelligence is more dominant. To conclude, there must necessarily be something that is conceived through itself, in itself, or else there cannot be any significance in the operations of intelligence. This conceiving through itself is the task of instinct, in one way or another. From these considerations, we can move to the second double proposition with which Bergson characterises the divergence and complementarity of intelligence and instinct.

> *Intelligence is independent from its object; instinct is fixed to its object* (Bergson [1907] 2013, 152).

Instinctive cognition exteriorises itself immediately into executed action instead of interiorising it into conscious representation (Bergson [1907] 2013, 147). Instinct is non-conscious in this sense: it is rather an immediate action than mediate representation or simulation of action. Cosmides and Tooby (1994, 72–73) have put their theory of cognitive instincts in highly similar manner, so that it can further clarify even Bergson's several decades older ideas: 'Instinct blindness is a side-effect of any instinct whose function is to generate some inferences or behaviors without simultaneously generating others. This is a very general property of instincts . . . The fact that human instincts are difficult for human minds to discover is a side-effect of their adaptive function.'

Bergson characterises the instinctive sign as adherent, which means that the sign can only denote its object and nothing else (Bergson [1907] 2013, 159). Social insects, such as bees and ants, use signs. However, these signs are tied to their function, such as bees' waggle dance (cf. George et al. 2019; Schürch et al. 2019; Linn et al. 2020; Couvillon, Schürch, and Ratnieks 2014). The intelligent sign Bergson characterises as *mobile*. Mobility means that the sign is not tied to any particular object but is independent of any specific object of reference (Bergson [1907] 2013, 159). Mobile sign suits for the relational mode of cognition, whereas instinctive sign, such as honeybee workers' waggle dance, has its specific structure with specific information that has meaning only in predetermined behaviour – waggle dance is an inherent sign of the foraging behaviour of honeybee workers.[244]

Here is the last and pivotal point in understanding the divergence and complementarity of the cognitive tendencies of intelligence and instinct:

[244] About olfactory signals in bees, cf. Kanzaki (1996).

> *'There are things that intelligence alone is able to seek, but which, by itself, it will never find. These things instinct alone could find; but it will never seek them.'* (Bergson [1907] 2013, 152.)[245]

As it is now clear, intelligence has the advantage to distance its operations from its objects, whereas instinct has the advantage, so to speak, to be one with its object. Both of their proper advantages are also their proper drawbacks. Together they can have the mobility and freedom of intelligence, which can direct thought towards an indefinite number of things, on which the sympathy of instinct can begin to increase the knowledge of things in themselves – or to realise the artificiality of arbitrary symbols of intelligence.

7.3 Summary

As we saw in the previous chapter, Bergson discerned the key factors of biological evolution: 1) the common *élan* in all the living beings and 2) the instability caused by the divergence of different evolutionary directions of development that nevertheless are interrelated and even complementary with each other. The same causes apply to the development of cognitive faculties in animals, as well. In fact, as Bergson has remarked, cognition is perhaps the most important driving force of animal evolution. He discerned two main cognitive strategies in animal evolution: instinct and intelligence.

We saw that Bergson's definition of intelligence is quite specific. Because of this specificity, I was easily able to corroborate Bergson's theory of intelligence with recent empirical evidence. We saw that intelligence is first and foremost *spatial* and subsumed to human activity and its modes. Mechanism and finalism are causal models generated by intelligence, as well. They have evolved for the use of human action and not for speculation. This is the reason why Bergson renounced mechanism and finalism as *metaphysical* explanatory models. The spatial or geometrical nature of intelligence appears in two essential modes of reasoning: deduction and induction.

As a concept present both in the history of science and in the history of philosophy, we saw that *instinct* faced some ambiguous treatments and biased attitudes. Because of these problems, I started with a conceptual analysis and clarification of the concept of *instinct*, after which I introduced Bergson's own theory of instinct. As we saw, Bergson's theory barely resembles the other

[245] 'Il y a des choses que l'intelligence seule est capable de chercher, mais que, par elle-même, elle ne trouvera jamais. Ces choses, l'instinct seul les trouverait ; mais il ne les cherchera jamais.'

theories of instinct I considered. Instinct, for Bergson, is a cognition that aims at organising unities.

After the systematisation of Bergson's theory of the cognitive tendencies of intelligence and instinct, I explained the epistemological relevance of their mutual complementarity and cooperation. In fact, their complementarity gave Bergson grounds for reformulating certain old philosophical dichotomies between *relations* and *things*, and *form* and *matter*, and to pave the way for elaborating the generative explanation of science and philosophy, which I will consider in the next chapter.

8 PHILOSOPHY AND SCIENCE

As we saw in the previous chapter, human cognition is mainly intelligent but also, to a lesser extent, instinctive. Thus, there are two sources of knowledge, and intelligence differs in nature from instinct. Bergson distinguishes the scientific and the philosophical formation of knowledge according to different ways in utilising cognitive modes. In this chapter, I will explain Bergson's thesis that science is based on intelligence whereas philosophy is based on the complementarity of intelligence and instinct. I elaborate this framework and explain the nature of both fields from the point of view of their employment of different cognitive faculties.

8.1 The object of scientific knowledge

Bergson does not pay much attention to the historical development of science. He seems to follow the generally accepted narrative of the birth of the modern mathematical sciences. Let us take one excerpt from Bergson to illuminate this assumption:

> Modern science dates back to the day when mobility was established as an independent reality. It dates from the day when Galileo, rolling a ball on an inclined plane, made the firm resolution to study this up-and-down movement by itself, in itself, instead of looking for its principle in the concepts of 'above' and 'below,' two immobilities by which Aristotle believed to have explained mobility sufficiently. And this is not an isolated fact in the history of science. (Bergson [1934] 2013, 217.)[246]

This depiction indeed seems to follow the general narrative of the history of science. According to Gower (2012, 23), during Galilei's time, the science of motion was understood as a study of the causes of motion. It was a demonstrative kind of inquiry. The demonstrable inquiry means that the 'experiential knowledge of the facts of motion was superseded by rational knowledge of the causes of those facts.' The rational knowledge of the causes of the facts was accomplished by deductions from fundamental principles, *common notions*, and

[246] 'La science moderne date du jour où l'on érigea la mobilité en réalité indépendante. Elle date du jour où Galilée, faisant rouler une bille sur un plan incliné, prit la ferme résolution d'étudier ce mouvement de haut en bas pour lui-même, en lui-même, au lieu d'en chercher le principe dans les concepts du *haut* et du *bas*, deux immobilités par lesquelles Aristote croyait en expliquer suffisamment la mobilité. Et ce n'est pas là un fait isolé dans l'histoire de la science.'

generally accepted definitions. It was thus a conceptual and logical study. Galilei transformed it into observation and mathematics.[247]

For Bergson, scientific knowledge shares the active role of knowledge with ordinary knowledge (Bergson [1907] 2013, 335–336):

> [Intelligence] isolates . . . what resembles the already known; it seeks the same in order to be able to apply its principle that 'the same produces the same.' This enables the ordinary knowledge to predict future. Science brings this operation to the highest possible degree of accuracy and precision, but it does not alter its essential character. Like ordinary knowledge, science only retains things with the aspect of *repetition*. . . . It can only operate on what is supposed to be repeated.[248] (Bergson [1907] 2013, 29.)[249]

According to Bergson, modern science was born when time was established as an independent variable (Bergson [1907] 2013, 336). It developed from astronomy, especially from Johannes Kepler's (1571–1630), Galileo Galilei's (1564–1642), and

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[247] According to Gower (2012, 22), great minds of different centuries have designated Galileo Galilei's works as the birth of modern science. These include Thomas Hobbes (1588–1679) in the seventeenth century, Nicolas de Condorcet (1743–1794) in the eighteenth, and Ernst Mach (1838–1916) in the nineteenth. Gower (2012, 22) notes that Mach attributed to Galilei the introduction of experimental methods in physics. The experimental investigation of the motion of falling bodies enabled Galilei to formalise their uniformly accelerating motion in a purely quantitative form. Contemporary textbooks of physics consider Galilei to be the exemplary case of experimentation as a way of testing scientific hypotheses (Gower 2012, 22). These principles seem to follow the old definition of doing science as observation, classification forming laws, and finding causalities: 1) observe or experiment, 2) classify results, 3) find regularities among classifications or generalisations, 4) formalise regularities into laws, and 5) find common causes for different phenomena.

[248] 'isole . . . ce qui ressemble au déjà connu ; elle cherche le même, afin de pouvoir appliquer son principe que "le même produit le même." En cela consiste la prévision de l'avenir par le sens commun. La science porte cette opération au plus haut degré possible d'exactitude et de précision, mais elle n'en altère pas le caractère essentiel. Comme la connaissance usuelle, la science ne retient des choses que l'aspect *répétition*. . . . Elle ne peut opérer que sur ce qui est censé se répéter.'

[249] According to Hoyningen-Huene (2013, 187), 'science develops out of common sense of the respective historical time or out of a non-scientific knowledge practice due to an increase in systematicity.' Scientific development is always characterised by increasing systematicity. This means that the relationship between science and common sense is determined by the investigation of 'what the effects of this increase in systematicity are, first upon common sense itself and later during the ensuing scientific development.' Thus, there is only a difference in systematicity between the starting point of scientific inquiry and that of common sense.

Isaac Newton's (1642–1726) inductions and deductions (Bergson [1907] 2013, 334). Kepler's laws 'establish a relationship between the areas described by the heliocentric vector radius of a planet and the times used to describe them, between the major axis of the orbit and the time taken to travel through it'[250] (Bergson [1907] 2013, 333). Galilei discovered a law 'that linked the space travelled by a falling body to the time occupied by the fall' (Bergson [1907] 2013, 333–334).[251]

In addition to astronomers, René Descartes's (1596–1650) inventions in geometry laid an important foundation. According to Bergson, one of the first great inventions in geometry in modern times was to introduce 'time and movement into the considerations of figures.'[252] The central idea of Cartesian geometry 'was to consider any plane curve as described by the movement of a point on a moving line that moves, parallel to itself, along the abscissa axis – the movement of the moving line being assumed to be uniform and the abscissa thus becoming representative of time' (Bergson [1907] 2013, 334).[253] Curve is then defined by the relation between the space travelled on the moving line and the time used to travel it. The measurer must be able to indicate the position of the moving line on the line it travels at any moment of its travel, of which the measurer gets the curve equation.

As I already noted in section 7.1, intelligence operates with induction and deduction. Therefore, science for Bergson is basically a systematised form of inductive and deductive reasoning (cf. Bergson [1934] 2013, 218). Thus, based on its form of reasoning, science considers its objects as fixed unities that are connected with time as an independent variable. Time as this fourth spatial dimension is a natural component of spatial intelligence. In fact, it is the only time intelligence can understand because the objects of geometrical intelligence cannot change; there can be no continuity, no flow of change (Bergson [1907] 2013, 336–341).

However, time as an independent variable erases its efficacy: its generative causality of things is set aside, and a canvas of showing sequences of phenomena, so to speak, is put in its stead. That which has no efficacy is nothing, and if time

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[250] 'établissent une relation entre les aires décrites par le rayon vecteur héliocentrique d'une planète et les temps employés à les décrire, entre le grand axe de l'orbite et le temps mis à la parcourir'

[251] 'qui reliait l'espace parcouru par un corps qui tombe au temps occupé par la chute'

[252] 'le temps et le mouvement jusque dans la considération des figures'

[253] 'fut de considérer toute courbe plane comme décrite par le mouvement d'un point sur une droite mobile qui se déplace, parallèlement à elle-même, le long de l'axe des abscisses, – le déplacement de la droite mobile étant supposé uniforme et l'abscisse devenant ainsi représentative du temps.'

is considered as an independent variable, then it functions as such in measurement, as well. Yet, experience tells us that time is real, that things take time, and, in fact, those phenomena that progress and evolve do take time and interpenetrate and interfere with one another precisely by taking time. According to Bergson, there is thus a need for another kind of discipline, and this discipline is what several metaphysicians have sought. Furthermore, the more science becomes self-aware of its nature, the more it suggests another field of knowledge by its side, namely, metaphysics. (Bergson [1907] 2013, 339–343.)

Scientific knowledge isolates the objects it studies from the reality as a whole. Then it begins to analyse the isolated objects. It executes the same process regardless of the object: what astronomy does with a star physiology does with an eye. All phenomena, living beings included, can be treated as closed systems insofar as they *are* closed systems (cf. Bergson [1907] 2013, 10). The almost seamless relationship between science as the work of intelligence and objects of reality is evident from the point of view that intelligence and reality have indeed, as we saw, co-adapted over the course of evolution of intelligence. Intelligence operates quite fluently within a certain kind of framework, as I have determined.

Positive science is about sensory observation. Science gathers data through observation and elaborates it through abstraction, generalisation, judgment, and reasoning – in other words, through intelligence. At first, this method was purely mathematical, but it was gradually applied in a variety of disciplines: first in mechanics, then in physics, chemistry, and later biology. It has been most successful in treating inert matter. (Bergson [1934] 2013, 34.) As I have noted, inert matter and the form of intelligence are developed interdependently, the nature of intelligence conditioning the appearance of reality and the nature of reality conditioning the evolution of intelligence.

