

## **Thought Styles and Paradigms –** A Comparative Study of Ludwik Fleck and Thomas S. Kuhn

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### **Abstract**

At first glance there seem to be many similarities between Thomas S. Kuhn's and Ludwik Fleck's accounts of the development of scientific knowledge. Notably, both pay attention to the role played by the scientific community in the development of scientific knowledge. But putting first impressions aside, one can criticise some philosophers for being too hasty in their attempt to find supposed similarities in the works of the two men. Having acknowledged that Fleck anticipated some of Kuhn's later theses, there seems to be a temptation in more recent research to equate both theories in important respects. Because of this approach, one has to deal with the problem of comparing the most notable technical terms of both philosophers, namely "thought style" and "paradigm".

This paper aims at a more thorough comparison between Ludwik Fleck's concept of thought style and Thomas Kuhn's concept of paradigm. Although some philosophers suggest that these two concepts are essentially equal in content, a closer examination reveals that this is not the case. This thesis of inequality will be defended in detail, also taking into account some of the alleged similarities which may be responsible for losing sight of the differences between these theories.

**Keywords:** Paradigm, Thought style, Ludwik Fleck, Thomas S. Kuhn, Incommensurability, Scientific Community

### **1 Introduction**

Recent philosophical analyses pay more and more attention to the impact of social aspects in gaining and justifying knowledge in both everyday and scientific contexts.<sup>1</sup> Thomas S. Kuhn

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<sup>1</sup> See e.g. the debates in social epistemology, compare Coady (1992), Goldman (1999) and (2008), Kusch (2004), Lackey (2008), Lackey and Sosa (2006), Longino (2008), Mirowski (2004), Mößner (2010), Shapin (1994).

and his inquiries into the influence of the scientific community on the development of knowledge have played an important role in paving the way for this endeavour. Through his work another philosopher has recently been rediscovered as an influential predecessor in this kind of theorising, namely Ludwik Fleck.

At first glance there seem to be many similarities between Kuhn's and Fleck's approaches. Notably, both pay attention to the role played by the scientific community in the development of scientific knowledge. In this context Fleck is of the opinion that cognition is not a dual process between subject and object, but a threefold one where tradition and stored knowledge by the community also play an essential part.<sup>2</sup> He claims that: "Cognition is therefore not an individual process of any theoretically "particular consciousness." Rather it is the result of a social activity, since the existing stock of knowledge exceeds the range available to any one individual."<sup>3</sup> In Kuhn's theory the concepts of paradigm and scientific community are closely connected. His claim is that, without the community, we would not encounter the kind of scientific activity that we are accustomed to: "Both normal science and revolutions are, however, community-based activities. To discover and analyze them, one must first unravel the changing community structure of the sciences over time. A paradigm governs, in the first instance, not a subject matter but rather a group of practitioners."<sup>4</sup> In the end, both philosophers arrive at the strong thesis that this social component significantly determines scientific research as it somehow defines the *world* the individual scientist is living in.<sup>5</sup>

For an adequate response to this issue and to decide whether both theories amount to the same thesis, one must first analyse the scope of their claims. Such an endeavour turns out to be necessary, as it seems that some philosophers have been too hasty in their attempts to find similarities through a comparison of both authors. For instance, Gert-Rüdiger Wegmarshaus does not hesitate to claim that the essential ideas of Ludwik Fleck first became known to the public by means of Kuhn's book.<sup>6</sup> Wegmarshaus is of the opinion that in the 1930s Fleck's writings did not catch the attention of the scientific community because he was ahead of his

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<sup>2</sup> See Fleck (1979), p. 38.

<sup>3</sup> Ibid.

<sup>4</sup> Kuhn (1996), pp. 179/180.

<sup>5</sup> See *ibid.*, ch. 10, particularly pp. 111, 135. Fleck also states that: "Cognition is the most socially-conditioned activity of man, and knowledge is the paramount social creation [*Gebilde*]." Fleck (1979), p. 42.

<sup>6</sup> See Wegmarshaus (2007), p. 53.

time.<sup>7</sup> Wegmarshaus offers a couple of supporting theses for this claim: Fleck was not part of the dominant logical empiricist movement which at the time represented the mainstream in the philosophy of science. On the contrary, Fleck attacked logical empiricists sharply.<sup>8</sup> Furthermore, Fleck's choice of case studies was unusual for his time. His examples come from the domain of medicine and microbiology, whereas at that time most examples discussed in the philosophy of science originated from physics or at least the natural sciences.<sup>9</sup> Last but not least, as a Jewish writer, the historical context made it extraordinarily difficult for Fleck to reach his audience. In this context Fleck lacked the necessary support for his ideas and his work.<sup>10</sup> Wegmarshaus's core thesis is that times had changed when Kuhn came up with the *same* ideas in the 1960s. He claims that it was no surprise that the rediscovery of Fleck took place in the United States of America. The reason for this was that, according to Wegmarshaus, at that time the US government pursued strategies to ensure its leading position in the world. This had certain consequences in the educational realm, e.g. to integrate lessons from the history of science and the sociology of science into academic curricula – a field in which Kuhn was also trained.<sup>11</sup> Accordingly, in such an environment it was not so difficult to state the importance of the scientific community and of tradition in epistemic processes. Hence, Kuhn was able to become famous using his predecessor's ideas, to underline the main point of Wegmarshaus's argument.

The attempt to equate Fleck's and Kuhn's theories in important respects leads to a false comparison between the essential technical terms of both philosophers, namely "thought style" and "paradigm". Eva Hedfors summarises this as follows: "There is an agreement bordering on consensus concerning the merits of Fleck's monograph, not least regarding its anticipation of the theses displayed in *The Structure of Scientific Revolutions* published by Kuhn in 1962, which was immediately acknowledged and has been immensely influential ever since. This anticipation is exemplified in the vocabulary deployed by Kuhn. His

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<sup>7</sup> See *ibid.*, p. 50.

<sup>8</sup> See e.g. Fleck (1979), pp. 50 and 89, ch. 4, section 2, and ft. 3 in ch. 4.

<sup>9</sup> See Wegmarshaus (2007), p. 51.

<sup>10</sup> See *ibid.*, p. 54f. Interestingly, Eva Hedfors offers a completely different account of why Fleck's work had been neglected for such a long time. One aspect that she mentions is that Fleck was a scientist who had lost contact with the scientific community and whose work was therefore dismissed. See Hedfors (2006), p. 133.

