

Thomas Henry Huxley's Agnostic Philosophy of Science

by

Jiwon Byun

M.A., The University of Chicago, 2009

B.A., The University of Wisconsin, Madison, 2007

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE DEGREE OF

Doctor of Philosophy

in

The Faculty of Graduate and Postdoctoral Studies

(Philosophy)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

August 2017

© Jiwon Byun, 2017

■ ABSTRACT

This dissertation examines Thomas Henry Huxley's notion of agnosticism and its bearings on his conception of science. Although agnosticism is commonly regarded as a position that recognizes the limits of human knowledge, Huxley – who coined the term “agnostic” – characterized it as more than a theory of ignorance or limits. I argue that Huxley intended his agnosticism to be a guide to knowledge that can work regardless of our ignorance or limits. To this end, I draw attention to Huxley's less famous philosophical works. I examine his discussions of Descartes to show that he had an epistemological project and to clarify the structure of agnosticism; I analyze his *Hume* to illuminate the reasoning behind his claim that verification is the only justificatory method and to highlight his reasons for situating agnosticism within what he called “modern critical philosophy”; I investigate his other essays to argue that his agnosticism concerns a claim to knowledge and should not be understood as ethics of belief.

Based on his epistemological inquiry, Huxley offered a quick guide to knowledge, consisting of an account of legitimate evidence and an ethics of knowing: agnosticism. It can be summarized as follows. Propositions concerning anything beyond phenomena lack evidential value; verified propositions have evidential value; if one wishes to make a claim about the knowledge status of a proposition, one should evaluate the evidence and be honest about the result without further pretension. Huxley discussed the realm of ignorance to show its lack of justificatory value. The signature remark of Huxleyan agnostics is “Show me evidence,” rather than “I don't know.”

This interpretation undermines the widely accepted view that Huxley's endorsement of agnosticism poses philosophical obstacles to his larger project of promoting science in Victorian society. His intention behind agnosticism was to establish and maintain epistemic merit of science without any unknowable, metaphysical or theological, apparatus. Science is the practice of agnosticism, and for this reason, our best way to knowledge. Our understandings of his life-long project and of the growth of science's autonomy during the 19th century would remain incomplete without due appreciation of this notion of agnosticism.

LAY SUMMARY

Although agnosticism is commonly regarded as a religious position on the existence of God, the coiner of the term, Thomas Henry Huxley (1825-1895), had more to say. This dissertation presents a more comprehensive understanding of agnosticism and its bearings on the conception of science by examining Huxley's underappreciated philosophical works. Agnosticism was a guide to knowledge that tells us what to count as evidence and what to do with evidence; he discussed the realm of ignorance to show its lack of evidential value; he understood science as the practice of agnosticism, and for this reason, as our best way to knowledge. This dissertation shows that Huxley's meta-scientific views deserve philosophical attention: science is metaphysic-agnostic, not metaphysics-free; science needs faith in the sense of trusting and risking. It also leads us to re-visit our preconceptions: agnosticism is not a passive, noncommittal or wishy-washy attitude, but a constructive, firm and confident position.

▮ PREFACE

This dissertation is original, unpublished, independent work by the author, Jiwon Byun.

TABLE OF CONTENTS

| | |
|--|------|
| Abstract | ii |
| Lay Summary | iii |
| Preface | iv |
| Table of Contents | v |
| Acknowledgements | vii |
| Dedication | viii |
| Chapter 1. Introduction | 1 |
| 1.1. A question for agnostics | 1 |
| 1.2. Huxley and Victorian scientific community | 5 |
| 1.3. Possible reasons for not paying philosophical attention to Huxley | 11 |
| 1.4. Structure of the dissertation | 17 |
| Chapter 2. The Reception of Huxley's Agnosticism | 20 |
| 2.1. A science defender's nescience: a puzzling position | 20 |
| 2.2. Partial approach to Huxley's agnosticism: the common approach | 23 |
| 2.2.1. Type one: an incidentally conjoined position | 24 |
| 2.2.2. Type two: an application of scientific method | 28 |
| 2.2.3. Type three: an intellectual code | 30 |
| 2.3. Huxley's promotion of agnosticism | 33 |
| 2.4. Inclusive approach to Huxley's agnosticism | 39 |
| Chapter 3. Huxley's Cartesian Project | 43 |
| 3.1. Dockrill's account of Huxley's agnosticism | 44 |
| 3.2. The importance of Huxley's discussions of Descartes | 48 |
| 3.3. Two paths that Descartes opened | 51 |
| 3.3.1. The first path: legitimate Idealism | 51 |
| 3.3.2. The second path: legitimate Materialism | 55 |
| 3.4. Huxley's reshaping of Descartes's project | 60 |

| | |
|--|-----|
| Chapter 4. Huxley’s Epistemology: Memory, Verification, and Physical Thinking..... | 74 |
| 4.1. How to identify knowledge..... | 75 |
| 4.1.1. Huxley’s <i>Hume</i> | 76 |
| 4.1.2. Anatomy of mind..... | 79 |
| 4.1.3. Memory | 86 |
| 4.1.4. Memory as a model of knowledge | 90 |
| 4.2. Huxley’s defense of the method of verification..... | 96 |
| 4.2.1. Metaphysicians’ appeal to necessity | 96 |
| 4.2.2. Religious thinkers’ appeal to faith..... | 108 |
| 4.3. Physical thinking as a constituent of a guide to knowledge | 113 |
| Chapter 5. Agnosticism as a Guide to Knowledge | 120 |
| 5.1. The two paths in agnosticism: an account of legitimate evidence | 120 |
| 5.2. Another component of agnosticism: the agnostic principle | 129 |
| 5.3. Huxley’s agnosticism and Clifford’s ethics of belief..... | 135 |
| 5.4. How to follow the agnostic principle..... | 156 |
| 5.5. Agnosticism in the tradition of modern critical philosophy..... | 173 |
| 5.6. Chapter summary..... | 185 |
| Chapter 6. Science and Faith | 186 |
| 6.1. Huxley’s incapability, insistence, and inconsistency | 186 |
| 6.2. Huxley’s conception of science | 191 |
| 6.2.1. Relying on principles and relying on the principles of science..... | 191 |
| 6.2.2. Anti-realistic conception of science | 204 |
| 6.2.3. Science as practice of agnosticism | 219 |
| 6.3. Huxley’s conception of faith | 226 |
| 6.3.1. An agnostic’s faith..... | 227 |
| 6.3.2. A critique of blind faith..... | 231 |
| 6.4. Chapter summary | 235 |
| Chapter 7. Conclusion..... | 237 |
| References..... | 249 |

ACKNOWLEDGEMENTS

When I wondered to myself about doing a PhD, I did not know that huge support, motivation and inspiration from others awaited me. It is hard to express gratitude that I feel. Here is my try.

I am most grateful to my supervisor, John Beatty. Although I have countless things to say, I note here only one. Thanks to John, I was able to have a variety of experiences which will continue to have influences on my way of thinking and living. I do not simply mean that John gave me valuable opportunities for doing new things; John seems to have some mysterious power of turning a single, ordinary experience into multiple, strange experiences. This dissertation is a small fraction of the experiences made possible and richer by John.

Everyone knows that my research committee is amazing: Margaret Schabas and Alan Richardson. Their helpful comments and advice shaped my drafts into a dissertation. Not only that, my work and life benefited from Margaret's sharp remarks and new perspectives and Alan's black humour and deep concerns about doing philosophy. I owe them much thanks.

By good fortune, I happened to have a wonderful examination committee: Robert Brain, James G. Lennox and Chris Stephens. Their questions and feedback helped me improve this dissertation and develop further ideas. I deeply appreciate their time and good words.

I wish to thank all members of UBC Philosophy. My special thanks to Sylvia Berryman, Eric Margolis and Chris Stephens for their support and academic advice; to Rhonda Janzen, Kate Lewis and Tim Son for their administrative aid which made my life far easier.

Many thanks to my dear colleagues for making this journey merrier: Tyler DesRoches, Serban Dragulin, Emma Esmaili, Sina Fazelpour, Chris French, Kinley Gillette, Jihee Han, Cosima Herter, S. Andrew Inkpen, Katie Joel, Alirio Rosales, Mojtaba Soltani, Servaas van der Berg and Gerardo (Jerry) Viera. I especially thank Emma, Jerry and Serban for their traditional, cool, and dark support (respectively) and various, on-going, help which started in 2009.

I thank Geunjae, Gyumin, Hyunkyung, Jaejun, Kkotchssi and Minyoung for being special audiences for my presentation; Minsun for being such a perfect companion for my Huxley trip.

Finally, I am very grateful to Anne Barrett of the Archives and Corporate Records Unit at Imperial College London for arranging for me to visit and read Huxley manuscripts.

To my parents

CHAPTER 1

Introduction

1.1. A question for agnostics

In 1869, Thomas Henry Huxley (1825-1895) coined the term “agnostic,” because he could not find a proper label for his philosophical position.¹ Since then, the term has quickly gained currency among both scholars and non-scholars. It is now further used to describe more than a position that a person may take. For example, in computer science, a program is described as “agnostic” when it is compatible with various operating systems.²

The most salient feature of agnostic position would be, ironically, refusal to take a position regarding the truth value of a given proposition. This shows that the mere absence of a belief or opinion does not sufficiently capture the state of being agnostic because it suggests that the state involves refusing.³ Consider, for example, the issue of the existence of a god, since

¹ The year is known based on Huxley’s own story. In 1869, Huxley did not use the terms “agnostic” and “agnosticism” in published essays and lectures. Later in 1889, Huxley explained how he had come to coin the term as follows:

This was my situation when I had the good fortune to find a place among the members of that remarkable confraternity of antagonists, long since deceased, but of green and pious memory, the Metaphysical Society. Every variety of philosophical and theological opinion was represented there, and expressed itself with entire openness; most of my colleagues were *-ists* of one sort or another; and, however kind and friendly they might be, I, the man without a rag of a label to cover himself with, could not fail to have some of the uneasy feelings which must have beset the historical fox when, after leaving the trap in which his tail remained, he presented himself to his normally elongated companions. So I took thought, and invented what I conceived to be the appropriate title of ‘agnostic.’ It came into my head as suggestively antithetic to the ‘gnostic’ of Church history, who professed to know so much about the very things of which I was ignorant; and I took the earliest opportunity of parading it at our Society, to show that I, too, had a tail, like the other foxes. ... That is the history of the origin of the terms ‘agnostic’ and ‘agnosticism’” (1889e, 239-40, his italics).

² *Oxford English Dictionary* Online (3rd ed., December 2016). Also, some mathematical scientists have used the term “agnostic” to indicate the possibility of using a data analysis tool without an understanding of the structure of a phenomenon at issue (Napoletani *et al.* 2011).

³ However, in the literature of epistemology, the state of being agnostic is sometimes explained in terms of the state of having no belief, as opposed to the state of taking a position or a stance. See Friedman 2013 and Yoder 2013 for critical discussions of an account of agnostic position as non-belief.

agnosticism is most commonly thought of as a religious position. Holding an agnostic position about this issue means refusing to take both positions that a god exists and that a god does not exist. In this context, agnosticism is generally introduced as a middle position between theism and atheism.⁴ Agnostics neither affirm nor deny the existence of a god; they are not those who simply lack a belief, opinion or interest regarding the issue.

Why would one take an agnostic position toward the existence of a god? It has been said that agnostics are cowards. Richard Dawkins introduces a view of a preacher from his old school. An agnostic is a “namby-pamby, mushy pap, weak-tea, weedy, pallid fence-sitter.”⁵ The basic idea is that agnostics are too timid to take a side on the existence of a god. By taking an agnostic position, one can escape from implications or consequences of taking either position. For example, agnostics want to avoid the charge of being a disbeliever, or they do not want to give an impression that they are arrogant or cocksure.

Agnostics may be cowardly in another sense. According to one of Huxley’s contemporaries,

[t]here is an agnosticism which is simply the cowardly escaping from the pain and difficulty of contemplating and trying to solve the terrible problems of life by the help of the convenient phrase, “I don’t know,” which very often means “I don’t care.”⁶

Agnostics, then, refuse to take a position because they want to refuse a (negative) connotation associated with each position or because they want to refuse to go through some intellectual struggle. Huxley, who lived in Victorian society under the Anglican establishment, was not free

⁴ Flint 1903; Woelfel 1998; Le Poidevin 2010; Dawkins 2006; Smart 2011.

⁵ Dawkins 2006, 69.

⁶ Magee 1889, 89.

from those charges.⁷ To religious critics, agnostics were just “infidels” who were afraid of the old name; or, agnostics were “freethinkers who had yet to learn to think.”⁸ An agnostic position is a noncommittal and self-serving position for cowards. In this way, Huxley’s coinage of “agnostic” has been sometimes explained.⁹

This account of “cowardly agnosticism” would not be satisfactory as a general account of why one would take an agnostic position. Of course, the account may be the most accurate description of some particular agnostics. Also, there would exist those who deliberately put forward an agnostic position in a diplomatic manner for some reasons. The account may turn out to be the most plausible (psychological) account, if an agnostic stance only concerns culturally significant issues like the existence of God.

However, there is also a reason that agnostics themselves have offered. Agnostics neither affirm nor deny, for example, the existence of a god, because of the nature of a given issue such as its insolubility or unknowability. The *Oxford English Dictionary* states that an agnostic is “a person who believes that nothing is known or can be known of immaterial things, especially of the existence or nature of God.”¹⁰ Agnostics refuse to take a position because they think that a given issue belongs to insoluble matters or because they think that the existence of God can be

⁷ Egil Asprem briefly describes one aspect of the domination of the Anglican establishment: “[r]eligious tests were, for example, required for anyone wishing to obtain a position at the most prestigious British universities (*i.e.*, Oxford, Cambridge, Durham) until 1871, when the University Test Act was passed. In practice these tests were designed to exclude Roman Catholics . . . , but also non-Christians and non-believers were affected by the requirement, and forced out of top institutions of education and research for purely theological reasons” (2014, 290).

⁸ For example, Wace 1888, 9, 10; Magee 1889. For more on the immediate reception of agnosticism, see Irvine 1968, 322-30; Jensen 1991, 118-25. Also see Huxley 1863b.

⁹ For example, Gavin Hyman writes as follows: “Thomas Huxley, for instance, was unhappy with ‘atheism’ because it was too dogmatic; ... [f]urthermore, it seems that ‘atheism’ was also being increasingly linked with far-left revolutionary politics, which further tainted the term in polite society” (2006, 30). See also Lightman 2015a.

¹⁰ *OED Online* (3rd ed., December 2016).

neither proved nor disproved.¹¹ That is, an agnostic position is based on a general epistemological position to the effect that there are some subject matters about which human beings cannot have knowledge.¹² Such an epistemological view of our ignorance, commonly labeled as “agnosticism,” leads one to an agnostic position about a specific issue.

An agnostic position, then, seems different from a skeptical position. Being agnostic implies a state of not knowing or being incapable of making a truth-value judgment, whereas being skeptical implies an active inquiry such as posing a question or casting doubt.¹³ When one takes a skeptical stance, she usually offers reasons to show that a given claim is doubtful; when she takes an agnostic stance, she would explain why it is not knowable. For example, we may say, a judge is skeptical about an indictment because submitted evidence is not conclusive, but thinks that there is no point of being skeptical about the existence of a god because the existence of a god is not knowable or the question regarding its existence is insoluble. In short, the judge was skeptical about the validity of the indictment but agnostic about the existence of a god.

Philosophical reasons for taking an agnostic position invite further questions regarding one’s epistemology. For example, we can ask why agnostics think that we cannot have knowledge about some subject matters such as the existence of a god. We expect that agnostics would have some views on what it means to know something and what specifically we cannot know. Similarly, we can ask Huxley about his epistemological position. What was the coiner of the term “agnostic” thinking? This is the question raised and answered in this dissertation.

¹¹ Smart 2011.

¹² Flint 1903; Paterson 1932; Baumer 1960; Le Poidevin 2010; Smart 2011. There is also a different formulation. For example, see Sorensen 2009 for an understanding of agnosticism in terms of epistemic possibility and for a discussion of meta-agnosticism.

¹³ Baumer 1960; Woelfel 1998.

We might conjecture that Huxley's notion of agnosticism and underlying epistemological position are settled issues. As we shall see from now on, many scholars have discussed Huxley and his agnosticism. I believe, however, there is an untold story that would help us to better understand what kind of agnostic he intended to be. Fifteen years after introducing the term "agnostic," Huxley said, "If a General Council of the Church Agnostic were held, very likely I should be condemned as a heretic."¹⁴ This remark, I think, remains valid. My aim is to understand Huxley's agnosticism from his own voice.

1.2. Huxley and Victorian scientific community

The fact that Huxley was the person who first suggested the term "agnostic" would be one reason for paying attention to him to understand the position labeled as "agnosticism," but there is another reason. Huxley engaged in philosophical discussions, and yet his philosophical struggle has not been appreciated as much as his social and political struggle.

Huxley, born in 1825 in London, can be seen as a typical example of a self-made person. His life started as a youngest kid of a financially insecure but large family; he attended a local evangelical school for two years but dropped out when he was only ten years old; he was unsupported and taught himself. The late-teenaged Huxley was a hard working medical school student in debt; he received scholarships for tuitions but he had no money for living expenses. In 1846, Huxley boarded on the HMS *Rattlesnake* as an assistant naval surgeon (unlike Charles Darwin who was on board as a gentleman paying his own expenses and later took the position of official naturalist of the *Beagle*). During the four-year voyage, Huxley examined marine invertebrates and sent his scientific papers and samples to London. Huxley after the journey was

¹⁴ Huxley 1884a, 5.

a young man who had scientific reputation but no decent job, leaving his fiancée on the other side of the globe. Around the age of thirty, Huxley could eventually secure a regular job at the Royal School of Mines in London and get married after their eight-year engagement. The middle-aged Huxley was a famed “man of science,” busy with scientific works, lectures, and services for the government and various scientific organizations. Finally, in 1883, Huxley was elected as a president of the Royal Society, which was probably the most privileged and influential position in Victorian scientific community. He died in 1895.¹⁵

Huxley’s dramatic change of his social standing went hand in hand with the social standing of science in the Victorian era. The first half of the 19th century was the period in which scientific activity started to be recognized as socially meaningful activity; there were scientific organizations and journals that appreciated and disseminated scientific results and discoveries, but science was not a solid profession.¹⁶ In the mid-19th century, along with the movement of professionalizing science, there was a shift in generation started within Victorian scientific community.¹⁷ Although the nature of the transition and the degree of discord are arguable, it seems undeniable that there was a notable transition of generations within the community. Bernard Lightman describes the transition as follows:

The aristocratic gentleman of science, those Oxbridge-educated Anglicans who dominated the scientific scene in the first half of the century, provided Victorians with a vision of culture and social order based on natural theology. The middle-class Young Turks of science like Thomas Henry Huxley and John Tyndall, who came

¹⁵ Huxley 1886d; 1890f; Clodd 1902; Leighton 1912; L. Huxley 1920; Peterson 1932; Bibby 1959; Ashforth 1969; Desmond 1997; Schwartz 1999; White 2002; Collie 2011. Also Darwin [1887] 1958; Desmond and Moore 1991.

¹⁶ Schweber 1981; Cahan (Ed.) 2003; White 2003; Snyder 2006. See also Turner 1997.

¹⁷ Turner 1974; 1978; Jacyna 1980; Desmond 1994; 2001; White 2003; Lightman 2004; Stanley 2011; Dawson and Lightman (Eds.) 2014; Abberley 2016. My statement simplifies the changes in Victorian scientific community around the mid-19th century, and historians have examined various aspects of the transition. For example, see Barton 1998a for a discussion of distinctive characteristics of scientific periodicals after 1860s.

from outside the Oxbridge environment, began at the middle of the century to vie with the gentlemen of science for the leadership of the British scientific world and the accompanying cultural authority.¹⁸

The transition from “gentlemen of science” to “young men of science” has been analyzed. Frank M. Turner emphasizes a class struggle initiated by the “middle class Young Turks” who had difficulty in securing a job and earning money despite the fact that their scientific achievements were well received and appreciated.¹⁹ Robert Young pays attention to the contrast between the natural theology of clerical scientists and the evolutionary theory of secular scientists.²⁰ Ruth Barton draws attention to the growing political influence of the members of the X-Club upon the Royal Society, which was a dining club of nine young men of science who were against the “aristocratic patronage of science.”²¹ Adrian Desmond highlights the conflict between Anglicans and disgruntled nonconformists.²² Matthew Stanley argues that the transition was possible because “naturalists,” young men of science, put efforts into and had strong effects on science education.²³ Recently, Lightman shows the contribution of their translation activities to weakening the power of the Anglican Church and “Oxbridge” education.²⁴

Regardless of a focal point taken to examine the transition, Huxley has been the lead actor. Huxley was self-appointed “Darwin’s bulldog” and well known for his defense of the

¹⁸ Lightman 1997b, 3.

¹⁹ Turner 1974; 1978.

²⁰ Young 1985. See also Brock and MacLeod 1976.

²¹ Barton 1990, 53; 1998b.

²² Desmond 1997; 2001.

²³ Stanley 2011, 540.

²⁴ Lightman 2015b.

evolutionary theory;²⁵ he was from the middle class family without the Oxbridge background; he earned “medals without money”;²⁶ he was one of the most active members of the X-Club which lasted about thirty years; he felt strong affinity for nonconformists since he was young; he made large and various contributions to science education; he translated German scientific works and introduced them to Victorian society. It would probably be more correct to say that Huxley was in fact the source for inspiring different focal points. As the leading protagonist of the new movement in Victorian scientific community, Huxley’s role has been well recognized and examined.²⁷ Relatedly, his rhetorical talents and strategies have been also studied.²⁸

On the other hand, in philosophy, Huxley is invisible. Consider the analysis of the 19th century science in Britain. In the philosophy of science, the 19th century of Britain was the period during when the nature of scientific explanation was discussed and the term “scientist” was coined.²⁹ Scholarly attention has focused on the three figures, John Herschel (1792-1871), William Whewell (1794-1866), and John Stuart Mill (1806-1873), and their views of Newtonian

²⁵ As far as I know, we cannot find Huxley calling himself “Darwin’s bulldog” from his published essays and letters. Huxley’s student Henry Fairfield Osborn reported the following in his *Impressions of Great Naturalists*:

Huxley’s solicitude for Darwin’s strength was characteristic of him. He often alluded to himself as “Darwin’s bull dog” (1924, 58).

He [Huxley] said afterward: “You know, I have to take care of him [Darwin]; in fact, I have always been Darwin’s bulldog,” and this exactly expressed one of the many relations which existed so long between the two men (*Ibid.*, 78-9).

See also Kaalund 2014 for a recent research on the reception of the famous Huxley-Wilberforce debate.

²⁶ I borrow the expression “medals without money” from Houston Peterson (1932, the title of Chapter 3).

²⁷ Interestingly, the recognition of Huxley’s role might have been too strong. Ruth Barton introduces “what can be described as ‘the Huxley problem’” in an article that analyzes how Victorians within the scientific community described themselves, and writes as follows: “I [Barton] have therefore been careful to avoid basing arguments on Huxley’s usage alone. For example, his usage of ‘workers’ for members of the scientific community must be checked against the usage of contemporaries” (2003, 75).

²⁸ Block 1986; Jensen 1991; Paradis 1997; Wright 2016.

²⁹ Cannon 1961; Ruse 1975; 2009b; Yeo 1979; 1993; Butts 1985; Hull 2003; Snyder 2006; Cobb 2011; Cowles 2016.

science, in particular, Isaac Newton's (1642-1727) first rule of reasoning in philosophy, according to which science admits only both true and sufficient causes, or "true causes" (*verae causae*).³⁰ This focal point deserves philosophical attention, because Newtonian science was then taken as an exemplary of science but yet the three philosophers had different understandings. Moreover, their views were reflected in their different evaluations of Darwin's theory of natural selection, which has been considered to have important bearings on the philosophy of science. To Herschel and Whewell, Darwin's notion of natural selection is not a scientific hypothesis that is worth considering whether it is confirmed or not; to Mill, it was a legitimate hypothesis.³¹ Mill, however, does not seem to have given Darwin or his followers enough time; a few years later, Mill considered a hypothesis of intelligent design to be better than Darwin's hypothesis of natural selection.³²

³⁰ Ruse 1975; 2009b; Yeo 1979; Hull 2003; Snyder 2006; 2009; Lewens 2009.

³¹ According to Herschel, there are two requirements for an alleged cause to be considered a *vera causa* (Herschel 1831; Lewens 2009; Snyder 2009). The first requirement is that its existence must be proved empirically; it must be either an already known cause or, if it is not observable, at least analogous to an observable cause. The second requirement concerns the causal sufficiency of an alleged cause. An alleged cause must be sufficient to bring about a phenomenon to be explained, and this sufficiency must be shown empirically by observation or analogy. The two requirements should be met in order for a hypothesis to be considered a scientific hypothesis. Herschel briefly mentioned Darwin's theory in a footnote of his book: natural selection may well be an existing cause, but it is not sufficient (Herschel 1861; also see Darwin 1859b; Hull 2003).

Whewell also thought that a *vera causa* must have solid inductive grounds, but Whewell considered Herschel's requirement for being analogous to a known cause to be too strict (Whewell 1840; Hull 2003; Snyder 2006; 2009). According to Whewell, it is better for a hypothesis not to invoke a cause familiar to us, because if we limit our search for true causes to known causes, science would hardly make progress (Snyder 2006). Whewell distinguished an adequate hypothesis from a "loose hap-hazard sort of guess" or "hasty and imperfect hypothesis" (Whewell 1849, 60). According to Whewell, an adequate hypothesis should be suggested by gathering facts and observations, superinducing a law, and generalizing the law (Snyder 2012, Ch. 2). Darwin's natural selection was not an adequate hypothesis, rather a speculation, because Darwin did not provide inductive grounds for the transition from one to another species, nor did he show that the amount of time required by such a transition is available (Whewell 1864; Hull 2003; Snyder 2006; see Curtis 1987 for a different explanation of why Whewell rejected Darwin's theory).

Mill seems to have been the most lenient toward the adequacy of a scientific hypothesis. Mill wrote that "Mr. Darwin's remarkable speculation on the Origin of Species [sic] is another unimpeachable example of a legitimate hypothesis" (Mill [1846] 1882, 614f; cited in Hull 2003, 186). Mill did not care whether a hypothesis already had solid empirical or "inductive" grounds. In fact, Mill said that "we ought not" to blame one for having "extremely slight grounds" or "bold" suggestion (Mill [1846] 1882, 614f, 615f).

³² Ruse 1975; Hull 2003.

There is another aspect of the 19th century science in Britain that has been noted: it was the period when the image of science as we now picture began to dominate. For example, regarding the 19th century natural sciences, Philippe Huneman notes that “[i]t became more and more possible to undertake a scientific discourse without taking sides on philosophical issues, such as metaphysical or epistemological problems.”³³ In this regard as well, Huxley has not received scholarly attention from philosophers. To be sure, Huxley has been discussed as one of the most important spokespersons for Victorian scientific naturalism which was the “cult of science” that was so popular during the second half of the 19th century.³⁴ Its proponents ruled out supernatural causes and promoted a scientific world view, but their philosophical views have been understood in terms of the positions of the early 19th century philosophers of science. Under the framework that Whewell’s philosophy of science was the representative philosophy of “gentlemen of science,” whereas Mill’s philosophy of science as the representative philosophy of “young men of science,” Huxley (and other Victorian scientific naturalists) has been assumed to simply adopt Mill’s position.³⁵ Mill’s influence on Huxley is not deniable, and Huxley openly, and throughout his life, endorsed Mill’s *System of Logic* as the exposition of scientific method.³⁶ Yet Huxley’s philosophical view should not be just taken as identical with that of Mill, as he said “though Mill’s ‘Logic’ was very good, empiricists were not bound by all his theories.”³⁷ Huxley neither agreed with Mill’s final evaluation of Darwin’s theory, nor considered a theory of

³³ Huneman 2011, 202.

³⁴ Lightman 1987, 28. The seminal work is Turner 1974. See Lightman 2009 for useful introductory discussions of Victorian scientific naturalism and the development of its scholarship. For recent researches, see Rectenwarld 2013; 2016; Lightman and Dawson (Eds.) 2014; Lightman and Reidy (Eds.) 2014.

³⁵ Flint 1903; Ellegård 1957; Passmore 1957; Turner 1974; 1975; Stoddart 1975; Jacyna 1980; di Gregorio 1981; 1984; 1997; Knight 1997.

³⁶ Huxley 1854a; 1878h; 1892c.

³⁷ Huxley 1887a; L. Huxley 1908 (Vol. III), 354; partly cited in Irvine 1968, 356.

creation by an intelligent designer to be a scientific theory. Although Huxley does not mention Huxley, Huxley's agnosticism can be appreciated as a philosophy of science that was intended to epistemologically liberate science from a particular metaphysics or theology.

1.3. Possible reasons for not paying philosophical attention to Huxley

Huxley as science publicist and social reformer has been emphasized in the scholarly literature, whereas Huxley as philosopher has been underrated. There seem to be at least two reasons for this asymmetry. The first seems to involve the conception that Victorian scientists were not serious philosophers. For example, John Passmore wrote that “[n]one of the nineteenth-century scientific publicists is of any great importance as a philosopher,” although, he added, their scientific works had an impact on philosophy.³⁸ Huxley is no exception to that conception; as the most well-known Victorian public figure, he is often the main target. As Roger Smith writes:

He [Huxley] did not write systematically as a philosopher but opportunistically as a public intellectual with a large number of irons in the fire. Moreover, as an extraordinarily busy man, he wrote under intense pressure, often late at night, seeking immediate effect. He certainly succeeded; and we can admire this while not taking too formally the philosophical dimensions of what he wrote.³⁹

Here Smith has in mind Huxley's views on mind, but similar points have been made regardless of subject matters.⁴⁰ James R. Moore characterizes Huxley and another leading Victorian scientific figure John Tyndall as “not first-rate philosophers but skilled controversialists.”⁴¹

Regarding attempts to examine Huxley's agnosticism from a philosophical perspective, Barton,

³⁸ Passmore 1957, 46. See also Cockshut 1964; Dockrill 1964.

³⁹ Smith 2015, 24. I am indebted to Piers J. Hale for this reference.

⁴⁰ Paterson 1932; Copleston 1966; Levine 1990.

⁴¹ Moore 1988, 511.

who understands it mainly as a rhetorical device for Victorian scientific naturalism, writes as follows: “I disagree with the emphasis of [James G.] Paradis and D. W. Dockrill, both of whom, in seeking philosophical system in Huxley’s thoughts, pay insufficient attention to polemical intent.”⁴² In next chapter, I will discuss the reception of Huxley’s agnosticism in detail, including the views of the two scholars whom Barton mentions. When it comes to agnosticism, Huxley has been too famous as a polemicist and science popularizer to attract philosophical attention.

The second reason has to do with the reputation that Huxley is infamous for speaking paradoxically, to put it generously, or inconsistently. Huxley left numerous lectures and essays, and his interest was not confined to science. He wrote and talked about philosophical, theological, political and social issues. Many scholars have found his “thoughts and doings” puzzling.⁴³

For instance, Huxley was a strong defender of Darwin, as his famous nickname “Darwin’s bulldog” attests. According to Huxley, his initial reaction to Darwin’s *Origin of Species* (published in 1859) was, “How extremely stupid of me not to have thought of that!”⁴⁴ However, Huxley did not accept the idea of gradual modification until around 1874, and moreover he was never fully committed to the idea of natural selection.⁴⁵ Thus, scholars have been puzzled over what Huxley was defending and whether he was a “real Darwinian,” “genuine Darwinian,” “pre-Darwinian,” “anti-Darwinian,” “pseudo-Darwinian” or something else.⁴⁶

⁴² Barton 1983, 262.

⁴³ “Thoughts and Doings” is the title of Huxley’s teenage diary (1840-45).

⁴⁴ Huxley 1887g, 551.

⁴⁵ Huxley 1859d; 1859e; Bartholomew 1975; di Gregorio 1981; 1982; 1984; 1997; Ruse 1997; Weiss 2004; Lyons 2009.

⁴⁶ The labels are from Bartholomew 1975, 535; Mayr 1997, 250; di Gregorio 1997, 159; Bowler 1997, 120. See also di Gregorio 1981; Ruse 1997; Lyons 2009; Depew 2010.

Similar examples of puzzlement abound. Huxley's materialistic writings appear irreconcilable with his insistence that he was not a materialist.⁴⁷ Many of his writings are full of severe criticisms of the Bible, but he also endorsed the inclusion of the Bible in elementary school curricula.⁴⁸ Regarding his lecture "Evolution and Ethics," commentators have pointed out that it was inconsistent for him to claim that "cosmic processes" led to the evolution of ethical attitudes and yet are antagonistic to them once they have arisen; he replied by saying that "I'm sorry for logic."⁴⁹ As another example, Lightman states that "[i]t is puzzling to see Huxley praising [Georges] Cuvier," since "Cuvier was an upholder of natural theology, and closely associated with Huxley's enemy, Richard Owen."⁵⁰ Some scholars have even questioned Huxley's integrity.⁵¹ Nevertheless, he said, "One thing people shall not call me with justice and that is – a liar."^{52, 53}

The common sentiment of puzzlement seems to reinforce or be reinforced by the conception that Huxley was just a clever opportunist, not a deep thinker committed to a system.⁵⁴

⁴⁷ For example, Huxley 1868a; 1886c.

⁴⁸ Huxley 1870d; 1879d; 1889f; 1893b; 1894e.

⁴⁹ Huxley 1893a; 1893c; 1894c, 12. For discussions of the lecture, Mivart 1893; Carus 1894; White 1895; Dewey 1898; Simpson 1949; Helfand 1977; Paradis and Williams 1989; Allhoff 2003; Goslee 2004; Ruse 2009a.

⁵⁰ Lightman 2014, 27. After expressing the puzzlement, Lightman introduces Gowan Dawson's explanation (Dawson 2016). "Huxley pursued two inconsistent strategies when he discussed Cuvier. When he wrote research papers for fellow anatomists he rejected the validity of Cuvier's law of correlation, but when writing for a popular audience he pretended to support it, since the notion of reconstructing the entire form of prehistoric creature from a single bone had caught the public imagination" (Lightman 2014, 27).

⁵¹ Houghton 1949; Richards 1987. See also Barr 1997a for a discussion of Huxley's integrity. Huxley also knew that even his ally thought of him as a hypocrite (Huxley 1879d).

⁵² Huxley 1860c, 319.

⁵³ In addition to the above examples, also note Barton's report. "Historians have found it difficult to find a consistent viewpoint in Huxley's many assertions about nature, its order, its laws, and its chains of causation. Some accuse him of deliberate equivocation. Others try to identify shifts of opinion, but no one agrees on what changed, when, or why" (1983, 268).

⁵⁴ Peterson 1932, 294, 312-3; Ashforth 1969, 122; Barton 1983, 261, 265, 269; Lightman 1987, Ch. 1; de Waal 2013, 34-5. For reports of this sentiment, see Blinderman 1966, 50-2; Dockrill 1971, 462.

As we will see in next chapter, the idea that Huxley was naïve concerning the issues that he was addressing, unaware when he was contradicting himself is also found in the reception of his agnosticism.

Despite the dominant impression of Huxley, since it is not a hidden fact that he addressed philosophical issues, few sympathetic scholars have looked into his writings and tried to defend him.⁵⁵ Charles S. Blinderman is an early notable example. In “T. H. Huxley: A Re-evaluation of his philosophy,” Blinderman paid attention to Huxley’s discussions of materialism and idealism to make sense of Huxley’s denial of being a materialist.⁵⁶ Probably having a similar motivation, Sophie Forgan and Graeme Gooday write that their research on Huxley’s working places such as the Jermyn Street Museum “will help to articulate some of the contradictions in Huxley’s life and may help to some degree to account for them.”⁵⁷

Also, some scholars have examined Huxley’s views on science, noting that, unlike other natural philosophers like Darwin, Huxley wrote essays that belong to what we now call “philosophy of science.”⁵⁸ Although Huxley’s position has been introduced fragmentarily, the following points have been made: he thought that a direct empirical demonstration of hypothesis is highly important;⁵⁹ he considered a skeptical attitude to be constitutive of scientific method;⁶⁰ he praised Zadig’s method, that is the application of knowledge of cause to distant time and

⁵⁵ Few scholars think that Huxley appears to have tried constructing a philosophical system, but conclude that he failed in the end (Blinderman 1966; Dockrill 1964; Paradis 1978).

⁵⁶ Blinderman 1966. According to Blinderman, Huxley held both idealism and materialism; the young Huxley was a more idealist whereas the old Huxley was a more materialist; Huxley was inconsistent in the sense that he did not commit himself to one position throughout his life by abandoning the other entirely. However, Blinderman did not view this only negatively: everyone tends to swing between the two perspectives, because there is some truth in both; going back and forth can be seen as a constructive process thanks to Huxley’s agnosticism.

⁵⁷ Forgan and Gooday 1996, 438.

⁵⁸ Ellegård 1957; Knight 1997.

⁵⁹ di Gregorio 1984; 1997; Hull 2003; Paradis 1978; Lyons 1999; 2009.

⁶⁰ Barton 1983; Knight 1997.

space;⁶¹ he rejected Auguste Comte's idea of the hierarchy of sciences;⁶² his view was similar to Herschel's and Mill's, but not to Whewell's;⁶³ he was not a Baconian in the sense that he viewed the invention of hypothesis as crucial for science.⁶⁴ Huxley's meta-scientific thoughts have been discussed, but not in connection with his agnosticism.

I have pointed out the asymmetrical standing of Huxley in the scholarships as well as the conception of Huxley as a shallow and paradoxical thinker. Huxley's agnosticism is no exception to this tendency. I take it to show that further research can be done to better understand Huxley's philosophical notion of agnosticism. The aim of this dissertation is to offer a more comprehensive picture of his agnosticism, which I believe helps us to understand, first, his epistemological view underlying his proposal of agnosticism, second, the nature and structure of agnosticism, and last, the relation between his agnosticism and his meta-scientific thoughts. The main message of each can be summarized as follows:

1. Following modern philosophers, especially René Descartes and David Hume, Huxley engaged in an epistemological project which was to find a method for identifying knowledge that would work regardless of our limited condition. Huxley's question concerns how to select mental contents that deserve the title of knowledge among all (possible) mental contents which certainly exist. His solution was to adopt the method of verification and material terminologies. To Huxley, it was not an epistemologically significant question how our mind comes to have mental contents that we consider knowledge.

⁶¹ Knight 1997; Sommerville and Shortland 1997.

⁶² Eisen 1964; Knight 1997.

⁶³ Ellegård 1957; di Gregorio 1984; 1997; Knight 1997.

⁶⁴ Sommerville and Shortland 1997.

2. Huxley based agnosticism on conclusions of his epistemological project. I characterize his agnosticism as a quick guide to knowledge that consists of an account of legitimate evidence and an ethics of knowing (as opposed to an ethics of belief). Huxley's agnosticism says that the knowledge status of proposition p should be determined by evidential reasons alone. It further requires epistemic agents to submit themselves to evidence and take a stance toward p accordingly. When presented with evidential reasons, agents involuntarily come to have a belief or opinion about the knowledge status of p ; they should be simply honest about it. On the other hand, having a belief or opinion about the knowledge status of p based on non-evidential (*e.g.*, prudential) reasons is done voluntarily; they should not pretend that p is knowledge.

3. Based on the notion of agnosticism above, Huxley defended science. Science is the only means of attaining knowledge, not because principles of science such as the uniformity of nature have been shown to be true or real, but because science has followed agnosticism. Science is metaphysics-agnostic in the sense that it makes use of metaphysical principles but does not base its epistemic value on any metaphysics. The proper stance toward principles of science is to put agnostic faith, which is trusting and taking risks. The notion that science needs the truth of a particular metaphysical or theological system to have any epistemic value comes from an application of an old philosophical view to science, which Huxley found not only improper but also potentially harmful to the progress of science.

By arguing that Huxley had a bigger picture behind his agnosticism, I hope to show that Huxley did not suggest agnosticism simply to underscore a certain psychological state (being ignorant or lacking a belief), a morally desirable attitude (humble or modest attitude), or an admission of the condition of human faculties (the confession of human ignorance or limits); also I hope to clarify why Huxley, in *Hume* where the term “agnosticism” was first mentioned in print, would have introduced agnosticism as “modern way of thinking.”⁶⁵

⁶⁵ Huxley 1878h, 70.

1.4. Structure of the dissertation

Chapter 2 discusses interpretations of Huxley's agnosticism that have been offered. Huxley associated more than one notion with his agnosticism, and most interpretations center on one of them. This leads me to categorize the interpretations into three groups. I also introduce recurrent worries about Huxley's promotion of agnosticism, and suggest that the worries have arisen because of the adoption of a partial approach to his agnosticism. I propose instead taking an inclusive approach. To illustrate what it means to take an inclusive approach, I discuss Dockrill's and Stanley's understandings of Huxley's notion of agnosticism. Yet I find their interpretations unsatisfactory in another aspect, and conclude that we need to pay more attention to Huxley's views of what and how we *can* know, as opposed to what and how we *cannot* know.

In Chapter 3, entitled "Huxley's Cartesian Project," I examine Huxley's interests in Descartes's epistemological inquiry. Huxley understood Descartes's inquiry into certainty as an attempt to introduce a method for identifying knowledge, and claimed that Descartes had offered two "paths" and one "maxim." His explanations of Descartes's inquiry and its development illuminate the structure and nature of his agnosticism. By showing that the two paths and the maxim also feature in Huxley's later discussions of agnosticism, I support the two suggestions made in the previous chapter: we should take an inclusive approach and Huxley intended agnosticism to be a guide to knowledge, as opposed to a theory of nescience.

I move on to discuss how Huxley incorporated the paths of idealism and materialism into his agnosticism. Huxley revised the conclusion of Descartes's method of doubt and took only an epistemological point from George Berkeley: thoughts (perceptions or mental contents appeared to consciousness) certainly exist and only thoughts are given to us. Huxley also disagreed with Descartes's rationale behind the second path of materialism, because Descartes had a

metaphysical reason to employ physical way of thinking. I discuss Huxley's epistemic reason to favor physical way of thinking over non-physical way of thinking, highlighting his distinction between metaphysical materialism and material terminology. I leave it unexplained how Huxley could think that physical way of thinking (material terminology) without an ontological commitment to metaphysical materialism gets us something that deserves the title of knowledge. This question is taken up in next chapter.

In Chapter 4, I mainly look into Huxley's *Hume* to find an answer. We can see there Huxley explaining what kind of thoughts can be considered knowledge and clarifying what would be the condition for a thought to be knowledge. Given our epistemic situation, since we cannot but make use of the stream of thoughts in finding a method of identifying knowledge among all thoughts, we need to first sort out thoughts to see how to proceed. Thus, I explain Huxley's categorization of thoughts to prepare the discussion of Huxley's view of memory as a model of knowledge. Huxley's conclusion was that we can only use experiencing of a set of sensory and relational impressions as a justificatory factor, which supplied him with another reason to adopt physical way of thinking (material terminology) over non-physical way of thinking (immaterial terminology) in expressing a thought that one wishes to claim to be knowledge. This chapter ends with Huxley's defense of the method of verification as the only justificatory method, against two methods, one appealing to the notion of necessity and the other to religious faith.

Based on the previous discussions, in Chapter 5, I elaborate on the suggestion that agnosticism primarily concerns the issue of knowing and involves the three elements that Huxley drew from Descartes. I characterize agnosticism as a guide to knowledge, consisting of an account of legitimate evidence and two epistemic duties regarding evaluation of evidence. In

showing that Huxley's concern was ethics of knowing, I argue against the interpretation of Huxley's agnosticism as William K. Clifford's ethics of belief; this discussion will resolve one of the two recurrent worries that will be introduced in Chapter 2. To further support my interpretation, I draw attention to Huxley situating agnosticism within the tradition of modern critical philosophy.

The penultimate chapter concerns epistemological bearings of agnosticism on Huxley's view of science. I re-visit the other recurrent worry that Huxley's agnosticism was a hindrance to his view of science as the only way to knowledge because he could not but base science on faith and yet he criticized his religious opponents for their faith. I argue that this worry is not well-directed. I first identify assumptions underlying the worry and then discuss Huxley's conceptions of science and of faith. This discussion aims to show the untenability of the assumptions and to illustrate Huxley's stance toward science. Huxley defended the epistemic value of science on the basis of agnosticism and considered both agnosticism and faith to be essential to science and its advancement.

The final chapter, Chapter 7, summarizes discussions and arguments in the previous chapters.

CHAPTER 2

The Reception of Huxley's Agnosticism

2.1. A science defender's nescience: a puzzling position

Huxley is often associated with agnosticism in the scholarly literature, in particular the literature concerning the relation between religion and science. Huxley has been introduced as the first person who used the term “agnostic” along with a brief note on his notion of agnosticism.⁶⁶

If we look into discussions of agnosticism that do not pay much attention to Huxley, agnosticism seems to stand as a defensible, irreducible philosophical position.⁶⁷ When we move from the discourse of agnosticism in general to that of Huxley's agnosticism, on the other hand, criticisms abound. An interesting point is that almost all criticisms against his agnosticism have something to do with his conviction in scientific method.

Agnosticism seems to promote a stance of ignorance toward metaphysical and theological issues. Yet it is well known that Huxley committed himself to scientific method. If so, one question arises. How could Huxley be so sure that scientific method is the only means of acquiring knowledge? When we move on to his own explanations of agnosticism, it appears that he put himself in trouble by inducing the question, because his *agnosticism* seems to involve the acceptance of scientific method as the only way to knowledge. To hold agnosticism appears to mean to make confession of ignorance toward metaphysical matters *and* to have conviction in scientific method. Scholars have noted that there is something puzzling about Huxley's

⁶⁶ van Fraassen 1998; Benn 1999; Hyman 2006; Dawkins 2006; Yoder 2013; de Waal 2013; Ruse 2014.

⁶⁷ See for example Rosenkranz 2007.

agnosticism.⁶⁸ If one wishes to be an agnostic, one needs to express both humility and dogmatic adherence. Thus, it seems that Huxley's agnosticism does not help us to understand how he could be so sure about scientific method. The question above is left unexplained. Perhaps this should not be expected; agnosticism might not be the right place to look for his rationale, because agnosticism in general has been regarded as a view on the limits of knowledge, or our *ignorance*. Perhaps we might find the rationale for his conviction in science elsewhere.

Yet, there is a more serious set of challenges than the paradoxical aspect. Many scholars have pointed out that if Huxley held agnosticism, he could not have grounds for his conviction in science, or he should not have expressed the conviction. These worries concern his *endorsement* of agnosticism, as opposed to his agnosticism. Given that his larger project was to defend and promote science as the only knowledge for society and its progress, agnosticism seems not suitable for his objective. The worries can be formulated as two kinds of criticism, which were made by his contemporaries and still continue today. First, endorsing agnosticism means that Huxley was philosophically naïve because he was thereby undermining foundations of science.⁶⁹ Second, endorsing agnosticism made him philosophically inconsistent because he held double standards, one for religious faith and the other for scientists' faith.⁷⁰ These points suggest that the fundamental claim underlying his project of promoting science is nothing but his own "gnosis."

Before I elaborate on the two general criticisms, let's look at Huxley's own explanations of agnosticism. It is not quite straightforward to identify what he meant by agnosticism. "One of the problems facing the student of agnosticism, and in particular Victorian agnosticism,"

⁶⁸ Hutton 1895; Dockrill 1971; Gilley and Loades 1981; Barton 1983; Lightman 1987; Levine 2014.

⁶⁹ Balfour 1895; Turner 1974; Lightman 1987; 1997a; 2001; Levine 2014; Stanley 201.

⁷⁰ Ward 1899 [1915]; James 1879; Gilley and Loades 1981; Lightman 1987; 1997a; 2001; Greene 2003; Levine 2014. Numbers 2003 introduces this line of criticisms.

Dockrill says, “is to know what to make of T. H. Huxley’s definitions and explanations of the word.”⁷¹ As implied, a problem emerges because Huxley associated agnosticism with more than one idea. He seems to have entertained three ideas. First consider two ideas that concern what we can or cannot know.

The theological “gnosis” would have us believe that the world is a conjuror’s house; the anti-theological “gnosis” talks as if it were a “dirt-pie” made by the two blind children, Law and Force. Agnosticism simply says that we know nothing of what may be beyond phenomena.⁷²

Here Huxley claims that we cannot know about theological and metaphysical matters because their subject matter concerns something “beyond phenomena.” Yet, Huxley also seems to have wanted to associate agnosticism with science:

It [Agnosticism] simply means that a man shall not say he knows or believes that which he has no scientific grounds for professing to know or believe.⁷³

Those two quotes seem to express two different ideas. Based on Huxley’s discussion of the limits of human faculties, it has been suggested that he claimed that we are ignorant of metaphysical issues that go beyond phenomena, *i.e.*, what appear to us in our consciousness. On the other hand, the second quote is deemed to express the idea that scientific method is the only means of attaining knowledge. Jointly, Huxley’s agnosticism appears to make the following claim:

⁷¹ Dockrill 1971, 461.

⁷² Huxley 1884a, 6.

⁷³ *Ibid.*, 5.

regarding something beyond phenomena, we can know nothing because of our limited condition, and regarding phenomena, we can know only by using scientific method. How did Huxley arrive at this double-sided claim? This question has led to different interpretations of his notion of agnosticism, as we will soon see.

The third idea that Huxley seems to have associated with agnosticism involves what we should or should not do. As implied in the aforementioned quote, his agnosticism requires one to confess one's ignorance. He proposed what he called the "agnostic principle."

Positively the principle may be expressed: In matters of the intellect, follow your reason as far as it will take you, without regard to any other consideration. And negatively: In matters of the intellect do not pretend that conclusions are certain which are not demonstrated or demonstrable.⁷⁴

The "essence" of agnosticism, according to Huxley, "lies in the rigorous application of" this principle.⁷⁵ What does agnosticism prescribe? This has complicated the issue of how to understand Huxley's agnosticism.

2.2. Partial approach to Huxley's agnosticism: the common approach

Huxley, after all, appears to claim: regarding something beyond phenomena, we can know nothing due to our limited faculties; regarding phenomena, we can attain knowledge only by using scientific method; follow the agnostic principle. We may grant that Huxley's agnosticism refers to all of them, without asking any further question regarding how they are related to each

⁷⁴ Huxley 1889e, 246.

⁷⁵ *Ibid.*, 245.

other.⁷⁶ Yet scholars have attempted to reconstruct how he would have arrived at agnosticism. Distinctive reasons seem to have led to each idea of agnosticism, and different interpretations have been offered accordingly. We can find, I suggest, three types of interpretations.

2.2.1. Type one: an incidentally conjoined position

The main motivation that leads to this type seems to be to avoid making the notion of agnosticism incoherent. The claim that scientific method is the only way to knowledge would generate tension with the claim that we cannot know something beyond phenomena. If Huxley meant agnosticism to mean that we are ignorant of some metaphysical and theological matters because of our limited faculties that restrict the realm of knowledge to phenomena, how could he also want agnosticism to mean that scientific method, not other methods, is the only means for gaining knowledge? To make this claim, he would have to claim that he knew something that cannot be known due to our limited faculties. Therefore, Huxley's discussions of agnosticism turn out to involve incompatible ideas, not just different ideas. Consequently, proponents of this type tend to separate the two ideas. Agnosticism is identified with an account of the limits of human knowledge based on the notion of the limited human faculties; his commitment to scientific method is now connected with Victorian scientific naturalism. Huxley's agnosticism is, thus, labeled as "scientific agnosticism."⁷⁷ Huxley loosely connected the two ideas to the same

⁷⁶ Van A. Harvey, for example, characterizes Huxley's agnosticism as skepticism and underscores its two components: "skepticism regarding the claims of metaphysicians or theologians to have produced knowledge and skepticism regarding the historical tradition about Jesus in the New Testament" (Harvey 2012, 536). Harvey also discusses Huxley's agnostic principle as the third component, and his view will be addressed in detail in Chapter 5.

⁷⁷ For example, Desmond 1997, 500, 525; Lightman 2002, 271, 289. See also Turner 1974. There is another rationale for the label "scientific agnosticism." As Huxley himself admitted, the idea that we are ignorant of metaphysical matters is also found in other thinkers like Mansel. The label "scientific agnosticism" is used in contrast with "religious" agnosticism. In this regard, it should be noted that Turner's and Lightman's books concern more than Huxley. A related distinction is the distinction between "right wing" agnosticism and "left wing" agnosticism (Passmore 1959; Harvey 2012).

term “agnosticism,” and he did simply because *he* endorsed both; he may or may not have acknowledged a philosophical complication coming from holding the two ideas.

Huxley endorsed the idea of science as the only way to knowledge, and it seems quite straightforward why he came to endorse the idea: he was a devoted scientist. A more interesting question regarding his coinage of the term “agnostic” would be how he arrived at the idea of metaphysical and theological ignorance grounded on the limits of human faculties (call it “metaphysical ignorance doctrine”) and why he found it worth endorsing and promoting enough to bother himself to give a thought on a new name. We have been given two accounts.

Let me start with a more hostile reading, which was once popular. Huxley promoted agnosticism, the metaphysical ignorance doctrine, not because he wanted to express his genuine view. Agnosticism conveys the philosophical notion which had been already well known without the help of the new label, but the notion *with* the new label was to him a device invented for polemical use. Accordingly, a “purely opportunistic element in agnosticism” has been examined.⁷⁸ For example, agnosticism is claimed to be a red-herring, because his intention was to hide or soften his genuine position: atheism, materialism, or scientism.⁷⁹ Or, his intention behind promoting agnosticism was to win a debate with his religious opponents, and thus he used it as a tool of showing that they cannot know about what they claimed to know.⁸⁰

This uncharitable account has been shown to be untenable by Bernard Lightman, because of its main point on Huxley’s purpose of the coinage. According to Lightman, “Huxley’s invention of the term ‘agnostic’ is often seen as a brilliant rhetorical strategy,” under the

⁷⁸ Moore 1988, 511.

⁷⁹ Engels 1892; Lenin 1908; Bibby 1959. See also Dockrill 1971; Lightman 2015a.

⁸⁰ Paterson 1932; Irvine 1968; Moore 1988; Reed 1997. Ruth Barton accepts Lightman’s view which I will introduce shortly and yet claims that polemical intention is the most important in understanding Huxley’s agnosticism (1983).

assumption that “Huxley’s role as a neologist was well known to his contemporaries during the 1870s and 1880s, before the publication of his trilogy of essays on agnosticism.”⁸¹ However, Lightman has shown that this assumption is incorrect. Although Huxley coined the term in 1869, he did not mention the terms “agnostic” and “agnosticism” in his essays and lectures until 1878. Most of his contemporaries, albeit familiar with agnosticism, did not even know that Huxley was the coiner of the terms until the mid-1880s when his letter revealing the fact was published without his permission in the inaugural issue of the *Agnostic Annual*, partly because he had not publicly engaged in controversies over agnosticism.⁸² In the meantime, however, Huxley continued to express the position of agnosticism in his letters and published works.⁸³ Lightman also points out that Huxley in the end revealed himself as the coiner in public debates and tried to control the meaning of agnosticism. The story fully uncovered by Lightman renders the “rhetorical strategy” account implausible because, if it were correct, we would arrive at an odd conclusion that Huxley invented a rhetorical device that he did not use for around twenty years in public and polemical contexts.⁸⁴

⁸¹ Lightman 2002, 272. Lightman is referring to Huxley’s “Agnosticism,” “Agnosticism: A Rejoinder,” and “Agnosticism and Christianity,” all of which were published in the *Nineteenth Century* 25 in 1889.

⁸² Huxley 1884a; Desmond 1997, 566-7; Lightman 2002; Lyons 2012. However, this does not mean that Huxley was not associated with agnosticism around that time. The first place where the terms “agnostic” and “agnosticism” appeared in print is Richard H. Hutton’s essay, “Pope Huxley,” which was published on January 27, 1870, less than one year after Huxley’s coinage. Hutton was also a member of the Metaphysical Society and in that essay, Hutton identified Huxley as an agnostic and his position as agnosticism (Hutton 1870).

⁸³ Lightman 2002; 2004. Even before inventing the word “agnostic,” Huxley held agnosticism. This point has been noted by his son Leonard Huxley (1920) and other scholars including Lightman (*e.g.*, Clausen 1976; Lyons 1999; 2012; White 2003; Beatty and Hale 2008).

⁸⁴ Lightman asks, “Why did he [Huxley] wait so long, only six years before his death, to state what he meant by the term as originally conceived?” and suggests the following: “At first, Huxley had remained relatively silent after 1869 in order to allow his coinage ‘agnostic’ to become part of intellectual discourse, but he later had an additional reason for not speaking at length about the meaning of the term: he would have had to reveal his significant gap between himself and his friend [Herbert Spencer]. Huxley wanted to present a united front, until 1889 when he was in the middle of an acrimonious quarrel with Spencer” (Lightman 2002, 272, 287). See also Huxley 1889i.

This “rhetorical strategy” account does not tenably account for Huxley’s adoption of agnosticism (identified as the metaphysical ignorance doctrine), but we can find a more balanced version from Lightman’s book *Origin of Agnosticism*. Although Lightman notes, in a footnote of his essay that I discussed just above paragraph, that his book, published in 1987, “follows” the “line of approach” that assumes that “agnosticism constituted a well-thought-out strategy which Huxley resorted to often during the 1870s and 1880s,” his account explains how Huxley would come to hold agnosticism and use it as a tool to attack religious targets.⁸⁵ Lightman defines agnosticism as “a species of skepticism built upon Kantian principles”:

Huxley therefore conceived of agnosticism as a theory that restricted knowledge to the phenomenal realm and that was based on Kant’s notion that human mind is subject to inherent limitations. . . . Any object that could be termed part of the transcendental or noumenal world was considered to be beyond the limits of human knowledge.⁸⁶

Huxley claimed that we are ignorant of some metaphysical or theological matters such as the existence of God or the constituents of reality, because these issues are not about the phenomenal world revealed by (the Kantian sense of) experience. This is Huxley’s agnosticism, and he was led to appreciate the destructive power of this “Kant’s notion” via a Christian thinker, Henry Longueville Mansel (1820-1871). Mansel’s *Limits of Religious Thought*, published in 1859, was mentioned more than one time in Huxley’s discussions of agnosticism and in an approving manner. Lightman’s account has been widely recognized and shared by other scholars.

⁸⁵ Lightman 2002, 273, n. 11.

⁸⁶ Lightman 1987, 15. Also Lightman 1983; 2012; 2014.

To summarize, the first type of interpretation of Huxley's agnosticism views his discussions of agnosticism as a juxtaposition of different ideas, and only counts the metaphysical ignorance doctrine as agnosticism.⁸⁷ The most elaborate account of how Huxley came to endorse the metaphysical ignorance doctrine is Lightman's account that highlights Mansel's influence.