8.2 The divergence of scientific disciplines

What Bergson implies (cf. Bergson [1907] 2013, 359), but does not explicitly say, is that without the differentiation of scientific disciplines according to their epistemological relevance and positive nature, their symbolism would be disturbed. Scientific symbolism needs the similarity of phenomena, a common epistemological level, on which every member in a discipline can operate with each other in a commensurate fashion. Bergson seems to recognise the positive or even necessary consequence of scientific development: *the more science grows and gains precision, the more fragmentary it becomes*. This is because *the more relative knowledge gains in precision, the more it gains in subtle incommensurability between different symbolic systems*.

Bergson gives a historical example of the incommensurability of the symbolical systems. He points out that in the first volume of his *Cours de philosophie positive*, Comte attributes the same nature to inorganic and organic phenomena. In the second volume, which appeared eight years later, he considers only plants to share the same nature with inorganic reality. Comte already, and in later volumes even more distinctively, distinguishes the nature of living phenomena from physical and chemical phenomena. In Bergson's words: '*The more he considers the manifestations of life, the more he tends to establish between the diverse orders of facts a distinction of rank or value, and not only one of complication.*' (Bergson [1934] 2013, 274, my emphasis.)[254] The special sciences, following the articulations of reality, must increasingly submit to the heterogeneous nature of reality, despite the homogeneous matter of intelligence which gives science its cognitive foundations. The difficulties of scientific symbolism increase when one proceeds from living through mental to social phenomena. Bergson formulates this as follows: 'It is less at ease in the organised world, where it can only move forward confidently if it relies on physics and chemistry; it is attached to what is physicochemical in vital phenomena rather than to what is properly vital in living things.' (Bergson [1934] 2013, 34.)[255]

The refinement of the form of external intuition was elaborated during the modern age, and it triumphed in inanimate reality and in the inanimate elements of the animate world. However, it became highly relative when it was applied to the 'scientific knowledge of the mind.' The relative nature of scientific knowledge was reflected on scientific knowledge as a whole. This, according to Bergson, is the fate of all the systems of knowledge that have tried to put all human knowledge on the same plane of knowledge. Unity is gained at the expense of reality because the natural differences must be erased from the way of commensurability. However, Bergson attests, knowledge does not need to be *symbolically commensurable*; in fact, it should not be. The more knowledge is articulated according to the natural differences of the subjects of research, the better. The highly symbolical nature of scientific knowledge 'is no longer the case if one makes distinctions between the various sciences, and if one sees in the scientific knowledge of the mind (and of the vital, consequently) the more or less artificial extension of a certain way of knowing which, applied to the [physical]

[254] 'Plus il considère les manifestations de la vie, plus il tend à établir entre les divers ordres de faits une distinction de rang ou de valeur, et non plus seulement de complication.'

[255] 'Elle est moins à son aise dans le monde organisé, où elle ne chemine d'un pas assuré que si elle s'appuie sur la physique et la chimie ; elle s'attache à ce qu'il y a de physico-chimique dans les phénomènes vitaux plutôt qu'à ce qui est proprement vital dans le vivant.'

bodies, would no longer be at all symbolic' (Bergson [1907] 2013, 359–360).[256] Intelligence is at home in the spatial or corporeal nature of ordinary experience, since ordinary experience is the co-adaptation of intelligence and reality, as I have already explained. In fact, the progress of the special sciences has empirically shown the fact that the generation of new scientific disciplines has been rapid in the nineteenth, twentieth, and twenty-first centuries. As science has progressed, it has scattered into an ever-increasing number of special sciences. However, this 'scattering' should not be regarded as a derogatory expression: it *follows* from the nature of proper scientific knowledge and its cognitive basis.

Let us take two examples of the fragmentary nature of science. The first example is the development of genetics, which I have already explained. The second example is the possible incommensurability between scientific disciplines and theories. *Incommensurability* is a familiar concept in the theory and history of science. This concept in science refers most remarkably to Pierre Duhem (1861–1916), Thomas Kuhn (1922–1996) and Paul Feyerabend (1924–1994), who developed the concept of *incommensurability*.[257] Let us cite the short definition of the concept by referring to a passage from Sankey (2013, 33):

> For Feyerabend, [scientific] theories are incommensurable [with each other] due to semantic variation between the vocabulary employed by [the certain] theories. Kuhn's original claims about incommensurability included methodological and perceptual aspects in addition to semantic aspects, though he later restricted it to the semantic sphere. (Sankey 2013.)

Based on this excerpt, we could name Feyerabend's idea of *symbolical incommensurability* and Kuhn's idea of *operational incommensurability*. In both, the conceptual schemes of a discipline are incommensurable with another discipline. Gattei (2016, 74) defines *incommensurability* in the following way:

> The term 'incommensurability' derives from the standard employment of this concept in geometry and mathematics: two quantities are said to be incommensurable if there is no common measure whole units of which divide both of them.

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[256] 'n'en est plus de même si l'on fait des distinctions entre les diverses sciences, et si l'on voit dans la connaissance scientifique de l'esprit (ainsi que du vital, par conséquent) l'extension plus ou moins artificielle d'une certaine façon de connaître qui, appliquée aux corps [physiques] n'était plus du tout symbolique.'

[257] Another term close to *incommensurability* is *untranslatability*, cf. Hoyningen-Huene, Oberheim, and Andersen (1996).

Let us take an example of symbolical incommensurability. We can assume that there has been a continuity within physics as a science: the properties of matter have been constantly researched in the history of modern physics. However, physical theories have not had the same axioms, starting points, formulations of the fundamental forces of nature. Definitions of certain key concepts such as *mass* differ in nature between Newtonian physics and the general theory of relativity, which is, in turn, different from the special theory of relativity (cf. Dilworth 2006, 70; Nersessian 2008, 3). Roth (2012, 337) discusses a similar point when he says that 'events or facts described in one [theory] have no status in the theory that supersedes it.' This means that if a theory has several concepts that the other theory also has, they may still be composed of essentially different elements and meanings and are thus incommensurable with each other. Carey (2011, 118) lists three features of incommensurability. First, incommensurability results from the qualitative differences between conceptual systems. Second, incommensurability between concepts results from their different expressive powers: the more precise and expressive the concept is, the more incommensurable it is regarding other concepts. Third, incommensurability emerges from the temporal development of concepts and conceptual systems. According to Carey (2011, 119),

> [i]ncommensurability arises when episodes of conceptual development have required conceptual change. Conceptual changes are of several kinds, including differentiations such that the undifferentiated concept in CS1 [conceptual system 1] plays no role in CS2 [conceptual system 2], and is even incoherent from the point of view of CS2; coalescences in which ontologically distinct entities from the point of view of CS1 are subsumed under a single concept in CS2; and changes in conceptual type and in content-determining conceptual cores.

Multidisciplinary and interdisciplinary research subjects are certain possible solutions to the fragmentation of the scientific disciplines. The phenomena of different domains of reality can be articulated with different disciplines, and different disciplines give their points of view on the given subject (Novikov and Novikov 2013, 65). Let us consider planetary science, for instance. It grew from astronomy and earth science (which itself is a similar collection of special sciences), and now it includes planetary geology, geochemistry, geophysics, cosmochemistry, atmospheric science, oceanography, hydrology, theoretical planetary science, glaciology, and exoplanetology (cf. Taylor 2004). Scientists commit to one or several special sciences and possibly develop them further, and when they study the phenomena of the reality, they come together and bring the different specialised points of view into one framework. These phenomena could

be anything that is recognised to be real, from 'the quality of life' or 'educational processes' to 'population health' (Novikov and Novikov 2013, 65).

8.3 Philosophy as the filler of a *metaphysical gap*

In the last chapter, I explained the two cognitive tendencies: intelligence and instinct. In the last sub chapter of this main chapter, I clarified the nature of scientific knowledge from the relevant point of view for philosophical considerations. I ended up explaining the necessary fragmentation and incommensurability of scientific knowledge. We saw this fragmentation as an intrinsic, divergent progress of the results of scientific knowledge. Now, it is time to explain the subject matter of philosophy, which I will call *metaphysical explanation*. Based on the results of the last chapter, it is now possible to understand metaphysical explanation to utilise the instinctive cognitive tendency together with intelligence.

Let me recapitulate certain of Bergson's claims that I have gathered in the course of Part 3 of this dissertation. Concepts as general ideas can only produce relative knowledge of their objects. Conceptual knowledge cannot cognise the natural differences between the articulations of reality. However, the physical domain of reality is the most natural domain for human intelligence to understand – it needs the least philosophical interference. As Bergson puts it, 'the physics and the metaphysics of brute matter are so close to each other' (Bergson [1907] 2013, 197).[258] This proximity of human intelligence with physical reality results from the nature of human intelligence, which I elaborated in the last chapter. Human intelligence has had only the need to prepare, coordinate, and simulate possible actions on matter, to manipulate and manufacture tools. Bergson puts this as follows: 'Precisely because this segmentation of reality has operated with regard to the demands of practical life, it has not followed the internal lines of the structure of things' (Bergson [1896] 2012, 204).[259]

The problems originating in the nature of intelligence increases when it operates with less quantifiable and more qualitative phenomena, namely, with biological and psychological phenomena. Regardless of the natural differences between physical and different living phenomena, intelligence can only comprehend them in relation to its cognitive capacities. These capacities originate in spatial cognition and those modes of thought that it engenders, as I have explained. Most of all, it has two causal models of explanation – mechanism and

[258] 'la physique et la métaphysique de la matière brute sont si près l'une de l'autre'

[259] 'Justement parce que ce morcellement du réel s'est opéré en vue des exigences de la vie pratique, il n'a pas suivi les lignes intérieures de la structure des choses.'

finalism – of which the former is the most legitimate scientific mode of causal explanation. *However*, as we saw in chapter six, living phenomena are not mechanical nor finalist – it is something different, and these two intelligent causal models are only approximate translations from life's proper causality. Nonetheless, mechanism is the ultimate explanatory tool for science to generalise and predict phenomena. However, from philosophy's point of view, it never reaches the absolute cognition of phenomena, that is, the knowledge of things in themselves. This task is reserved for philosophy.

However, scientific and philosophical knowledge cannot meet within the language, into which the nature of concepts take part, as well, because concepts are generalisations and relative. Scientific and philosophical knowledge must meet within experience, in philosophers' (or scientists', for that matter) thought. It goes without saying that concepts are used as tools according to their function, which I have explained, but they never suffice as such for understanding without learning, experience, or cognition. Now I must explain philosophical knowledge that I already called *metaphysical explanation*. A clear definition of the metaphysical explanation helps transform philosophy as a positive research discipline. I follow Bergson's definition of *positive* as a discipline that aims at progression and perfection (Bergson [1934] 2013, 216). The positive definition of philosophy would also 'lead the [other] positive sciences . . . to become conscious of their true bearing which is often very much superior to what they suppose' (Bergson [1934] 2013, 216–217).

As I already noted, the more intelligence tries to comprehend the phenomena of life and thought, the more its knowledge becomes symbolic. For instance, biology needs to smooth out differences and particularities while making generalisations and comparisons. Even before generalisation and comparison, intelligence needs to turn experiential data into concepts, which it then generalises and compares (Bergson [1934] 2013, 181). Symbolisation increases because intelligence moves further away from the nature of the things it has evolved to understand. Reality itself is not homogeneous, and thus biological truth 'cannot have the same value as physical truth' (Bergson [1907] 2013, 197).[260] The more science 'penetrates into the depths of life, the more the knowledge it provides us becomes symbolic, relative to the contingencies of action' (Bergson [1907] 2013, 200).[261] According to Bergson, all arguments for the relativity of scientific knowledge originates in the forgetting or dismissing the proper nature of philosophy.

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[260] 'ne peut pas avoir la même valeur que la vérité physique'

[261] 's'enfonce dans les profondeurs de la vie, plus la connaissance qu'elle nous fournit devient symbolique, relative aux contingences de l'action'

If science and philosophy were aware of their nature and their complementary relationship, this awareness 'would put more science into metaphysics and more metaphysics into science.' The more the nature of science and the nature of philosophy are understood, the more efficient and complementary to each other they can become. The task of philosophy is to bring together the fragmented, diverged scientific disciplines that have followed the scientific method into increasingly comprehensive knowledge on the expense of the coherence of human knowledge. The work of positive philosophy 'would be to re-establish the continuity between the intuitions which the various positive sciences have obtained at intervals during their history, and which they have obtained only by strokes of genius' (Bergson [1934] 2013, 216–217). For Bergson, the great inventors of human intellectual achievements have utilised both philosophical and scientific knowledge without much thinking about this division. They have only observed, classified, thought, learned, and created.

In conclusion to the preceding recapitulation, we can say that the relativity of conceptual knowledge of intelligence increases when intelligence exits from the physical reality to vital, psychic, and social things in themselves. Intelligence's utilitarian nature has no way of appropriately understanding these things. A gap emerges between the increasingly relative concepts and reality itself. Thus, I call this gap a *metaphysical gap*. After coining this term, I have encountered an appeal for a definition of metaphysics that would *fill the gaps between different scientific disciplines*. The appeal is the following:

> One of the main things we want from a metaphysics is a remedy for the radical fragmentation of culture in the last century. *We want the gaps among the disciplines to be bridged, if they cannot be closed*. . . . At the same time, *we will not be satisfied with a metaphysics that achieves these goals unless it also lives up to our standards of systematic rigor and justifiability by the evidence* (Robinson 2008, 105, my emphasis).