<sup>11</sup> See Wegmarshaus (2007), p. 54f.

concepts, such as *paradigm* and *scientific community*, have been seen as equivalents to Fleck's much earlier formulated notions of *thought style* and *thought collective*."<sup>12</sup>

An example of a writer who proposes such a similarity between the works of Kuhn and Fleck is Hubert Knoblauch. The aim of his article is to give an introduction to the sociology of knowledge. In this context Knoblauch presents Fleck's and Kuhn's theories as important forerunners of this new academic discipline. Interestingly, he suggests that Kuhn combined Fleck's concepts of thought style and thought collective in his own concept of paradigm.<sup>13</sup> This thesis is somewhat puzzling. Why does Knoblauch think that the concept of paradigm comprises both of Fleck's concepts? Unfortunately, his remarks are too short to enable the necessary analysis. Nevertheless, two parts of his text offer a hint as to why he came to this conclusion: Firstly, Knoblauch understands Fleck's concept of thought style in a far too narrow sense. He says that a thought style consists of a certain state of knowledge.<sup>14</sup> (In the text that follows we will see that there is more to defining this concept than merely mentioning a stock of knowledge.) Secondly, Knoblauch does not refer to the term *scientific community* as another important concept in Kuhn's theory.<sup>15</sup> As this would be an adequate correlate for Fleck's "thought collective", it can be assumed that Knoblauch overlooked the importance of the term in Kuhn's writing. However, as there are no quotations on this point in Knoblauch's text, one can only speculate that this is the case.

Another scholar writing about the apparent similarities between Fleck's and Kuhn's core concepts is Babette E. Babich. Her account of the connection between both philosophers is clearly in accordance with Hedfors's thesis concerning the historical interpretation of Fleck's work. Furthermore, Babich tries to offer an historical explanation for why Kuhn – although deeply influenced by Fleck's theory – felt unable to re-use the same terms (i.e., thought style and thought collective). She states that it was impossible for Kuhn to use Fleck's terminology because of the political context of the McCarthy era, and the individualistic ideal influencing science at that time.<sup>16</sup> "Not a problem of translation, the problem corresponds to the political restrictions of Kuhn's era (from the 1940s through the 1950s and early 1960s) entailing that Kuhn could not adequately refer to Fleck's terminology. Kuhn in his 1962 book *could not*

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<sup>12</sup> Hedfors (2006), p. 132, her italics.

<sup>13</sup> See e.g. Knoblauch (2005), p. 238.

<sup>14</sup> See *ibid.*

<sup>15</sup> See *ibid.*, pp. 238-241.

<sup>16</sup> Steven Fuller also stressed the political context of Kuhn's writings as an important aspect for the correct interpretation of his theory. See Fuller (2000), esp. ch. 3.

have used such dangerously loaded terms as “thought collectives” – or “thought styles” – for the perfectly banal reasons we still attribute to and name “politics”. For this reason, paradigm became Kuhn’s term of choice. The language of collectives or thought styles would have evoked precisely *reactive* reactions in a time of paranoia and anxieties expressed in words like brainwashing, propaganda, the Iron Curtain and the Iron State, and the inscrutable evil in Eastern Europe, of Russia and (this is all that is left today) China.”<sup>17</sup> However interesting this thesis might be, there is no evidence for its truth in Kuhn’s writings. Nevertheless, this demonstrates how the attempt to find similarities between Fleck and Kuhn can also lead to speculation which would otherwise lack any basis.

In the end we have to face the question of whether the similarities between the concepts of thought style and paradigm are really that close. Do both concepts really pick out the same entities or at least a set of things that are similar in important respects? In the text that follows I will concentrate on a comparison between Ludwik Fleck’s concept of thought style and Thomas Kuhn’s concept of paradigm. Contrary to the aforementioned attempts to equate both concepts, a more careful examination will reveal that they cannot be treated as alike. In the text below, I will defend the thesis of inequality in detail. But first let us take a closer look at the similarities between both theories which also may be responsible for leading us to lose sight of their differences.<sup>18</sup>

## **2 Similarities between the Theories**

Kuhn himself states in the foreword to the English translation of Fleck’s work “Genesis and Development of a Scientific Fact”<sup>19</sup> that he is “almost totally uncertain” as to which of Fleck’s ideas he actually adopted.<sup>20</sup> So, let us take a look at the similarities which we can find in the texts.

As a first point of comparison we can take the social component of epistemic processes: Both authors regard knowledge as an epistemic desideratum broadly influenced by social aspects. In this context Kuhn declares that “[s]cientific knowledge, like language, is intrinsically the common property of a group or else nothing at all.”<sup>21</sup> In a similar manner Fleck states that: “*An ahistorical cognition, abstracted from history is impossible, and just as*

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<sup>17</sup> Babich (2003), pp. 81/82, her italics.

<sup>18</sup> There is no claim for completeness concerning the following list of similarities.

<sup>19</sup> In the remainder of the text I will refer to this book by the term *Genesis and Development*.

<sup>20</sup> Kuhn (1976) in Fleck (1979), p. viii.

<sup>21</sup> Kuhn (1996), p. 210.

*impossible is the asocial cognition, conducted by an isolated researcher.*”<sup>22</sup> For him knowledge is clearly ascribable only to groups. As was mentioned above, Fleck and Kuhn come to the conclusion that it is the social component – thought style or paradigm – that defines the world an individual scientist is living in. Both philosophers, however, resist subsuming their positions under the term of relativism.<sup>23</sup>

Our second point of comparison is the impact of education. Its role is emphasised by both authors and connected with the significant role of the community and shared knowledge, theories, and methods for the development of scientific knowledge. By means of education laymen become members of a certain scientific community. Fleck writes: “Introduction to a field of knowledge is a kind of initiation that is performed by others.”<sup>24</sup> During this period the epistemic subject is confronted with the shared opinions of the community that they are going to become a member of. Both Fleck and Kuhn highlight the strong impact of traditional views in this phase.<sup>25</sup> Due to this fact, education becomes more of a kind of indoctrination than guidance to voluntary and reflective belief formation.<sup>26</sup> The result is that after finishing their studies the adepts look at things *through the eyes of the community*, i.e., they only see what is of interest to their research area. Additionally, they are prone to a certain inability to notice aspects falling outside the currently shared opinion in their community.<sup>27</sup> At this point the influence of the social on the development of scientific knowledge becomes obvious.

Furthermore, both Fleck and Kuhn use the characteristics of and also the concrete term ‘gestalt-switch’<sup>28</sup> to describe what happens to a scientist’s perception once it is embedded in a certain paradigm or thought style either by education or as a result of a change of the prevalent paradigm or thought style.<sup>29</sup>

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<sup>22</sup> Fleck (1986), p. 110, his italics.

<sup>23</sup> See Fleck (1979), p. 100 and Kuhn (1996), p. 205ff.

<sup>24</sup> Fleck (1979), p. 96.

<sup>25</sup> See Fleck (1979), p. 104 and Kuhn (1996), p. 10f.

<sup>26</sup> See Fleck (1979), pp. 54 and 104.

<sup>27</sup> See *ibid.*, p. 104 and Kuhn (1996), p. 111f.

<sup>28</sup> See Kuhn (1996), p. 85f.

<sup>29</sup> Kuhn himself has pointed out that the issue of gestalt-switches is an element of his theory for which he found support in Fleck’s monograph. He writes in the preface of the English translation of *Genesis and Development*: “The lines in the margin of my copy of the book [Fleck’s monograph, NM] suggest that I responded primarily to what had already been very much on my mind: changes in the gestalts in which nature presented itself, and the resulting difficulties in rendering “fact” independent of “point of view”.” Kuhn (1976) in: Fleck (1979), p. ix. See also Fleck (1979), p. 92.

