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Riedinger, M.

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CONSTRUCTING THE MIND OF ANTS

THE ROLE OF ANTHROPOMORPHISM IN GERMAN- LANGUAGE ANIMAL PSYCHOLOGY AROUND 1900

Maike Riedinger

University of Kassel, Kassel, Germany

Anthropomorphism is a recurring and contested topic in the scientific study of animal behaviour. This article aims at gaining a deeper understanding of anthropomorphism and its function for animal behaviour science by examining the study of ants in the German-language discourse of animal psychology around 1900. By analysing the works of physiologist Albrecht Bethe and entomologist Auguste Forel it is demonstrated that the use of analogy as a method in the study of animals led to a debate on anthropomorphism, resulting in the demarcation of scientific approaches from unscientific ones. As the production of knowledge in animal psychology relied heavily on human judgement of scientific methods and philosophical ideas, it can be concluded that the mind of ants is not only conceptually, but socially constructed in these studies.

In the past as well as today, anthropomorphism is one of the most disputed topics in the study of non-human animals. There is a general agreement on a broad definition of anthropomorphism as an attribution of humanlike traits to animals in a description of their behaviour. However, the extent to which a given description of animal behaviour is anthropomorphic or not results in divergent answers. The answer to this question is important insofar as there is hardly a scientist who would like to be associated with anthropomorphism, as it is widely understood in science as being unscientific. To illustrate this, primatologist Frans de Waal coined the contrasting term “anthropodenial”. With this term he refers to “the a priori rejection of humanlike traits in other animals or animal-like traits in us”.¹ He adds that a critical attitude to anthropomorphism

¹ Frans de Waal, *Are we smart enough to know how smart animals are?* (New York City: W.W. Norton & Company, 2016), 25.

“for the sake of scientific objectivity often hides a pre-Darwinian mindset, one uncomfortable with the notion of humans as animals”.² De Waal thus connects anthropomorphism to an understanding of science, but also to an understanding of the relation between humans and animals in a broader sense. Both vary historically and among cultures and complicate a more specific definition of anthropomorphism. Accordingly, anthropologist Pamela Asquith argues that “we cannot assume that anthropomorphism carries exactly the same connotations at all times or for all scientists”,³ and further expands the idea that a definition of humanness is necessary in order to declare something anthropomorphic.

Based on Asquith’s assumption that a precise definition of anthropomorphism applicable to all contexts is impossible, this article takes a closer look at anthropomorphism in a specific context: the study of ant behaviour in the German-language discourse of animal psychology around 1900. It will be demonstrated that the divergent evaluations of analogy as a scientific method led to an accusation of anthropomorphism, and that anthropomorphism was taken to imply a demarcation of scientific approaches to animals from non-scientific ones. Thereby, it will become apparent that the production of knowledge in animal psychology relied on the scientists’ judgement of scientific tools and philosophical ideas and not only resulted out of studying ant behaviour.

Whereas today animal psychology is often understood as mental therapy for animals, around 1900 German-language animal psychology dealt with the study of animal behaviour and its possible intrinsic motivation. The word “possible” reveals the complicated relationship of behaviour and mind. A study of behaviour does not necessarily link to a “mind” — that is to say, with an intrinsic motivation for behaviour and an internal processing of information. Thus, terms such as *intention*, *consciousness*, and *thinking* are associated with the term *mind*.⁴ The explanation of behaviour, as will be demonstrated in this article, often leads to a discussion of a possible internal motivation,

2 Ibid., 26

3 Pamela J. Asquith, “Why Anthropomorphism Is NOT Metaphor: Crossing Concepts and Cultures in Animal Behavior Studies,” in *Anthropomorphism, Anecdotes, and Animals*, ed. Robert W. Mitchell, Nicholas S. Thompson, and H. Lyn Miles (Albany: State University of New York Press, 1997), 23.

4 Markus Wild, *Tierphilosophie. Zur Einführung* (Hamburg: Junius, 2008), 11–15.

5 An overview of publications in the field is given, for example, in Britt von den Berg, *Die "neue Tierpsychologie" und ihre wissenschaftlichen Vertreter (1900-1930)* (Bristol u.a.: Tenea, 2008). Focusing only on the crucial experiments done with animals which were believed to be able to speak by tapping in the beginning of the twentieth century: Henny Jutzler-Kindermann, *Können Tiere denken? Ein Buch vom Verstand und Wesen der Tiere* (St. Goar: Reichl, 1996).

6 See, for example: Birgit Mütterich, "Die soziale Konstruktion des Anderen: Zur soziologischen Frage nach dem Tier," in *Tierethik Grundlagentexte*, ed. Friederike Schmitz (Berlin: Suhrkamp, 2014), 445–477; Markus Wild, *Tierphilosophie*, 7.