Let us investigate Bergson's answer to this kind of appeal. The more the gap between knowledge and reality widens, the more abstract conceptual knowledge becomes. But if there is a discipline that dismisses the symbols and possesses immediate knowledge of the object, that discipline would be called metaphysics. [262] As a necessary consequence from these considerations,

[262] Robinson (2008, 104–105) craves this kind of discipline: 'What we seem to be after is a kind of knowledge. What we want that will integrate all the other forms of knowledge is itself a form of knowledge. We might describe it as a vision or a grasp of the relationships among all the departments of knowledge and, by means of that, an understanding of the relationships among all the departments of human life. . . . To recognise the goal as a kind of

metaphysical explanation must abandon conceptual knowledge as its cognitive tool (Bergson [1934] 2013, 182). As we saw in the fifth chapter, thought does not equal concepts, which are but the indispensable tools of the former. Concepts as symbols enable computation according to whatever syntax or system of rules – this is the precise nature of intelligence, as I have explained.

But what gives concepts their matter? As I have explained it in the seventh chapter, instinctive cognitive tendency gives the cognitive matter for concepts. In the context of the subject matter of philosophy, I find it necessary to specify Bergson's concept of *intuition*. In his answer to French mathematician Émile Borel's (1871–1956) criticism of *L'évolution créatrice*, Bergson writes as follows:

> Nowhere I have claimed that one should 'replace intelligence with something different,' or prefer instinct in its stead. I have simply tried to show that, when one leaves the domain of mathematical and physical objects to enter that of life and consciousness, one must appeal to a certain *sense of life*, which contrasts with pure understanding, and which has its origin in the same vital impulse as instinct – albeit so-called instinct proper is completely another thing. This sense of life is only consciousness deepening more and more while seeking, by a kind of twist on itself, to put itself back in the direction of nature. It is a certain kind of experience, as old as mankind, but from which philosophy is far from having obtained all that it could get from it. (Bergson 1908, 30.)[263]

I suggest that the concept of *instinct* was a useful approximation of the cognitive mode that is present in human thought, although in a rather undeveloped state. With reflective self-development, learning, and intellectual effort, as I explained in the fifth chapter, this capacity can be elaborated for philosophy's use. Developing the so-called instinctive cognition, Bergson believes that philosophy could reach a form of knowledge that is not conditioned, that is, a form of knowledge that is *absolute*.

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knowledge is to distinguish it from other ways of unifying the divisions of learning and life. . . . The traditional name for this kind of knowledge was "metaphysics."'

[263] 'Nulle part je n'ai prétendu qu'il fallût "remplacer l'intelligence par une chose différente" ou lui préférer l'instinct. J'ai simplement essayé de montrer que, lorsqu'on quitte le domaine des objets mathématiques et physiques pour entrer dans celui de la vie et de la conscience, on doit faire appel à un certain *sens de la vie* qui tranche sur l'entendement pur, et qui a son origine dans la même poussée vitale que l'instinct, – quoique l'instinct proprement dit soit tout autre chose. Ce sens de la vie n'est que la conscience s'approfondissant de plus en plus en cherchant, par une espèce de torsion sur elle-même, à se replacer dans la direction de la nature. C'est un certain genre d'expérience, aussi vieux que l'humanité, mais dont la philosophie est loin d'avoir obtenu tout ce qu'elle en pourrait tirer.'

Based on the aforementioned considerations, let us further the ongoing discussion of the subject matter of philosophy. Invoking the idea of m*etaphysical gap*, I can contrast it with Bergson's formulation: 'On this new terrain philosophy must follow science in order to overlay on scientific truth a knowledge of another kind that could be called metaphysical' (Bergson [1907] 2013, 200).[264] From these considerations I formulate a proposition concerning the subject matter of philosophy:

> *The subject matter of philosophy is the metaphysical gap between relative symbols and absolute cognition.*

Considering the role of philosophy among the study of living nature, Bergson states that philosophy's 'attitude towards the living cannot be that of science, which only aims to act, and which, being able to act only through the intermediary of inert matter, considers the rest of reality under this single aspect' (Bergson [1907] 2013, 197).[265] Bergson questions the results that may occur, if philosophy retreats from biological and psychological facts, as it has mainly retreated from physical facts. If philosophy does this retreat, it will *a priori*, or *ontologically* accept 'a mechanistic conception of the whole of nature, an unthoughtful consideration,'[266] which follows only from the practical superiority of mechanistic *explanation* (Bergson [1907] 2013, 197). It is a fallacy to consider things to be identical with the cognitions of the things in reality, a matter of course since Kant's contribution to philosophical progress. According to Bergson, such a fallacy would nonetheless be a death sentence for philosophy, and if philosophy as whole commits to the fallacy, the only possible forms of philosophy would be *dogmatism* and *scepticism*, neither of which adds anything to science; the sacrifice would give nothing to science, and it would erase philosophy (Bergson [1907] 2013, 198).

However, there is no danger of the preceding fallacy, if philosophers are sufficiently analytical, precise, and sensitive. If the nature of conceptual knowledge and mechanistic explanation are well understood, there is no danger of 'ontologisation,' that is, of *conceptualised things* being taken as concepts, or *mechanistic explanations* being taken as causality itself. Perhaps philosophy, by filling the metaphysical gap, can contribute to fix these kinds of problems.

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[264] 'Sur ce nouveau terrain la philosophie devra donc suivre la science, pour superposer à la vérité scientifique une connaissance d'un autre genre, qu'on pourra appeler métaphysique'

[265] 'attitude vis-à-vis du vivant ne saurait être celle de la science, qui ne vise qu'à agir, et qui, ne pouvant agir que par l'intermédiaire de la matière inerte, envisage le reste de la réalité sous cet unique aspect'

[266] 'une conception mécanistique de la nature entière, conception irréfléchie'

Philosophy complements the gap between symbols of intelligence and reality. As I noted in the sixth chapter, Bergson's model of the relationship between philosophy and science is vertical and not horizontal, according to which I meant that there is no hierarchy between them but collaboration, complementarity. Because philosophy complements science, it does not synthesise sciences together or generalise their knowledge to form higher levels of abstraction. Neither does it provide any axioms to scientific disciplines. The function of philosophy is to *integrate* the different cognitions it creates out of scientific knowledge to connect or coordinate their connections.

Now philosophy must intervene. Symbolic systems cannot overcome the qualitative differences between the phenomena of reality these systems have spatialised, quantified, or conceptualised. These phenomena are *epistemologically* homogeneous but *ontologically* heterogeneous. We could also say that while their *form* appears to be unitary and commensurable, their *matter* is incommensurable. The metaphysical gap is an ontological or qualitative gap between different systems of knowledge. This is the reason why there cannot be epistemology without ontology, and, as I have stated in the beginning, this solidarity of epistemology and ontology is metaphysics itself, and philosophy is metaphysics. Thus, this epistemological gap is filled with the help of metaphysics, which consolidates epistemology and ontology. Metaphysics is the knowledge of knowing and the knowledge of being. The gap is filled by the 'disinterested inquiry,' that is, *speculation* in its etymological sense.

Bringing science, epistemology, and metaphysics together in the problem of inert matter and living reality will make all three fields profit from one another (Bergson [1907] 2013, 199). Science gets rid of its relativity when metaphysics gives its experiences a proper ontology. Together they 'touch the absolute.' This absolute knowledge would be *incomplete* but not *relative* (as Kant, Comte, and Spencer have asserted). Bergson assumes that while the masters of philosophy have been those who have assimilated the most recent scientific knowledge of their time, the assumed eclipse of metaphysics in the late nineteenth century occurred because the elaboration of scientific knowledge has grown so vast and scattered (Bergson [1934] 2013, 226). In the last chapter we saw that this is inherent to scientific knowledge. Nevertheless, if science was scattered at the end of the nineteenth century, it simply burst apart in the twentieth and the twenty-first centuries.

The collaboration between science and philosophy allows human knowledge to attain the absolute (cf. Bergson [1934] 2013, 69). We can bring along all the previously gathered knowledge and say that this attainment is only possible *precisely because of the difference in nature between* philosophy and science: 'philosophy and science are entirely distinct in terms of subject matter and

method and *of the faculties of thought* to which they principally refer' (Bergson 2011, 820). [267] While science utilises and elaborates intelligence, philosophy utilises and elaborates the complementarity of instinct and intelligence.

Now I have explained the subject matter of philosophy. Next, we will move to Bergson's account of the method of philosophy. We must remember that, for Bergson, all knowledge comes from experience. 'There is no other source of knowledge than experience' (Bergson [1932] 2013, 263).[268] 'An existence can be given only in experience,'[269] and this experience has two forms, conceptual and intuitive (Bergson [1934] 2013, 50). In this chapter, I showed the task of philosophy, and next I proceed to explaining *how* philosophy will conduct its task.

8.4 Method of philosophy

A method is a way to gain knowledge. Philosophy has its proper form of cognition and its proper research subject. These two factors condition its method. However, Bergson's theorisation of philosophical methodology is not so far removed from theoretical science.

Bergson characterises the method he uses in several ways. The multitude of characterisations itself pictures its non-conceptual, non-discursive nature quite well. He calls it 'qualitative differentiation,' 'qualitative integration,' 'convergence,' 'triangulation,' gathering the lines of fact,' increasing probability, and *intuition*. On one occasion, Bergson characterises his method as an 'interior observation' (Bergson [1919] 2017, 37). On another occasion, he describes the aim of his method as 'an intimate knowledge' which is 'born from a long friendship' (Bergson [1900] 2012, 2). Furthermore, 'the essence of philosophy is the spirit of simplicity' (Bergson [1934] 2013, 139).[270] On yet another occasion, Bergson notes that 'it is from the high towards the bottom that I have directed the light' (Bergson [1900] 2012, 101). [271] We can infer from these different definitions and characterisations that philosophical method is first and foremost a kind of simplicity that comes from a long journey of learning – as if the subject matter would resemble a long friendship.

Let us move forward from these figurative characterisations towards more precise definitions. I will go through Bergson's philosophical method by presenting it similarly to the way how Descartes has presented his own in *Regulæ*,

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[267] 'philosophie et science sont entièrement distinctes et par leur objet et par leur méthode *et par les facultés de la pensée* auxquelles elles font principalement appel'

[268] 'Il n'y a pas d'autre source de connaissance que l'expérience'

[269] 'Une existence ne peut être donnée que dans une expérience'

[270] 'l'essence de la philosophie est l'esprit de simplicité'

[271] 'c'est du haut vers le bas que nous avons dirigé la lumière'

that is, by expressing every step of the method in an imperative form. Here are the steps:

1) *Learn and get acquainted with the research subject to start gaining disinterested cognitions of it* (cf. Bergson [1934] 2013, 153).

2) *Out of these disinterested, infinitesimal cognitions, find those that converge and overlap with one another* (cf. Bergson [1932] 2013, 292; 2011, 807).

3) *Integrate converging and overlapping cognitions by using intellectual effort, a form of thought that brings together the elaborated cognitive tendencies of instinct and intelligence* (cf. Bergson [1934] 2013, 207, 226–7).

I find the expression according to rules to reach Bergson's aim in his method. The question is about controlling and directing one's cognition, as it was Descartes's idea, so philosophical method should probably be understood as more like a set of heuristic instructions than a method in scientific meaning. Now, let us follow this order of rules.

> *Learn and get acquainted with the research subject to start gaining disinterested cognitions of it.*

The philosophical method aims at a cognition that is not conditioned by any pragmatic or social need. It is possible and even probable that the relativity of human knowledge can be overcome with an intense intellectual effort (Bergson [1896] 2012, 205). However, this intellectual effort requires long and laborious work. Its aim is to turn thinking from *useful* to *direct* cognition, from relative knowledge to absolute knowledge. The task of philosophy is to intervene in scientific research by examining the research subject through disinterested inquiry, without practical purposes. This task requires disengaging from intelligent reasoning and learning to elaborate on the instinctive cognition. With instinctive cognition, philosopher can sympathise with the research subject. This is another expression for the older characterisation of metaphysics as *speculation*, a *vision* in its etymological sense (Bergson [1907] 2013, 197). This is only possible through complete disinterestedness in anything other than the subject matter (Bergson [1934] 2013, 153).

The cognitions received with this kind of method are minute, even infinitesimally small, so to speak (Bergson [1896] 2012, 205–206). This is because '[i]t is . . . natural that metaphysics should adopt the generative idea of our mathematics *in order to extend it to all qualities*, that is, to reality in general'

(Bergson [1934] 2013, 215 emphasis mine).[272] Bergson suggests that philosophers should see *how* mathematicians quantify reality. Philosophers should see the operation or the principle of the quantification, not the result of the quantification itself (Bergson [1934] 2013, 215). Mathematics grows from itself and from its interaction and usage within the empirical sciences. With mathematics, science can form laws out of generalisations and regularities. Should philosophy similarly to mathematics give its benefits into the use of human intellectual labour? With mathematics and metaphysics, human consciousness can transgress the limits of language, ordinary reasoning, and all those articulations imposed on it by life and society, whose aim is not to gain truth but to execute and control different actions (Bergson [1934] 2013, 214).