An important role is ascribed to scientific literature – most of all to textbooks – read by adepts of a certain scientific field, in stabilising the system of shared values and knowledge.<sup>30</sup> Kuhn states: “To a remarkable extent the members of a given community will have absorbed the same literature and drawn similar lessons from it.”<sup>31</sup> Fleck only mentions textbooks in passing, stating that they are not that relevant.<sup>32</sup> His concern is more with “vademecum science” (“Handbuchwissenschaft”). And in this context he offers a somewhat more elaborate explanation than Kuhn of how scientific literature and the process of its production serve to form the opinion of the community.<sup>33</sup> The exchange of ideas between the members of the community via journal publications and their subsequent discussion within the community leads to the formation of new opinions. Interestingly, Fleck states that these ideas cannot be ascribed to a single author. In this way opinions become the product of the community itself in entering the shared vademecums (“Handbuch”) of the thought collective.<sup>34</sup>

We can find further similarities between Fleck and Kuhn in their descriptions of the behaviour of scientists when confronted with counter-evidence, and of scientists’ resistance to accepting a failure in the current system. Both authors point out that sticking to the prevalent belief system as long as possible is a central feature of scientific communities. Fleck claims that: “Once a structurally complete and closed system of opinions consisting of many details and relations has been formed, it offers constant resistance to anything that contradicts it.”<sup>35</sup> In a similar manner Kuhn writes: “Part of the answer, as obvious as it is important, can be discovered by noting first what scientists never do when confronted by even severe and prolonged anomalies. Though they may begin to lose faith and then to consider alternatives, they do not renounce the paradigm that has led them into crisis. They do not, that is, treat anomalies as counter-instances, though in the vocabulary of philosophy of science that is what they are.”<sup>36</sup> Both offer detailed descriptions of how scientists react when counter-evidence or anomalies arise.<sup>37</sup>

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<sup>30</sup> Nevertheless, there are also some essential differences between Fleck’s and Kuhn’s treatment of this issue. Contrary to Kuhn, Fleck shows in detail how changes in textbooks and thought styles accompany one another. For a detailed discussion on this point see Brorson / Andersen (2001).

<sup>31</sup> Kuhn (1977), p. 296.

<sup>32</sup> See Fleck (1979), p. 112.

<sup>33</sup> See *ibid.*, ch. 4, section 4.

<sup>34</sup> See *ibid.*, p. 119f.

<sup>35</sup> *Ibid.*, p. 27.

<sup>36</sup> Kuhn (1996), p. 77.

<sup>37</sup> See Fleck (1979), ch. 2, section 3, and Kuhn (1996), ch. 8.

The concepts of thought style and paradigm play a major role in explaining these characteristics of scientific communities. Fleck uses the term *thought style* to describe the feature that connects individuals in a group with shared knowledge, methods and communicative behaviour.<sup>38</sup> By contrast, Kuhn refers to the term *paradigm* – or *disciplinary matrix* as it is known in his later works.<sup>39</sup>

This reappearance of some of the central ideas of Fleck’s work in Kuhn’s writings is of course partly explained by Kuhn’s admission to having read Fleck’s book. Nevertheless, many of the aforementioned similarities are not the result of simply citing Fleck’s work. Actually, a short mentioning of Fleck in the preface of “The Structure of Scientific Revolutions”<sup>40</sup> is the only hint of the early Kuhn taking notice of Fleck’s work.<sup>41</sup> This means that the similarities revealed between the two authors are not conscious citations in *Structure*.

Setting aside speculation as to the omission of more concrete quotations from Fleck’s work, the overlap between the central concepts of both theories is quite interesting. Both – thought style and paradigm – occur in reciprocal<sup>42</sup> definitions in both theories: a certain community is characterised by a shared thought style or paradigm and thought styles or paradigms are constituted and maintained by certain communities. Accordingly, the community’s contribution to the work of an individual scientist consists in the thought style or paradigm at hand.<sup>43</sup> Kuhn explicitly says: “A paradigm is what the members of a scientific community, and they alone, share. Conversely, it is their possession of a common paradigm that constitutes a scientific community of a group of otherwise disparate men.”<sup>44</sup>

With regard to the aforementioned similarities between both theories, there is a strong temptation to put both concepts on the same level. One may even try to explain the differences away by emphasising that Fleck’s work was only available in German when Kuhn

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<sup>38</sup> See Fleck (1979), p. 99, his italics.

<sup>39</sup> This renaming was Kuhn’s reaction to his critics. Many critics stressed the point that Kuhn was not consistent in the use of the term *paradigm* in his book “The Structure of Scientific Revolutions”. Kuhn himself mentions this criticism in his “Postscript” which has been published as an appendix to the book since 1969. See Kuhn (1996), p. 181ff. He offers an elaborate version of the concept of a disciplinary matrix in Kuhn (1977), p. 297ff.

<sup>40</sup> In the text that follows I refer to this book by the term *Structure*.

<sup>41</sup> Kuhn writes: “[...] Ludwik Fleck’s almost unknown monograph, *Entstehung und Entwicklung einer wissenschaftlichen Tatsache* (Basel, 1935), an essay that anticipates many of my own ideas.” Kuhn (1996), pp. viii/ix.

<sup>42</sup> Kuhn even says “circular” definitions. See Kuhn (1996), p. 176.

<sup>43</sup> See, e.g. Fleck (1979), p. 39.

<sup>44</sup> Kuhn (1977), p. 294.

began to take notice of it. This view is partially supported by Kuhn himself, who later writes in the foreword of the English translation of Fleck's *Genesis and Development*: "At the time I found Fleck's German extraordinarily difficult, partly because mine was rusty and partly because I possessed neither the background nor the vocabulary to assimilate discussions of medicine and biochemistry, especially when viewed from the to me unknown and yet vaguely repulsive perspective of a sociology of the collective mind."<sup>45</sup> So, one may argue that perhaps the similarities are an expression of Kuhn's subconscious adaptation and translation of Fleck's ideas in his own language.

But it would be precipitant to equate both theories, as there are also some important differences. We can find some hints of this in Kuhn's foreword to Fleck's *Genesis and Development*. In particular, with respect to the term *thought collective* he says that "[...] I find the notion intrinsically misleading and a source of recurrent tension in Fleck's text."<sup>46</sup> It seems necessary to take a closer look at the disparities between both theories.

### 3 Substantial Differences

In this section I want to point out some of the main differences between Fleck's concept of thought style and Kuhn's concept of paradigm. With regard to the latter concept, we have to take into account Kuhn's development of his original ideas in his later works.

Reacting to the confusion over the term *paradigm* in *Structure*<sup>47</sup>, Kuhn refined his concept in his later works. In order to differentiate its two basic meanings, he renamed the wider concept *disciplinary matrix* (instead of *paradigm*) and left the original term to refer to narrower one. Due to this development, the following comparison of both authors refers to three different terms, namely *thought style*, *disciplinary matrix* and *paradigm*. The first aspect of inquiry focuses on conceptual differences between these three terms. But, as this differentiation plays a significant role only in the next section, I will afterwards speak about *paradigms* and omit the term *disciplinary matrix*. The reason for this consists in the fact that I will refer to both Kuhn's earlier and later works in the rest of this paper.