2.2.2. Type two: an application of scientific method

The second type of interpretation of Huxley's agnosticism understands it as an expansion of his adherence to scientific method.⁸⁸ The main motivation seems to be that an interpretation of Huxley's agnosticism should make sense of his stance toward issues that do not require us to go beyond phenomena. If we equate his agnosticism with the metaphysical ignorance doctrine based on our conditioned faculties, agnosticism would have nothing to say about a claim concerning the phenomenal world, except that it does not fall within the boundary of ignorance. However, his three 1889 essays on agnosticism primarily concern alleged miracles like Jesus walking on water. Huxley intended to apply agnosticism not only to claims about the nature of reality but also claims about immaterial entities such as soul or vital force and even seemingly legitimate scientific claims. This motivation seems to have led some scholars to focus on Huxley's illustration of agnosticism as the "essence of science."⁸⁹

According to the second type, Huxley's agnosticism follows from his conviction in scientific method, confirmation by sense experience. Huxley would arrive at the notion of

⁸⁷ Lightman's reason for the exclusion seems to be the following. "Although there were times when Huxley himself, carried away by the heat of controversy and his own polemical skill, used the word *agnosticism* rather loosely, it is fairly clear what he intended. In those key sections of Huxley's work where he deals with his conception of agnosticism, two elements will always be found: a discussion of Kant or a thinker profoundly influenced by Kant, and an elaboration of Kant's notion of the limits of knowledge" (1987, 14).

⁸⁸ Hibben 1903; Turner 1974; MacLeod 1982; Jensen 1991; Lyons 2014.

⁸⁹ Huxley 1884a, 5.

metaphysical ignorance because we cannot solve metaphysical matters, for example, whether materialism or immaterialism is true, by applying scientific method. Although Huxley spoke of Kant, Hamilton, and Mansel in connection with the idea of limited human mind, this would be just his careless way of expressing the point that scientific method is inapplicable. It would be better to look at what his *practice* of agnosticism was like.

Sherrie L. Lyons, whose research focus is Huxley's scientific works, holds this interpretation. To examine "what he meant by it [agnosticism]," she says, we need to understand "the context of his life as a scientist."⁹⁰ The following quote from Lyons shows her interpretation. "On those questions [like the existence of God] that were not amenable to the scientific method, *i.e.*, those that went beyond the cognizance of the five senses, he [Huxley] declared himself an agnostic."⁹¹ This, she highlights, should not be understood to imply that Huxley was not critical about scientific claims. The core idea underlying his agnosticism is that any – metaphysical, theological, and scientific – claim should be evaluated by the same standard, and the standard is that of science. In this sense, according to Lyons, "Huxley's agnosticism provided the framework for his scientific view," but also "his experience as a scientist provided the framework for his agnosticism."⁹²

A similar but interestingly different view has been suggested by James G. Paradis.⁹³ Lyons portrays Huxley qua agnostic as a confident scientist, but in Paradis's interpretation, the agnostic is illustrated as a frustrated scientist. According to Paradis, Huxley's declaration as an

⁹⁰ Lyons 2012, 86.

⁹¹ *Ibid.*, 87. In her earlier essays, Lyons explains Huxley's agnosticism rather unclearly: "Building on the Kantian principle that the human mind had inherent limitations and further elaborated by Hume, Huxley maintained that our knowledge of reality was restricted to the world of phenomena as revealed by experience. It also became the cornerstone in defining what constitutes the practice of science" (2009, 152; also 2010, 435).

⁹² Lyons 2012, 102.

⁹³ James G. Paradis, *T. H. Huxley: Man's Place in Nature* (1978).

agnostic dramatically shows his identity as a scientist who underwent a kind of epistemological crisis. “Huxley,” Paradis states, “had recognized that as physical science moved closer to the material objects of its attention, achieving greater clarity and certainty, the ontological considerations were becoming impossible to deal with definitely.”⁹⁴ Huxley expressed a kind of ambivalent feeling which Paradis thinks captures the historical aspect of agnosticism. Huxley’s strict application of empirical method led him to declare that we cannot know the truth of doctrines that had been supplying us with intellectual and moral principles. Thus, Huxley wanted to have an epistemology that can validate some of his beliefs in such principles, in particular the order of nature, but he could not find one. Agnosticism excused Huxley’s failure. Agnosticism was a “scanty gown” but yet “suitable attire” for Huxley as a scientist.⁹⁵

2.2.3. Type three: an intellectual code

This type of interpretative approach pays more attention to what Huxley’s agnosticism asks one to do or not to do, than to how exactly Huxley grounded his account of the limits of human knowledge. The scholars who take this approach tend to focus on Huxley’s “agnostic principle.”

One cluster of interpretations of this type highlights the notion of free inquiry implied in agnosticism. Huxley could arrive at the state of being ignorant, because, in the first place, he questioned beliefs that people had been forced to hold uncritically. Moreover, he always emphasized the freedom of inquiry and wanted it to be realized in society: the state of being free from traditionally inculcated beliefs and being free to question. In this context, David Knight

⁹⁴ Paradis 1978, 101.

⁹⁵ *Ibid.*, 103. As I will show in Chapter 6, Huxley expressed his instrumentalistic conception of science too strongly and systemically to characterize his position as an excuse for no epistemology.

connects Huxley's agnosticism with the "Royal Society's motto, 'Nullius in verba [Taking nothing on authority]'" and points out that he wanted science to be "an agnostic enterprise."⁹⁶

Another related cluster draws our attention to intellectual honesty. Agnosticism does emphasize free inquiry, but further, Huxley associated free inquiry with intellectual and moral virtue. His contemporary Robert Flint considered Huxley's agnosticism to mean "simply honesty in investigation" or "merely the conscientious exercise of intelligence in the pursuit of truth."⁹⁷ Flint appears not to have been impressed by this "unquestionable" or "self-evident" principle.⁹⁸ On the other hand, according to Christopher Clausen, the significance of Huxley's agnosticism is that it has turned having doubts and the absence of beliefs, by redefining them as honesty or even humility, into a more superior or at least alternative position that one may take.⁹⁹ Clausen thinks that it was Huxley's contribution; no one had been successful in this regard.¹⁰⁰

Yet another version of this type is the one popular in the literature on the ethics of belief. Huxley's agnosticism is understood to express evidentialism, according to which we should have a belief based on only evidential reasons as opposed to non-evidential reasons such as prudential reasons. The fact that Huxley was a close friend and supporter of William K. Clifford (1845-1879) further has invited scholars to interpret his agnosticism in this way. In the famous essay, "Ethics of Belief," Clifford asserted: "[i]t is wrong always, everywhere, and for anyone to believe anything on insufficient evidence."¹⁰¹ This is a quite clear example of evidentialism,

⁹⁶ Knight 1997, 57, 58.

⁹⁷ Flint 1903, 43, 44.

⁹⁸ *Ibid.*, 43.

⁹⁹ Clausen 1976.

¹⁰⁰ Alan P. Barr, in his essay on Huxley's passion for truth, also understands Huxley's agnosticism as intellectual honesty in the sense that agnostics undertake "not to assert the truth of anything about which he or she is uncertain" and points out that "this honesty of word or deed" was what Huxley took as the most valuable quality (1997a, 17-8).

¹⁰¹ Clifford 1876, 295.

although contemporary evidentialists tend to claim only for being epistemically wrong, unlike Clifford who presented his imperative as both epistemic and moral. And, when William James (1842-1910) argued against Clifford in another famous essay “Will to Believe,” he also cited Huxley and considered them to have the same view.¹⁰² Since then, the understanding of Huxley’s agnosticism as Clifford’s ethics of belief has been received without a serious challenge.¹⁰³

This “intellectual code” type also has accounts of how Huxley would have arrived at agnosticism. Paul White’s works offer a notable account.¹⁰⁴ White understands that agnosticism was “a more dynamic orientation toward belief as a practice: an active questioning, an openness toward beliefs of others or toward evidence contrary to one’s own beliefs, a process of conscientious doubt and inquiry.”¹⁰⁵ According to White, the Metaphysical Society, an enclosed debate club of social and intellectual elites with fundamentally opposed views, can illuminate how Huxley would have been led to agnosticism. Indeed, Huxley said that the meetings of the members of the Society had triggered the coinage of “agnostic.”¹⁰⁶ White suggests, based on topics and manners of discussions done in the Society, that the Society could function due to the shared agnostic code of openness and inquiry.¹⁰⁷ Agnosticism, then, emerged as a “bridge between intellectual groups, a means of drawing them together despite difference of belief.”¹⁰⁸

¹⁰² James 1896.

¹⁰³ For example, Kauber 1974; Doore 1983; Weolfel 1989; Aikin 2008; Yoder 2013. This is probably because philosophers’ focus has been put on a position called “evidentialism,” as opposed to Clifford’s or Huxley’s position. I will discuss the interpretation of Huxley’s agnosticism as Clifford’s ethics of belief more thoroughly in Chapter 5.

¹⁰⁴ *Thomas Huxley: Making the ‘Man of Science’* (2003) and “The Conduct of Belief: Agnosticism, the Metaphysical Society, and the Formation of Intellectual Communities” (2014).

¹⁰⁵ White 2014, 222.

¹⁰⁶ See footnote 1.

¹⁰⁷ The Metaphysical Society was initially suggested in 1868 as the “Theological Society” to discuss questions on “speculative subjects, especially theology,” “with the freedom of an ordinary scientific society” (Hutton 1885, 177; also cited in White 2014).

¹⁰⁸ White 2014, 237.

2.3. Huxley's promotion of agnosticism

“Many studies,” Barton says, “have found inconsistencies and inadequacies in Huxley’s agnosticism.”¹⁰⁹ Many of the findings have to do with Huxley’s project of defending science: this project seems not to hang together with espousing agnosticism.¹¹⁰ We can situate recurrent worries that are thought to bear on philosophical value of agnosticism as follows: agnosticism poses two problems for Huxley who wanted to claim that scientific method is the only means of acquiring knowledge. Depending on scholars’ interpretation of agnosticism, the two problems are presented as criticisms or illustrated as its limitations.

The first problem has to do with agnosticism as an account of the limits of human knowledge. It is problematic, because this account left him with no way to show the reality of objective validity of axioms of science. Science has fundamental assumptions: for example, the uniformity of nature, causation, and the existence of an external world. These assumptions would seem to fall under the realm of our ignorance. Consider Type One interpretation: if we understand Huxley to base his account of the limits of knowledge on the notion of human condition restricted to phenomena, scholars have pointed out, he would not be able to show the reality or objective validity of the fundamental principles of science.¹¹¹ Huxley cannot claim that he can, because he would end up claiming to know something that cannot be known according to his own doctrine of metaphysical ignorance. Regarding this self-destructive aspect of Huxley’s endorsement of agnosticism, Lightman writes, “[a] philosophical justification of the axioms upon

¹⁰⁹ Barton 1983, 261.

¹¹⁰ Hutton 1895; Flint 1903; Paterson 1932; Ashforth 1969; Barton 1983; Lightman 1987; Levine 2014.

¹¹¹ Lightman 1987; Levine 2014.

which science must be based could not be undertaken by the agnostics if they restricted knowledge to the same degree as did Mansel.”¹¹²

Type Two (an application of scientific method) leads us to the same concern. If Huxley based his account of the limits of knowledge on the applicability of scientific method, again, he would not be able to show the reality or objective validity of axioms of science, because, in this case, these claims cannot be shown to be true by using scientific method, inference based on observations. One of his contemporaries rhetorically asked, soon after Huxley’s death, “How could Professor Huxley be an ‘Agnostic’ if he knew as much as that?”¹¹³ In short, agnosticism is relied on scientific method and it is supposed to be the only way of knowing, but, unfortunately, it cannot help Huxley; as have been said, scientific method cannot justify its fundamental principles.

Thus, regardless of whether Type One or Type Two is accepted, Huxley was undermining the grounds of science by proposing agnosticism. In this sense, his endorsing agnosticism is philosophically short-sighted given his larger project.¹¹⁴

The second problem troubling Huxley is that his agnosticism appears to prohibit him from doing what he did during his whole life – believing and claiming that science is the only

¹¹² Lightman 1987, 9.

¹¹³ Hutton 1895, 105. Hutton concluded that “he [Huxley] is the great Agnostic who has tried, and, as I hold, tried in vain, to regard physical science as the one sure guide of life, ...” (*ibid.*, 106).

¹¹⁴ Recently George Levine summarizes the issue and reports Turner’s reaction to his earlier thought as follows:

..., thanks to the work, among others, of Bernard Lightman and Frank Turner, historians and philosophers of science have recognized fundamental intellectual inconsistencies in the [Victorian scientific] naturalists’ program. Lightman has demonstrated the inherent contradictions in naturalist thought and its vulnerability to philosophically strenuous questioning of its metaphysical bases. Epistemologically, scientific naturalism seems not to have had a leg to stand on. Turner has talked of “the existential, intellectual, and moral bankruptcy of scientific naturalism,” echoing judgments made by many of the naturalists’ contemporaries. Nevertheless, some years ago when I cited the phrase at a conference Turner was attending, he blanched at his own rhetoric and asked, “Did I write that?” It is now, alas, too late to find out how he might have wanted to diminish the severity of the dismissal (2014, 80).

means of gaining knowledge. Agnosticism involves the idea that we should confess our ignorance about what we cannot know. Huxley criticized Victorian clerics because they claimed to know what they cannot know. However, to his critics, at the end of the day, the belief in axioms of science is on par with the belief in assumptions of theology.¹¹⁵ For example, Flint wrote, Huxley's agnosticism "was confined to beliefs not drawn from and confirmed by sense-perceptions, but was not hostile to such as were."¹¹⁶ Huxley's promotion and defense of science seem to suggest that he did not follow what his own agnosticism demands: question passed-down beliefs or confess ignorance. Huxley only vehemently pushed his enemies to "critically examine" their faith and further to admit their ignorance, while letting his allies hold and express faith (in science). If we understand Huxley's agnostic principle as Clifford's imperative, the situation gets worse, because the imperative regulates one's belief formation. Huxley should not even have said that he had faith in assumptions of science, because there seems not to be sufficient evidence to demonstrate them. Thus, Huxley has been seen as having double standards for his faith in science and against theological faith.¹¹⁷

The interpretations discussed in the previous section either generate the two problems or provide no solution to the problems.¹¹⁸ For this reason, Huxley's promoting agnosticism has been considered to have damaged his conviction in scientific method. Yet, as I will discuss shortly and many scholars have pointed out, it seems obvious that Huxley *used* agnosticism to promote his conception of science and to raise his social status, and his agnosticism did make

¹¹⁵ Balfour 1895; Ward [1899]1915; Flint 1903; Gilley and Loades 1981; Lightman 1987.

¹¹⁶ Flint 1903, 46.

¹¹⁷ For example, Flint 1903; Lightman 1987; Levine 2014.

¹¹⁸ This depends on the issue of how to understand agnosticism – whether Victorian scientific naturalism is ultimately constitutive of or independent of agnosticism. Thus sometimes the problems have been presented as criticisms of scientific naturalism or Victorian scientific naturalists' empiricism.

some contributions to his project. This has invited research on benefits that Huxley would have gained by endorsing agnosticism, or roles that his promoting agnosticism played. Turner's analysis on Victorian scientific naturalism has set up a concrete historical stage for such research: Victorian scientific naturalists' struggle with established Anglican authority over scientific community and society in general.¹¹⁹

According to Turner, Victorian scientific naturalists promoted their conception of science, with the belief that the method and results of science can solve social problems and lead to social progress. This promotion happened to involve a kind of class struggle. The scientific community was then under the control of clerical scientists or theologically accommodating scientists who "could and did directly influence evaluation of work, patronage of research, and appointments in scientific institutions, the universities, and the public schools."¹²⁰ Many of Victorian scientific naturalists, as mentioned, were from the middle class without Oxbridge background or "proper" religion. To secure their position as a scientist and to propagate their conception of science, Victorian scientific naturalists had to undermine social and political influence of the Anglican establishment.

If we approach Huxley's agnosticism as part of his larger project of promoting scientific naturalism, we can see some roles that agnosticism served for Huxley. First, take a look at Turner's own discussion.¹²¹ Turner's understanding of Huxley's agnosticism ultimately falls under Type Two: Huxley's agnosticism, the doctrine of metaphysical ignorance, was an application of the epistemological position that knowledge should be "verifiable by observable

¹¹⁹ Turner 1974; 1975.

¹²⁰ Turner 1978, 364.

¹²¹ Turner 1974; 1975. Turner's analysis is not just about Huxley. Turner is more interested in investigating Victorian scientific naturalism of which Huxley was one of leading protagonists.

empirical facts.”¹²² Victorian scientific naturalists “had chosen” the work of John Stuart Mill as the epistemological basis of science.¹²³ Applying the epistemological view to some theological matters and further promoting an ignorance stance toward such matters in the name of “agnosticism,” according to Turner, were a strategically useful move for Victorian scientific naturalists. Turner highlights three advantages. First, “any religious belief that could not be sustained by verifiable empirical facts became open game for the agnostic challenge”; second, “agnosticism was an instrument for clearing away certain metaphysical remnants in practical scientific research”; “[b]y asserting that men lacked sufficient knowledge to decide whether the universe was material or spiritual or whether it was ruled by a deity, the agnostics rejected a culture and cultural values that depended upon answers to such questions.”¹²⁴ Because of these advantages, their arguments for scientific enlightenment and against the dominance of Christian church could be convincing.

Turner’s understanding of Huxley’s agnosticism as “self-serving agnosticism” based on the agenda of Victorian scientific naturalists has been shared by many scholars.¹²⁵ Strictly speaking, the terms “scientific naturalism” and “agnosticism” do not convey the same idea, but many scholars, including Turner, use “scientific naturalists” and “agnostics” interchangeably because in general they are co-extensive. Ruth Barton says, “Behind the agnostic was a defender of naturalism”; Roy MacLeod views scientific naturalism as an “agnostic ideology”; Martin

¹²² Turner 1974, 19.

¹²³ *Ibid.*, 20.

¹²⁴ *Ibid.*, 21-2. When Turner makes the first point, he refers to Annan 1951 and Irvine 1968.

¹²⁵ *Ibid.*, 21. For example, MacLeod 1982; Barton 1983; Fichman 1997; Desmond 2001; Stanley 2011.

Fichman says, “Huxley was one of the first to see the polemical advantage of adapting agnosticism.”¹²⁶

Turner has identified contributions of agnosticism mainly by using the idea that Huxley used agnosticism *to undermine* the authority of his social and political enemies, clerics and theologically oriented scientists. While keeping the basic historical setting of Victorian scientific naturalists’ struggle for their cultural authority, other scholars have added or revised contributions of agnosticism to Huxley’s larger project of promoting science, by uncovering other roles.¹²⁷ For example, according to Adrian Desmond, Huxley’s agnosticism contributed to creating an image of scientific knowledge as neutral.¹²⁸ As seen, White’s account tells us that Huxley’s agnosticism functioned as a tool for “sociability.”¹²⁹ Lightman’s later study on Huxley’s agnosticism as a “Nonconformist Sect” shows how agnosticism furnished Huxley with a rationale for the nonconformists’ task of dismantling the established dominance of aristocratic Anglican church, which Huxley also shared.¹³⁰

To conclude, we can summarize the reception of Huxley’s endorsement of agnosticism as follows: it made contributions to his cultural project of promoting science, but it was not, philosophically speaking, a good move because of the two problems that he imposed upon himself. Agnosticism helped him to increase his voice for science, but it cannot help him to show

¹²⁶ MacLeod 1982, 3; Barton 1983, 279; Fichman 1997, 103.

¹²⁷ There has been growing concern over the simplicity of Turner’s framework – young middle class men of science competing with established clerics and theologians with aims to take over social and cultural authority; for example, it leads us to pay attention to conflicts, competitions, and divergence, and excludes or marginalizes other groups (see Lightman 2009; 2014; White 2014). This kind of concerns may be led by, or generate, different accounts of roles of Huxley’s endorsement of agnosticism, other than the role of attacking. Yet, the concerns involve characteristics of Huxley’s project of promoting science – say, belligerent, cooperative, or something else – rather than the existence of his project. Still, roles of Huxley’s endorsement of agnosticism have been explored within his larger project.

¹²⁸ Desmond 2001. Also Moore 1988; Fichman 1997.

¹²⁹ White 2003, 119.

¹³⁰ Lightman 2004, 198.

science as the only way to knowledge. This may not be a surprise, because Huxley basically repackaged a well-known notion in philosophy with a catchy new label.

2.4. Inclusive approach to Huxley's agnosticism

I take a different approach to Huxley's agnosticism. The main aim of this dissertation is to take all seemingly constitutive elements of agnosticism into consideration and to unearth his epistemological – not social – project behind. I believe that my interpretation of Huxley's agnosticism can resolve the two worries. This is because the worries involve elements of agnosticism: the first worry that concerns how to secure foundations of science is set up by the metaphysical ignorance doctrine; the second worry that concerns Huxley's faith in science is set up by the agnostic principle.

Taking an inclusive approach strikes me as a desideratum if we aim to understand *Huxley's* agnosticism as he intended, although many scholars have offered an account that focuses on only part of his discussions of agnosticism. If Huxley associated different ideas with agnosticism, associating itself would more illuminate Huxley's notion of agnosticism than does each idea associated. To understand “associating” – why Huxley put different ideas together under the same label, all the ideas should be taken into consideration.

There have been few attempts to make sense of Huxley's agnosticism in this way. An early attempt was made by David W. Dockrill.¹³¹ Dockrill admits that Huxley's discussions are confusing and misleading, yet argues that Huxley's agnosticism indeed consists of two elements: “the doctrine of the necessity of metaphysical ignorance” and “the acceptance of what Huxley

¹³¹ Dockrill 1964; 1971.

regarded as the method of scientific inquiry.”¹³² In order to understand Huxley’s connection of the two ideas of agnosticism, Dockrill suggests, we should look at Huxley’s essay on Descartes.¹³³ According to Dockrill, the essay shows that Descartes’s method of doubt, which is another representation of the agnostic principle, is the common root of the two ideas of agnosticism:

In epistemology, the method has led to the theory that man’s knowledge is limited to his own mental states and cannot reach to matters which lie outside them. Applied to physical science the method has given rise to the doctrine that all natural phenomena can be represented and understood in materialistic terms.¹³⁴

Dockrill’s account of Huxley’s rationale for combining the two ideas appears to be interesting, but he offers no further clear explanation. I will return to Dockrill’s account in next chapter. For the current purpose, it should suffice to note that Dockrill understands the doctrine of metaphysical ignorance and the acceptance of scientific method as the consequences of applying Descartes’s method of doubt.

As for another attempt, we have Matthew Stanley’s account found in his recent book, *Huxley’s Church and Maxwell’s Demon*, although its main concern is not Huxley’s agnosticism. Stanley suggests taking agnosticism “seriously as a philosophical stance that can provide insight into Huxley’s thinking about the *limits* of science.”¹³⁵ Stanley considers Lightman’s account of Huxley’s metaphysical ignorance doctrine to be “definitive,” and yet he further mobilizes the

¹³² Dockrill 1971, 463, 461.

¹³³ Thomas H. Huxley, *On Descartes’ “Discourse Touching the Method of Using One’s Reason Rightly and of Seeking Scientific Truth”* (1870).

¹³⁴ Dockrill 1971, 475.

¹³⁵ Stanley 2014b, 81, my emphasis.

notion of the limited human faculties to make sense of Huxley's association of agnosticism with the acceptance of scientific method.¹³⁶

According to Stanley, “[a]cknowledging [human] limitations,” rather than scientific method based on observation and experiment, was what Huxley meant when he spoke of agnosticism as the “essence of science, whether ancient or modern.”¹³⁷ The basic idea seems to be that Huxley drew various “limits” of human cognitive faculties from the thoughts of philosophers (Stanley introduces Locke, Hume, Kant, Hamilton and Mansel), and suggested that accepting all the limits is the “essence of science”: for example, “Locke’s warning against universal knowledge” is one of them.¹³⁸ The scope of limits even includes historical failure of human activities. Huxley’s discussion of the unproductivity of an inquiry with “spiritualistic” or non-materialistic terminology is understood by Stanley to show one of human limitations.

Acknowledging the limits involves taking certain attitudes, and, Stanley appears to suggest, these are expressed in Huxley’s umbrella principle, “agnostic principle.” For instance, Huxley’s warning against certainty taken from Locke implies “an obligation to always have one’s mind open for new evidence.”¹³⁹ Once we admit all the limits and put them together, we arrive at Huxley’s conception of science: “science should restrict itself to statements and ideas that were accessible to experimentation, quantification, provided for further investigation, and could be represented in materialist terms without complete allegiance to materialism.”¹⁴⁰ Huxley’s agnosticism is an account of *various* human limitations and the “agnostic sense of”

¹³⁶ *Ibid.*

¹³⁷ *Ibid.*, 83; Huxley 1884a, 5.

¹³⁸ Stanley 2014b, 82.

¹³⁹ *Ibid.*, 84.

¹⁴⁰ *Ibid.*, 87.

such limitations.¹⁴¹ The role of agnosticism for Huxley, then, was *to limit* scientific practice and thus Huxley could accuse some practice such as invoking God's direct intervention to explain phenomena of being unscientific.¹⁴²

As I said, I also take an inclusive approach to Huxley's agnosticism. However, I further suggest, we need to see that his agnosticism more concerns *knowledge* than belief, and what we *can* know than what we cannot know. I believe that the two philosophical difficulties ultimately stem from the understanding of Huxley's notion of agnosticism as an account of ignorance or limits. An account of "being ignorant" is not an account of "ignoring," and thus agnosticism as an account of ignorance hardly makes sense of his strong claim about science.

It is my view that his agnosticism concerns how we can move from "being ignorant" to "ignoring," and this is what Huxley intended to convey. His agnosticism, as I understand it, was a guide *to* knowledge consisting of an account of legitimate evidence and an ethics of knowing, which is supposed to work regardless of our ignorance. In following chapters, I examine whether there is a good reason to think that Huxley had a philosophical project behind his agnosticism, if he did, what it was, and how each idea associated with agnosticism works together. I hope to show that Huxley's agnosticism was a constructive position about how to attain knowledge, rather than an idle position about our ignorance.

¹⁴¹ *Ibid.*, 84.

¹⁴² This interpretation leaves the possibility of having knowledge by other means, such as revelation. Huxley argued not only that science should be naturalistic, but also that because only scientific method can supply society with knowledge, science, not theology, should have social and cultural authority.

CHAPTER 3

Huxley's Cartesian Project

This chapter discusses what I call “Huxley’s Cartesian project” which can be described as an epistemology of inquiry. Huxley found Descartes’s inquiry into certainty illuminating, because Descartes had left us ways to knowledge: two “paths” of idealism and materialism, and his maxim (only accept something clear and distinct as certain). By mobilizing the three elements all of which he associated with agnosticism, Huxley attempted to come up with a method for identifying knowledge that would work despite our ignorance or limits. However, Huxley understood and combined the three elements in his own way. This chapter focuses on the first two elements, “paths.” Huxley’s defense for his method for identifying knowledge and the discussion of the third element will be addressed in the following chapters.

The important points of this chapter are as follows. First, Huxley’s discussions of Descartes shed considerable lights on Huxley’s notion of agnosticism. Second, Huxley’s own way to a Cartesian guide to knowledge is an epistemological journey without devising and relying on a metaphysical or theological argument. Third, Descartes’s first path puts us in the situation where we cannot but select some mental contents as knowledge by which we construct our best understanding of nature; Descartes’s second path shows us that we can have mental contents that have explanatory value by understanding given phenomena in a materialistic-mechanistic way.

3.1. Dockrill's account of Huxley's agnosticism

In his 1971 essay, David W. Dockrill points out a widespread assumption in understanding of Huxley's agnosticism, and attempts to challenge it. According to Dockrill, Huxley indeed presented his agnosticism in two very different ways: first, agnosticism was presented as an account of metaphysical ignorance on the basis of the necessary limits of human faculties; second, agnosticism was presented as an account of metaphysical ignorance on the basis of the notion of scientific method as the only means of attaining knowledge. Since the two accounts are different account of human ignorance, commentators tend to assume that Huxley's agnosticism should be limited to either of the two accounts. Dockrill admits that Huxley's *mode of presentation* looks confusing, but, he argues, this does not have to show that he was inconsistent. Dockrill further admits that Huxley sometimes discussed only one of the two ideas, but, he explains, Huxley did so because of the context or topic of essays. According to Dockrill, Huxley's agnosticism is the "combination" of the two ideas, because they have the same origin.¹⁴³

Dockrill pays special attention to Huxley's lecture essay on Descartes's *Discourse*, because, as briefly noted in the previous chapter, he considered the essay to reveal the common root, Descartes's method of doubt. Dockrill's basic idea is that applying Descartes's method of doubt results in two ideas and Huxley later presented them as the two components of his agnosticism. On one hand, the method results in the thesis of the necessity of metaphysical and theological ignorance; on the other hand, the method results in the thesis of scientific method as the only means of attaining knowledge. Thus, Huxley's rationale for combining the two ideas

¹⁴³ Dockrill 1971, 474.

and labeling them with a single name is that they are consequences of employing the same method – Descartes’s method of doubt.

However, Dockrill offers no other clear illustrations on how Descartes’s method of doubt results in the two components. Instead, Dockrill introduces the following passage from Huxley:

In truth, Descartes’ physiology, like the modern physiology of which it anticipates the spirit, leads straight to Materialism, so far as that title is rightly applicable to the doctrine that we have no knowledge of any thinking substance, apart from extended substance; and that thought is as much a function of matter as motion is. Thus we arrive at the singular result that, of the two paths opened up to us in the “Discourse upon Method,” the one leads, by way of Berkeley and Hume, to Kant and Idealism; while the other leads, by way of De La Mettrie and Priestley, to modern physiology and Materialism. Our stem divides into two main branches, which grow in opposite ways, and bear flowers which look as different as they can well be. But each branch is sound and healthy and has as much life and vigour as the other.¹⁴⁴

Without further explanations, Dockrill concludes that “Huxley’s stress on the common methodological basis of his theories of science and knowledge” supports the claim that Huxley intended his agnosticism to mean both ideas.¹⁴⁵ This, according to Dockrill, undermines the widely shared assumption: “[t]he conflict between the accounts is not, despite appearances, between different claims about what agnostic doctrine is; rather it is a conflict between different ways of viewing this doctrine.”¹⁴⁶

Huxley’s passage does little to help us to understand Dockrill’s account of how Huxley arrived at his double sided agnosticism from Descartes’s method of doubt. Dockrill’s earlier work partially suggests what he has in mind: the application of the method of doubt led Huxley to the so-called *cogito* argument, just as it had led Descartes himself; the acceptance of the

¹⁴⁴ Huxley 1870c, 190; also cited in Dockrill 1971, 475.

¹⁴⁵ Dockrill 1971, 476.

¹⁴⁶ *Ibid.*, 477.

conclusion, *cogito ergo sum*, led Huxley to the doctrine of idealism that we can know nothing beyond phenomena, which would be in turn formulated as the first component of agnosticism that we cannot know metaphysical and theological matters.¹⁴⁷ This appears to be one aspect of Huxley's journey that Dockrill has in mind. Indeed, we can see Huxley discussing Descartes's *cogito* argument directly in this regard (I will return to this later).

On the other hand, Dockrill's second connection between Descartes's method of doubt and the idea of scientific method as the only way of attaining knowledge is less straightforward. Dockrill seems to rely on the fact that Huxley considered the method of doubt to be "the great first commandment of science."¹⁴⁸ Dockrill's idea seems to be that science which adopts a materialistic perspective can be said to be the practice of the method of doubt, and for this reason science is claimed to be the only way of attaining knowledge. However, in addition to an exposition of what it means for science to practice Descartes's method of doubt, a further explanation should be provided to see how practicing the method of doubt is related to adopting a materialistic perspective, and further to the claim that scientific method is the only way of attaining knowledge.

Apart from the lack of explanations, it is not clear whether Dockrill's account succeeds in resolving the scholars' worry concerning the two different accounts of human ignorance, which would have motivated the adoption of a partial approach to Huxley's agnosticism. Most commentators have not denied the fact that Huxley associated more than one idea with his agnosticism. Huxley's agnosticism should mean only one of the two ideas, because, as we have seen in the previous chapter, they are distinctive accounts and the tension can be generated by

¹⁴⁷ Dockrill 1964.

¹⁴⁸ Huxley 1870c; also cited in Dockrill 1971, 475.

holding the two accounts. We may grant Dockrill's claim that the two components of Huxley's agnosticism are the two results of applying Descartes's method of doubt, and yet we can still maintain that the two results put Huxley in trouble. Since 1971 when Dockrill's essay was published, the worry appears to have gained a bigger voice. Although Dockrill wrote that "Huxley's inconsistency is less serious than most of his critics have thought," it looks more serious than Dockrill thought.¹⁴⁹

Nevertheless, I also think, with Dockrill, that Huxley intended his agnosticism to include both ideas. Furthermore, I believe that Dockrill is correct in claiming that Huxley's essay on Descartes helps us to understand Huxley's notion of agnosticism. I share Dockrill's approach to Huxley's agnosticism, however, I do not accept his account.

My worry is that Dockrill's account does not adequately support the interpretation that Huxley's agnosticism is a combined thesis. To be sure, Dockrill states that Huxley's agnosticism is a "combination" of the two ideas and once uses the expression "integrally related parts of the one whole" to characterize them.¹⁵⁰ However, Dockrill's notion of combination amounts to sharing a common origin. Furthermore, his claim that Descartes's method of doubt was the common root cannot make sense of the following remark from Huxley: "Descartes' two paths meet at the summit of the mountain, though they set out on opposite sides of it."¹⁵¹ Pointing to Descartes's method of doubt as the common root of the ideas of Huxley's agnosticism can account for "diverging" but not for "meeting." We need to examine if "combining" played a greater role.

¹⁴⁹ Dockrill 1971, 477.

¹⁵⁰ *Ibid.*, 475.

¹⁵¹ Huxley 1870c, 194.

3.2. The importance of Huxley's discussions of Descartes

As Dockrill's literature review shows, Huxley's essays concerning Descartes have been neglected by the commentators most interested in Huxley's agnosticism.¹⁵² This is unfortunate because these essays shed considerable lights on the nature and structure of his agnosticism.

To be sure, Huxley did not mention the terms "agnostic" and "agnosticism" in his essay on Descartes's *Discourse*, which was published in 1870. Nonetheless, given that Huxley later stated that he had invented the term around 1869 and that, as mentioned in the previous chapter, Huxley had held the position from his earlier days without the label, it would be highly probably that Huxley had agnosticism in mind when he was writing the Descartes essay.

Even though Huxley held agnosticism in his earlier days, one might point out, this fact does not necessarily mean that Huxley's Descartes essay reflects his conception of agnosticism. However, as we will see soon, his Descartes essay reveals the structure underlying agnosticism, not just fragmentary ideas. I see this essay as his proposal for how he would like to reconstruct his agnosticism as a more or less unified position. We can regard the essay as a place where Huxley took an occasion to organize loosely related but separated thoughts.

Huxley started his essay on Descartes's *Discourse* by introducing a metaphor for "the intellectual filiation of mankind": instead of the metaphor of "one great chain," the "thoughts of

¹⁵² Dockrill 1971. Huxley discussed Descartes in more than one essay (*e.g.*, Huxley 1868a; 1878h; 1878d; 1881). Although Dockrill's paper was published in 1971, his conclusion still holds. Salvatore Vasta's 2012 paper would be one addition, because he discusses Huxley's philosophical project in the Descartes essays; he connects Huxley's Descartes essays not with agnosticism, but with his efforts to undermine Comtean positivism. Also, to be sure, Huxley has been sometimes mentioned by philosophers of mind and neuroscientists as a proponent of epiphenomenalism (about the mind-body problem), as a follower of Descartes who offered a physiological and chemical account of vital phenomena, or as the owner of the famous Aladdin lamp illustration about so-called "Hard Problem" (*e.g.*, Kim 2008; Block 2002; Gulick 2014). In this context, Huxley's essay on Descartes's *Discourse* and other related essays are often cited. However, most of them simply introduce Huxley's expression and his essays in passing without discussion. Notable exceptions are Dennett 1991, N. Campbell 2001, and Greenwood 2010.

men seem rather to be comparable to the leaves, flowers, and fruit upon the innumerable branches of a few great stems, fed by commingled and hidden roots.”¹⁵³ Then, he wrote:

It seems to me that the thinker who, more than any other, stands in the relation of such a stem towards the philosophy and the science of the modern world is René Descartes. I mean, that if you lay hold of any characteristic product of modern ways of thinking, either in the region of philosophy, or in that of science, you find the spirit of that thought, if not its form, to have been present in the mind of the great Frenchman.¹⁵⁴

What Huxley meant by “modern ways of thinking” are idealism and materialism. The modern way of thinking in philosophy is the adoption of the doctrine that we cannot go beyond phenomena, and the modern way of thinking in science is the adoption of a materialistic perspective. Huxley later claimed that the “two paths” to truth introduced in Descartes’s *Discourse* had led to the two modern ways of thinking.

One and the same person, Descartes, had exhibited the spirits of both ways of thinking. Since then, Huxley observed, “Our stem divides into two main branches, which grow in opposite ways, and bear flowers which look as different as they can well be.”¹⁵⁵ After Descartes, thinkers had taken only one of the two ways of thinking. As Huxley called them, they were either “metaphysical thinkers” or “physical thinkers.” Although branching had led to development of each way of thinking, the state of exclusiveness was not ideal to Huxley.

If a botanist found this state of things in a new plant, I imagine that he might be inclined to think that his tree was monœcious – that the flowers were of different sexes, and that, so far from setting up a barrier between the two branches of the tree,

¹⁵³ Huxley 1870c, 166.

¹⁵⁴ *Ibid.*, 167. This is the only occasion when Huxley spells “Réné.” Huxley sometimes misspelled a name. He was once accused of pretending to have read Mansel’s book, because he wrote “Mansell” (Huxley 1895a). I think that his misspelling should not be considered to indicate his unfamiliarity with authors whom he addressed.

¹⁵⁵ *Ibid.*, 190.

the only hope of fertility lay in bringing them together. I may be taking too much of a naturalist's view of the case, but I must confess that this is exactly my notion of what is to be done with metaphysics and physics. Their differences are complementary, not antagonistic; and thought will never be completely fruitful until the one unites with the other.¹⁵⁶

The way to fruition is to unite the two ways of thinking. That is why Huxley found Descartes worthy of attention, rather than others who had employed just one of the two ways of thinking.

Later in the essay, Huxley hinted at how to unite metaphysical and physical thinkers:

The reconciliation of physics and metaphysics lies in the acknowledgment of faults upon both sides; in the confession by physics that all the phænomena of Nature are, in their ultimate analysis, known to us only as facts of consciousness; in the admission by metaphysics, that the facts of consciousness are, practically, interpretable only by the methods and the formulæ of physics: and, finally, in the observance by both metaphysical and physical thinkers of Descartes' maxim – assent to no proposition the matter of which is not so clear and distinct that it cannot be doubted.¹⁵⁷

What physical thinkers need to confess seems to be related to the thesis of metaphysical and theological ignorance based on conditioned human faculties; what metaphysical thinkers need to admit seems to be related to the thesis of scientific method as the only way of attaining knowledge; finally, Descartes's maxim is the rule complied with by those whom Huxley regarded as past agnostic thinkers like Socrates. Given that the three items that Huxley picked up from Descartes look closely related to the three ideas underlying his agnosticism, it seems clear that

¹⁵⁶ *Ibid.*, 190-1.

¹⁵⁷ *Ibid.*, 194. The "faults" of metaphysical and physical thinkers were the reasons why Huxley refused to endorse the metaphysical versions of Idealism and Materialism. According to Huxley, "the Idealist, not content with declaring the truth that our knowledge is limited to facts of consciousness, affirms the wholly unprovable proposition that nothing exists beyond these and the substance of mind," whereas "the Materialist, holding by the truth that ... material phenomena are the causes of mental phenomena, asserts his unprovable dogma, that material phenomena and the substance of matter are the sole primary existences" (Huxley 1879a, 318; 1863c; 1868a).

our understanding of his agnosticism would benefit from an examination of why and how he mobilized the three Cartesian items.

Huxley appreciated Descartes not only because Descartes had introduced and followed two paths leading to the modern ways of thinking, but also because, as Huxley quoted Descartes, he “always had an intense desire to learn how to distinguish truth from falsehood in order to be clear about [his] actions, and to walk surefootedly in this life.”¹⁵⁸ To Huxley, Descartes sought for a method for identifying knowledge and did so to live; he was neither a dogmatist of traditional beliefs nor merely a destructive sceptic. Satisfying the “intense desire,” Huxley appears to have thought, has something to do with Descartes’s having two paths (and “maxim” which I will discuss later). Huxley, who also shared the desire, wished to have a guide to knowledge, by uniting the two modern ways of thought.

3.3. Two paths that Descartes opened

Before examining Huxley’s own way of using the two modern ways of thought, we need to look into his claim that Descartes’s *Discourse* shows the “spirits” of each of them. The plausibility of his interpretation of Descartes is not my concern. Huxley’s discussions can clarify components of his agnosticism and notions that he used to make claims about agnosticism, thereby preparing us to see how his guide to knowledge is supposed to work.

3.3.1. The first path: legitimate Idealism

First consider the modern way of thinking in philosophy. Huxley called it “legitimate Idealism,” according to which “whatever the universe may be, all we can know of it is the picture presented

¹⁵⁸ Cited in Huxley 1870c, 168.

to us by consciousness.”¹⁵⁹ Huxley claimed that the “ultimate issue” of Descartes’s *cogito* argument is the doctrine of legitimate Idealism.¹⁶⁰

Descartes had tried to find something certain in the sense of being indubitable, and thus he had exercised the so-called “method of doubt.” The basic idea is that if we cannot doubt something, we would be entitled to be certain about it. We can doubt a given belief, according to Descartes, if we can entertain the possibility that it is not true. Huxley illustrated this process as follows.

As the record of his [Descartes’s] progress tells us, he was obliged to confess that life is full of delusions; that authority may err; that testimony may be false or mistaken; that reason lands us in endless fallacies; that memory is often as little trustworthy as hope; that the evidence of the very senses may be misunderstood; that dreams are real as long as they last, and that what we call reality may be a long and restless dream. Nay, it is conceivable that some powerful and malicious being may find his pleasure in deluding us, and in making us believe the thing which is not, every moment of our lives. What, then, is certain?¹⁶¹

As is well known, Descartes eventually found one thing that he could not doubt: he was doubting. Doubting is one type of thinking, and this finding is applicable to any other types of thinking activity. Whatever we are thinking, we cannot deny that we are thinking. Thus, while thinking, we cannot doubt the existence of us thinking: *cogito ergo sum*.

According to Huxley, however, Descartes had not carried out the method of doubt thoroughly. When Descartes was arriving at “I am thinking, therefore I exist,” he should have pushed further. Huxley first pointed out that the term “therefore” plays no role in Descartes’s reasoning because what Descartes had found certain is the existence of a “thinking I.” Huxley

¹⁵⁹ *Ibid.*, 178.

¹⁶⁰ *Ibid.*, 176.

¹⁶¹ *Ibid.*, 172.

then claimed that Descartes's conclusion consists of three different theses: "something called I exists," "something called thought exists" and "the thought is the result of the action of I."¹⁶² According to Huxley, only the second thesis can pass the method of doubt. It would be an important issue in the literature on Descartes how "I" should be understood, but Huxley understood that Descartes's term "I" was supposed to refer to some entity governing thoughts ("masterful entity, the Ego"), something more than "I" being momentarily aware of itself thinking.¹⁶³ Huxley thought that the existence of such an entity can be doubted. Also, he claimed that we can entertain the possibility that thoughts are not the result of the action of such an entity. On the other hand, doubting that a thought exists proves the existence of a thought. Thus, according to Huxley, the method of doubt leads us to the conclusion that we cannot doubt the existence of thoughts.¹⁶⁴

What does it mean that we cannot doubt the existence of *thoughts*? According to Huxley, "Descartes uses 'thought' as the equivalent of our modern term 'consciousness.'"¹⁶⁵ It refers to mental phenomena or states of consciousness (regarding the latter expression, he added: "'Consciousnesses' would be a better name, but it is awkward").¹⁶⁶ Whatever we are aware of – thoughts, feelings, or sensations – is something that certainly exists. It cannot be doubted that the states of consciousness exist, because doubting itself is such a state.

¹⁶² *Ibid.*, 177.

¹⁶³ *Ibid.*; Huxley 1878h, 87.

¹⁶⁴ Huxley had made the same point earlier in his letter to Kingsley: "*Cogito, ergo sum* is to my mind a ridiculous piece of bad logic, all I can say at any time being 'Cogito.' The Latin form I hold to be preferable to the English 'I think,' because the latter asserts the existence of an Ego – about which the bundle of phenomena at present addressing you knows nothing" (1863c, 349).

¹⁶⁵ Huxley 1881, 359.

¹⁶⁶ Huxley 1878h, 87, n18; 1870a; 1870c; 1874a; 1880a.

Thus, the lesson of the revised argument of Descartes is, according to Huxley, that “a thought is existence.”¹⁶⁷ The conclusion that we cannot doubt that thoughts exist means that thoughts are “real and existent.”¹⁶⁸ To be sure, this does not mean that we can take the content of thoughts as *true*, as Huxley said, “thoughts may be delusive, but they cannot be fictitious.”¹⁶⁹

The lesson, Huxley conjectured, had been further developed into the doctrine that “existence is thought.”¹⁷⁰ Whatever we conceive as an existence or being takes a form of thought. When we say that a thing or property exists, what we can say with certainty is only that it exists as a state of consciousness, and our understanding of a thing or property comes from contents of thoughts. To turn “a thought is existence” into “existence is a thought,” one needs to show that nothing can be known to exist to us without being a thought. This is, according to Huxley, what George Berkeley tried to show when he argued that it is contradictory to talk about an unperceived being.¹⁷¹ Agreeing with Berkeley, Huxley also found it impossible for us to think of unperceived objects or properties. However, Huxley’s concern is entirely epistemological. Unlike Berkeley, he did not further claim that the state of consciousness is the *only* ontological mode that objects and qualities take because this is an extra point that overstates the epistemological point that all we can come to know is what appears to our consciousness; it cannot pass the method of doubt, and thus cannot be taken as certain. Huxley’s “legitimate Idealism” refers to an epistemologically understood idealism, not metaphysical idealism.

¹⁶⁷ Huxley 1870c, 172.

¹⁶⁸ *Ibid.*

¹⁶⁹ *Ibid.*

¹⁷⁰ *Ibid.*

¹⁷¹ Huxley 1871c.

As Huxley saw it, Descartes's *cogito* argument had been advanced to Berkeley's famous thesis that to exist is to be perceived. The advancement had gone further: if we highlight our capability or incapability implied in Berkeley's thesis, we would arrive at a Kantian idea that we are capable of knowing only what is experienced or the phenomenal.¹⁷²

Huxley's understanding of the modern way of thought in philosophy will help us later to understand the first component of his agnosticism more precisely. Huxley mentioned Kant, Hamilton, Mansel, and Spencer as those whom he thought had endorsed legitimate Idealism, but Descartes and Berkeley were those whom Huxley discussed to explain a way to the notion.

3.3.2. The second path: legitimate Materialism

The other path opened in Descartes's *Discourse* is what Huxley called "physical ways of thought." According to Huxley, physical thinking involves adopting a materialistic-mechanistic view that seeks to offer a causal or structural account in material terms. As Huxley noted, Descartes's predecessors and contemporaries had employed this way of thinking to physical phenomena. However, Descartes turned it into a "grand conception"; he "sought to resolve all the phenomena of the universe into matter and motion, or forces operating according to law."¹⁷³

Huxley also referred to Descartes's other essays where we can see a more detailed development of the materialistic-mechanistic view, but he thought that Descartes's discussion of blood circulation in *Discourse* sufficiently shows the view.

Huxley appears to have thought that the materialistic-mechanistic view comes in degrees, reflecting three component ideas. First, it involves accounting for a given phenomenon as a

¹⁷² Huxley 1878h.

¹⁷³ Huxley 1871c, 181.

physical operation or its outcome, with the idea that a materialistic-mechanistic account can do explanatory work. Second, it involves the notion of a materialistic-mechanistic account as a sufficient account. These first two points, as we will see later, partially constitute Huxley's reason for favoring physical thinking over non-physical thinking. Last, it involves commitment to its universal applicability. At this point, a materialistic-mechanistic view becomes a materialistic-mechanistic worldview. According to Huxley, Descartes should be considered more "modern" than William Harvey, because Harvey had only endorsed the first conception whereas Descartes also endorsed the second and a qualified version of the third.¹⁷⁴ In the following, I will illustrate each idea in turn.

Consider the first idea. Physical thinkers attempt to explain a given phenomenon in material terms and in a mechanical way. To offer a materialistic-mechanistic account is to consider a given phenomenon to be an operation that results from a particular arrangement of matter and motions. For example, according to Descartes (understood by Huxley), Harvey, known to discover the circulation of the blood, had offered a physical account of how the blood circulates in terms of valves, muscles, and contraction. The heart, the main organ responsible for the phenomenon, is seen as a physical-chemical machine. Seemingly holistic processes or parts are thought to be decomposable into a set of more basic motions and elementary physical units, and their combination or coordination instantiate a particular mechanism. To identify the correct mechanism among possible, imaginary mechanisms, numerous observations and dissections need to be done. These are what Harvey had done, and Descartes also did the same work.

According to Huxley, a materialistic-mechanistic account has explanatory value in the sense that it renders a given phenomenon intelligible. For Huxley, to explain or to make a thing

¹⁷⁴ Huxley 1871c; 1874a; 1881.

intelligible is to show a causal chain leading to a phenomenon expressed in an explanandum.¹⁷⁵ Here, showing a causal chain does not merely mean enumerating events in a temporal order; it also involves unpacking events in terms of relevant objects' properties and behaviors so that a particular series of events can be determined. For example, to explain the circulation of the blood, one may speak of a certain event, say, muscles squeezing the blood; but one may further show how such an event can happen by utilizing, say, properties and behaviors of the muscles, valves, and blood. In this way, events are concatenated in a certain way, and not in other ways. In this manner, Huxley argued, a mysterious and holistic phenomenon, the circulation of the blood, becomes "at once intelligible" as it is shown to be an invariant or determinate effect of a particular set of interrelated local events; the function and importance of the valves become "at once apparent."¹⁷⁶

Let's turn to the second idea. Huxley's physical thinkers also believe in the sufficiency of a mechanical account using material objects and properties. In other words, physical thinkers refuse to appeal to a special agent, essence, quality or organ that is usually assumed to be non-material and govern a *whole* process, which some people claim completes a materialistic-materialistic understanding of phenomena. This point is well illustrated in Huxley's discussion of the difference between Harvey and Descartes.

According to Huxley, the "founder of modern physiology" is Descartes, not Harvey.¹⁷⁷

Although Harvey had influenced Descartes and Descartes praised him in the *Discourse* (and moreover, as Huxley pointed out, Harvey was right and Descartes was wrong about the cause of

¹⁷⁵ Huxley 1880a. According to Huxley, "[a]nything is said to be explained as soon as we have discovered its cause, or the reason why it exists; the explanation is fuller, if we can find out the cause of that cause; and the further we can trace the chain of causes and effects, the more satisfactory is the explanation" (*Ibid.*, 7).

¹⁷⁶ Huxley 1878b, 335.

¹⁷⁷ Huxley 1881, 356; 1874a.

the blood circulation), Harvey belonged to the “ancient physiology” tradition. This is because Harvey invoked immaterial or animistic stuff to account for vital phenomena, as the ancient had done.¹⁷⁸ Huxley’s point concerns Harvey’s discussion of “innate heat.” It is a kind of vital power that is thought to reside in the blood, which Harvey invoked to explain why the heart circulates the blood at all. According to Huxley, Harvey conceived the blood as “the seat of a soul,” and, with its power, “maintains and fashions all parts of the body.”¹⁷⁹ What Huxley found “ancient” about Harvey is the idea that organs or local processes related to a vital activity need a soul or some special entity to operate. The invocation of non-materialistic entities or properties, according to Huxley, usually adds no explanatory value to a given causal account but simply exemplifies the “ingrained tendency of the human mind to suppose that a process is explained when it is ascribed to a power of which nothing is known except that it is the hypothetical agent of the process.”¹⁸⁰ In short, Huxley appears to conclude that Harvey did not regard the heart as an automatic machine although he thought that it is working like a machine.

On the other hand, Descartes clearly conceived of the heart as a machine. That is, Descartes considered a materialistic-mechanistic explanation to be sufficient. Huxley quoted Descartes to highlight his manner:

“I [Descartes] shall try to explain our whole bodily machinery in such a way that it will be no more necessary for us to suppose that the soul produces such movements as are not voluntary than it is to think that there is in a clock a soul which causes it to

¹⁷⁸ Huxley 1870c; 1874a; 1878b; 1881.

¹⁷⁹ Huxley 1881, 357.

¹⁸⁰ *Ibid.* However, this does not mean that Huxley underestimated Harvey. In his “William Harvey,” Huxley was at pains to show the significance of Harvey’s achievement and to clear away some misconceptions about him and his theory. Huxley was firm in his view that Harvey had made contribution to modern physiology because Harvey was the first person who took quantitative considerations into account (for example, “the comparison of the quantity of blood driven out of the heart, at each beat, with the total quantity of blood in the body”), but cannot be regarded as a modern physiologist (1878b, 335; 1878c).

show the hours.” These words of Descartes might be appropriately taken as a motto by the author of any modern treatise on physiology.¹⁸¹

According to Huxley, Descartes was, because of his strict dualism, “logically compelled to seek for the explanation of the phenomena of the material world within itself” where he saw “nothing but extension and motion.”¹⁸² At least in the case of behaviors of living things without a soul, materialistic-mechanistic accounts must suffice. This idea, Huxley suggested, had left modern physical science with the two options: “[i]t offers physical explanations of vital phenomena, or frankly confesses that it has none to offer.”¹⁸³

Lastly, Huxley’s conception of physical thinking involves an attitude of expanding a materialistic-mechanistic approach. According to Huxley, Descartes approached vital phenomena that had not been traditionally accounted for solely in material and mechanical terms, with the clear “conception that the physical universe, whether living or not living, is a mechanism, and that, as such, it is explicable on physical principles.”¹⁸⁴ However, Descartes did not expand his materialistic-mechanistic approach to mental phenomena. For Descartes, thoughts are the operation of a soul. In this sense, Huxley concluded, Descartes was not a fully physical thinker, although he did expand the scope of a materialistic-mechanistic approach to vital phenomena. Those whom Huxley regarded as the followers of Descartes’s second path had gone farther than Descartes. They had attempted to explain the operations of “thinking organ” in terms of matters and motions of a brain and other physical parts. Descartes had thought that animals are

¹⁸¹ Huxley 1881, 362. Huxley, however, noted that the analogy between a living body and a machine like a clock is not perfectly apt, because it can suggest that “there is a central source of power and the parts of the machine are merely passive distribution of that power” (*Ibid.*, 362-3; also, see 368-9).

¹⁸² *Ibid.*, 359.

¹⁸³ *Ibid.*, 358.

¹⁸⁴ Huxley 1878d, 205.

unconscious automata whereas human beings who have a soul are not thus automata; to Huxley, animals are *conscious* automata and human beings are one of them. The scope of physical thinking had been larger enough to lead to “a robust faith in the universal applicability of the principles laid down by Descartes.”¹⁸⁵

We have seen what Huxley meant to suggest by introducing the two paths, legitimate Idealism and legitimate Materialism, which he found in Descartes’s *Discourse*. However, I have not clearly identified how Huxley wanted to mobilized the two paths and why he thought that they should be structured in a guide to knowledge. Descartes would have his own reasons, but Huxley did not agree with all of his reasons. For example, Descartes’s metaphysical commitment to dualism did not persuade Huxley to apply physical thinking to vital phenomena. The following section discusses Huxley’s view of how the two paths can contribute to our search for knowledge.

3.4. Huxley’s reshaping of Descartes’s project

I have said that Huxley wanted to find a method for identifying knowledge. How did Huxley understand the notion of knowledge? Since he accepted Descartes’s two paths to knowledge, we may also expect that he would have adopted Descartes’s notion of knowledge, and indeed he did.¹⁸⁶ Descartes had understood knowledge in terms of certainty, which had been in turn understood in terms of the impossibility of doubting. Huxley adopted that notion of knowledge. This is also reflected in the fact that he spoke of certainty in most of the formulations of agnosticism or its principle.

¹⁸⁵ Huxley 1881, 371.

¹⁸⁶ Huxley 1870c; 1878h.

Yet, a further clarification is needed because the notion of being certain is ambiguous. It can mean a mental state (having no doubt) or a property of a proposition (being true). One issue that can arise immediately would concern a relation between them. To Huxley, our being certain of p is prior to p being certain in the sense that we reach the conclusion that p is certain from our being certain of p .¹⁸⁷ If we are in the state of having no doubt regarding the truth value of p , p is considered to be true, and we have knowledge.

However, we cannot freely switch from our feeling of certainty to our state of being certain. Sometimes we *feel* certain even though there are reasons that show we should not be certain. According to Huxley, to know p is to be certain of p , thus we need to make sure whether we are in the state of being certain or just feel certainty.¹⁸⁸ Phenomenologically speaking, it might be hard to distinguish between being certain and feeling certain. The notion of being certain should be understood normatively. It is one thing that we feel certainty and it is another thing that we deserve to feel certainty. If we want to find something certain, something that deserves the title of knowledge, we should not simply point to our feeling of certainty but justify it. In other words, being justified is the most important connotation of the concept of knowledge.

As we have seen, Huxley shared Descartes's concern: we need a guide that leads us to knowledge. Huxley also wanted a guide that basically has Descartes's two paths of Idealism and Materialism (and maxim). If so, then Huxley could have just embraced all of Descartes's claims. However, he did not. As we have seen, he did not accept Descartes's conclusion of the *cogito* argument (similarly, he dismissed Berkley's metaphysical idealism as well). As we will see, he did not think that a guide to knowledge needs to be supported by a theological argument that is

¹⁸⁷ Huxley 1878h; 1889e.

¹⁸⁸ Huxley 1878h; 1889e; 1889g.

supposed to assure us of the reliability of our faculties such as Descartes's argument from undecieving God.

Huxley's selective endorsement of Descartes (and other modern philosophers) means two things. First, Huxley would have needed to offer a different story for how the two paths of idealism and materialism are to be incorporated into a guide to knowledge, which I will illustrate soon. Second, Huxley seems to have thought that he could make a case for his guide to knowledge without constructing metaphysical or theological underpinnings. Descartes likened philosophy to a tree and metaphysics to its root that constitutes principles of knowledge.¹⁸⁹ For Huxley, as I introduced earlier, Descartes *himself* is a stem "fed by commingled and hidden roots," from which the branches of Idealism and Materialism have diverged.¹⁹⁰ Huxley wanted them to be commingled again. As he put it, the task is to "breed" the flowers of "monoecious" trees to produce "fruits." Huxley seems to have thought that *we*, not a metaphysical or theological system, do the breeding, and he could get our agreement on his guide to knowledge because his discussion is epistemological and based on something that we all can be certain about.