7 Niels Werber, *Ameisengesellschaft* (Frankfurt am Main: Fischer, 2013).

8 Michael Tye, "The Problem of Simple Minds: Is There Anything It Is like to Be a Honey Bee?" *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 88, no. 3 (Dec., 1997): 289.

but not necessarily to the conclusion that a mind is responsible for such behaviour (or even exists). Besides the focus on animal behaviour, German-language animal psychology can be characterized by certain recurring topics. These topics were the notion of the inaccessibility of other minds, a discussion of anthropomorphism and analogy, and the scientific character of animal psychology, which were tightly interwoven with one another and strongly influenced each other. Animal psychology thus offers an opportunity to gain an understanding of anthropomorphism and its relevance within a scientific field. Moreover, most historians of science place the beginning of German-language animal behavioural studies in the work of the ethologists Konrad Lorenz and Oskar Heinroth, as well as in the institutionalization of ethology around 1930. The precursor of ethology, animal psychology, is less studied from a discourse analysis perspective. A close study of it will therefore provide useful insights into the discourse of the historical study of animal behaviour.⁵

The common understanding of the terms "animal" or "animals" encompasses a variety of different species, but leaves out a particular one: humans.⁶ In order to avoid the vagueness of the term "animal(s)", and to acknowledge the diversity of animal species, this article chooses to take a look at studies focusing on one group of animals: ants. The reason for this choice is twofold. Firstly, ants were popular animals to study around 1900. Literary scholar Niels Werber, for example, explains the interest in insects through discussions of political questions around that time: the terminology used in entomology — e.g. *monarchy*, *worker ants*, and *queen* — offers a first insight into that connection.⁷ Secondly, ants are exemplary of what Michael Tye calls "the simple minds". These concern:

[s]impler beings than ourselves [about which] we are left with nothing physical or structural that we could plausibly take to help us determine whether they are conscious. The Problem of Other Minds, as it applies to the consciousness of such creatures, is without solution.⁸

Tye's statement represents creatures that are physically very different from humans and, moreover, are "simpler", a psychological mystery that cannot be solved. Consequently, one can assume that scientific papers that focus on animals with "simple minds", such as ants, will reveal more controversies and therefore provide deeper insights into the debate on the mind of non-human animals. Although this article focuses on one specific group of animals, it uses in some cases the term "animal(s)" instead of "ants". This is mainly because the studies about ants which will be examined used the term "animal(s)" as well.

This article understands animal psychology as a scientific discourse and draws its methodological approach from Foucauldian discourse theory.⁹ This means that the production of knowledge about animal behaviour in animal psychology is considered a negotiation of rules on how to approach non-human animals and on how to pursue animal psychology as a science. In other words, in order to participate in the discourse of animal psychology and to be recognized as scientific, scientists had to follow certain rules in their contributions to the field. As will be demonstrated in this article, the avoidance of anthropomorphism represents such a rule. To illustrate this, contributions by German physiologist Albrecht Bethe and Swiss entomologist Auguste Henri Forel will be analysed in regard to their responses to one another's ideas.

These two scientists are taken as representatives of two different schools of studying ant behaviour and pursuing animal psychology around 1900. Bethe was a physician and physiologist, who in 1937 was banned by the Nazis from carrying out his profession.¹⁰ Bethe's work included an examination of the nervous system of animals and his approach to ant behaviour followed this physiological approach and thus focused on physical processes. This research approach resulted in attempts to find a formal terminology for the behaviour of animals and provided a rather machine-like understanding of it. His studies therefore led him to a very sceptical view of the cognitive abilities

9 As Foucault never wrote a coherent methodological description, ideas were derived from Achim Landwehr, *Historische Diskursanalyse* (Frankfurt am Main: Campus: 2009); Reiner Keller, *Diskursforschung. Eine Einführung für SozialwissenschaftlerInnen* (Wiesbaden: VS, 2011); and Siegfried Jäger, *Kritische Diskursanalyse. Eine Einführung* (Münster: Unrast, 2012).

10 For a detailed account of his biography see: Ernst August Seyfarth, *Albrecht Bethe. Naturforscher, Mediziner und liberaler Patriot* (Frankfurt am Main: Societäts, 2018).

11 Stephan Osiro et al., "August Forel (1848-1931): a look at his life and work," *Child's Nervous System* 28, no. 1 (2012): 1–2. See also: Charlotte Sleigh, *Six Legs Better: A Cultural History of Myrmecology* (Baltimore: Johns Hopkins University Press, 2007), 11.