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<sup>45</sup> Kuhn (1976) in Fleck (1979), p. ix.

<sup>46</sup> Ibid., p. x.

<sup>47</sup> Kuhn mentions that a commentator has identified at least twenty-two different meanings of the concept in the original publication. See Kuhn (1977), p. 294.

### 3.1 Conceptual Issues

Concerning the notion of thought style, Fleck states that: “We can therefore *define thought style as [the readiness for] directed perception, with corresponding mental and objective assimilation of what has been so perceived.* It is characterized by common features in the problems of interest to a thought collective, by the judgements which the thought collective considers evident, and by the methods which it applies as means of cognition. The thought style may also be accompanied by a technical and literary style characteristic of the given system of knowledge.”<sup>48</sup> This definition makes clear that Fleck’s term is meant to cover more than a mere set of shared opinions. Rather, it combines several different issues shared by a thought collective. Most importantly, it is determining the choice of problems the community wants to investigate and how members handle these problems. In this respect a thought style becomes more a kind of *thought constraint*.<sup>49</sup> It defines what is of interest for a certain thought collective. “A fact always occurs in the context of the history of thought and is always the result of a definite thought style.”<sup>50</sup> Additionally, it is responsible for the disposition of the individual researcher to omit some characteristics of the examined entity.<sup>51</sup> In this way, thought styles restrict the field of research to certain features of problems. Kuhn mentions that this is also characteristic of the function of paradigms.<sup>52</sup>

Furthermore, a thought style contains shared methods and a certain technical and literary style. What does this mean? The notion of style is of great importance in Fleck’s concept. There are two related points here. Firstly, as was mentioned in the above quotation, there seems to be a certain style concerning the verbal expressions made by members of a thought collective. Fleck claims that: “Words as such do not have fixed meanings. They acquire their most proper sense only in some context or field of thought. This delicate shading of the meaning of a word can be perceived only after an “introduction,” whether historical or didactic.”<sup>53</sup> But there seems to be more connected to this than the mere usage of certain technical terms in different scientific fields. What is really meant by this statement can partially be grasped when one examines Fleck’s examples on the problem of translation

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<sup>48</sup> Fleck (1979), p. 99, his italics.

<sup>49</sup> See *ibid.*

<sup>50</sup> *Ibid.*, p. 95.

<sup>51</sup> See *ibid.*, p. 27.

<sup>52</sup> See Kuhn (1996), pp. 37, 111, 126.

<sup>53</sup> Fleck (1979), p. 53.

between historically different thought styles.<sup>54</sup> He writes that: “Words as such constitute a special medium of intercollective communication. Since all words bear a more or less distinctive coloring conforming to a given thought style, a character which changes during their passage from one collective to the next, they always undergo a certain change in their meaning as they circulate intercollectively.”<sup>55</sup>

But the concept of style is not only restricted to the verbal domain in Fleck’s theory. Secondly, he stresses a special kind of shared mood in his notion of style. Every thought collective is characterised by a certain mood that prevails when members of this collective meet.<sup>56</sup> With regard to the mood of modern natural sciences, Fleck points out that: “It [the specific intellectual mood, NM] is expressed as a common *reverence* for an ideal – the ideal of objective truth, clarity, and accuracy. It consists in the *belief* that what is being revered can be achieved only in the distant, perhaps infinitely distant future; in the *glorification* of dedicating oneself to its service; in a definite *hero worship* and a distinct *tradition*. This would be the keynote of the common mood in which the thought collective of natural science lives its life. No one already initiated would claim that scientific thinking is devoid of feeling.”<sup>57</sup>

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<sup>54</sup> Claus Zittel suggests that it is this aspect which can explain the problem of translation, Fleck mentions, between different thought styles. “One must not ignore the fact that Fleck’s concept of style is neither merely logically nor primarily socially (Porus, Harwood) but also aesthetically designed and is the result of a transfer of categories of style, taken from history of art into history of science. Non-propositional components, like feeling, mood and gestalt-perception, have a much bigger role in Fleck’s work [...]” [My translation from “Man darf nicht übersehen, dass Flecks Stilbegriff weder nur logisch aber auch nicht primär sozial (Porus, Harwood), sondern auch ästhetisch konzipiert ist und sich einer Überführung kunstgeschichtlicher Stil Kategorien [...] in die Wissenschaftsgeschichte verdankt. Nicht-propositional fassbare Komponenten wie Fühlen, Stimmung und Gestaltwahrnehmung haben bei Fleck einen weit größeren Anteil, [...]”] And: “By means of the impact of aesthetical elements the respective thought styles become incommensurable to one another and the possibilities of understanding are reduced or lost totally.” [My translation from “Durch den starken Anteil von ästhetischen Elementen werden die jeweiligen Denkstile tatsächlich untereinander inkommensurabel und die Verstehensmöglichkeiten entweder stark eingeschränkt oder gar dispensiert.”] Zittel in: Chołuj / Joerden (2007), pp. 461/ 462.

<sup>55</sup> Fleck (1979), p. 109. For Fleck’s discussion of change in meaning see also Fleck (1986), pp. 89-97. Here he points out that concepts used in thought collectives preceding current ones seem to consist of a set of different meanings which later have been differentiated. Some of these notions are still in use in the current scientific community, but others are only used metaphorically.

<sup>56</sup> See Fleck (1979), p. 44.

<sup>57</sup> *Ibid.*, p. 142, his italics.

In contrast to this, Kuhn seems to concentrate more on the shared *hard facts* of scientific work. He differentiates between three components of a disciplinary matrix: symbolic generalisations, models and exemplars, adding that there may be other components than just these.<sup>58</sup> To give a brief account of these components, one can say that symbolic generalisations provide a scientist with the syntax of his working field, while exemplars provide him with the semantics. On the one hand, symbolic generalisations can consist of formalised terms as well as of expressions of ordinary language. Therefore, Kuhn mentions as examples both “ $f = ma$ ” and “elements combine in constant proportion by weight”<sup>59</sup>. They are not only dual in their appearance but also dual in their function: “they function in part as laws but also in part as definitions of some of the symbols they deploy.”<sup>60</sup>

Exemplars, on the other hand, allow one to apply these generalisations to a concrete field of research. Roughly speaking, they connect symbols of laws and theories with empirical data. In his later works Kuhn reserves the original use of the term “paradigm” for these exemplars which he describes as “concrete problem solutions, accepted by the group as, in a quite usual sense, paradigmatic.”<sup>61</sup>

In contrast to his detailed discussion of the role of exemplars and their interaction with symbolic generalisations Kuhn only gives a rough sketch of his view about models. He says that they “provide the group with preferred analogies or when deeply held, with an ontology”<sup>62</sup>. Their role can either be heuristic or they are regarded as “the objects of metaphysical commitments”, e.g. “the heat of a body *is* the kinetic energy of its constituent particles”<sup>63</sup>. No doubt these qualifications regarding the components of a disciplinary matrix raise more questions than offer a satisfying answer about the nature of a scientific community’s shared features. Nevertheless, as this paper is devoted to a comparison between

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<sup>58</sup> See Kuhn (1977), p. 297ff. In his “Postscript” of 1969 Kuhn also mentions *values* – like accuracy, simplicity, consistency and so on – as another component of the disciplinary matrix. See Kuhn (1996), pp. 184/185. These are omitted in his later works. A reason for this might be the fact that values are not only shared within a certain community, but also belong to different paradigms. Kuhn already pays attention to this point in his “Postscript”, when he writes: “Usually they [the values, NM] are more widely shared among different communities than either symbolic generalizations or models, and they do much to provide a sense of community to natural scientists as a whole.” *Ibid.*, p. 184.