According to Huxley, if we employ the method of doubt, we would be able to arrive at irrefragable facts which Huxley labeled as "legitimate Idealism," which were introduced in the previous section.¹⁹¹ One of them is the revised conclusion of the *cogito* argument: the certain existence of the states of consciousness. In other words, what appear in consciousness – either propositional or non-propositional contents – are real and existent. For example, when I think of ice being cold, the mental content that ice is cold exists in my consciousness and I am not deluded about the content appearing in my consciousness; similarly, when I feel pain, the

¹⁸⁹ Descartes 1982 [1644].

¹⁹⁰ Huxley 1870c, 166.

¹⁹¹ Huxley 1886c.

sensation of pain exists in my consciousness and I am not deluded about the sensation appearing in my consciousness.

The other “irrefragable” fact is Berkeley’s thesis that to exist is to be perceived. To Huxley, Berkeley’s message is that all we come to know about existence ultimately comes from what consciousness shows us. We speak of objects such as marbles and their qualities like solidity, but our understanding of them is about how they appear to us. Huxley wrote that “whatever may, or may not, exist in the thing [marble], all that we can know of these qualities is a state of consciousness.”¹⁹² According to Huxley, Berkeley’s view can be best received as an epistemological effort to search for “the limits of our faculties,” which should not be carelessly dismissed by “stamping on the ground.”¹⁹³

These two “irrefragable” facts, Huxley urged, bear on the search for knowledge. First, because it is certain that the states of consciousness exist, if we make use of the states of consciousness, we can be assured that we are dealing with something real and existent (which may or may not be “delusive,” as Huxley said). On the other hand, the second fact tells us that the stream of consciousness is all we can have, because it denies the possibility that we can come to know something that does not take a form of the state of consciousness. Jointly, the two facts inform us that we cannot but make use of what appears to consciousness, but what we are about to make use of is something that certainly exists. To Huxley, our knowledge is “knowledge of states of consciousness.”¹⁹⁴

Incorporating the two irrefragable facts into the search for knowledge hints at how Huxley would like to proceed. One may take the certain existence of thoughts as the first thesis and want

¹⁹² Huxley 1870c, 175.

¹⁹³ Huxley 1871c, 251.

¹⁹⁴ Huxley 1870c, 176.

to examine what can be inferred from it. Valid reasoning will make us sure that its certainty is transmitted along with the reasoning. However, this is not the way that Huxley proceeded. What we learn is that *each* thought certainly exists. The “first thesis” tells us where to look to find more knowledge although such knowledge would not be certain in the highest degree.

As just implied, for Huxley, there are two kinds of knowledge: immediate and mediate knowledge.¹⁹⁵ What Huxley labeled as “immediate knowledge” or “intuitive knowledge” is about what happens in our consciousness. Immediate knowledge has two characteristics. First, because we cannot doubt our having a state of consciousness, this type of knowledge enjoys the highest degree of certainty, indubitability.¹⁹⁶ Second, this type of knowledge is known by virtue of being in a state of consciousness. In other words, we need not come up with some special method to have immediate knowledge.

A method for identifying knowledge, which Huxley wanted to find, is a method that we need to have what he called “mediate knowledge.” Immediate knowledge would take the form of, say, “It seems to me that the marble is round,” whereas mediate knowledge would take the form of “The marble is round.” We cannot, of course, simply claim that any mental content is mediate knowledge, and thus we need a criterion or method for distinguishing mediate knowledge from not mediate knowledge. According to Huxley, mediate knowledge, unlike immediate knowledge, is not certain in the sense of being impossible to doubt.¹⁹⁷ Instead, mediate knowledge is certain in lesser degree, in the sense of being implausible to doubt or having no reason to doubt.¹⁹⁸

¹⁹⁵ Huxley 1879a, 319, n 6.

¹⁹⁶ Huxley 1870c, 178. Huxley interchangeably used “indubitable” and “irrefragable” (1860d; 1862c; 1868a; 1871c, 279; 1874a; 1874b; 1878h; 1886c).

¹⁹⁷ Huxley 1870a; 1879a.

¹⁹⁸ Huxley’s notion that certainty comes in degree can be summarized as follows. If either we cannot doubt *p* or we have no reason or grounds for doubting *p*, we are justified to be certain of *p* and thus *p* deserves the title of either

Huxley loosened the notion of being beyond doubt to make room for less certainty that mediate knowledge would enjoy.

The motivation of Huxley's Cartesian project, then, can be re-illustrated as follows: we want to make use of contents of immediate knowledge to have mediate knowledge. Thus, he asked the following question: "now the question arises, whether any, and if so what, portion of these contents of the mind are to be termed 'knowledge?'"¹⁹⁹ Numerous and various thoughts appear in consciousness. It is certain that I am in the state of having, for example, the following mental contents: a benevolent god exists; a red elephant starts running when it sees the moon; my finger hurts; there must be a tree at the corner. Among all possible mental contents present to us, Huxley wanted to select mental contents that deserve the title of (mediate) knowledge (hereafter, "knowledge" will mean mediate knowledge unless otherwise noted).

How can we find such mental contents? One might try to single out mental contents that correctly capture reality. However, we have not been given any metaphysical or theological truth that can help us. Huxley did not welcome the suggestion because he did not think that there are metaphysical or theological facts that can pass the method of doubt with the highest standard. Furthermore, given the irrefragable fact about our limited condition, he did not think that we can come up with a way of identifying mental contents that convey a genuine description of something outside our consciousness or a god's plan. Instead, Huxley suggested looking for a way of identifying mental contents that convey a trustworthy connection of *mental states*.

To see what Huxley suggested, let's focus on the state of consciousness as a mental state. When we are in a state of consciousness, a particular mental content appears to us. We can speak

immediate knowledge or mediate knowledge. Accordingly, Huxley's method of doubt involves either checking the possibility of doubting *p* or checking the plausibility of doubting *p* by examining reasons to doubt *p*.

¹⁹⁹ Huxley 1878h, 85.

of a state of consciousness in terms of a mental content, but we can also talk about a state of consciousness as a mental state. Huxley drew attention to modes in which mental contents are present to consciousness by likening consciousness to a kaleidoscope. Mental contents appear and disappear in succession, and a stream of contents looks sometimes orderly and sometime disorderly.²⁰⁰ In other words, all possible mental contents are not present to us at once. Huxley thought, because the stream of mental contents makes up “our whole life” and we cannot go beyond the stream, it is good enough for us if we can make sure which mental state follows or accompanies with which mental state(s).²⁰¹ In a sense, Huxley aimed to find arrangements about mental streaming and looked for mental contents that capture such arrangements in a reliable and useful way to us. With this type of knowledge, Huxley stated, borrowing Descartes’s expression, “we are enabled ‘to walk surefootedly in this life.’”²⁰²

Huxley’s suggestion that we should aim for having mental contents that convey trustworthy arrangements of mental states, as opposed to those that convey correct representations of something outside consciousness, raises questions. One question would be whether mental contents that “merely” convey an arrangement of mental states indeed deserve to be considered “knowledge.” The following chapter addresses this issue. We need to see first how such mental contents can be identified according to Huxley.

For the task, it is necessary to organize the stream of mental contents. Huxley did not think that this is a strange idea. We have been, without much awareness and via unknown processes, sorting out mental contents by using concepts, and this is one type of organizing. For

²⁰⁰ Huxley 1878h.

²⁰¹ Huxley 1870c, 176.

²⁰² *Ibid.*, 178.

example, some contents are about what we call “self” and others are about “non-self.”²⁰³ To Huxley, self and non-self are hypothetical entities that play a certain explanatory or categorizing role. For instance, take the concept of self: self has been deemed to consist of corporeal and mental parts and to interact with non-self, as opposed to “ego” which is supposed to only mean the mental part of self.²⁰⁴ Another example relevant to the current section is the distinction between the material and the immaterial. Based on our notions of material object (matter) and immaterial object (spirit), we group mental contents into contents about the material and contents about the immaterial.²⁰⁵ Thus we have been saying, “All the phenomena of nature are either material or immaterial, physical or mental.”²⁰⁶

As the expression “the phenomena of nature” just quoted shows, a concept of nature is used. Huxley observed that people say that they live in nature and various things happen around them; they also say that mental contents are about nature. This, for Huxley, is another act of organizing mental contents. Organizing mental contents involves interpreting mental contents, that is, regarding them as information about something. We accommodate the stream of mental contents by situating a conscious agent or “thinking thing” within a cosmological framework and this kind of stage set is, according to Huxley, what people have called “nature” (or “universe” or “world”). Huxley’s metaphorical expression, “the shifting patterns of a kaleidoscope” becomes “the shifting scenes of the world’s stage” or “the shifting scenes of the phantasmagoria of Nature.”²⁰⁷ To organize mental contents, we use the minimal conception of nature as a framework

²⁰³ Huxley 1870c, 176; 1879a.

²⁰⁴ Huxley 1879a.

²⁰⁵ To Huxley, a material object is “[e]verything which occupies space, offers resistance, has weight, and transfers motion” and an immaterial object is everything that is not a material object (1880a, 92).

²⁰⁶ *Ibid.*, 94.

²⁰⁷ Huxley 1878h, 73; Huxley 1892c, 3.

accommodating consciousness, and fill nature with hypothetical, often loosely defined, concrete and abstract entities such as trees, water, material objects, self, non-self, etc. The specific layout and makeup of nature, according to Huxley, have been serious issues throughout human intellectual history among religious and philosophical thinkers.

Huxley conjectured that people had shared this way of understanding of nature, but there is one point to highlight regarding his minimal conception of nature. Conscious agents are cast to play both roles of “interpreters” of nature and of “actors” in nature.²⁰⁸ Huxley’s metaphor expands to illustrate how we should conceive ourselves: we are looking into a kaleidoscope; but also we have “got between the bits of glass of the kaleidoscope.”²⁰⁹

This point deserves attention because it can help us to see how Huxley saw the role of the concept of nature in his epistemological project. To proceed with an inquiry on what to count as knowledge, we organize mental contents while assuming that we are part of events in nature and objects in nature are responsible for our having mental contents. This assumption need not be shown to be true, because some mental contents will not be judged as knowledge *because of* their being correct descriptions of nature. If they were, one might justly claim that Huxley ended up following the suggestion he did not welcome by taking it for granted that, for example, we have mental contents and they represent nature. To Huxley, we conclude that some mental contents are correct descriptions of nature after judging them as knowledge. In next chapter, we will see his proposal for an internal way of determining knowledge. For now, it should suffice to note that the concept of nature is used to translate mental contents into objects or events in nature so that we can have a systematic understanding of nature.²¹⁰ That is to say, Huxley’s epistemological inquiry

²⁰⁸ Huxley 1887a, 81. This point has been neglected; an exception is Eng 1978.

²⁰⁹ Huxley 1887a, 74.

²¹⁰ Huxley 1880a.

concerns *not* a relation between a “real” nature and a phenomenal nature made up of our everyday mental contents, but a relation between such a familiar phenomenal nature and a constructed nature or what Huxley called a “new Nature” made up of trustworthy mental contents or knowledge.²¹¹

Descartes’s first path led Huxley to the task of identifying trustworthy mental contents among all possible mental contents. This task involves examining a given mental content to see if it organizes mental states in a reliable and useful way. At this point, we meet Descartes’s second path, physical thinking. We may organize mental contents in various ways, but physical thinking is the way to knowledge. Let’s return to the issue of how to organize mental contents to clarify what it means to adopt physical thinking.

As I introduced earlier, one manner of organizing mental contents is to re-illustrate them by using hypothetical entities comprising nature. We somehow connect mental contents with objects and their properties.²¹² For example, smelly yellowish pointy globular stuff presented in our consciousness may be described in terms of an object with particular properties, onion; spooky damp feeling may be stated as, say, the presence of a ghost; the benevolence of a god may be associated with the usefulness of eyes to animals. Of course, re-illustrations are also mental contents. The mental content that a ghost is hovering around me may be further linked with other mental contents: I have skipped meals; or I am paying my karma. We use hypothetical entities to translate given mental contents and we also have mental contents about them.

Another manner of organizing mental contents that concerned Huxley has to do with how to sequence mental contents, that is, how to arrange phenomena of nature when linking one to

²¹¹ Huxley 1887f, 51.

²¹² Huxley 1880a.

another. All phenomena of nature have been, for some reason, grouped by people repeatedly into material and immaterial phenomena with reference to two hypothetical entities, the material and the immaterial. This means to Huxley that we have been making sense of our phenomenal nature in two ways. We interpret some phenomena in terms of the operation of material objects or events, while regarding them as material phenomena; we interpret other phenomena in terms of the operation of immaterial objects or events, while regarding them as immaterial phenomena. This does not suggest, according to Huxley, that we should not mix-match two types of phenomena when arranging them. There is no barrier against it, because we deal with the same thing – contents appeared to our consciousness. The point of arranging phenomena is to get some systematic understanding of what-follows-what in the stream of our consciousness.

When we interpret and arrange phenomena, we can employ either physical thinking or non-physical thinking. We may want to link a given phenomenon to immaterial phenomena by understanding it as being produced by or correlated with the operation of an immaterial object. When, borrowing Huxley's example, we attempt to understand a phenomenon that water tends to flow in terms of an immaterial object, "aquosity," we are employing non-physical thinking.²¹³ Or, we may try the other way. We may attempt to link the phenomenon with material phenomena by understanding it as being produced by or being correlated with material objects. When we understand the behavior of water in terms of properties and structure of molecules, we are employing physical thinking.

Which way of thinking, then, should we adopt? Or, should we adopt both? According to Huxley, there is no correct way of thinking. Which to adopt between the two ways of thinking is not an issue that has been pre-determined by an alleged ontological truth which is called

²¹³ Huxley 1868a, 152.

“materialism” or “immaterialism.” Moreover, Huxley did not think that debating over which to adopt can be settled by a metaphysical inquiry. Rather, it is the matter of choosing “terminologies” or “one set of symbols,” which can be settled by taking into consideration the fittingness and effectiveness of adopting each in the light of users’ epistemic condition and aim.²¹⁴ A language and way of thinking are employed by human beings to organize mental contents and further to achieve a certain goal. There is no truer choice, but there could be a more rational choice.

Of course, Huxley preferred and argued for the thoroughgoing adoption of physical thinking, because he was interested in a way of thinking for a guide to knowledge, as opposed to a guide for, say, casual chats. When our concern is knowledge, it is better to use one way of thinking, because we cannot adopt both ways of thinking at the same time. If we deal with water tending to flow from a non-physical perspective, it means that we have given up taking the physical perspective. Thus, Huxley said, if “using one terminology, or one set of symbols, rather than another” turns out to be more conducive to our epistemic goal, “it is our clear duty to use the former.”²¹⁵

He recommended physical thinking.²¹⁶ As discussed, Huxley thought that physical thinking likely offers a definite causal and structural chain which makes an account explanatory. He found non-physical thinking incapable of offering a definite causal and structural chain; what spiritual thinkers usually do is attach an immaterial entity to a given (hard-won) physical chain and claim that it is a governor or beginner of a whole process. This kind of work can add no explanatory value, and thus Huxley concluded that physical thinking offers a sufficient

²¹⁴ *Ibid.*, 164.

²¹⁵ *Ibid.*

²¹⁶ Huxley 1854c; 1868a; 1878h.

account.²¹⁷ A guide to knowledge should promote a way of thinking that can render phenomena intelligible, and this is one reason why Huxley recommended physical thinking or material terminology; “the alternative, or spiritualistic, terminology,” Huxley said, “is utterly barren, and leads to nothing but obscurity and confusion of ideas.”²¹⁸ We are trying to identify knowledge to be used to construct a new Nature, and, although not all materialistic-mechanistic accounts turn out to be a trustworthy mental content (I have not discussed how Huxley determined a trustworthy mental content; it will be explained in next chapter), we should try to come up with a materialistic-mechanistic mental content so that our candidate for knowledge can have explanatory value.

Thus, Huxley insisted that he did not commit himself to materialism.²¹⁹ Interpreting phenomena in material terminology appears to adopt the doctrine of materialism, according to which all phenomena are resolved into matter and motion. However, when the doctrine is adopted as part of the package of physical thinking, it is not a true ontological statement about reality. It is rather a statement about what one will do: a physical thinker will view all phenomena in terms of phenomena of matter and motion. Huxley preferred the expression “material terminology” over “materialism” not just because he intended to keep distance from those who had taken the doctrine as an ontological truth; but also because expression “material terminology” reflects his instrumentalistic understanding of language as a tool to capture and fix an idea. To Huxley, for example, scientists’ “matter” is analogous to mathematicians’ “*x*,” and words used in an ordinary

²¹⁷ Huxley understood the “law of parcimony” [sic] in terms of explanatory value (1879a, 307). If two accounts do the same explanatory work, and one account has as its component an entity or event that makes no explanatory contribution, the “law of parsimony” guides us to favor the other account.

²¹⁸ Huxley 1868a, 164.

²¹⁹ *Ibid.*; 1894d.

life are no less symbolic.²²⁰ Huxley did not speak of “terminology” to disguise his ontological commitment to materialism; metaphysical materialism and material terminology do different works, and as we will see in Chapter 6, he thought that it is better not to endorse metaphysical materialism for the sake of science.

Huxley’s distinction between metaphysical materialism and material terminology can be also explained in terms of the difference between Huxley and Descartes in their push for the physical ways of thought. Huxley highlighted Descartes’s practice of physical thinking, but noted that Descartes had expanded his physical thinking to and only to vital phenomena because of his dualism. For Descartes, there is a metaphysical reason to study animals physically; animals are material objects without a soul and thus it would not make sense to adopt immaterial thinking to study them. Huxley could not find any metaphysical necessity that would compel us to study animals physically. Instead, Huxley had an epistemic reason to study animals physically: explanatory value understood in terms of offering a definite causal and structural account. What Huxley had for his guide to knowledge are only the two paths (in addition to Descartes’s maxim) and no other ontological commitment. Thus, he could say that he had methodological commitment to materialism, while denying metaphysical materialism.

Although Huxley thought that his guide to knowledge lacks any metaphysical commitment (including metaphysical materialism), as I briefly introduced, some might think that he would need some eventually. Can we claim to have epistemic value without grounding it on reality? Huxley would have to explain why some mental contents are knowledge and others are not, and how using physical thinking can get us something that deserves the title of knowledge. These issues will be addressed in the following chapter.

²²⁰ Huxley 1868a, 165; 1852; 1877b.

CHAPTER 4

Huxley's Epistemology: Memory, Verification, and Physical Thinking

As seen in the previous chapter, Huxley had an epistemological project of offering a guide to knowledge. I have described the project as “Cartesian,” because he shared Descartes’s aim and wanted to mobilize the three elements derived from Descartes: legitimate Idealism, legitimate Materialism, and Descartes’s maxim which I have not yet examined. Huxley thought that any guide to knowledge should embrace legitimate Idealism (we can have access only to mental contents), because it is an irrefragable fact obtained by the method of doubt and it delineates our epistemic condition. Huxley also wanted to endorse legitimate Materialism (a materialistic-mechanistic account is sufficiently explanatory and universally applicable), because physical thinking, unlike non-physical thinking, tends to offer an account that has explanatory value. The discussions of this chapter supply us with another reason: physical thinkers’ account can become a justified account by the way of verification, which he defended as the only proper method of justification. For those two epistemic reasons, physical thinking alone should be a constituent of a guide to knowledge.

Thus, Huxley’s second reason for favoring physical thinking over non-physical thinking hinges on his claim that the method of verification is the only proper method of justification, and this chapter reconstructs how he would have made a case for the claim. Huxley first attempted to establish the method of verification is *a* method of justification. Because of our epistemic situation, we should single out a particular group of mental contents that we may use as a model of knowledge, and an “anatomy of mind” would help us in this regard. According to Huxley, memory is such a group, and thus we may come up with a process by which we can make sure

that a given mental content takes the form of memory. This process is the method of verification, and we can use this process despite our uncertainty about what is outside of our consciousness. Huxley further showed that the method of verification is the only method of justification, by arguing that other methods cannot function properly as a method of justification. Finally, Huxley claimed that the method of verification works well with physical thinking, but not with non-physical thinking.

4.1. How to identify knowledge

Recall the irrefragable fact that the states of consciousness are only things that are given to us. This fact was fundamental to Huxley's epistemological project in the sense that every epistemologist should start with the fact. Also, recall that the goal of his project was to offer a guide to knowledge. Because he wanted a guide to knowledge, he needed to have a method for identifying knowledge among all possible thoughts or mental contents. However, because we can only rely on our "observation and reflections" about what is happening in our consciousness, Huxley tried not resort to other ways that are incompatible with the irrefragable situation of human beings. A kind of pattern or criterion can be internally seen if we carefully examine thoughts, as he could see a shared form from a messy pile of similar and dissimilar marine invertebrates.²²¹

Thus, Huxley found it necessary to categorize and examine thoughts, mental contents, based on similarities and dissimilarities among them and on nothing else. A philosophical purpose of conducting an analysis of mind is to understand characteristics of a model class of

²²¹ Mario A. di Gregorio, after examining Huxley's scientific works, notes as follows. "It should be already apparent that Huxley was consistent in method and approach throughout his career. The basis, despite changes of discipline and subject matter over the years, is always the detailed structural examination of specimens, leading to a classification on the basis of the affinities revealed" (1984, 115).

mental contents that has been considered to be trustworthy and further to come up with a method of justification, which will base his guide to knowledge. According to Huxley, as we will see shortly, memory is a class of mental contents that we may use as a model of knowledge; a structural characteristic of memory as a class can serve as an indicator of being knowledge. Thus, if we can come up with a process by which we can make sure that a given mental content has the characteristic of memory, we would have a method of justification (this process is the method of verification). Then, Huxley seems to have concluded, we will have obtained an epistemological tool that works within our limits and regardless of our ignorance of something external to our consciousness.

4.1.1. Huxley's *Hume*

The best place to see Huxley's analysis of mental contents and his reasoning behind it is *Hume* where he discussed Hume's and other modern philosophers' analysis of mind. There we can see Huxley explaining the purpose and necessity of examining mind: "it is obviously impossible to answer the question, What can we know? unless, in the first place, there is a clear understanding as to what is meant by knowledge," and this issue "cannot be approached without the examination of the contents of the mind; and the determination of how much of these contents may be called knowledge."²²² Also, *Hume* was the first place where the term "agnosticism" appeared in print. Huxley situated agnosticism within the tradition of critical modern philosophy which he thought Descartes had started. It seems beyond doubt that the book contains philosophical views and lines of reasoning that lay behind Huxley's agnosticism.

²²² Huxley 1878h, 58-9.

Huxley's *Hume* has not received sufficient attention from Huxley scholars. Apart from the reviews of his contemporaries, early scholarly biographical works have covered the essay to various extents: P. Chalmers Mitchell, Huston Peterson, William Irvine and Albert Ashforth discussed the essay; James A. Davis reproduced parts without much discussion; Cyril Bibby mentioned it in passing.²²³ Turning to rather recent scholars' works, the book has been barely mentioned in connection with his epistemology and agnosticism. For example, in the case of book-size works, *Hume* is not mentioned in Frank M. Turner 1974, Mario A. di Gregorio 1984, J. Vernon Jensen 1991, Adrian Desmond 1994 and Sherrie L. Lyons 1999. Desmond's later version of *Huxley* provides information regarding the publication of *Hume* with general comments such as that Huxley made Hume "the voice of Victorian Scientific agnosticism."²²⁴ Paradis discusses Huxley's view on innate ideas presented in *Hume*.²²⁵ Lightman comments with reference to *Hume* that Huxley tried to solve the difficulties of Humean epistemology by using a Kantian idea of the structure of mind and that Huxley denied the necessity of causal relations.²²⁶ Matthew Stanley's recent book, *Huxley's Church and Maxwell's Demon*, would be a notable exception in the sense that Huxley's *Hume* is one of Stanley's main texts as he cites it many times, yet his focus is not on Huxley's work on mind and its bearing on epistemology, but on introducing Huxley's views on law, miracle, will, and the nature of philosophy, which I consider to be grounded on Huxley's discussions of mind and language.²²⁷ In the case of article-size works on Huxley, Huxley's *Hume* is sometimes mentioned in passing or briefly introduced in a footnote:

²²³ Mitchell 1900; Davis 1907; Peterson 1932; Bibby 1959; Irvine 1968; Ashforth 1969.

²²⁴ Desmond 1997, 500.

²²⁵ Paradis 1978.

²²⁶ Lightman 1987.

²²⁷ Stanley 2014b.

Ellegård 1957, Dockrill 1971, Barton 1983, Block 1986, Smith 1998, Levine 1999, and Lyons 2010. The following works *use* some of Huxley's thoughts in *Hume* in connection to their subject matter: Stanley 1957, Blinderman 1966, Clausen 1976, Gilley and Loades 1981, Knight 1997, Campbell 2001 and Lightman 2002. On the other hand, within Hume scholarship, Huxley has been from time to time mentioned and discussed as an interesting interpreter of Hume's thoughts.²²⁸ Within Darwin scholarship, some of Huxley's thoughts in *Hume* are mentioned in regard to Hume's influence on Darwin (Huntley 1972) and Darwin's view on consciousness (Smith 1978).

In addition to its title, the fact that many parts of *Hume* address the topic of mind may prevent us from seeing its relevance to Huxley's agnosticism. Indeed, the book appears to be all about Hume and it starts with chapters on Hume's life and political and historical writings. Huxley's *Hume* does help us to understand Hume's thoughts on several issues, but it is not all about Hume. Huxley also introduced other philosophers' views, but more importantly, *Hume* is filled with Huxley's own views and reasoning. Huxley's contemporary philosopher James McCosh said "Professor Huxley has now in this work on Hume given his own philosophy."²²⁹ For instance, consider Huxley's discussion of mind, which is one of the main topics of this chapter. His discussion addresses in various degrees the classical modern philosophers' account of mind. We might expect Huxley to have examined their views separately and thoroughly, but he did not. For example, he brought in Spinoza, but only Spinoza's analysis of emotion, in connection with an elementary group of mental content. This kind of cherry-picked discussion might be seen as philosophically unprofessional, and scholars of each modern philosopher might

²²⁸ For example: Maidment 1939; Kemp Smith 1941; Flew 1959; Noxon 1964; Wright 1983; Pitson 1993; Fosl 1994; Russell 2008; McGrew 2014.

²²⁹ McCosh 1884, 43. Also Desmond 1997.

find it misleading. However, Huxley's aim was not to offer a complete exposition of these philosophers' positions. He presented their distinct views in the way we can arrive at the most plausible and up-to-date account of mind, which is, not surprisingly, the account endorsed by himself. It would be more correct to say that this book illustrates Huxley's thoughts by using philosophical issues that Hume was tackling. That is why Ashforth describes the book as "a kind of collaboration between Hume and Huxley."²³⁰ I cannot agree more. It appears that Huxley saw a development or even progress in modern philosophers' understanding of given issues, and his hidden aim was to incorporate and present his view by taking the opportunity of writing a volume on Hume for the series, *English Men of Letters*.²³¹

In the following, I introduce Huxley's analysis in detail, because this would put us in a better position to understand his well-known claim for verification as a testing process for putative knowledge. His conception of verification is grounded on his lesser known idea that knowledge should take the form of memory, which in turn owes its plausibility to his categorization and analysis of mental contents and to his selection of memory as a model class of trustworthy mental contents.

4.1.2. Anatomy of mind

Huxley reported that things that appear in consciousness had been termed differently, "thoughts" by Descartes, "ideas" by Locke, and "perceptions" by Hume. These different names, according to Huxley, refer to "certain events, facts, or phenomena (whichever name be preferred) which pass

²³⁰Ashforth 1969, 98.

²³¹ John Morley, editor of *English Men of Letters*, asked Huxley to write a volume on Hume (Huxley 1874c; 1878a). Huxley wrote to Morley that "Hume is frightfully tempting" and that Hume's *Inquiry* "touches all the problems which interest us most just now" (1874c, 149; 1878c). See also Desmond 1997, 497-500.

over the inward field of view in rapid and, as it may appear on careless inspection, in disorderly succession, like the shifting patterns of a kaleidoscope.”²³² This conception of the states of consciousness, Huxley said, is based on our observation, and “without any hypothetical admixture.”²³³ In this respect, Huxley found Hume’s terminology the most proper.

Huxley not only adopted Hume’s term “perception,” but he also embraced Hume’s general categorization of perceptions. I will explain Huxley’s view on the contents of the mind while highlighting characteristics of Hume’s categorization that Huxley seems to have found attractive. The following two questions can help us to see Huxley’s rationale underlying proposing of his own analysis of mental contents. First, why did Huxley accept some aspects of Hume’s categorization? Second, why and how did he revise others?

Past philosophers with whom Huxley acquainted himself also had offered a categorization of mind, but Huxley adopted Hume’s. Hume used two distinctions. First, perceptions are either impressions or ideas. Second, each class is grouped into simple and complex ones. Accordingly, there are four categories: simple impressions, complex impressions, simple ideas and complex ideas. Huxley found Hume’s categorization appropriate. For one thing, the two sets of distinctions seem to have been made without appealing to something other than states of consciousness, such as mental contents given by God or a distinction like Locke’s primary and secondary properties. For another, Hume had not simply taken our ordinary state of consciousness as a basic unit of mental contents, but he had attempted to identify what Huxley called “primary irresolvable” mental contents, as Huxley introduced Hume’s letter to Francis

²³² Huxley 1878h, 73.

²³³ *Ibid.*

Hutcheson where Hume had contrasted an anatomist's and a painter's approaches to the mind.²³⁴ These points will be illustrated more later on.

Consider the first distinction: perceptions are divided into impressions and ideas. Following Hume, Huxley took it for granted, based on our experience and reflection, that quite similar images or contents are present in consciousness but somehow differently. Hume had formulated the felt difference as the difference in vividness. The more vivid contents are impressions which we have when we sense or feel, and the less vivid or "faint" ones are ideas which we have when we recollect or think.

Huxley noted that Hume's criterion, the degree of vividness, had been criticized. Huxley added that there are occasions where the degree of vividness misleads one about whether a given perception is an idea or an impression: for example, a person who is undergoing visual afterimage may take, say, the idea of redness as a new impression of redness because of the vividness of the afterimage.²³⁵ Nevertheless, Huxley admitted that it is hard to find a better criterion than Hume's. For Huxley, the criterion of vividness has the advantage that it does not appeal to anything outside the states of consciousness, which are only things given to us as certain.

When Huxley stated that "the psychologist dissects mental phenomena into elementary states of consciousness, as the anatomist resolves limbs into tissues, and tissues into cells," he appears to have in mind Hume's distinction between impressions and ideas.²³⁶ Limbs are formed from tissues, and tissues from cells. This is supposed to correspond to an elementary-derivative relationship that Hume had proposed for impressions and ideas. According to Hume, ideas are "copied" from impressions, and this in turn accounts for the greater vividness of more elementary

²³⁴ *Ibid.*, 88; 71, n1.

²³⁵ *Ibid.*

²³⁶ *Ibid.*, 59.

perceptions relative to more derivative ones. Although Huxley was wary of Hume's illustration of the relationship between impression and idea as "copying" or "copied" and preferred instead "metamorphosis" from impressions to ideas, Hume had been, to Huxley, right in capturing an elementary-derivative relationship from the felt difference in vividness among similar perceptions.²³⁷ The important message regarding Hume's impression-idea distinction is that we can group mental contents into elementary mental contents ("impressions") and derivative mental contents ("ideas") by using vividness, without reference to their assumed origin. When grouping mental contents, we need not understand impressions in terms of, say, some interaction with objects that really exist outside.

Hume had used an additional distinction to sort out perceptions: simple and complex perceptions. When a perception can be broken into simpler perceptions, it is considered to be complex. For example, using Huxley's example, the perception of red is simple whereas the perception of a red circle is complex. This distinction is supposed to capture a single-composite relationship, and Huxley agreed with Hume that perceptions exhibit such a relationship. Huxley added that "[t]he one [anatomist] traces the development of complex organs from simple rudiments; the other [psychologist] follows the building up of complex conceptions out of simpler constituents of thought."²³⁸ Huxley was referring to a compositional relationship expressed in Hume's distinction between simple and complex perceptions.

²³⁷ *Ibid.*, 78, 88, 102. Some Hume scholars understand the copying relation to hold only between a *simple* impression and a *simple* idea, but not between a *complex* impression and a *complex* idea. Huxley seems either to disagree or to think that this issue does not stand as important. To Huxley, after all, Hume's so-called "copy principle" is a crude attempt to describe unknown processes generating one group of perceptions (idea) in connection with the other group of perceptions (impression). What is important about Hume's discussion of "copying" relation or principle, to Huxley, is the notion that an idea is derived or transformed from an impression. Thus Huxley appears to have reasoned that it is no risk to loosely say that a *complex* idea is a copy of a *complex* impression. Huxley stated that the idea of red rose is the copy of the impression of red rose, whereas the idea of blue rose is "not an actual copy of any complex impression though all its elements are such copies" (*Ibid.*, 76).

²³⁸ *Ibid.*, 59.

Now turn to the second question concerning Huxley's revision of Hume's categorization. Huxley was willing to adopt Hume's two distinctions to sort out perceptions, but it is another issue to determine what to count as an impression or idea and what to count as simple or complex. Huxley's revision involves the extension of each category. Huxley summarized Hume's categorization of impressions:

According to Hume, these [impressions] are of two kinds: either they are impressions of sensation, or they are impressions of reflection. The former are those afforded by the five senses, together with pleasure and pain. The latter are the passions or the emotions (which Hume employs as equivalent terms). Thus the elementary states of consciousness, the raw materials of knowledge, so to speak, are either sensations or emotions; and whatever we discover in the mind, beyond these elementary states of consciousness, results from the combinations and the metamorphoses which they undergo.²³⁹

Huxley moved on to point out that Hume had erred in failing to include a certain type of impression, namely perceptions of relations. They should have been regarded as elementary perceptions (*i.e.*, impressions), not derivative perceptions (*i.e.*, ideas).²⁴⁰ This revision is worth highlighting, given the concern regarding Hume's account, which Alan Richardson succinctly summarizes as follows: "a succession of impressions is not an impression of succession, so there seems to be nothing for the concept of succession to be the copy of."²⁴¹ As we will see in following discussions of this chapter, this inclusion of the impression of relation seems to have allowed Huxley to take steps that would not have been available for Hume.

²³⁹ *Ibid.*, 77-8.

²⁴⁰ Huxley also pointed out that Hume should *not* have counted "impressions of reflection" as impressions. Following Spinoza, Huxley claimed that emotions are complex perceptions containing the idea of pleasure or pain and other ideas (*Ibid.*, 78). The seeming complexity of a given perception does not show that the perception is an idea and thus should be excluded from the list of impression; yet, once we notice that a given perception looks complex not simple, we can proceed to examine whether its parts are derived ideas or elementary impressions.

²⁴¹ Richardson 2003, 59.

Huxley claimed that Hume had characterized the notion of relation in an inconsistent manner. According to Huxley, Hume's discussion makes it unclear whether a perception of relation results in, or results from, an association between two ideas. In some places and initially, Hume had characterized relations such as resemblance or cause-and-effect in terms of the "associating qualities" of an idea, which "attract" another idea; in other places, relations are complex ideas generated by an associating process.²⁴² Yet Hume had offered another characterization when discussing the relation of equality (a relation of quantity), which Huxley found the most adequate as an account of relation: it is a perception that arises when the mind compares two impressions. This characterization should have suggested to Hume himself that perceptions of relations belong to impression, elementary group of perceptions. However, even when entertaining the notion that relations are not attracting qualities but perceptions that emerge when two impressions are present, Huxley said, Hume had failed to count them as impressions.

Hume had regarded the perceptions of relations as ideas, but Huxley argued, they should be counted as impressions. This is because perceptions of relations also have the characteristics that had led Hume to think that sensations belong to the elementary group of perceptions, impression. A perception of a relation also, Huxley claimed, is describable as a perception of distinctive single quality and is not a derivative of some other perceptions. Thus, by the same reason, Hume should have concluded that relations are impressions, rather than ideas, qualities of an idea, or some kind of principle.

According to Huxley, there are four impressions of relation: perceptions of co-existence, succession, similarity, and dissimilarity. The impression of relation is different from the impression of sensation only in that at least two of the other impressions must be present, and

²⁴² Huxley 1878h, 83.

additional mental faculties such as remembering would be required. This does not mean that a perception of relation is derivative, like an idea which is a copied impression. If we stick to Hume's understanding of impression, nothing prevents us from calling, for example, the feeling of co-existence "impression of co-existence." Moreover, given Hume's thesis that all ideas are copied from impressions, if perceptions of relation are ideas, there must exist impressions of which the ideas are copies.²⁴³ In a sense, Huxley suggested, we may describe impressions of relation as "impressions of impressions" or "the sensations of an inner sense."²⁴⁴

Accordingly, Huxley revised Hume's category of impression.²⁴⁵ Huxley excluded impression of reflections and instead added impressions of relations.²⁴⁶ For Huxley, the contents of mind consist of an elementary group of perceptions, termed "impressions," and a derivative group of perceptions, termed "ideas." All the perceptions are either impressions or ultimately resolved to impressions.

²⁴³ *Ibid.*

²⁴⁴ *Ibid.*, 82.

²⁴⁵ Huxley's revision is as follows (the list as appeared in Huxley 1878h, 85):

- A. IMPRESSIONS.
 - A. Sensations of
 - a. Smell.
 - b. Taste.
 - c. Hearing.
 - d. Sight
 - e. Touch.
 - f. Resistance (the muscular sense).
 - B. Pleasure and Pain.
 - C. Relations.
 - a. Co-existence.
 - b. Succession.
 - c. Similarity and dissimilarity.
- B. IDEAS.
 - Copies, or reproductions in memory, of the foregoing.

According to Huxley, Hume had not included resistance as a kind of sensory impression. Huxley did not think that Hume's omission is a serious mistake because it was not known in Hume's days.

²⁴⁶ See footnote 240 for why Huxley excluded reflections from an elementary group of perceptions.

The categorization of perceptions by itself does not tell us what to single out as trustworthy perceptions that we may use as a model of knowledge. Let me highlight once more the purpose of this sorting out work. Huxley was probably interested in learning about how mind exactly works and how mind comes to have a perception, but this kind of proto-scientific or metaphysical inquiry can be set aside. For an epistemological inquiry, an “anatomy” of mind is necessary. However, Huxley categorized perceptions not because he wanted to conclude that impression as an elementary unit should be correct information of a world external to consciousness and thus impressions have epistemic value. The categorization of perceptions and the two criteria used for the categorization would be instructive when we examine distinctive characteristics of a certain type of perception that has been more or less trusted. If we determine its distinctive characteristics by comparing and contrasting it with other types, we can examine epistemic value of such characteristics and further we may be able to use them to formulate a methodical process for identifying trustworthy perceptions, which would work independently from our ordinary trust or distrust in particular perceptions.

In this regard, according to Huxley, memory is a type of perception that deserves our attention.

4.1.3. Memory

Memory is one group of complex ideas. Hume had grouped all complex ideas into two, memory and imagination. Huxley introduced Hume’s two criteria for the division, and dismissed one of them, the degree of vividness. This criterion works well enough for distinguishing impressions and ideas, but does not work well in this case, because, Huxley reasoned, many memories are not vivid and some imaginations are not faint. Huxley however agreed to the other criterion. Some

complex ideas retain the arrangement of a complex impression and others do not; the former group is what we call “memories” and the latter group is what we call “imagination.” This difference, Huxley explained, amounts to the presence or absence of the idea that a corresponding complex impression existed, which captures our feeling of happening or occurrence when we were perceiving a complex impression. Hume had viewed the group that lacks the idea as a single type, and labeled all its members “imagination.”

However, Huxley pointed out, Hume should have divided the latter group into two kinds, imagination and expectation. Expectations, Huxley wrote, “differ from simple imaginations in being associated with the idea of the existence of corresponding impressions, in the future, just as memories contain the idea of the existence of the corresponding impressions in the past.”²⁴⁷ If, as Hume appears to have suggested, we have a reason to distinguish some complex ideas by utilizing the presence of the idea that its corresponding complex impression existed in past, then we are also given a reason to utilize the presence of the idea that its corresponding complex impression will exist in future. Thus, to Huxley, a complex idea is one of three kinds: memory, expectation, and imagination.

One might think that memories are not perceptions about generalized objects and events, and thus memory is not a class of perceptions worthy of attention for our task of determining a model of knowledge. However, Huxley disagreed. If we look into the stock of perceptions, Huxley said, we could see that we indeed have both specific and generic memories. A memory about a particular object or event is “specific” because its complex idea is derived from a *single*

²⁴⁷ Huxley 1878h, 110.

complex impression about a particular object or event.²⁴⁸ There is also another type of memory: a complex idea that is *not* derived from a *single* complex impression.

When several, more or less different, complex impressions are present in consciousness, a complex idea is consequently formed (by unknown processes). This type of complex idea is a generic idea, not a specific idea derived from one of complex impressions. Huxley illustrated how a generic idea might be generated to explain the conception of generic memory.

This mental operation may be rendered comprehensible by considering what takes place in the formation of compound photographs – when the images of the faces of six sitters, for example, are each received on the same photographic plate, for a sixth of the time requisite to take one portrait. The final result is that all those points in which the six faces agree are brought out strongly, while all those in which they differ are left vague; and thus what may be termed a generic portrait of the six, in contradistinction to a specific portrait of any one, is produced.²⁴⁹

What Huxley meant by “compound photograph” is corresponding to Francis Galton’s “composite portrait,” a kind of blended photograph produced by superimposing several photographs of individuals, which Galton made to see an “average” face of a certain group of people, such as criminals.²⁵⁰ As images are superimposed, Huxley conjectured, we form an idea representing a “general image” (which does not take a linguistic form like a general proposition), different from

²⁴⁸ *Ibid.*, 112.

²⁴⁹ *Ibid.*, 111.

²⁵⁰ Galton 1878, 97. Huxley did not mention Francis Galton in *Hume* which was written and printed during the latter half of 1878, but Huxley was probably aware of Galton’s work on composite portraits, because Galton had introduced his work in his presidential address in the previous year and also in *Nature* in early 1878 (Galton 1878; Huxley 1878e; 1878f; 1878g). Yet, in a later essay, Galton mentioned Huxley and wrote the following: “Professor Huxley, from whom I have borrowed the apt phrase [“generic image”], has expressed himself to a similar effect in his recent *Life of Hume*, ...” and “he [Huxley] has, quite independently of myself, adopted a view which I also entertained, and had hinted at in my first description of composite portraiture, though there was not occasion at that time to write more explicitly about it” (1879, 164).

all of specific “superimposed” perceptions. Huxley considered many of what people have commonly labeled as “abstract or general ideas” to be generic ideas.²⁵¹

Huxley provided several examples to persuade readers. One example is worth noting.

An anatomist who occupies himself intently with the examination of several specimens of some new kind of animal, in course of time acquires so vivid a conception of its form and structure, that the idea may take visible shape and become a sort of waking dream. But the figure which thus presents itself is generic, not specific. It is no copy of any one specimen, but, more or less, a mean of the series.²⁵²

Huxley, versed anatomist, regarded a biological type as a generic idea. di Gregorio, whose research focus is Huxley’s zoological works, notes that Huxley aimed for a conception of type that has “a purely empirical meaning,” but as for the product, di Gregorio concedes, “[o]ne might venture to say that here Huxley is either a bad Platonist or a bad empiricist – or both.”²⁵³

Huxley’s conception of generic idea may look less strange if his claim is taken into consideration that the formation of a generic idea does not require using a language or conscious efforts, especially in the case of a generic idea of sensible objects as opposed to abstract objects. He argued that babies and some animals undergo the same process. This is hard to deny, he said, given behavioral and anatomical similarities. They are equipped with organs that can perform basically the same function, and they exhibit behaviors that appear to be acted upon by “abstract” or “general” ideas. His point is that such memories are generic ideas that are not expressed in a statement of generalization. A baby cannot formulate the sentence that a sugarplum is sweet, but

²⁵¹ Huxley 1878h, 112.

²⁵² *Ibid.*, 113.

²⁵³ di Gregorio 1984, 33-4.

the sentence is “merely the verbal expression.”²⁵⁴ When she is trying to grab a sugarplum on the table, Huxley said, she is acting upon a generic memory.²⁵⁵

Once a generic memory is formed, its corresponding expectation follows. The object of a memory, the part of a complex idea, is turned to the object of an expectation. A partial complex idea, say, that a candy being coexistent with sweetness, remains but it is now combined with the idea of the future existence of the corresponding impression instead of the past existence of that impression. If the impression of sweetness follows after eating a candy and this happens repeatedly, according to Huxley, we cannot *think of* candy without *thinking of* sweetness. In this way, we form a corresponding expectation. A point to note here is that for Huxley, the memory that *a candy was sweet* and the expectation that *a candy will be sweet* share the same component that *a candy is co-existent with sweetness*. To see whether a given memory is a correct memory, we sometimes recall what happened in the past, but if we are dealing with a generic memory, we can instead check on its corresponding expectation.

4.1.4. Memory as a model of knowledge

According to Huxley, we generally trust, both consciously and unconsciously, our memories in daily lives. As Huxley understood it, believing is basically remembering. When we distinguish “true” beliefs from “false” beliefs, we are separating memories from imaginations. We value and treat expectation and imagination differently, and this also reflects our trust in memories.

²⁵⁴ Huxley 1878h, 114.

²⁵⁵ Elsewhere Huxley also wrote: “No child has recourse to imaginary personifications in order to account for the ordinary properties of objects which are not alive, or do not represent living things. It does not imagine that the taste of sugar is brought about by a god of sweetness, or that a spirit of jumping causes a ball to bound” (1869c, 319).

Given that memory is our best candidate as a group of perceptions that we trust among all groups of perceptions, we may move on to argue that all memories that people claim to have are therefore knowledge. This is not Huxley's move, however. Our ordinary memories or beliefs about a phenomenal nature do enjoy our trust in general, but they tend to be imprecise and ambiguous (I will return to similarities and differences between ordinary reasoning and scientific reasoning in Chapter 6). As explained in the previous chapter, Huxley wanted to construct a new Nature out of such a familiar and everyday phenomenal nature; this was the reason why he found it necessary to come up with a method for identifying knowledge among all possible perceptions.

In other words, in Huxley's epistemology, memory as such is a *model* of trustworthy perception. For any perception to be considered knowledge, it is shown that a given perception takes the form of memory. Accordingly, Huxley highlighted the structural difference of memory from expectation and imagination: only memory has the idea that a complex impression, corresponding to what is remembered, existed in the past. This essential component would illuminate why we tend to trust memories and further form and trust expectations based on memories. This information, Huxley thought, should guide us when we attempt to formulate a justificatory method for identifying knowledge.

What is special about the essential component of memory? We have an idea of the past existence of corresponding impressions when we perceived a set of impressions of sense, relation, pain and/or pleasure in the past (for now, let's ignore the case of a false memory). To be sure, all the parts of an imagination are resolved into impressions. For any imagination, say, consisting of three ideas, *A*, *B* and *C*, there are supposed to be "originals," corresponding impressions, *a*, *b*, and *c*. Thus, the fact that all contents of a given perception can be ultimately traced back to impressions does not differentiate memory from imagination. The imagination has

been formed without the experience of perceiving *a*, *b*, and *c altogether*. That is to say, we experience some arrangements of impressions but we do not experience others. For example, using Huxley's example, we come to get the information that we are having the impressions of "sugarplum," "sweetness," and "co-existence" together, which would be later featured in a memory as the part that the complex impression appeared to us in the past.

Huxley appears to have found the essential component of memory epistemically valuable in two respects. On one hand, the component seems to have rendered memories credible to us, by supplying us with the feeling of happening. If a perception is accompanied with such feeling, we may have a reason to be certain about the perception. The essential component may be well used in our justificatory method for identifying *trustworthy* perceptions.

On the other hand, this essential component can well function for our *justificatory* method for identifying trustworthy perceptions. Huxley's discussions of memory so far and his examination of other methods which will be introduced in the following sections suggest that he appears to have found two kinds of merit. First, the essential component of memory supplies us with information on a particular *arrangement* of impressions, not simply information on each impression. That is, the idea of the past existence of a certain arrangement, in a sense, picks out to us which arrangement of ideas to trust. For example, we have the memory that candies were sweet, not that candies were bitter. Just as the result of a so-called "critical experiment" tells us which hypothesis to prefer, the essential component of memory tells us which complex idea to prefer. One merit of the essential component is that it can function as a differentiator.

The essential component of memory has another merit. By virtue of the component, we can check a dubious memory, by try having another memory of the same kind. If one claims that an unsupported object soars high based on a memory, we can examine its corresponding

expectation by checking whether the complex impression of an unsupported object soaring high will exist. If we cannot have the impression, the person's perception would turn out to be an imagination, not a memory. This process can be done because we can experience again a complex impression of the same generic memory. When we are not certain and want to determine if an unsupported object falls to the ground, we can put ourselves in the mental state of perceiving an unsupported object and wait and see what appears in our consciousness; in short, we can let go of an object again. The other merit of the essential component of memory is that it allows us to test a given complex idea.

Because of the epistemic value of the essential component of memory, memory deserves special attention as a model of knowledge. Huxley's suggestion is that we can use experiencing an arrangement of *impressions* when we want to check whether a given arrangement of *ideas* is trustworthy or not. Thus, to determine whether a given complex idea is knowledge or not, we need to figure out how we can have a corresponding or relevant complex impression.

Some might doubt: we want to have a method for identifying knowledge, because we want to determine whether or not, say, a sugarplum *is* sweet, not because we want to determine whether or not we have ever perceived "sugarplum," "sweetness," and "co-existence" together. However, according to Huxley, having a complex impression is a fitting criterion given our epistemic situation and aim. We have acquaintance with nothing but what appears in our consciousness, and what we need to do is to distinguish trustworthy complex ideas from non-trustworthy ones. Here, a complex idea is, in the end, a perception. A trustworthy complex idea is just a particular perception; its arrangement has appeared to us as an arrangement of impressions. We cannot and need not know, for example, if an idea that an unsupported object falls to the ground really reflects reality. Instead, it should suffice for us if we can be certain about a

particular sequence of mental states: for example, the *mental content* of an unsupported object *is followed* in our consciousness by the *mental contents* of succession and the object falling to the ground. This is the context in which epistemic value should be found and appreciated. According to Huxley, in addition to “our trust in representation of consciousness,” nothing more is needed to be pursued as our epistemic aim and nothing more can be achieved due to our condition.²⁵⁶

The notion that experiencing a complex impression is epistemically valuable can illuminate why Huxley considered observations and experiments to be essential to science. The point of that kind of activity is to put ourselves in a certain situation or condition so that we can learn which particular arrangement of impressions appears and whether a series of impressions under discussion indeed appears. To Huxley, a hypothesis is a supposition about what we would observe.²⁵⁷ It is, thus, a necessary task to identify what it means or involves to observe a given (rather theoretical) hypothesis and to formulate a plan on how to make ourselves observe it.²⁵⁸ In other words, these are efforts to turn an expectation into a memory.

Huxley used his discussions of mind to explain the notion of verification, and we can see that he attempted to understand the method of justification in terms of ordinary mental processes.

The process of strengthening generic memories of succession, and, at the same time, intensifying expectations of succession, is what is commonly called *verification*. The impression B has frequently been observed to follow the impression A. The association thus produced is represented as the memory, $A \rightarrow B$. When the impression A appears again, the idea of B follows, associated with that of the immediate appearance of the impression B. If the impression B does appear, the expectation is said to be verified; while the memory $A \rightarrow B$ is strengthened, and

²⁵⁶ Huxley 1870c, 178.

²⁵⁷ Huxley 1880a. Huxley’s conception of scientific method will be more explained in Chapter 6.

²⁵⁸ It is well known that Huxley had disputes with Darwin over experimental proof of Darwin’s theory of natural selection. I will return to this issue in Chapter 5.

gives rise in turn to a stronger expectation. And repeated verification may render that expectation so strong that its non-verification is inconceivable.²⁵⁹

As explained here, if the impression *B*, say, sweetness, follows, it is said that the expectation is verified, not just met. This highlights that verification works on a link between mental states, as opposed to a relation between expressed contents. To check whether a candy is sweet or not is to check whether *we eat* a candy *with or without tasting* sweetness. Repeated verification means that a given arrangement of mental contents has appeared in consciousness repeatedly, but it also has a consequence of making the arrangement inseparable by making the arrangement unbreakable in our consciousness. When we say that the concept of candy is not separable from the concept of sweetness, it means to Huxley that we cannot think of a candy without thinking of sweetness. According to Huxley, (some of) what people call “laws of nature” are generic memories that have been always verified and thus are expected to be always verified, although they tend to consider a law of nature to denote “a thing” that is “endowed with certain powers,” not a careful statement of an arrangement of ideas.²⁶⁰

To summarize, a memory is usually accompanied with an idea of occurrence, picking out an arrangement of ideas, which can be tested and strengthened. These characteristics, I believe, constitute the reason why Huxley thought that memory is a type of perception that deserves epistemological attention and that memories, as such, have default credibility.²⁶¹ Experiencing an arrangement of impressions is epistemically valuable to us, not because it supplies us with sundry “building blocks”; rather it supplies us with building blocks as a set or series, and strengthens or

²⁵⁹ Huxley 1878h, 120, his italics.

²⁶⁰ Huxley 1887a, 74; 1870a; 1878h; 1880a. As for another example, Huxley wrote: “*Calling* our often verified experience a ‘law of nature’ adds nothing to its value, nor in the slightest degree increases any probability that it will be verified again, which may arise out of the fact of its frequent verification” (1878h, 155, my emphasis). Huxley’s conception of law of nature will be discussed in Chapter 6.

²⁶¹ Huxley 1870a.

weakens a set or series of mental contents. What we need to do with the lesson is not to conclude that any claimed memory deserves the title of knowledge, but to come up with a procedure by which we can make sure that a perception at issue is memory – the method of verification.

4.2. Huxley's defense of the method of verification

Huxley's suggestion for a method for identifying knowledge among all possible thoughts is to test a given derivative thought (idea) against a series of elementary thoughts (impressions) by trying to have an experience of a series of elementary thoughts, that is, by conducting the process of verification. According to Huxley, the method of verification is the *only* method of justification that is available to us. How did Huxley show that?

Huxley's strategy can be described as reduction and elimination. On one hand, Huxley discussed what he regarded as philosophers' traditional method. Huxley argued that their search for necessary truths amounts to finding out repeatedly verified propositions. On the other hand, Huxley discussed religious thinkers' notion that faith yields knowledge. According to Huxley, their appeal to faith cannot be considered to be a legitimate justificatory process because it is arbitrary and often produces contradictory conclusions. These points will be discussed in detail.

4.2.1. Metaphysicians' appeal to necessity

Huxley's discussion of necessary propositions, which is not just an exposition of Hume's view, deserves attention in two respects. First, the fact that there were propositions that had been called "necessary propositions" showed to Huxley that some contents of mind indeed had been considered to have the status of knowledge. This was assumed when he was examining the

contents of mind. Traditional metaphysicians, non-physical thinkers and Huxley shared the assumption that some mental contents had been accepted as knowledge.

Second, the traditional search for necessary propositions utilizes the epistemic resources of Huxley's way of identifying knowledge, but in a cruder way. According to Huxley, to be certain of p means to be certain of the link between ideas expressed in p , and the more strongly the link has been verified, the more certain we are entitled to be. He acknowledged that some people are suspicious about the claim that repeated experiences can be used to find what is certain, but argued that the method of appealing to the notion of necessity is in fact an attempt to find repeatedly verified ideas. In this way, he showed why some "necessary propositions" had been considered knowledge, and further argued that the method of verification is better.

Huxley was well aware that propositions judged to be true by experience had been considered to be inferior to so-called "necessary truths," especially in the realm of philosophy.²⁶² Huxley regarded this as a poorly established preconception, and thus it was an essential task for him to undermine it. He seized an opportunity when he came to discuss Hume's distinction between "relations of ideas" and "matters of fact." Huxley introduced the following passages from Hume's *Inquiry Concerning Human Understanding*:

All the objects of human reason and inquiry may naturally be divided into two kinds, to wit, relations of ideas and matters of fact. Of the first kind are the sciences of geometry, algebra, and arithmetic, and, in short, every affirmation which is either intuitively or demonstratively certain. *That the square of the hypotenuse is equal to the square of the two sides*, is a proposition which expresses a relation between these two figures. *That three times five is equal to the half of thirty*, expresses a relation between these numbers. Propositions of this kind are discoverable by the mere operation of thought without dependence on whatever is anywhere existent in the

²⁶² Huxley 1878h.

universe. Though there never were a circle or a triangle in nature, the truths demonstrated by Euclid would for ever retain their certainty and evidence.

Matters of fact, which are the second objects of human reason, are not ascertained in the same manner, nor is an evidence of their truth, however great, of a like nature with the foregoing. The contrary of every matter of fact is still possible, because it can never imply a contradiction, and is conceived by the mind with the same facility and distinctness, as if ever so conformable to reality. *That the sun will not rise tomorrow*, is no less intelligible a proposition, and implies no more contradiction, than the affirmation, *that it will rise*. We should in vain, therefore, attempt to demonstrate its falsehood. Were it demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind – (IV. pp. 32, 33).²⁶³

Hume had divided “all the objects of human reason and inquiry” into two groups, “relations of ideas” and “matters of fact,” because they are not “ascertained in the same manner.” What concerned Huxley was not the distinction *per se*, but an intention behind the distinction. As Huxley understood it, the distinction had been made to claim that the certainty given by checking a relation of ideas is different from, and further superior to, the certainty given by checking “whatever is anywhere existent in the universe.” What Huxley wanted to reject is an epistemological implication that the distinction bears on experience: “the assertion that the evidence of matter of fact is not so strong as that of relations of ideas.”²⁶⁴

Let’s first clarify Hume’s line of reasoning. The difference in the degree of certainty that we are entitled to have stems from the difference in manner in which *we* ascertain the truth value of a proposition. The truth value of propositions of “relations of ideas” can be shown “demonstratively,” whereas that of propositions of “matters of fact” cannot. What is the condition

²⁶³ Hume 1748, as quoted in Huxley 1878h, 137-8 (Hume’s italics). Huxley’s citations of Hume’s works are based on the four volume edition published by Black and Tait in 1826. The citation comes from the beginning of Section IV. Sceptical Doubts Concerning the Operation of the Understanding.

²⁶⁴ Huxley 1878h, 140.

for the truth of a proposition to be shown demonstratively? It is when the negation of a given proposition implies a contradiction. On the other hand, if the negation of the proposition does not imply a contradiction, according to Hume, we cannot affirm the proposition demonstratively, and this means that we need the aid of observation to affirm it. At the end of the day, we would affirm or deny any given proposition, but sometimes we need to consult experience and sometimes we do not. The difference in the manner, it has been said, has something to do with, not us, but a proposition – whether its negation involves a contradiction.