12 August Forel, *Das Sinnesleben der Insekten. Eine Sammlung von experimentellen und kritischen Studien über Insektenpsychologie* (München: Ernst Reinhardt 1910), VII.

13 See for the English translation by William Morton Wheeler: August Forel, *Ants and Some Other Insects. An Inquiry into the Psychic Power of these Animals. With an Appendix on the Peculiarities of their Olfactory Sense* (Chicago and London: Open Court, 1904). The first edition of the German version was published in 1901.

14 Dominik Perler and Markus Wild, "Der Geist der Tiere – eine Einführung," in *Der Geist der Tiere. Philosophische Texte zu einer aktuellen Diskussion*, ed. Dominik Perler and Markus Wild (Frankfurt am Main: Suhrkamp Verlag, 2005), 13.

of animals, especially of ants. This article mainly focuses on his book *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?* (Are we allowed to ascribe mental abilities to ants and bees?) (1898). Forel, on the other hand, was an entomologist, psychiatrist, neuroanatomist, and social reformer promoting pacifism and social morality among other topics. He was not only interested in the behaviour of ants, but also became famous for his description of ant species. His book *Les Fourmis de la Suisse* (The ants of Switzerland), written in 1874, was one of his most famous works, and in it, he combined descriptions of ant species with a study of their behaviour.¹¹ In contrast to Bethe, Forel discussed the behaviour of ants less rigorously and presumed a mind in ants. In his book *Das Sinnesleben der Insekten. Eine Sammlung von experimentellen und kritischen Studien über Insektenpsychologie* (The sensory life of insects. A collection of experimental and critical studies on insect psychology) (1910) he wrote that it would not be possible to understand behaviour without knowledge of sensory organs and their functions.¹² This work, as well as *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten* (The psychic power of ants and some other insects) (1907), are of primary interest in this article.¹³

OTHER MINDS: ACCESS DENIED?

That only an exterior view on the inner life of a non-human animal is possible is what philosophers Markus Wild and Dominik Perler consider the basic methodological problem when trying to approach the mind of other animals.¹⁴ This methodological problem is also key to understanding the discussion of anthropomorphism in the work of both Bethe and Forel.

To introduce the difficulty of accessing the mind in general, Forel began *Die psychischen Fähigkeiten von Ameisen und einiger anderer Insekten* (1907) with a distinction between consciousness and unconsciousness and explains that consciousness made up only a small part of the total mental activity, while the bigger part was unconscious. For Forel, this division meant that a psychology

based on introspection only allowed for insights into consciousness and left out most mental activities, because of their unconscious nature — in other words, they were inaccessible. Forel found a solution to this problem in the process of drawing analogies between different species and concluded that analogy was the only existing tool to access the mind and therefore necessary. Furthermore, he added that a comparison of the five senses was fundamental to infer information on the mind of human and nonhuman animals likewise.¹⁵ Although precise definitions of the terms *comparison*, *analogy*, and *induction* are missing in Forel's work, it can be inferred from his studies that a *comparison* means, for example, that the senses of ants were compared with that of other animals such as humans. An *analogy* goes further and indicates that the compared subjects have similar features. These similarities can be used to gain insights into a certain subject, thereby inferring information from the process of comparison. An example of this would be Forel arguing that an injury of the cerebrum causes a similar shift in behaviour in ants as in pigeons.¹⁶ This comparison — actually used to justify the study of brain morphology for psychological studies — demonstrates that a comparison of pigeons and ants finds analogies in the brain structure and further justifies assuming that these structures are related to the same behaviour in ants and pigeons.

In agreement with Forel, Bethe wrote that one knew sensation only from oneself and thus no direct access to other minds was possible. This also led him to consider analogy as a tool to access other minds. Yet this “unscientific tool” of inference, as he called it in a paper published in 1899 with physiologist Jakob von Uexküll and Theodor Beer, could not be applied to “ascribe sensation to lower animals and lower centres of man”.¹⁷ His reference to analogy as “unscientific” and not applicable to “lower animals” points to the first difference between Forel and Bethe. Whereas both agreed on analogy as the only method to gain insights into other minds, they differed in their assessment of the extent to which analogy could be used to determine how valid the results of this method were. According to Bethe's paper, drawing

15 August Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten* (München: Ernst Reinhardt 1907), 7–8.

16 August Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 18.

17 Albrecht Bethe, Theodor Beer and Jacob Uexküll, “Vorschläge zu einer objektivierenden Nomenclatur in der Physiologie des Nervensystems,” *Zoologischer Anzeiger* 22 (1899): 275. [trans. Maike Riedinger]. Original: “den niederen Thieren wie den niederen Centren des Menschen Empfindungen zuzuschreiben”. What is meant by lower animals and lower centres of men remains unanswered. Based on evolutionary theory and the terminology Darwin used, “lower animals” could be translated as not closely related to humans. Since Bethe, Uexküll, and Beer were scientists with a strong physiological background, lower centres of men could mean physical processes that were seen as unrelated to complex cognitive ones such as digestion.

