Fitch's paradox:
Two attempts to rescue Tennant's proposal from the threat of ad hocness

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Abstract

Fitch's paradox is problematic to any philosopher that claims the truth to be independent of us. Neil Tennant has proposed a solution to this paradox, which has been criticized in many ways. One is that the proposal is ad hoc. In this thesis I will examine two attempts to save the proposal from that criticism. First, Tennant himself has suggested that there is a general pattern for thesis restrictions when a counterexample is found, and he claims that his proposal is an instance of that pattern. In this paper I will show that Tennant fails to save his own theory, simply because the suggested pattern does not generate proper theories but mere tautologies that are necessarily true - which is a catastrophy to any theory that wants to claim something new. Second, Igor Douven has argued that Tennant's proposal is equivalent to a principled one, an therefore is rescued from the threat of ad hocness. I will not deny that the two versions are equivalent, but that Douven's is principled. More exactly, I will show that the one proposed by Douven is less principled than Tennant's original one.

Contents

1 Introduction

Two answers are stressed to the question of what truth is. First, the world and all truths that it consists in, exist independently of us and of our descriptions of them. This answer is called *realism*, simply because it claims the truths to be *real* and objective. The second answer is that the truths are somehow affected by how we think about and describe the world. This view is called *anti-realism*. This thesis will deal with anti-realism.

A certain kind of anti-realism is *verificationism*. This is an idea that springs out of the Vienna circle; they said that a proposition is meaningful if and only if it is verifiable. Verificationism is the view that a proposition that is true must be verifiable; from now on I will use the terms anti-realism and verificationism as synonyms.

Now what do anti-realists say about knowledge? Well, knowledge is (simplified) justified, true belief. Since justification and verification is synonymous, and truth is that which is verifiable, the definition of knowledge given above could be shortened into just justified belief (according to the anti-realist). Since both the justifying and the believing are personal attitudes, there is no problem in claiming that an agent that is able to verify something, is also able to believe it. It follows that anything that is true, is also

verifiable and believable, and therefore knowable. Shortened, the anti-realist thesis on knowledge says that:

$$p \rightarrow \Diamond Kp \tag{1}$$

That is, if something is true, say "the sun shines", then it is possible (for someone, at sometime) to achieve knowledge that "the sun shines".

This holds, according to the anti-realist, for any statement, such as: "there is a computer standing on my desk", "there exists life on an exoplanet" or "a certain piece of roman pottery existed once in Pompeii but was ruined when the city was buried". For all of these statements, the anti-realist claims that, if the statement is true, then it is possible for someone at some time to achieve knowledge of it. I am a perfect example of an agent who - preferably right now - can know that there is a computer standing on my desk. Sometime in the future, some astrobiologist may know that there existed life on an exoplanet at our time, if that is true. And of course there may have been a roman citizen that saw how the roman pottery was destroyed, if that was the case.

A problem for the anti-realist who endorses (1) is a deduction first performed by Frederic Fitch[4] in his *A Logical Analysis of Some Value Concepts* from 1963. There he shows that (1) logically falls into the following, much less intuitive thesis:

$$p \rightarrow Kp \tag{2}$$

That is, if something is true, say "there was a spider in my bathroom yesterday", then someone at sometime will actually know that "there was a spider in my bathroom yesterday".

A defender of (2) will have a lot to explain, in view of the example "there exists life on an exoplanet" given above. The initial anti-realist thesis (1) was rescued by saying: sometime in the future there *can* exist a scientist who knows that "there exists life on an exoplanet". But according to (2) there *will* actually exist an agent who knows that "there exists life on an exoplanet". That is a much stronger claim, and therefore the deduction by Fitch is a big problem to the anti-realist.

I will give a more formal version of Fitch's paradox in section 2. In the next one, I will present a possible solution to it, namely Tennant's proposal. The issue of the thesis concerns the question whether this proposal is independently principled, why that will be the crucial theme in section 3 also.

Section 4 will consist in a critizism put forward by Hand and Kvanvig on Tennant's proposal. They have put words on the suspicion that the solution to Fitch's paradox in fact is ad hoc. Tennant will reply on this critizism in section 5. And since Igor Douven is not satisfied with Tennant's defense, or the proposal in general, he tries to improve it in section 6.

Section 7 consists in a discussion, where I will not judge whether the proposal is ad hoc or not. The reason is that a part of my conclusion will be that a certain argument is important for such a judgement - and since my thesis does not focus on that exact argument, it would be to bite off more than I can chew, to make such a judgement. But I will argue, first, a matter that actually has not been brought up in the debate yet, namely the question whether Tennant's proposal is *scientifically progressive* at all - that is, if it predicts any new empirical facts. If it does not, it is an unscientific theory. Examining that matter, I will establish that Tennant's defense, presented in section 5, implies the proposal to be a mere tautology. Furthermore, I will determine what conditions Tennant's proposal must fulfill to be scientific. Second, I will argue that Douven's argument also fails in its purpose; I will claim that it is even counterproductive and makes Tennant's proposal even more ad hoc. In section 8 I will give a summary of my thesis.