> *Out of these disinterested, infinitesimal cognitions, find those that converge and overlap with one another.*

Both philosophy and science utilise and manipulate probabilistic knowledge because probabilistic knowledge is the mode of empirical knowledge, and philosophy and science are both empirical disciplines. However, a philosopher uses this empirical knowledge in a slightly different manner from the scientist because philosophical aims differ from scientific aims, as I have already explained. The philosopher searches for multiple probabilities in order to attain absolute cognition from saturating the research subject with multiple probabilities. Bergson calls these multiple probabilities 'lines of fact' (*lignes de fait*; cf. Bergson [1932] 2013, 266). The lines of fact, being empirical and thus both probable and relative, give directions that surpass the knowledge that is contained only in their conceptual representations. Thus, with the lines of fact, a philosopher can carefully infer from empirical evidence something that this evidence does not *prima facie* deliver. This careful procedure is enabled with several overlapping lines of fact, which increase their certainty in philosophical research and enable absolute cognition.

Bergson has remarked the sensitivity to this 'extra-empirical' knowledge. 'I say nothing that could not one day be confirmed by biology' (Bergson [1932] 2013, 272).[273] He continues as follows: 'In waiting for this confirmation, I have had results that the philosophical method, such as I understand it, has allowed me to take to be true' (Bergson [1932] 2013, 272).[274] He continues further still: 'The truth

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[272] 'Il est . . . naturel que la métaphysique adopte, *pour l'étendre à toutes les qualités*, c'est-à-dire à la réalité en général, l'idée génératrice de notre mathématique.'

[273] 'Nous ne disons rien qui ne pût être confirmé un jour par la biologie.'

[274] 'En attendant cette confirmation, nous avions des résultats que la méthode philosophique, telle que nous l'entendons, nous autorisait à tenir pour vrai.'

is that it is necessary to proceed by trial and error and to follow simultaneously several methods, each of which would only lead to possibilities or probabilities: interfering with each other, the results will neutralise or mutually reinforce each other' (Bergson [1932] 2013, 292).[275] To be clear, according to Bergson, every researcher has basically two options: philosophers proceed either relying on the non-conceptual, intuitive knowledge or simply applying representational, already conceptualised knowledge (Bergson [1889] 2013, 49).

This convergence of different types of evidence, independent from each other, Bergson – and some other theorists of knowledge – have called *triangulation* (cf. Bergson [1932] 2013, 263). As Bergson puts it: '[T]he philosophical method is, at least to a certain extent, a method of overlapping [*recoupement*] that utilises the different sciences to make the conclusions converge, where possible, on the same point' (Bergson 2011, 807).[276] In its simplicity, the core idea of the triangulation metaphor is as follows: *With partial but sufficient empirical data and with the adequate method, the researcher gains firm knowledge with the help of indirect objects, and he or she can even base further inferences on these indirectly inferred objects.* With this metaphor, Bergson refers to an old geodesic operation: 'The cartographer measures the distance of an inaccessible point aiming at it turn by turn from two points into which he has the access' (Bergson [1932] 2013, 263).[277] Other theorists of triangulation have put the triangulation metaphor in a way that highly resembles that of Bergson. According to Blau (2011, 361), triangulation 'involves seeing if different *kinds* of data imply the same conclusions.' According to Tibben (2015, 638), triangulation promotes rigor and encourages researchers to adopt multiple perspectives on the subject matter. According to Moran-Ellis et al. (2006, 47), triangulation concerns 'what more can be known about a phenomenon when the findings from data generated by two or more methods are brought together.'

The philosophical knowledge needs vast amounts of data, which comprises mainly the scientific results and philosopher's intuited cognitions. These sources of data fuse together, 'neutralising from each other all the preconceived and premature ideas observers may have deposited unknowingly in their observations' (Bergson [1934] 2013, 226). This kind of knowledge creation

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[275] 'La vérité est qu'il faut procéder par tâtonnement et recoupement, suivre à la fois plusieurs méthodes différentes dont chacune ne mèneraient qu'à des possibilités ou des probabilités : interférant entre eux, les résultats se neutraliseront ou se renfonceront mutuellement.'

[276] '[L]a méthode philosophique est, en partie au moins, une méthode de recoupement, qui utilise des sciences diverses pour en faire converger les conclusions, là où c'est possible, sur le même point.'

[277] 'L'arpenteur mesure la distance d'un point inaccessible en le visant tour à tour de deux points auxquels il a accès.'

resembles the reconciliation of relative knowledge according to instinctive, organising cognition. In other words, philosophical use of cognition is *integrative*.

> *Integrate converging and overlapping cognitions by using intellectual effort, a form of thought that brings together the elaborated cognitive tendencies of instinct and intelligence.*

After the first two stages of the philosophical method, 'there remains the task of reconstructing, with the infinitely small elements that we discern from the real curve, the form of the curve itself which extends into the obscurity beyond them' (Bergson [1896] 2012, 206).[278] The philosopher must find the 'curve' from the reflected experiences that work as 'differentials.' Less figuratively put, single absolute cognitions are minute, infinitesimal. Gradually philosophical thought integrates these cognitions together by organising them. In other words, this is a veritable *learning*. It is the becoming of a philosopher into his or her research subject. This learning is integrative cognition, understanding in its most serious significance. One etymological meaning of *integral*, from which integration is derived, illustrates its philosophical use in Bergson as I interpret it: I am referring to the meanings of 'untouched' and 'intact' (cf. Schwartzman 1994, 117).

Integration aims at understanding the object of cognition in itself, and that is all. This understanding is better known as *intuition*. Intuition progressively dispels the difficulties, contradictions, and incoherencies that intelligent reasoning accumulates around problems, whether small or perennial to metaphysics (cf. Bergson [1934] 2013, 206–207). As I have explained as part of these methodological rules, intuition is not a single, sudden cognitive vision but a vast number of singular cognitions that are gradually integrated into vaster, comprehensive cognition (Bergson [1934] 2013, 207). The clearest result of intuition is the idea of an *élan vital*, which I explained in the sixth chapter. With the *élan vital*, Bergson was able to obtain an intuitive cognition of evolutionary movement by a laborious acquaintance with the scientific evidence and philosophical reflection.

As I have already noted, the task of philosophy is not to make a synthesis of the sciences – that becomes an increasingly more absurd assumption (cf. Bergson [1934] 2013, 226–227). Metaphysics does not *generalise* human knowledge but rather *integrates* it. This is why Bergson calls the outcome of the metaphysical method the 'integral experience' (*l'expérience intégrale*; Bergson [1934] 2013, 226–227). Philosophy does not synthesise either scientific knowledge

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[278] 'il reste à reconstituer, avec les éléments infiniment petits que nous apercevons ainsi de la courbe réelle, la forme de la courbe même qui s'étend dans l'obscurité derrière eux.'

or previous philosophical knowledge. Rather, it analyses, intuits, and integrates cognitions (Bergson [1934] 2013, 138). As is clear by now, philosophy is not a synthesis, or a level of abstraction above science. Neither is it an analysis of any form of relative knowledge. It is an intuition of minute cognitions in an increasingly integrated form: therefore, Bergson calls the aim of philosophy the 'dilatation of mind.' On several occasions, I have invoked the concept of *learning*. Again, I find the 'dilatation of mind' to be nothing but learning in the deepest meaning of understanding. Integration of cognition, or intuition, 'is the only [method] that could definitely advance metaphysics' (Bergson [1932] 2013, 263).[279]

This integration also makes the collaboration and accumulation of philosophical knowledge possible (Bergson [1932] 2013, 263–264). If philosophers could communicate the obtained intuitions with each other, they would increase the scope of the integration of philosophical cognition in the philosophical field. Interpersonal communication of philosophical thought is possible as personal sympathy, inspiration, and learning is possible between individuals. Philosophical cognition is expressed in the way an emotion is expressed: no general idea resembles it. A person who has ever loved another person knows *both* the insufficiency of words *and* the necessity of communication for maintaining the shared relationship. This conflict between the insufficiency of words and the necessity of expression is identical in philosophy – although the content is totally different.

8.5 Summary

In this chapter, I concentrated on Bergson's theory of the subject matter of science, as far as it was relevant from a metaphilosophical point of view, and the subject matter and method of philosophy.

First, I explained Bergson's schematic picture of the nature of science as the construction of symbolic representational systems. The more science progresses, the more precise and analytic the scientific disciplines and their conceptual systems become. Scientific precision causes science as a whole to shatter into even smaller symbolic systems. This is due to its symbolical nature, and it is not a deficit – it is its feature. This feature originates in the nature of intelligence, elaborated in the last chapter, and science is the systematised, institutionalised form of intelligence.

The nature of science as an institutionalised form of intelligence provided my present metaphilosophical task with the direction for outlining the first

[279] 'est la seule [méthode] qui puisse fait avancer définitivement la métaphysique'

positive role of philosophy. We saw that for Bergson the aim of philosophy is to overcome what I called the *metaphysical gap* between relative knowledge and absolute reality, which in turn gives well-defined scientific disciplines an ontological basis, without which their knowledge would remain merely symbolical and hypothetical.

For Bergson, both science and philosophy are conditioned by their methods of experimental inquiry. The shortcomings of both disciplines can be overcome with the help of philosophical methodology. I briefly problematised the concept of *method* in philosophy, after which we proceeded to my explication of Bergson's method according to three heuristic rules. With these rules, I argued that Bergson has an aim to make philosophical thought comprising 1) to produce disinterested cognitions, 2) to make the disinterested cognitions to converge, or overlap, and 3) with an intellectual effort to integrate the convergent, or overlapping, cognitions into ever greater organisations of disinterested cognitions.

Reflecting on the themes in this chapter, I find it necessary to underline one additional, but highly instructive, point regarding Bergson's central metaphilosophical idea. It is a common adage that philosophy is the 'mother of science.' Philosophy is not the mother of science. Intelligence is still the mother of science, because it is the cognitive basis of scientific knowledge elaborated with empirical observation and symbolical reasoning. Science has never become differentiated from philosophy; instead, there have been coinciding moments of philosophical and scientific thought in human intellectual history. Philosophy is not the mother of science – it is its sister, and the evolutionary origin of human cognition is their common mother.

PART IV: CONVERGENCES AND CONCLUSION

9 CONVERGENT AIMS IN MAINE DE BIRAN AND HENRI BERGSON

In parts II and III of the dissertation, I have individually analysed the origin and generation of knowledge and their consequences on philosophy in Maine de Biran and Henri Bergson. In this chapter, we shall engage with the final aim of this dissertation. I will bring together the two analyses and find *convergences* between them. By *convergence*, I mean the case of two or more philosophies having such metaphilosophical aims that point towards the same goal. For instance, if one has an aim that converges with the aims of Maine de Biran and Bergson, the aim ultimately leads into similar philosophical results as those of Maine de Biran and Bergson – given that Maine de Biran and Bergson's aims converge. The direction of aims is inferred from philosophers' arguments and conclusions. In short, clarifying convergent aims between philosophers helps us in abstracting robust metaphilosophical arguments on the nature of philosophy.

I find the search for converging aims to be the proper method 1) for bringing different philosophies together and 2) in increasing the cogency of the theory under which the philosophical research operates. I have invented this method for the purpose of this study, but its purpose is to offer a novel, general method for the historical study of philosophy, as well. In this dissertation, I am not pursuing a comparative study of Maine de Biran *with* Bergson or *vice versa*.

Instead, I try to find commonalities in their systematic directions under the explicitly stated aims. Here, the convergences are strictly tied to the metaphilosophical aims that were present in the second and third part of the dissertation: 1) finding the origin and generation of human knowledge, 2) showing the consequences of the origin and generation of knowledge for the subject matter of philosophy, and 3) drawing from the two previous aims to clarify the relationship between philosophy and science. In the following, I will consider all three key metaphilosophical topics and abstract Maine de Biran and Bergson's converging aims.

9.1 The origin and generation of knowledge

Let us first concentrate on the metaphilosophical convergences between Maine de Biran and Bergson that relate to the origin and generation of knowledge. I propose that the convergences concerning the origin and generation of knowledge are as follows: 1) there are two sources of knowledge that differ in nature from each other; 2) although the duality of cognitive modes in Maine de Biran and Bergson are different, they aim to provide an analogous answer to the origin of knowledge from the generative point of view; 3) the generative

explanation clarifies the role of concepts, as well. Let me recapitulate the central points of both Maine de Biran and Bergson.

Maine de Biran sought for the primitive fact of consciousness, the principle of the generation of knowledge. He found this fact in individual *activity* and in the sentiments of effort and resistance generated by this activity. Effort and resistance, in turn, give rise to volition, which is cognitive in its nature. This volitional cognition develops into two divergent modes: attention and reflection. Attention uses perception and imagination, according to which it forms generalities from the coordinated resemblances. This is the origin of general ideas, that is, concepts. Reflection concentrates on the possible unities, instead, which are not generalised but abstracted.

For Bergson, intelligence and instinct as cognitive tendencies have evolved out of the same primitive cognitive capacity. Human consciousness is mainly based on intelligence. As I explained, intelligence is first and foremost spatial. This spatiality enables consciousness to distance itself from the immediate action, to discriminate, analyse, and synthesise objects of perception and imagination, to manipulate and manufacture instruments, and to form mechanistic and finalistic causal models to reason, predict, and manufacture objects. Its main forms of reasoning are induction and deduction. Its main matter are general ideas, which it can manipulate and create indefinitely according to their use case.