18 Bethe, Beer, and Uexküll, "Vorschläge zu einer objektivierenden Nomenclatur in der Physiologie des Nervensystems," 275–280.

19 Ernst Dzenolet, "Behaviorism and sensation in the paper by Beer, Bethe and von Uexküll (1899)," *Journal of the History of the Behavioral Sciences* 3 (1967): 256–261. See also: Florian Mildener, "The Beer/Bethe/Uexküll Paper (1899) and Misinterpretations Surrounding 'Vitalistic Behaviorism,'" *History and Philosophy of the Life Sciences* 28, no.2 (2006), 175–189.

20 Asquith, "Why Anthropomorphism is NOT Metaphor: Crossing Concepts and Cultures in Animal Behavior Studies," 25.

21 See, for example: George John Romanes, *Die geistige Entwicklung im Tierreich* (Leipzig: Ernst Günthers Verlag, 1887); Ernst Haeckel, *Die Welträthsel. Gemeinverständliche Studien über monistische Philosophie*, (Bonn: Emil Strauss, 1899), 101–242.

22 Charles Darwin, *Die Abstammung des Menschen* (Wiesbaden: Fourier 1992), 163.

23 Robert Boakes, *From Darwin to behaviourism. Psychology and the mind of animals* (Cambridge: Cambridge University Press, 1984), 2.

analogies was no valid method to infer information about the motivation of behaviour shown by "lower animals" such as ants. Forel, on the other hand, used analogies to approach the behaviour of ants and regarded it as scientifically valid. Moreover, Bethe, Uexküll, and Beer's general consideration of analogy as being "unscientific" led them to develop a nomenclature in an attempt to standardize an approach to the study of non-human animals.¹⁸ Their paper was considered to be influential for the development of behaviourism and as the link between the German-language discourse of animal psychology and behaviourism.¹⁹ In accordance with this paper, Pamela Asquith described it as part of what she calls the "first objectivist movement",²⁰ by which she refers to the increasing number of attempts to ban subjectivisms from science, similar to the aim of Behaviourism.

As analogy depends on similarities between different species, the difference in Forel and Bethe's opinions is also mirrored by their different takes on evolution-based explanations in the behavioural study of ants. Around 1900, some studies of animal behaviour were explicitly influenced by evolutionary theory. This can often be seen in works by biologists who were also interested in the study of the animal mind, such as Ernst Haeckel and George Romanes.²¹ The evolutionary theory was first applied to the study of animal minds in *The Descent of Man* (1871) by British naturalist Charles Darwin. In this work, Darwin states that the difference between the human and the animal mind is one of degree and not of kind.²² However, some approaches to the study of animal behaviour remained rather unaffected by Darwin's argument. Psychologist Robert Boakes notes that two distinct scientific traditions collided in German-language discourse in the period from Darwin's evolutionary theory to the beginning of behaviourism: the evolutionary and the physiological. He writes that "experimental physiologists, mainly working in German universities, had been making a series of important discoveries about the nervous system".²³ Furthermore, he adds that: "A general theoretical concept for much of this work was the idea of the reflex [. . .] Eventually this concept was extended in

a way that many hoped would provide a generally adequate explanation of why animals [. . .] act in the way that they do”.²⁴ Bethe and Forel represent two different interpretations of the evolutionary theory in the study of ants. Following Boake’s distinction, Bethe can be described as a representative of the German experimental physiologists. Although Bethe did not reject the use of evolutionary explanations, he used natural selection primarily to claim that no inner life was necessary to explain behaviour and said further that a physiological or mechanistic explanation was sufficient.²⁵ By labelling a scientific approach “mechanistic”, Bethe refers to an explanation of behaviour based on physical processes. Bethe’s use of the term “mechanistic” refers to the image of a machine — hence, no mind is necessary to explain behaviour. Jacques Loeb, Bethe’s contemporary, can be considered another follower of this school of thought. He became famous for his ideas about tropism — a view that regards animal behaviour mainly as a reaction to an external stimulus. He is therefore also considered a representative of the early stages of behaviourism.²⁶ In contrast to Bethe, Forel did not interpret evolutionary theory as suggesting a mechanistic explanation. Rather, for him, it legitimized the assumption of similarities in the psychology of different species. He wrote that “evolutionary theory is just as valid in psychology as other research areas studying organisms”.²⁷ Consequently, evolutionary theory led him to the idea that the brain of social insects is comparable to that of humans and that insights into the psychology of social insects are possible.²⁸ In summary, both Bethe and Forel accepted evolutionary theory but did not agree on its applicability to the study of animal behaviour. Against this background, it can be explained why they had different ideas on the limits of analogy as a scientific method in approaching the behaviour of ants.