A contradiction is a proposition that is not “intelligible” or that cannot be “distinctively conceived.” Huxley examined what it means to say that a proposition is distinctively conceivable. It may mean that the link expressed in a proposition is indissoluble in our consciousness. If our assurance ultimately comes from the indissolubility of a link between ideas in our consciousness, there is no reason to think that we should be entitled to have “greater” assurance regarding the propositions of “relations of ideas” than we should regarding the propositions of “matters of fact.” The factor that determines the degree of certainty would be how strong a link expressed in a proposition is, not to which group a proposition belongs. Huxley illustrated in what sense the propositions of “relations of ideas” are on par with the propositions of “matters of fact.”

To the assertion that the evidence of matter of fact is not so strong as that of relations of ideas, it may be justly replied, that a great number of matters of fact are nothing but relations of ideas. If I say that red is unlike blue, I make an assertion concerning a relation of ideas; but it is also matter of fact, and the contrary proposition is inconceivable. If I remember something that happened five minutes ago, that is matter of fact; and, at the same time, it expresses a relation between the event remembered and the present time. It is wholly inconceivable to me that the event did not happen, so that my assurance respecting it is as strong as that which I have respecting any other necessary truth.²⁶⁵

²⁶⁵ *Ibid.*, 140-1.

Huxley's reply may look strange without taking into consideration his account of perceptions. As discussed, a proposition is a verbal expression for a perception, and we cannot go beyond our perceptions. A proposition of "matter of fact," in his terms, reports a complex idea, and a complex idea includes an idea of relation which is derived from an impression of relation. Also, it appears in our consciousness as a mental link of ideas. When we affirm a proposition of "matter of fact," our certainty is about a mental link; when verified repeatedly, the link becomes indissoluble in our mind.

Huxley made the same point regarding the propositions of "relations of ideas." He reminded readers of Hume's position: perceptions are divided into ideas and impressions, and ideas are ultimately derived from impressions. Thus, if we follow the position strictly, Huxley asserted, we should conclude that perceptions referred to in the propositions of "relations of ideas" can be traced back to our having some impressions. For example, "if there were no impressions of straight lines and triangles there could be no ideas of straight lines and triangles."²⁶⁶ Here Huxley's point of bringing up the generation of ideas is not to state that experience of impressions is needed to learn the propositions of "relations of ideas." Rather, his point is that propositions of "relations of ideas" involve mental links in our consciousness just like propositions of "matters of fact," and experience of impressions has equally played a role in forming a mental link.

Given that both propositions of "relations of ideas" and propositions of "matters of fact" involve mental links, Huxley would argue, it is a red herring to point to the different manners in which their truth value is ascertained, based on which the distinction between "relations of ideas" and "matters of fact" is drawn. Note that Huxley speaks of a proposition concerning the past

²⁶⁶ *Ibid.*, 139.

event in the quote above. A proposition concerning the past event (*e.g.*, the sun rose yesterday) is as certain as a proposition used to demonstrate that “three times five is equal to the half of thirty.” A proposition that has not been experienced (*e.g.*, the sun will rise tomorrow) is as uncertain as, say, a mathematical proposition that has not been demonstrated. Our experience turns an expectation into a memory, and our “mere operation of thought” turns an unproved mathematical proposition into a proved one. Once experienced or demonstrated, we can be equally certain about them. The point that there is no contradiction between propositions concerning our past experience of the sun and the proposition that the sun will not rise tomorrow is irrelevant to our entitlement of being certain.

To summarize, propositions of “relations of ideas” and propositions of “matters of fact” are on equal footing when it comes to certainty that we are entitled to have; for, regardless of their membership, our certainty targets on ideas linked in consciousness and comes from an indissoluble link formed by verification. Hume’s expression, “whatever is anywhere existent in the universe,” Huxley noted, should be understood, given his own doctrine, to refer to “the sum of our actual and possible impressions”²⁶⁷ To Huxley, as far as certainty is concerned, we have no grounds to think that propositions concerning relations of ideas enjoy higher certainty by virtue of their belonging to a particular type, than do propositions concerning matters of fact.

Some might still argue that Hume’s distinction concerns the mode of truth. That is, (in)conceivability, which is supposed to differentiate the nature of certainty, should be understood in terms of the mode of truth, not (in)dissolubility in consciousness. As Huxley also noted, Hume’s distinction concerns the concept of necessity. Necessary propositions and non-necessary propositions are mutually exclusive, and this suggests that the necessity of proposition can be

²⁶⁷ *Ibid.*

used to differentiate the nature of certainty. As Huxley further admitted, our belief about the mode of truth is one thing and our belief about truth is another. Yet, while acknowledging that necessity is meant to be understood in terms of inconceivability, Huxley argued that there is no other way to understand (in)conceivability than in terms of (in)dissolubility in consciousness.

According to Huxley, Hume had illustrated necessity in terms of (in)conceivability but had failed to show how (in)conceivability can be understood differently from (in)dissolubility in consciousness. Huxley critically examined Hume's claim that it is not a necessary proposition that "whatever event has a beginning must have a cause."²⁶⁸ This proposition had been regarded as a necessary truth, but Hume had argued that it is not, because its negation is conceivable. Huxley highlighted Hume's rationale for thinking that its negation is conceivable: "all distinct ideas are separable from each other."²⁶⁹ According to Huxley, Hume was supposed to show, not presuppose, that "all distinct ideas *are separable* in thought."²⁷⁰ Hume's "circular" argument does not show how necessity can be understood other than in terms of an indissoluble mental link; introducing the notion of (in)conceivability that is presupposed to differ from the notion of (in)dissolubility did not impress Huxley.

Moreover, the notion of (in)conceivability, as Huxley understood it, primarily concerns our ability, not a property of a proposition. Thus, we should not focus on the "distinctiveness" of given ideas, but instead directly on the dissolubility of a given link of the ideas. According to Huxley, despite the "circular" argument, Hume in the end intended to endorse conceivability in

²⁶⁸ *Ibid.*, 142.

²⁶⁹ Hume as quoted in Huxley 1878h, 143.

²⁷⁰ *Ibid.*, 144, my emphasis.

terms of dissolubility, because he had made the distinction between “conjoined” ideas and “connected” ideas, which captures the degree of the separableness of a mental link.²⁷¹

Huxley’s main complaint about the distinction between “relations of ideas” and “matters of fact” was its implication for certainty rendered by experience. The claim that the membership of a given proposition determines our entitlement of certainty, he traced, ultimately hinges on the notion of (in)conceivability. His point is that we cannot but understand (in)conceivability in terms of (in)dissolubility in consciousness, which depends on how strongly experience has made a mental link of ideas inseparable or separable.

Huxley pressed his point further to claim that the traditional search for necessity has nothing special or superior as an epistemological approach. Throughout his life, Huxley was hostile toward those whom he called “pure metaphysicians.”²⁷² Pure metaphysicians “attempt to base the theory of knowing upon supposed necessary and universal truths.”²⁷³ Their approach has been to search for necessary propositions on the basis of the notion that only necessity shows whether a given proposition is certain; once a necessary proposition is somehow identified, the next step is to make logical inferences by which certainty can be safely passed on. According to Huxley, they thought that they have proved a derived proposition by “fine-drawn deductions from axiomatic assumptions” which they took as necessary propositions.²⁷⁴ Speculation and deduction are their main work to find knowledge, and what Huxley found especially annoying was that they “assert that scientific observation is impossible unless such truths are already known or

²⁷¹ *Ibid.*, 144, 146.

²⁷² For example, Huxley 1871b; 1878h, 62, 87; 1891c; 1892a.

²⁷³ Huxley 1878h, 62.

²⁷⁴ Huxley 1854a; 1891c, viii.

implied.”²⁷⁵ Huxley called their approach “the high *a priori* road of mere philosophical speculation,” or “*a priori* method.”²⁷⁶

To debunk the search for necessity, Huxley first clarified what so-called “necessary truths” turn out to be.

Either they depend on the convention which underlies the possibility of intelligible speech, that terms shall always have the same meaning; or they are propositions the negation of which implies the dissolution of some association in memory or expectation, which is in fact indissoluble; or the denial of some fact of immediate consciousness.²⁷⁷

Propositions that we think we cannot deny have been considered to be “necessary propositions,” and they can be grouped into different types in accordance with a rationale why we cannot deny them. According to Huxley, propositions like “A is A” belong to the first type; we cannot deny them because the denial destroys intelligible speech.²⁷⁸ As an example of the second type, Huxley offered “two straight lines cannot inclose a space,” and claimed that to say that the proposition is necessary means to say that “we have no memory, and can form no expectation of their so doing.”²⁷⁹ The revised conclusion of Descartes’s *cogito* argument is of the last type; its denial “involves the denial of consciousness.”²⁸⁰

The second type is Huxley’s main concern, because “pure metaphysicians” have primarily relied on this type. Even Hume can be seen to have failed to resist it as seen from him approving the distinction between “relations of ideas” and “matters of fact.” According to Huxley, pure

²⁷⁵ Huxley 1854a; 1878h, 62.

²⁷⁶ Huxley 1871b, 133; 1890b; 1891c, viii; 1894e; 1894f.

²⁷⁷ Huxley 1878h, 140.

²⁷⁸ *Ibid.*

²⁷⁹ *Ibid.*

²⁸⁰ *Ibid.*

metaphysicians' approach was to find necessary truths, because they used the necessity of a given proposition as a criterion for checking whether our feeling of certainty toward the proposition is legitimate. Necessity and thus certainty are understood in terms of something we cannot *conceive*. Although some might claim that they are dealing with metaphysical possibility and impossibility, to Huxley, their reasoning has only concerned whether the negation of a proposition is conceivable or not. That is, they have invoked nothing but (in)conceivability in order to account for, or to single out, metaphysical (im)possibility which is supposed to inform us about whether we are entitled to be certain. Huxley summarized that "to say that an idea is necessary is simply to affirm that we cannot conceive the contrary."²⁸¹

As seen, Huxley understood inconceivability as indissolubility of a mental link. Accordingly, he claimed, those who search for necessity to find something that we are entitled to be certain of, unwittingly, show that certainty that they claim to have found is grounded on repeated experiences. Huxley could not see any legitimate additional signification by calling some propositions "necessary propositions," instead of "repeatedly verified propositions." If those who search for necessity claim that we are entitled to be certain that "the square of the hypotenuse is equal to the square of the two sides," Huxley thought, we should be equally entitled to be certain that the sun rises. Thus, he concluded that the question of whether a given proposition is *necessary* is "really of very little importance"; what matters is how well and often it has been verified and how much we are willing to verify it.²⁸²

Huxley's criticism went further. It turns out that the pure metaphysicians' search for necessity is not superior as insisted. What is worse, their proposal of taking necessity as truth can

²⁸¹ *Ibid.*, 144.

²⁸² *Ibid.*

be misleading. This is because the search for necessity exclusively focuses on the bridge notion – conceivability – on the assumption that it serves as a proof of truth. Huxley found this myopic focus problematic, because in some situations, running an inconceivability test can lead us to a false proposition. Huxley introduced a case in which a false proposition is necessary in the sense of its opposite being inconceivable and thus can be claimed to be true instead.

In the well-known experiment of touching a single round object, such as a marble, with crossed fingers, it is utterly impossible to conceive that we have not two round objects under them; and, though light is undoubtedly a mere sensation arising in the brain, it is utterly impossible to conceive that it is not outside the retina. In the same way, he who touches anything with a rod, not only is irresistibly led to believe that the sensation of contact is at the end of the rod, but is utterly incapable of conceiving that this sensation is really in his head. Yet that which is inconceivable is manifestly true in all these cases. The beliefs and the unbeliefs are alike necessary, and alike erroneous.²⁸³

In other words, showing the necessity of a given proposition in the sense that its opposite is inconceivable does not guarantee its truth. p being inconceivable ($\sim p$ being necessary) is thought to show that $\sim p$ is certain and thus true. If we follow this reasoning, we end up saying that the belief that “we have two round objects under fingers” is true because its contrary is not conceivable. But it is not true. Focusing only on inconceivability sometimes misleads us regarding the truth value of a proposition; it has the same problem of the claim that we should take any claimed memory as true. Testing necessity in terms of inconceivability is not always

²⁸³ *Ibid.*, 144-5.

reliable to Huxley.²⁸⁴ He concluded, “the fact that we cannot conceive the contrary of any belief may be a presumption, but is certainly no proof, of its truth.”²⁸⁵

To have a better method of justification, we should instead put our attention directly on the existence of a set of impressions at issue and conduct the process of verification. This is why we tend to consider propositions of which negation is inconceivable to be certain in the first place. We should aim to find invariable links between mental states, but this does not mean that we can point to indissoluble links and readily accept them as knowledge. An idea conveying an indissoluble link *has been* regarded as certain, but as seen in the previous section, Huxley wanted to use that to come up with an epistemological tool of finding something that deserves certainty. Thus, we need to clarify further what renders a mental link indissoluble. This, according to Huxley, has been neglected by those who search for necessity; what they have been doing is finding actual indissolubility as if it is a sufficient condition for a link to be invariable. Rather, Huxley suggested the method of verification: we should aim for invariable links and for this, we need to go through testing by utilizing a refined and independent procedure modeled on a process leading to an indissoluble link of mental states in consciousness.

²⁸⁴ Some might find Huxley’s account of inconceivability too idiosyncratic or liberal, even after we accept his understanding of inconceivability in terms of indissolubility of a mental link. However, according to Huxley, our ability to conceive is constrained by our physical constituents, as our locomotion or respiration is (1878h). In other words, the indissolubility of a mental link depends not only on experiences of repeated verification but also on our physical conditions. To be clear, issues regarding the tenability of his account of inconceivability are irrelevant to my concern here. Huxley’s point is that, no matter how one likes to define or reduce (in)conceivability (by invoking, for example, “metaphysical impossibility”), one cannot but rely on feelings about inseparableness or irresistibility to single out what is conceivable and what is not. As long as Huxley’s targets, traditional philosophers, are in the same situation, his point can be made. However, to defend Huxley, there seems no fair reason to exclude his account of inconceivability at the outset. As an unfair reason, I have in mind some *meta*-constraint on an account of inconceivability like the following: an account of inconceivability should be neither too weak nor too liberal because it should be able to accommodate the philosophical practice that philosophers have used the notion of (in)conceivability as a sort of grounds when they decide to let a given thesis occupy or not occupy a philosophical discourse space.

²⁸⁵ *Ibid.*, 144.

4.2.2. Religious thinkers' appeal to faith

Huxley criticized his contemporary religious thinkers' claims in many places, and his criticisms have been well discussed.²⁸⁶ My focus is on Huxley's discussion of the inadequacy of using faith as a method for identifying knowledge. He recognized that many religious thinkers assumed that having faith can serve as evidence for the truth of the content of faith. However, according to Huxley, having faith can make no contribution to our task of distinguishing trustworthy perceptions from non-trustworthy perceptions. Huxley made two points: first, the appeal to faith is based on arbitrary grounds; second, the appeal to faith leads us to incompatible conclusions. Because of these two defects, faith is not qualified as a justificatory factor.

As Huxley understood religious thinkers, they had a fundamentally different view on what kind of knowledge we need to have to lead our lives.²⁸⁷ They seem to have disagreed with proponents of the method of verification who generally hold the position that our life in the natural world only matters and thus knowledge about that world suffices. Huxley labeled this position as "naturalism": we need knowledge only about a world that we can experience – "tangible, commonplace, orderly world of Nature."²⁸⁸ If naturalism is granted, the method of verification might be accepted as the only way of identifying trustworthy perceptions, but many religious thinkers reject the position. Instead, Huxley stated, they claim that nature is "surrounded and interpenetrated by another intangible and mysterious world" which is "not

²⁸⁶ For example, Turner 1874; Barton 1983; Macleod 1982, Lightman 1987; Harvey 2013.

²⁸⁷ Huxley 1892c; 1895b.

²⁸⁸ Huxley 1892c, 3.

merely beyond, but above, Nature.”²⁸⁹ According to Huxley, this different “frame of things in which their lives are set” has led them to apply the concept of knowledge to the other world.²⁹⁰

[I]t is obvious that, on this theory of the Universe, the successful conduct of life must demand careful attention to both worlds; and, if either is to be neglected, it may be safer that it should be Nature. In any given contingency, it must doubtless be desirable to know what may be expected to happen in the ordinary course of things; but it must be quite as necessary to have some inkling of the line likely to be taken by supernatural agencies able, and possibly willing, to suspend or reverse that course. Indeed, logically developed, the dualistic theory must needs end in almost exclusive attention to Supernature, and in trust that its over-ruling strength will be exerted in favour of those who stand well with its denizens.²⁹¹

According to supernaturalism, we live in a universe that consists of natural and supernatural worlds, and knowledge about the supernatural world is not just necessary but more important. The seekers of knowledge about the supernatural world seem to have relied on a different kind of method than the method of verification. Huxley examined their method and its qualifications.

Huxley pointed out that history shows that “the field of the supernatural has awarded its cultivators with a harvest”: “an almost infinite diversity of Religions.”²⁹² Religions which mainly consist of “information about Supernature” tell us about “the attributes of supernatural beings, of their relations with Nature, and of the operations by which their interference with the ordinary course of events can be secured or averted.”²⁹³ The proponents of supernaturalism, notably theologians and clerics, have preached their own knowledge about the supernatural world, which

²⁸⁹ *Ibid.*, 3-4.

²⁹⁰ *Ibid.*, 3

²⁹¹ *Ibid.*, 4-5.

²⁹² *Ibid.*, 6.

²⁹³ *Ibid.*

they regard as the most important for our life. How did they arrive at such knowledge? Huxley found them appealing to faith.

Huxley noted that, to religious thinkers, having faith does not simply mean that one has a strong conviction that a given proposition is true. It also involves the notion that the proposition, or the content of faith, is a kind of special knowledge revealed or mediated by a supernatural entity such as a god. To them, having faith can serve as evidence for the truth of the content of faith, because having faith is understood to imply that one has received knowledge from a god or one has exercised divinely given faculties. We can find this conception of faith as knowledge from one's blurring the distinction between "subjective and objective verities" or "the region of speculation and that of fact."²⁹⁴ For example, in his discussion of George Fox's "inner light," Huxley observed the following: "When an ordinary person would say 'I thought so and so,' or 'I made up my mind to do so and so,' George Fox says, 'It was opened to me,' or 'at the command of God I did so and so.'"²⁹⁵

Huxley argued that having or not having faith is an arbitrary criterion for identifying propositions that deserve the title of knowledge. One's having faith is supposed to help us to determine which propositions are divine knowledge, but the relationship between one's having faith in a proposition and a proposition being divine knowledge has been established on the basis of the fact that one has feeling that a proposition at issue is certain. Theologians and clerics wish to claim that they have some divine source for their faith, but Huxley concluded that they just appeal to faith only for their favorite dogmas. In other words, holding a particular dogma comes first. For example, the Bible, agreements among Church Fathers, inner-lights, and the notion of

²⁹⁴ Huxley 1887b, 189;1894a, 302.

²⁹⁵ Huxley 1887b, 189. Huxley also made a brief criticism regarding a kind of religious inspiration because it "leads to the promulgation of a fable as divine truth" (1886a).

antiquity have been mentioned as a kind of intermediary that connects one's holding faith with divine knowledge.²⁹⁶ However, according to Huxley, those intermediaries, in the end, only show which belief one wishes to endorse and reject. As for the Bible, all issues raised throughout history regarding which books should be included or excluded and how a given text should be interpreted attest the arbitrary use of having faith. In a similar manner, Huxley discussed "Declaration on the Truth of Holy Scripture" signed by thirty-eight clergymen in 1891. The declaration used "antiquity" to identify "traditionary testimony of the Church" which is supposed to show infallibility of the books of the Old and New Testaments.²⁹⁷ Huxley pointed out that the notion is conveniently indecisive and they had not looked further what is underneath their "tortoise," and thus, their appeal to antiquity amounts to that "whoso defines the canon defines the creed."²⁹⁸ According to Huxley, pointing to having faith is not adequate as a way of identifying knowledge unless its proponents establish a non-arbitrary connection between one's strong conviction and one's having (divine) knowledge.

The arbitrariness of using faith as an indication of knowledge leads to another concern: if we adopt that method, we cannot have grounds for favoring one's faith over others'. Huxley considered this point to show that having faith cannot serve the role of the method of justification.²⁹⁹ According to Huxley, religious faith has generated mutually exclusive religions, and "their adherents delight in charging each other, not merely with error, but with criminality,

²⁹⁶ Huxley 1892c.

²⁹⁷ *Ibid.*, 27.

²⁹⁸ *Ibid.*, 29, 28.

²⁹⁹ Huxley 1889e; 1892c.

deserving and ensuing punishment of infinite severity.”³⁰⁰ For example, Huxley quoted Henry Wace:

What made the Mahomedan world? Trust and faith in the declarations and assurances of Mahommed. And what made the Christian world? Trust and faith in the declarations and assurances of Jesus Christ and His Apostles” (l.c. p. 253).³⁰¹

Wace would want to regard “Mahommed as an unbeliever” or “infidel,” but Huxley pointed out that Wace ended up confessing that faith has no value as an indicator of truth.³⁰² There is no difference between the faith that has made “the Mahomedan world” and the faith that has made “the Christian world.”³⁰³ Huxley raised the same issue repeatedly. “If the Eastern branch of the Church had a right to reject the Apocalypse and accept the Epistle to the Hebrews, and the Western an equal right to accept the Apocalypse and reject the Epistle,” Huxley wrote, “any other branch would have an equal right,”³⁰⁴ Similarly, we cannot arrive at an agreement over how to read a given religious text, because every interpretation would be equally well based on its adherents’ faith.

Adopting having faith as a way of identifying knowledge has not done what it is supposed to do; instead it has produced, history shows, the variety of religions and its denominations. These reflect, according to Huxley, the inadequacy of faith as a criterion for knowledge. An appeal to faith has been made arbitrarily and leads to incompatible “knowledge.”

³⁰⁰ Huxley 1892c, 6.

³⁰¹ As quoted in Huxley 1889e, 213. The passage is from Henry Wace’s “On Agnosticism,” which were read at the Manchester Church Congress in 1888.

³⁰² Huxley 1889e, 213.

³⁰³ *Ibid.*, 213-4.

³⁰⁴ Huxley 1892c, 29.

We might live in a dualistic world, but the proponents of supernaturalism have failed to offer an adequate justificatory process that can show that their faith deserves the title of knowledge.

4.3. Physical thinking as a constituent of a guide to knowledge

I have discussed Huxley's analysis of mind to show his view of a way of identifying knowledge. Among all groups of perceptions or mental contents, memory has been considered to have default credibility because it contains an idea of the past existence of a corresponding set of impressions. This constitutive idea is present in our consciousness only when we experience a set of impressions. From the analysis, Huxley found an epistemological lesson: by trying to have an experience of a set of impressions, we can check whether a given perception has the constitutive idea, and thereby determining whether it is trustworthy or not. This is the method of verification. Thus, we need to test an explanation at issue against an observation or experiment.

Huxley further argued that the method of verification is the only way of identifying knowledge. The traditional way of searching for necessity turns out to be a search for perceptions that have been repeatedly verified. The religious way of identifying knowledge, appeal to faith, is not qualified as a method of justification because it tends to be applied arbitrarily and it cannot function as a discriminator.

Given that the method of verification is the only legitimate way of identifying knowledge that is available to us, Huxley can provide us with a reason for adopting physical thinking, not non-physical thinking. In the previous chapter, we saw that Huxley thought that we may understand phenomena, the contents of perceptions, either physically or non-physically. If we adopt physical thinking, we are to understand a given phenomenon in material terminologies, ultimately matter and motion; we *aim* to offer a materialistic-mechanistic account even when a

given phenomenon appears to us as a spiritual or holistic phenomenon. If we adopt non-physical thinking, we are to understand a given phenomenon in immaterial terminologies and accordingly aim to offer an account in terms of spirit, vital force, divine will, or some immaterial entity. According to Huxley, the method of verification works better with physical thinking, and this suggests that a physical account can be shown to be justified.

To accept an offered account as knowledge, we should justify it. In other words, both physical and non-physical accounts of a given phenomenon, which are present to us as complex ideas, should be tested against having a series of impressions. This means to Huxley that we need to have a translation or derivation of an offered account in terms of impressions. This kind of work which is necessary for us to go through a verification process would be easier for physical thinkers than for non-physical thinkers, because physical thinkers tend to understand a given phenomenon in terms of objects, properties or events that can be observed or measured. Physical thinkers will be able to indicate what to be observed or experimented to test their account. Their account allows us to use our experience of having complex impressions.³⁰⁵

On the other hand, if we adopt non-physical thinking, the method of verification would not work very well, because immaterial objects and events which interest non-physical thinkers are assumed to lack properties about which information of impressions concerns. Some non-physical thinkers may have objections to using the method of verification, and thus they may claim that their account cannot be tested by trying experiencing of complex impressions. This, for Huxley, amounts to giving up the title of knowledge, since verification is the only way by which we can determine what to count as knowledge. Other non-physical thinkers may be willing to

³⁰⁵ If we had only sensations of smell and hearing, according to Huxley, we “might have a conception of time, but could have none of extension, or of resistance, or of motion” (Huxley 1879a, 306). In this case, even if we somehow manage to come up with a notion of matter, physical thinking would not be then effective in our attempt to use the method of verification to test a physical account.

connect their account with other ideas that can be eventually tested against a set of impressions. However, Huxley seems not to have encountered such efforts. Refusing to participate in investigation of spirituality, he conjectured that the inquiry “would involve much trouble and (unless it were unlike all inquiries of that kind I have known) much annoyance.”³⁰⁶ If the proponents of spiritualism showed that they can derive, from their account, a detailed and definite causal or structural explanation for, say, a table’s moving two inches away, Huxley would find it worth examining. Non-physical accounts tend to be simply an invocation of immaterial agency, for which verification is almost useless, and in most cases, Huxley pointed out that there is an alternative physical account that has been already verified.

If non-physical thinking offers an account that can be hardly justified by verification, it should not be considered a way to knowledge. If one seeks knowledge, Huxley urged, it is better to adopt physical thinking in the first place and to hold the view that a mechanical account in material terms is universally applicable, because a physical account is explanatory and can be shown to be justified. This is just another way of saying that an explanans (as opposed to an explanandum) should better be a statement concerning a material phenomenon to be counted as a candidate for knowledge.³⁰⁷

Huxley’s exclusion may raise one worry. If physical thinking is not universally applicable, it could not be regarded as an approach that is proper to be included in a guide to knowledge; if a non-physical account, although unlikely, can be shown to be explanatory and susceptible of justification, we do not have to regard physical thinking as the only approach for

³⁰⁶ Huxley 1871d, 144.

³⁰⁷ This also means that only material events will count as events that cause other events. Huxley has been known, in the literature of philosophy of mind, for the view that mental events are effects, not causes of other events. His view of the mind-body problem has attracted attention from several philosophers, and they have disputed over how to understand his view. I will briefly introduce the interpretative issue and my understanding in footnote 537.

our guide knowledge. This worry would arise because of metaphysical concerns, but Huxley found no grounds to think that there exists some metaphysical barrier against the universal application of physical thinking. Once the path of legitimate Idealism is taken, the type of content of perception – either material or immaterial – is irrelevant. What matters instead, according to Huxley, is which type of terminology we should let monopolize the explanatory task because we cannot adopt both at the same time and we are trying to achieve our epistemic goal by using a more effective way.³⁰⁸ Against the claim that a mechanistic-materialistic approach is not applicable to vital and mental phenomena, Huxley said, he “can discover no logical halting-place.”³⁰⁹

Thus, *for example*, Huxley applied the same approach to the generation of perception. It does not matter whether an explanandum is the statement about material (*e.g.*, the movement of blood) or immaterial (*e.g.*, the generation of perception) phenomena, because both are after all contents of our perception; it does not matter whether an explanandum concerns our perception, because we also have perceptions about perceptions. As we explain the perception of blood movement by utilizing contents of other perceptions, Huxley thought, we explain the perception of perception generation by utilizing contents of other perceptions. He summarized his position: “we have as much right to believe that the sensation is an effect of the molecular change, as we have to believe that motion is an effect of impact; and there is as much propriety in saying that the brain evolves sensation, as there is in saying that an iron rod, when hammered, evolves heat.”³¹⁰

³⁰⁸ Huxley 1868a.

³⁰⁹ *Ibid.*, 154.

³¹⁰ Huxley 1874a, 239.

According to Huxley, Hume had made the same point. In Hume's *Treatise of Human Nature* where the immortality of the soul is discussed, Huxley found Hume arguing against the claim that a cause of thought or perception cannot be motion of a body.³¹¹ Hume had pointed out that, judging from our experience, the connection between motion and motion is no more secure than the connection between motion and thinking. The main idea is that we should employ the same reasoning, if we want to employ one at all. That is, if we want to say that our experience shows that motion of one body causes motion of another body, we also have to say that our experience shows that motion of a body causes thinking. After introducing a long quotation from Hume, Huxley developed Hume's point and summarized as follows:

The upshot of all this is, that the "collection of perceptions," which constitutes the mind, is really a system of effects, the causes of which are to be sought in antecedent changes of the matter of the brain, just as the "collection of motions," which we call flying, is a system of effects, the causes of which are to be sought in the modes of motion of the matter of the muscles of the wings.³¹²

As Huxley understood him, Hume had overcome the reluctance to entertain the notion of the interaction between the material and the mental and had "grasped the fundamental truth, that the key to the comprehension of mental operations lies in the study of the molecular changes of the nervous apparatus by which they are originated."³¹³

Huxley found no difficulty in applying physical thinking to vital and mental phenomena, but he was well aware that his approach had been loosely called "materialism," according to which "there is nothing in the world but matter, force, and necessity."³¹⁴ It has been said that he

³¹¹ Huxley 1878h.

³¹² *Ibid.*, 92.

³¹³ *Ibid.*, 94.

³¹⁴ Huxley 1874a; 1878h, 94; 1868a, 154, 162.

should not have been so surprised when his critics labeled him as a “materialist.”³¹⁵ What surprised him, however, was probably that his efforts to highlight the “union of materialistic terminology with the repudiation of materialistic philosophy” had not been properly understood or simply had been neglected, rather than the charge of being a materialist.³¹⁶

As discussed in the previous chapter, material terminology should not be read as an ontological statement. For example, consider his position on the generation of sensation: he said, it had been demonstrated by observations and experiments that “the immediate antecedents of sensations are changes in the nervous system.”³¹⁷ It should be understood to mean that one type of perception (about sensation) follows another type of perception (about the changes in the nervous system) in our mind. Thus, his view that has been accused of materialism, Huxley explained, makes a claim about what is going on *in our mind*, not in reality: a perception whose content concerns brain activity antecedes a perception whose content concerns sensation. We should not forget that all things that explain or need to be explained are contents taken from our perception; at the end of the day, our attempt to offer an account amounts to saying which state of consciousness is followed by what. This should be remembered regardless of whether we are to formulate an account in material or immaterial languages. It is in this context that Huxley further argued for adopting a materialistic-mechanical approach, because this approach offers an account with explanatory value and allows us to proceed the process of justification, verification. In this sense, Huxley claimed that only the material terminology enables us to “practically” interpret the facts of consciousness.³¹⁸

³¹⁵ Lyons 2012, 92.

³¹⁶ Huxley 1868a, 155.

³¹⁷ Huxley 1878h, 89. This point has been discussed by Huxley in detail in other essays (1874a; 1879a).

³¹⁸ Huxley 1870c, 194.

Huxley's endorsement of the materialistic-mechanistic approach should be understood in the connection with his starting point that perceptions certainly exist and are only things given to us. This consideration is needed not only to see the difference between metaphysical materialism and what he called "legitimate materialism." But this also helps us to see how Huxley wanted to combine Descartes's two paths. We do not follow one path or the other because a metaphysics compels us. Adopting the materialistic-mechanistic approach involves the recognition that we are dealing with mental contents. In this manner we should follow Descartes's second path; we should hold legitimate materialism. It is, according to Huxley, "neither more nor less than a sort of shorthand Idealism; and Descartes' two paths meet at the summit of the mountain, though they set out on opposite sides of it."³¹⁹ As we will see in Chapter 6, Huxley's understanding of science and its progress shows that he genuinely held the combination of legitimate Idealism and Materialism, not metaphysical Idealism or Materialism.

³¹⁹ *Ibid.*

CHAPTER 5

Agnosticism as a Guide to Knowledge

In previous chapters, I discussed Huxley's "Cartesian project": Huxley tried to find a way of identifying knowledge that works within our epistemic condition. His journey led him to the position that we should adopt the approach of Materialism and use the method of verification to find knowledge. In doing so, Huxley urged, we should not mistake adopting the approach of Materialism for metaphysical Materialism; that is, we should not forget about our epistemic condition as specified in legitimate Idealism.

Huxley's Cartesian project illuminates the nature and structure of his agnosticism; also its conclusions play roles behind his agnosticism. This chapter elaborates on that suggestion. Huxley intended agnosticism to be a (quick) guide to knowledge, consisting of an account of legitimate evidence and an ethics of knowing. To support my understanding, I will also argue that Huxley's agnosticism should not be understood as Cliffordian ethics of belief, and discuss why Huxley situated agnosticism within the tradition of modern critical philosophy.

5.1. The two paths in agnosticism: an account of legitimate evidence

I have noted that Huxley's agnosticism has been associated with either of the two theses: first, we cannot know some metaphysical and theological matters because of our conditioned faculties; second, scientific method is the only means of attaining knowledge. This situation is understandable since it is beyond doubt that he claimed both. This fact, as seen in Chapter 2, has

invited two interpretations of Huxley's notion of agnosticism. Agnosticism seems to be about our ignorance, and he appears to have used both ideas to explain what we cannot know.

The conception of Huxley's agnosticism as an account of ignorance does not help us in understanding how he defended epistemic value of scientific method. Huxley's conception of scientific method is featured in his agnosticism, but it has not been part of the analysis of his agnosticism. Huxley's *commitment* to science, or more precisely, his *dogmatic* commitment to science is something that needs to be pointed out regarding his promotion of agnosticism. His conception of science has been assumed to stand as independent from his agnosticism. This perspective, as discussed in Chapter 2, has led to the criticism that Huxley's endorsement of agnosticism either poses the philosophical problem that he could not defend science as the only way to knowledge or offers no solution to that problem.

It is not a fair interpretive framework to view Huxley's agnosticism solely as an account of ignorance or nescience, given his discussion and practice of agnosticism which will be brought up throughout this chapter. With his Cartesian project, we can have a better understanding of his notion of agnosticism, because we can appreciate what he was trying to do with agnosticism by connecting different ideas with a single position labeled "agnosticism." More specifically, as I will show in the following, the same concern and interest led Huxley to a Cartesian project and agnosticism, namely that we need a method for identifying knowledge. Also, the result of his project played a role behind agnosticism as his epistemological position. In a sense, his agnosticism was a summary and didactic formulation of his view of how to find knowledge.

Thus, instead of viewing Huxley's agnosticism as an account of ignorance, I suggest understanding it as an account of knowing. Huxley's discussion of the two paths and his effort to combine them seem to have been presented by commentators as two alternative accounts of

ignorance: we cannot know about matters that go beyond phenomena; we cannot know matters to which scientific method is inapplicable. However, I will argue, his discussion and effort are presented in his agnosticism as an account of legitimate evidence. Huxley's agnostic principle has been understood by some commentators as an ethics of belief and by others as a humble stance toward our ignorance or the unknowable. I will argue that the agnostic principle was an ethics of *knowing* that concerns a stance toward evidential valuation.

First note that the fact that Huxley appears to have suggested two different ideas in connection with agnosticism is compatible with my claim that his agnosticism developed from his discussions of Descartes's two paths. In fact, we can see more than compatibility. It is not surprising that his discussions of agnosticism involve "two components." Combining the two components which appear to invite the alternative interpretations is exactly what Huxley intended to do, as he wanted to "reconcile" the physical and metaphysical followers of Descartes. Thus, if we ground his agnosticism on only one of the two components, we end up neglecting his intention. Regardless of whether he had, philosophically speaking, succeeded in combining the two paths, we need to try to understand first what he was up to.

Why did Huxley highlight the two paths found in Descartes's writings? If we stick to the conception of agnosticism as an account of ignorance, we may answer that the two paths somehow show us what we cannot know. That is, Huxley's intention was to set the boundary of knowledge. The proponents of a partial approach would note once again that Huxley drew two lines for the boundary. Thus, we are still left with the two ways of interpreting agnosticism even after taking Huxley's discussions of Descartes into consideration.

However, this answer does not correctly represent Huxley's intention behind his discussions of Descartes. As seen, his Cartesian project and subsequent journey were not geared

toward a conclusion about the realm of ignorance, non-knowledge. Rather, his primary aim was to find a guide to knowledge that can inform us how we can arrive at something certain within our limits. If we can admit that there is some parallel between his discussions of Descartes and of agnosticism, which I highlighted in Chapter 3, it can be misleading to frame his agnosticism as a pointer to the realm of our ignorance, because this perspective directs attention to what he said about our ignorance, not to what he was at pains to convey.

Huxley's various essays show that his major concern was knowledge, something about which we are entitled to be certain.³²⁰ For example, in the prologue of *Essays upon some Controverted Questions* in which the three essays on agnosticism were republished, he wrote:

But, however the polemical concomitants of these discussions may be regarded – or better, disregarded – there is no doubt either about the importance of the topics of which they treat, or as to the public interest in the “Controverted Questions” with which they deal. Or rather, the Controverted Question; for disconnected as these pieces may, perhaps, appear to be, they are, in fact, concerned only with different aspects of a single problem, with which thinking men have been occupied, ever since they began seriously to consider the wonderful frame of things in which their lives are set, and to seek for trustworthy guidance among its intricacies.³²¹

The main issue of Victorian society which he shared or wanted to raise was to identify “the knowledge essential to the right guidance of life”; the “Controverted Question,” according to Huxley, involves adopting a mode of inquiry for such knowledge.³²² In addition, he did not consider that being a truth is sufficient for a proposition to be knowledge and he was concerned

³²⁰ For example, Huxley 1868a; 1870c; 1878h; 1892c.

³²¹ Huxley 1982c, 3.

³²² *Ibid.*, 22, 7. In this essay, Huxley contrasted two modes, naturalism and supernaturalism, and argued for the former. He formulated the “controverted question” more precisely as follows: “The question – how far is this process [of eliminating the supernatural] to go? – is, in my apprehension, the Controverted Question of our time” (*Ibid.*, 7).

more with justification. Thus, he often made the following points: a given belief may be true, but not subject to verification; it may be true, but not evidence.³²³ As we will see shortly, Huxley's discussions of agnosticism always involve the issue of evidence or justification conferring factor.

My suggestion was that Huxley's agnosticism conveys his views on one of our epistemic activities, claiming to have knowledge. Accordingly, we can see that his notion of agnosticism includes an account of legitimate evidence, which determines whether or not one is entitled to make a claim to knowledge. His discussions of Descartes's paths were meant to show what to count and not to count as having evidential value.

First consider Descartes's path of Idealism. The point that we cannot go beyond our consciousness indicates our limited condition, which in turns shows the nature of knowledge. Our knowledge is knowledge of consciousness, based on what appeared and appear in consciousness. This is what Huxley took as the most important message of Hamilton's and Mansel's thoughts: our knowledge can only be about "the relative and finite."³²⁴ Consciousness presents us something as appeared, not as it really is, and in succession, not in an infinite or eternal manner. Of course, there are some perceptions whose contents concern something beyond our consciousness. For example, people have entertained ideas about an entity that is thought to comprise a real world or a being that is assumed to exist independently from our consciousness. We have perceptions about such an entity, and yet, it has been claimed, these perceptions represent such an entity as it stands without any relation to our consciousness, or the

³²³ For example, Huxley 1863d; 1876c.

³²⁴ Huxley 1860c, 315; 1889e; 1890a; 1895a. However, this was the only point that Huxley agreed with Hamilton and Mansel. In his early days, Huxley wrote in a letter: "I believe in Hamilton, Mansell [sic] and Herbert Spencer so long as they are destructive, and I laugh at their beards as soon as they try to spin their own cobwebs" (1863c, 349). The same point is also found in Huxley's later letter and last essay (1889i; 1895b).

“Absolute.”³²⁵ However, according to Huxley, we are not in a position to claim whether or not these perceptions correctly capture a thing in itself.³²⁶ As noted, this has been formulated as the thesis of metaphysical and theological ignorance.

Huxley’s *further* point is that the realm of our ignorance should be excluded from our activity of knowing. We cannot use what we are incapable of knowing in order to find knowledge, because a perception that cannot be found trustworthy cannot show whether or not other perceptions are trustworthy. In short, what is not justifiable is not justificatory. For example, consider Huxley’s discussion of miraculous events such as Jesus walking on water or transferring evil spirit from people to pigs.³²⁷ He acknowledged that Christian beliefs in the miracle had been disputed in terms of whether or not such a miraculous event *can* happen, but he disagreed with the rationales of both believers and disbelievers. According to Huxley, due to “the limitations of our faculties,” “we never can be in a position to set bounds to the possibilities of nature.”³²⁸ The believers’ reason that the order of nature can be violated by a being like Jesus, and the disbelievers’ reason that the present science determines what is possible in nature are equally grounded in something that we are not capable of knowing. If they think that such an appeal can support their claim, they are claiming that a speculation or imagination has justificatory power. However, propositions regarding issues that require us to exceed our

³²⁵ Huxley 1890a; 1895a.

³²⁶ Huxley accepted the concept of appearance and of thing-in-itself, but he did not think that we know that appearance differs from thing-in-itself (1878h).

³²⁷ Huxley 1878h; 1889e; 1892a.

³²⁸ Huxley 1892a, 198. In 1866, Huxley made the same point in a letter to an editor of *Spectator*, part of which, interestingly, Alfred Russel Wallace quoted, along with a passage from Herschel, in the front page of his book, *The Scientific Aspect of the Supernatural: Indicating the Desirableness of an Experimental Enquiry by Men of Science into the Alleged Powers of Clairvoyants and Mediums*: “With regard to the miracle question, I can only say that the word ‘impossible’ is not to my mind applicable to matters of philosophy. That the possibilities of nature are infinite is an aphorism with which I am wont to worry [weary] my friends” (quoted in Wallace 1866; Huxley 1866a; also see Prasch 2015, 34, n.6).

limitations cannot serve as evidence. People may speculate about such issues, but Huxley argued, they must admit that their speculation can have no evidential value. Neither does embellishing their speculation by capitalizing the first letter of words like “Force,” “Absolute,” or “Reason” render evidential power. This is, Huxley sarcastically remarked, giving “a Grenadier a bearskin cap, to make him look more formidable than he is by nature.”³²⁹ Huxley’s agnostics say not only that we are incapable of knowing whether God exists or not, but also that we are incapable of using God’s existence or inexistence as evidence for other claims.³³⁰ The lesson of Idealism tells us that no realm outside consciousness is a place to look for evidential value.

What can be then considered to be evidence? Evidence should be found among what appear in our consciousness. To Huxley, evidence is, above all, a perception that can support one claim (perception), and not others. Not all contents of mind, however, can play a role of evidence. Our consciousness sometimes presents to us inconsistent perceptions at different times or places; it also presents to us perceptions contradictory to other perceptions. We need to find trustworthy perceptions to have evidence. If *unjustifiable* statements cannot function as evidence, neither can *unjustified* statements. Huxley applied the lesson of Materialism. To turn perceptions into perceptions with evidential power, physical thinking works better. For a mental content at issue should be expressed in terms of what-have-been-experienced and what-will-be-experienced so that it can be shown to be justified and thus can be used as evidence.

Huxley’s suggestion amounts to the idea that we should only take a perception that has been verified as evidence, and we can see whether a given perception has been verified only

³²⁹ Huxley 1870c, 179.

³³⁰ Relatedly, Huxley wrote, regarding “syllogisms” that concern “Substance,” that “the premises of [the syllogisms] convey no meaning, while the conclusions carry no conviction” (1878h, 211).

when it is expressed as an effect of interactions of material objects about which we can ultimately have a complex impression. This idea is folded in his illustrations like the following: “It [agnosticism] simply means that a man shall not say he knows or believes that which he has no scientific grounds for professing to know or believe.”³³¹ It is not surprising that Huxley’s agnosticism has been understood to suggest that science is the only way to knowledge.

However, a logically prior point is Huxley’s view of legitimate evidence.³³² This view, according to Huxley, is not peculiar to (narrowly understood) scientific disciplines; other areas like history and law share this account of evidence.³³³ Moreover, when Huxley discussed an agnostic’s position on controversial issues like miracles, he did not simply dismiss beliefs in miracles by pointing out that miraculous events are discordant with scientific discoveries up to his days. Instead, Huxley’s focus is on believers’ evidence for their claim; he went through the trouble of examining their evidence and judged whether offered evidence indeed has evidential value or not.³³⁴ I will return to this point with specific examples when I discuss what his agnostics are supposed to do.

Huxley’s epistemological position that he presented in his discussions of the modern philosophers such as Descartes, Berkeley and Hume is layered behind his agnosticism. Rehashing it as qualification for evidence would effectively serve Huxley who wanted to deal with a claim to knowledge. From Huxley’s perspective, Victorian intellectual contemporaries were suffering

³³¹ Huxley 1884a, 5.

³³² Huxley did not express interests in the concept of evidence only in his later years. In 1853, he anonymously published “The Valuation of Evidence” which shows his interests in this issue. In fact, around mid-19th century, due to the popularity of spiritualism and séances, there were discussions of evidence and testimony (See Lamont 2004). In the anonymous essay, Huxley mentioned spirit rapping and table moving (1853).

³³³ Huxley 1886b; 1889f; 1890c.

³³⁴ Huxley 1889e; 1892a.

from loose and incorrect conceptions of knowledge or knowing. Denying the evidential power of the unknowable and unknown and affirming the evidential power of experience were his fundamental theme found in his Cartesian project and practice of agnosticism. Saying that we cannot know is surely a confession of our ignorance, but it is also a declaration that we cannot find any evidential value.³³⁵ Thus, the identity of agnostic would be better captured with the remark “Tell me your reason” or “There is no evidence,” rather than “I don’t know” *per se*. Huxley described “a true agnostic” as follows:

... if you were to meet with such a phoenix and to tell him [an agnostic] that you had discovered that two and two make five, he would patiently ask you to state your reasons for that conviction, and express his readiness to agree with you if he found them satisfactory. The apostolic injunction to “suffer fools gladly” should be the rule of life of a true agnostic. I am deeply conscious how far I myself fall short of this ideal, but it is my personal conception of what agnostics ought to be.³³⁶

We can also see that Huxley himself did not merely say “I don’t know,” but further moved on to discuss the issue of evidential value. For example, when discussing the doctrine of the immortality of the soul, Huxley said: “Give me such evidence as would justify me in believing anything else, and I will believe that.”³³⁷ With respect to the claim that Jesus had said and done what is written in the Bible, according to Huxley, an agnostic would try to determine the value of evidence and then say, “I cannot find good evidence that so and so is true.”³³⁸

³³⁵ As I understand Huxley, he tended to highlight confession of ignorance when a discussion involves his criticism of idolization of the unknowable. For example, in a letter, Huxley contrasted a confession of ignorance to “the apotheosis of ignorance under the name of the ‘Absolute’ or its equivalent” (Huxley 1889h in Lightman 1987, 13). I will return to this issue in Section 4 of this chapter.

³³⁶ Huxley 1889e, 246-7. Also Huxley 1889f; 1892c.

³³⁷ Huxley 1860c, 314; see also 1870b. In a similar manner, Huxley replied to his disputant: “It may be so, or it may not be so; but where is the evidence which would justify any one in making a positive assertion on the subject [the order of creation]?” (1886e, 177).

³³⁸ Huxley 1889e, 212. I cannot agree more with Asprem’s following statement:

If we pay due attention to Huxley's persistent concern over when one can say that we attain knowledge, which is also the concern expressed in his discussion *and* practice of agnosticism, we need not see him as suggesting two alternative accounts of ignorance. Huxley claimed that we are not capable of knowing something beyond our consciousness; he also claimed that science is the only means of attaining knowledge. These two ideas are traces of his Cartesian project which was to find a guide to knowledge that can work regardless of our conditioned faculties. In agnosticism, they are intended to work together to provide an account of legitimate evidence, which Huxley considered to be crucial and urgent information for Victorians who aimed to seek knowledge.

5.2. Another component of agnosticism: the agnostic principle

In addition to the combined instruction regarding evidence, Huxley's guide has another instruction. The additional component concerns what an epistemic agent should do. According to Huxley, Descartes had followed a rule which Huxley called "Descartes' maxim" or "golden rule" – "assent to no proposition the matter of which is not so clear and distinct that it cannot be doubted."³³⁹ This maxim had regulated Descartes's "assent" regarding the truth value of a given proposition and required him not to "lie" to himself about the certainty of a given proposition.³⁴⁰

Before Huxley began to discuss agnosticism publicly, he had introduced Descartes's maxim when discussing how to reconcile metaphysical thinkers and physical thinkers who

The valuing of evidence is thus a crucial element of Huxley's agnosticism that often goes overlooked or misunderstood – both in his own days and in later conception of agnosticism. The disbelief associated with agnosticism is *not* of a purely *a priori* character, but deals rather with the *justification* of claims and the *coherence* of knowledge in general (2014, 295-6, her italics).

³³⁹ Huxley 1870c, 169, 194.

³⁴⁰ *Ibid.*, 171.

exclusively followed only one of Descartes's two paths. Huxley illustrated this maxim as the condition for their reconciliation.³⁴¹ They have their own view on reality and their metaphysical views are incompatible. We can mediate both parties while preserving their own mode of thinking, Huxley thought, by having them admit that their different views concern something that we cannot be certain about. If they complied with Descartes's maxim, they would not have assented to a proposition regarding a real world. Huxley wanted to reconcile the two parties, because he could neither take one side nor give up either type of thinking; each type of thinking has something to say to us about how to attain knowledge. Moreover, Huxley had an example – Descartes who had somehow managed to employ both ways of thinking.

As Descartes had had a maxim, Huxley also included a similar rule in his guide to knowledge, the agnostic principle.³⁴² Yet, the agnostic principle should not be understood as a merely re-named Cartesian maxim, because Huxley focused on an idea underlying the maxim rather than on unpacking the meanings of Descartes's words such as "clear" and "distinct." Huxley introduced other thinkers whom he considered to share Descartes's maxim such as Socrates.³⁴³ For example, consider the following series of quotes.

³⁴¹ "The reconciliation of physics and metaphysics lies ... in the observance by both metaphysical and physical thinkers of Descartes' maxim—assent to no proposition the matter of which is not so clear and distinct that it cannot be doubted" (*Ibid.*, 194).

³⁴² Huxley mentioned this principle in many places, but the exact expression "agnostic principle" or "Agnostic principle" appears in the following: Huxley 1889e, 246, 249, 253; 1889g, 310, 313, 317, 327 (this list is not exhaustive).

³⁴³ Huxley 1871c; 1878h; 1889e; 1893-4 (Vol. VI); 1895a. Although Huxley was willing to credit Hamilton and Mansel for holding the doctrine that we are ignorant of what is beyond phenomena and further he called them "agnostics," Huxley did not introduce them as those who held the maxim. Even before Huxley mentioned Hamilton in connection with agnosticism, Huxley had considered Hamilton to overstep his own boundary of ignorance and thus Huxley could not see him as a follower of the maxim (1860c, 315; 1895a; 1895b). Huxley appears to have considered Mansel to be one of like-minded persons in an enemy camp: when Huxley "came across the *Limits of Religious Thought*," Huxley found "the thrill of pleasure" because "I [Huxley] was as orthodox as a dignitary of the Church, ..." (1985a, 534).

It is the Cartesian doubt – the maxim that assent may properly be given to no propositions but such as are perfectly clear and distinct – which, becoming incarnate, so to speak, in the Englishmen, Anthony Collins, [John] Toland, [Matthew] Tindal, [Thomas] Woolston, and in the wonderful Frenchman, Pierre Bayle, reached its final term in Hume.³⁴⁴

Berkeley and Locke, each in his way, applied philosophical criticism in other directions; but they always, at any rate professedly, followed the Cartesian maxim of admitting no propositions to be true but such as are clear, distinct, and evident ...³⁴⁵

That [Agnostic] principle is of great antiquity; it is as old as Socrates; as old as the writer who said, “Try all things, hold fast by that which is good”; it is the foundation of the Reformation, which simply illustrated the axiom that every man should be able to give a reason for the faith that is in him; it is the great principle of Descartes ...³⁴⁶

He [Socrates] also persisted in demanding that no man should “take anything for truth without a clear knowledge that it is such.”³⁴⁷

Huxley appears to have seen an idea shared by them: one should assent to a proposition only when one has grounds. We might be tempted to compare this idea with the position now called “evidentialism,” according to which one ought to believe something based on evidential reasons as opposed to non-evidential reasons such as prudential reasons.³⁴⁸ From one aspect, the shared idea seems to restrict grounds for assent to a particular type and, as I have discussed, Huxley had a specific view of what can or cannot serve as evidence. Thus, in a sense, it sounds similar to evidentialism. Yet, from another aspect, the shared idea is not identical with evidentialism,

³⁴⁴ Huxley 1871c, 245.

³⁴⁵ Huxley 1878h, 66.

³⁴⁶ Huxley 1889e, 245-6. The old aphorism is from *Thessalonians* (5:21) and he also mentioned it in his earlier essay (1887d, 18).

³⁴⁷ Huxley 1893-4 (Vol. VI), viii.

³⁴⁸ Aikin 2008; Reisner 2008; Wood 2008; Chignell 2016.

because it seems not to concern a way of forming a belief and it does not explicitly convey the notion that there is a right way of forming a belief. My point here is that, at this moment, we do not have information enough to formulate the shared idea as a clear thesis. What is clearer seems to me that Huxley wanted to introduce a rule regarding our attitude toward the certainty of a given proposition, and that the rule has to do with a particular understanding of grounds. We can tentatively say that Huxley saw a sort of “evidentialistic attitude” shared by the past knowledge or truth seekers, but we need to see how he illustrated it in his own terms.

Descartes’s maxim, or the shared attitude that Huxley wanted to introduce, was later formulated as the agnostic principle. Huxley illustrated his principle in different ways and practiced it in many places, but the following quotes are where he explained it most explicitly.

Positively the principle may be expressed: In matters of the intellect, follow your reason as far as it will take you, without regard to any other consideration. And negatively: In matters of the intellect, do not pretend that conclusions are certain which are not demonstrated or demonstrable.³⁴⁹

This principle may be stated in various ways, but they all amount to this: that it is wrong for a man to say that he is certain of the objective truth of any proposition unless he can produce evidence which logically justifies that certainty.³⁵⁰

Huxley’s descriptions of the agnostic principle show how he understood the shared attitude. As we see in the first quote, he expressed the agnostic principle “positively” and “negatively.” First consider the negative characterization concerning what his principle says to be wrong. The principle regulates an act of “saying,” “professing,” or “pretending” rather than believing. It also

³⁴⁹ Huxley 1889e, 246.

³⁵⁰ Huxley 1889g, 310.

concerns the certainty of the truth of a proposition as opposed to the truth of a proposition. Neither simply holding a belief nor professing a belief about the plausibility of a proposition is subject to the agnostic principle. Notice that the above illustrations include “certainty,” and remind that Huxley understood knowledge in terms of certainty. In short, his agnostic principle targets a claim to knowledge.

Huxley’s agnostic principle also specifies conditions under which it is wrong to claim a proposition to be certain or knowledge: we are allowed to do so only when a given proposition is demonstrable and has been demonstrated, or only when our certainty can be justified by evidence. The expressions like “not demonstrated or demonstrable” or “evidence” are not neutral, of course. To understand the conditions under which a claim to knowledge should be made, we need to take his view of evidence into consideration, which I discussed in the previous section. Accordingly, the agnostic principle prohibits a particular type of action. If one claims one’s belief to be certain without offering any evidence or with something that in fact lacks evidential value, the person is doing something wrong according to the agnostic principle.

Next, consider the other illustration of the agnostic principle: “follow our reason as far as it will take us, without regard to any other consideration.” We can see here something “evidentialistic,” if we understand “follow our reason” to mean taking evidential reasons into consideration, and “any other consideration” to mean any non-evidential reasons. Yet the agnostic principle also sounds similar to Hume’s “wise man” rule that concerns the degree of assurance or certainty, according to which one should proportion one’s confidence in a belief to given evidence.³⁵¹ We can then understand the principle as follows: take into consideration an

³⁵¹ Although Huxley did not quote Hume to introduce the rule, there seems to be no doubt that Huxley as an author of *Hume* was well aware that the rule had been associated with Hume.

evidential reason only and apportion a given proposition's certainty to its evidence. Again, to fill out what he meant by "reason" and "any other consideration," we need to consult his account of legitimate evidence.

How can we summarize the message of Huxley's agnostic principle? Generally speaking, the principle urges everyone to apply the concept of knowledge or knowing strictly. More specifically, by proposing the agnostic principle, Huxley intended to express, I suggest, the following three ideas. First, the degree of certainty of a given proposition, or its status of knowledge, is determined by evidential reasons alone. This idea has nothing to do with what one should do, and it basically re-states the other components of agnosticism in more abstract terms: only propositions that have been verified by experience (in addition to a logical relation) can contribute to determining whether or not a given proposition is certain or entitled to the status of knowledge. Second, to form a judgement or opinion about the certainty of a given proposition, we have a duty to find evidential reasons. It is wrong to have an opinion on whether or not a given proposition is certain without examining evidential reasons. Third, we have a duty to follow what given evidential reasons say about the certainty of a proposition at issue. It is wrong to ignore or manipulate the result of evaluation of evidential reasons by, for example, taking prudential reasons into consideration. The two duties are found in Huxley's writings.³⁵²

Huxley's agnosticism has normative part, and this is an interesting aspect as compared with a definitional analysis of knowledge. Why did he need that part? In a sense, a concept can function as a norm, without having an additional "principle," and he had an account of evidence embedded in his agnosticism. To examine the implication of having the agnostic principle, the

³⁵² Huxley 1863d; 1878h; 1886e; 1887e; 1890d; 1892b; 1892c.

two duties briefly introduced in the previous paragraph should be explained more. In this regard, it would be helpful to contrast Huxley's agnosticism with Clifford's ethics of belief.

5.3. Huxley's agnosticism and Clifford's ethics of belief

This section examines whether or not Huxley endorsed evidentialism *concerning belief formation*. His agnosticism has been understood as a type of evidentialism, because scholars, especially in the literature of ethics of belief, have considered him to share the position of William K. Clifford.³⁵³ Clifford, who has been also regarded as one of influential Victorian intellectuals, made a strong claim in his famous essay, "The Ethics of Belief":

To sum up: it is wrong always, everywhere, and for anyone to believe anything upon insufficient evidence.³⁵⁴

According to Clifford, whenever we believe something on the basis of insufficient evidence, we are doing something morally and intellectually wrong. This position is later called "(strong or strict) evidentialism," according to which a legitimate reason for believing must be evidential as opposed to prudential reasons, although the contemporary version does not usually further include moral evaluation.³⁵⁵ Evidential reasons are reasons related to the truth value of a given proposition and considered to increase its plausibility. On the other hand, prudential reasons are reasons related to potential consequences, usually benefits that one would gain by believing a

³⁵³ Scholars have noted that Huxley's agnosticism and Clifford's ethics of belief convey the same imperative (James 1896; Livingston 1987; Doore 1983; Aikin 2008; Yoder 2013). Van A. Harvey (2013) is a notable exception, whom I will discuss shortly.