There clearly is a duality in both Maine de Biran and Bergson's theories, but does this duality reach at the very origin of cognitive capacities? Now, one might think that my theory is not quite accurate: although there are two forms of knowledge, originating in two cognitive modes, according to both Maine de Biran and Bergson, there seems to be only one source, in which these cognitive modes originate. Here the question is about demarcation: what do we count as a source of something? However, knowledge itself has two sources, even if these sources have a common source. Or is this really the case?

In Maine de Biran's theory, even though attention and reflection develop from volition, volition itself does not develop from instinct. In other words, volition as the second-order cognition develops independently from instinct, which is the first-order cognition. However, as we saw in section 3.4, reflection, albeit originating in volition, has something to do with instinctive cognition.

As we saw in the seventh chapter, for Bergson, rudimentary life in the early stages of evolution is accompanied by a primitive type of cognition that evolves into three divergent accentuations: into a sort of torpor in plants, and into instinct and intelligence in animals. Although these accentuations are distinguishable from one another, they nonetheless are tendencies of the same activity we call cognition.

Considering these observations, I refine my interpretation of Maine de Biran and Bergson as philosophers of two sources of human knowledge. To put the point as precisely as possible in a single sentence, I attest that in both thinkers, *there is activity as a single generative source of cognition; cognition then divides into two cognitive tendencies that are the proximate generative sources for two incommensurate but complementary forms of knowledge*. Thus, there is *one* source for the two cognitive tendencies, and these two tendencies are, in turn, *two sources of knowledge*. The following passage from Bergson, in which he points out the impossibility of intelligence to comprehend instinct, concisely characterises this central idea:

> Some hold the act of volition to be a composite reflex, others are inclined to see in the reflex a degradation of volition. The truth is that the reflex and the voluntary convey two views on a primordial, indivisible activity, which was neither the one nor the other, but which retroactively, through them, transforms into both of them at once. We could say the same of instinct and intelligence, of animal life and vegetative life, of many other pairs of divergent and complementary tendencies. (Bergson [1932] 2013, 313–314.)[280]

The common source for divergent, or incommensurate things is difficult for intelligence to comprehend, because it sees them only according to its own nature. Thus, either it comprehends instinctive behaviour according to its own nature or it does not comprehend it at all, because the instinctive tendency has accentuated precisely those features that intelligence must have abandoned in order to accentuate its own traits. *Nevertheless*, both instinct and intelligence have a developmentally common source, although their operations and products are incommensurate. For Bergson, this development is phylogenetic, for Maine de Biran, it is ontogenetic.

It is clear that there are several dissimilarities between Maine de Biran and Bergson, as well. One essential difference is the location of the division of cognitive modes. Expressing the difference between Maine de Biran and Bergson in biological terms, Maine de Biran located the division of the cognitive modes in ontogeny, whereas Bergson located it in phylogeny. Let us take a step closer into clarifying the convergent metaphysical aims between Maine de Biran and

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[280] 'Certains tiennent l'acte volontaire pour un réflexe composé, d'autres verraient dans le réflexe une dégradation du volontaire. La vérité est que réflexe et volontaire matérialisent deux vues possibles sur une activité primordiale, indivisible, qui n'était ni l'un ni l'autre, mais qui devient rétroactivement, par eux, les deux à la fois. Nous en dirions autant de l'instinct et l'intelligence, de la vie animale et de la vie végétale, de maint autre couple de tendances divergentes et complémentaires.'

Bergson concerning the origin and generation of knowledge. If we pay attention only to the philosophical consequences of both cognitive dualities, we can discern both Maine de Biran and Bergson's converging aims on the common problem.

The problem can be approached first, with the old philosophical schools, over the nature of concepts: nominalism and conceptualism. Both philosophers attest that ordinary concepts are nominal: they are merely names for resembling things gathered together. Nonetheless, there can be representations that resemble concepts that can attain things in themselves. In this way, there are *conceptual* concepts. However, attention for Maine de Biran and intelligence for Bergson can only produce nominalist concepts based on generalisations. For Maine de Biran, reflection and instinct together with intelligence can produce cognitive units that are conceptual. Furthermore, we can assume that neither Maine de Biran nor Bergson wanted to resolve the problem of the nature of concepts itself; they wanted to resolve the problem of the generation of knowledge, out of which the problem of the nature of concepts originates. The result for both was that the function of concepts was refined and clarified.

I want to stress the fact that in the case of cognition, *the duality of cognitive modes in Maine de Biran and Bergson differ essentially from each other, but their metaphilosophical aim is convergent, because, from remote points of view, their aim is to resolve analogical problem*. One possible reason for this was that Bergson had the opportunity to utilise evolutionary explanations of cognition, whereas Maine de Biran had to rely on more rudimentary physiological and developmental observations.

Before proceeding to the next section, in which I will focus on the convergences concerning the nature of philosophy itself, I will elaborate on the basic setting of human experience and perception, which is the starting point of philosophical thought according to both Maine de Biran and Bergson. If the matter of consciousness is understood as comprising simple objects or particularities and these are taken as the experiential starting point of thought, thinking would start from elements already profoundly conditioned by cognitive operations. Thus, if philosophy wants to commit to an empiricism worthy of its name, as Maine de Biran and Bergson apparently wanted, it cannot be naïve realism. However, overcoming the naïve realism has been a rather difficult task for philosophers. It is not our task in this context to evaluate other theories than those of Maine de Biran and Bergson; thus, I will put their central idea of the consequences of the nature of human perception for philosophy as concisely as possible. In short, *human perception is mainly directed towards action*.

We can corroborate this central idea especially with the observations, simulations, and theorisations conducted and created by Donald Hoffman and his colleagues (Paulson, Hoffman, and O'Sullivan 2019; Hoffman 2019; Hoffman

and Prakash 2014; Mark, Marion, and Hoffman 2010; Hoffman and Singh 1997). Combining these pieces of evidence with those that I provided on the representative and action-oriented nature of language in section 5.3 (cf. Jeannerod 2006; Rüschemeyer, Brass, and Friederici 2007; Arbib 2015; Perszyk and Waxman 2018; Spelke 2017; Boeckx 2011), I attest that both Maine de Biran and Bergson's theories of perception and the nature of consciousness are in line with a vast body of scientific evidence. Indeed, language and conceptual thought as the primary tool of human cognition causes problems for philosophy if its proper nature and function are not well understood. In fact, it is an apparent, albeit not definitive, impediment to philosophical knowledge. I considered the nature of language in both philosophers' cases, but I elaborated on the topic more specifically with Bergson, in which I corroborated the analysis with recent scientific evidence.

We discerned three functions of language: it is a tool of 1) reasoning, 2) social communication, and 3) representation. We saw all these functions to converge towards the key function of language: language is first and foremost directed towards action, whether it is prepared (reasoning), coordinated (social communication), or simulated (representation). Both Maine de Biran and Bergson considered language in precisely similar fashion. In short, language for both Maine de Biran and Bergson is for symbolical reasoning, communication, and representation.

9.2 The subject matter of philosophy

Let us move to the philosophical consequences of the origin and generation of knowledge. Both Maine de Biran and Bergson developed a generative explanation of knowledge. Why do we have this convergence?

Now, let us consider the following propositions that characterise the metaphilosophical ideas of both Maine de Biran and Bergson: 1) human perception is directed towards action; 2) philosophy is an empirical discipline; 3) the concept of *philosophy* practically coincides with *metaphysics*; and 4) one part of metaphysics is the study of things in themselves, that is, the research of absolute knowledge.

The research of absolute knowledge is a general, classical definition of metaphysics; thus, what are Maine de Biran and Bergson's positions against this classical background? The answer lies in both philosophers' theories of the origin and generation of knowledge. For both Maine de Biran and Bergson, absolute knowledge is non-conceptual knowledge, and non-conceptual knowledge is the product of another mode of cognition than that which produces concepts. Moreover, the development of this cognition can be traced and known. If

philosophy gains a clear picture of the nature of all the elements of human knowledge, such as perception, consciousness, concepts, and language, it also learns to overcome their limitations, because it gets to know their proper nature.

However, if philosophy is not aware of the nature and function of the obvious and common elements of cognition, it most likely will go astray in its thoughts and conclusions and produces pseudo-problems. Out of these pseudo-problems I have dealt with, for instance, was the problem of innate ideas, and the problems that the spatiality of reasoning and concepts have caused. Thus, as explicitly expressed by both Maine de Biran and Bergson, philosophy needs *precision* (Maine de Biran 1995, IV:9; Bergson [1934] 2013, 1, 23). Precision, in its stead, requires one to get acquainted with things in themselves.

Maine de Biran and Bergson's methodologies differ greatly in their appearance. For Maine de Biran, philosophical method first clarifies the human cognitive capacities. Second, it concentrates on the reflective mode of cognition. With reflection, the philosopher can understand *unities* and *generative reasons*, that is, the *real causes* of things. For Bergson, the philosopher first produces infinitesimal intuitions of the research subject, after which he or she starts to integrate them to attain more comprehensive cognition of the given subject matter. Intuition is possible by the elaboration of the complementarity of intelligence and instinct. At first sight, Maine de Biran appears to be rather introspective, whereas Bergson is looking more towards things in reality. Moreover, Maine de Biran restricted his study to *human science*, whereas Bergson adopted a wider scope from the special sciences ranging from biology to physics, along with the special problems of each of these sciences.

Once again, let us not be disturbed by a comparison of partial elements. We need to focus on the metaphilosophical aims in both Maine de Biran and Bergson. I argue that the metaphilosophical convergences between Maine de Biran and Bergson on the philosophical methodology are possible. For Maine de Biran and Bergson, *philosophy aims at knowledge about the unconditioned unity of things*. This aim requires a *profound analysis of human cognitive capacities*, as well, that comprises most of the philosophical work. In addition, the methodology in both Maine de Biran and Bergson appears to be a set of systematic heuristics in the same fashion as Descartes's *Regulæ*.

There is one additional feature in both Maine de Biran and Bergson that I should still point out. Instead of taking part in explaining the generative sources of knowledge, it tells us something about the direction of philosophical knowledge. Here, I am referring to mysticism and its relation to philosophy, a theme common to both Maine de Biran and Bergson.

The philosophical aims of Maine de Biran and Bergson appear to converge in a surprising topic, namely mysticism, of which both philosophers found

resemblances with philosophical aims. Mysticism has in fact always been close to philosophy. In an essay, which he by and large devoted in criticising Bergson, Bertrand Russell (1872–1970) characterises the relation between mysticism and metaphysics as follows:

> Metaphysics, or the attempt to conceive the world as a whole by means of thought, has been developed, from the first, by the union and conflict of two very different human impulses, the one urging men towards mysticism, the other urging them towards science. Some men have achieved greatness through one of these impulses alone, others through the other alone: in Hume, for example, the scientific impulse reigns quite unchecked, while in [William] Blake a strong hostility to science co-exists with profound mystic insight. *But the greatest men who have been philosophers have felt the need both of science and of mysticism*: the attempt to harmonise the two was what made their life, and what always must, for all its arduous uncertainty, make philosophy, to some minds, a greater thing than either science or religion. (Russell 1932, 1, my emphasis.)

With these philosophers who combine science and mysticism, Russell is explicitly referring to Heraclitus and Plato, but I find the remark applicable to Maine de Biran and Bergson, as well. Although neither Maine de Biran nor Bergson wanted to 'conceive the world as a whole,' they did want to conceive the world as such, or the things in the world in themselves, and while doing so, they accommodated the state of the art in the sciences of their time.

Mysticism seems to be a direction of thought or an attitude of consciousness. If philosophy and science are articulations things according to their measure, mysticism is an expression of the *capacity* of thought. Here are most of the characteristics that Russell (1932, 8–11) attributes to mysticism: 1) a disbelief in discursive knowledge, 2) a feeling of certainty, 3) a belief in unity, and 4) a recognition of two ways of acquiring knowledge. Interestingly, these are some of the central themes I have considered in this dissertation belonging to the philosophies of Maine de Biran and Bergson.

These remarks concerning mysticism are by no means specific to supposedly mystical topics, such as cosmogony, theology, or eschatology. Instead, they focus on the ideal purpose of philosophy in Maine de Biran and Bergson. However, it is necessary to address the question of mysticism, because it has given rise to certain problematic interpretations, especially in Maine de Biran's case. It is also philosophically interesting, because it yields us further evidence about thought without symbols and language. Here, the question concerning creativity and mysticism is purely secular and related to human activity and cognition.

For Maine de Biran, the creativity of reflection is the point of contact between philosophy and mysticism or quietism (Maine de Biran 1989b, IX:183).[281] I propose that Maine de Biran's idea about the importance of mysticism is the following. As he notes, in a mystical contemplation, attention clears consciousness from any perceptual and imaginary matter, focusing only on one's personality. Nevertheless, a mystic receives intuitions that he or she believes do not come from himself or herself. If a mystic is a theist, such as a Christian, he or she thought that the intuitions was sent by God. It is nonetheless a fact that a mystic does not need to be a theist and still experience strong activity of his or her consciousness even thought his or her body is in completely passive state. Reflection resembles mystical contemplation, but Maine de Biran stresses that reflection is a purely active form of cognition, whereas contemplation, or meditation, is usually considered as a passive receptivity from somewhere higher. (Cf. Maine de Biran 1989b, IX:183.)