ANTHROPOMORPIC ANTS OR REFLEX MACHINES?

The debate between Bethe and Forel on analogy’s applicability in studying ant behaviour was not implicit. Forel wrote explicitly in regard to Bethe that

²⁴ Ibid., 2.

²⁵ Albrecht Bethe, *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?* (Bonn: Martin Hager, 1898), 5.

²⁶ Sleigh, *Six Legs Better: A Cultural History of Myrmecology*, 43–45; Heiner Fangerau, “Tierforschung unter mechanistischen Vorzeichen: Jacques Loeb, Tropismen und das Vordenken des Behaviorismus,” in *Philosophie der Tierforschung 1. Methoden und Programme*, ed. Martin Böhnert, Kristian Köchy, and Matthias Wunsch (München and Freiburg: Karl Alber, 2016), 183–208.

²⁷ August Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 4. [trans. Maïke Riedinger]. Original: “Die Evolutionstheorie gilt genauso gut auf dem psychischen Gebiet als auf allen anderen Gebieten des organischen Lebens”.

²⁸ See also Osiro et al., “August Forel (1848-1931): a look at his life and work,” 2.

29 Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 11.

30 August Forel, “Nochmals Herr Dr. Bethe und die Insekten-Psychologie,” *Biologisches Centralblatt* 23 (1903): 1–3. [trans. Maike Riedinger]. Original: “Bethe überschätze die Exaktheit der Physiologie in geradezu lächerlicher Weise. Selbst viel exaktere Wissenschaften, z.B. die Chemie, verschmähen es nicht, psychologische Qualitäten für ihre Experimente mit zu benutzen, z.B. Farben- und Geruchsqualitäten”.

31 Forel, *Das Sinnesleben der Insekten*, VIII.

32 Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 1. [trans. Maike Riedinger]. Original: “In neuerer Zeit haben Bethe, Uexküll und andere die psychischen Fähigkeiten der wirbellosen Tiere in Abrede gestellt. Sie erklären letztere für Reflexmaschinen, in dem sie sich auf den sogenannten psycho-physiologischen Parallelismus stützen, um die Unmöglichkeit der Erkennung ihrer Seelenqualitäten darzuthun”.

analogy was an inherent part of animal psychology. He further added that animal psychology was a field that could never be exact, and that Bethe and others had missed the fact that knowledge was always relative.²⁹ This became even more evident shortly thereafter, when Forel responded to a criticism by Bethe in the journal *Biologisches Centralblatt*: “Bethe overestimates the accuracy of physiology in a downright ridiculous way. Even far more rigorous sciences, like for example chemistry, do not disdain using psychological qualities for their experiments, e.g. the qualities of colour or smell”.³⁰ In accordance with this criticism, Forel wrote seven years later in *Das Sinnesleben der Insekten* (1910) that we should be aware that a comprehensive understanding of the “insect soul” was not possible with the current state of scientific knowledge.³¹ His ideas were accompanied by a critical attitude towards approaches that were based on what was in his view an exaggerated claim of scientific rigour — referring thereby to studies that focused only on aspects of behaviour that provided certainty. According to Forel’s view, this results in leaving out parts which are difficult to prove rigorously such as animals’ mental life. For Forel, an example of this type of research is demonstrated by Bethe’s physiological approach. By focusing only on aspects that could be proven with certainty, in other words physiological processes and mechanistic explanations, Bethe created a strict separation between mind and body. Forel’s accusation is based on an understanding of the mind as inseparable from the body and that the existence of a certain physical structure legitimates the assumption of a mind. As Bethe’s explanations of ant behaviour consider only physical structures without deriving psychological qualities from them, Forel accused him of ignoring the unity of mind and body. Consequently, he related Bethe’s studies to a mind–body dualism and called this dualism a psycho-physiological parallelism:

More recently, Bethe, Uexküll, and others have denied the cognitive abilities of invertebrates. They declare the latter to be reflex machines by relying on the so-called psycho-physiological parallelism in order to demonstrate the impossibility of recognizing their soul qualities.³²