³⁵⁴ Clifford 1876, 295.

³⁵⁵ Reisner 2008; Chignell 2016.

given proposition. The famous case in philosophy is Pascal's wager. Blaise Pascal (1623-1662) suggested believing the existence of God based on prudential reasons: weigh the benefits that we would gain by believing and not believing in God. He claimed, we can gain far more benefits by believing in God; hence, believe in God. Clifford's imperative prohibits this kind of prudential belief formation.

It is important to examine whether Huxley indeed endorsed Clifford's imperative, because this issue is related to another issue of whether Huxley violated his own agnosticism when he expressed his faith in axioms of science. Clifford's imperative says that we are (morally and intellectually) allowed to have a belief based on only sufficient reasons, but there seem not to be sufficient reasons to demonstrate axioms of science such as the uniformity of nature. As seen in Chapter 2, the assumption that Huxley endorsed Clifford's imperative is one of the factors that have generated the typical criticism against Huxley, according to which Huxley closed his eyes to his own faith and yet criticized his religious targets for their faith.

It is a historically possible scenario that Huxley and Clifford in fact had an identical view. Huxley was Clifford's academic supporter and dear friend. In 1874, Clifford became a member of the Metaphysical Society on Huxley's recommendation.³⁵⁶ It was the Society where a shorter version of Clifford's "Ethics of Belief" was presented one year before its publication. Moreover, it was the place where Huxley felt that his position differed from other members' and was motivated to coin the term "agnostic."³⁵⁷ According to Alan Brown who researched and documented the Society, Clifford's essay was presented in April 11, 1876, but he could not find the participation log for that meeting (when Huxley presented an essay titled "The Evidence of

³⁵⁶ Bivona 2012.

³⁵⁷ Huxley 1889e.

the Miracle of Resurrection” three month earlier, Clifford attended).³⁵⁸ However, there seems to be no doubt that Huxley was well aware of Clifford’s position, considering controversies generated by Clifford’s essay. Regarding Clifford’s essay, Timothy J. Madigan writes that “[w]hile exciting strong criticisms among certain of the Society’s members, Clifford also had his defenders” and mentions Huxley, FitzJames Stephens, and Leslie Stephens as the defenders.³⁵⁹ Madigan shows how the Stephens brothers defended Clifford’s position by introducing their writings and by explaining their position, but he does not discuss Huxley’s defense in the same manner and only comments that “colleagues such as Thomas Huxley sprang to his defense.”³⁶⁰ Meanwhile, Gowan Dawson reports that Clifford’s radical view concerned Huxley.³⁶¹ The most plausible historical conclusion seems to be a minimal one: Huxley knew well about Clifford’s position on ethics of belief. However, there seems to be no document that shows that Huxley committed himself to Clifford’s thesis or that either of them said so. Thus it would be better to compare and contrast Huxley’s agnosticism and Clifford’s ethics of belief.

We need to clarify Clifford’s position first. Following the literature, I assume that Clifford held at least the view that has been characterized as strong evidentialism: anyone as a believer has a moral and intellectual duty to form a belief on the basis of evidential reasons only. Some scholars have argued that Clifford’s ethics of belief is not as simple as expressed in his famous thesis above.³⁶² However, I will not go into specific issues over Clifford’s position because my main concern is how to interpret Huxley’s agnosticism in connection with Clifford, and his

³⁵⁸ Brown 1947.

³⁵⁹ Madigan 2008, 91.

³⁶⁰ *Ibid.*, 85.

³⁶¹ Dawson 2007.

³⁶² For example, Madigan 2008.

agnosticism has been associated with that understanding of Clifford's position, namely, evidentialism centered on the famous thesis. My interpretative issue here is two-fold: whether or not *Huxley* endorsed Clifford's thesis, and whether or not Huxley's *agnosticism* incorporated the basic evidentialistic notion in the same manner of Clifford's ethics of belief.

Note four features of Clifford's imperative. First, it is moral and intellectual. Second, it is universal in the sense that it is applied to everyone who is capable of believing. Third, it is universal in another sense that it is applied to every case; it does not allow an exception that a failure to fulfill the duty is exempted from blame. Fourth, it targets an act of believing. These features are, we may say, "added on" to the basic evidentialistic notion of considering evidential reasons only.

Although Huxley's agnosticism and Clifford's ethics of belief have been grouped together as evidentialism over belief formation, there is a notable exception. Van A. Harvey recently argues that their views have "subtle but important differences."³⁶³ One of differences that Harvey highlights is that Clifford's imperative concerned anyone's every belief, whereas Huxley's imperative (the agnostic principle) "more narrowly directed at anyone who claims to be certain of the objective truth of any proposition but cannot produce evidence justifying that certainty."³⁶⁴ Thus, an agent who believes *p* on prudential or inadequate reasons does not violate Huxley's principle, because she is not subject to it in the first place. When she claims *p* to be certain, we can then discuss whether she is violating Huxley's principle or not. According to Harvey, Huxley did "not argue that one requires evidence or justification for every belief that one holds."³⁶⁵

³⁶³ Harvey 2013, 10.

³⁶⁴ *Ibid.*

³⁶⁵ *Ibid.*

I am sympathetic to Harvey, because his views on their different targets capture two points that I take as important in understanding of Huxley's agnosticism. The first point concerns how significantly believing stands as an action or attitude that we take toward a proposition. It is not disputable that Huxley's agnosticism has something to do with our action or attitude toward a proposition. What is disputable is whether Huxley's agnosticism takes believing to be the most essential action or attitude that needs to be regulated as Clifford suggested. The interpretation of Huxley's agnosticism as Clifford's ethics of belief assumes that believing was the only significant action to Huxley, although Huxley mainly talked about "saying," "professing," or "pretending to believe." According to Harvey, Huxley's main concern was not believing.

The second point is that Harvey's interpretation makes a distinction between considering p true and considering p certain, which is often ignored in the interpretation of Huxley's agnosticism as Clifford's ethics of belief. When it comes to blameworthiness, Huxley's concern was unentitled attitudes like showing over-confidence in one's belief, not holding a belief.³⁶⁶ The difference between believing p and believing the certainty of p might look to be an insignificant point to make, but not for Huxley who distinguished being true and being knowledge, as noted earlier. Evidence does not work as a truth maker of p , but renders justification for turning our feeling certain of p into our being certain of p .

The lack of attention to those two points seems to have led one to consider Huxley's agnosticism to be identical with Clifford's ethics of belief. Yet it is still possible that Huxley's agnosticism implicitly includes Clifford's thesis even though Huxley had a different focal point. As Harvey points out, Huxley's agnostic principle focuses on claiming one's belief to be certain without justification. We can further ask what grounds Huxley had for the principle. Huxley

³⁶⁶ Huxley 1886e; 1889g; 1892c.

might have found such assertions blameworthy because, at the end of the day, he considered it to be wrong to believe something on non-evidential reasons. If so, then, despite his wording, Huxley's view amounts to Clifford's. Did Huxley endorse Clifford's universal moral imperative on belief formation? Harvey's position on this issue is not clear; yet he writes that "[Huxley and Clifford] believed that irrational beliefs had social consequences, and so it was a duty to weigh the evidence for beliefs."³⁶⁷ This suggests that they had a utilitarian argument for or against a certain type of belief formation.

I have introduced the possibility that because Huxley was committed to Clifford's moral imperative on belief formation, he would have found it blameworthy to claim a proposition to be certain without having evidential reasons. From this, we can find one line of reasoning behind the interpretation of Huxley's agnosticism as Clifford's ethics of belief. Huxley *himself* took the evidentialistic way of forming a belief as an ideal to pursue and tried not to form a belief on insufficient or "wrong" types of reasons. For example, in a letter to Charles Kingsley, which has been often cited as evidence to show that Huxley had held agnosticism before he coined "agnostic," Huxley wrote:

I neither deny nor affirm the immortality of man. I see no reason for believing it, but, on the other hand, I have no means of disproving it. ... Give me such evidence as would justify me in believing anything else, and I will believe that.³⁶⁸

Huxley, who cries "Oh devil! truth is better than much profit" in the same letter, appears to be committing himself to Clifford's imperative on belief formation.³⁶⁹ Moreover, Huxley seems to

³⁶⁷ Harvey 2013, 10; 2012.

³⁶⁸ Huxley 1860c, 314.

³⁶⁹ *Ibid.*, 313.

have thought that a “true” agnostic is a person who strictly follows the evidentialistic way of forming a belief. In an unpublished fragment on agnosticism, Huxley penned that agnosticism is “the method [into] the cause of belief, which [sic] marks the true agnostic, not the results of the intellectual operation conducted according to that method.”³⁷⁰ If an agnostic is supposed to form a belief based on evidential reasons alone and Huxley also tried to be such an agnostic, he would have made a value judgment on a way of forming one’s belief, which amounts to Clifford’s thesis. Moreover, as the line of reasoning may further go, it is plausible to understand the agnostic principle in terms of an agnostic’s ideal regarding belief formation.

Including the two quotations I just introduced, there are some places where Huxley mentioned “believe” or “believing” in normative tone in connection with his agnosticism (four places, as far as I am aware).³⁷¹ This might have encouraged scholars to group Huxley and Clifford together, but it seems that William James should be held responsible for the association and its spread. In his famous lecture essay “Will to Believe,” James introduced, with a comment, the last sentence of Huxley’s essay written for a symposium on “Influence upon Morality of a Decline in Religious Belief” right before the quote from Clifford’s essay.³⁷²

Huxley exclaims: “My only consolation lies in the reflection that, however bad our posterity may become, so far as they hold by the plain rule of not pretending to believe what they have no reason to believe, because it may be to their advantage so to pretend [the word ‘pretend’ is surely here redundant], they will not have reached

³⁷⁰ Huxley n.d.1, Huxley File’s brackets. It is undated but we can conjecture that Huxley wrote this after 1889, because he referred to the essays on agnosticism published in 1889.

³⁷¹ The third place is Huxley’s symposium essay that James quoted. It will be introduced shortly. The last example is Huxley’s letter to Watts, which was published, without Huxley’s permission, in the first issue of *Agnostic Annual* (Lightman 2002; Le Poidevin 2010). Huxley replied to Watt’s question “1. Is Agnosticism in accord with modern science?” as follows: “1. Agnosticism is of the essence of science, whether ancient or modern. It simply means that a man shall not say he knows or believes that which he has no scientific grounds for professing to know or believe” (Huxley 1884a, 5).

³⁷² Huxley 1877d.

the lowest depth of immorality.” And that delicious *enfant terrible* Clifford writes: “Belief is desecrated when given to unproved and unquestioned statements for the solace and private pleasure of the believer [...] ... If [a] belief has been accepted on insufficient evidence [even though the belief be true, as Clifford on the same page explains] the pleasure is a stolen one. [...] It is sinful because it is stolen in defiance of our duty to mankind. That duty is to guard ourselves from such beliefs as from a pestilence which may shortly master our own body and then spread to the rest of the town. [...] It is wrong always, everywhere, and for every one, to believe anything upon insufficient evidence.”³⁷³

In response to the Cliffordian unqualified moral imperative on believing, James argued that one has a right to believe despite insufficient evidence under certain circumstances.³⁷⁴ If we understand that one’s having a right implies others’ duty to accommodate the right, James’s claim would mean that one has a duty not to require sufficient evidence for holding a belief under some conditions, and thus that sometimes holding a belief upon insufficient evidence is exempt from Clifford’s moral valuation. When introducing one of such conditions, James used the expression “lowest kind of immorality” with which he seems to refer back to his earlier direct quote of Huxley, “the lowest depth of immorality” (in fact, Huxley wrote “the lowest depths of immorality”),³⁷⁵ and considered “our scientific absolutists” to share Clifford’s moral imperative:

There are, then, cases where a fact cannot come at all unless a preliminary faith exists in its coming. *And where faith in a fact can help create the fact*, that would be an insane logic which should say that faith running ahead of scientific evidence is the “lowest kind of immorality” into which a thinking being can fall. Yet such is the logic by which our scientific absolutists pretend to regulate our lives!³⁷⁶

³⁷³ James 1896, 7-8, his brackets.

³⁷⁴ It has been known that James regretted having titled his essay “The Will to Believe” instead of “The Right to Believe” (Harvey 1969).

³⁷⁵ Huxley 1877d, 530.

³⁷⁶ James 1896, 25, his italics.

In the symposium essay on the relationship between morality and religious beliefs, Huxley noted that theology had exerted an “enormous influence” on morality (and also *vice versa*), but questioned the claim that the decline in theological beliefs will negatively affect morality.³⁷⁷ Huxley thought that morality is “strong enough to hold its own,” because the “capacity for the pleasures and pains afforded by sense, by sympathy, or by the contemplation of moral beauty and ugliness” is “obviously in no way affected” by “the abbreviation or the prolongation of his conscious life” or even by “the mere existence or non-existence of anything not included in Nature”; as long as “the constitution of man” remains similar and “he believes that actions have consequences,” Huxley conjectured, social and personal morality would not be lost.³⁷⁸ Thus, Huxley did not share the worry that “without this or that theological dogma the human race will lapse into bipedal cattle, more brutal than the beasts by means of their greater cleverness.”³⁷⁹ Yet, he admitted that he might be wrong and wanted to learn about whether the worry has some grounds. According to Huxley who distinguished religion from theology, many theological doctrines are about nature and are subject to “ordinary methods of investigation.”³⁸⁰ Huxley said: “I have not the slightest doubt that if mankind could be got to believe that every socially immoral act would be instantly followed by three months’ severe toothache, such acts would soon cease to be perpetrated”; “[i]t would be a faith charged with most beneficent works,” he continued, “but unfortunately this faith can so easily be shown to be disaccordant with fact that it is not worth

³⁷⁷ Huxley 1877d.

³⁷⁸ *Ibid.*, 530, 536. Huxley understood morality as follows: “[s]ocial morality relates to that course of action which tends to increase the happiness or diminish the misery of other beings; personal morality relates to that which has the like effect upon ourselves” (*Ibid.*, 537).

³⁷⁹ *Ibid.*, 530.

³⁸⁰ *Ibid.*, 538.

while to become its prophet.”³⁸¹ In the same manner in which he dealt with this “toothache” doctrine, Huxley asked if there are reasons for assuming some sort of connection between the decline in morality and disbeliefs in particular theological doctrines. His point was that if we keep following the ordinary methods of investigation, we would not reach “the lowest depths of immorality,” even if it were true that the loss of the faith in particular theological doctrines weakens our morality.

Huxley’s expression “the lowest depths of immorality” appears to have caught James’s special attention. In an essay written before “The Will to Believe,” James wrote:

With regard to all other possible truths, however, a number of our most influential contemporaries think that an attitude of faith is not only illogical but shameful. Faith in a religious dogma for which there is no outward proof, but which we are tempted to postulate for our emotional interests, just as we postulate the uniformity of nature for our intellectual interests, is branded by Professor Huxley as “the lowest depth of immorality.”³⁸²

Here we can also see the typical criticism of Huxley: Huxley was blind to his own faith in axioms of science and yet condemned religious faith. Huxley is here portrayed as one who endorsed the Cliffordian imperative but gave himself an exception.

It would be incorrect to say that Huxley and Clifford shared nothing. Like Clifford, Huxley valued the evidential way of forming a belief. There could be several ways that one can adopt as a policy for forming one’s belief, for instance, relying on the Bible, people in authority, rolling a die, and so on. Huxley himself tried to follow the evidentialistic policy and believe

³⁸¹ *Ibid.*, 530

³⁸² James 1879, 92-3.

accordingly.³⁸³ They also shared the social context. They lived in Victorian society where they thought their evidentialistic policy was neither secured nor welcomed but yet needed; they applied their policy to theological matters (and non-theological matters) and as a result, they were blamed and tagged as “infidels” or “atheists.”³⁸⁴ In other words, they had to argue that forming a belief solely on evidence is *not* something that should be condemned. They shared the same aim.

However, Huxley and Clifford did not further share a reactive strategy for defending their cherished policy. Here we can see how they differently formulated their evidentialistic criterion. Against those who asserted that it is morally wrong not to believe in Christian doctrines, Clifford’s position would be that *on the contrary* what is actually morally wrong is to believe something on non-evidential reasons. According to Clifford, believing is not private act, but a public act that has social repercussions.³⁸⁵ In this sense, believing can be an act that requires regulation. In other words, Clifford’s strategy amounts to *immoralizing* his critics’ habit of believing. In this way, the evidentialistic policy would have been shaped to be a duty to believe and framed as a universal moral duty.

On the other hand, Huxley was defensive, as opposed to proactive.³⁸⁶ Huxley’s focus was on de-immoralizing the evidentialistic way of forming a belief, rather than on moralizing a certain way as the only right way of believing. This point should not be regarded as an overly interpretative distinction, fooled by his rhetorical skill. If we examine why Huxley reacted in such

³⁸³ Huxley 1860c, 314-5; 1866a, 158; n.d.1.

³⁸⁴ Huxley 1866a; 1889e; 1892c; 1892b; Madigan 2008.

³⁸⁵ Harvey 1969; Madigan 2008.

³⁸⁶ Harvey makes a similar point: “He [Huxley] does claim that his principle is both ethical and intellectual, but interestingly enough, his invocation of the terms ‘reprobation’ and ‘abomination’ is applied principally to those clerics who themselves assert that it is morally wrong *not to believe* certain propositions (about God, Christ, etc.)” (2013, 10, his italics).

a defensive manner, I think, we can conclude that he was not willing to endorse the evidentialistic policy in the form of universal moral duty for any believer.

Let's see first how Huxley defended his application of the evidentialistic criterion. Although James complained about Huxley's use of word "pretend," it is important because it tells us how Huxley understood what he was not doing and what his religious opponents were doing. We need to see contexts regarding what Huxley argued against to see in what sense pretending can be a blameworthy act.

Huxley had to deal with the claim that it is condemnable not to believe Christian doctrines, which may sound an unpopular claim to make in the current secularized society or at least in the literature of epistemology or of ethics of belief. For example, Huxley introduced the claim made by John Henry Newman:

The Cleric [Newman] asserts that it is morally wrong not to believe certain propositions, whatever the results of a strict scientific investigation of the evidence of these propositions. He tells us "that religious error is, in itself, of an immoral nature." He declares that he has prejudged certain conclusions, and looks upon those who show cause for arrest of judgment as emissaries of Satan.³⁸⁷

Similarly, Huxley reported the assertion of Henry Wace who blamed non-believers:

"It is, and it ought to be," authoritatively declares this official representative of Christian ethics, "an unpleasant thing for a man to have to say plainly that he does not believe in Jesus Christ."³⁸⁸

³⁸⁷ Huxley 1889g, 313.

³⁸⁸ Huxley 1889e, 240.

Huxley acknowledged that the evidentialistic way of forming a belief was not properly appreciated, and especially by clerics who appeared to care only about its outcome, that is, whether one believes Christian doctrines or not. In “Agnosticism and Christianity,” Huxley clarified the ideas underlying the moral accusation brought against agnostics’ practice:

That which Agnostics deny and repudiate, as immoral, is the contrary doctrine, that there are propositions which men ought to believe, without logically satisfactory evidence; and that reprobation ought to attach to the profession of disbelief in such inadequately supported propositions.³⁸⁹

We can see here what Huxley argued against. He did not argue against the theses that there are propositions which a person *may* believe without logically satisfactory evidence and that reprobation ought *not* to attach to the profession of *belief* in such inadequately supported propositions, which James wanted to claim while setting up Huxley as a foil.

Huxley argued against the doctrine that there are propositions that one ought to believe without or regardless of evidence, because it is not compatible with the practice of the evidentialistic way of forming a belief, which agnostics would take as an ideal life to lead. Moreover, if it is morally wrong to believe in accordance with the result of one’s evidentialistic examination of a given proposition, it would be hardly meaningful to conduct such an examination in the first place, which he thought was critical for scientific practice. It was an important and necessary task for Huxley to eliminate morally negative connotations that had been associated with a group of people who requested reasons, decided to follow reasons only and cast doubts or believed accordingly.

³⁸⁹ Huxley 1889g, 310.

The importance and necessity of the task seems to have led Huxley to a particular focal point of illustrating the history of human inquiry.³⁹⁰ People following the evidentialistic way of forming a belief had been oppressed. Despite intellectual persecution, evidentialistic thinkers had continued to appear and yet again, to struggle. It is worth noting how he portrayed them: “[i]t had long been difficult for reasonably honest people even to pretend to believe in the mythological fables held sacred by their forefathers.”³⁹¹ They are not moral offenders who deserve a shameful label, but innocent and intellectual victims (or at least powerless minority). To Huxley, Victorian society was society where a non-evidentialistic way was regarded as a morally default way of forming one’s belief.³⁹²

How, then, did Huxley argue against the claim that there are propositions that one ought to believe without evidence? To eliminate the moral blame placed on the evidentialistic way of forming a belief, which an agnostic pursues, Huxley could have turned an agnostic’s ideal to any believer’s moral duty as Clifford did. Yet it is hard to find Huxley arguing in this way.

The first reason why Huxley thought it not morally wrong to practice the evidentialistic way of belief formation can be seen in Huxley’s reply to Wace (whose moral accusation was

³⁹⁰ Huxley 1892c; 1895b.

³⁹¹ Huxley 1895a, 527.

³⁹² Recollecting his childhood, Huxley wrote as follows:

From dark allusions to “sceptics” and “infidels,” I became aware of the existence of people who trusted in carnal reason; who audaciously doubted that the world was made in six natural days, or that the deluge was universal; perhaps even went so far as to question the literal accuracy of the story of Eve’s temptation At the same time, [preachers] imagined they were discharging that most sacred duty by impressing upon my childish mind the necessity, on pain of reprobation in this world and damnation in the next, of accepting, in the strict and literal sense, every statement contained in the Protestant Bible. I was told to believe, and I did believe, that doubt about any of them was a sin, not less reprehensible than a moral delict. I suppose that, out of a thousand of my contemporaries, nine hundred, at least, had their minds systematically warped and poisoned, in the name of the God of truth, by like discipline. I am sure that, even a score of years later, those who ventured to question the exact historical accuracy of any part of the Old Testament and *a fortiori* of the Gospels, had to expect a pitiless shower of verbal missiles, to say nothing of the other disagreeable consequences which visit those who, in any way, run counter to that chaos of prejudices called public opinion (Huxley 1892c, 21-2).

quoted above). Huxley said, “A thousand times, no! It ought *not* to be unpleasant to say that which one honestly believes or disbelieves.”³⁹³ To Huxley, agnostics are those who only follow evidential reasons when examining the certainty of a given proposition *and* accordingly form a belief. Thus they would refuse to say that they believe what they find lacking evidential reasons. Considering shared moral virtues like honesty or sincerity, Huxley thought, there is nothing morally wrong about their profession of disbelief and their refusal to pretend by saying that they believe what they do not actually believe.³⁹⁴ Yet, as Huxley acknowledged, the moral blame ultimately targets agnostics’ very practice of the evidentialistic way of believing.

It is also found in his early writings that Huxley acknowledged the negative connotations attached to disbelievers and tried to get rid of them. For example, in 1847, Huxley wrote a letter to his future wife Henrietta Heathorn (1825-1914). Huxley appears to have worried that his views on religious doctrines might have negative impacts on their relationship which had just started.³⁹⁵

I have thought much of our afternoon conversation, and I am ill at ease as to the impression I may have left on your mind regarding my sentiments. If there be one fact in a man’s character rather than another, which may be taken as a key to the whole, it is the tendency of his religious speculations. ... Opinion is the result of evidence. From a given amount and strength of evidence, as cause, a certain belief must, in all minds, always follow as effect. The intellect here acts passively, and is as irresponsible for its conclusion as a jury, who convict a man on the strength of certain evidence are irresponsible for their conclusion should that evidence turn out to have been unworthy of trust. ... The opinion a man has, once more, neither is nor can be a matter of moral responsibility. The extent to which he deserves approbation or reprobation depends on the mode in which he has founded his opinion – and of this the Almighty search of hearts can alone be the efficient judge. May his fellowmen

³⁹³ Huxley 1889e, 241, his italics.

³⁹⁴ Huxley 1860c; 1889e.

³⁹⁵ Huxley first met Heathorn in 1847, and this letter seems to be the third letter sent to her, judging from the information at website “Thomas Henry Huxley Collection” provided by Imperial College London, Records and Archives (<http://www.imperial.ac.uk/recordsandarchives/huxleypapers/>).

then form no judgment upon the point? Surely they must and will do so, But let them not judge him by his agreement or disagreement with their own ideas however venerable and raised the latter may appear to them – let them rather inquire whether he be truthful and earnest – or vain and talkative – whether he be one of those who would spend years of silent investigation in the faint hope of at length finding truth, or one of those who conscious of capability would rather gratify a selfish ambition by adopting and defending the first fashionable error suited to his purpose.³⁹⁶

Here, we can see two ideas regarding how Huxley defended evidentialistic thinkers. Like the previously introduced defense, the first idea also appeals to moral virtues, but differently. The earlier defense was that it is not morally wrong to *express* one's genuine opinion or belief. In this letter, the defense is that there is nothing morally wrong about the evidentialistic way of forming one's belief. If we are to make a moral judgment regarding one's opinion or belief, he suggested attending not to one's opinion but to one's "mode in which [one] has founded [one's] opinion." He then implied that similar minded persons like him, evidentialistic thinkers, are "trustful and earnest" and "spend years of silent investigation." There is nothing morally wrong about their mode of arriving at an opinion.

Huxley appears to think that if people do not judge his opinion by checking whether it is the same as that of clerics or that of infidels, but instead they judge it by considering what kind of person he has been and what kind of mode his inquiry has taken, they could not find something immoral about the practice leading him to an opinion that he has. He brought in one's moral character and intentions that would indicate one's mode of arriving at an opinion, because, we are not usually in position of being an "efficient judge" who can directly evaluate one's mode. He noted that we should make a moral judgment regarding one's opinion in this way. This suggestion is based on another point that he made to defend the evidentialistic thinking: a moral

³⁹⁶ Huxley 1847. See also Huxley 1860c; 1880b; 1892c.

evaluation should be made concerning one's mode of arriving at an opinion, not one's *holding* an opinion. This point deserves further attention.

According to Huxley, one “neither is nor can be” held morally responsible for holding a certain opinion, because holding an opinion is not something that one can control but a result caused by learning evidence.³⁹⁷ This point is particularly interesting because he appealed to an idea that is similar to the view now labeled “doxastic involuntarism” which is often invoked, ironically, to criticize Clifford’s ethics of belief. This type of involuntarism is a position on believing, according to which we cannot make ourselves believe. As William P. Alston puts it, “beliefs are items we *find* ourselves with, not items we *choose* to have.”³⁹⁸ Critics of Clifford argue, based on the so-called “‘ought’ implies ‘can’ principle,” that the very idea of ethics of belief makes no sense because it prescribes a moral rule over what we cannot control, that is, what to believe.³⁹⁹

Huxley’s rationale for the claim that one is not morally responsible for holding one’s opinion *per se* is that one comes to hold it involuntarily or, as he puts it, the intellect “acts passively” in the presence of evidence. He also held a view that captures the ought-implies-can principle. For example, regarding an idea about “a prohibitory duty upon philosophical speculation,” he wrote:

In this case, however, as in some others, those who lay down the law seem to forget that a wise legislator will consider, not merely whether his proposed enactment is

³⁹⁷ Huxley expressed a similar idea as follows: “Every belief is the product of two factors: the first is the state of the mind to which the evidence in favour of that belief is presented; and the second is the logical cogency of the evidence itself” (1880b, 230).

³⁹⁸ Alston 1996, 7, his italics.

³⁹⁹ Chignell 2016.

desirable, but whether obedience to it is possible. For, if the latter question is answered negatively, the former is surely hardly worth debate.⁴⁰⁰

Similarly, he wrote fifteen years later:

Suppose there is an immutable eternal moral law for the angels: what is that to us who are not angels and do not live under heavenly conditions? Surely a farmer, who laid down rules for his horses and expected his pigs to obey them, would be a little unreasonable!⁴⁰¹

Huxley thought that “morality is in its very essence a rule for the guidance of his [man’s] conduct,” and regarding the suggestion of a moral rule that prescribes something an agent cannot do, he confessed that he was “at a loss to understand.”⁴⁰²

Huxley’s version of doxastic involuntarism can be then understood as follows. We cannot entirely control our believing, but as he suggested, we can indirectly influence our believing by exposing or not exposing ourselves to evidence. Thus, for this reason, we cannot be held responsible for holding an opinion but we can be held responsible for our manner with which we come to believe something. Based on this idea, he argued that there is nothing morally blameworthy in the manner in which agnostics come to have a belief or opinion. Although each agnostic would lead a different life and have various characters, agnostics’ manner in principle (or “true” agnostics’ manner) is to adopt the evidentialistic policy for arriving at their belief. In hopes of finding knowledge, taking into consideration only factors that indicate whether a given proposition can count as knowledge is far from being morally condemnable.

⁴⁰⁰ Huxley 1879a, 288.

⁴⁰¹ Huxley 1895b in Peterson 1932, 320-1.

⁴⁰² *Ibid.*, 320.

Yet Huxley's version has an interesting qualification: only believing on evidential reasons is involuntary.⁴⁰³ The idea is that when presented with evidential reasons, an opinion or belief emerges in our mind. Here he is pointing to the force of evidence and logic which is not something that is easily resistible. On the other hand, our attending to prudential reasons does not get us to believe proposition p involuntarily. Acknowledging the usefulness of believing p does not generate belief p in our mind whereas acknowledging the amount and strength of evidence for p does. In this sense, he said that we pretend that p when attending to prudential reasons while disregarding evidential reasons, whereas he did not say that we pretend that $\sim p$ when attending to evidential reasons while disregarding prudential reasons. Thus, to Huxley, holding a belief based on evidential reasons is the state in which we have been placed involuntarily, and is not subject to moral condemnation; our act of exposing ourselves to evidential reasons is a voluntary act, but it is hardly morally reproachable. On the other hand, holding a belief based on prudential reasons is the state in which we have chosen to be, often disregarding a belief generated by the lack or presence of evidential reasons, and in this sense, the state involves pretension; our act of paying attention to prudential reasons is a voluntary act, and he found it intellectually blameworthy when it is done to make a claim to knowledge. In short, the restricted version of doxastic involuntarism enabled Huxley to de-immoralize one's evidentialistic way of belief formation and make room for epistemically blaming one's non-evidentialistic way of belief formation.

It is then more plausible to conclude that Huxley did not hold the strong thesis that has been credited to Clifford. Huxley's defensive stance shows that he focused on de-immoralizing the evidentialistic way of forming a belief, and his rationale behind his defense undermines the interpretation that Huxley and Clifford endorsed the same moral imperative on believing. Huxley

⁴⁰³ Huxley 1869a.

could not see any moral wrongdoing in those who adopt the evidentialistic policy and believe accordingly: they are just people who have earnestly struggled to find knowledge and expressed their genuine beliefs. Huxley's views discussed so far do not establish the case that he made the claim that the evidentialistic way of belief formation is the only morally right way.

We can find another set of reasons for concluding that Huxley's position is not the same as Clifford's imperative from Huxley's stance on ordinary beliefs and on having a faith. Clifford's imperative does not allow exceptions, but Huxley was not willing to claim that it is always morally wrong to believe anything on non-evidential reasons or on faith. Huxley appears to have granted multiple manners of arriving at a belief to lead one's own life.

First of all, Huxley admitted that a belief without evidential reasons can have practical values in ordinary life (of course, pernicious effects as well).⁴⁰⁴ It can give people some emotional comforts such as encouragement or consolation, and in this sense, he noted, "even the worst form of Christianity" can be said to have given a "great practical advantage to them [believers]."⁴⁰⁵ However, one might point out, admitting practical values does not necessarily mean that he rejected Clifford's thesis. Clifford can also admit practical values of believing on non-evidential reasons while thinking it morally and intellectually wrong. This is a fair point, but Huxley did not make a moral judgement on one's having a groundless belief as long as context concerns one's way of leading a life, not one's claiming such a belief to be certain or knowledge.

Second, Huxley was well aware that some beliefs that we hold lack evidential reasons such as a belief that we rely on as a "starting point" for reasoning.⁴⁰⁶ He would have agreed on

⁴⁰⁴ Huxley 1860c; 1889e.

⁴⁰⁵ Huxley 1889e, 241.

⁴⁰⁶ Huxley 1878h;1889e.

James's remark that "[t]here are, then, cases where a fact cannot come at all unless a preliminary faith exists in its coming," although James assumed that he would not.⁴⁰⁷ Huxley also noted that we are "often obliged, by the pressure of events, to act upon very bad evidence."⁴⁰⁸ This shows that Huxley permitted exceptions to Clifford's imperative.

Last, Huxley did not claim that having faith in itself is morally wrong. He had no quarrel with individuals living by faith, and often described himself as having faith. In fact, this has led critics to argue that he had his own article of faith, that is, faith in science. Yet interestingly, he openly and shamelessly expressed his faith.⁴⁰⁹ His stance on faith has been unappreciated and I will return to it in next chapter where I examine the criticism that Huxley's faith in science is on par with his religious targets' faith. For now, we just need to note that Clifford's imperative is too strong for Huxley to fully endorse.

To sum up, Huxley observed that some people (whom he called "agnostics") adopt the evidentialistic policy for forming their belief and tried to be one of them, but he did not formulate this policy as a universal moral imperative that any believer ought to obey in every case. Huxley would not be happy with the interpretation that his agnosticism amounts to evidentialism concerning *what to believe*; he tried to argue against the notion that there is something that we ought to believe. Now we can focus on my suggestion about the imperatives that he wanted to have in his agnosticism. In the previous section, I briefly introduced a duty to examine evidential reasons for making a claim to be certain or knowledge, and a duty to accept the result of an examination. In the following, I will discuss them in detail.

⁴⁰⁷ James 1896, 25.

⁴⁰⁸ Huxley 1889e, 243. Also Huxley 1888b.

⁴⁰⁹ Huxley 1887e; 1887g, 553; 1889e; 1892c.

5.4. How to follow the agnostic principle

The agnostic principle sounds like an instruction only for those who are willing to be an agnostic. Yet it also sounds like a universal principle, especially when we consider that it was the basis that Huxley had for criticizing clerics. If his principle was only meant to be a rule for insiders, his agnosticism would not work as a criticism against those who are not interested in becoming an agnostic such as Victorian clerics, materialists, or all sorts of “-ists.” Huxley’s writings show that he intended his agnosticism to be universally applicable. I suggest that the agnostic principle was his ethics of knowing. The aim of this section is to clarify duties implied in his agnosticism.

Clifford and Huxley promoted the evidentialistic policy – taking into consideration evidential reasons alone. Clifford urged people to adopt this policy whenever they form a belief or whenever they judge what to believe. It was turned into a universal and unqualified imperative for any believer. In contrast, I argue, Huxley urged people to adopt this policy whenever they intend to have a belief about the certainty of a proposition or whenever they judge what to accept as certain or knowledge. Huxley turned the policy into a universal and unqualified imperative not for any believer. Instead of claiming that his opponents believed Christian doctrines in a morally wrong way, Huxley claimed that their cherished doctrines were not certain as they insisted or that their assurance was unfounded.⁴¹⁰ Clifford characterized the evidentialistic policy as an ethics of believing, whereas Huxley characterized it as an ethics of knowing.

What would it mean to have the evidentialistic policy in a guide to knowledge as a principle? I believe that Huxley wanted to highlight the following universal duties by proposing his agnostic principle. First, to learn about the knowledge status of a given proposition, one ought

⁴¹⁰ Huxley 1878h; 1886e; 1889e; 1889g; 1890d.

to attend to evidential reasons and evidential reasons only. Afterwards, second, one ought to accept the result of an evaluation: in Huxley's expressions, "professing to accept for proof evidence which we are well aware is inadequate" or "willfully shutting our eyes and our ears to facts which militate against this or that comfortable hypothesis" should not be done.⁴¹¹ I regard the second duty as more important in understanding his agnostic principle, because he had a quite specific picture about what we should do once we expose ourselves to evidential reasons, as I will show shortly.

Let's start with the first duty. It requires us to take into consideration evidential reasons and evidential reasons only when we judge the certainty or knowledge status of a given proposition. This duty might be seen as uncontroversial because it appears to prescribe that we should strictly employ the concept of knowing or knowledge. However, as shown, Huxley's agnosticism includes his view of evidential reasons, which might be contentious. This duty, then, turns out to be that we should commit ourselves to his account of legitimate evidence.

According to Huxley, evidence is a trustworthy perception, and a trustworthy perception can function as evidence when it supports the occurrence of a particular event or phenomenon at issue, and not others. He grouped evidence into three categories: direct observational or experimental evidence, (human) testimonial evidence, and circumstantial evidence.⁴¹² The observational evidence is evidence that can verify a given statement by showing that we have experienced a (expected) set of impressions, but it is not always available. Especially when we deal with the past, we have to rely on the last two types of evidence. Using Huxley's example, a

⁴¹¹ Huxley 1892c, 54; 1886e; 1890d.

⁴¹² Huxley 1876c. Huxley considered an experiment to be a special kind of observation where we know conditions related to an event to be observed; thus he called experiment "artificial observation" (1854a, 52; also 1880a).

witness's report on a murder is testimonial evidence whereas the shape or character of injury is circumstantial evidence.⁴¹³ Although "[w]e are very much in the habit of considering circumstantial evidence as of less value than testimonial evidence," Huxley argued, "it must not be forgotten that, in many cases, circumstantial is quite as conclusive as testimonial evidence, and that not unfrequently, it is a great deal weightier than testimonial evidence," because circumstantial evidence is less subject to falsification and various kinds of doubt.⁴¹⁴ We may understand this point to mean that circumstantial evidence is less subject to, in contemporary terms, respectively, rebuttal defeaters and undercutting defeaters.

As implied in the quote above, we also need to evaluate the quality of alleged evidence. Evidence is after all a perception. Perceptions are the only materials available to us, but not all perceptions are trustworthy. Huxley wrote:

"I tell you I saw it myself," is the so-thought conclusive assertion with which many a controversy is abruptly ended. Commonly those who make this assertion think that after it nothing remains to be urged; and they are astonished at the unreasonableness of those who still withhold their belief. . . . [Y]et they cannot imagine that their own perceptions have been vitiated by influences like those which vitiated the perception of others. Or, to put the thing more charitably and perhaps more truly, they forget that such vitiations are constantly occurring.⁴¹⁵

According to Huxley, they do have a perception, but not thereby having evidence. If we want evidence, we need to check, for example by trying experiencing again, whether there is any defeater that "vitiates" the quality of a perception at issue, because it can count as evidence only

⁴¹³ Huxley 1876c.

⁴¹⁴ *Ibid.*, 57.

⁴¹⁵ Huxley [Anon.] 1853, 162. See also Huxley 1889e.

when it is indeed trustworthy. That is, in some cases, alleged evidence itself becomes a claim that calls for independent evidence.

A perception suggested as evidence needs to be examined from another aspect. According to Huxley, our perception may be either distorted or incomplete, because our perceptions are generated in various degrees with the aid of a “pre-condition.”⁴¹⁶ Huxley noticed that people tended to consider their “evidence” to report what they were sensing, but sometimes their evidence turned out to be one of interpretations of what they were sensing. In this case, alleged evidence may not have evidential power as intended. We should keep in mind that a “sensible phenomenon” can be reported in different ways, and thus we need to examine whether an interpretative framework incorporated into given evidence is credible.⁴¹⁷ In this regard, Huxley introduced Johann Wolfgang von Goethe’s aphorism on facts as theories. Huxley understood it to imply that “[o]ur faculties are liable to report falsely from two opposite causes – the presence of hypothesis, and the absence of hypothesis.”⁴¹⁸ The first cause tends to lead to a distorted perception and the second to an incomplete perception.⁴¹⁹ From this perspective, he approached witnesses in miracles or some magical powers like psychokinesis. They may be sincere and well-intended, but they may not know that other ways may have produced the event.⁴²⁰

When are we advised to examine whether a given perception indeed has evidential power? Huxley introduced a “canon,” which he considered to capture Hume’s principle and common sense reasoning: “the more a statement of fact conflicts with previous experience, the

⁴¹⁶ Huxley [Anon.] 1853, 167.

⁴¹⁷ Huxley 1889e, 262, n. 9.

⁴¹⁸ Huxley [Anon.] 1853, 162. He introduced Goethe’s “Alles factische ist schon Theorie” in his 1889e (262, n. 9).

⁴¹⁹ Huxley [Anon.] 1853, 167.

⁴²⁰ Huxley [Anon.] 1853; 1878h; 1889e; 1889a.

more complete must be the evidence which is to justify us in believing it.”⁴²¹ He illustrated the canon as follows:

If a man tells me he saw a piebald horse in Piccadilly, I believe him without hesitation. The thing itself is likely enough, and there is no imaginable motive for his deceiving me. But if the same person tells me he observed a zebra there, I might hesitate a little about accepting his testimony, unless I were well satisfied, not only as to his previous acquaintance with zebras, but as to his powers and opportunities of observation in the present case. If, however, my informant assured me that he beheld a centaur trotting down that famous thoroughfare, I should emphatically decline to credit his statement; and this even if he were the most saintly of men and ready to suffer martyrdom in support of his belief. In such a case, I could, of course, entertain no doubt of the good faith of the witness; it would be only his competency, which unfortunately has very little to do with good faith, or intensity of conviction, which I should presume to call in question.⁴²²

Huxley explained that his strong hesitation to credit the testimony on a centaur was not meant to point to an impossibility. As he noted, if a centaur is shown to exist, anatomists and physiologists would have something to work on and might need to revise established generalizations. The hesitation means “to cast the entire burthen of proof, that centaurs exist, on the shoulders of those who ask [one] to believe the statement.”⁴²³ The burden can be placed on them, because to Huxley, a less conflict with previous experience and repeated experience suggests a wider range of and higher degree of being verified.⁴²⁴

In many places, we can see Huxley applying this canon. Many of his critical discussions of Christian doctrines developed in this manner.⁴²⁵ Some clerics claimed that their belief was

⁴²¹ Huxley 1878h, 158. Also, Huxley 1887c; 1889e, 226.

⁴²² Huxley 1878h, 158-9.

⁴²³ *Ibid.*, 160.

⁴²⁴ *Ibid.*; 1887c.

⁴²⁵ Huxley 1878h; 1886e; 1889e; 1890d; 1892c.

certain; based on the canon, Huxley “hesitated” to accept their beliefs as certain and instead asked for evidence; he examined and found that alleged evidence had in fact no evidential value; accordingly, he concluded that their claim was not certain. This process shows that Huxley did not dismiss their claims in an *a priori* manner. He might be seen as biased against clerics’ claims, but he was applying the canon, which he considered to have epistemological grounds. In order for the testimonial evidence that an adult man walked on water to count as evidence, more demanding scrutiny is required than the report, say, that an adult man went down.

Complying with the agnostic principle involves taking into account evidential reasons and not other types of reasons, when our concern or context is the certainty of a given proposition. However, Huxley did not stop there. Following the agnostic principle also means admitting the result of an evaluation. This, to Huxley, involves exhibiting two kinds of attitude. First, we should be honest. Second, we should take a proper epistemic attitude toward a given proposition in accordance with a given outcome. Each point will be clarified in the following.

Consider that we examine evidential reasons offered for a given proposition, and suppose that the reasons do not show the certainty of the proposition. According to the agnostic principle, we should accept this result *as* turned out. Yet what does honesty have to do with this acceptance? According to Huxley, a competent judge will be able to see the value of given evidence, and a knowledge seeker will note that whether a proposition at issue counts as certain is determined in the light of given evidence and independently from one’s wish. Once evaluation is done, admitting the result is not an act that requires voluntary efforts or will, as discussed in the previous section. When we expose ourselves to evidential reasons, through simple or complex valuation of evidence depending on a case, we are led (or “compelled,” as Huxley sometimes

said) to have a belief or opinion concerning whether a proposition at issue is certain or not.⁴²⁶

What we need to do is to be honest about a generated belief or opinion and not to forge one.

Thus, Huxley's agnostic principle says: do not *pretend* that one's belief is certain when it turns out not to be certain; do not *pretend* that others' belief is uncertain when it turns out to be certain.

In this way, Huxley connected his agnosticism with the virtue of honesty.

Honesty has been associated with agnosticism, but as far as Huxley's agnosticism is concerned, it is more precise to understand honesty as being honest with logical and evidential forces that compel us to have a belief or opinion, rather than as being honest about the fact that there is something that we are not capable of knowing. We have this kind of honest attitude when we are in a state of the lack of pretension or intention to misrepresent, as opposed to a humble state with feelings of inferiority in front of something of which we are ignorant, or, say, the "Unknowable." To Huxley, "intellectual honesty means absolute submission to evidence."⁴²⁷

In addition to the attitude of being honest, admitting the result of an evidential evaluation also involves an epistemic attitude. There are three modes of being honest in accordance with possible results of an examination on evidence. First, a proposition at issue falls under the boundary of knowledge, and it has been demonstrated. Second, a proposition at issue falls under the boundary, but neither it nor its opposite has been demonstrated. Third, a proposition at issue does not fall under the boundary; it is not demonstrable because no evidence can be offered.

Consider the first two cases that concern our attitude toward propositions within the boundary of knowledge. Huxley was more generous about counting a proposition as being within the boundary of knowledge than his opponents would like to assume. All we can know is, in the

⁴²⁶ Huxley 1893-4 (Vol. V), xvi.

⁴²⁷ Huxley 1876b, 7.

end, facts of phenomena, and this sets the boundary of our knowledge. In other words, except statements that purport to be about the “real” world as opposed to the phenomenal world, any statement was counted by him as being placed within the boundary of knowledge. For example, proponents of materialism according to which reality consists of matter and force transgress the boundary of knowledge, because they wish to deal with absolute and eternal entities. On the other hand, if one intends to make a claim about material objects as constituents of the phenomenal world, this claim falls under the boundary of knowledge; he treated such a claim as a hypothesis. Thus, for the same reason, he did not dismiss statements about immaterial or spiritual phenomena as transgressing the boundary of knowledge.⁴²⁸ Many of Christian doctrines, he found, concern the phenomenal world.⁴²⁹

With respect to any statement within the boundary of knowledge, according to Huxley, we have to request evidence and evaluate the value of offered evidence, as explained above. When either p or $\sim p$ has been shown to be justified by evidence, we accept it as knowledge or certain. He noted that not all his contemporaries, including clerics and even scientists, exhibited this attitude when it was required.⁴³⁰

An interesting case is when neither p nor $\sim p$ is certain, because Huxley recommended a specific stance that has become a signature stance of agnosticism. As mentioned, to conclude that proposition p is certain and deserves the status of knowledge, there must be evidential reasons. In other words, justification is necessary. A possibility of p being true or the lack of evidence for $\sim p$ is not sufficient enough to count p as knowledge.⁴³¹ If we have this case, according to Huxley, we

⁴²⁸ However, Huxley strongly refused to engaged in an inquiry on spiritualism (for example, see 1871d).

⁴²⁹ Huxley 1878h; 1886e; 1888b; 1889e; 1892a.

⁴³⁰ Huxley 1863d; 1878h;1887c; 1887g; 1892a.

⁴³¹ Huxley 1876c; 1878h; 1870e.

should say “I don’t know.” This profession of ignorance differs from the profession of ignorance regarding something beyond our boundary of knowledge. In the case where we do not have positive evidence for either p or $\sim p$, which may be found later, the profession of ignorance means the suspension of judgment. We neither affirm nor negate p , but we can assume that either p or $\sim p$ can be supported by evidence. In short, we do not know whether p or $\sim p$ is the case. Huxley tended not to take or recommend the suspension of judgment regarding statements outside the knowledge boundary; there is no judgement to be suspended. Huxley appears to have reserved this stance only for statements within the boundary. Examples of such statements that Huxley mentioned were ones about whether evolution occurred, whether evil spirit was moved to pigs, whether a large amount of people were fed with a small amount of food, the story about Regal Rome, or legendary figures like King Author.⁴³² This stance, suspension of judgement, deserves further attention.

Some might think that Huxley’s conception of the suspension of judgment is similar to that of the stance recommended by ancient skeptics for cases that competing claims are equally convincing. However, Huxley’s conception involves the situation of claims being equally *not* conclusive. Since his agnostic principle requires the presence of positive evidence to make a claim to knowledge, when a position has not been supported by evidence, the suspension of judgement is required. As he said, when “none is worthy of belief,” “our condition of mind should be that suspension of judgment which is so difficult to all but trained intellects.”⁴³³ His standard for not suspending judgment or for withdrawing the suspension of judgement would be comparable to the standard of proof used in criminal cases, beyond reasonable doubt, not the one

⁴³² Huxley 1866a; 1889e; 1890d.

⁴³³ Huxley 1876c, 56; 1870e.

in civil cases. In this manner, he mentioned a “verdict of ‘not proven’” with respect to historical claims of Christianity.⁴³⁴ To Huxley, the suspension of judgment is not, strictly speaking, a stance led by relative comparison of how compelling each position is.

Another point that distinguishes Huxley’s conception of the suspension of judgment from that of ancient skeptics is that to him the suspension of judgment is not the final stage to stay.⁴³⁵ Ancient skeptics claimed that by suspending our judgment, we would be able to be in tranquil mind.⁴³⁶ Although Huxley expressed worries about people’s impatience with the “most wholesome state of mind – suspended judgment,” it is a temporal and intermediate stage.⁴³⁷ Suspending judgement about a given proposition means to him that if we continue to pursue knowledge and search for evidence, we would be able to arrive at our judgment about which one is the case. Thus, for example, he explained why some people had been “unwilling to accept evolution” before Darwin as follows: there had been no better grounds than those offered by Jean-Baptiste Lamarck and Robert Chambers, and due to the lack of evidence, those people “therefore [had] preferred to suspend their judgment on the question.”⁴³⁸

The point that the suspension of judgment is not the final stage leads to another point that it involves “active doubt,” which was Huxley’s translation of Goethe’s “Thätige Skepsis.” “It is,” Huxley explained, “doubt which so loves truth that it neither dares rest in doubting, nor extinguish itself by unjustified belief.”⁴³⁹ Huxley’s notion of doubt does not necessarily refer to a

⁴³⁴ Huxley 1889g, 311; 1893-4 (Vol. V), xxxi; also 1884a, 5.

⁴³⁵ Huxley 1893-4 (Vol. V).

⁴³⁶ Vogt 2014.

⁴³⁷ Huxley 1890g, 272. Also Huxley 1870e.

⁴³⁸ Huxley 1878d, 222.

⁴³⁹ Huxley 1859f, 20. Also Huxley 1887g; 1892b.

certain psychological state, although being doubtful or skeptical is often characterized as a psychological state. To illustrate what Huxley had in mind, it would be useful to introduce David Fate Norton's discussion of doubt. According to Norton, doubt is not always accompanied with a particular psychological state or disposition (*e.g.* being uneasy or hesitating) and it may also refer to "intellectual activity" like challenging and cautionary behaviors.⁴⁴⁰ Thus Norton distinguishes two kinds of doubt: "active doubt" understood in terms of activity and "affective doubt" in terms of the state of mind.⁴⁴¹ Huxley's notion of doubt, especially when he introduced Goethe's "Thätige Skepsis," is closer to Norton's "active doubt" than to "affective doubt."

Huxley's notion that the suspension of judgment and active doubt are two sides of the same coin helps us to understand how he could think that suspending judgment and favoring one position over others are compatible. While suspending judgment with respect to the certainty of each of competing propositions, one may prefer one to others based on, for example, relative probabilities.⁴⁴²

For instance, in that way, we can understand Huxley's stance toward Darwin's theory of natural selection.⁴⁴³ Huxley regarded Darwin's theory as the most compelling and "ingenious" hypothesis, yet never accepted it as an established fact, knowledge.⁴⁴⁴ He appreciated the explanatory power of Darwin's theory, but its relative superiority regarding explanatory breadth does not establish its status as knowledge. There is a conceptual gap between "hypothesis" and "fact"; Huxley thought that "the admission of a state of mind intermediate between knowledge

⁴⁴⁰ Norton 1982, 288.

⁴⁴¹ *Ibid.*, 284.

⁴⁴² Huxley 1889g.

⁴⁴³ For the discussions of Huxley's defense of Darwin, see Bartholomew 1975; Bowler 1997; Ruse 1997; di Gregorio 1981; 1984; Lyons 1999, 2009.

⁴⁴⁴ Huxley 1859f, 19; 1860a; 1860b, 391; 1862a; 1862b; 1863d; 1891d; 1892d.

and no-knowledge is fatal to all clear thought.”⁴⁴⁵ Without “experimental proof,” he could not rank Darwin’s hypothesis of natural selection as a fact.

In 1892, three years before his death, Huxley wrote in a letter as follows:

In a review of Darwin’s *Origin of Species* published in the Westminster for 1860 (*Lay Sermons*, pp. 323-24), you will see that I insisted on the logical incompleteness of the theory so long as it was not backed by experimental proof that the cause assumed was competent to produce all the effects required. . . . In fact, Darwin used to reproach me sometimes for my pertinacious insistence on the need of experimental verification.⁴⁴⁶

Mainly around early 1860s, Huxley and Darwin had arguments over natural selection. Huxley’s concern was that all aspects of the causal sufficiency of selective breeding – “whether artificial or natural” – had not been verified.⁴⁴⁷ Since natural selection was proposed by Darwin as the cause of the generation of a new species, Huxley expected natural selection to account for characteristics that mark different species (as opposed to varieties). One is *morphological* divergence among species, and Huxley thought that it had been verified that natural selection is the cause of such morphological divergence.

Another divergence among species that Huxley brought to Darwin as an issue concerns hybrid infertility: two distinctive species cannot breed with each other or their offspring is sterile. Huxley’s point was that it had not been verified that natural selection is also the cause of such *physiological* divergence. Huxley insisted that Darwin needed experimental proof, because it was “the weak point of his case from the point of view of scientific logic.”⁴⁴⁸ In other words, Huxley

⁴⁴⁵ Huxley 1895a, 535; 1879c.

⁴⁴⁶ Huxley 1892b, 204, his brackets.

⁴⁴⁷ Huxley 1860a, 74.

⁴⁴⁸ Huxley 1891d, 203.

claimed, we need to have a memory of natural or artificial selection producing that effect. As discussed, a complex idea is either an imagination, an expectation or a memory, and we can turn our imagination or expectation into our memory by experiencing a corresponding complex impression. To complete “scientific logic,” Huxley found it necessary to have experience of an (scientifically well) expected causal process, and one way was to get “virtually infertile breeds from a common stock.”⁴⁴⁹ Darwin complained to Joseph Dalton Hooker that Huxley wanted to see natural selection “in action.”⁴⁵⁰ In addition, Darwin initially (and finally) saw hybrid infertility as a by-product of morphological differences, and pointed out that infertility varies in degree.⁴⁵¹ In other words, hybrid infertility is not a significant characteristic that marks species as different. On the other hand, as Huxley saw it, it constitutes “physiological species” and any theory of the origin of species, to be perfect, must be able to account for physiological divergence.⁴⁵² In short, for Huxley, physiological divergence was an important phenomenon to be explained, and no one had experienced, in some way, selective breeding leading to hybrid infertility. Huxley could not but say that Darwin’s natural selection was a hypothesis about the origin of species.⁴⁵³

However, Huxley expected that experimental proof for the physiological effects of natural selection will be done in future and was supportive of Darwin and others who engaged in the project of producing the proof.⁴⁵⁴ Thus Huxley could consider Darwin’s natural selection to be

⁴⁴⁹ *Ibid.*

⁴⁵⁰ Darwin 1860; also quoted in Lyons 1999, 241. See also Darwin 1862; Huxley 1864a, 921.

⁴⁵¹ Darwin 1975[1856-8], Ch. IX; Lyons 1999, Ch. 7; Harvey 2003.

⁴⁵² Huxley 1860a; 1863a; 1891b.

⁴⁵³ Huxley’s view of natural selection can be best summarized by his own sentence: “He [Darwin] *has* shown that selective breeding is a *vera causa* for morphological species; he has not yet shown it a *vera causa* for physiological species” (1863a, 344, his italics).

⁴⁵⁴ Huxley 1860a; 1863a; 1891d.

the most promising hypothesis and urge scientists to take it as a research hypothesis.⁴⁵⁵ In other words, he suspended his judgment and actively doubted. This stance would not be taken if one thinks that natural selection cannot possibly be the cause of the origin of species.

Let's move on to the case of statements outside the boundary of knowledge. This kind of statement is not demonstrable because the boundary has been drawn in accordance with human limits. We have no way of justifying our feeling certain and thus turning it into being certain. Even employing Descartes's method of doubt with the highest standard cannot settle an issue of this kind. If we understand an idea about a non-phenomenal world as its proponents intend, the idea is, to Huxley, neither a memory nor an expectation, but an imagination. What should we do about such an idea?

The agnostic principle, first of all, demands the profession of ignorance regarding the certainty of a proposition outside the boundary of knowledge. The state of being ignorant in this case differs from the state of suspending judgment. An agnostic may say "I don't know," but strictly speaking, it has the connotation of "I can't know, and neither can you." As the two cases of the profession of ignorance are different in meaning, accompanied attitudes are different. In the case of non-demonstrated proposition within the boundary of knowledge, we are temporarily ignorant and we are capable of knowing. We thus should suspend our judgement for a while and practice active doubt to move forward to our state of knowing from our state of being ignorant. On the other hand, in the case of non-demonstrable proposition, we are not capable of knowing. Intellectual activity like active doubt is pointless in this case. According to Huxley, although

⁴⁵⁵ Huxley 1860a, 74; 1860b; 1887g; 1894b, 3.

some “short-sighted” people forget about the boundary of knowledge, “they must be content with imagination, with hope, and with ignorance.”⁴⁵⁶

To clarify the attitude associated with the confession of ignorance in this case, first note examples that Huxley had in mind. Although it seems to have been expected that he would have considered his contemporary clerics’ claims to be outside the boundary of knowledge, he did not. What Huxley counted as going beyond our boundary of knowledge was claims mainly put forward by “*a priori* philosophers,” “*a priori* speculators” or “pure metaphysicians.”⁴⁵⁷ For example, one of such issues is whether our mental contents correspond to reality.⁴⁵⁸ The mental picture may resemble or may not resemble what we call “reality” or what are regarded as the cause of the picture, as metaphysical thinkers have variously claimed, but we are not capable of knowing about this issue.⁴⁵⁹

We can also see an attitude that an agnostic would take toward non-demonstrable propositions by considering Huxley’s own attitude toward unknowable issues and his criticism of *a priori* philosophers. Huxley did not attempt to examine relative plausibility of each of competing propositions as he did with disputed propositions within the boundary of knowledge; he simply listed different views as if he introduced diverse stories or “imagination” about one issue. Regarding the issue of our mental picture, Huxley wrote as follows:

⁴⁵⁶ Huxley 1885b, 161.