Based on this resemblance between contemplation and reflection, Maine de Biran remarks that philosophy cannot abstain itself anymore from the considerations of mysticism (Maine de Biran 1989a, X/2:25–26). In mysticism, philosophy has one source of evidence of the capacities of reflective cognition and of the most intense moments of human consciousness (cf. Maine de Biran 1989a, X/2:26, 252, 322, 329). Maine de Biran remarks that the reason why Leibniz renounced Averroism[282] and quietism was because he confused the nature of personality with the substance of the soul, thus confusing activity with a passive idea (Maine de Biran 1989a, X/2:322; Leibniz [1765] 1966, 43). The human mind

> has faculties and exercises activities, which are proper to it or come only from it, and it also knows them as belonging to it. As long as it uses its proper activity, or exercises its cognitive faculties, either in its interior world or on the world of objects, the mind remains appropriated to itself, without going any further. But in addition, it has faculties, or operations, which pertain to a higher principle than it is itself, and these secret

[281] *Quietism* was mainly a label of accusation of the Christian catholic church against some of its certain members, such as Madame Guyon (1648–1717), who were condemned as heretics. The Quietists got their name from their belief that *a prayer, or a contemplation, could be conducted without words*.

[282] Averroes or Abū l-Walīd Muḥammad Ibn Aḥmad Ibn Rušd (1126–1198) as well as those labeled as Quietists have all defended the integrity of knowledge against social and religious orthodoxy.

> operations are performed in its foundation and without its knowledge. (Maine de Biran 1989a, X/2:323–324.)[283]

This is the essential role of mysticism in Maine de Biran's philosophy. It signifies the open and active part of the human mind that aims to transcend the given conditions, in which the human being contends. Exploiting its cognitive nature, philosophy can elaborate on the creative capacity of mystical contemplation.

Bergson elaborates the relationship between philosophy and mysticism in great length in *Les deux sources de la morale et de la religion* ([1932] 2013, 259–267, 324–338). According to François (2013b, 345, note 150), for Bergson, mysticism means intuitive knowledge of the principle of life. Unfortunately, this is not the place to give an elaborate exposition of Bergson's idea of the relationship between philosophy and mysticism, but a concise explanation is necessary for the sake of the present discussion.[284] Waterlot (2013, 230–231) has remarked that Bergson characterises mysticism as 'sensitivity' or 'food for thought' (*un supplément d'âme*; Bergson [1932] 2013, 330). According to Kenmogne (2008, 340), mysticism can play an auxiliary role for philosophical knowledge formation. Bergson claims to have found the mystics recently in 1911 (Bergson 1972, 881; cf. Kenmogne 2008, 340–341), and in 1922, he expressed his conception of intuition to resemble mysticism (Bergson [1934] 2013, 50). Mysticism could intensify intuition in moral and social matters of fact (Bergson [1932] 2013, 224; cf. Goddard 2002, 215–216).

We can infer from the preceding characterisations that mysticism's role is to support philosophy to better understand human cognition and behaviour by providing a source of evidence that is not conceptual but essentially part of behaviour and cognition themselves. Maine de Biran's reference to quietism seems to share the same aim with Bergson's ideas of mysticism. In short, both Maine de Biran and Bergson attested the moderate interest in mysticism in aiding philosophy as a discipline of non-conceptual cognition.

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[283] 'a des facultés et exerce des activités qui lui sont propres ou ne viennent que d'elle, et aussi qu'elle connaît comme lui appartenant. Tant qu'elle use ainsi de son activité propre ou qu'elle exerce ses facultés cognitives, soit dans son monde intérieur, soit dans celui des objets, l'âme demeure appropriée à elle-même, sans aller plus loin. Mais elle a de plus des facultés ou opérations qui tiennent à un principe plus haut qu'elle-même, et ces opérations secrètes s'exécutent dans son fond et à son insu.'

[284] Kenmogne (2008) has written a good introduction to Bergson's idea of mysticism, and she has also collected the occurrences of mysticism in Bergson's writings.

9.3 The relationship between philosophy and science

As it is now evident, both Maine de Biran and Bergson argue that philosophy needs to become self-aware of the generation of its knowledge. Moreover, they both see philosophy as the research of the origin and generation of knowledge. They see this as the metaphysical essence of philosophy. Because the origin and generation of knowledge is the metaphysical essence of philosophy, metaphysics *in this sense* is the foundation for all the theoretical and practical fields that produce and deal with knowledge. In this sense, metaphysics for both Maine de Biran and Bergson precedes science, but it is not their foundation. Metaphysics is the discipline that has the human capacity of knowing as its subject matter. Let me briefly recapitulate my interpretations of Maine de Biran and Bergson's ideas of the relationship between philosophy and science.

For Maine de Biran, philosophy and science rely on different explanatory models. First, science generalises observations into laws by induction. Second, successful inductions lead the most inventive scientists to deduce new laws out of other laws. Third, science uses mechanistic causal explanation, which provides the causal framework for inductions and deductions.

Bergson committed historically and analytically to the general view on the scientific method of his time. Science uses induction, deduction, and mechanistic causal explanation. As such, science has been successful in all the domains of reality into which it is implemented. However, this succession has come with a cost. Bergson was interested in the increasing fragmentation of the field of scientific disciplines. He argued, as we saw in section 8.1, that the fragmentation was a natural result of the increase of accuracy in the sciences. The more precise the scientific symbols or systems of symbols become, the more they become incommensurate with each other.

The fragmentation of scientific disciplines gave Bergson a concrete example of the direct utility of philosophy. The role of philosophy is to integrate scientific disciplines according to the articulations of reality and not according to symbolical systems. Philosophy must not further generalise the products of science with further generalisation. Such a procedure would only end up increasing the abstractness of scientific knowledge and strip away the precision of scientific concepts, designed for specific purposes in their respective domains. Instead, philosophy can complement science by providing knowledge of the natural differences between the phenomena of reality. Philosophy provides this knowledge by elaborating the instinctive cognitive capacity alongside intelligence. It provides organising, unifying thought.

According to Maine de Biran, philosophy does not generalise scientific knowledge, either. Instead, it searches for the generative unity of phenomena.

Maine de Biran was mainly concerned with the roles of scientific and philosophical explanation of human cognitive capacities. This concern is clearly visible in his project of human science, whose task for Maine de Biran was to clarify the division of labour and complementarity between mathematical part of human science and metaphysical part of human science, namely, physiology and psychology.

Both Maine de Biran and Bergson committed in their own ways to the principles of empirical knowledge (cf. Bergson [1932] 2013, 263; Maine de Biran 1995, IV:12, 60; 1986, VIII:73, 103, 122). This is of particular significance, since defining philosophy both in terms of empirical and absolute knowledge is uncommon. This is yet the central characteristic of philosophical knowledge in Maine de Biran and Bergson. Maine de Biran and Bergson shared similar views on the function of philosophical knowledge, and I argue that this is caused by their convergent aims.

I argue that the first evidence of the convergent aim between Maine de Biran and Bergson considering the relationship between philosophy and science is clearly visible in the role they give philosophy in connecting different sciences. For both Maine de Biran and Bergson, scientific concepts and conceptual systems are useful and valid as long as they are treated as univocal symbols of closed systems. Mixing concepts and conceptual systems together would detach each of them from their useful purpose and end up in abstractness.

Both Maine de Biran and Bergson proposed an analogical role of philosophy in this scattered situation. Philosophy does not generalise different scientific concepts by mixing them. Instead, philosophical research understands their natural differences and finds ways to gain continuity between different scientific fields separate from their practical use of concepts.[285] This effort is not conceptual but non-conceptual, purely cognitive. Only after all the elaboration I have given in this dissertation, we could meaningfully attest the (otherwise trivial) statement: the task of philosophers is *thinking*. For Maine de Biran, this thinking is the working of reflective cognition; for Bergson, it is the working of instinct complementing intelligence. This can be put in terms of causal

[285] In recent decades, scientific disciplines have gained a more profound understanding of the nature and role of concepts in human intelligence (cf. MacLeod and Nersessian 2013; Nersessian 2008; Nersessian and Chandrasekharan 2009; Osbeck et al. 2011; Giere 1997; Carey 2009; Carruthers, Stich, and Siegal 2004; Margolis and Laurence 2015; Chilton 2014; Borghi and Binkofski 2014; Paradis, Hudson, and Magnusson 2013; Jakus et al. 2013; Feest and Steinle 2012; Machery 2009). We can assume that researchers nowadays have much better means to understand the cognitive nature of science. Therefore, the limitations and possibilities of scientific research are better understood.

explanation, as well. Science uses mechanistic causal explanation, whereas philosophy uses generative causal explanation. Differing in nature and not, for instance, in a degree of abstraction makes philosophy as first-degree research of things in themselves, alongside and not below or above science.

For both Maine de Biran and Bergson, the necessary relationship between science and philosophy is understandable only in cognitive terms. Thus, the concepts of *philosophy* and *science* signify cognitive operations for both Maine de Biran and Bergson. Consequently, philosophy's relation to, differences from, and collaboration with other disciplines must be conceived in terms of types of cognition. Neither Maine de Biran nor Bergson considered the division into philosophy and science to be merely intellectual, let alone institutional. By *intellectual*, I mean a division by virtue of factors that are not derived from biological and psychological facts. By *institutional*, I mean a division by virtue of academic conventions. I elaborated the intellectual approach to the relationship between science and philosophy in section 6.1. In terms of the distinction, I introduced in section 6.1, Maine de Biran and Bergson's theories argue for a fundamental difference in nature between philosophy and science that I called *difference in nature model* (DN). In general, the definitions of metaphysics, especially more recent ones (cf. Dyke 2012, 23–24; Koons and Pickavance 2015, 15; Marmodoro and Mayr 2019, 2, 4–5; Lowe 2002, 2–3), take mainly as granted the *difference in degree model* (DD) between philosophy and science. Moreover, clearly distinguished nomenclature of intellectual disciplines into scientific and philosophical was much more ambiguous in the turn of the nineteenth century as it is today.

9.4 Summary

This chapter presented the most important convergent metaphilosophical aims between Maine de Biran and Bergson. I gathered the convergent aims together under three specific metaphilosophical themes: 1) the origin and generation of knowledge; 2) the subject matter of philosophy; and 3) the relationship between philosophy and science. These themes covered the central topics I explained in the second and the third part of this dissertation.

Searching for these central metaphilosophical aims between Maine de Biran and Bergson was the last task I had assigned for this dissertation. Next, we are proceeding to the conclusion of the present work, in which, after concluding the dissertation in general, I suggest why these results are worth taking into consideration in metaphilosophical research more generally.

10 CONCLUSION: GENERATION OF HUMAN KNOWLEDGE

Human knowledge originates in and develops from the activity of two cognitive tendencies, of which the first reasons with mediate concepts and symbols and the second intuits with immediate cognitions. Obstacles, resistance, and problems, imposed by life on individuals, engender volitional responses that we generally call 'learning,' or 'creation.' This is the general scheme that shines through the works of both Maine de Biran and Bergson. Let us recapitulate the stages we have travelled through in this dissertation, after which I will elaborate the conclusion that I have inferred from my study.

In the first chapter, I started by clarifying that metaphysics for Maine de Biran is the study of the active cognitive capacities of human being. Following this definition, I explained the primitive fact of metaphysics, from which all knowledge generates. As we saw, Maine de Biran found this fact from the activity of personality itself. In the second chapter, I started by Maine de Biran's assertion that the problem of causality is the principal problem of metaphysics. We found out that for Maine de Biran, there are two causal models. The first model is mechanism, and the second model is a certain kind of 'psychologism.' I clarified the fact that mechanism is not a proper model of causality; rather, it is a model for generalised regularities. Mechanism is a tool and not an explanatory model for proper causes, for which the psychologism is the answer. Maine de Biran located the proper causality in the understanding of the source of causal cognition itself.

After the first two chapters, I reconstructed Maine de Biran's developmental theory of knowledge in the third chapter. There are two cognitive degrees, instinct as the first-degree cognition and volition as the second-degree cognition, of which the latter does not develop from the former but is a gradual self-recognition of an individual of his or her active capacity to have an effect to the instinctive reactions. This active capacity develops into two opposite modes: attention and reflection. Attention is the faculty of analysis, synthesis, and generalisation, and by using these capacities, it gives birth to general ideas, namely, concepts. Reflection searches for generative unities of things, instead. It does not generalise, it abstracts. Attention cannot understand these unities because it can only generalise and thus conceptualise their relative effects. We saw human personality to be the best object in clarifying the opposite procedures of attention and reflection.

In the last chapter concentrating on Maine de Biran, we saw how the philosopher understands the nature of philosophy and science and how he brings them together. Philosophy and science are brought together in the

research program he called *human science* (*science de l'homme*). Human science enabled Maine de Biran to articulate the division of labour and collaboration between philosophy and different scientific disciplines, such as physiology and psychology.

Next, we moved to Bergson's philosophy in the fifth chapter, in which I clarified Bergson's philosophical motivation. His basic motivation arose from philosophers' misunderstanding or neglect of the dual nature of human knowledge. To clarify the setting of this duality in the immediate data of consciousness, I analysed both the active nature of human thought in the case of *intellectual effort* (*effort intellectuel*) and the nature of language and concepts as general ideas. Although concepts are indispensable tools for human thought, human thought in its entirety does not entirely commensurate with conceptual thought. In fact, creativity and learning are two striking examples of the cognitive mode that surpasses concepts.