By associating Bethe's study with psycho-physiological parallelism, Forel intended to depict Bethe's research approach negatively. This becomes even more apparent when Forel contrasted this psycho-physiological parallelism with a monistic approach.³³ Monism was a widely discussed idea around 1900 and referred to the principle unity of mind and body, or of mental life and physiology. In 1906, the influential biologist Ernst Haeckel founded the German Monist League and Forel became one of the board members.³⁴ The accusation of a scientific approach as not monistic can therefore be seen as a harsh criticism of scientific validity. Not surprisingly, Bethe rejected this criticism and described his research as in accordance with monism. He even added that his views were more justifiably monistic than those of other scientists and explained this by saying that his physiological explanations were purely based on scientifically provable facts. He did not elaborate further on monism and only stressed his point that lacking explanations in the study of behaviour did not justify a hypothesis of psychological qualities, as scientific proof for it was missing.³⁵

To summarize, the difficulty of accessing other minds and the reliability of analogy as a scientific tool led to a debate on mind-body dualism and the fundamental question of a definition of animal behaviour studies as a scientific field. According to Forel, the presence of psychological qualities in animals — although not rigorously provable — can be assumed and are therefore a necessary part of behavioural studies. For Bethe, on the other hand, the lack of certainty justifies the omission of psychological qualities. He insisted on relying only on factual, provable aspects, as per the requirements of scientific inquiry.³⁶ In this debate between Bethe and Forel two different ideas of how to pursue the scientific study of animals arose. This difference is reflected in what primatologist de Waal describes as a common phenomenon in the study of animal behaviour that is still relevant today: "Whereas one school warns against assuming things we cannot prove, another school warns against leaving out what may be there [. . .]."³⁷ This was also the case with Bethe and

33 Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 1, 9.

34 Osiro et al., "August Forel (1848-1931): a look at his life and work," 4.

35 Bethe, *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?*, 5–7.

36 Bethe, *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?*, 85.

37 Frans B. M. de Waal, "Foreword," in *Anthropomorphism, Anecdotes, and Animals*, ed. Robert W. Mitchell, Nicholas S. Thompson, and H. Lyn Miles (Albany: State University of New York Press 1997), XV. See for a further examination also: Elliott Sober, "Comparative Psychology meets Evolutionary Biology. Morgan's Canon and Cladistic Parsimony," in *Thinking with Animals. New Perspectives on Anthropomorphism*, ed. Lorraine Daston and Gregg Mitman (New York: Columbia University Press, 2005), 85–87.

Forel. Their different ideas regarding the pursuit of behavioural studies led to a devaluation of each other's scientific approach.

In order to declare the research of the other scientists as unscientific two terms came up: "anthropomorphism" and "reflex machines". Forel claimed that Bethe, by leaving out psychological qualities in his study of ants, rendered invertebrates reflex machines.³⁸ On the other hand, although Bethe acknowledged Forel's high degree of scepticism, he also stated that Forel frequently fell into "critical anthropomorphism". As the scientific proof for psychological qualities in ants — based on Bethe's understanding of science — was missing, its attribution could only result out of anthropomorphism, meaning the projection of humanlike traits on ants. Bethe added that, to the extent in which he was familiar with the newly published literature about ants and bees, there was not even one contribution approaching the matter of ant behaviour without bias and with the full scepticism required for their study.³⁹ Forel reacted to the accusation of anthropomorphism by accusing Bethe in turn of being anthropomorphic, since the latter considered the ability to modify behaviour and therefore a human kind of reason necessary to attribute psychological qualities.⁴⁰ He accused Bethe of implicitly assessing the behaviour of ants based on human standards and on the ability of non-human animals to show characteristics which are associated with humans such as reason.

38 Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 3.

39 Bethe, *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?*, 3–4.

40 Forel, *Die psychischen Fähigkeiten der Ameisen und einiger anderer Insekten*, 15.

41 Emanuela Cenami Spada, "Amorphism, Mechanomorphism, and Anthropomorphism," in *Anthropomorphism, Anecdotes, and Animals*, ed. Robert W. Mitchell, Nicholas S. Thompson, and H. Lyn Miles (Albany: State University of New York Press 1997), 41.

The accusation of being anthropomorphic is linked to the debate on analogy and the different perceptions of analogy as a scientific tool to approach the non-human mind. Philosopher Emanuela Cenami Spada writes about anthropomorphism in general that "the difficulties posed by the use of analogies between humans and animals is the core of the entire puzzle of anthropomorphism".⁴¹ In the case of Bethe and Forel case, an (implicit) use of analogy was enough to lead to an accusation of being anthropomorphic by either transferring attribution, which also occurs in humans to ants, or by implicitly looking for similarities to humans while assessing the psychological qualities of

animals. Summarized, it becomes apparent that both scientists have a different perception of which aspects — in other words which use of analogy — led to the characterization of a study as being anthropomorphic. While for Forel anthropomorphism meant to assess ant behaviour based on human standards, for Bethe it meant to assume mental abilities in animals for which a proof based on his scientific standards was missing.