⁴⁵⁷ Huxley singled out Plato who had used imagination to far extent (1860c; 1863c; 1878h; 1888a, 1893-4 (Vol. VI); 1895a; 1895b).

⁴⁵⁸ Huxley 1870c; 1878h. Another “insoluble” problem that Huxley briefly mentioned is whether a frog has consciousness, because we can attain “no positive evidence” for and against it; his reason seems to be that we cannot be a frog (1870a, 7).

⁴⁵⁹ Huxley does not appear to have considered non-demonstrable propositions to lack a truth value.

This picture may be a true likeness – though how this can be is inconceivable; or it may have no more resemblance to its cause than one of Bach’s fugues has to the person who is playing it; or than a piece of poetry has to the mouth and lips of a reciter. It is enough for all the practical purposes of human existence if we find that our trust in the representations of consciousness is verified by results;⁴⁶⁰

Huxley seems to suggest no epistemic stance toward such imaginations.⁴⁶¹ Yet, sometimes he expressed more than epistemic indifference: “Why trouble ourselves about matters of which, however important they may be, we do know nothing, and can know nothing?”⁴⁶²

The agnostic principle demands something more than the profession of ignorance, as some people have attached an additional connotation to the notion of the unknowable. For example, it has been sometimes told that something “beyond” or “above” (not simply “outside,” as Huxley loved to point out) our knowledge is more important or meaningful to our life than what we know and can know; or, the “fact” that we cannot know something proves the unknowable to be a being. It seems that the young Huxley had been rather tolerant of such a connotation attached to the notion of our limits or ignorance, if it had no explicit epistemological import. But the later Huxley seems not. He declared that he did not care about the “unknowable” and he did not even want to waste the capital U.⁴⁶³ Mystification or idolization, which is usually intended to make a further point, is done thanks to an idea of the certain existence of a thing; it is not free from making a claim to know. We identify the realm of our ignorance to learn what we can know and what we can use as evidence, not to affirm the existence of the unknowable and further to invoke some mystic access to it. According to Huxley, the term “agnostic” was for him

⁴⁶⁰ Huxley 1870c, 178.

⁴⁶¹ Huxley 1870c; 1892c.

⁴⁶² Huxley 1868a, 162-3.

⁴⁶³ Huxley 1889g; 1895a. See also Huxley 1890b.

“a fit antithesis” to “the gnostics being those ancient heretics.”⁴⁶⁴ Huxley found himself strongly disagreeing with Spencer over how to understand what we are incapable of knowing, although Huxley could not express the difference in his early days.⁴⁶⁵ Regarding the origin of the term “agnostic,” in the letter part of which I just quoted, Huxley wrote:

The term “agnostic” was not suggested by the paragraph in the Acts of the Apostles in which Paul speaks of an inscription to the unknown God (*agnostic theo*). It is obvious that the author of this inscription was a theist – I may say an anxious theist – who desired not to offend any God not known to him by ignoring the existence of such a deity. The person who erected the altar was therefore in the same position as those philosophers who in modern times have brought about the apotheosis of ignorance under the name of the “Absolute” or its equivalent.⁴⁶⁶

To Huxley, the confession of ignorance with an “anxious” state (of desiring not to miss any truth unknown, in this case) is not the confession of ignorance that his agnostics would make. Huxley’s focus was always put on what we can know and how we can know, rather than what we cannot know.

How can we then formulate a required attitude toward statements outside the boundary of knowledge? “[A] consistent agnostic,” according to Huxley, “might let his imagination wander freely among such possibilities and remain perfectly true to his principles, so long as he did not mistake his dreams for knowledge, or abuse other people because they dreamed dreams of other kind or refused to dream at all.”⁴⁶⁷ Huxley made a similar point repeatedly, but did not present it in the form of thesis. I suggest, by saying that we cannot know *p*, Huxley would mean to declare

⁴⁶⁴ Huxley 1889h in Lightman 1987, 13

⁴⁶⁵ Huxley 1863c; 1889i; 1895b. See also Lightman’s account which I briefly introduced in footnote 84 of Chapter 2.

⁴⁶⁶ Huxley 1889h in Lightman 1987, 13

⁴⁶⁷ Huxley 1895b in Paterson 1932, 319.

that *p* is neither justified nor justificatory. Dreaming has nothing to do with justification. Thus, we should refrain from thinking that a claim transgressing the boundary can justify our beliefs about a phenomenal world. By removing epistemological relevance, Huxley could undercut any intention or motivation to invoke the unknowable. Huxley noticed that many of his contemporaries tended to regard the realm of ignorance as a source for justification as if their assumption about the realm is certain, although not all made their intention explicit. To Huxley, “[building] castles in the air” makes no contribution to our activity of justification.⁴⁶⁸ By proposing agnosticism, *i.e.*, a guide to knowledge consisting of an account of legitimate evidence and an ethics of knowing, I suggest, Huxley was depriving alleged evidential power of the unknowable or unknown and empowering evidential value of the known by experience.

5.5. Agnosticism in the tradition of modern critical philosophy

Another place to see the nature and structure of agnosticism is Huxley’s discussions of critical philosophy or “philosophical criticism,” as he sometimes called it, because he located agnosticism within this tradition.⁴⁶⁹ His understanding of critical philosophy as an epistemological struggle to overcome skepticism on one hand and dogmatism on the other hand helps us to see why a guide to knowledge is a better frame to understand his agnosticism because we can see what he intended to do with it. Furthermore, Huxley’s discussions of characteristics shared by modern critical philosophies illuminate what he wanted to incorporate into his version of critical philosophy, agnosticism.

⁴⁶⁸ Huxley 1893-4 (Vol. VI), viii, x. Also Huxley 1894g.

⁴⁶⁹ Huxley 1878h, 65.

Huxley valued critical philosophy because he considered it to be a philosophical attempt to avoid both (Pyrrhonian or excessive) skepticism and (Platonic or metaphysical) dogmatism. Skeptics made a clever or “shallow” destructive point to claim that we can have no knowledge; dogmatists insisted that we can arrive at knowledge only by employing “Reason” (whatever it means), while discrediting experience.⁴⁷⁰ Skepticism left us with no knowledge for us who cannot but live based on some knowledge, whereas dogmatism left us with various speculations or imaginations that confuse us who had learned from experience in everyday life.

Huxley told us that he had wanted to distinguish his position from other sorts of “-ists” and thus had come up with the label, “agnostics,” but philosophical foes that he set up in a rather general level were skeptics and dogmatists. His discussions of agnosticism are often accompanied with expressing dissatisfaction at skepticism and dogmatism, which varies from a sarcastic caricature to a serious criticism. This set up, agnosticism contrasted to skepticism and dogmatism, was his recurrent theme.⁴⁷¹

Huxley found that modern philosophers had shared his epistemological concern. They had examined a way to find something certain or knowledge, while trying to overcome both skepticism and dogmatism. Huxley wrote as follows:

The modern spirit is not the spirit “which always denies,” delighting only in destruction; still less is it that which builds castles in the air rather than not construct; it is that spirit which works and will work “without haste and without rest,” gathering harvest after harvest of truth into its barns and devouring error with unquenchable fire.⁴⁷²

⁴⁷⁰ Huxley 1878h; 1888a; 1895b in Paterson 1932, 316-7.

⁴⁷¹ Huxley 1887g; 1985b; 1893-4 (Vol. VI).

⁴⁷² Huxley 1893-4 (Vol. VI), x.

According to Huxley, this “spirit” had been exhibited in “philosophical criticism” put forward by modern philosophers such as Descartes, Locke, Berkeley, Hume, and Kant.⁴⁷³ Although, as he noted, the term “critical philosophy” had become famous because of Kant, he understood modern philosophy as a segment of history of philosophy during which critical philosophy had been embarked on and developed.⁴⁷⁴

It was Huxley’s view that the modern critical philosophers’ approach had been on the right track. He discussed shared characteristics of their approach and considered them to be desiderata that an epistemological inquiry needs to fulfill. In other words, Huxley not only shared philosophical concerns with those whom he regarded as modern critical philosophers, but also took critical philosophy as a model of philosophy.

First of all, as well known from Kant’s expression “critical,” critical philosophy involves an examination of the capability and incapability of human beings as epistemic agents.⁴⁷⁵ To Huxley, any philosophical thinker who recognizes the importance of what human beings can know and cannot know counts as a critical philosopher. Thus, Socrates, despite living in ancient Greek and having “no true disciples,” counts as a critical philosopher because he saw that knowing both what we know and what we cannot know is important.⁴⁷⁶ Although Socrates was not considered to offer a critical philosophy, as Huxley understood him, he held “a kind of inverse agnosticism.”⁴⁷⁷ Critical philosophy examines the power and conditions of human

⁴⁷³ Huxley 1870c; 1871c; 1878h; 1879a.

⁴⁷⁴ Huxley 1878h; 1893-4 (Vol. V).

⁴⁷⁵ Huxley 1878h.

⁴⁷⁶ Huxley 1893-4 (Vol. VI), viii.

⁴⁷⁷ Huxley 1893a, 70. According to Huxley, Socrates had a basic spirit of critical philosophy but reversely assigned the realm of knowledge and of ignorance: he “set the fashion of a kind of inverse agnosticism, by teaching that the problems of physics lie beyond the reach of the human intellect; that the attempt to solve them is essentially vain; that the one worthy object of investigation is the problem of ethical life” (*ibid.*).

faculties in order to understand the nature, source and limits of human knowledge. Huxley's conception of critical philosophy seems to be broader than usually thought. Descartes's inquiry had shown that raw materials for knowledge are the contents of mind and that we can be certain about their existence. Locke, Berkeley, Hume and Kant also examined and wrote a monograph on human understanding and knowledge. Their specific accounts are different from each other, but according to Huxley, we should note the general point that they took the condition and nature of human faculties into consideration.

An inquiry into human faculties stands as important to Huxley, because it helps us not to fall prey on both skepticism and dogmatism. Skeptics and dogmatists were led to their doctrine, because they either underestimated or overestimated human faculties. To be sure, the diagnosis made here is not that they were ignorant of human faculties, but that they did not take it into consideration when developing their views about what we can know. In short, their conception of knowledge is not based on the condition and nature of human faculties. According to Huxley, skeptics looked for "irrational certainty" whereas dogmatists took an imagination or "delusion" as something certain.⁴⁷⁸

From his discussions of the modern philosophers, we can see Huxley thinking that it is important and necessary to take our faculties into consideration in conceptualizing the notion of knowledge. In particular, it is worth noting that he introduced quotes from them to show what we should do with an inquiry into our faculties. For example, Huxley quoted Locke while introducing him as one than whom "[n]o one has more clearly stated the aims of the critical philosopher."⁴⁷⁹

⁴⁷⁸ Huxley 1892a, 206; 1893-4 (Vol. VI), viii-x.

⁴⁷⁹ Huxley 1878h, 66.

We should not then, perhaps, be so forward, out of an affectation of universal knowledge, to raise questions and perplex ourselves and others with disputes about things to which our understandings are not suited, and of which we cannot frame in our minds any clear and distinct perception, or whereof (as it has, perhaps, too often happened) we have not any notion at all. ... We shall not have much reason to complain of the narrowness of our minds, if we will but employ them about what may be of use to us: for of that they are very capable: and it will be an unpardonable as well as a childish peevishness, if we undervalue the advantages of our knowledge, and neglect to improve it to the ends for which it was given us, because there are some things that are set out of reach of it. It will be no excuse to an idle and untoward servant who would not attend to his business by candlelight, to plead that he had not broad sunshine. The candle that is set up in us shines bright enough for all our purposes.⁴⁸⁰

According to Huxley, the critical philosophers had emphasized benefits of inquiry into our faculties by illustrating what it can do for us. They had examined our faculties to warn us about or delineate what we cannot know, thereby claiming that our search for knowledge should be based on what we can do. Huxley also introduced Hume in this context: “Hume develops the same fundamental conception in a somewhat different way, and with a more definite indication of the practical benefits which may be expected from a critical philosophy.”⁴⁸¹ Further Huxley introduced Kant who also had shared the same point.⁴⁸²

One point that I want to emphasize is that the critical philosophers’ inquiry into the nature and condition of human faculties plays not only a destructive role but also a constructive role. The destructive aspect is that the inquiry can serve as the “best check upon the tendency to dogmatism.”⁴⁸³ In this way, a critical philosophy helps us not to fall prey on dogmatism. The

⁴⁸⁰ Locke quoted in Huxley 1878h, 66-7.

⁴⁸¹ Huxley 1878h, 67.

⁴⁸² *Ibid.*, 71.

⁴⁸³ *Ibid.*, 68.

constructive aspect is that the inquiry can shed lights on how we can “methodize” and “correct” our “reflection of common life.”⁴⁸⁴ That is, the critical philosophers were also interested in a way of finding knowledge within our conditions and capacities. In this way, a critical philosophy helps us to overcome skepticism or Pyrrhonism. To Huxley, engaging in both destructive and constructive projects was precisely what the critical philosophers had intended to do. He summarized as follows:

If, in thus conceiving the object and the limitations of philosophy, Hume shows himself the spiritual child and continuator of the work of Locke, he appears no less plainly as the parent of Kant and as the protagonist of that more modern way of thinking, which has been called “agnosticism,” from its profession of an incapacity to discover the indispensable conditions of either positive or negative knowledge, in many propositions, respecting which, not only the vulgar, but philosophers of the more sanguine sort, revel in the luxury of unqualified assurance.⁴⁸⁵

It is no surprise, then, that we find from Huxley’s discussions of agnosticism an idea challenging “unqualified assurance” and an idea concerning “indispensable conditions” of knowledge.

Huxley also highlighted how the modern critical philosophers had understood the point of having knowledge at all. They expressed dissatisfaction with “pure” metaphysicians’ dogmatism and “excessive” skeptics’ negations that had been passed with academic authority on them. As Huxley understood them, their dissatisfaction came from the fact that pure metaphysicians and excessive skeptics had missed the point that we have the concept of knowledge and we search for knowledge because we need to rely on them to act and live. Dogmatism and skepticism are, at best, out of touch with human conduct and life and at worst, harmful.

⁴⁸⁴ *Ibid.*, 68.

⁴⁸⁵ *Ibid.*, 70-1.

For example, Huxley noted that Descartes had “discovered that the most of what he had learned, except in mathematics, was devoid of solid and real value” and introduced his remark from the *Discourse*: “I [Descartes] always had an intense desire to learn how to distinguish truth from falsehood, in order to be clear about my actions, and to walk surefootedly in this life.”⁴⁸⁶ Huxley appears to have liked Descartes’s expression “walk surefootedly in this life” (he mentioned it three times). To Huxley, this remark shows why we need knowledge at all and what we need to know: we need to walk surefootedly and we need to know about our steps and the place where we walk through. When Huxley discussed Hume, his favorite expression was “live at ease ever after.”⁴⁸⁷ Huxley also found the same idea in Locke’s *Essay concerning Human Understanding*: “Our business here is not to know all things, but those which concern our conduct.”⁴⁸⁸

The point that we need knowledge because we lead a life that demands knowledge is further illustrated as the point of doing philosophy. In other words, to Huxley, philosophy is primarily epistemology. By introducing Kant’s three questions of philosophy, Huxley began the discussion of Hume’s philosophy in *Hume*.

Kant has said that the business of philosophy is to answer three questions: What can I know? What ought I to do? and For what may I hope?⁴⁸⁹

Huxley’s main concern was the first question, but he pointed out that the last two questions rely on an answer to the first question and this is why we concern the first question. The object of

⁴⁸⁶ Huxley 1870c, 168.

⁴⁸⁷ Hume quoted in Huxley 1878h, 70.

⁴⁸⁸ Locke quoted in Huxley 1878h, 67.

⁴⁸⁹ *Ibid.*, 57.

philosophy is set up with a conception of knowledge that highlights why we need knowledge in the first place, and in this way, philosophy is given its role in society. He also used Kant's questions to explain what should be taught in universities.⁴⁹⁰

The point that a certain type of philosophy makes no contribution to our life or action may sound like a banal criticism to many contemporary ears, but Victorian Huxley repeatedly introduced the point whenever he found it from philosophers' thoughts. To Huxley, the point can give us a reason to think that skeptics and dogmatists are off the track. They may insist that what they have in mind is "real" or "absolute" knowledge which may serve them well.⁴⁹¹ Skeptics attempt to find such knowledge by offering an argument for the negation of a given claim, and arrive at no knowledge. Dogmatists attempt to find such knowledge by "bas[ing] the theory of knowing upon supposed necessary and universal truths," and arrive at their own knowledge.⁴⁹² These lines of inquiry are judged as failures, because their understanding of knowledge does not incorporate why we need a conception of knowledge at all and what is at the stake. This means that, in using Huxley's metaphor, both skeptics and dogmatists qua epistemologists attempt to find knowledge not for epistemic agents placed inside images of a kaleidoscope.

It stands as important to Huxley to understand the purpose and stake of identifying knowledge when we embark on the search for knowledge. Knowledge is pursued as knowledge of nature (or a world or universe) and for members cast in nature. This context should be incorporated into a conception of knowledge. As a member of nature, Huxley thought, "man's place in nature" is not different from that of other living beings in the sense that all living things,

⁴⁹⁰ Huxley 1874b.

⁴⁹¹ Huxley 1868a, 159.

⁴⁹² Huxley 1878h, 62.

using their own physical functions and mental faculties, have to explore and learn the world around them to survive or live well.⁴⁹³ Human mental faculties may allow us to create and contemplate mysteries underlying the world and ideas about ultimate or absolute truths, but, he urged, a proper conception of knowledge should include the connotation that knowledge is something that can make or break us.

Suppose it were perfectly certain that the life and fortune of every one of us would, one day or other, depend upon his winning or losing a game of chess. Don't you think that we should all consider it to be a primary duty to learn at least the names and the moves of the pieces; to have a notion of a gambit, and a keen eye for all the means of giving and getting out of check? Do you not think that we should look with a disapprobation amounting to scorn, upon the father who allowed his son, or the state which allowed its members, to grow up without knowing a pawn from a knight?

Yet it is a very plain and elementary truth, that the life, the fortune, and the happiness of every one of us, and, more or less, of those who are connected with us, do depend upon our knowing something of the rules of a game infinitely more difficult and complicated than chess. It is a game which has been played for untold ages, every man and woman of us being one of the two players in a game of his or her own. The chess-board is the world, the pieces are the phenomena of the universe, the rules of the game are what we call the laws of Nature.⁴⁹⁴

Huxley reshaped the modern philosophers' notion that knowledge concerns human life and conduct: he associated the notion with a game-or-battle-like setup, and illustrated it in an urgent

⁴⁹³ According to Huxley, there is no "smallest indication that man has been treated on any other principles than the rest of the animal world" (1892c, 51). I borrow the expression "man's place in nature" from Huxley's book *Evidence as to Man's Place in Nature* (1863d).

⁴⁹⁴ Huxley 1868b, 81-2.

and dramatic manner; it has little to do with a notion of knowledge or ultimate wisdom that has made philosophers' life the happiest life. Huxley's earlier analogy was a card game.

This universe is, I conceive, like to a great game being played out, and we poor mortals are allowed to take a hand. By great good fortune the wiser among us have made out some few of the rules of the game, as at present played. We call them "Laws of Nature," and honour them because we find that if we obey them we win something for our pains. The cards are our theories and hypotheses, the tricks our experimental verifications. But what sane man would endeavour to solve this problem: given the rules of a game and the winnings, to find whether the cards are made of pasteboard or goldleaf? Yet the problem of the metaphysicians is to my mind no saner.⁴⁹⁵

To Huxley, because philosophers should inquire knowledge not for themselves but for "poor" agents in nature, the search for knowledge is neither noble nor contemplative, but inevitable and desperate. It is important to have a proper conception of knowledge, and given the proper conception of knowledge, Huxley thought, it makes no sense to inquire knowledge while neglecting our abilities and limits.

The last point to note is that Huxley highlighted another implication of "being critical" associated with critical philosophy. Critical philosophers are those who engage in an inquiry of the nature and conditions of human faculties, but they do so in a critical manner. That is, in addition to understanding human faculties, there is another aim of the inquiry – to call for watchful attention. For instance, it is one thing to set a boundary for our knowledge based on the inquiry and it is another thing to take a certain attitude toward the transgression of the boundary. To Huxley, a critical philosophy includes a "critical" attitude toward what is beyond the limits of human faculties.

⁴⁹⁵ Huxley 1863c.

This signification of “being critical” can be found when Huxley contrasted Idealism with what he called “Critical Idealism.” Noting that Descartes’s view had been developed into the “Critical Idealism of his great successor Kant,” Huxley wrote:

It is that Idealism which declares the ultimate fact of all knowledge to be consciousness, or, in other words, a mental phenomenon; and therefore affirms the highest of all certainties, and indeed the only absolute certainty, to be the existence of mind. But it is also that Idealism which refuses to make any assertions, either positive or negative, as to what lies beyond consciousness. It accuses the subtle Berkeley of stepping beyond the limits of knowledge when he declared that a substance of matter does not exist; And it refuses to listen to the jargon of more recent days about the “Absolute” and all the other hypostatized adjectives, the initial letters of the names of which are generally printed in capital letters; ...⁴⁹⁶

Here Huxley mentioned Berkeley as one “stepping beyond the limits of knowledge,” but Berkeley was not alone. Elsewhere, Huxley also added Locke, Hume, Kant and Hamilton as critical philosophers who temporarily or seriously forgot to “refuse.”⁴⁹⁷ Huxley’s contribution can be found when he urged us not to step beyond the limits by labeling his position “agnosticism” which can draw our special attention to how we should think about and what we should do about the realm of ignorance.

What would it mean not to step beyond the limits? In the quote above, the critical aspect of idealism is illustrated in terms of the act of refusing (“to make any assertion”). Huxley also introduced other philosophers’ suggestions. For example, Huxley quoted Locke:

If by this inquiry into the nature of the understanding I can discover the powers thereof, how far they reach, to what things they are in any degree proportionate, and where they fail us, I suppose it may be of use to prevail with the busy mind of man to

⁴⁹⁶ Huxley 1870c, 178-9.

⁴⁹⁷ Huxley 1860c; 1863c; 1878h, 1895a; 1895b.

be more cautious in meddling with things exceeding his comprehension: to stop when it is at the utmost extent of its tether; and to sit down in quiet ignorance of those things which, upon examination, are proved to be beyond the reach of our capacities.⁴⁹⁸

Huxley also had Hume who had recommended “leaving the more sublime topics to the embellishment of poets and orators, or to the arts of priests and politicians.”⁴⁹⁹ In a similar vein, Huxley wrote the following: “I should imagine that most sober thinkers will agree in the agnostic conclusion that this [whether the “Universe is the creation of Reason”] is one of the topics respecting which silence is better than speech”; “Agnosticism has one advantage – that of allowing us to take refuge in silence, when speech drifts towards grotesque anthropomorphism”; “our duty is therefore to remain silent.”⁵⁰⁰

Refusing to make an assertion, refusing to listen to such an assertion, sitting down in quiet ignorance, or remaining silent should not be understood literally as saying no word at all. Nor should it mean tacit assent to or active affirmation of the unknowable. It is silence demanded and of particular kind – stern silence concerning the knowledge status of a claim. I have suggested that one of Huxley’s intentions behind his agnosticism was to exclude what we are not capable of knowing from our justification activity.

According to Huxley, modern critical philosophy is an epistemological effort to offer a methodical way of identifying knowledge while rejecting both skepticism and dogmatism. The modern, critical effort has three characteristics: it involves an inquiry into human faculties; it focuses on a conception of knowledge that bears on human life and conduct; it promotes a

⁴⁹⁸ Locke quoted in Huxley 1878h, 66.

⁴⁹⁹ Hume quoted in Huxley 1878h, 68.

⁵⁰⁰ Huxley 1895b in Patterson 1932, 318; *ibid.*; 1893-4 (Vol. VI), x.

critical stance toward issues that go beyond human faculties. Given my understanding of Huxley's agnosticism, we can see why Huxley situated agnosticism within the tradition of modern critical philosophy. We may conclude that a gnostic to whom Huxley opposed himself by coining the term "agnostic" would be anyone who fails to have and use a "legitimate" conception of knowledge.

5.6. Chapter summary

In this chapter, I have tried to show that Huxley's agnosticism is a guide to knowledge, which consists of an account of legitimate evidence and an ethics of knowing. To defend my interpretation, I critically examined two interpretations: agnosticism as an account of ignorance and as an ethics of belief. Agnosticism involves a constructive position on how to identify knowledge, which is grounded on epistemological conclusions of Huxley's Cartesian project; agnosticism includes duties regarding a claim to knowledge, not an act of believing. This interpretative framework of Huxley's agnosticism as a guide to knowledge is also supported by his discussions of Descartes's inquiry into certainty and of modern critical philosophy.

CHAPTER 6

Science and Faith

This chapter discusses Huxley's views of science and faith to clarify how he defended science as our best intellectual inquiry. The contributions of agnosticism to Huxley's defense of science have been evaluated from two perspectives. From one aspect, Huxley's promotion of agnosticism made huge positive contributions to increasing the influence of science in Victorian society. I do not deny this claim, and the contributions that agnosticism made to the social status of science are not my concern in this chapter. My concern is its contribution to the epistemological status of science. There is a widespread evaluation: Huxley's agnosticism undermines his notion that science has epistemological superiority, because he could not but admit that science is based on faith as is theology. This evaluation pays little attention to Huxley's philosophical position and epistemological ambition; thus, ironically, as we will see, the evaluation is inapplicable to Huxley precisely because he held agnosticism.

6.1. Huxley's incapability, insistence, and inconsistency

Scholars have pointed out the destructive aspect of Huxley's agnosticism to his larger project of defending science as the only means of attaining knowledge. The most elaborative exposition of this criticism is found in Bernard Lightman's *Origin of Agnosticism*. Lightman explains why Victorian scientific naturalists' promotion of agnosticism was self-defeating:

Ironically, the marriage between agnosticism and scientific naturalism did not work out. ... Applying the Manselian idea of the limits of knowledge to the natural world proved to be as destructive to scientific naturalism as to orthodox Christianity. The sceptical element of the Victorian agnostics' thought made it difficult for them to

demonstrate the reality and validity of the crucial scientific principles of the universality of the law of causation, the uniformity of nature, and the existence of an objective, external, natural world.⁵⁰¹

Huxley who endorsed agnosticism should not be able to demonstrate those principles of science, or “axioms of science,” because this task requires him to claim that he can have knowledge that cannot be attained according to his own agnosticism.

Let’s take a closer look at Huxley’s trouble that Lightman notes. Victorian agnostics, including Huxley, were also scientific naturalists whose epistemological position was British empiricism. They believed that human beings can attain knowledge only through sense experience and inference. This epistemological position could not help them to defend principles of science. Lightman discusses three: the uniformity of nature, the universality of causation, and the existence of an external natural world. Victorian scientific naturalists regarded these principles as crucial to science, but according to their epistemological position, the principles do not have the status of knowledge. They could not, by appealing to sensation and inference, account for universality implied in the notion of the uniformity of nature and necessary connection implied in the notion of causation. Also, they could not guarantee the existence of an external world, because they needed to establish a reliable relationship between perception and such a world, but they could not do this kind of work only with sensation and inference. In short, their epistemological position made them incapable of accommodating universality, necessity and externality implied in the principles of science. Consequently, the epistemic superiority or objectivity of science remains insecure.

⁵⁰¹ Lightman 1987, 146.

Yet Victorian scientific naturalists made their situation worse by promoting Manselian agnosticism, according to which knowledge is restricted to the phenomenal realm. For this move left them with no other ways of showing the reality or validity of the principles of science. Accepting Manselian agnosticism means rejection of the possibility of having any knowledge concerning transcendental or noumenal realms. As Lightman puts it, Victorian scientific naturalists, including Huxley, rejected the notion of *a priori* knowledge. The denial of the type of knowledge that is thought to be obtained not by sensation and inference, according to Lightman, was a bad move for them, because they ended up preventing themselves from mobilizing ways that had been available to others like Kantian thinkers or theologians. Of course, Victorian scientific naturalists would not find it attractive to appeal to a theological idea by, for example, attempting to connect the principles of science with a notion of God, but this was not the only option that they lost. They may want to claim that perception is produced by an external world via sensation, but they could neither show that the claim is true nor resolve the worry that perception could be an illusion that has nothing to do with an external world. They could not appeal to a Kantian idea that there must be some sort of interlock between nature out there and our perception, which is supposed to establish the objectivity of our experience of nature. Or, there might be some other ways, but Lightman writes, “[t]heir various attempts at justification were doomed to failure.”⁵⁰² Endorsing agnosticism posed a problem for them, but not for all. Hamilton and Mansel, Lightman says, were not concerned if their agnosticism “did not provide sound justification for the axioms grounding natural science.”⁵⁰³ However, Victorian scientific

⁵⁰² Lightman 1987, 165.

⁵⁰³ *Ibid.*, 46-7.

naturalists should have been concerned, because they wanted to secure the foundations of science and claimed that science is the only way to knowledge.

Despite his inability of showing the reality or validity of the principles of science, Huxley insisted that the principles are fundamental to science *and* science is epistemically superior to theology. However, Lightman points out, “these three scientific axioms became articles of faith, for the agnostic could no more justify certainty in their existence than orthodox Christians could ...” and thus “the status of agnostic scientific theology differed little from that of Christian theology.”⁵⁰⁴ This point has been also made by other scholars, Huxley’s contemporaries included.⁵⁰⁵ Huxley’s dogmatic belief in the superiority of science attests his philosophical inconsistency regarding one’s faith.

Huxley’s having double standards that overlook scientists’ faith and condemn clerics’ faith appears to indicate that there is another thing to worry about concerning his promotion of agnosticism. George Levine recently writes the following:

Paradox upon paradox, [Victorian scientific] naturalists were fully aware that their anti-metaphysical stance, and the work of science, were dependent on metaphysically unprovable assumptions. Early in his career, Huxley had already confronted the paradox unapologetically.⁵⁰⁶

⁵⁰⁴ *Ibid.*, 146, 147.

⁵⁰⁵ For example, according to Barton:

They [The agnostics] used the Kantian critical philosophy, as interpreted by William Hamilton and Henry Mansel, to undermine the systems of others, in particular, all systems of dogmatic theology. However, their own systems were equally inadequate because they tried to justify the assumptions of science – the objective existence of the material world, the uniformity of nature, and the concept of cause and effect – on purely empirical grounds (1983, 265).

As for other examples: Balfour 1895; Ward [1899]1915; Gilley and Loades 1981; Levine 1990; 2014. See also Hutton 1885.

⁵⁰⁶ Levine 2014, 85.

If the belief in assumptions of science such as the uniformity of nature turns out to be on a par with the belief in assumptions of theology, Huxley should also have been agnostic about assumptions of science as he was toward assumptions of theology. However, Huxley did not appear to confess his ignorance.

To sum up, the worry that Huxley's notion of agnosticism undermines the conception of science as an epistemically superior inquiry ultimately stems from the point that Huxley could not but base axioms of science on faith, because his agnosticism left him with no means to show their reality or objective validity. However, Huxley did not claim that axioms of science are true or have been proved; he also said that he did not believe that the uniformity of nature can be proved.⁵⁰⁷ Furthermore, as Levine points out (with surprise), Huxley openly spoke of his faith in axioms of science, and even encouraged others to have that faith.⁵⁰⁸ In other words, Huxley and his critics agree. If so, how could Huxley think that he was defending the epistemic superiority of science while acknowledging that its axioms are based on faith?

To better understand Huxley's position, the assumptions behind the worry should be pointed out. First, it is assumed that there would be no important epistemological difference between science and theology if both are ultimately grounded on faith. Second, in order to claim that science is the only means of attaining knowledge, *Huxley* must show the reality or objective validity of principles of science. However, Huxley would not grant these assumptions, because the point of holding agnosticism was to reject them. Huxley's agnosticism tells us, regarding the first assumption, that there are important differences, and regarding the second one, that the demand of establishing the reality or objective validity of foundations of science comes from

⁵⁰⁷ Huxley 1876c; 1878h; 1887e; 1887g, 553; 1887f; 1892c. Also see Hutton's record of Huxley's remark (Hutton 1885).

⁵⁰⁸ Huxley 1860d, 226; 1878h; 1886c; 1887e; 1887g, 553; 1892c, 38.

improper understandings of justificatory value of the unknowable and of the epistemic value of science. These points will be discussed in the following.

6.2. Huxley's conception of science

This section addresses Huxley's conception of science to show how Huxley understood axioms of science and its epistemic merit. At the most general level, Huxley usually discussed science as a method of inquiry, as opposed to the sum of scientific discoveries. Science is a method of inquiry that uses inference and observation (including experimentation) to identify "laws of nature." This basic characterization of science, he appears to have thought, is hardly disputable and widely shared. However, Huxley notes, some aspects of scientific inquiry had been poorly understood. He drew attention to two aspects. First, science is a human epistemic tool for constructing a chart about nature, with a particular framework through which it deals with its subject matter, nature; that is, science does not aim to offer literal descriptions of nature. Second, science uses ordinary intellectual human faculties in a systematic and rigorous manner, following the guide to knowledge as specified in agnosticism; that is, scientific practice is neither the practice of divinely sanctioned faculties nor the practice passively receptive to everyday understanding of a phenomenal nature.

6.2.1 Relying on principles and relying on the principles of science

As scholars have noted, Huxley pointed out, and repeatedly, that there are fundamental principles, "axioms," or "postulates" in science.⁵⁰⁹

⁵⁰⁹ Huxley 1876c; 1880c; 1886c; 1887a; 1887e; 1887f; 1892c.

All physical science starts from certain postulates. One of them is the objective existence of a material world. ... Another postulate is the universality of the law of causation; that nothing happens without a cause (that is, a necessary precedent condition), and that the state of the physical universe, at any given moment, is the consequence of its state at any preceding moment. Another is that any of the rules, or so-called “laws of Nature,” by which the relation of phenomena is truly defined, is true for all time.⁵¹⁰

Huxley singled out three, as Lightman reports: the existence of an external material world, causation, and the uniformity of nature or “the constancy of the order of Nature.”

These principles of science, Huxley noted and never felt shy to note, cannot be proved to be true, nor are they self-evident. Their unprovability, however, did not concern Huxley. When Huxley said that these unprovable assumptions are principles of science, he did not consider himself to be asserting true ontological statements. These assumptions function as “principles,” “postulates” or “axioms” that are necessary for any inquiry with an epistemic aim. Since scientific inquiry cannot start without presupposing them, in one aspect, scientists regard them as true; yet, because these assumptions point to what scientific inquiry should target, in another aspect, scientists do not regard them as true. Briefly, we may say, they are rules. They are something that must be taken, not shown, to be true; they are something that an inquirer adopts over others because of some reasons or grounds, trusts, and acts upon. In Huxley’s expression, one “guides his life and risks his fortune upon the belief” in them.⁵¹¹ We would not be able to “risk” something upon what has been proved to be true. Accordingly, Huxley paid more attention to discussing why science rests on a particular set of principles, and emphasized how one should and should not understand science relying on principles.

⁵¹⁰ Huxley 1887f, 60-1.

⁵¹¹ Huxley 1876c, 47.

Although our current issue concerns principles *of science*, it should be first noted that scientists are not alone in relying on principles or rules. For now, let's focus on how Huxley understood the idea of relying on principles. The three principles that Huxley singled out are characterized as "axioms" or "postulates" because they constitute a cosmological framework used to interpret mental contents. Anyone who wishes to attain knowledge by using the stream of consciousness needs such a framework. Different frameworks may be used, but we need at least a principle that involves a world that is external to consciousness. This principle is what I called "minimal conception of nature" in Chapter 3. To make sense and use of what consciousness shows to us, we invoke an external world (not yet an external *material* world) or consider our mental contents to be about something; this also happens in our search for what to accept as knowledge.

Huxley thought that one needs to take the existence of a world external to consciousness as a starting point if one has an epistemic goal at all. No one, except extreme skeptics whom Huxley almost considered to lack any intellectual desire, would deny the inevitability of taking such an epistemologically problematic – unprovable – assumption as a principle to engage in an epistemic inquiry. This intellectual necessity is also found as a fact about human beings. As Huxley understood it, human history shows that people had taken for granted the existence of nature, world, or universe, and wanted to learn about it. This suggests to Huxley not only that the belief in an outside world around us has a long history, although many people probably have not noticed that the belief is unprovable and have regarded it as true; it also suggests that an inquiry into which is certain among mental contents also has a long history. Huxley seems to have thought that no one needs to defend one's *using* the minimal conception of nature to translate the stream of consciousness.

While locating consciousness within nature, Huxley suggested that we should pay our attention to nature as appeared to us and how we can make use of it. What does that mean? As an epistemologist, Huxley thought that we cannot know whether nature as appeared to us really exists, let alone what comprises nature. That is why the concept of nature is called for. Nature invoked in his minimal conception of nature is indefinite. Everything is possible in nature and something is happening all the time in nature. Huxley was thus sympathetic to Spinoza's notion of nature as the deity with infinite attributes and Goethe's notion of nature as ever changing and producing.⁵¹² If nature is set up as the object of our inquiry and yet also conceived as something not completely reachable by us, we may simply want to give up proceeding with our inquiry. Or, we may want to try to understand nature based on how it has appeared to us so far, while acknowledging that our interpretation would not be an exact and complete description. Huxley wanted to take the latter route, aiming to move from "the region of disorderly mystery" to "the realm of orderly mystery."⁵¹³ He hoped that the notion of wondrous and mysterious nature inspires people, especially scientists, as he introduced Goethe's aphorisms in *Nature*, but he did not attempt to turn the notion into a correct or proved ontological thesis.⁵¹⁴ He was opposed to an

⁵¹² Huxley 1869b; 1878h. See also Huxley 1886b; 1893a; 1894g.

⁵¹³ Huxley 1854c, 320; 1882.

⁵¹⁴ Upon the request of writing an opening article for the first issue of *Nature*, Huxley introduced his translation of Goethe's aphorisms on nature which he thought many people would find "pantheistic," and he ended the article by stating that Goethe's vision "will remain as a truthful and efficient symbol of the wonder and the mystery of Nature" (Huxley 1869b, 10, 11; 1894b). As I will discuss shortly, Huxley's conception of nature is multi-layered, and all layers are altogether captured in Goethe's aphorisms, including the minimal conception of nature. Goethe's aphorisms start as follows:

Nature! We are surrounded and embraced by her: powerless to separate ourselves from her, and powerless to penetrate beyond her.

Without asking, or warning, she snatches us up into her circling dance, and whirls us on until we are tired, and drop from her arms (Huxley 1869b, 9).

See also Eng 1978 for an interesting discussion of Huxley's introduction of Goethe in *Nature*.

attempt to change nature from the object of inquiry to the object of worship. The route he followed, as later we will see, is related to his anti-realistic conception of science.

Let's return back to the minimal conception of nature. I have suggested that Huxley intended the concept of nature to work as a framework by which we, knowingly or unknowingly, make sense of our stream of consciousness. Conscious agents are located in nature and what consciousness shows to them have something to do with nature. However, this understanding of nature does not help us much. As Huxley noted, more specific illustrations of nature had been proposed, and there had been disagreements over how we should think of nature. Some have further believed that something more – a supernatural or intelligible realm – is needed.⁵¹⁵ The point that science rests on unprovable assumptions means, to Huxley, that scientific practice adopts a particular understanding of nature, which is expressed in the three axioms of science.

An inquiry called “science” addresses nature with the following character. In nature, material objects that are external to one’s consciousness exist; events occurring in nature have a cause; and causally connected events occur in accordance with laws of nature that cannot be violated at any time and in any place. The existence of an external world is also assumed, but science postulates a material world as part of physical thinking. Events in nature or phenomena are understood by reference to “material substances.”⁵¹⁶ Consciousness is then re-conceptualized as an object of inquiry: the operations of consciousness also have some material basis; like any other events, there are also causes for the operations; and the operations also occur in accordance with laws of nature.⁵¹⁷ Consciousness situated in such nature also led Huxley to conceptualize experience in another way: experience was initially understood to be the conversion of potentially

⁵¹⁵ Huxley 1892c.

⁵¹⁶ Huxley 1880a; 1887f.

⁵¹⁷ Huxley 1880a.

existing innate perceptions to actual perceptions in consciousness; experience, with the scientific understanding of nature, is then viewed as an event of having impressions (elementary perceptions), causes of which are material objects.⁵¹⁸

Huxley's conceptualization of nature as assumed in science, then, is not simple in the sense that it can be rejected or accepted as a whole and for a single reason. At the most minimal level, nature is a stage setting for a conscious actor. Huxley assumed that no one would seriously refuse to use this conception of nature, although he also acknowledged that the conception has been rejected on purpose for the sake of philosophical discussion; if we want to identify knowledge, the minimal conception of nature is necessary because we need something (nature) that we link up with the states of consciousness to interpret our perceptions. On the other hand, how to understand nature and which understanding of nature is better are agenda discussed at another level. Here Huxley contrasted "naturalism" and "supernaturalism" (which were briefly discussed in Chapter 4), and defended the principles of science as one version of naturalism. Yet there is a further level. There are different views about nature among, say, those who adopt the same scientific conception of nature. At this level, Huxley discussed scientific theories as specific accounts of nature, and supported some and criticized others.

We can find Huxley's implicit and explicit illustrations of the multi-layered understanding of nature in his essays.⁵¹⁹ Even when the main aim of an essay is to introduce a specific scientific discovery, he tended to invite his audience and reader to appreciate nature dealt with in science, starting with the minimal conception of nature and moving on to the axioms of science. For example, consider the following quote.

⁵¹⁸ Huxley 1878h; 1879a.

⁵¹⁹ Huxley 1876c; 1880a; 1892c.

We live in and form part of a system of things of immense diversity and perplexity, which we call Nature; and it is a matter of the deepest interest to all of us that we should form just conceptions of the constitution of that system and of its past history. ... It has taken long ages of toilsome and often fruitless labour to enable man to look steadily at the shifting scenes of the phantasmagoria of Nature, to notice what is fixed among her fluctuations, and what is regular among her apparent irregularities; and it is only comparatively lately, within the last few centuries, that the conception of a universal order and of a definite course of things, which we term the course of Nature, has emerged.⁵²⁰

When it is said that Huxley promoted a “scientific world view,” that view should be understood with more than one dimension.

Since our concern is Huxley’s views on the principles of science, let’s turn to how Huxley justified the “employment” of them as axioms.⁵²¹ Huxley did not neglect that issue by simply declaring that he had faith. Let me focus on the axiom of causation: for every event, there is its cause, “necessary precedent condition.”⁵²² The axiom of causation seems to raise two problems: we cannot experience “every” event; nor can we experience “necessary” precedent conditions or events.

First consider the notion of necessity. According to Huxley, we have impressions of succession but not impressions of necessary succession. Yet he thought that we can still make use of the concept of cause as necessary precedent conditions, because we can empirically distinguish different types of succession by employing Hume’s “Rules by which to Judge of Causes and Effects” or Mill’s four methods.⁵²³ Through repeated or different experiences, we can identify

⁵²⁰ Huxley 1876c, 46-7.

⁵²¹ Huxley 1887f, 61.

⁵²² *Ibid.*

⁵²³ Mill’s four methods are the method of agreement, the method of difference, the method of concomitant variations, and the method of residues. Before introducing Mill’s methods, Huxley stated the following: “Hume gives a sketch of the method of allocating effects to their causes, upon which, so far as I am aware, no improvement was made down to the time of the publication of Mill’s ‘Logic’” (Huxley 1887g, 147-8).

whether a given event should be viewed as a cause (or an effect) or simply as a preceding (or following) event. What Hume had taught, as Huxley understood him, was that we need to re-conceptualize necessity by taking our abilities and conditions into consideration. In short, we retain the motivation but aim to identify invariable succession.

Thus, to be clear, although Huxley spoke of necessary precedent events and claimed that we can identify a certain event as a cause, he did not mean the axiom of causation to convey the notion that necessity exists in nature. Science relies on the axiom of causation, not to show the existence of some metaphysical necessity underlying phenomena, but to arrange events in some manner. Without the notion of cause, we would be still able to arrange events in a temporal order; with the notion, we can do more. Because Huxley thought that to explain is to find a cause, we can further arrange events in a logical manner. This means that we let identified causation exert necessity in our understanding of nature, not in nature, like the case where we are compelled to think in a particular way when making a deduction from a set of propositions. Science aims to come up with a theory, and it is a theory that has internal necessity. We only find invariable succession between events in nature and turn it into necessary connection in our interpretation of nature.⁵²⁴ To Huxley, thus, the most important notion behind the axiom of causation is not an idea of power producing an event. What people call “property,” “power,” or “force” is, Huxley asserted, a particular effect that a certain thing always generates. The most important notion of the axiom concerns a chain of causation: “everything is the effect of something which preceded it as its cause, and that this cause is the effect of something else, and so on, through a chain of causes and effects which goes back as far as we choose to follow it.”⁵²⁵ In other words, the point

⁵²⁴ Huxley 1878h, 150.

⁵²⁵ Huxley 1880a, 7. Also Huxley 1878h, 149.

of employing the notion of causation is not to capture or examine the nature of one event causing the other, but to *link* events in accordance with rules (of Hume or of Mill). Therefore, according to Huxley, to deny the axiom of causation means to admit an uncaused event.⁵²⁶

Now consider the second problem. Huxley was well aware of the worry concerning universality implied in the axiom of causation. “It is commonly urged that the axiom of causation cannot be derived from experience, because experience only proves that many things have causes, whereas the axiom declares that all things have causes.”⁵²⁷ Employing the notion that every event has a cause may be seen as illegitimate, when we compare *propositions* expressed in the axiom and in observation statements because we will find conceptual gaps. However, this was not how Huxley viewed the issue. Arriving at and using the axiom of causation is an act. The logical point of being “fallacious,” which is raised by constructing a deductive argument, does not show that “the belief, or expectation, expressed by the axiom, is not a product of experience, generated antecedently to, and altogether independently of, the logically unjustifiable language in which we express it.”⁵²⁸ If we view the notion of a principle (of causation) as involving a mental act, we can open another way of evaluating it.

In fact, the axiom of causation resembles all other beliefs of expectation in being the verbal symbol of a purely automatic act of the mind, which is altogether extra-logical, and would be illogical, if it were not constantly verified by experience. Experience, as we have seen, stores up memories; memories generate expectations or beliefs—why they do so may be explained hereafter by proper investigation of cerebral physiology. But to seek for the reason of the facts in the verbal symbols by which they are expressed, and to be astonished that it is not to be found there, is surely singular; and

⁵²⁶ Huxley 1878h; 1880a; 1887g.

⁵²⁷ Huxley 1878h, 145.

⁵²⁸ *Ibid.*

what Hume did was to turn attention from the verbal proposition to the psychical fact of which it is the symbol.⁵²⁹

If we view the adoption of the principle of causation as an act, and focus instead on the history of experience (of a given type), the illogical jump between propositions may not be “illogical” in another aspect which will be discussed in the following.

One interesting point that Huxley made regarding the principles of science is that they are “strictly speaking” not demonstrable but beliefs behind them have been repeatedly verified by experience when contrasted with the opposite beliefs.⁵³⁰ The idea that there is a cause for every event is verified, when the perception of an event happening and the perception of the existence of an invariable precedent event (*i.e.*, cause) appear in our consciousness together. Whenever we attempt to find a cause for an event, we have been able to single out an event to which we can apply the concept of cause, and repeated experiences of this success have made it hard for us to think of an event without thinking of its cause.⁵³¹ This, to Huxley, is a kind of epistemic reason given by the historical record of verified experience; it is not “illogical” to hold the axiom of causation whereas it would be “illogical” to hold the negation of the axiom of causation.⁵³²

The point that the belief behind the axiom of causation has been verified was also made by Huxley to indicate that the scientific understanding of nature is not a peculiar framework that only few ardent scientists started using and advocating, but a framework that has been shared and trusted.⁵³³ The axiom of causation is a verified axiom, not an imaginary axiom picked up

⁵²⁹ *Ibid.*, 146.

⁵³⁰ Huxley 1887f, 61. Also Huxley 1887g and Hutton’s record of Huxley’s remark (Hutton 1885)

⁵³¹ Huxley 1878h, 147.

⁵³² Huxley’s point seems to be that an inductive inference can be better understood not as a non-deductive argument form but as a type of practical reasoning.

⁵³³ Huxley 1876c.

arbitrarily. It has not betrayed our confidence during human history; our expectation that there will be a cause for this or that event has been met repeatedly enough to assume that there must be a cause for a given event and to blame ourselves (rather than the principle of causation) when a cause is not readily identifiable. Huxley unhesitatingly stated that the principle “tacitly underlies every process of reasoning.”⁵³⁴ The other principles of science, according to Huxley, are in the same situation.⁵³⁵ Repeated verification has led human beings to trust in the principles, not their negations, and continue to put trust. Scientists are, then, those who explicitly adopt the principles as axioms of their inquiry, strictly comply with them, and endeavor to offer an interpretation of nature accordingly. This means, as Huxley viewed them, that scientists do not merely regard the principles of science as policies in a psychologically neutral or indifferent manner, but have “faith” in them (his understanding of the notion of faith will be addressed later in this chapter).

The point that science rests on unprovable assumptions about nature as its principles, Huxley thought, should be understood to show what scientific practice aims at, rather than an epistemological burden that should be discharged to secure the value of science (his understanding of the epistemic superiority of science will be discussed later in this section). Science aims to discover orders of nature defined in physical terms, and that is why everyone in science, despite holding different metaphysical or theological views, seems to have agreed on the notion of scientific progress as the expansion of physical thinking: “its [science’s] progress has, in all ages, meant, and now, more than ever, means, the extension of the province of what we call matter and causation, and the concomitant gradual banishment from all regions of human thought

⁵³⁴ *Ibid.*, 48.

⁵³⁵ Huxley 1887f, 61.

of what we call spirit and spontaneity.”⁵³⁶ Huxley believed that the “extension of the province” likely continues, but his belief is an empirical prediction based on the past performance of science, not a metaphysical assertion based on the reality of axioms of science.⁵³⁷ If, for example, the uniformity of laws turned out to be false, Huxley said, the following should be done:

⁵³⁶ Huxley 1868a, 159. In an 1886 essay, Huxley reproduced a nearly identical phrase, and added, “I hold that opinion now, if anything, more firmly than I did when I gave utterance to it a score of years ago, for it has been justified by subsequent events [scientific discoveries since then]” (1886c, 137-8). Also Huxley 1887a; 1887f, 61.

⁵³⁷ The distinction that I have in mind here seems to be related to an interpretive dispute regarding Huxley’s position on so-called “mind-body problem” – whether Huxley endorsed *metaphysical* epiphenomenalism or *empirical* epiphenomenalism. Huxley has been mentioned more often than one might expect, but just in passing, in the literature of philosophy of mind. There Huxley is presented as a proponent of “epiphenomenalism,” according to which mental states have no causal efficacy with respect to physical states (Robinson 2015). Against this traditional interpretation, Daniel Dennett argues that Huxley’s position is not what philosophers call “epiphenomenalism” because Huxley’s claim was that mental states are not causes of physical states *that had been thought to be caused by mental states*, and thus we should not conclude that Huxley denied causal efficacy of mental states in an absolute sense (1991). On Dennett’s reading, Huxley’s position is *empirical or relative* epiphenomenalism.

Noting that Huxley’s position has been identified without due attention, Neil Campbell defends, contra Dennett, the traditional view but makes a revision: Huxley’s claim was indeed that mental states have no causal efficacy at all, but his epiphenomenalism amounts to physicalism meant by contemporary philosophers of mind. What concerns me here is one interpretation that Campbell finds “in a sense correct” and “well-motivated” but rejects in the end: “it is a mistake to characterize Huxley’s epiphenomenalism as a philosophical position at all,” because “Huxley’s epiphenomenalism is not a metaphysical doctrine about the nature of consciousness, but is simply a statement of the empirical findings from his studies of consciousness” (2001, 370, 369). Campbell rejects this interpretation because it includes a misunderstanding of contemporary philosophers of mind: their concern, according to Campbell, is not quite about the nature of consciousness or the “substance” of matter; rather they “are interested in determining ... whether or not mental states *can* be understood and explained in the terms of physical theory, which is plainly the essence of Huxley’s project” (*ibid.*, 370, my emphasis).

I would say that Huxley believed that mental states *will* be understood and explained in physical terms if scientists keep researching with physical thinking, and that the justification for this belief comes from accumulated “empirical findings” which he expected to increase more quickly. Further, Huxley would not think that there is a “philosophical” way of “determining” whether mental states can or cannot be understood and explained in physical terms; there is instead a philosophical decision on whether to understand them physically or non-physically.

Yet, interestingly, Campbell ends his essay as follows. “After all, it is unclear whether he [Huxley] himself believed epiphenomenalism to be true. ... In this sense, Huxley’s essay could not have a more appropriate title. Epiphenomenalism is a *hypothesis*. The hypothesis is both scientific *and* philosophical. It might be true, and indeed, Huxley thought there was strong evidence in its favour, but I think it is clear that in Huxley’s work we have yet to see a proof of its truth” (*ibid.*, 373-4, his italics).

Very few philosophers of mind have shown interests in Huxley’s position, and this interpretative issue seems to be going on. Recently, John Greenwood offers a more detailed examination to argue that Huxley held empirical epiphenomenalism (2010).

Science must throw down its arms in despair, and commit suicide, either by the admission that the universe is, after all, irrational, inasmuch as that which is truth in one corner of it is absurdity in another, or by a declaration of incompetency.⁵³⁸

Yet he continued to express his confidence in further expansion of science, and his optimism probably came partly from, ironically, the very unprovability of the axioms of science. What we should demand him to show is not the reality or objective validity of the axioms of science, but grounds for his giving us assurance regarding the enlargement of scientific account. The history of science had attested, according to Huxley.

So far, I have discussed how Huxley understood relying on principles and defended relying on the principles of science. Huxley does not appear to have thought that he or anyone needs to defend relying on a principle. As he saw it, the act of relying on a principle does not aim to make a true ontological statement. Although the principles that have been discussed above appear to be about nature, world, or universe, it is unprovability of the principles that makes the principles work as principles which people adopt with hopes and fears, having ambivalent feeling about their truth value. Yet, Huxley would add, we should remain epistemically calm by not turning them into knowledge and take an agnostic attitude when it is claimed that they are or should be shown to be metaphysically or theologically true or real.

What Huxley thought needed to be defended, on the other hand, is relying on particular principles, not others. Briefly, as seen above, two types of defense can be found in Huxley's essays. First, we are justified in *adopting* the principles of science to trust because they convey beliefs verified repeatedly throughout human history. The other type of his defense has to do with rationality. According to Huxley, the principles of science collectively portray nature as rational.

⁵³⁸ Huxley 1887a, 66.

This means that if we understand nature in that way, not in accordance with the contrary principles, *we* can engage in intellectual activity such as organizing, classifying, generalizing, making an inference, predicting, etc., which would constitute part of epistemic activity. If we conceive that some events in nature are uncaused, objects are neither observable nor measurable, and no rules are at work or rules are sometimes violated, Huxley thought, we could not approach nature in a rational manner, and we cannot but pray. Science aims to find “rational orders” in nature and try to account for what have happened and would happen in nature in terms of such orders.⁵³⁹ It was obvious to Huxley that it is rational to look for patterns and cosmos, whereas it is irrational to look for irregularity and chaos; as he said, rational people would try to find orders from nature, thinking that “[c]hance and accident are only *aliases* of ignorance.”⁵⁴⁰ Thus, he was strongly opposed to letting other conceptions of nature than the three axioms creep into science, such as the notion of special providence, because he thought that this would destroy the rational aspect of scientific understanding of nature, which was, to him, the whole point of doing science.

6.2.2. Anti-realistic conception of science

Huxley, unlike his critics, did not find it problematic or undesirable that under his epistemological view, the axioms of science cannot be proved to be true. One reason, as discussed in the above section, is that Huxley understood them to function as rules. Another reason involves his anti-realistic conception of science, which he was at pains to pass to his audience. In this section, I will show that Huxley held anti-realism and further thought that a realistic understanding of science could be harmful to science.

⁵³⁹ Huxley 1887a, 62.

⁵⁴⁰ Huxley 1880a, 11, his italics; 1887g, 553.

In “Scientific and Pseudo-Scientific Realism,” Huxley claimed that “many excellent, instructed, and intelligent people” misunderstood science.⁵⁴¹ According to his diagnosis, the misconception occurs because one employs a particular way of thinking when viewing science. The way of thinking is “scholastic realism” and the result of its application to science is pseudo-scientific realism.⁵⁴²

The essence of such realism [scholastic realism] is that it maintains the objective existence of universals, or, as we call them nowadays, general propositions. It affirms, for example, that “man” is a real thing, apart from individual men, having its existence, not in the sensible, but in the intelligible world, and clothing itself with the accidents of sense to make the Jack and Tom and Harry whom we know. Strange as such a notion may appear to modern scientific thought, it really pervades ordinary language.⁵⁴³

Huxley introduced scholastic realism not to endorse instead that only individuals exist as objective entities. Rather he drew attention to scholastic realism because he thought that it is often employed implicitly when thinking about *science* and results in misunderstandings of science.⁵⁴⁴ Science is thought to reveal, by gathering truths about individuals, truths about universals, entities that objectively exist and have a sort of power over individuals. This stance had led to ontological readings of scientific principles, concepts, and discoveries, which he called “pseudo-scientific realism.”

As the label shows, Huxley claimed that pseudo-scientific realism is not a correct way of thinking about science. If we recall Huxley’s epistemological position that led to agnosticism, his opposition to a realistic conception of science is no surprise. As has been noted, the scientific

⁵⁴¹ Huxley 1887a, 69. See also Huxley 1886b; 1887c.

⁵⁴² Huxley 1887a, 75; 1886b; 1871a; 1889i.

⁵⁴³ Huxley 1887a, 75-6.

⁵⁴⁴ *Ibid.*, 88. See also Huxley 1884b.

understanding of nature as identified in the axioms of science cannot be shown to be a true and exact description of “real” nature. Because of Huxley’s legitimate Idealism which determines the boundary of human knowledge, he considered both scholastic realism and nominalism to overstep the boundary. Huxley was sympathetic to what he called “conceptualism,” according to which both universals and individuals are hypothetical entities and exist in mind as generic and specific concepts.⁵⁴⁵ Huxley conjectured that not many people would now admit that colour exists apart from mind; they, he claimed, should view universals and colour in the same manner.⁵⁴⁶ In fact, especially when it comes to science, we should not forget that concepts are useful symbolic tools.⁵⁴⁷ Scientists do not simply accept concepts that have been traditionally passed on to them; they actively introduce and carefully re-define scientific concepts.