After the analysis of the immediate data of consciousness, we moved to Bergson's developmental theory of the sources and generation of knowledge. Following his aims, Bergson ultimately ended up in considerations about the evolutive change in itself. After I explained Bergson's analysis of the most important theories on heredity, we saw how he brought the merits of all of them together in searching for a philosophical idea of evolution. On this basis, Bergson clarified the common origin of all organisms and its consequences on evolutionary change. He discerned two tendencies in the divergent movement of evolution: incommensurability of divergent species or characteristics and complementarity of the divergent species or characteristics. The former means that the species or characteristics, diverged from the common source, accentuating those characteristics in the common origin that become incommensurate when they are accentuated from their rudimentary state. The latter means that the divergent and incommensurate species or characteristics can mutually benefit from each other and increase their fitness and success, that is, complement each other. We saw that plants and animals are perhaps the most striking example of such incommensurability and complementarity.

However, incommensurability and complementarity are present in the development of animal cognition, to which we turned in the seventh chapter. We saw that Bergson discerns two cognitive tendencies in animals: intelligence and instinct, which are incommensurate but complementary cognitive tendencies. Nevertheless, all animals hold in themselves both tendencies, although their incommensurability makes one tendency play the dominant role over the other. In humans, intelligence is the dominant cognitive tendency, but instinct is recognisable on the fringes of human cognition. Because intelligence and instinct are incommensurate but complementary, they have tremendous epistemological

and metaphysical consequences. I explained Bergson's theory of intelligence. Intelligence is spatial, which enables its reasoning abilities, such as induction, deduction, and mechanistic and finalistic causal models. Contrary to intelligence, instinct is an organising cognition that enables the coordination and unity of the partial elements of cognition, because it does not spatialise and thus atomise experience. Intelligence analyses and synthesises whereas instinct sympathises.

Relying on the results of the three previous chapters, I finally clarified Bergson's ideas on the generation of philosophical and scientific knowledge from the developmental point of view. The task of philosophy is to elaborate on the instinctive cognition along with intelligence. As we saw, he characterises instinct as sympathy and organisation, whereas philosophical thought he calls integration. The task of philosophy is to integrate knowledge according to the articulations of reality, of which the conceptual reasoning cannot itself achieve. Scientific knowledge shares the *modus operandi* with ordinary reasoning, that is, intelligence, and it is only a systematised form of the latter.

The aforementioned is the recapitulation of the main points of this dissertation. We now come to the conclusion, which I argue to be as follows: *According to both thinkers, there are two sources of knowledge, conceived as two incommensurate but complementary cognitive tendencies, which in turn have a common source in human activity. Philosophy and science each utilise one of these cognitive tendencies. Once this duality is recognised, human reasoning can better understand itself and by learning overcome its own limits. This overcoming amounts to progress in philosophy. This general scheme can be found in both Maine de Biran and Bergson.* Thus, the conclusion of this dissertation is that this scheme is the point convergence for the central aims of both thinkers.

What are the consequences of such a conclusion? From my personal point of view, this study has opened various possible directions for my future research contributions. First, the theory of the *generative factors of knowledge* is applicable to many other modern philosophers. I am confident that the implementation of the theoretical framework used in this dissertation to the study of other philosophers will end in productive results. In fact, the study of the generation of human knowledge, as explained in this dissertation, appears to be the shared element between the greatest philosophers among the empiricist and rationalist traditions, albeit their crucial differences and ultimately their differing conceptions on the developmental factors of the generation of knowledge.

However, the directions of the future study are not limited to historical study. Another worthwhile avenue for future research is metaphilosophical. First, widening the scope of the convergent aims between modern philosophers can benefit metaphilosophical research on the nature of philosophy. The results could clarify the unity and plurality of philosophy, which in turn may lead to

more accurate definitions of the different parts of the discipline of philosophy. For instance, by clarifying the metaphilosophical aims of philosophers and their theories about the starting point of philosophy, we may enhance the efficacy of philosophical research and offer better frameworks for philosophical education. This is because we may end up, if not in total agreement, at least in a consensus about the purpose of philosophy and the principles from which the importance of philosophy wells up. Second, the developmental approach to epistemological and metaphysical problems should have better situation now than before, because science has tremendously advanced during the past century, and the means of gathering resources and achieving knowledge is constantly facilitated.

Finally, the findings of this dissertation may help philosophy in finding a place among and genuine contribution to scientific research, because it provides a coherent explanation of the cognitive sources of both philosophy and science. Of course, utilising the ideas of Maine de Biran and Bergson requires updating them to meet contemporary standards and needs. However, the recognition of the divergent tendencies of human cognition and the proper nature of philosophy as complementary to science should offer vast areas of further study. For instance, it could clarify the ontologies of the scientific disciplines. Likewise, philosophy oriented on this recognition could resolve epistemological problems in and between the scientific disciplines, contribute and complement research in human and animal cognition, and offer points of view on the development of adult thinking, because its research subject is the active human cognition itself. As an articulation of the relationship between philosophy and science, I find Maine de Biran and Bergson's points of view suitable to present discussions as such.

Because this dissertation has important metaphilosophical consequences, I find it necessary to say that it has not been my intention to give a normative account of the nature of philosophy. I do not want to say that 'Biranian' philosophy or 'Bergsonian' philosophy is the standard for valid philosophy. The only kind of normativity that I think does follow from my research is conditional: *if* the discipline of philosophy strives to be a study of the active cognitive faculties of the human being, *then* the contribution of these two philosophers is worth taking into consideration. To put this another way, if the metaphilosophical argument for grounding philosophy in a metaphysical (as defined in this dissertation) study of the human cognitive faculties is endorsed, *then* Maine de Biran and Bergson have made a significant contribution to the progress of philosophy.

Of course, such normative considerations are to be decided collectively by the community of philosophers. In this regard, I want to argue that the metaphilosophical aims of Maine de Biran and Bergson ought to be taken into

serious consideration in this collective discussion. Sensitively abstracted from their source, Maine de Biran and Bergson's metaphilosophical aims can be implemented in contemporary philosophy to guide the research concerning the metaphysical problems we continue to face.

And I expect philosophy will continue to face ever new metaphysical problems, because time, if nothing else, will play its part. We can witness concrete progress in various fields of human activity, such as in technology and politics. Both originate from human creativity and coordination, and both aim at overcoming the difficulties of human life and increasing the range of human effort. *Progress in philosophy, on the other hand, is the result of an effort to recognise, analyse, and overcome the habits, conditionings, and impediments of human intelligence with the ever-increasing precision and power of integrating comprehension*. Philosophy, from this point of view, is learning to learn. In the life of human intellection, philosophy gives us things by their measure, as we create ourselves to be the measure of things in themselves. Knowledge is the creative adaptation of cognition by effort, the creation of intellectual sympathy with its objects. This is the place of philosophy in the life of the human intellect for both Maine de Biran and Bergson.

YHTEENVETO (FINNISH SUMMARY)

Väitöskirjani käsittelee kahden ranskalaisen filosofin, Maine de Biranin (1766–1824) ja Henri Bergsonin (1859–1941), kehitysteoreettisia tutkimuksia tiedon luonteesta ja niiden filosofista merkitystä. Työssäni kehitän teorian "tiedon generatiivisista tekijöistä", jota sovellan Maine de Biranin ja Bergsonin filosofisiin teoksiin. Lopuksi tuon molemmilta ajattelijoilta abstrahoimani metafilosofiset tavoitteet yhteen ja vertailen niitä keskenään. Toteuttamani Maine de Biranin ja Bergsonin metafilosofisten tavoitteiden vertailu ja sen pohjalta tekemäni johtopäätökset tarjoavat kehitysteoreettisia vastausehdotuksia epistemologisiin ja metafyysisiin ongelmiin.

Tutkimukseni koostuu neljästä osasta. Ensimmäinen osa sisältää johdannon sekä työn teoreettisen viitekehyksen esittelyn. Toinen osa keskittyy Maine de Biraniin ja kolmas Bergsoniin. Toinen osa käsittää luvut 1–4 ja kolmas osa luvut 5–8. Ensimmäisessä luvussa käsittelen Maine de Biranin käsitystä metafysiikan oleellisuudesta tiedon alkuperää koskevissa ongelmissa. Toisessa luvussa käsittelen Maine de Biranin väitettä, jonka mukaan kausaalisuuden ongelma on metafysiikan ensisijaisin ongelma. Kolmannessa luvussa rekonstruoin Maine de Biranin tietokykyjen kehitysteorian. Neljännessä luvussa käsittelen aiempien lukujen tulosten pohjalta Maine de Biranin teoriaa filosofian luonteesta ja sen suhteesta tieteeseen.

Viidennessä luvussa esittelen Bergsonin käsityksen metafysiikan lähtökohdista. Kuudennessa luvussa käsittelen Bergsonin filosofista teoriaa evoluution luonteesta, joka johdattaa meidät seitsemänteen lukuun, jossa käsittelen Bergsonin teoriaa vaistosta ja älykkyydestä kahtena kognitiivisena taipumuksena ja näiden kahden taipumuksen epistemologisista seurauksista. Kahdeksannessa luvussa hyödynnän aiempien lukujen tuloksia esittelemällä Bergsonin kehitysteoreettisen näkemyksen filosofisen ja tieteellisen tiedon muodostumisesta.

Neljäs osa muodostuu väitöskirjan kahdesta viimeisestä luvusta. Yhdeksännessä luvussa esittelen Maine de Biranin ja Bergsonin metafilosofisten tavoitteiden yhteneviä eli konvergentteja piirteitä. Kymmenes luku on väitöskirjan päättävä luku. Väitöskirja käsittää siten johdattavat ja teoreettiset luvut, yhdeksän varsinaista käsittelylukua sekä päättävän luvun.

Maine de Biranin käsittelyni etenee seuraavalla tavalla. Lähden liikkeelle Maine de Biranin filosofisista lähtökohdista. Yhtäältä käsittelen Maine de Biranin tulkintoja menneistä filosofeista ja toisaalta selvitän Maine de Biranin aatehistoriallisia asiayhteyksiä. Näiden kahden tulokulman pohjalta määrittelen metafysiikan ihmisen aktiivisten tietokykyjen tutkimukseksi. Tämän määritelmän

avulla kerään yhteen Maine de Biranin huomioita metafyysisen filosofian kehitysaskelista ja virheistä häntä edeltävien filosofien töissä. Suurimmat edistysaskeleet Maine de Biran näkee niissä filosofeissa, jotka ovat hänen näkemyksensä mukaisesti onnistuneet löytämään filosofian ominaisen tutkimuskohteen, ihmisen tahdonalaisen toimintakyvyn, jonka ilmenemismuotoja korkeimmat kognitiiviset kyvyt ovat. Filosofian yleisenä ongelmana on Maine de Biranin mukaan ollut vajaaksi jäänyt tiedon generatiivisten lähtökohtien selvittäminen ja ymmärtäminen.

Tahdonalainen toiminta näyttää kuitenkin olevan ristiriidassa todellisuuden säännönmukaisuuden kanssa, joten se tekee kausaalisuuden käsitteestä moniselitteisen. Siksi siirryn seuraavaksi Maine de Biranin käsittelemiin kausaalisiin selitysmalleihin ja kausaalikognitioon. Jätän kausaalisuuden filosofisten ja tieteellisten seurausten käsittelyn myöhempään vaiheeseen. Maine de Biranille kausaalisia selitysmalleja on kaksi. Tämä kausaalisten selitysmallien dualismi oli yleinen 1700-luvun lopun ja 1800-luvun alun filosofeilla. Käsittelen lyhyesti David Humen, Dugald Stewartin ja Immanuel Kantin kausaalisuuden määritelmiä. Humea mukaillen Maine de Biranille mekanistinen kausaalisuus ei ole suoranaisesti kausaalisuutta. Sen käyttötarkoituksena on muodostaa lainmukaisuuksia havainnoista yleistetyistä säännönmukaisuuksista. Kausaalikognition alkuperä ja kehittyminen puolestaan johtavat Maine de Biranin käsittelemään ajattelevan persoonan itsensä kehittymistä. Tämän kehittymisen tutkiminen tarjoaa myös tietoa todellisen kausaalisuuden ymmärtämisestä. Käsittelyni kuitenkin keskittyy tämän kausaalisuuden alkuperän selvittämiseen Maine de Biranilla.

Seuraavaksi siirryn inhimillisten tietokykyjen kehittymiseen. Maine de Biran jakaa kognitiiviset kyvyt kahteen asteeseen, joita kutsun ensimmäisen ja toisen asteen kognitioksi. Ensimmäisen asteen kognitio on "vaistomaista" (*instinctive*), eikä siihen kuulu itsetietoista tai tahdonalaista toimintaa. Se on ärsykkeisiin reagoivaa toimintaa. Sellaisenaan vaistomainen kognitio ei mahdollista todellisen ajattelun ja järkeilyn kehittymistä. Toisen asteen kognitio perustuu tahdonalaiseen, itsetietoiseen toimintaan (*volition*), joka saa alkunsa vaiston synnyttämien reaktioiden yksilölle asteittain valkenevasta itsetietoisesta kyvystä niiden hallitsemiseen.