<sup>59</sup> Kuhn (1996), pp. 182/183.

<sup>60</sup> *Ibid.*, p. 183.

<sup>61</sup> Kuhn (1977), p. 298.

<sup>62</sup> *Ibid.*, pp. 297/298.

<sup>63</sup> *Ibid.*, p. 298.

Fleck and Kuhn and not so much to a clarification of Kuhn's theoretical ideas, I wish to focus on just one of these components – namely, on exemplars – and to ask whether anything of this sort can be found in Fleck's works.

Although, Fleck does not explicitly mention *exemplars* as a component of thought styles, there are some important similarities concerning the acquirement, functions and consequences which are characteristic of these problem solutions in Kuhn's theory and which are also characteristic of a community connected via a certain thought style.

Firstly, both authors stress the important role of education. As Kuhn mentions, exemplars are acquired during this formative period in a scientist's life.<sup>64</sup> In the same way Fleck points out that: "Introduction to a field of knowledge is a kind of initiation that is performed by others. It opens the door. But it is individual experience, which can only be acquired personally, that yields the capacity for active and independent cognition."<sup>65</sup> This resembles Kuhn's thesis on the necessity to work on examples during an individual's educational phase in order to get acquainted with a scientific field of interest.

Secondly, as a consequence of this educational phase students are able to perceive their chosen scientific domain in the same way that mature scientists do. Kuhn states that: "The resultant ability to see a variety of situations as like each other, as subjects for  $f = ma$  or some other symbolic generalization, is, I think, the main thing a student acquires by doing exemplary problems, whether with a pencil and paper or in a well-designed laboratory. After he has completed a certain number, which may vary widely from one individual to the next, he views the situations that confront him as a scientist in the same gestalt as other members of his specialists' group. [...] He has meanwhile assimilated a time-tested and group-licensed way of seeing."<sup>66</sup> Fleck describes this effect of education on students in a somewhat more metaphorical way: "The Holy Ghost as it were descends upon the novice, who will be able to see what has hitherto been invisible to him. Such is the result of the assimilation of a thought style."<sup>67</sup>

Moreover, both Fleck and Kuhn emphasise that the influence of a thought style or a paradigm on the individual's scientific work is not a conscious one. It is nothing that the individual can easily resist. While Fleck labels the influence of a thought style as "thought constraints", Kuhn states that noticing the similarities between different research activities is

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<sup>64</sup> See Kuhn (1996), p. 187.

<sup>65</sup> Fleck (1979), p. 96.

<sup>66</sup> Kuhn (1996), p. 189.

<sup>67</sup> Fleck (1979), p. 104.

an involuntary process which is not rule-based. “If it is [involuntary, NM], then we may not properly conceive of it as something we manage by applying rules and criteria. To speak of it in those terms implies that we have access to alternatives, that we might, for example, have disobeyed a rule, or misapplied a criterion, or experimented with some other way of seeing. Those, I take it, are just the sorts of things we cannot do.”<sup>68</sup>

Finally, besides the aforementioned differences in the notion of thought style and paradigm / disciplinary matrix, their consequences for an individual scientist are the same: By shaping our manner of perception they are responsible for the fact that scientists of different communities with different thought styles or paradigms live in different *worlds*. Moreover, they lead to a certain difficulty in communication between members of different communities. This fact is labelled “incommensurability” in Kuhn’s work, but also plays a significant role in Fleck’s theory.<sup>69</sup>

Returning to the differences between the two concepts, I suggest that these can – at least partly – be explained by the scope which the terms “thought style” and “paradigm / disciplinary matrix” are designed to cover.

### 3.2 Scope

In his investigation Kuhn exclusively considers scientific communities and, in this context, he restricts his interest to certain sciences. Paul Hoyningen-Huene describes in detail which domains fall within the scope of Kuhn’s theory, when he writes: “It is misleading even to say [...] that the issue of Kuhn’s theory is “scientific development,” for “the sciences” encompass more than the “hard science” with which Kuhn is actually concerned. This domain includes the natural sciences and the systematic social sciences; history and philosophy, including philosophy of science, are explicitly excluded. Kuhn’s theory also claims to address the biological sciences; though these are extremely underrepresented in his examples.”<sup>70</sup> Although some of the main characteristics of *scientific development* seem to be applicable to other domains of human life, Kuhn is reluctant to broaden his theory to cover such processes in other fields – e.g. politics or culture.<sup>71</sup> This restriction is because Kuhn wants to analyse the topic of scientific progress in his work. He is of the opinion that “it is only during periods of

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<sup>68</sup> Kuhn (1996), p. 194.

<sup>69</sup> In fact, Fleck himself uses the term of incommensurability to explain the problems of understanding between members of different thought styles. See Fleck (1979), p. 62.

<sup>70</sup> Hoyningen-Huene (1993), pp. 4/5.

<sup>71</sup> See Kuhn (1996), pp. 208/209.

normal science that progress seems both obvious and assured.”<sup>72</sup> But not all of the competing schools of the pre-paradigmatic period reach a state of normal science. In *Structure* Kuhn mentions some of the characteristics a scientific field must have so that his theory can be applied to it.<sup>73</sup> The methods of education and selecting objects of research are examples of these discriminating criteria.<sup>74</sup>

In contrast to this, Fleck’s concept of thought style is designed to cover all kinds of human cognitive life and, therefore, can be considered the more general account.<sup>75</sup> Even though most of his examples belong to the scientific domain, he points out that thought styles emerge from any kind of communicative interaction. The exchange of ideas between two persons is the essential aspect of a thought style’s constitution.<sup>76</sup> Therefore, the concept of thought style can be regarded as applicable to all kinds of cognitive life where this condition is met. Fleck states that: “We see professional and semiprofessional thought communities in commerce, military, sports, arts, politics, fashion, science, and religion.”<sup>77</sup> Here it becomes obvious that Fleck’s theory is not restricted to the scientific domain. Although written as an inquiry into the philosophy of science, his theses about social influences on cognition are also relevant for everyday life.