AVOIDING ANTHROPOMORPHISM AND SEEKING A DEFINITION OF SCIENCE

Their different perceptions of anthropomorphism notwithstanding, Bethe and Forel referred to it with the same rhetorical purpose: to criticize and disqualify each other's approach to animal behaviour, to depict each other's scientific contributions as unscientific. The mutual accusations of anthropomorphism or creation of "reflex machines" aimed at attacking the philosophical underpinnings of the studies. Thus, Bethe and Forel used the term anthropomorphism according to their own understanding of animal psychology as a scientific discipline and their own definition of scientific inquiry. Consequently, these accusations contained an attempt to negotiate the shape of the scientific methods to study animal behaviour. Bethe made this clear by writing that everyone was allowed to attribute to animals as many cognitive abilities as they wanted in their private lives, but not in science.⁴²

On the basis of discourse theory, it can be said that by referring to certain approaches as anthropomorphic and thereby as unscientific Bethe and Forel negotiated the scientific character of animal psychology. Moreover, this can be understood as an attempt to demarcate animal psychology as a field from other, "unscientific", approaches to ants. This, in turn, led to a situation in which the avoidance of anthropomorphism had become an implicit rule that scientists had to follow in order to be accepted by the scientific community. This situation was also influenced by other crucial events in animal psychology at the beginning of the twentieth century such as the case of Clever Hans, a horse

⁴² Bethe, *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?*, 8.

that was believed to solve different tasks such as counting by tapping with his hooves. The assumption that the horse could count and solve mathematical tasks was soon explained by the detection of unconsciousness signs made by the experimenter. However, the case of Clever Hans enforced the suspicion that non-human animals could possess psychological qualities and intensified the intention to ban anthropomorphism from the scientific study of animal behaviour.⁴³

The topicality of the rule to avoid anthropomorphism in order to participate in scientific discourse is also an issue in the current philosophy of animal behaviour sciences. In his foreword to philosopher Vinciane Despret's book *What Would Animals Say If We Asked the Right Questions?* (2016) Bruno Latour quotes Despret's idea of *academocentrism* and asks: "Is the fight against anthropomorphism so important that it should give way to what she calls a generalized 'academocentrism'?"⁴⁴ The term *academocentrism* can be understood as the necessity for scientists to undertake research according to the academic standards such as the accepted scientific methods and theories in order to participate in a scientific discourse. The debate between Bethe and Forel provides an understanding of how the scientific character of theories and methods were negotiated in the past and thus, of how *academocentrism* gained its specific charge. Therefore, it illustrates an ongoing dispute in the discourse of animal psychology and points at underlying aspects of the discussion on anthropomorphism: its importance in the search for scientific standards and for the demarcation of scientific approaches to animal minds from non-scientific ones.

43 For a detailed illustration of the case, see also: Karl Krall, *Denkende Tiere. Beiträge zur Tierseelenkunde auf Grund eigener Versuche. Der kluge Hans und meine Pferde Muhamed und Zarif* (Leipzig: Friedrich Engelmann, 1912).

44 Vinciane Despret, *What Would Animals Say If We Asked the Right Questions?* (Minneapolis: University of Minnesota Press, 2016), viii, (pages vii- xiv: Bruno Latour, "Foreword: The Scientific Fables of an Empirical La Fontaine.").

CONSTRUCTING THE MIND OF ANTS

As was demonstrated, the assumed difficulty to access other minds led Bethe and Forel to a methodological discussion on analogy. While Bethe did not think of analogy as a suitable method to gain insights into the behaviour of

ants, Forel used analogies between humans and social insects to draw conclusion on their minds. The debate on analogy resulted in contrary explanations of the behaviour of ants und further to a devaluation of one another's research approach. While Forel thought of Bethe's research as a creation of ants as reflex machines, Bethe accused Forel of anthropomorphism — a criticism which Forel saw also in Bethe's work. Philosophical ideas about monism (the unity of body and mind) and about mind–body dualisms (so-called “psycho-physiological parallelism”) came up as points of debate. For Bethe, monism meant knowledge about behaviour as purely based on — according to his definition of science — provable facts. Forel, on the other hand, understood monism as a reason to accept psychological qualities, as mind and body were a unit. Thus, different ideas about scientific methods and a definition of science arose from the debate and resulted in different understandings about ants and about the motivation of their behaviour.