Consider first Huxley’s conception of scientific practice, which can be characterized as anti-realism about science. Huxley thought that it is incorrect to consider scientific practice to aim to reveal nature or reality as it is. Human beings are not capable of doing this, and thus we should not expect science as human practice to give us true or genuine descriptions of nature. Rather, human beings practice science to serve themselves. Scientists deal with nature as appeared and come up with linguistic and mathematical illustrations to account for what human beings have experienced and to make predictions about what they would experience. Huxley identified a series of tasks of science as follows: “The first is the determination of the sensible character and order of the phenomena”; “The second is the determination of the constant relations of the phenomena thus defined, and their expression in rules or laws”; “The third is the explication of these particular laws by deduction from the most general laws of matter and

⁵⁴⁵ Huxley 1871c, 255.

⁵⁴⁶ Huxley 1887a; 1887c.

⁵⁴⁷ Huxley 1868a; 1886b.

motion.”⁵⁴⁸ Note that Huxley characterized scientific practice or scientists’ tasks without reference to understanding of reality or a god’s wisdom. By performing these tasks, science aims to provide human beings with “a symbolic conception of the universe, which, although doubtless highly imperfect and inadequate as a picture of the great whole, is yet sufficient to serve [them] as a chart for the guidance of [their] practical affairs.”⁵⁴⁹ The meaning of doing science is understood as a chart with reference to the minimal conception of nature. We are in nature and we engage in an inquiry called “science” for ourselves.

The best place to see Huxley’s opposition to literal readings of scientific discoveries is where he tried to correct a popular conception of laws of nature. Huxley reported that he had found people having the notion that a law of nature is a thing or agent responsible for the generation of an event and the regulation of a process.⁵⁵⁰

Even at the present day, and in the writings of men who would at once repudiate scholastic realism in any form, “law” is often inadvertently employed in the sense of cause, . . . We commonly hear of bodies falling to the ground by reason of the law of gravitation, whereas that law is simply the record of the fact that, according to all experience, they have so fallen (when free to move), and of the grounds of a reasonable expectation that they will so fall.⁵⁵¹

The law of gravitation is a statement about our experience. According to Huxley, “a law of nature, in the scientific sense, is the product of a mental operation upon the facts of nature which come under our observation and has no more existence outside the mind than colour has.”⁵⁵²

⁵⁴⁸ Huxley 1887f, 64. Huxley did not think that branches of science had developed in that order. He introduced the order as a logical sequence.

⁵⁴⁹ Huxley 1876c, 46-7.

⁵⁵⁰ Huxley 1878h; 1880a; 1886b; 1887a; 1887c; 1894c.

⁵⁵¹ Huxley 1887a, 78.

⁵⁵² *Ibid.*, 76.

Huxley was particularly annoyed by the misconception of laws of nature. It is rooted in scholastic realism which Huxley considered to be not only epistemologically inadequate but also irrelevant to science; yet it appeared to lead people, via a kind of worship of intellectual conceptions, to make unfair criticisms against science or unintelligible complaints about scientists (such as being arrogant). For example, Huxley discussed claims of those who believe in miracles done by a supernatural agent or in the paranormal like levitation. According to the believers, science assumes that laws of nature cannot be violated, but miraculous or paranormal events occurred; this shows that some laws of nature may have been violated or suspended; how, then, can scientists make sure that their discoveries, laws of nature, will not be violated again and by a divine or supernatural agent? Responding to this claim, Huxley stated that they “are assuming that laws are agents – efficient causes of that which happens – and that one law can interfere with another”; but “that assumption is as nonsensical as if [they] were to talk of a proposition of Euclid being the cause of the diagram which illustrates it, or of the integral calculus interfering with the rule of three.”⁵⁵³ Huxley further pointed out:

In fact, the habitual use of the word “law,” in the sense of an active thing, is almost a mark of pseudo-science; it characterises the writings of those who have appropriated the forms of science without knowing anything of its substance.⁵⁵⁴

Huxley declared, “such a conception of the nature of ‘laws’ has nothing to do with modern science.”⁵⁵⁵ To Huxley, this extra-scientific idea is responsible for the realistic conception of

⁵⁵³ *Ibid.*, 80.

⁵⁵⁴ *Ibid.*, 79. Huxley also wrote: “The science of the present day is as full of this particular form of intellectual shadow-worship as is the nescience of ignorant ages. The difference is that the philosopher who is worthy of the name knows that his personified hypotheses, such as law, and force, and ether, and the like, are merely useful symbols, while the ignorant and the careless take them for adequate expressions of reality” (1886b, 372).

⁵⁵⁵ Huxley 1887a, 75.

laws, but this conception is used either to undermine science or to serve a non-scientific, often theological, purpose.⁵⁵⁶

What is the proper understanding of scientific laws of nature? Huxley illustrated it by comparing with laws of society.⁵⁵⁷ Human beings have made laws not only for members in society, but also for members in nature. Both social and natural laws, according to Huxley, are not things that cause conducts or events to occur. Laws are statements about, under certain circumstances or conditions, what members of its domain will act or what will happen to them.

There are laws about the payment of taxes, and there are laws against stealing or murder. But the law is not the cause of a man's paying his taxes, nor is it the cause of his abstaining from theft and murder. The law is simply a statement of what will happen to a man if he does not pay his taxes, and if he commits theft or murder; and the cause of his paying his taxes, or abstaining from crime (in the absence of any better motive) is the fear of consequences which is the effect of his belief in that statement. A law of man tells what we may expect society will do under certain circumstances; and a law of nature tells us what we may expect natural objects will do under certain circumstances.⁵⁵⁸

Social and natural laws are equally called "laws" and carry normative signification, because information conveyed in statements must be taken into consideration when humans think and act.

We have succeeded in finding out the rules of action of a little bit of the universe; we call these rules "laws of nature," not because anybody knows whether they bind nature or not, but because we find it is obligatory on us to take them into account, both as actors under nature, and as interpreters of nature.⁵⁵⁹

⁵⁵⁶ For example, Huxley wrote: "When a boy who has climbed a tree loses his hold of the branch, 'the law of gravitation unrelentingly pulls him to the ground, and then he is hurt,' whereby the Almighty is quite relieved from any responsibility for the accident" (1887c, 108).

⁵⁵⁷ Huxley 1880a; 1887c; 1892e.

⁵⁵⁸ Huxley 1880a, 13-4.

⁵⁵⁹ Huxley 1887a, 80-1.

What have been promulgated or identified as social or natural laws are not just recommendations, because disregarding them brings about negative effects on individuals and society in general.

Any man who should attempt to live in a country without reference to the laws of that country would very soon find himself in trouble; and if he were fined, imprisoned, or even hanged, sensible people would probably consider that he had earned his fate by his folly.

In like manner, any one who tries to live upon the face of this earth without attention to the laws of nature will live there for but a very short time, most of which will be passed in exceeding discomfort; ... In fact, nobody could live for half a day unless he attended to some of the laws of nature; and thousands of us are dying daily, or living miserably, because men have not yet been sufficiently zealous to learn the code of nature.⁵⁶⁰

If something is recognized as a law, this means to Huxley that human beings should lead their conduct and life in accordance with it. Although natural laws “take effect without summons or prosecution,” he said, neglecting them, like the case of neglecting social laws, leads to the destruction of an individual and even society.⁵⁶¹ This is the whole point of recognizing something as a law: we need to take it seriously.

However, Huxley noted, social laws and natural laws are different in the form of expression. First consider social laws. Social laws report information about how members of society will act and what will happen to them in more ideal or desirable society, but people may or may not act in accordance with laws, and thus laws are issued as the form of command. By expressing laws as commands, it becomes possible to violate a law and to have grounds for punishment. Huxley summarized, “Human law consists of commands addressed to voluntary agents, which they may obey or disobey; and the law is not rendered null and void by being

⁵⁶⁰ Huxley 1880a, 15.

⁵⁶¹ *Ibid.*

broken.”⁵⁶² Laws of society, which are supposed to capture desirable states, indicate what members are ordered to do and what will happen if they do not act accordingly.

On the other hand, natural laws also report information about how members of nature will act and what will happen to them, but they are expressed as a generalization, based on our best knowledge of nature. Natural laws are human-made imperfect assertions about states, not commands made to reach ideal states, and thus they are expressed as inviolable but instead revisable statements. According to Huxley, expressions like “the violation, or the suspension, of a law of nature” are absurd, but when read generously, they can only mean that “we have made a mistake in stating that order.”⁵⁶³

As Huxley understood them, both legal laws and scientific laws are suggested and recognized as a law by us to guide our thinking and acting. There may or may not exist some objective entities with power binding members of society and of nature to behave in a particular way. However, this is a speculation irrelevant to understanding of science. Huxley conjectured that if one’s usage of scientific term “laws of nature” exhibits pseudo-scientific realism, “in common life, [the] man will say that he is compelled by the law to do so and so, when, in point of fact, all he means is that the law orders him to do it, and tells him what will happen if he does not do it.”⁵⁶⁴

Huxley did not just claim that a realistic understanding of science is inadequate. He also made a claim to the effect that it could damage science. First, he implied that taking scientific statements as genuine representations of real entities and properties in nature can arrest the

⁵⁶² Huxley 1880a, 14.

⁵⁶³ *Ibid.*

⁵⁶⁴ Huxley 1887a, 78.

development of science, because he thought that along with scientific theories, *phenomena* to be examined and theorized also undergo changes. To see his point, consider the following quote:

At a certain period in the history of astronomical science, the assumption that the planets move in circles was true enough to serve the purpose of correlating such observations as were then possible; after Kepler, the assumption that they move in ellipses became true enough in regard to the state of observational astronomy at that time. We say still that the orbits of the planets are ellipses, because, for all ordinary purposes, that is a sufficiently near approximation to the truth; but, as a matter of fact, the centre of gravity of a planet describes neither an ellipse nor any other simple curve, but an immensely complicated undulating line.⁵⁶⁵

Here we can also see Huxley's anti-realistic reading of scientific statements, but his main rationale does not simply come from the point that scientific statements involve simplification and abstraction. That is, science simplifies and abstracts phenomena to formulate a generalization or equation for some utility: for example, doing so makes it easier to make inference or calculation. A point to note is that phenomena presented to pre-Kepler scientists, post-Kepler scientists (or ordinary people in Huxley's days), and Huxley's contemporary scientists are not identical. Each assumption is "truth enough," or "empirically adequate" as we now say, given their observations.⁵⁶⁶

A scientific hypothesis or theory is suggested or supported based on known phenomena, and available phenomena can vary in both quantity and quality.⁵⁶⁷ An increase in the amount of phenomena of a similar kind provides us with a larger sample size for simple induction, but this was not the only, or salient, case that Huxley found in the history of science. An apparent case is

⁵⁶⁵ Huxley 1887f, 63-4.

⁵⁶⁶ Recall the discussion of the trichotomy of nature in Chapter 3 (real nature, phenomenal nature, and constructed nature or "new Nature") and that Huxley's concern was the relation between the last two.

⁵⁶⁷ Huxley 1870e; 1886e; 1887f.

when we become able to experience more due to the advancement of technologies. The invention and improvement of research instruments have allowed scientists to observe, record, or register new phenomena that were not attainable or measurable. The development of transportation and equipment has made it possible to explore regions that were not accessible. In addition to this kind of enlargement of available phenomena, Huxley's further point is that the advancement of technologies has sometimes led scientists to see different patterns or significance from familiar phenomena. For instance, a motionless phenomenon becomes a set of phenomena full of motion. But, there have been also qualitative changes in available phenomena that cannot be seen as the result of the advancement of technologies. A concept, notation, classification, or hypothesis also has directed scientists to perceive phenomena in a different manner, to look for new relations between known phenomena, or to try making afresh an inference or generalization.⁵⁶⁸ In turn, later scientists are presented with a novel set of phenomena. If the empirical adequacy of a given scientific statement varies depending on available and targeted phenomena, and a set of phenomena to be recorded and determined as observations varies over time, it would be recommended not to view scientific statements as conveying rigid and precise notions. Thus, Huxley asserted, we should consider scientific hypotheses "not as ideal truths, the real entities of an intelligible world behind phenomena, but as a symbolical language, by the aid of which Nature can be interpreted in terms apprehensible by our intellects."⁵⁶⁹

This is, in fact, according to Huxley, how scientists usually think and behave. For example, "[t]he term 'atoms' appears to be used as a mere name for physico-chemical units

⁵⁶⁸ For instance, Huxley noted that Dalton's system of symbolic notation had suggested not only a convenient way of expressing and recollecting scientific ideas, but also "new lines of inquiry," by revealing, for example, patterns in the arrangement of elements (Huxley 1887f, 71).

⁵⁶⁹ Huxley 1887f, 65; 1877b; 1886b.

which have not yet been subdivided,” but Huxley said, “I cannot discover that any contemporary physicist or chemist believes in the real indivisibility of atoms.”⁵⁷⁰ They presupposed the indivisibility of atoms (which was one of John Dalton’s assumptions), but yet wondered about it. Here we see again the ambivalent attitude, or the state of trusting, and this seems to characterize an agnostic thinker about science. Huxley claimed that a scientific statement is composed of symbols “by which we interpret Nature,” but these symbols are adopted “as if [they] were absolutely true.”⁵⁷¹ On Huxley’s reading of the history of science, science had been advanced because of such ambivalence (or, say, dual recognition), and not by “[converting] symbols into idols.”⁵⁷²

Huxley found that the realistic conception of science, or pseudo-scientific realism, more badly “impeded” scientific investigation of biological phenomena which were his research area.⁵⁷³ This is not because realistic thinkers simply read scientific statements as descriptions about real entities with properties. Their realistic conception of science led them to the confusion that invoking a thing with a power is a sufficient and legitimate account if an explanandum concerns a phenomenon about living things. This in turn “arrested” the application of scientific principles to biological phenomena, that is, investigation for a materialistic-mechanistic account.

For instance, Huxley claimed, the idea that a thing or agent called “vital force” is the cause of vitality, or activity of living bodies, is a relic of scholastic realism; for, while considering a generalization about a living body to describe a real entity with power, a kind of “lively” force

⁵⁷⁰ *Ibid.*, 75. See also 1894d.

⁵⁷¹ Huxley 1887f, 64.

⁵⁷² Huxley 1886b, 372.

⁵⁷³ Huxley 1859c; 1887a, 85.

is looked for to make sense of “lively” aspects of activity exhibited by all living bodies.⁵⁷⁴ It may be hard to understand how gravity as force causes a non-living stone to move, whereas it may look obvious that vital force causes a living cat to move. Proponents of vital force posited that all living bodies share an entity with some power, and thought that they had accounted for vital aspects of phenomena by pointing to the entity as the cause. To Huxley, as discussed in Chapter 3, this adds nothing to our understanding of life; using his descriptions, we would not be any the wiser and anything more would not be gained.⁵⁷⁵ Presumably most annoyingly, a notion of vital force was put forward with intention to discourage scientists from searching for a materialistic-mechanical account which Huxley regarded as the only legitimate scientific account. Huxley was told, repeatedly, that he could not learn about life or living phenomena by studying dead things in spirits.⁵⁷⁶ Realistic thinkers would not find it problematic to explain inorganic phenomena in material terms, but may not be able to see how organic phenomena can be explained away in material terms. For Huxley, science is human inquiry that *aims* to account for all phenomena and only in material terms, and regardless of whether facts and laws are related to inorganic or organic beings, they “stand on the same good sound foundation.”⁵⁷⁷

There was another concern that Huxley had regarding the realistic conception of science. When scholastic realism, which may be defensible as a philosophical position, is employed to

⁵⁷⁴ Huxley 1887a; 1887c.

⁵⁷⁵ Huxley 1879a, 306-7.

⁵⁷⁶ Huxley 1854c; 1863e; 1868a; 1876a; 1877c. Regarding “objections of this kind,” according to which investigation of vital phenomena with physical thinking is “futile, not to say presumptuous,” Huxley replied as follows:

You may remember the story of the Sophist who demonstrated to Diogenes in the most complete and satisfactory manner that he could not walk; that, in fact, all motion was an impossibility; and that Diogenes refuted him by simply getting up and walking round his tub. So, in the same way, the man of science replies to objections of this kind, by simply getting up and walking onward, and showing what science has done and is doing – by pointing to that immense mass of facts which have been ascertained as systematised under the forms of the great doctrines of morphology, of development, of distribution, and the like (1863e, 358).

⁵⁷⁷ *Ibid.*

understand scientific statements, a dogma of metaphysical or theological camps is likely summoned and mingled with scientific inquiry. Huxley found it problematic, because this kind of association tends to make people confuse non-scientific practice with scientific practice.

Consider Huxley's main criticism of *Vestiges of the Natural History of Creation* which was published anonymously but widely read.⁵⁷⁸ The author (Robert Chambers), aiming to offer an account in terms of natural causation, endorsed (among other things) the doctrine of progressive transmutation of species, or "progressionism"; yet the author further considered the natural causation to be the manner of divine being's creation. Huxley problematized the author's "condition of mind" that would have led the author to the further step – the belief that laws are entities.⁵⁷⁹ The author addressed an idea worthy of scientific consideration, which Huxley called "progressionism": species have transmuted from lower types to higher types. If one is taking scientific approach, one should be led to examine the generalization that "there have been, in the progress of time, strong appearances of a progress of forms, from the more simple to the more complex," on which the idea was grounded, and to clarify when a certain form can be identified as a lower or higher type.⁵⁸⁰ This move was obvious to Huxley; in science an idea "must be admitted or rejected according to the evidence attainable."⁵⁸¹ However, Huxley conjectured, the author seemed not to have bothered himself to check the generalization and instead had taken the doctrine of progressionism as correct; afterwards, the author would have read the doctrine literally and considered the natural process of progressive transmutation to be governed by a law

⁵⁷⁸ The book was published in 1844. Huxley wrote this review essay in 1854 when its 10th edition was published.

⁵⁷⁹ Huxley 1854b, 6.

⁵⁸⁰ *Ibid.*, 10. Huxley's quotation of the author of the *Vestiges*.

⁵⁸¹ *Ibid.*, 7. Huxley thus critically examined the generalization about the pattern of progression, on which the author of the *Vestiges* based the doctrine of progressive transmutation (1854; 1855). The generalization and the doctrine are legitimate scientific ideas, but Huxley found their grounds weak.

which was in turn claimed as a method of a divine creator. The author may be regarded by some as doing scientific practice. However, Huxley claimed, what the author did was non-scientific practice that simply involved a scientific thought; scholastic realism and a particular theological view had led the author astray.⁵⁸²

Huxley saw a similar reasoning being applied to other scientific thoughts such as the unity of plan or archetype. His scientific works were motivated by the concept of archetype, and he tried to determine a plan in a group of animals. However, for other scientists, an archetype was a real entity; they attributed to archetypes “lights” or “thoughts of God” by which nature was created or governed.⁵⁸³ From his early days, Huxley noticed theological treatments in disguise and found that such treatments had been done by even respected naturalists; he came to raise his critical voice more often and louder.⁵⁸⁴ As he understood the situation, non-scientific treatments were often done thanks to the belief of a law as a causal entity in conjunction with a theological notion. One of such respected naturalists was Louis Agassiz (1807-1873) who, according to Huxley, was eager to have a narrative on a divine plan throughout successive epochs. Agassiz had made undisputable contributions to science, but Huxley added, “he was preaching the doctrine of the Cabbala, pure and simple.”⁵⁸⁵ From Huxley’s perspective, scientific practice and non-scientific practice had been so mingled due to the realistic conception of science.

Huxley judged that the widespread tendency to read scientific thoughts and concepts ontologically or in Platonic manner came from an inadequate understanding of science and its practice. Science, for Huxley, is a chart that human beings have made for their life in nature.

⁵⁸² Huxley 1854b, 7; 1859g; 1878c.

⁵⁸³ Huxley 1887a, 86, 87.

⁵⁸⁴ Huxley 1859b; 1878h; 1887a; 1887c; di Gregorio 1984.

⁵⁸⁵ Huxley 1887a, 88.

Science cannot deal with real entities and does not contemplate about them; science is a chart, thus it should be written intelligibly and made accessible. Some may believe that real entities exist in nature or that nature was created by a god; they may further believe that they can know about real nature or reality. This kind of belief, according to Huxley, has nothing to do with science; it can be harmful to the progress of science.

We can summarize that there are two sources that supplied Huxley with grounds for the claim that the truth of metaphysical or theological beliefs is irrelevant to science. The first is his epistemological position that shaped his agnosticism. Science is human endeavor to construct a new nature; it works regardless of our ignorance, and to do science, nothing more can be done or needs to be done. The second source is the history of science. On one hand, the way science has advanced shows, according to Huxley, that its development has been driven by the non-realistic conception of science. On the other hand, the history of science also defines the advancement of science in terms of physical thinking; Huxley conjectured that even theologically oriented scientists would also agree that science is considered to have made progress when a materialistic-mechanical account of nature is enlarged and unified.

Huxley did not simply point to his having faith in science. He had views on what it would mean to have faith in science and tried to offer an alternative understanding of scientific principles and thoughts, so that science can be better understood as it had been. Given Huxley's conception of science and agnosticism, the demand for showing the reality or objective validity of the principles of science is an ill-posed request that has its root in a non-scientific notion which he often found even harmful to science. To see epistemological value of science, our attention should not be paid to attempts to construct a metaphysical or theological system that is assumed and yet claimed to guarantee foundations of science; rather we need to evaluate the merit of

scientific inquiry as an epistemic tool, and examine what scientists tend to do and not to do to keep the integrity of scientific inquiry. The latter is the topic of the following section.

6.2.3. Science as practice of agnosticism

According to Huxley, science is a method of inquiry that adopts a particular conception of nature as its principle, but there was another aspect of science that he wanted to highlight. Huxley also endeavored to show that agnosticism is the “essence” of science. The message here is, given my understanding of agnosticism, scientific investigation follows Huxley’s guidelines on legitimate evidence and ethics of knowing. His message can be read in two ways. On the one hand, it is descriptive. Huxley thought that science had been more or less the practice of agnosticism. On the other hand, it is normative. Science should strictly follow agnosticism. This is, according to Huxley, the condition for science to be the way to knowledge. Practicing agnosticism means striving to maintain epistemological value and integrity.

To connect agnosticism with science in Victorians’ mind, Huxley tried to explain scientific investigation in terms of common sense reasoning. As I have argued, according to Huxley, agnosticism is the only legitimate guide to knowledge, which he formulated based on ordinary mental operations and within the limits of human faculties. Following the guide to knowledge does not require some special faculties other than everyday activities. Similarly, Huxley emphasized the continuity between science and ordinary reasoning.⁵⁸⁶ This point may not be seen as a point worth highlighting, but Huxley thought that it had not been well received. Huxley claimed that “scientific investigation is not, as many people seem to suppose, some kind

⁵⁸⁶ Huxley 1854a; 1856; 1863e; 1877a; 1880c; 1887f.

of modern black art”; he also found highly problematic the idea that there was no science before Francis Bacon (1561–1626).⁵⁸⁷

Huxley’s remark on science as “nothing but trained and organized common sense” is quite popular.⁵⁸⁸ The exact wording has been so frequently cited in both scholarly and non-scholarly works. Steven Shapin once commented, after citing Huxley’s remark, that “a surprising number of eminent scientists through the ages – not just relativist sociologists – have enthusiastically concurred,”⁵⁸⁹ Yet, there have been those who dismiss it. Ernst Mayr’s dismissal would be the most famous case (at least in the field of the philosophy and history of biology). When discussing what science is, Mayr writes:

T. H. Huxley, a friend of Charles Darwin and a popularizer of Darwin’s theories, defined science as “nothing but trained and organized common sense.” Alas, this is not true. Common sense is frequently corrected by science. For instance, common sense tells us that the earth is flat and that the sun circles the earth. In every branch of science there have been commonsense opinions that have subsequently been proven wrong. One might go so far as to say that scientific activity consists of either confirming or refuting common sense.⁵⁹⁰

Rejection with the sentiment of “alas” is still found in rather recent works. For example, Scott O. Lilienfeld writes as follows:

In many respects, science is “uncommon sense,” because it requires us to set aside our gut hunches and intuitions *in lieu* of convincing data. Even many great thinkers have failed to grasp this profound truth. Huxley (1902), Darwin’s “bulldog,” wrote that “science is nothing but trained and organized common sense”⁵⁹¹

⁵⁸⁷ Huxley 1863e, 361. Also Huxley 1879b; 1887f.

⁵⁸⁸ Huxley 1854a, 45.

⁵⁸⁹ Shapin 1999, 9.

⁵⁹⁰ Mayr 1997, 24-5.

⁵⁹¹ Lilienfeld 2010, 282, his italics.

Before Mayr, Donald O. Hebb offered a witty revision: “Huxley defined science as ‘organized common sense’ but a better definition would be an organized *attack* on common sense.”⁵⁹²

These three cases show that their dissatisfaction ultimately comes from Huxley’s using the expression “common sense.” What is perplexing about this type of dismissal is that their correction does not go against Huxley’s view captured in the quote. Huxley in fact wrote as follows.

Science is, I believe, nothing but *trained and organised common sense*, differing from the latter only as a veteran may differ from a raw recruit: and its methods differ from those of common sense only so far as the guardsman’s cut and thrust differ from the manner in which a savage wields his club. The primary power is the same in each case, and perhaps the untutored savage has the more brawny arm of the two. The real advantage lies in the point and polish of the swordsman’s weapon; in the trained eye quick to spy out the weakness of the adversary; in the ready hand prompt to follow it on the instant. But, after all, the sword exercise is only the hewing and poking of the clubman developed and perfected.⁵⁹³

Huxley did not introduce the notion of common sense to talk about “gut hunches” or “the earth is flat.” Rather Huxley did so to compare and contrast common sense reasoning and scientific practice. He made comparison to point out that scientific method and common method use “the same powers of reasoning”; he made contrast to argue that scientific investigation deserves more credibility than ordinary investigation and thus a scientifically constructed nature should be considered to be epistemically weightier than our ordinary, familiar phenomenal nature.⁵⁹⁴

First, Huxley pointed out that scientific method is something that ordinary people use in daily lives. According to Huxley, anyone, whether a scientist or a layperson, engages in “the four

⁵⁹² Hebb 1965, 377, his italics.

⁵⁹³ Huxley 1854a, 45, his italics.

⁵⁹⁴ Huxley 1863e, 363.

great intellectual processes of observation, experiment, induction, and deduction.”⁵⁹⁵ The scientific practice is a particular course of action that utilizes these intellectual processes, and the core activity that characterizes science is formulating a hypothesis and testing it.⁵⁹⁶ While dismissing Bacon’s condemnation of inventing a hypothesis, Huxley declared that “[a]ll science starts with hypotheses” and proposing a hypothesis is “legitimate and necessary in science.”⁵⁹⁷

Huxley understood hypothesis in terms of observation: “[w]hen our means of observation of any natural fact fail to carry us beyond a certain point it *is* perfectly legitimate, and often extremely useful, to make a supposition as to what we should see, if we could carry direct observation a step further.”⁵⁹⁸ A hypothesis is a type of observation expressed in the form of supposition, and thus when we make a supposition about what we have not directly observed, we are formulating a hypothesis. This process, Huxley claimed, is conducted in a daily life.⁵⁹⁹ When we act on such a supposition and pay attention to the consequence of our action, we are testing a hypothesis. This is also something that we do every day in our life as we make an expectation based on our memories and learned facts. Daily expectations and scientific hypotheses are “after all” the outcomes of the same activity. Yet, they are different. The former would be suppositions of a “raw recruit” whereas the latter would be suppositions of a “veteran.”

Huxley’s point of contrasting between common sense and science begins by drawing attention to the “legitimacy” of formed hypotheses:

⁵⁹⁵ Huxley 1856, 312; 1854a; 1880a.

⁵⁹⁶ Huxley 1859a; 1878h; 1880a; 1887f.

⁵⁹⁷ Huxley 1878h, 65; 1880a, 68; 1887f.

⁵⁹⁸ Huxley 1880a, 67, his italics.

⁵⁹⁹ *Ibid.*

In daily life, nine-tenths of our actions are based upon suppositions or hypotheses, and our success or failure in practical affairs depends upon the legitimacy of these hypotheses.⁶⁰⁰

Suppositions can have different degrees of legitimacy, primarily depending on empirical grounds and consistency with other known facts. Daily expectations and scientific hypotheses are the outcomes of the same mental activity, but yet they usually differ in their qualities because of manners in which the same activity is done. Different manners bring about difference in quality, and this difference has to do with the legitimacy of suppositions. “The man of science, in fact,” Huxley said, “simply uses with scrupulous exactness the methods which we all, habitually and at every moment, use carelessly.”⁶⁰¹ That is, scientific activity is done in a more precise, disciplined, and complete manner. Huxley likened the difference between scientific inquiry and ordinary inquiry to the difference between a baker or butcher “weighing out his goods in common scales” and a chemist “performing a difficult and complex analysis by means of his balance and finely-graduated weights.”⁶⁰² Another difference pointed out by Huxley is that when classifying objects, ordinary people “feel” resemblances whereas scientists “define” them.⁶⁰³

The same kind of activity is carried out in different manners from another aspect. According to Huxley, scientific inquiry more strictly follows agnosticism.⁶⁰⁴ As I argued in the previous chapter, Huxley’s agnosticism is a guide to knowledge consisting an account of legitimate evidence and an ethics of knowing. As he understood science, verification stands as a crucial step of scientific investigation, because it is a process of justification. This differentiates

⁶⁰⁰ *Ibid.*, 67-8.

⁶⁰¹ Huxley 1854a, 4.

⁶⁰² Huxley 1863e, 363.

⁶⁰³ Huxley 1854a, 51.

⁶⁰⁴ Huxley 1860b, 226; 1866a, 158; 1884a, 5.

scientific investigation from speculative investigation. Huxley spoke of those who say that their master already taught a certain scientific idea, for example, an idea of atoms as the basic elements, but this kind of remark simply shows the lack of understanding of scientific inquiry and its value; if one “did not take the trouble to go through the process of verification,” an *a priori* investigation has been done.⁶⁰⁵ Verification, the process of testing a given idea to accept or reject it, is indispensable to science, and this process tends to be done in science in accordance with the guide to knowledge specified by agnosticism. For this reason, science is the only way to knowledge.

Agnosticism is reflected in science as a work ethics. For example, Huxley wrote:

Scientific men get an awkward habit – no, I won’t call it that, for it is a valuable habit – of believing nothing unless there is evidence for it; and they have a way of looking upon belief which is not based upon evidence, not only as illogical, but as immoral.⁶⁰⁶

This “habit,” as Huxley understood it, is more than a habit of individuals. “Belief, in the scientific sense of the word,” he said, “is a serious matter, and needs strong foundations.”⁶⁰⁷ He wrote:

The man of science, however, who commits himself to even one statement which turns out to be devoid of good foundation, loses somewhat of his reputation among his fellows, and if he is guilty of the same error often he loses not only his intellectual but his moral standing among them;⁶⁰⁸

Because science aims to attain knowledge, given Huxley’s claim that agnosticism is the only guide to knowledge, it is obvious that science has codes of ethics as indicated in agnosticism. A

⁶⁰⁵ Huxley 1887f; 1854a, 55.

⁶⁰⁶ Huxley 1876c, 65. Also Huxley 1856; 1859b, 1866a, 158; 1887d, 18.

⁶⁰⁷ Huxley 1879f, 256.

⁶⁰⁸ Hutton’s record of Huxley’s presentation on December 10, 1872 (Hutton 1885).

scientist may have a religion, but “cannot escape from the moral obligation to weigh the evidence in favour of any alleged wonderful occurrence.”⁶⁰⁹

In addition to the duty of conducting an evidential evaluation, as noted in the previous chapter, agnosticism also requires absolute submission to evidence or “intellectual obedience.”⁶¹⁰ Huxley illustrated the notion reflected in science in a letter addressed to his Anglican friend, Kingsley, as follows:

Science seems to me to teach in the highest and strongest manner the great truth which is embodied in the Christian conception of entire surrender to the will of God. Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses nature leads, or you shall learn nothing.⁶¹¹

Looking around his days and the history of science, Huxley noticed that some scientists did not follow agnosticism, and that his conception of science as the practice of agnosticism had not been set as a default view. He needed to argue and highlight his position, because it is agnosticism that renders science epistemologically superior to other types of inquiry. We can thus see Huxley making both descriptive and normative claims. Science has adopted agnosticism, and science should follow agnosticism. Huxley wrote: “Agnosticism is of the essence of science, whether ancient or modern.”⁶¹² The word “essence” conveys both descriptive and normative significations. Science will secure its epistemic superiority and be the best way to knowledge so long as it strictly follows agnosticism.

⁶⁰⁹ Huxley 1892c, 36.

⁶¹⁰ Huxley 1877c, 264.

⁶¹¹ Huxley 1860c, 316. Also Huxley 1860d, 226.

⁶¹² Huxley 1884a, 5.

6.3. Huxley's conception of faith

Although most criticisms of Huxley's position are grounded on the point of his having faith in science, it has not been examined how he understood faith. There seem to be four reasons. First, because Huxley attacked clerics' faith when he criticized theological claims, he might be seen to reject faith of any kind. Second, as discussed in the previous chapter, Huxley's position has been sometimes identified as a Cliffordian ethics of belief, and Clifford has been considered to leave no room for faith. Third, Huxley did not write an essay solely devoted to the topic of faith. Furthermore, it might sound oxymoronic to speak of an agnostic's faith, like an atheist's god.

In Chapter 4, I discussed one aspect of Huxley's views on faith. Huxley rejected a particular understanding of faith – faith as a means of yielding knowledge. In Chapter 5, I argued that Huxley's agnosticism, unlike Clifford's ethics of belief, targets a belief or claim concerning the status of knowledge, and prescribes duties that an epistemic agent should fulfill in pursuing knowledge. These discussions suggest that Huxley might not have rejected having faith categorically. Furthermore, although none of Huxley's essays was written for the topic of faith, he frequently spoke of "faith" or "having faith" to describe himself or others, and also discussed issues over faith in essays and letters. Huxley's usage of "faith" shows that he did not use the term only refer to religious faith and he had a certain understanding of faith not restricted to religious context.⁶¹³

In this section, I will discuss what it means for an agnostic to have faith in order to cast doubts on the following points: first, Huxley as an agnostic should not have faith; second, according to agnosticism, Huxley's faith in principles of science and clerics' faith in theological

⁶¹³ I have examined Huxley's essays and letters that contain "faith" or "faithful" and that address issues relevant to the topic of faith. I have concluded that he had a definable and persistent view of faith (which will be introduced shortly). In particular, see the following: Huxley 1860d; 1876c; 1887b; 1889e; 1890e; 1891a; n.d.2.

doctrines are equally blameworthy. These two points have led to the criticism that I introduced at the beginning of this chapter. I will argue that it was agnosticism that allowed Huxley to put faith in science and rendered his faith “reasonable” and his religious target’s faith “blind.”

6.3.1. An agnostic’s faith

The most explicit illustration of a notion of faith that Huxley offered is as follows: “men constantly feel certain about things for which they strongly hope, but have no evidence, in the legal or logical sense of the word.”⁶¹⁴ Three points are worth noting. First, faith involves a constant feeling of certainty. Huxley understood faith basically as an affective state or “feeling” that we have about a proposition or thing.⁶¹⁵ Yet, secondly, the feeling of certainty has not been formed by evidence. Nevertheless, we have the feeling of certainty, because, thirdly, having faith also involves being in the state of having a strong hope. When we have faith, as Huxley viewed it, we strongly hope that a given proposition will turn out to be true or that a given thing will be (or behave) in the way as hoped, although we lack evidence for the certainty we feel. If one constantly feels certain about something in accordance with given evidence, this agent’s state would not be described as having faith. The condition of lacking evidence is made presumably because Huxley considered having faith to involve hoping; it would not make sense to hope for something that one knows to be certain.

Huxley tended to use “faith” and “trust” interchangeably, and this suggests what faith does for us.⁶¹⁶ A constant feeling of certainty, according to Huxley, can do nothing for us

⁶¹⁴ Huxley 1889e, 244.

⁶¹⁵ According to Huxley, hopes and fears are similar to expectations, but they are associated with emotion: hopes are associated with the emotion of pleasure, and fears with the emotion of pain (Huxley 1878h, 120, f25).

⁶¹⁶ Huxley 1889e; 1890e.

regarding the epistemic status of a proposition at issue.⁶¹⁷ A feeling of certainty does not show that a proposition is true and cannot be used to justify it, because we come to have the feeling without evidence. However, we constantly feel certain about something that is strongly hoped for, and this intense affective state likely leads an agent to reason and act based on the content or object of faith. This understanding of faith appears to have led Huxley to see that faith can function as an ideal or policy by which people live. Thus, it is not surprising that Huxley admitted that faith has a practical value in ordinary life.⁶¹⁸ He had no quarrel with individuals living by faith, and he was one of them.

Philosophers have disputed over whether faith necessarily involves belief or acceptance.⁶¹⁹ Huxley was not particularly concerned about the issue over whether an agent is led to reason and act via the state of believing or the act of accepting; he appears to have thought that sometimes the state of believing and other times the act of accepting motivate one to reason and act upon one's faith. In conceptualizing faith, Huxley's focus was not on the state of believing, but on the state of having a strong hope and the accompanied state of trusting, and thus to him, it makes sense to say that one may lose one's faith (faith involving belief) or one may decline to put faith (faith involving acceptance).⁶²⁰

As mentioned, Huxley openly stated that he had faith in principles of science. That is, he reasoned and acted based upon principles of science. Faith is needed to get science going, and

⁶¹⁷ Huxley 1878h; 1889a; n.d.2.

⁶¹⁸ Huxley 1889e.

⁶¹⁹ For an introductory discussion of various accounts of faith, see Bishop 2010. It appears that in the literature of faith, the dominant view is that faith necessarily involves the state of believing. Since the "hope" or "trust" model of faith seems not quite popular as an account of faith, it would be interesting to know why Huxley primarily viewed faith as hope and trust. On the other hand, in the literature of *trust*, it seems to be agreed that if an agent already believes that something is the case, there is no point of trusting (Baier 1986; McLeod 2015).

⁶²⁰ For example, Huxley 1859a, 35; 1860c; 1892c, 38.

thus, to Huxley, having faith is not something to hide. Yet, Huxley does not appear to have employed the expression “faith” only to mean one’s taking something as a rule or policy. After all, having faith involves an intense state – constant and powerful hope along with willingness to trust. As Huxley understood it, there is something “religious” about having faith. To see another connotation that Huxley wanted to associate with his notion of faith, we need to take how he understood religion into consideration.

Huxley distinguished religion from theology. Theology involves having and maintaining beliefs in dogmas, whereas religion concerns having and maintaining feelings, particularly “the reverence and love for [an] ethical ideal, and the desire to realise that ideal in life.”⁶²¹ He claimed that Christian theology cannot be reconciled with science in his days, because theology is subject to scientific evaluation and many of its dogmas had been well challenged.⁶²² On the other hand, religion, passion for an ethical ideal, Huxley said, concerns emotion that “every man ought to feel.”⁶²³ To Huxley, Jesus was deeply religious in that sense, and the Bible is a book of morality.⁶²⁴ He further claimed that “the antagonism between science and religion” has been “fabricated” partly by “short-sighted religious people who confound a certain branch of science, theology, with religion.”⁶²⁵

Huxley saw no conflict between science and religion. On the contrary, they share the passion for an ideal or a “religious tone of mind”:

⁶²¹ Huxley 1889e, 249. According to Huxley, he learned the possibility of religion without theology from the works of Thomas Carlyle (1795-1881) (Huxley 1860c). Regarding Carlyle’s influence on Huxley, see Turner 1975; Paradis 1978, 63-5.

⁶²² Huxley 1859a; 1864b; 1885b; 1886e; 1887e.

⁶²³ Huxley 1889e, 249-50.

⁶²⁴ Huxley 1859b; 1889g; 1892c; 1892d. Similarly, Huxley said in a letter to John Knowles that “Christ was not a Christian” (1889b, 109). See Huxley 1885a and 1889c for his view of the relation between Jesus and the Church.

⁶²⁵ Huxley 1885b, 160-1.

True science and true religion are twin-sisters, and the separation of either from the other is sure to prove the death of both. Science prospers exactly in proportion as it is religious; and religion flourishes in exact proportion to the scientific depth and firmness of its basis.

The great deeds of philosophers have been less the fruit of their intellect, than of the direction of that intellect by an eminently religious tone of mind. Truth has yielded herself rather to their patience, their love, their single-heartedness, and their self-denial, than to their logical acumen.⁶²⁶

To prosper, science needs the passion for its epistemic ideal. Huxley had observed scientists firmly relying on principles of science and engaging in laborious scientific works which appeared to have rewarded them with nothing but truth; he found them religious.⁶²⁷ However, as seen in the above quote, he did not simply report what he had noticed. He thought that scientific practice should be religious for science to develop. Thus, I think, Huxley spoke of faith when describing a stance toward science. For example, Huxley wanted axioms of science to be the object of faith, as opposed to the object of acceptance which is a lesser intense state. Axioms of science need to be followed by its practitioners in a religious manner, if we want to keep science – the only promising way to knowledge – going and flourishing. If so, then there would be no reason for Huxley to be apologetic about or ashamed for asserting that he had faith in science.

The often made criticism that Huxley's science too rests on faith, then, is correct only in one sense. There is no inconsistency between his discussions of faith in science and of science as the practice of agnosticism. According to his agnosticism, for example, the uniformity of nature

⁶²⁶ Huxley 1859a, 35. The “religious tone of mind” was also illustrated as a moral character:

The moral faculties of courage, patience, and self-denial, are of as much value in science as in life; the origin of an erroneous doctrine lies as often in the heart as in the head; and the basis of the character of a great philosopher will commonly be found, on close analysis, to be earnest truthfulness – and no imaginary gift of genius. It is character and not talent which is the essential element of success in science (Huxley 1856, 313; also see Huxley 1854a; 1880d).

⁶²⁷ Huxley 1856; 1887f.

is not a proved truth; trusting the uniformity of nature involves recognition of the possibility of its being false, and thus, here trusting is taking risks. In fact, I think, Huxley found them complimentary to each other. Science needs agnosticism as a guide for accepting, holding and rejecting an idea, according to which principles of science are not demonstrable and scientific statements are symbolic interpretations to be updated continually; *therefore*, science also needs practitioners who are faithful to those principles and willing to do scientific labors persistently in accordance with its work ethics. To fully understand Huxley's claim that science is the only way of attaining knowledge, we need to take into consideration not only his epistemological position on the search for knowledge, but also his view of how the search for knowledge can be carried out. To secure the epistemological merit of science, Huxley did not ask for either metaphysical or theological "proof" or a belief in the "imagination" that science deals with reality; instead he asked for the will to follow agnosticism rigorously and put faith on principles of science.

6.3.2. A critique of blind faith

If so, then what is wrong with theological thinkers' or clerics' faith? According to Huxley, his religious opponents' faith is "blind." In the essay written just before his death, Huxley said, "I have heard a good deal about 'blind causation' in my time; but I have met with nobody who was able or willing to help me to the meaning of the phrase by defining its implied antithesis, 'seeing causation.'"⁶²⁸ Given sensitivity and dissatisfaction that he consistently expressed toward irresponsibly used expressions throughout his life, we can expect that Huxley had something in mind when he introduced the expression "blind faith" in his essays several times.⁶²⁹ There are

⁶²⁸ Huxley 1895b in Paterson 1932, 319.

⁶²⁹ For example, Huxley wrote: "For him [improver of natural knowledge], scepticism is the highest of duties; blind faith the one unpardonable sin" (1866b, 40; also, 1865, 71; 1887b, 182, 190; 1887g, 553; n.d.2). Huxley also spoke

two reasons why Huxley would consider his religious opponents to have “blind faith”: their illegitimate reliance on faith and their indiscriminate reliance on faith.

First, one has blind faith when one is blind to the legitimate use of faith. As discussed in Chapter 4, Huxley argued that having faith cannot serve the role of evidence, but he was well aware that there were those, among religious thinkers, who took their having faith as evidence. As Huxley viewed them, their appeal to faith showed that they had been inadequately relying on faith. Huxley illustrated their blindness to the fact that having faith lacks evidential value by introducing a legal context:

I may have the most absolute faith that a friend has not committed the crime of which he is accused. In the early days of English history, if my friend could have obtained a few more compurgators of a like robust faith, he would have been acquitted. At the present day, if I tendered myself as a witness on that score, the judge would tell me to stand down, and the youngest barrister would smile at my simplicity. Miserable indeed is the man who has not such faith in some of his fellow-men – only less miserable than the man who allows himself to forget that such faith is not, strictly speaking, evidence;⁶³⁰

Huxley suggested that his contemporary clerics were making the same mistake (at which “the youngest barrister would smile”). Huxley acknowledged their claim that their religious faith is special because of its source being divine. However, as discussed, to Huxley, this point is useless in showing that appealing to faith can work as evidence.

On the other hand, one has “seeing” faith when one keeps in mind the the legitimate role of faith. We may rely on faith when our ability fails us, but when we do, we should not consider the content or object of faith to be certain or knowledge. Trust in the content or object of faith is

of other kinds of blindness, for example, “the blind opponents of properly-conducted physiological experimentation” (1889d, 225). The same notion of blindness seems to have been applied whenever he spoke of “blind.”

⁶³⁰ Huxley 1889e, 244.

seen as a way of making up for our limits. In this sense, Huxley trusted principles of science which are not provable due to the limits of human faculties.

It is quite true that the ground of every one of our actions, and the validity of all our reasonings, rest upon the great act of faith, which leads us to take the experience of the past as a safe guide in our dealings with the present and the future. From the nature of ratiocination, it is obvious that the axioms, on which it is based, cannot be demonstrated by ratiocination. It is also a trite observation that, in the business of life, we constantly take the most serious action upon evidence of an utterly insufficient character. But it is surely plain that faith is not necessarily entitled to dispense with ratiocination because ratiocination cannot dispense with faith as a starting-point; and that because we are often obliged, by the pressure of events, to act on very bad evidence, it does not follow that it is proper to act on such evidence when the pressure is absent.⁶³¹

Huxley noted situations where we should or cannot but act on faith. Yet, he also pointed out that we should not conclude that we can trust any faith, without constraints, whenever we please. It is a manner of having faith, as opposed to a content of faith, that determines whether or not one is deemed to have blind faith.

The other aspect of “blind faith” is indiscriminative reliance on faith. Those with blind faith do not bother themselves to apply scientific methods when their faith concerns a claim that can be shown to be supported or undermined by evidence. This is a recurrent complaint that Huxley had against his clerical opponents: they appealed to their having faith over issues that are scientifically or rationally examinable.⁶³² They did not care about the demonstrability of a given idea, and pointed to their faith whenever they found fit. For instance, against the charge of not trusting in Jesus Christ’s authority, Huxley replied as follows:

⁶³¹ Huxley 1889e, 243.

⁶³² Huxley 1886e; 1887b; 1888b; 1889e; 1890d; 1892c; n.d.2.

Now, the question as to what Jesus really said and did is strictly a scientific problem, which is capable of solution by no other methods than those practised by the historian and the literary critic. It is a problem of immense difficulty, which has occupied some of the best heads in Europe for the last century; and it is only of late years that their investigations have begun to converge towards one conclusion.⁶³³

After pointing out the same nature of questions over the credibility of Gospels, Huxley commented on the approach taken by his critic, Henry Wace: “That kind of faith which Dr. Wace describes and lauds is of no use here.”⁶³⁴

Professing to know something unknowable by faith surely concerned Huxley, but at least in equal degree, professing to know something *knowable* by faith concerned him too. According to Huxley, the significant part of religious or Christian faith involves issues concerning “Thus saith the Lord” or “This is the work of the Lord,” which can be examined by using scientific and rational means.⁶³⁵ Huxley’s criticism targeted over-reliance on faith.

Whatever the nature and the value of that operation of the mind which is called Faith, it is surely the extremity of folly, to imagine that it has any place in any enquiry the object of which, in the first place, is to ascertain whether certain events which are said to have taken place did take place or not; and, in the second place, to determine whether A.B. was the person denoted by a certain description or whether he was not.⁶³⁶

⁶³³ Huxley 1889e, 212. Huxley also wrote the following in a letter: “Christian beliefs profess to be based upon historical facts. If there was no such person as Jesus of Nazareth, and if His biography given in the Gospels is a fiction, Christianity vanishes. Now the inquiry into the truth or falsehood of a matter of history is just as much a question of pure science as the inquiry into the truth or falsehood of a matter of geology and the value of evidence in the two cases must be tested in the same way” (1888b, 92).

⁶³⁴ Huxley 1889e, 212.

⁶³⁵ Huxley 1887b, 190.

⁶³⁶ Huxley n.d.2, 111.

What is more, it was considered to be “blasphemy” to point out clerics’ indiscriminate reliance on faith by indicating the nature of given issues and asking for rational grounds.⁶³⁷

Huxley saw “blind” faith in his contemporary theological thinkers and clerics, and they viewed faith as truth acquired via a divinely given faculty or revealed by God. If faith is understood in this way, there would be no reason to be wary of relying on faith. A constant feeling of certainty would be taken as a sign of truth, and thus pointing to the fact of having faith can be considered to be evidence. It would be not so meaningful to learn that a given claim is demonstrable by using scientific and rational methods. Moreover, when our faith is in conflict with a certain scientific claim, we might have to adhere to our faith. A similar attitude can be found in one’s claim that we keep our faith firm especially when contrary evidence is present.

Religious thinkers may say that God is testing their faith, but Huxley would say that we need to test our faith. The fact that there are cases in which we need to rely on strong feelings of certainty reflects our limits or situations, but we do have a means to attain knowledge, which, Huxley thought, religious thinkers also utilize in their daily life. As opposed to blind faith in the sense of being indiscriminate, Huxley recommended the minimal reliance on faith. When a given question is demonstrable, the fact of having faith should not determine whether or not the content or object of faith is certain. In other words, agnosticism should be followed.

6.4. Chapter summary

In this chapter, I discussed Huxley’s views on science and on faith to re-evaluate the meaning of having faith in science. Huxley would not have thought that he should show the reality or objective validity of principles of science because, according to his epistemological position, they

⁶³⁷ Huxley 1887b, 191.

are unprovable assumptions that call for not proof but faith, and science does not aim to offer literal descriptions of real nature or reality; also, because the epistemic value of science has come and will come from its adoption and practice of agnosticism. Furthermore, Huxley would not have considered him to be treating his faith in science and his opponents' faith in theology inconsistently, because his concern was how one relies on faith. Blind faith ignores agnosticism, whereas reasonable faith works with agnosticism.

CHAPTER 7

Conclusion

Huxley scholarship has grown partly from efforts to resist the “traditional understanding” of Huxley as a powerful and clever defender of Darwin and science.⁶³⁸ Most notably, scholars have shown that Huxley was a scientist with his own achievement, not merely a science publicist or controversialist. In this regard, the titles of works done by Sherrie L. Lyons are worth introducing: “The Origin of T. H. Huxley’s Saltationism: History in Darwin’s Shadow,” “Introduction: Not Just Darwin’s Bulldog” and “In Search of Huxley the Scientist.”⁶³⁹ Huxley’s scientific works had been discussed and evaluated in connection with Darwin’s theory, and this seems to have motivated Lyons. Lyons wrote in 1995:

He [Michael Bartholomew] notes that [Huxley’s] *Man’s Place in Nature* made no contribution to natural selection theory, and that in his scientific papers Huxley showed no interest in problems of variation, selection, or inheritance. . . . Mario Di Gregorio is even critical of Huxley’s motives for writing *Man’s Place in Nature*, claiming that it was written primarily to get back at his archenemy, Richard Owen.⁶⁴⁰

No one now would doubt that Huxley was a scientist with his own merit and achievement.

Yet I think that we can add one more identity to Huxley: philosopher. The best place where we can see Huxley’s philosophical thoughts is his discussions of agnosticism. However, as Lyons pointed out, to expand his identity, we need to put aside, for a while, Huxley the Victorian science popularizer. This is not because Huxley’s agnosticism has nothing to do with his aim of

⁶³⁸ di Gregorio 1982, 397.

⁶³⁹ Lyons 1995; 1999b; 1999a.

⁶⁴⁰ Lyons 1995, 464.

promoting science for social reform; rather it is because his agnosticism has been primarily understood as part of the larger project of promoting science in connection with a kind of class struggle, as I discussed in the first two chapters. To clarify the locus of contribution that I believe my dissertation makes, let's briefly re-visit the discussions in those chapters.

Huxley had a project of promoting science, which can be regarded, without dispute, as his most important, life-long project. Huxley wanted science to play a major role in social reform. He believed that to make social progress, more scientific discoveries and scientific ways of thinking should be incorporated into society, from policies to school curricula. Since Victorian society was led by the Anglican establishment, his project of promoting science involved a sub-project of undermining the authority of Anglican leaders in political and social areas. We can summarize the dominant evaluation of Huxley's agnosticism in this context as follows: endorsing agnosticism was, politically or tactically speaking, a good move. This is because it served as a tool to attack the grounds of theology, thereby challenging the influence of clerics. Another benefit was that agnosticism helped Huxley to get along well with his Anglican allies like Kingsley as well as non-conformist allies, because Huxley could say, simply, "I don't know." The contribution of his endorsement of agnosticism to raising the social standing of science has been well examined.

However, further questions can be asked. Why would Huxley have thought that his Victorian society needed to give a larger role to science? What was his diagnosis of the circumstances for which he prescribed the empowerment of science? Without some answers to these questions, I thought, our understanding of Huxley's agnosticism as part of his project of social reform by means of science would remain incomplete. The immediate answer that Huxley wanted to promote his occupation which happened to be about science could be easily ruled out,

given that he had serious interests in philosophical and meta-scientific issues. My dissertation has been motivated to find a prequel.

Huxley viewed philosophy primarily as an epistemological enterprise, and his main concerns were how to understand knowledge and how to increase the stock of knowledge. This may reflect his diagnosis of Victorian society: confusing, inadequate or “pre-modern” uses of the concept of knowledge. Indeed, his sub-project of weakening clerics’ authority and strengthening scientists’ authority was centered around epistemic authority. Theological doctrines cannot be considered knowledge, whereas scientific method is the only way of gaining knowledge. This claim was made by Huxley repeatedly and openly, and this is no secret. Pointing to Huxley making such an epistemological claim would not be then sufficient to show that he had deep concerns over Victorians’ epistemic activity. He might have just wanted to win debates with anyone whom he identified as an enemy to science (as some scholars have argued).

Therefore, I have tried to establish the thesis that Huxley had an epistemological project of offering a method for identifying knowledge that would work regardless of our limits or ignorance. This project was layered behind agnosticism, and agnosticism was his quick guide to knowledge, consisting of an account of legitimate evidence and an ethics of knowing. With agnosticism understood in this way, I believe, we can better understand Huxley’s conception of science as the only way to knowledge and thus his promotion of science as means to social reform. Huxley was concerned about a claim to knowledge and aimed to empower evidential value of experience. This was his life-long message not only for Victorian society but also for philosophy.

I started with Huxley’s philosophical thoughts that may look irrelevant to agnosticism at first glance (Chapter 3 and Chapter 4). I drew attention to Huxley’s discussions of Descartes and

introduced three notions that he found from Descartes: legitimate Idealism, legitimate Materialism, and Descartes's maxim on when one should assent to a proposition. From Huxley's discussions of Descartes, we have seen not only that Huxley's philosophical concern was how to identify knowledge within our epistemic situation, but also that all the three notions are incorporated into his later discussions of agnosticism.

To further clarify the nature and structure of his agnosticism, I also discussed how Huxley mobilized the three notions to turn them into essential constituents of our search for knowledge. Legitimate Idealism, according to which perceptions (thoughts or mental contents appeared to consciousness) certainly exist and all we can have access to is perceptions, has bearings on our epistemic practice, and we should accept this notion because it is irrefragable. The lesson is that whichever propositions turn out to be knowledge, all knowledge takes the form of perception and all knowledge is knowledge about what we have perceived.

Legitimate Materialism, according to which a materialistic-mechanistic account is a sufficient explanation that we can try without limits on subject matters, provides us with a methodological approach that Huxley called "physical thinking" or "material terminology." He argued that, in our search for knowledge, we should try to offer a materialistic-mechanistic account, because this kind of account tends to have explanatory value and can alone go through the process of verification, which he considered to be the only legitimate method of justification.

The method of verification, based on the view that memory is a model of knowledge, is a process of converting an expectation into a memory. It is a justificatory process, because it utilizes our experiencing of impressions that can supply us with a feeling of happening from which credibility accrues and can function as a discriminator and tester due to the fact that we do not experience any possible, imaginable arrangements of impressions while we can have an

experience of the same kind of arrangement of impressions again. The method of verification is the *only* justificatory process because one of the two other processes (appeal to religious faith) turns out to be disqualified as a justificatory process whereas the other (appeal to the notion of necessity), turns out to piggyback on the same resources (verified ideas), but in a cruder manner, that are used by the method of verification.

Legitimate Idealism and Materialism, I argued, are incorporated into Huxley's agnosticism as an account of evidence – what not to count and what to count as evidence. To support my claim, I highlighted that his agnostics are those who ask for evidence and examine given evidence, rather than those who express ignorance or conveniently point to current scientific discoveries as if they are ultimate facts. I also discussed Huxley's application of agnosticism to specific issues to show that his underlying claim was that propositions about anything beyond our consciousness lack justificatory power whereas verified propositions have justificatory power. Huxley discussed the boundary of ignorance, but he did so to take away evidential value from the realm of ignorance.

The third notion, Descartes's maxim regarding when to assent, according to Huxley, had been held by many like-minded thinkers, including Socrates. Huxley formulated the shared idea as the agnostic principle, which I identified as an ethics of knowing, as opposed to an ethics of believing. The agnostic principle imposes the following epistemic duties on agents: to claim that a proposition is knowledge, the valuation of evidence should be done, and its result should be accepted. To support my claim, I showed that Huxley's main concern was a claim to knowledge, and discussed his positions on ethics of belief and belief formation (qualified version of doxastic involuntarism). His view of belief formation is important for another reason, because it illuminates how his account of evidence is related to his ethics of knowing via the notions of

pretension and honesty which Huxley also associated with his agnosticism. Huxley turned lack of pretension and honesty into epistemic virtues with respect to evidence, rather than the realm of ignorance.

I ended the chapter on agnosticism with Huxley's discussion of what he called "modern critical philosophy." I introduced it to show that my understanding of the nature and structure of agnosticism goes well with his situating agnosticism within modern critical philosophy. The take-home message from this philosophical tradition is to abandon notions of knowledge entertained by all sorts of "-ists" or gnostics and instead come up with a "more modern" or "critical" conception of knowledge.