The greater versatility of Fleck’s theory is also evident in his discussion on an individual’s membership of different thought collectives at the same time. “As a research worker he is part of that community with which he works. [...] As a member of a political party, a social class, a nation, or even a race, he belongs to other collectives.”<sup>78</sup> Interestingly, through this conception of human cognitive life, Fleck’s theory – although, socially oriented – ascribes a significant role to the individual: it is in the mind of the individual where different thought styles mix – either in a fruitful and enriching way or in a silent and solitary way. So, Fleck points out that: “Something remains to be said about the individual’s belonging to several thought communities and acting as a vehicle for the inter-collective communication of

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<sup>72</sup> Ibid., p. 163. He also states that this does not imply that there is no progress in pre-paradigmatic phases. Rather, the problem which arises in these periods is that, by means of competition between different schools, the progress of each individual school is always called into question by its rivals.

<sup>73</sup> See *ibid.*, p. 168.

<sup>74</sup> See *ibid.*, pp. 164/165.

<sup>75</sup> You can see this when you take a look at the examples Fleck mentions for his concept of thought collective, the carrier of the thought style, see Fleck (1979), p. 102. Concerning the examples see *ibid.*, ft. 72.

<sup>76</sup> See Fleck (1979), p. 44.

<sup>77</sup> *Ibid.*, p. 107.

<sup>78</sup> *Ibid.*, p. 45.

thought. The stylized uniformity of his thinking as a social phenomenon is far more powerful than the logical construction of his thinking. Logically contradictory elements of individual thought do not even reach the stage of psychological contradiction, because they are separated from each other. Certain connections, for instance, are considered matters of faith and others of knowledge. Neither field influences the other, although logically not even such a separation can be justified. A person participates more often in several very divergent thought collectives than in several closely related ones.”<sup>79</sup> It is clear that Fleck thinks that the individual constitutes the link between different thought styles via his membership in different thought collectives.

Furthermore, in the same context we can find hints of what happens when different thought styles come into conflict with one another within the same person. Fleck assumes that a separation between styles can be sustained in the case that their differences are great enough. He claims that: “If thought styles are very different, their isolation can be preserved even in one and the same person. But if they are related, such isolation is difficult. The conflict between closely allied thought styles makes their coexistence within the individual impossible and sentences the person involved either to lack of productivity or to the creation of a special style on the borderline of the field.”<sup>80</sup> From this quotation one can see that Fleck admits the possibility that there may be a contradiction between the different thought styles that an individual is the bearer of. His concept of a harmony of illusions<sup>81</sup>, therefore, does not preclude such an insight. Nevertheless, the alternatives Fleck grants such an individual are not really desirable. Either the person becomes incapable of any (scientifically) useful action or he has to build up his own thought style and it is by no means clear whether he will find any adherents in this endeavour.

Kuhn suggests, with regard to the membership of the individual in different communities, that a certain person may belong to “[...] several such groups, either simultaneously or in succession.”<sup>82</sup> But, in contrast to Fleck, he does not mean the membership of an individual in communities from different domains. Instead of focussing on communities of different topics, as Fleck does, Kuhn thinks of participation in different subgroups of a particular scientific community. In this way, he takes into account the trend of

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<sup>79</sup> Ibid., p. 110.

<sup>80</sup> Ibid.

<sup>81</sup> See *ibid.*, ch. 2, section 3. Here he describes in detail how scientists behave when confronted with apparent counter-evidence.

<sup>82</sup> Kuhn (1977), p. 297.

specialisation within the sciences.<sup>83</sup> For example, a physicist as a member of the general physics community may also be a member of the radio astronomy community and so on. But Kuhn says nothing about the consequences for a shared paradigm by means of the individual's membership in such different subgroups, nor does he regard the individual as a kind of communicative link between them.

These differences concerning the scope of both theories have consequences on the chronological side of application and it is here that I want to compare Fleck's and Kuhn's theses next.

### 3.3 Synchronic vs. Diachronic Account

We have seen above that Fleck's theory has the broader scope. Additionally, it includes his theses on the lively exchange between the parts of one collective, respectively, between certain – though not all – different thought collectives. Despite this, there are similarities at the synchronic level, but major differences at the diachronic one when comparing Fleck's and Kuhn's accounts. The similarities have already been pointed out at the beginning of this paper so that, in the text that follows, I want to focus on differences at the diachronic level. The subject matter addressed here is the development of thought styles or paradigms.

Fleck argues for a *continuous process of development*. “The thought style is subject to independent development for generations.”<sup>84</sup> This is a consequence of his conception of how ideas circulate. The formation of a thought style is the result of this continuous communication and of the changes in meaning which are connected to this process. “Every pronouncement leaves behind either the solution or the problem, if only the problem of the problem's own rationality. The formulation of a problem already contains half its solution. Any future examination must return along existing thought tracks. The future will never be completely isolated from the past, whether normal or abnormal, except when a break with it occurs as the result of the rules characteristic of the thought structure in question.”<sup>85</sup> As a consequence of this Fleck states that: “A historical connection thus arises between thought styles. In the development of ideas, primitive pre-ideas often lead continuously to modern scientific concepts. Because such ideational developments form multiple ties with one another and are always related to the entire fund of knowledge of the thought collective, their actual

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<sup>83</sup> See *ibid.*, pp. 296/297.

<sup>84</sup> Fleck (1979), p. 99.

<sup>85</sup> *Ibid.*, p. 37.

expression in each particular case receives the imprint of uniqueness characteristic of a historic event.”<sup>86</sup>

Hence, there are no sudden breaks in the historical development of (scientific) thought styles for Fleck. In his description we find rather a continuous transformation of an existing style. The process of how this works – also within the lifespan of a single scientist – can be seen in his example of the development of the Wassermann reaction.<sup>87</sup> In this case study Fleck shows how the collective develops the idea of the initial scientists to maturity.<sup>88</sup> The experiments carried out by Wassermann, Neisser and Bruck were continued by their respective community until they arrived at some fruitful results. And, although Wassermann and his colleagues had started their endeavour with totally wrong assumptions, in the end they held the opinion that from the outset they had followed the idea that was ultimately proven. We find a kind of apparent self-deception in their behaviour. “The ultimate outcome of this research thus differed considerably from that intended. But after fifteen years an identification between results and intentions had taken place in Wassermann’s thinking. The meandering progress of development, in all stages of which he was certainly deeply involved, had become a straight, goal-directed path. How could it be otherwise? With the passing of time Wassermann amassed further experience, and as he did so lost the appreciation of his own errors.”<sup>89</sup> Such (personal) consequences of scientific progress might explain why Fleck does not integrate a concept of radical change into his theory.

The continuous model of development in which communication plays a major part can also account for the aforementioned self-deception of scientists. “Thoughts pass from one individual to another, each time a little transformed, for each individual can attach to them somewhat different associations. Strictly speaking, the receiver never understands the thought exactly in the way that the transmitter intended it to be understood. After a series of such encounters, practically nothing is left of the original content. Whose thought is it that continues to circulate? It is one that obviously belongs not to any single individual but to the collective. [...] After making several rounds within the community, a finding often returns considerably changed to its originator, who reconsiders it himself in quite a different light. He either does not recognize it as his own or believes, and this happens quite often, to have

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<sup>86</sup> Ibid., p. 100.