Tahdonalainen toiminta kehittyy kahteen toimintaperiaatteiltaan vastakkaiseen kognitiiviseen muotoon: 1) tarkkaavuuteen (*attention*) ja 2) reflektioon (*réflexion*). Tarkkaavuus hyödyntää kuvittelukykyä ja kieltä siten, että se kykenee erottamaan ja luokittelemaan ominaisuuksia ja muodostamaan niistä yleiskäsitteitä. Reflektio puolestaan pyrkii etsimään yksilöllisyyksiä, joiden käsittämiseen tarkkaavuus ei kykene muuten kuin suhteellisina yleistyksinä. Käsittelen tästä esimerkkinä ihmisen omaa persoonallisuutta. Yleiskäsitteet voivat luoda vain nä-

kökulmia yksilön kognitiivisesta toiminnasta sellaisilla käsitteillä kuin "havainto", "muisti", "kuvittelukyky" ja "mielle", ja se kykenee näiden yleistysten sisäisiin jaotteluihin. Se ei kuitenkaan oman luonteensa vuoksi kykene käsittämään persoonallisuuden ominaista luonnetta, jonka eri näkökulmien yleistyksiä yleiskäsitteet ovat. Tätä luonnetta ei näin ollen ole mahdollista tavoittaa näiden käsitteiden synteesin pohjalta, vaan sen ymmärtäminen vaatii ajattelua, joka eroaa tarkkaavuudesta, ja tämä toinen ajattelu on reflektiivinen kognitio. Reflektio ei Maine de Biranin mukaan yleistä vaan *abstrahoi*. Reflektion abstrahoimat ykseydet eivät ole yleistettyjä tai syntetisoituja vaan abstrahoituja ykseyksiä.

Inhimillisten tietokykyjen generatiivisen selittämisen ansiosta Maine de Biran kykenee tarjoamaan kognitiivisen selityksen tieteen ja filosofian ominaisluonteista sekä niiden eroista ja keskinäisestä täydentävyydestä. Osoitan, kuinka Maine de Biranin mukaan filosofian ja tieteen yhteistyön ja toisiaan täydentävä toiminta käytännössä tapahtuu. Filosofinen ja tieteellinen tutkimus yhdistyvät Maine de Biranin teoretisoimassa *ihmistieteessä* (*science de l'homme*) tai *antropologiassa*. Väitän, että Maine de Biranin käsitys ihmistieteestä on yksi varhaisimmista mutta silti hyvin kehitetty monitieteellinen projekti. Ihmistiede tutkimusohjelmana toimi merkittävänä suunnannäyttäjänä usean 1700-luvun lopun ja 1800-luvun alun filosofin työssä. Ihmistiede ei siis ollut Maine de Biranin keksintö, mutta hän antoi sille omalaatuisen määritelmän, jonka vaikuttimena oli hänen inhimillisen tiedon generatiivinen selitysmallinsa. Ihmistieteen viitekehyksessä Maine de Biran onnistuu myös selventämään fysiologisen ja psykologisen tutkimuksen periaatteita osina monitieteellistä projektiaan.

Maine de Biranin filosofian kehitysteoreettisten näkemysten selventämisen jälkeen siirryn Bergsonin filosofiaan. Aloitan Bergsonin käyttämistä merkittävimmistä filosofianhistoriallisista esimerkeistä. Näemme, kuinka monet epistemologiset ja metafyysiset dualismit ja antinomiat – kuten mielen ja ruumiin välinen dualismi ja ykseyden ja moneuden välinen ristiriita – ovat juontuneet kahden tiedon lähteen sivuuttamisesta, kieltämisestä tai niiden vääränlaisesta käsittämisestä. Kielen luonne ja rooli ihmisen ajattelussa näyttäytyy Bergsonille erityisenä esteenä filosofisen ymmärryksen kehittymiselle. Näin ollen tarjoan tarkan analyysin Bergsonin kielen luonnetta sekä aktiivista kognitiota koskevista käsityksistä. Vahvistan tulkintaani nykytieteellisen tutkimuksen tarjoamilla todisteilla. Bergson luonnehtii aktiivista kognitiota älylliseksi ponnisteluksi (*effort intellectuel*), joka näyttäytyy luovan ajattelun edellytyksenä.

Tietokykyjen lähteiden ja tietokykyjen kehittymisen syvä ymmärrys johdattaa Bergsonin niiden evolutiiviseen perustaan eli eläinkunnan kognitiivisten kykyjen evoluutioon – ja tämä puolestaan suuntaa hänet tutkimaan evoluution pääpiirteitä. Pyrkimys evolutiivisen muutoksen pääpiirteiden yleiskuvaan johtaa

Bergsonin käsittelemään keskenään ristiriitaisia luonnonvalintaa ja perinnöllisyyttä koskevia merkittävimpiä tieteellisiä teorioita eli darwinismia, mutationismia, eimerismia sekä uuslamarckismia. Hän erottelee tieteellisten teorioiden ansiot, joiden pohjalta hän luo tieteellisten teorioiden filosofisen yhteensovittamisen. Näin hän kykenee riittävällä tavalla näkemään evolutiivisen muutoksen pääpiirteet.

Selventämällä ensin kaikkien eliöiden yhteistä alkuperää ja luonnetta Bergson osoittaa elämälle yhteisten tekijöiden seuraukset evolutiiviselle muutokselle. Evolutiiviseen lajien eriytymiseen kuuluu oleellisesti kaksi taipumusta: 1) eriytyneiden kehityslinjojen yhteensopimattomuus (*incommensurabilité*) ja 2) vastavuoroisuus tai täydentävyys (*complémentarité*). Ensimmäinen taipumus tarkoittaa sitä evoluutiobiologiassakin yleisesti jaettua näkemystä, että toisistaan eriytyneet lajit tai ominaisuudet korostavat niitä yhteisen lähtökohdan piirteitä, jotka korostuessaan joutuvat luopumaan joistain muista yhteisessä lähtökohdassa idullaan olleista piirteistä, jotka eivät voi korostua samassa lajissa tai ominaisuudessa. Jälkimmäinen tarkoittaa sitä, että tiettyjä piirteitä korostavat lajit tai ominaisuudet kykenevät hyödyntämään ja edistämään toistensa menestystä. Nämä kaksi taipumusta esiintyvät kaikkialla evoluution taitekohdissa. Ne ovat selvästi esillä aitotumaisten domeenin toisistaan eriytyneiden pääryhmien eli kasvien, eläinten ja sienten välisessä tarkastelussa. Bergson käsittelee erityisesti kasvien ja eläinten kehityshistoriassa havaittavaa yhteensopimattomuutta ja vastavuoroisuutta. Kasvien ja eläinten yhteensopimattomuus esiintyy niiden tavoissa kerätä itselleen välttämättömiä ravinteita sekä energiaa, ja joiden täydentävyys esiintyy ympärillämme kukoistavana elonkehänä.

Yhteensopimattomuus ja vastavuoroisuus tai täydentävyys ovat lisäksi esillä eläinkunnan kognitiivisten taipumusten eriytymisessä, jonka käsittelyyn luku 7 keskittyy. Bergsonin mukaan eläinkunnassa esiintyy kaksi kognitiivista taipumusta: älykkyys (*intelligence*) ja vaisto (*instinct*), jotka ovat keskenään yhteen sopimattomia mutta toisiaan täydentäviä. Älykkyys näyttäytyy korostetuimpana ihmisessä ja vaisto useissa pistiäisiin (Hymenoptera) kuuluvien sukujen kuten kaivaja-ampiaisten (*Sphex*) ja hunajamehiläisten (*Apis*) lajeissa. Tarkemmin sanottuna nämä kaksi taipumusta ovat alkuperäisen primitiivisen kognition kaksi omia ominaisuuksiaan korostaessaan toisen ominaisuuksista luopunutta strategiaa. Molemmat toteuttavat eläimen kognitiivisen toimintaperiaatteen omilla, yhteen sovittamattomilla tavoillaan. Nimenomaan yhteensopimattomuutensa vuoksi ne täydentävät toisiaan. Ihminen kykenee itsetietoisella, oppivalla ponnistelulla korostamaan heikkoa vaistomaista kognitiotaan ja vahvistamaan sillä niitä puutteita, jotka ovat älykkyyden voimistuessa korostuneet. Analysoin Bergsonin älykkyyden määritelmää tukeutumalla nykytieteen todisteisiin, jotka hämmästyttävän hyvin soveltuvat filosofin yli sata vuotta vanhaan teoriaan.

Määrittelen älykkyyden spatiaaliseksi, erottelevaksi ja toimintaa simuloivaksi. Nämä luonteenpiirteet synnyttävät deduktiivisen ja induktiivisen päättelyn sekä mekanistiset ja finalistiset kausaalimallit. Vaiston käsitteen perusteellinen analyysi vaatii Bergsonin teorian historiallisen taustan esittelemistä, jonka jälkeen erittelen vaiston keskeiset luonteenpiirteet. Vaisto näyttäytyy *organisoivalta* kognitiolta, joka mahdollistaa kognition kohteena olevien osatekijöiden koordinoinnin. Siinä missä älykkyys *analysoi* ja *syntetisoi*, vaisto *sympatisoi*.

Filosofian tehtäväksi muodostuu vaistomaisen kognition kehittäminen älyllisen kognition rinnalla. Siinä missä Bergson luonnehtii vaistoa sympatiaksi tai organisoinniksi, filosofista ajattelua hän kutsuu "integroinniksi" (*intégration*). Vaikka ranskan *intégration* kääntyy suomeksikin vierasperäiseksi matemaattiseksi käsitteeksi, sen kotoperäisenä vastineena toimii myös "sopeuttaminen". Filosofian tehtävänä on integroida eli sopeuttaa tietoa todellisuuden luonteenpiirteiden mukaan, joita käsitteellinen tieto ei sellaisenaan voi tavoittaa. Kuten tietyt tieteenteoreettiset näkemykset ovat asian perustelleet, tieteellinen tieto jakaa tavanomaisen järkeilyn toimintaperiaatteen ja on sen systematisoitu muoto. Sama ajatus on myös Bergsonin tieteenteorian ytimessä.

Molempien filosofien käsittelyjen jälkeen vertailen Maine de Biranin ja Bergsonin filosofioita niistä abstrahoimieni metafilosofisten tavoitteiden perusteella. Kutsun näiden tavoitteiden mahdollista samankaltaisuutta niiden lähentymiseksi tai konvergenssiksi (*convergence*), jolla tarkoitan sitä, että toisiaan lähenevien tavoitteiden seuraaminen tai toteuttaminen johtaa lopulta hyvin samankaltaisiin lopputuloksiin. Konvergenssin käsitteen määritteleminen filosofisessa vertailevassa tutkimuksessa on yksi tämän väitöstyön merkittävistä ansioista. Käsittelen Maine de Biranin ja Bergsonin tavoitteita kolmen metafilosofisen aiheen puitteissa. Ensimmäinen aie koskee tiedon alkulähteitä ja kehittymistä. Toinen aihe koskee filosofian luonnetta tiedon kehitysteoreettisesta näkökulmasta katsottuna. Kolmas aihe koskee filosofian ja tieteen toisiaan täydentävää suhdetta tiedon kehitysteoreettisesta näkökulmasta katsottuna. Havaitsemme useita merkittäviä lähentymisiä Maine de Biranin ja Bergsonin filosofioissa. Nämä lähentymiset osiltaan vahvistavat sitä, että filosofisen tutkimuksen tulisi ottaa ne vakavasti huomioon metafilosofiaa koskevissa pohdinnoissa.

Työni johtopäätös on, että Maine de Biranin ja Bergsonin tutkimusten mukaan on olemassa kaksi toisistaan luonteeltaan erilaista tiedon lähdettä: Maine de Biranille tarkkaavuus ja reflektio ja Bergsonille älykkyys ja vaisto. Ne ovat kognitiivisia taipumuksia, jotka eroavat toisistaan luonteeltaan, mutta jotka tästä syystä kykenevät täydentämään toisiaan. Näiden taipumusten yhteinen alkuperä on toiminnassa. Tiede hyödyntää näistä Maine de Biranin teoriassa tarkkaavuutta ja Bergsonin teoriassa älykkyyttä ja filosofia molempia. Kun inhimillinen ajattelu käsittää selvästi tietokykyjensä kahtalaisuuden, se kykenee oppimiseen

ja itsensä kehittämiseen, mikä mahdollistaa inhimillisen kognition tavanomaisten muttei ehdottomien rajoitteiden ylittämisen. Tällainen oppiminen on myös filosofian kehittymisen perustana. Tämä yleinen kaava on löydettävissä sekä Maine de Biranilla että Bergsonilla, ja löydös todistaa näiden kahden filosofin metafilosofisten tavoitteiden yhtenevyyden.

Työni luo merkittäviä filosofianhistoriallisia ja metafilosofisia jatkotutkimusaiheita. Se tarjoaa lisäksi lähestymistavan filosofisen tutkimuksen roolin käsittämiseksi monitieteellisessä tutkimustyössä. Erityisesti oppimista, luovuutta, kognition perusperiaatteita ja kognitiivista tieteenteoriaa koskevat tutkimukset hyötyvät Maine de Biranin ja Bergsonin tavoitteiden edelleen kehittämisessä.

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