My understanding of Huxley's notion of agnosticism can be contrasted with another dominant view in Huxley scholarship. In addition to the contributions that Huxley's agnosticism made to the social status of science, scholars also have evaluated whether his agnosticism made some contribution to the epistemological status of science. The dominant evaluation is negative, and we can summarize as follows: philosophically speaking, agnosticism does not allow him to secure the epistemic superiority of science. In other words, his agnosticism has been considered to pose philosophical obstacles to his project of promoting science. I argued, on the contrary, that his agnosticism made philosophical contribution to the project. Thus, although I agree with, and put aside, the evaluation that his agnosticism made contributions to science's *social* standing, I argued against the negative evaluation of his agnosticism regarding its contribution to science's *epistemological* standing.

What is the philosophical worry here? Huxley wanted to claim that science is the only means of attaining knowledge. But, his agnosticism poses two problems. The first problem has to do with the doctrine that we cannot know about metaphysical and theological matters. It is

problematic, because this doctrine left him with no ways to guarantee the reality or objectivity of axioms of science. Like theology, science also has fundamental assumptions such as the uniformity of nature and causation. These assumptions would seem to fall under the boundary of ignorance. If so, then how can Huxley secure science? In other words, he was undermining not only the grounds of theology but also the grounds of science. In this sense, his endorsing agnosticism has been said to be philosophically naïve or short-sighted.

This worry misses its target when we understand Huxley's agnosticism as a guide to knowledge that would work despite our limits and take its bearings on his conception of science into account. Huxley did not think that the epistemic value of science is grounded on the reality or objectivity of axioms of science. In fact, I argued, it was precisely his intention behind agnosticism to challenge such a way of defending or securing science. He was well aware of those who had tried to construct a metaphysical or theological system that will guarantee the truth or reality of axioms of science, while pretending that their favorite system is certain. He criticized – not simply neglected – this kind of defense, and agnosticism tells us what is wrong with it. First, such a metaphysical or theological defense cannot do what it is supposed to do because unjustifiable claims have no justificatory power. Second, this kind of defense is not desirable because it has been motivated by the literal and realistic conception of science, which is irrelevant to and sometimes even harmful to scientific practice. If we want to understand epistemic superiority of science, according to Huxley, we should note that science has been the best practice of agnosticism and realize that science is the only way to knowledge insofar as it rigorously follows agnosticism. As Huxley understood its history, science has been done with the correct conception of evidence and in epistemically virtuous manners.

The second problem concerns Huxley's making the claim that science is the only means for gaining knowledge. He seems to have violated his own agnostic principle. This principle seems to say that we should have a belief based on only evidential reasons. Huxley admitted that axioms of science are not demonstrable; nonetheless, he openly and repeatedly said that he had faith in science; yet, he criticized his religious targets for their faith. Endorsing agnosticism made him inconsistent.

This criticism is sometimes built on the interpretation of Huxley's agnosticism as Clifford's ethics of belief. However, I argued against the understanding that Huxley was interested in establishing a morally right way of believing and his agnosticism concerns our state of believing something as true; he was at pains to undermine the notion that there is something that we ought to believe, and thought that we cannot entirely control what to believe.

In other cases, the criticism has been raised on the basis that both science and theology ultimately and equally rest on one's faith. I argued instead that Huxley saw the difference in their manners of resting on faith, and the focus should be put on whether one's having faith is done and managed compatibly with practicing agnosticism. For Huxley, having faith means trusting and taking risks, not having knowledge. Science needs both agnosticism and faith to keep working and progressing, in short, agnostic faith.

I believe that my dissertation sheds light on the following issues. The first concerns whether Huxley's claim of science being the only way to knowledge is based on his agnosticism, or the other way around. The common interpretive frame prioritizes Huxley's claim about science. Huxley might have first come to have the conviction that the scientific method is the only means of gaining knowledge, but my concern is not temporal order. If we look into Huxley's thoughts, we can see that his defense of agnosticism is philosophically prior to his

defense of science. It is also a matter of historical fact whether Huxley was indeed concerned about theoretical order, and I have tried to show that he was.

Second, we can better understand religious dimensions of science in Huxley's views. It has been pointed out that there is something religious about Huxley's stance toward science, as the expressions "Pope Huxley" and "agnostic scientific theology" attest. I tried to show that Huxley did not render science religious by claiming that scientific discoveries are absolute facts about reality or by getting people to believe that axioms of science are proved to be true. The religious dimensions that he saw were as follows. On one hand, science as an intellectual inquiry requires trusting axioms of science and taking risks that might come due to the possibility of them being false; in this sense, Huxley pointed out, having faith is a religious – "patient, loving, single-hearted, and self-denial" – act.⁶⁴¹ On the other hand, science as the practice of agnosticism requires surrendering to the force of evidence without any further pretension or resistance, which Huxley likened to complete obedience to God's will. In these aspects, science provides us not only with knowledge but also with religious teachings.

Third, Huxley's approach to epistemological issues can clarify what kind of empiricist he was. Suppose that there is a set of propositions that are taken as knowledge. We can ask whether those propositions are obtained from sensory experience alone or partially from the operation of non-sensory organs, or, say, reason. Although Huxley thought that even impressions do not solely come from sensory operations and thus agreed that all contents of propositions considered knowledge are not exhausted by so-called sense data, issues over how our mind comes to perceive or understand propositions considered knowledge are not, to Huxley, salient and urgent issues of our *epistemological* inquiry; these are issues of metaphysical or proto-scientific inquiry

⁶⁴¹ Huxley 1859c, 35.

on mind, and he thought that little was known about mental operations or abilities regarding the generation of perceptions. Huxley, instead, started with the certain existence of mental contents, which modern critical philosophers seemed to have endorsed with one voice despite the differences in theories of mind, understanding, or knowledge put forward by them. As Huxley understood it, epistemological inquiry starts there and aims to come up with the best method or criterion for selecting some as knowledge among all possible mental contents. Thus, he considered issues concerning the relationship between our having perceptions and reality to be irrelevant to epistemology and focused on the relationship between the content of perception and a charted out “new Nature” based on some of the content of perception.⁶⁴² It is in this context that he argued for the method of verification. Huxley may be considered an empiricist in two senses. First, he was not interested in a project of reducing all propositions considered knowledge or scientific facts into sense data, but he did claim that for a proposition to be counted as knowledge, it must be tested against experiencing of a complex impression; he was an empiricist about justification. Second, although the method of verification can work independently from one’s ordinary mental process as any measuring tool can correct our experience, Huxley understood verification to be initially modeled on (barely known) mental processes producing memories and considered memory to be a type of perception to which all knowledge should belong; he had an empiricist view that a justificatory process and a psychological process lie on the continuum (as a chemist’s scale and a baker’s scale do).

This dissertation has limits, most of which would stem from the fact that I have exclusively focused on Huxley’s own writings. Because of the scope and aim of this dissertation,

⁶⁴² To be sure, Huxley discussed notions regarding the relationship between perceptions and external material objects as hypotheses about the phenomenal world (*e.g.*, Huxley 1879a).

first, comparison/contrast studies and situating works have been entirely untouched. For example, I did not discuss the possibility that his agnosticism may have shared views held by his contemporaries. It would be interesting to compare and contrast, from a broader perspective, Huxley's notion of agnosticism with philosophical movements in the 19th and early 20th centuries such as German scientific thinkers' views on human ignorance and the position labeled as "neutral monism."⁶⁴³ For another example, I did not attempt to situate Huxley within the history of philosophy of science. I discussed Huxley without introducing thoughts of Comte, Herschel, Whewell, or Mill, which have occupied a large portion of the history. Also, I said nothing about the contemporary philosophy of science, although Huxley's agnosticism might look relevant to its core issues. For instance, the term "scientific agnostic" has been around in the literature on scientific realism and anti-realism.⁶⁴⁴

There is another type of research not done in this dissertation: research projects inspired by some implications of Huxley's notion of agnosticism. For example, it would be interesting to do historical and philosophical research on connection between one's emphasis on work ethics (or intellectual and moral guidance) for scientists and instrumentalistic conception of science. Related to this and to the literatures on epistemic duty and epistemology, Huxley's views may draw attention to the nature of epistemological challenges for science in a certain period of time and to the role of faith in search for knowledge. Also, the notion of the trichotomy of nature (or

⁶⁴³ James Ward identified Huxley's position as "Neutral or Agnostic Monism" ([1899]1915, 206).

⁶⁴⁴ In the paper where Huxley is introduced as the coiner of the term "agnostic," Bas C. van Fraassen defines "scientific agnostic" as "someone who believes the science s/he accepts to be empirically adequate but does not believe it to be true, nor believe it to be false" and "scientific gnostic" as "someone who believes the science s/he accepts to be true" (1998, 213; see also Forrest 1994, Psillos 2000, Monton and Mohler 2012). Huxley would agree with the description, and yet he was not concerned with the distinction between the observable and the theoretical.

world) might have been an important notion located at the intersection of the history of science and the history of epistemology.

This dissertation may have yet another kind of limits. I'd like to view all limits as invitations to future research.

REFERENCES

- Abberley, W. (2016). Review of the book *Victorian Scientific Naturalism: Community, Identity, Continuity*, by G. Dawson and B. Lightman (Eds.). *Victorian Review* 41(1), 188-190.
- agnostic, n. and adj. OED Online. 3rd ed. (December 2016). *Oxford University Press*.
<http://www.oed.com/view/Entry/4073?redirectedFrom=agnostic>.
- agnosticism, n. OED Online. 3rd ed. (December 2016). *Oxford University Press*.
<http://www.oed.com/view/Entry/4076?redirectedFrom=agnosticism>.
- Aikin, S. F. (2008). Evidentialism and James' Argument from Friendship. *Southwest Philosophy Review* 24(1), 173-180.
- Allhoff, Fritz. (2003). Evolutionary Ethics from Darwin to Moore. *History and Philosophy of the Life Sciences* 25(1), 51-79.
- Annan, N. G. A. (1951). *Leslie Stephen*. Arno Press.
- Ashforth, A. (1969). *Thomas Henry Huxley*. New York: Horizon Press.
- Asprem, E. (2014). *The Problem of Disenchantment: Scientific Naturalism and Esoteric Discourse 1900-1939*. Brill.
- Baier, A. (1986). Trust and Antitrust. *Ethics* 96(2), 231-260.
- Balfour, A. J. (1895). *The Foundations of Belief: Being Notes Introductory to the Study of Theology*. Longmans, Green, and Co.
- Barr, A. P. (Ed.). (1997b). *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays*. University of Georgia Press.
- . (1997a). "Common Sense Clarified": Thomas Henry Huxley's Faith in Truth. In *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 9-30). University of Georgia Press.
- Bartholomew, M. (1975). Huxley's Defence of Darwin. *Annals of Science* 32(6), 525-535.
- Barton, R. (2003). 'Men of Science': Language, Identity and Professionalization in the Mid-Victorian Scientific Community. *History of Science* 41, 73-119.
- . (1998b). 'Huxley, Lubbock, and Half a Dozen Others': Professionals and Gentlemen in the Formation of the X Club, 1851-1864. *Isis* 89, 410-444.
- . (1998a). Just before Nature: The Purposes of Science and the Purposes of Popularization in some English Popular Science Journals of the 1860s. *Annals of Science* 55, 1-33.
- . (1990). 'An Influential Set of Chaps': The X-Club and Royal Society Politics 1864-85. *The British Journal for the History of Science* 23(1), 53-81.
- . (1983). Evolution: The Whitworth Gun in Huxley's War for the Liberation of Science from Theology. In D. R. Oldroyd and K. Langham (Eds.), *The Wider Domain of Evolutionary Thought* (pp. 261-287). Springer Netherlands.
- Baumer, F. L. V. (1960). *Religion and the Rise of Scepticism*. Harcourt, Brace & World.
- Beatty, J. and P. J. Hale. (2008). *Water Babies: An Evolutionary Parable*. *Endeavour* 32(4), 141-146.
- Bibby, C. (1959). *T. H. Huxley: Scientist, Humanist and Educator*. New York: Horizon Press.

- Bishop, J. (2010). Faith. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <http://plato.stanford.edu/entries/faith/>.
- Blinderman, C. S. (1966). A Re-evaluation of T. H. Huxley's Philosophy. *Rationalist Annual* 40, 50-62.
- Block, E. (1986). T. H. Huxley's Rhetoric and the Popularization of Victorian Scientific Ideas: 1854-1874. *Victorian Studies* 29(3), 363-386.
- Block, N. (2002). The Harder Problem of Consciousness. *The Journal of Philosophy* 99(8), 391-425.
- Bowler, P. J. (1997). Thomas Henry Huxley and the Reconstruction of Life's Ancestry. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 119-139), University of Georgia Press.
- Brock, W. H. and R. M. MacLeod. (1976). The Scientists' Declaration: Reflexions on Science and Belief in the Wake of *Essays and Reviews*, 1864-5. *The British Journal for the History of Science* 9(1): 39-66.
- Brown, A. (1947). *The Metaphysical Society: Victorian Minds in Conflict, 1869-1880*. Columbia University Press.
- Butts, R. E. (1985). "A Purely Scientific Temper": Victorian Expressions of the Ideal of an Autonomous Science. In N. Rescher (Ed.), *Reason and Rationality in Natural Science* (pp. 191-213), University Press of America.
- Cahan, D. (2003). Looking at Nineteenth-Century Science: An Introduction. In D. Cahan (Ed.), *From Natural Philosophy to the Sciences: Writing the History of Nineteenth-Century Science* (pp. 3-15), University of Chicago Press.
- Campbell, N. (2001). What Was Huxley's Epiphenomenalism?. *Biology and Philosophy* 16(3), 357-375.
- Cannon, W. F. (1961). John Herschel and the Idea of Science. *Journal of the History of Ideas* 22(2), 215-239.
- Carus, P. (1894). Ethics and the Cosmic Order: A Criticism of Professor Thomas H. Huxley's Position. *Monist* 4(3), 403-416.
- Chambers, R. (1844). *Vestiges of the Natural History of Creation*. London: John Churchill.
- Chignell, A. (2016). The Ethics of Belief. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/ethics-belief/>.
- Clausen, C. (1976). Agnosticism, Religion, and Science: Some Unexamined Implications. *Rocky Mountain Review of Language and Literature* 30(2), 73-85.
- Clifford, W. K. (1876). The Ethics of Belief. *The Contemporary Review* 29, 289-309.
- Clodd, E. (1902). *Thomas Henry Huxley*. Edinburgh: William Blackwood & Sons.
- Cobb, A. D. (2011). History and Scientific Practice in the Construction of an Adequate Philosophy of Science: Revisiting a Whewell/Mill Debate. *Studies in History and Philosophy of Science Part A* 42(1), 85-93.
- Cockshut, A. O. J. (1964). *The Unbelievers: English Agnostic Thought 1840-1890*. London: Collins.
- Collie, M. (2011). *Huxley in America: T. H. Huxley, American Science, University Education and Scientific Propaganda, 1870-1880*. Palo Alto, CA: Academica Press.
- Copleston, F. (1966). *A History of Philosophy, Vol. VIII: Bentham to Russell*. London: Burns and Oates Ltd.
- Cowles, H. M. (2016). The Age of Methods: William Whewell, Charles Peirce, and Scientific Kinds. *Isis* 107(4), 722-737.

- Curtis, R. (1987). Darwin as an Epistemologist. *Annals of Science* 44(4): 379-408.
- Darwin, C. R. (1975 [1856-8]). *Charles Darwin's Natural Selection; Being the Second part of his Big Species Book Written from 1856 to 1858*, edited by R. C. Stauffer. Cambridge: Cambridge University Press.
- . (1958 [1887]). *The Autobiography of Charles Darwin, 1809-1882: With Original Omissions Restored*. Edited with Appendix and Notes by His Grand-Daughter N. Barlow Collins.
- . (1862). Letter no. 3878: C. R. Darwin to T. H. Huxley, 28 December 1862. *Darwin Correspondence Project*. <https://www.darwinproject.ac.uk/letter/DCP-LETT-3878>.
- . (1860). Letter no. 2696: C. R. Darwin to J. D. Hooker, 14 February 1860. *Darwin Correspondence Project*. <http://www.darwinproject.ac.uk/DCP-LETT-2696>.
- . (1859b). Letter no. 2575: C. R. Darwin to C. Lyell, 10 December 1859. *Darwin Correspondence Project*. <https://www.darwinproject.ac.uk/letter/DCP-LETT-2575>.
- . (1859a). *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. 1st ed. London: John Murray.
- Davis, J. R. A. (1907). *Thomas H. Huxley*. J. M. Dent & Co., and E. P. Dutton & Co.
- Dawkins, R. (2006). *The God Delusion*. Random House.
- Dawson, G. (2016). *Show Me the Bone: Reconstructing Prehistoric Monsters in Nineteenth-Century Britain and America*. University of Chicago Press.
- . (2007). *Darwin, Literature, and Victorian Respectability*. Cambridge and New York: Cambridge University Press.
- Dennett, D. C. (1991). *Consciousness Explained*. Boston, MA: Little Brown.
- Depew, D. J. (2010). Darwinian Controversies: An Historiographical Recounting. *Science & Education* 19(4-5), 323-366.
- Descartes, R. (1982 [1644]). *Principles of Philosophy*. Translated, with explanatory notes by V. R. Miller and R. P. Miller. Springer.
- Desmond, A. (2001). Redefining the X Axis: “Professionals,” “Amateurs” and the Making of Mid-Victorian Biology—A Progress Report. *Journal of the History of Biology* 34(1), 3-50.
- . (1997). *Huxley: From Devil's Disciple to Evolution's High Priest*. Addison-Wesley.
- . (1994). *Huxley: Devil's Disciple*. Penguin Books Ltd.
- Desmond, A. and J. Moore. (1991). *Darwin: The Life of a Tormented Evolutionist*. New York: Times Warner.
- de Waal, F. (2013). *The Bonobo and the Atheist: In Search of Humanism among the Primates*. W. W. Norton & Company.
- Dewey, J. (1898). Evolution and Ethics. *Monist* 8, 321-341.
- di Gregorio, M. A. (1997). Thomas Henry Huxley and German Science. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 159-181). University of Georgia Press.
- . (1984). *T. H. Huxley's Place in Natural Science*. New Haven: Yale University Press.
- . (1982). The Dinosaur Connection: A Reinterpretation of T. H. Huxley's Evolutionary View. *Journal of the History of Biology* 15(3), 397-418.
- . (1981). Order or Process of Nature: Huxley's and Darwin's Different Approaches to Natural Sciences. *Journal History of Philosophy of Life Sciences* 2, 217-241.
- Dockrill, D. W. (1971). T. H. Huxley and the Meaning of “Agnosticism.” *Theology* 74(616), 461-477.

- . (1964). *Studies in Nineteenth-Century English Agnosticism*. Ph.D. dissertation, Australian National University.
- Doore, G. L. (1983). William James and the Ethics of Belief. *Philosophy* 58(225), 353-364.
- Eisen, S. (1964). Huxley and the Positivists. *Victorian Studies* 7(4), 337-358.
- Ellegård, A. (1957). The Darwinian Theory and Nineteenth-Century Philosophies of Science. *Journal of the History of Ideas* 18(3), 362-393.
- Eng, E. (1978). Thomas Henry Huxley's Understanding of 'Evolution.' *History of Science* 16, 291-303.
- Engels, F. (1892). Special Introduction to the English Edition of 1892. In *Socialism: Utopian and Scientific, Marx/Engels Selected Works*, Vol. II, 1951, Eng. ed., Moscow: FLPH.
- Fichman, M. (1997). Biology and Politics: Defining the Boundaries. In B. Lightman (Ed.), *Victorian Science in Context* (pp. 94-118), University of Chicago Press.
- Flew, A. (1959). Hume's Check. *The Philosophical Quarterly* 9(34), 1-18.
- Flint, R. (1903). *Agnosticism*. William Blackwood.
- Forgan, S. and G. Gooday. (1996). Constructing South Kensington: The Buildings and Politics of T. H. Huxley's Working Environments. *British Journal for the History of Science* 29(103), 435-468.
- Forrest, P. (1994). Why Most of us Should be Scientific Realists: a Reply to van Fraassen. *The Monist* 77(1), 47-70.
- Fosl, P. S. (1994). Doubt and Divinity: Cicero's Influence on Hume's Religious Skepticism. *Hume Studies* 20(1), 103-120.
- Foster, M. and E. R. Lankester. (Eds.). (1899). *The Scientific Memoirs of Thomas Henry Huxley*. 5 Volumes. London: Macmillan and Co. Ltd.
- Friedman, J. (2013). Suspended Judgment. *Philosophical Studies* 162(2), 165-181.
- Galton, F. (1879). Generic Images. *Nineteenth Century* 6(1), 157-169.
- . (1878). Composite Portraits. *Nature* 18, 97-100.
- Gilley, S. and A. Loades. (1981). Thomas Henry Huxley: The War between Science and Religion. *The Journal of Religion* 61(3), 285-308.
- Goslee, D. (2004). Evolution, Ethics, and Equivocation: T. H. Huxley's Conflicted Legacy. *Zygon* 39(1), 137-160.
- Greene, J. (2003). Balfour v. Huxley on Evolutionary Naturalism: A 21st Century Perspective. *Science and Christian Belief* 15(1), 41-64.
- Greenwood, J. (2010). Whistles, Bells, and Cogs in Machines: Thomas Huxley and Epiphenomenalism. *Journal of the History of the Behavioral Sciences* 46(3), 276-299.
- Gulick, R. V. (2014). Consciousness. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/consciousness/>.
- Harvey, J. (2003). Fertility or Sterility? Darwin, Naudin and the Problem of Experimental Hybridity. *Endeavour* 27(2), 57-62.
- Harvey, V. A. (2013). Huxley's Agnosticism. *Philosophy Now* 99, 10-12.
- . (2012). Challenges to Religion in the Nineteenth Century. In A. W. Wood, and S. Hahn. (Eds.), *Cambridge History of Philosophy in the Nineteenth Century (1790-1870)* (pp. 521-544), Cambridge University Press.
- . (1969). Is There an Ethics of Belief?. *The Journal of Religion* 49(1), 41-58.
- Hebb, D. O. (1965). Review Lecture: The Evolution of Mind. *Proceedings of the Royal Society of London. Series B, Biological Sciences* 161(984), 376-383.

- Helfand, M. S. (1977). T. H. Huxley's "Evolution and Ethics": The Politics of Evolution and the Evolution of Politics. *Victorian studies* 20(2), 159-177.
- Herschel, J. W. (1867[1861]). *Physical Geography of the Globe*. Adam and Charles Black.
- . (1831). *Preliminary Discourse on the Study of Natural Philosophy*. New ed. London.
- Houghton, W. E. (1949). The Rhetoric of T. H. Huxley. *University of Toronto Quarterly* 18(2), 159-175.
- Hull, D. L. (2003). Darwin's Science and Victorian Philosophy of Science. In J. Hodge and G. Radick (Eds.), *The Cambridge Companion to Darwin* (pp. 168-191), Cambridge University Press.
- Hume, D. (1888 [1739]). *A Treatise of Human Nature*. Oxford University Press.
- Huneman, P. (2011). Natural Sciences. In A. Wood and S. Hahn, (eds.), *Cambridge History of Philosophy in the Nineteenth Century (1790-1870)* (pp. 201-240), Cambridge University Press.
- Huntley, W. B. (1972). David Hume and Charles Darwin. *Journal of the History of Ideas* 33(3), 457-470.
- Hutton, R. H. ([1889]1895). The Great Agnostic. In *Aspects of Religious and Scientific Thought* (pp. 99-106). London: MacMillan and Co.
- . (1885). "The Metaphysical Society: A Reminiscence." *The Nineteenth Century* 18, 177-196.
- . (1870). Pope Huxley. *Spectator* 43, 135-36.
- Huxley, L. (1920). *Thomas Henry Huxley: A Character Sketch*. London: Watts & Co.
- . (1908). *Life and Letters of Thomas Henry Huxley*. 3 volumes. London: Macmillan and Co., Ltd.
- Huxley, T. H. (n.d.2). [Natural] History of Christianity. Huxley Papers 48.1, 48.3. Imperial College London, Records and Archives. Available at Huxley File. <http://aleph0.clarku.edu/huxley/Mss/HistX.html>.
- . (n.d.1), Agnosticism: A Fragment. Huxley Papers 47.148., Imperial College London, Records and Archives. Available at Huxley File. <http://aleph0.clarku.edu/huxley/Mss/AGN-F.html>.
- . (1895b). Mr. Balfour's Attack on Agnosticism II. In H. Peterson, *T. H. Huxley: Prophet of Science* (pp. 315-327), 1932, AMS Press.
- . (1895a). Mr. Balfour's Attack on Agnosticism I. *The Nineteenth Century* 37, 527-540.
- . (1894g). Owen's Position in the History of Anatomical Science. In M. Foster, and E. R. Lankester, *Scientific Memoirs IV* (pp. 658-689).
- . (1894f). Letter to Farrer, December 19. In L. Huxley, *LLT III* (pp. 336-338).
- . (1894e). Letter to Farrer, November 6. In L. Huxley, *LLT III* (pp. 335-336).
- . (1894d). Letter to Mr. G--. S--, October 31. In L. Huxley, *LLT III* (p. 334).
- . (1894c). Evolution and Ethics: Prolegomena. In *Collected Essays IX* (pp. 1-45).
- . (1894b). Past and Present. *Nature* 51, 1-3.
- . (1894a). Huxley's Letter to Thomas Common: March 23. In L. Huxley, *LLT III* (pp. 302-303).
- . (1893-4). Prefaces of *Collected Essays I-IX*. London: Macmillan.
- . (1893c). Letter to Seth, October 27. In L. Huxley, *LLT III* (pp. 299-300).
- . (1893b). Letter on Bible Reading. In L. Huxley, *LLT III* (pp. 280-281).
- . (1893a). Evolution and Ethics. In *Collected Essays IX* (pp. 46-116).

- . (1892e). Letter to N. P. Clayton, November 5, 1892. In L. Huxley, *LLT III* (pp. 222-224).
- . (1892d). Letter to Romanes, November 3. In L. Huxley, *LLT III* (pp. 271-272).
- . (1892c). Prologue to Essays on Some Controverted Questions. In *Collected Essays V* (pp. 1-58).
- . (1892b). An Apologetic Irenicon. *Fortnightly Review* 52, 557-571.
- . (1892a). Possibilities and Impossibilities. In *Collected Essays V* (pp. 192-208).
- . (1891d). Letter to Henry de Varigny, November 25. In L. Huxley, *LLT III* (pp. 202-203).
- . (1891c). Introduction. In F. Rocquain, *The Revolutionary Spirit Preceding the French Revolution* (pp. vii-x), 1891, London: S. Sonnenschein.
- . (1891b). Letter to Romanes, April 29, 1891. In L. Huxley, *LLT III* (pp. 204-205).
- . (1891a). Hasisadra's Adventure. In *Collected Essays IV* (pp. 239-286).
- . (1890g). The Aryan Question and Pre-Historic Man. In *Collected Essays VII* (pp. 271-328).
- . (1890f). Autobiography. In *Collected Essays I* (pp. 1-17).
- . (1890e). Darkest England Scheme (Letters to the *Times*). In *Collected Essays IX* (pp. 237-311).
- . (1890d). The Keepers of the Herd of Swine. In *Collected Essays V* (pp. 366-392).
- . (1890c). The Lights of the Church and the Light of Science. In *Collected Essays IV* (pp. 201-238).
- . (1890b). Government: Anarchy or Regimentation. In *Collected Essays I* (pp. 383-430).
- . (1890a). Natural Rights and Political Rights. In *Collected Essays I* (pp. 336-382).
- . (1889i). Letters to F. J. Gould. In L. Huxley, *LLT III* (pp. 290-291).
- . (1889h). Letter to James Avery Skilton, December 10. In B. Lightman, *The Origins of Agnosticism: Victorian Unbelief and the Limits of Knowledge* (pp. 12-13), 1987, Baltimore: Johns Hopkins University Press.
- . (1889g). Agnosticism and Christianity. In *Collected Essays V* (pp. 309-365).
- . (1889f). Agnosticism: A Rejoinder. In *Collected Essays V* (pp. 263-308).
- . (1889e). Agnosticism. In *Collected Essays V* (pp. 209-262).
- . (1889d). Prof. Huxley and M. Pasteur on Hydrophobia. *Nature* 40(1027), 224-225.
- . (1889c). Letter to Robert Taylor, June 3. In L. Huxley, *LLT III* (pp. 115-116).
- . (1889b). Letter to John Knowles, March 10. In L. Huxley, *LLT III* (pp. 108-109).
- . (1889a). Spiritualism Unmasked. *Pall Mall Gazette* (January 1, 1889).
- . (1888b). Letter to Lady Welby, November 27. In L. Huxley, *LLT III* (pp. 91-93).
- . (1888a). The Struggle for Existence in Human Society. In *Collected Essays IX* (pp. 195-236).
- . (1887g). On the Reception of *the Origin of Species*. In F. Darwin (Ed.), *The Life and Letters of Charles Darwin* (pp. 533-558), New York: D. Appleton and Company.
- . (1887f). The Progress of Science. In *Collected Essays I* (pp. 42-129).
- . (1887e). An Episcopal Trilogy. In *Collected Essays V* (pp. 126-159).
- . (1887d). Letter to Unknown Correspondent, September 30. In L. Huxley, *LLT III* (pp. 17-18).
- . (1887c). Science and Pseudo-Science. In *Collected Essays V* (pp. 90-125).
- . (1887b). The Value of Witness to the Miraculous. In *Collected Essays V* (pp. 160-191).
- . (1887a). Scientific and Pseudo-Scientific Realism. In *Collected Essays V* (pp. 59-89).

- . (1886e). Mr. Gladstone and Genesis. In *Collected Essays IV* (pp. 164-200).
- . (1886d). Letter to Herbert Spencer, November 25. In L. Huxley, *LLT II* (pp. 470-472).
- . (1886c). Science and Morals. In *Collected Essays IX* (pp. 117-146).
- . (1886b). The Evolution of Theology: An Anthropological Study. In *Collected Essays IV*, pp. 287-372.
- . (1886a). Letter to Edward Poulton, February 19. In L. Huxley, *LLT II* (pp. 430-1).
- . (1885b). The Interpreters of Genesis and the Interpreters of Nature. In *Collected Essays IV* (pp. 139-163).
- . (1885a). Letter to Leonard Huxley, January 20. In L. Huxley, *LLT II* (pp. 391-392).
- . (1884b). Letter to Lady Welby, April 8. In L. Huxley, *LLT II* (pp. 357-359).
- . (1884a). Agnosticism: A Symposium. *The Agnostic Annual* 1, 5-6.
- . (1882). Charles Darwin. In *Collected Essays II* (pp. 244-247).
- . (1881). The Connection of the Biological Sciences with Medicine. In *Collected Essays III* (pp. 347-373).
- . (1880d). Science and Culture. In *Collected Essays III* (pp. 134-159).
- . (1880c). On the Method of Zadig. In *Collected Essays IV* (pp. 1-23).
- . (1880b). The Coming of Age of "The Origin of Species." In *Collected Essays II* (pp. 227-243).
- . (1880a). *Introductory Science Primer*. London 1880.
- . (1879d). Letter to Edward Clodd, December 21. In L. Huxley, *LLT II* (pp. 273-274).
- . (1879c). Prefatory Note. In E. Haeckel, *Freedom in Science and Teaching* (pp. v-xx), London: C. Kegan Paul & Co.
- . (1879b). *The Crayfish: An Introduction to the Study of Zoology*. New York: D. Appleton and Company.
- . (1879a). On Sensation and the Unity of Structure of Sensiferous Organs. In *Collected Essays VI* (pp. 288-319).
- . (1878h). *Hume*. In *Collected Essays VI* (pp. 3-242).
- . (1878g). Letter to John Morley, November 5. In L. Huxley, *LLT II* (pp. 254-255).
- . (1878f). Letters to John Morley, September 30. In L. Huxley, *LLT II* (pp. 252-253).
- . (1878e). Letters to John Morley July 6, 1878. In L. Huxley, *LLT II* (p. 252).
- . (1878d). Evolution in Biology. In *Collected Essays II* (pp. 187-226).
- . (1878c). Biology. *Encyclopaedia Britannica* (9th Ed.) 1, 679-690.
- . (1878b). William Harvey. In M. Foster, and E. R. Lankester, *Scientific Memoirs IV* (pp. 319-344).
- . (1878a). Letter to John Morley, March 31. In L. Huxley, *LLT II* (p. 251).
- . (1877d). A Modern Symposium: The Influence upon Morality of a Decline in Religious Belief. *The Nineteenth Century* 1, 536-539.
- . (1877c). On Elementary Education in Physiology. In *Collected Essays III* (pp. 294-303).
- . (1877b). On the Study of Biology. In M. Foster, and E. R. Lankester, *Scientific Memoirs IV* (pp. 248-264).
- . (1877a). *Physiography: An Introduction to the Study of Nature*. London: Macmillan.
- . (1876c). Lectures on Evolution. In *Collected Essays IV* (pp. 46-138).
- . (1876b). The Evidence of the Miracle of the Resurrection. The Metaphysical Society (January 11, 1876). Available at Huxley File.
<http://aleph0.clarku.edu/huxley/Mss/RESURR.html>.
- . (1876a). On the Study of Biology. In *Collected Essays III* (pp. 262-293).

- . (1874c). Letters to John Morley July 4. In L. Huxley, *LLT II* (p. 149).
- . (1874b). Universities: Actual and Ideal. In *Collected Essays III* (pp. 189-234).
- . (1874a). On the Hypothesis that Animals are Automata, and Its History. In *Collected Essays I* (pp. 199-250).
- . (1871d). Report on Spiritualism. In L. Huxley, *LLT II* (pp. 143-144).
- . (1871c). Bishop Berkeley on the Metaphysics of Sensation. In *Collected Essays VI* (pp. 243-287).
- . (1871b). Yeast. In *Collected Essays VIII* (pp. 110-36).
- . (1871a). Mr. Darwin's Critics. In *Collected Essays II* (pp. 120-186).
- . (1870e). Biogenesis and Abiogenesis. In *Collected Essays VIII* (pp. 229-270).
- . (1870d). The School Boards: What They Can Do, and What They May Do. In *Collected Essays III* (pp. 374-403).
- . (1870c). On Descartes' "Discourse Touching the Method of Using One's Reason Rightly and of Seeking Scientific Truth." In *Collected Essays I* (pp. 166-198).
- . (1870b). The Views of Hume, Kant, and Whately upon the Logical Basis of the Doctrine of the Immortality of the Soul. The Metaphysical Society (November 17, 1870). Available at Huxley File. <http://aleph0.clarku.edu/huxley/Mss/VIDIS.html>.
- . (1870a). Has a Frog a Soul; and of What Nature is that Soul, Supposing it to Exist? The Metaphysical Society (8 November, 1870). Available at Huxley File. <http://aleph0.clarku.edu/huxley/Mss/FROG.html>.
- . (1869c). The Scientific Aspects of Positivism. In *Lay Sermons, Addresses and Reviews* (pp. 128-150), 1870, London: Macmillan.
- . (1869b). Aphorisms by Goethe. *Nature* 1, 9-11.
- . (1869a). Scientific Education: Notes of an After-Dinner Speech. In *Collected Essays III* (pp. 111-133).
- . (1868b). A Liberal Education; and Where to Find It. In *Collected Essays III* (pp. 76-110).
- . (1868a). On the Physical Basis of Life. In *Collected Essays I* (pp. 130-165).
- . (1866b). On the Advisableness of Improving Natural Knowledge. In *Collected Essays I* (pp. 18-41).
- . (1866a). Letter to the Editor [Mr. Huxley's Doctrine]. *Spectator* 46, 158-159.
- . (1865). Emancipation—Black and White. In *Collected Essays III* (pp. 66-75).
- . (1864b). Science and "Church Policy." *The Reader* 4 (December 31), 821.
- . (1864a). Criticisms on "The Origin of Species." In *Collected Essays II* (pp. 80-106).
- . (1863e). On Our Knowledge of the Causes of the Phenomena of Organic Nature. In *Collected Essays II* (pp. 303-475).
- . (1863d). *Evidence as to Man's Place in Nature*. Reprinted in *Collected Essays VII* (pp. 1-208).
- . (1863c). Letter to Charles Kingsley, May 22. In L. Huxley, *LLT I* (pp. 348-352).
- . (1863b). Letter to Charles Kingsley, May 5. In L. Huxley, *LLT I* (pp. 345-348).
- . (1863a). Letter to Charles Kingsley, April 30. In L. Huxley, *LLT I* (pp. 343-345).
- . (1862c). Geological Contemporaneity and Persistent Types of Life. In *Collected Essays VIII* (pp. 272-303).
- . (1862b). Letter to Charles Darwin, January 20. In L. Huxley, *LLT I* (pp. 283-284).
- . (1862a). Letter to Joseph Dalton Hooker, January 16. In L. Huxley, *LLT I* (pp. 282-283).
- . (1860d). A Lobster; or, the Study of Zoology. In *Collected Essays VIII* (pp. 196-228).

- . (1860c). Letter to Charles Kingsley, September 23. In L. Huxley, *LLT I* (pp. 313-20).
- . (1860b). On Species and Races, and Their Origin. In M. Foster, and E. R. Lankester, *Scientific Memoirs II* (pp. 388-393).
- . (1860a). The Origin of Species. In *Collected Essays II* (pp. 22-79).
- . (1859g). Time and Life: Mr. Darwin's "Origin of Species." *Macmillan's Magazine* 1, 142-148.
- . (1859f). [Anon.] The Darwinian Hypothesis. In *Collected Essays II* (pp. 1-21).
- . (1859e). Letter to Charles Darwin, November 23. In L. Huxley, *LLT I* (pp. 253-254).
- . (1859d). Letter to Charles Darwin, June 25. In L. Huxley, *LLT I* (pp. 249-252).
- . (1859c). Letter to Leuckart, January 30. In L. Huxley, *LLT I* (pp. 233-236).
- . (1859b). Letter to Dyster, January 30. Huxley Paper 15.106., Imperial College London, Records and Archives. Available at Huxley File.
<http://aleph0.clarku.edu/huxley/letters/59.html>.
- . (1859a). Science and Religion. *The Builder* 17 (January 15), 35-36.
- . (1856). On Natural History, as Knowledge, Discipline, and Power. In M. Foster, and E. R. Lankester, *Scientific Memoirs I* (pp. 305-314).
- . (1855). On Certain Zoological Arguments Commonly Adduced in Favour of the Hypothesis of the Progressive Development of Animal Life in Time. In M. Foster, and E. R. Lankester, *Scientific Memoirs I* (pp. 300-304).
- . (1854c). On the Present State of Knowledge as to the Structure and Functions of Nerve. In M. Foster, and E. R. Lankester, *Scientific Memoirs I* (pp. 315-320).
- . (1854b). Review of *Vestiges of the Natural History of Creation*, 10th Ed. In M. Foster, and E. R. Lankester, *Scientific Memoirs V* (pp. 1-19).
- . (1854a). On the Educational Value of the Natural History Sciences. In *Collected Essays III* (pp. 38-65).
- . (1853). [Anon.] The Valuation of Evidence. *The Leader* (June 25), pp. 161-167.
- . (1852). Upon Animal Individuality. In M. Foster, and E. R. Lankester, *Scientific Memoirs I* (pp. 146-151).
- . (1847). Letter to Henrietta Heathorn, October 18, 1847. Available at Huxley File.
<http://aleph0.clarku.edu/huxley/letters/47.html>.
- . (1840-45). Thoughts and Doings. Edited by S. Cann. Available at Huxley File.
<http://aleph0.clarku.edu/huxley/letters/T&Dsjc.html>
- Hyman, G. (2006). Atheism in Modern History. In M. Michael (Ed.), *The Cambridge Companion to Atheism* (pp. 27-46), Cambridge University Press.
- Irvine, W. (1968). *Apes, Angels and Victorians: Darwin, Huxley, and Evolution*. Meridan Books.
- . (1980). Science and Social Order in the Thought of A. J. Balfour. *Isis* 71(1), 11-34.
- James, W. (1896). The Will to Believe. In *The Will to Believe, and Other Essays in Popular* (pp. 1-31), 1912, Longmans, Green, and Co.
- . (1879). The Sentiment of Rationality. In *The Will to Believe, and Other Essays in Popular* (pp. 63-110), 1912, Longmans, Green, and Co.
- Jensen, J. V. (1991). *Thomas Henry Huxley: Communicating for Science*. Associated University Press.
- Kaalund, N. K. L. (2014). Oxford Serialized: Revisiting the Huxley–Wilberforce Debate through the Periodical Press. *History of Science* 52(4), 429-453.
- Kauber, P. (1974). The Foundations of James's Ethics of Belief. *Ethics* 84(2), 151-166.
- Kemp Smith, N. (1941). *The Philosophy of David Hume*. Macmillan.

- Kim, J. (2008). The Causal Efficacy of Consciousness. In M. Velmans and S. Schneider (Eds.), *The Blackwell Companion to Consciousness*, (pp. 406-417), John Wiley & Sons.
- Knight, D. (1997). Huxley and Philosophy of Science. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 51-66), University of Georgia Press.
- Lamont, P. (2004). Spiritualism and a Mid-Victorian Crisis of Evidence. *The Historical Journal* 47(4), 897-920.
- Leighton, G. (1912). *Huxley: His Life and Work*. London: T. C. & E. C. Jack.
- Lenin, V. I. (1908). Materialism and Empirio-Criticism. In *Lenin Collected Works 14* (pp. 17-362), 1972, Progress Publishers.
- Le Poidevin, R. (2010). *Agnosticism: A Very Short Introduction*. Oxford University Press.
- Levine, G. (2014). Paradox: The Art of Scientific Naturalism. In B. Lightman and G. Dawson (Eds.), *Victorian Scientific Naturalism: Community, Identity, Continuity* (pp. 79-97), University of Chicago Press.
- . (1999). Huxley, the Most Powerful Sage of Them All. *Victorian Studies* 42(1), 101-119.
- . (1990). Scientific Discourse as an Alternative to Faith. In R. J. Helmstadter and B. Lightman (Eds.), *Victorian Faith in Crisis: Essays on Continuity and Change in Nineteenth Century Religious Belief* (pp. 225-261), London: Macmillan.
- Lewens, T. (2009). The *Origin* and Philosophy. In M. Ruse and R. J. Richards (Eds.), *The Cambridge Companion to the Origin of Species* (pp. 314-332), Cambridge University Press.
- Lightman, B. (2015b). Scientific Naturalists and Their Language Games. *History of Science* 53(4), 395-416.
- . (2015a). "Nineteenth Century Science and Western Materialisms." In J. M. Kanjirakkat, G. McOuat and S. Sarukkai (Eds.), *Science and Narratives of Nature: East and West* (pp. 174-194), New Delhi, London, New York: Routledge.
- . (2014). Conan Doyle's Ideal Reasoner: The Case of the Reluctant Scientific Naturalist. *Journal of Literature and Science* 7(2), 19-36.
- . (2012). Does the History of Science and Religion Change Depending on the Narrator? Some Atheist and Agnostic Perspectives. *Science & Christian Belief* 24(2), 149-168.
- . (2009). Introduction. In *Evolutionary Naturalism in Victorian Britain: The 'Darwinians' and Their Critics* (pp. vii-xviii), Ashgate Publishing Company.
- . (2004). Interpreting Agnosticism as a Nonconformist Sect: T. H. Huxley's "New Reformation." In P. Wood (Ed.), *Science and Dissent in England, 1688-1945* (pp. 197-214), Ashgate Publishing Ltd.
- . (2002). Huxley and Scientific Agnosticism: The Strange History of a Failed Rhetorical Strategy. *The British Journal for the History of Science* 35(3), 271-289.
- . (2001). Victorian Sciences and Religions: Discordant Harmonies. *Osiris* 16, 343-366.
- . (Ed.). (1997b). *Victorian Science in Context*. University of Chicago Press.
- . (1997a). "Fighting Even with Death": Balfour, Scientific Naturalism, and Thomas Henry Huxley's Final Battle. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 323-350), University of Georgia Press.
- . (1987). *The Origins of Agnosticism: Victorian Unbelief and the Limits of Knowledge*. Baltimore: Johns Hopkins University Press.
- . (1983). Pope Huxley and the Church Agnostic: The Religion of Science. *Historical Papers/Communications Historiques* 18(1), 150-163.

- Lightman, B., and G. Dawson. (Eds.). (2014). *Victorian Scientific Naturalism: Community, Identity, Continuity*. University of Chicago Press.
- Lightman, B., and M. S. Reidy. (Eds.) (2014). *The Age of Scientific Naturalism: Tyndall and His Contemporaries*. Routledge.
- Lilienfeld, S. O. (2010). Can Psychology Become a Science?. *Personality and Individual Differences* 49(4), 281-288.
- Livingston, J. C. (1987). British Agnosticism. In N. Smart, J. Clayton, S. T. Katz, and P. Sherry (Eds.), *Nineteenth Century Religious Thought in the West*, vol. 2 (pp. 231-270), Cambridge University Press.
- Lyons, S. L. (2012). A Most Eminent Victorian: Thomas Henry Huxley. *Cahiers Victoriens et Édouardiens* 76, 85-104.
- . (2010). Evolution and Education: Lessons from Thomas Huxley. *Science & Education* 19, 445-459.
- . (2009). *Species, Serpents, Spirits, and Skulls: Science at the Margins in the Victorian Age*. SUNY Press.
- . (1999b). *Thomas Henry Huxley: The Evolution of a Scientist*. Prometheus Books.
- . (1999a). In Search of Huxley the Scientist. [Review of the book *Huxley: From Devil's Discipline to Evolution's High Priest*, by A. Desmond]. *Biology and Philosophy* 14(4), 585-591.
- . (1995). The Origins of T. H. Huxley's Saltationism: History in Darwin's Shadow. *Journal of the History of Biology* 28(3), 463-494.
- . (1993). Thomas Huxley: Fossils, Persistence, and the Argument from Design. *Journal of the History of Biology* 26(3), 545-569.
- MacLeod, R. (1982). The 'Bankruptcy of Science' Debate: The Creed of Science and its Critics, 1885-1900. *Science, Technology & Human Values* 7(4), 2-15.
- Madigan, T. J. (2009). *W. K. Clifford and "The Ethics of Belief."* Newcastle upon Tyne: Cambridge Scholars Publishing.
- Magee, W. C. (1889). Agnosticism. In *Christianity and Agnosticism: A Controversy* (pp. 87-90), New York: D. Appleton & Company.
- Maidment, H. J. (1939). In Defence of Hume on Miracles. *Philosophy* 14(56), 422-433.
- Mansel, H. L. (1858). *Limits of Religious Thought Examined in Eight Lectures Preached before the University of Oxford*. Oxford: Printed by J. Wright for John Murray.
- Mayr, E. (1997). *This is Biology: The Science of the Living World*. Harvard University Press.
- McCosh, J. (1884). *Agnosticism of Hume and Huxley, with a Notice of the Scottish School*. Scribner.
- McGilvary, E. B. (1910). Huxley's Epiphenomenalism: A Criticism and an Appreciation. *The Journal of Philosophy, Psychology and Scientific Methods* 7(17), 449-460.
- McGrew, T. (2014). Miracles. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <http://stanford.library.usyd.edu.au/entries/miracles/>.
- McLeod, C. (2015). Trust. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/trust/>.
- Mitchell, P. C. (1900). *Thomas Henry Huxley: A Sketch of his Life and Work*. G. P. Putnam's Sons.
- Mill, J. S. ([1846]1882). *System of Logic: Ratiocinative and Inductive, Being a Connected View of the Principles of Evidence and the Methods of Scientific Investigation*. 8th Ed. New York: Harper & Brothers, Publishers, Franklin Square.

- Mivart, G. (1893). Evolution in Professor Huxley. *The Nineteenth Century* 34, 198-211.
- Monton, B. and C. Mohler. (2012). Constructive Empiricism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/constructive-empiricism/>.
- Moore, J. R. (1988). Review of *the Origin of Agnosticism: Victorian Unbelief and the Limits of Knowledge* by Bernard Lightman. *Isis* 79(3), 510-511.
- Napoletani, D., M. Panza, and D. C. Struppa, (2011). Agnostic Science: Towards a Philosophy of Data Analysis. *Foundations of Science* 16(1), 1-20.
- Newton, I. (1846[1713]). *The Mathematical Principles of Natural Philosophy*. 1st American Ed. New York: Daniel Adee.
- Norton, D. F. (1982). *David Hume: Common-Sense Moralist, Sceptical Metaphysician*. Princeton: Princeton University Press.
- Noxon, J. (1964). Hume's Agnosticism. *The Philosophical Review* 73(2), 248-261.
- Numbers, R. L. (2003). Science without God: Natural Laws and Christian Belief. In D. C. Lindberg and R. L. Numbers (Eds.), *When Science and Christianity Meet* (pp. 265-285), University of Chicago Press.
- Osborn, H. F. (1924). *Impressions of Great Naturalists: Reminiscences of Darwin, Huxley, Balfour, Cope and Other*. Charles Scribner's Sons.
- Paradis, J. G. (1997). Satire and Science in Victorian Culture. In B. Lightman, (ed.), *Victorian Science in Context* (pp. 143-175), University of Chicago Press.
- . (1978). *T. H. Huxley: Man's Place in Nature*. University of Nebraska Press.
- Paradis, J. G. and G. C. Williams. (Eds.). (1989). *Evolution and Ethics: T. H. Huxley's Evolution and Ethics with New Essays on Its Victorian and Sociobiological Context*. Princeton University Press.
- Passmore, J. (1959). Darwin's Impact on British Metaphysics. *Victorian Studies* 3(1): 41-54.
- . (1957). *A Hundred Years of Philosophy*. 2nd ed. Gerald Duckworth & Co. Ltd.
- Peterson, H. (1932). *Huxley, Prophet of Science*. AMS Press.
- Psillos, S. (2000). Agnostic Empiricism versus Scientific Realism: Belief in Truth Matters. *International Studies in the Philosophy of Science* 14(1), 57-75.
- Pitson, A. E. (1993). The Nature of Humean Animals. *Hume Studies* 19(2), 301-316.
- Prasch, T. (2015). "All the Strange Facts": Alfred Russel Wallace's Spiritualism and Evolutionary. In A. Clapp-Itnyre and J. Melnyk (Eds.), *"Perplex in Faith": Essays on Victorian Beliefs and Doubts* (pp. 6-38), Cambridge Scholars Publishing.
- Reisner, A. (2008). Weighing Pragmatic and Evidential Reasons for Belief. *Philosophical Studies* 138(1), 17-27.
- Rectenwarld, M. (2016). *Nineteenth-Century British Secularism*. Palgrave Macmillan UK.
- . (2013). Secularism and the Cultures of Nineteenth-Century Scientific Naturalism. *The British Journal for the History of Science* 46(2): 231-254.
- Reed, J. R. (1997). Thomas Henry Huxley and the Question of Morality. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 31-50), University of Georgia Press.
- Richards, R. J. (1987). *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*. Chicago: University of Chicago Press.
- Richardson, A. W. (2003). Conceiving, Experiencing, and Conceiving Experiencing: Neo-Kantianism and the History of the Concept of Experience. *Topoi* 22(1), 55-67.

- Richmond, M. L. (2000). T. H. Huxley's Criticism of German Cell Theory: An Epigenetic and Physiological Interpretation of Cell Structure. *Journal of the History of Biology* 33(2), 247-289.
- Rosenkranz, S. (2007). Agnosticism as a Third Stance. *Mind* 116(461): 55-104.
- Ruse, M. (2014). *Atheism: What Everyone Needs to Know?*. Oxford University Press.
- . (2009b). The Origin of the *Origin*. In M. Ruse and R. J. Richards (Eds.), *The Cambridge Companion to the Origin of Species* (pp. 1-31), Cambridge University Press.
- . (2009a). Introduction. In M. Ruse (Ed.), *Thomas Henry Huxley: Evolution and Ethics* (pp. vii-xxxvi), Princeton: Princeton University Press.
- . (1997). Thomas Henry Huxley and the Status of Evolution as Science. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 140-158), University of Georgia Press.
- . (1975). Darwin's Debt to Philosophy: An Examination of the Influence of the Philosophical Ideas of John F. W. Herschel and William Whewell on the Development of Charles Darwin's Theory of Evolution. *Studies in History and Philosophy of Science Part A* 6(2), 159-181.
- Russell, P. (2008). *The Riddle of Hume's Treatise: Skepticism, Naturalism, and Irreligion*. New York: Oxford University Press.
- Schwartz, J. S. (1999). Robert Chambers and Thomas Henry Huxley, Science Correspondents: The Popularization and Dissemination of Nineteenth Century Natural Science. *Journal of the History of Biology* 32(2): 343-383.
- Schweber, S. S. (1981). Scientists as Intellectuals: The Early Victorians. In J. Paradis and T. Postlewait (Eds.), *Victorian Science and Victorian Values: Literary Perspectives* (pp. 1-37), New York: New York Academy of Sciences.
- Simpson, G. G. (1949). *The Meaning of Evolution*. New Haven: Yale University Press.
- Smart, J. J. C. (2011). Atheism and Agnosticism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <http://plato.stanford.edu/entries/atheism-agnosticism/>.
- Smith, C. U. M. (1998). Owen and Huxley: Unfinished Business. *Endeavour* 22(3), 110-113.
- Smith, R. (2015). *Free Will and the Human Sciences in Britain, 1870–1910*. Routledge.
- Snyder, L. J. (2012). William Whewell. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <http://plato.stanford.edu/entries/whewell/>.
- . (2009). Hypotheses in 19th Century British Philosophy of Science-Herschel, Whewell, Mill. In M. Heidelberger and G. Schieman (Eds.), *The Significance of the Hypothetical in the Natural Sciences* (pp. 59-75), Walter de Gruyter.
- . (2006). *Reforming Philosophy: A Victorian Debate on Science and Society*. University of Chicago Press.
- Sommerville, B. and M. Shortland. (1997). Thomas Henry Huxley, H. G. Wells, and the Method of Zadig. In A. P. Barr (Ed.), *Thomas Henry Huxley's Place in Science and Letters: Centenary Essays* (pp. 296-322), University of Georgia Press.
- Sorensen, R. (2009). Meta-agnosticism: Higher Order Epistemic Possibility. *Mind* 118(471), 777-784.
- Stanley, M. (2014b). *Huxley's Church and Maxwell's Demon: From Theistic Science to Naturalistic Science*. University of Chicago Press.
- . (2014a). Where Naturalism and Theism Met: The Uniformity of Nature. In B. Lightman and G. Dawson (Eds.), *Victorian Scientific Naturalism: Community, Identity, Continuity* (pp. 242-262), University of Chicago Press.

- . (2011). The Uniformity of Natural Laws in Victorian Britain: Naturalism, Theism, and Scientific Practice. *Zygon* 46(3), 536-560.
- Stanley, O. (1957). T. H. Huxley's Treatment of "Nature." *Journal of the History of Ideas* 18(1), 120-127.
- Stoddart, D. R. (1975). That Victorian Science: Huxley's Physiography and Its Impact on Geography. *Transactions of the Institute of British Geographers* 66:17-40.
- Turner, F. M. (1997). Practicing Science: An Introduction. In B. Lightman (Ed.), *Victorian Science in Context* (pp. 283-289), University of Chicago Press.
- . (1978). The Victorian Conflict between Science and Religion: A Professional Dimension. *Isis* 69(3), 356-376.
- . (1975). Victorian Scientific Naturalism and Thomas Carlyle. *Victorian Studies* 18(3), 325-343.
- . (1974). *Between Science and Religion: The Reaction to Scientific Naturalism in Late Victorian England*. Yale University Press.
- van Fraassen, B. C. (1998). The Agnostic Subtly Probabilified. *Analysis* 58(3), 212-220.
- Vasta, S. (2012). «The Burning Question of Physicochemical Science»: Philosophical Remarks about Thomas Huxley's Reading of Cartesian Physics. *Annali della facoltà di Scienze della formazione Università degli studi di Catania* (11), 95-105.
- Vogt, K. (2014). Ancient Skepticism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/skepticism-ancient/>.
- Wace, H. (1888). On Agnosticism. In *Christianity and Agnosticism: A Controversy* (pp. 5-13), 1889, New York: D. Appleton and Company.
- Wallace, A. R. (1866). *The Scientific Aspect of the Supernatural: Indicating the Desirableness of an Experimental Enquiry by Men of Science into the Alleged Powers of Clairvoyants and Mediums*. London: F. Farrah.
- Ward, J. (1915[1899]). *Naturalism and Agnosticism: The Gifford Lectures Delivered before the University of Aberdeen in the Years 1896-1898*. 2 volumes. 4th Ed. London: A. & C. Black, Ltd.
- Weiss, K. M. (2004). Thomas Henry Huxley (1825–1895) Puts us in Our Place. *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution* 302(3): 196-206.
- Whewell, W. (1864). *Astronomy and General Physics: Considered with Reference to Natural Theology*. 7th Ed. London: Pickering.
- . (1857). *History of the Inductive Sciences, from the Earliest to the Present Time*. 3 volumes. 3rd Ed. with additions. London: John W. Parker.
- . (1849). *Of Induction, with Especial Reference to Mr. J. Stuart Mill's System of Logic*. London: John W. Parker.
- . (1840). *The Philosophy of the Inductive Sciences, Founded Upon Their History*. 2 volumes. London: John W. Parker.
- White, F. E. (1895). Professor Huxley on the Relation of the Ethical to the Cosmic Process. *International Journal of Ethics* 5(4), 478-489.
- White, P. (2014). The Conduct of Belief: Agnosticism, the Metaphysical Society, and the Formation of Intellectual Communities. In B. Lightman and G. Dawson (Eds.), *Victorian Scientific Naturalism: Community, Identity, Continuity* (pp. 220-241), University of Chicago Press.
- . (2003). *Thomas Huxley: Making the 'Man of Science.'* Cambridge University Press.

- Woelfel, J. (1998). Victorian Agnosticism and Liberal Theology: T. H. Huxley and Matthew Arnold. *American Journal of Theology & Philosophy* 19(1), 61-76.
- . (1989). William James on Victorian Agnosticism: A Strange Blindness. In C. Peden and L. E. Axel (Eds.), *God, Values, and Empiricism: Issues in Philosophical Theology* (pp. 239-248), Mercer University Press.
- Wood, A. (2008). The Duty to Believe According to the Evidence. *International Journal for Philosophy of Religion* 63(1-3), 7-24.
- Wright, J. P. (1983). *The Sceptical Realism of David Hume*. Manchester University Press.
- Wright, J. T. (2016). *Darwin, Huxley, and the Nineteenth-Century Rhetoric of Science*. Ph.D. dissertation, University of Minnesota.
- Yeo, R. (1993). *Defining Science: William Whewell, Natural Knowledge and Public Debate in Early Victorian Britain*. Cambridge: Cambridge University Press.
- . (1979). William Whewell, Natural Theology and the Philosophy of Science in Mid Nineteenth Century Britain. *Annals of Science* 36(5), 493-516.
- Yoder, S. D. (2013). Making Space for Agnosticism: A Response to Dawkins and James. *American Journal of Theology and Philosophy* 34(2), 135-153.
- Young, R. M. (1985). *Darwin's Metaphor: Nature's Place in Victorian Culture*. Cambridge: Cambridge University Press.