<sup>87</sup> See *ibid.*, ch. 3.

<sup>88</sup> See *ibid.*, p. 73.

<sup>89</sup> *Ibid.*, p. 76.

originally seen it in its present form.”<sup>90</sup> In this context Fleck also states that cognition alters its epistemic subject.<sup>91</sup> The individual adapts to the prevalent thought style or tradition of cognition. Therefore, radical changes are not an option for a scientist in Fleck’s account. As a result of these considerations we can ask the following open-ended questions: When does a *new* thought style arise? Does this ever happen? Or are we just confronted with a continually changing concept over a period of decades?

Fleck’s historiographic view also has some interesting consequences for the evaluation of formerly-held ideas and the developmental phases of thought styles. On his account old ideas or theories are not to be evaluated according to their truth or falsehood. “It is altogether unwise to proclaim any such stylized viewpoint, acknowledged and used to advantage by an entire thought collective, as “*truth or error.*” Some views advances knowledge and gave satisfaction. These were overtaken not because they were wrong but because thought develops. Nor will our opinions last forever, because there is probably no end to possible development of knowledge just as there is probably no limit to the development of other biological forms.”<sup>92</sup> For Fleck, truth is a category that only arises within the context of a given thought style, but not independently.<sup>93</sup> Accordingly, ideas which were formed in older thought styles cannot be evaluated on the basis of current knowledge. Hence, those ideas are neither right nor wrong. They were helpful at their time – that is all that can be said.

Contrary to this picture of continuity, Kuhn emphasises the fact that *scientific revolutions* are the key characteristic of the process of scientific development. His conception encompasses puzzle-solving normal sciences which are bound to a certain paradigm. During this period of normal sciences the accumulation of knowledge is possible within the boundaries of a paradigm.<sup>94</sup> Kuhn claims that: “Normal science, the puzzle-solving activity we have just examined, is a highly cumulative enterprise, eminently successful in its aim, the steady extension of the scope and precision of scientific knowledge.”<sup>95</sup>

But, contrary to Fleck, Kuhn is of the opinion that radical changes happen when the prevalent paradigm is called into question. The accumulation of anomalies<sup>96</sup> leads to the adoption of a completely new paradigm which is able to cover most of the old problems and

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<sup>90</sup> Ibid., pp. 42/43.

<sup>91</sup> See *ibid.*, pp. 86/87.

<sup>92</sup> Ibid., p. 64, his italics.

<sup>93</sup> See *ibid.*, p. 100.

<sup>94</sup> See Kuhn (1996), ch. 4.

<sup>95</sup> Ibid., p. 52.

also offers solutions for new ones.<sup>97</sup> This is what happens during a scientific revolution. He defines such a revolution in the following way: “[...] scientific revolutions are here taken to be those non-cumulative developmental episodes in which an older paradigm is replaced in whole or in part by an incompatible new one.”<sup>98</sup> Kuhn goes even so far to claim that the world in which the scientists live changes in its entirety after a scientific revolution.<sup>99</sup> He claims that: “The data themselves had changed.”<sup>100</sup> Accordingly, there are no essential connections between paradigms before and after such a revolutionary phase.<sup>101</sup>

As a first result we can state that Fleck’s theory involves a somewhat greater dependence on past developments for a certain thought style than is claimed in Kuhn’s account. In particular, Fleck’s concept of proto-ideas (“Ur Ideen”) gives rise to such an assumption.<sup>102</sup> “Proto-ideas must be regarded as developmental rudiments of modern theories and as originating form a socio-cognitive foundation.”<sup>103</sup> But it is not only this concept which reveals Fleck’s process-related thinking. We can also see this when he speaks about the development of a mature thought style. He points out that there are always ideas etc. that remain within a changed context. In this way older thought styles come in contact with new ones.<sup>104</sup> Therefore, we can say that Fleck’s conception can be described as a continuous process, whereas Kuhn’s model of scientific progress shows continuous phases but also clear breaks which separate past developments from new ones.

Closely linked to this chronological disparity is our next point of our comparison. It is the problem of understanding across community borders.

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<sup>96</sup> One should add that Kuhn is of the opinion that anomalies have to be of a certain kind to yield such a result. See *ibid.*, p. 82.

<sup>97</sup> See *ibid.*, pp. 17/18, 23, 66, 97, 205f.

<sup>98</sup> *Ibid.*, p. 92.

<sup>99</sup> See *ibid.*, ch. 10: pp. 111, 121/122.

<sup>100</sup> *Ibid.*, p. 135.

<sup>101</sup> One should add that there are some points in Kuhn’s work where he briefly mentions that there is something which remains constant even after a scientific revolution, but it is by no means clear what exactly he has in mind. See, e.g. Kuhn (2000), p. 36, and Kuhn (1996), pp. 25, 169.

<sup>102</sup> See Fleck (1979), ch. 2, section 2.

<sup>103</sup> *Ibid.*, p. 25.

<sup>104</sup> See *ibid.*, p. 100.

### 3.4 Communication and Problems of Understanding

Both authors discuss the problem of understanding which members of different communities are confronted with when they mingle with each other – either directly in conversations or indirectly by reading each other’s works.

Communication plays a major role in Fleck’s theory. He describes in detail what happens when an idea or thought circulates within the same thought collective or between different groups. The first case is called “intracollective communication”. A special feature of this is that it leads to corroboration. Fleck claims that: “[...] the longer a thought has been conveyed *within the same thought collective*, the more certain it appears.”<sup>105</sup> The communication of an idea from an expert to a layman also means simplifying the content of the thought, to adapt it to the assumed level of background knowledge of the recipient. As a consequence, contradictory elements are eliminated during this process.<sup>106</sup> Fleck names three different kinds of intracollective communicative acts.<sup>107</sup> The first one is called “popularization”. This is of the kind we have just described. “Legitimization” is the second one. This is what happens when an idea or statement of an individual scientist is discussed within a community of experts. During this process the idea is adjusted to the prevalent thought style. Any tentativeness with which it was originally formulated by an individual scientist gets lost. Last but not least, Fleck mentions “information” as a further category of intracollective communication. In this case, experts communicate directly with one another. They spread their knowledge in order to inform their colleagues. This kind of communication is, according to Fleck, not so important in scientific practice. Why do we view these different kinds of intracollective communicative acts under the heading of comprehension?

The point is that in these cases we are confronted with changes in meaning. An idea circulating within the collective almost never remains completely the same.<sup>108</sup> A change in meaning becomes problematic when it comes to communicative acts between different thought collectives. This kind of communication is called “intercollective” by Fleck. “When transferred to another collective, the idea undergoes various vicissitudes. It becomes a mystical, inconceivable motive around which a deep cult (*apotheosis of the thought*) is grouped. In other cases it becomes ridiculous and undergoes scoffing (*caricaturing of the thought*). It predominantly fertilizes and enriches the alien style, while being altered and

<sup>105</sup> Ibid., p. 106, his italics.

<sup>106</sup> See ibid., pp. 112/113.