The debate outlined above between Bethe and Forel shows that statements about ants were not only deduced from their behaviour, but were significantly influenced by human judgement of scientific methods and philosophical ideas. The decision to take sides with one or another school of thought and its argumentation is, in the end, a human decision. By translating the object of study — in this case the behaviour of ants — and its properties into a human language, by choosing a philosophical background and a method, what is meant by the term “ants” and the definition of their behaviour is shaped and, to a certain degree, constructed by the scientific practice. Various approaches to the history of science, such as historical epistemology or science and laboratory studies, describe social construction as crucial for knowledge production in general. In sum, it can be said that they illustrate research as a social process, the results of which are constructed in the process itself. In particular, sociological and feminist approaches emphasize that conditions and possibilities of knowledge in science interact with non-scientific factors, thus questioning the assumption that culture and nature are separated in the scientific process,

as was constitutive for the early history of science. It is through language and scientific activity, technology, and method that the object of investigation can be represented and is therefore decisively shaped.⁴⁵ Bruno Latour and Steven Woolgar write in *Laboratory Life. The Construction of Scientific Facts* (1986) about the process in which knowledge is socially constructed in the laboratory and the techniques to translate natural occurrences into scientific facts. They describe how scientists learn what to recognize in an examination as important aspects of the scientific study, and which aspects they can omit.⁴⁶ This point is similar to Bethe and Forel's negotiations on how to deal with aspects of research that are considered improvable. The debate on psycho-physiological dualism and monism can be understood as a negotiation on the shape of scientific practice as mentioned by Latour and Woolgar: to find an agreement on which aspects of the issue may be omitted and which may not. A mutual agreement between Bethe and Forel on the philosophical and methodological background and henceforth on the same approach to study ant behaviour might have resulted in the construction of a canonical understanding of the mind of ants. This construction would not have appeared to be artificial, but a reflection of the nature of ants, because of a scientific consensus. Their disagreement makes it easier to recognize this construction as such and, further, as an attempt to shape the scientific study of non-human animals.

As the use of analogy and labelling something as anthropomorphic need a definition of humanness, it can also be concluded that Bethe and Forel have a different underlying idea of this humanness.⁴⁷ Forel found in ants a model for the human society and the human psyche. Literary scholar Benjamin Bühler even writes that Forel's examination of social instincts of ants led him to social ethics.⁴⁸ While Forel draws analogies between ants and humans in his scientific approach, Bethe tried to ban them from scientific inquiry. Their choices of scientific methods relied not only on an (implicit) definition of humanness, but also had a retroactive effect on the idea of what humanness means and on the relation between human and non-human animals. Bethe's intention to

45 Marianne Sommer, Staffan Müller-Wille, and Carsten Reinhardt, "Wissenschaftsgeschichte und Wissensgeschichte," in *Handbuch der Wissenschaftsgeschichte*, ed. Marianne Sommer, Staffan Müller-Wille, and Carsten Reinhardt (Stuttgart: J.B. Metzler, 2017), 4–8.

46 Bruno Latour and Steven Woolgar, *Laboratory Life. The Construction of Scientific Facts* (Princeton, New Jersey: Princeton University Press, 1986).

47 Asquith, "Why Anthropomorphisms Is NOT Metaphor," 33–34.

48 Benjamin Bühler, "Tierische Kollektive und menschliche Organisationsformen: Kropotkin, Canetti und Lem", in *Schwärme – Kollektive ohne Zentrum: eine Wissensgeschichte zwischen Leben und Informationen*, ed. Eva Horn et al. (Bielefeld: transcript, 2009), 258.

avoid the attribution of psychological characteristics which were associated with humans resulted in constructing the non-human animal as “the other” and reinforced the idea of a human–animal boundary. Forel’s use of analogies in his description of ant behaviour, on the other hand, resulted in another understanding of ants and their relation to humans. Based on the ideas of sociologist Eileen Crist, it can be concluded that for the reader of Forel’s works his approach offers a language that supports a comprehension of non-human behaviour and to perceive animals as subject.⁴⁹ Thus, the scientific approach does not only create an image of non-human animals, but also affects the possibility of perceiving non-human animals as mind-endowed creatures at all.⁵⁰

49 Eileen Crist, *Images of Animals. Anthropomorphism and Animal Mind* (Philadelphia: Temple University Press 1999), 2.

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Maike Riedinger is based at the University of Kassel, Germany, where she is writing her PhD dissertation in social and cultural history focusing on the history of the human–animal relations. Her research interests are human–animal studies with a particular interest in ethology and its history. Her thesis focuses on German-language animal psychology around 1900 and deals with the negotiation of scientific approaches. In addition to her academic work, she is a member of *Mensch Tier Bildung e.V.*, an organization that hosts workshops in schools with a focus on animals in agriculture and their wider embedding in economy and ecology.