<sup>107</sup> See Fleck (1986), pp. 86/87.

<sup>108</sup> We have remarked on this already with regard to the problem of self-deception in the last section.

assimilated: the content changes sometimes beyond recognition, even if the word has remained unchanged. May I give as an example the word and notion of ‘race’, which has been transferred from the natural-sciences or anthropological style to the political one.”<sup>109</sup> The reward of enriching a different thought style and the risk of being completely misunderstood are inseparably connected when a scientist tries to communicate his ideas to a member of a different collective.

In general we can say that for Fleck, problems of translation between different thought styles are a gradual matter, ranging “from a minor change in coloration, through an almost complete change of meaning, to the destruction of all sense.”<sup>110</sup> How serious communication problems become depends on the distance between the two different thought styles in question. The farther away two thought styles are from one another, the more problematic the communication between them becomes. This aspect of distance is meant both chronologically and spatially by Fleck – i.e., as regards content. The latter aspect arises because of the diversity of thought styles in each realm of human cognitive life. Fleck writes: “The principles of an alien collective are, if noticed at all, felt to be arbitrary and their possible legitimacy as begging the question. The alien way of thought seems like mysticism. The questions it rejects will often be regarded as the most important ones, its explanations as proving nothing or as missing the point, its problems as often unimportant or meaningless trivialities. Depending upon the relation between the collectives, single facts and concepts are considered either free inventions, which scientists simply ignore like, for instance, “psychic facts” [*spiritistische Tatsachen*]. Less divergent collectives, alternatively, may produce only different interpretations, translations into another dialect of thought [...].”<sup>111</sup>

Fleck discusses the difficulties of translation both on the synchronic and the diachronic<sup>112</sup> level. On the synchronic level the problems of translation are not so bad if we are confronted with collectives that are not very divergent with regard to their subject matter – e.g. physics and one of its special fields (e.g. quantum mechanics) or mathematics and logic in

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<sup>109</sup> Fleck (1986), p. 88, his italics.

<sup>110</sup> Fleck (1979), p. 110.

<sup>111</sup> *Ibid.*, p. 109.

<sup>112</sup> The diachronic aspect can, for example, be found in Fleck’s discussion of historical anatomical pictures. In this context he states: “During each period with its own characteristic style the concepts used were absolutely clear, since clarity is based upon reducibility to other stylized concepts. Despite this clarity, direct communication between the adherents of different thought styles is impossible. How is the ancient anatomical term “bosom” [*Schoss*], for instance, to be translated into a modern one?” *Ibid.*, p. 36.

philosophy and so on. On the diachronic level the problem of translation becomes more significant the bigger the time gap in the formation of two collectives. To grasp this, Fleck suggests comparing medical papers.<sup>113</sup>

I want to mention one final aspect concerning his treatment of the problem of comprehension which arises in the context of his analysis of medical thought styles. Discussing Joseph Löw's works (from 1815) on urine as a means of medical diagnosis, Fleck comes to the conclusion that it is difficult to find similarities between Löw's concept of phosphorus (as an ingredient of urine) and the one prevalent in Fleck's time – about hundred years later. Nevertheless, as the time lag between both styles is not too wide, both concepts also seem to have something in common. To capture this, Fleck introduces the concept of a motif. "It would be well to borrow the word "motif" from the field for art and speak of an *identity of some motifs of both configurations*. Both the source and the special relation to fire and smell would thus be common motifs, which occur both in Löw and in the modern scientific concept of phosphorus."<sup>114</sup> Hence, *motif* is the second concept Fleck borrows from art history.<sup>115</sup>

Tackling the same problem of comprehension and translation, Kuhn introduces his famous and also problematic concept of *incommensurability*. Borrowing this term from mathematics, he uses it in a metaphorical way to describe the fact that the meanings of scientific terms are mostly theory-dependent and, after a change in theories has occurred, a translation of all old terms into the vocabulary of the new theory is impossible.<sup>116</sup> One must add that Kuhn's concept of incommensurability has undergone a certain development in his writings. In his early works – especially in *Structure* – he applies the term to other elements of a changing paradigm, e.g. to methods, problem-fields, and standards of solution.<sup>117</sup> In the footnote of a later paper on incommensurability Kuhn points out that he no longer wants to take this broad meaning, but wants to restrict the term to language and to "necessary consequences of the language-learning-process"<sup>118</sup> where this can involve the aforementioned elements (i.e., methods, problem-fields, and standards of solution).

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<sup>113</sup> See *ibid.*, p. 127.

<sup>114</sup> *Ibid.*, p. 130, his italics.

<sup>115</sup> The other one is *style* as Zittel has pointed out. Compare ft. 54 in this text.

<sup>116</sup> See Kuhn (2000), p. 34.

<sup>117</sup> See Kuhn (1996), p. 103.

<sup>118</sup> Kuhn (2000), p. 34, ft. 2.

There is another interesting point to be picked out here concerning the development of Kuhn's theory: Originally the concept of incommensurability was introduced by Kuhn to describe the problem of understanding resulting from a scientific revolution by a change of paradigms. This means that incommensurability only appears at the diachronic level. But the restriction of the term to mere language problems in Kuhn's later writings broadens the extension of this term, i.e., it is also applicable at the synchronic level, as the problem of incommensurability can also arise between natural languages in the process of everyday translations.<sup>119</sup>

But for the sake of argument, putting these details aside, it is obvious that Kuhn, contrary to Fleck, discusses this topic concerning the scientific domain only in a diachronic way. He just talks about problems which arise in translations of statements of theoretical results between members of paradigms that follow one another in development.<sup>120</sup>

#### **4 Conclusion**

The above comparison between Fleck's concept of thought style and Kuhn's concept of paradigm can only be taken as a rough outline. Yet in this rather introductory inquiry it is obvious that there are several important differences between both theories on a number of different levels.

On the one hand, in Fleck's theory the influence of the social is seen to be more widespread, because thought styles do not only apply to the realm of science but also to ordinary life, and more constant, because the development of a certain thought style seems to take place steadily from a pre-scientific to a mature scientific period. And if we take into account that thought styles are not restricted to the scientific world, this also means that *facts* in everyday life have the same developmental history. "Knowledge exists in the collective and is continually being revised. The store of facts also changes."<sup>121</sup>

On the other hand, Kuhn's concept of a paradigm is devoted to the natural sciences. Such a paradigm changes rapidly during a revolutionary stage. Taking this into account, it can be argued that the constructive influence of the social on an individual's cognition is comparatively greater in Fleck's theory than it is in Kuhn's. It is interesting to ask what the consequences are of the stated differences with regard to the metaphysical commitments both authors have to subscribe to, i.e., the existence of an outside world which is independent of

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<sup>119</sup> See *ibid.*, pp. 48/49.

<sup>120</sup> See Kuhn (1996), pp. 148/149.

<sup>121</sup> Fleck (1979), p. 95.

theoretical considerations predetermined by the scientific community the individual researcher belongs to. What stance do both philosophers take with regard to social constructivism? This question is left open for further investigation.

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