2 Fitch's paradox

When assuming that any true proposition p is knowable, one can derive that any true proposition p is actually known. This result is called Fitch's paradox, and now we will give it a closer look. We will derive (2) from the one premise (1). In short, the paradox arises when one assumes the existence of propositions of the form:

p is true but unknown.

According to (1), it is possible to achieve knowledge of such a proposition. But if it becomes known, two things will be known: first, that p, and second, that no one knows that p. This is a contradiction. Thus our assumption fail; its negation is true. So we have that:

There is no p such that p is true but unknown.

This is equivalent with:

If p, then p is known.

But that is exactly (2), so from (1) we have derived (2). More formally, the deduction goes as follows. Three extraordinary logical rules are used. These are:

(i) $Kp \to p$, that is, if someone knows that p, then p is true.

(ii) $K(p \wedge q) \to (Kp \wedge Kq)$, that is, knowledge of a conjunction implies knowledge of each conjunct.

(iii) $\Diamond\bot \to \bot$, that is, if a logical contradiction is possible, then we have an actual contradiction.

When, in the following, we derive (2) from (1), the rule (i) is used in row 5, rule (ii) in row 4 and rule (iii) in row 7.

1	$p \to \Diamond Kp$	
2		$p \wedge \neg Kp$
3		$\Diamond K(p \wedge \neg Kp)$
4		$\Diamond(Kp \wedge K\neg Kp)$
5		$\Diamond(Kp \wedge \neg Kp)$
6		$\Diamond\bot$
7		$\bot$
8	$\neg(p \wedge \neg Kp)$	
9	$p \to Kp$	

Therefore, the anti-realist is committed to endorse (2) also. The anti-realist now has to either accept the conlusion or disqualify the deduction, in order to save anti-realism from the effects made by Fitch. But since the paradox is valid in classical logic the latter option seems to be a hard path to take.

Suggestions in this direction are made though: Williamson[14] proposes that intuitionistic logic is the right one, and claims that Fitch's paradox is

not valid there. Though this may be true, one can still deduce that there is no truth that is not known, and this rejection of our non-omniscience as a society seems bad enough. Here, we shall focus on the anti-realist that, opposed to Williamson, accepts the deduction in Fitch's paradox. He has three options:

(i) Abandon anti-realism.

(ii) Endorse Fitch's paradox with all its implications. That is to say that (2) is the case. This option is of course possible, but as we saw in the introduction, the view implies that any true sentence (for instance there could be a true sentence like: "there was a spider in my bathroom yesterday") was, is or will actually be known by someone. This seems implausible, and the anti-realist who chooses this path seems to have a lot to explain.

(iii) Modify the initial anti-realism so that Fitch's paradox no longer has any effect upon it.

In this thesis, we will consider (ii) as an absurd position, and since (i) is basically to give up, there is only (iii) left. For example, Edgington[3] has suggested a new interpretation of (1) which only concerns truths in *actual situations*. There is no actual situation where a proposition like "the sun shines, but no one knows it" can be known, since the actual situation where it was true will disappear in the same moment, and so the paradox is solved. But Williamson[15] has pointed out that this restriction is too strong, since contingent truths that the anti-realist wants to be knowable, are rejected in Edgington's analysis.

Another suggestion for solving the paradox, by restricting the initial anti-realist thesis so that it escapes Fitch's results, is made by Neil Tennant. In short, he proposes that only those truths, which in case of their being known do not lead to a contradiction, can be known. That this restriction really solves the paradox is not completely accepted; both Williamson[16] and Van Benthem[13] have presented counterexamples that are true and whose being known do not lead to contradictions, but still are not knowable in Tennant's new anti-realism. While Van Benthem requires the use of the more dynamic operator *learnable* instead of knowable, to succeed with his example, and therefore hits his target only in that particular interpretation, Williamson's

counterexample has emerged by a logical mistake made by himself, as has been pointed out by Tennant[11] and established by myself[6].

A more difficult criticism for Tennant's proposal is that it is ad hoc. At a first sight his suggestion seems to be no more than to stick with the original thesis, but to exclude those truths that imply problems. Such a restriction would clearly be ad hoc, but fortunately there is more to it. The theme of this thesis concerns wheter Tennant succeeds in escaping this problem or not.

3 Tennant's proposal

The proposal was presented first in Tennant's[10] *The Taming of the True* (mainly chapter 8). As mentioned, he restricts (1) so that it ranges over certain truths only. The propositions that are included in his new anti-realism are those which are not only true but also *cartesian*. That a proposition p is cartesian means that:

$$Kp \text{ is consistent}$$

When this new property of propositions is introduced, Tennant restricts anti-realism in the following way:

$$p \rightarrow \Diamond Kp, \text{ if } Kp \text{ is consistent} \tag{3}$$

That is, if p is true and cartesian, then p is knowable. To see that this restriction solves the paradox, we will have a look at the deduction where Fitch's paradox emerged, once again. Obviously, it is crucial to the paradox that we assume that there exists propositions of the form:

p is true but unknown.

Later, we apply (1) on this proposition and get the strange knowledge that no one knows etc.. This is where the paradox arise. But in Tennant's restricted anti-realism, this step is not valid, since propositions must be both true and cartesian to be knowable, and the propositions of the form given above are not cartesian. Actually, this is exactly what Fitch's paradox shows, but for convenience, let us see it again:

1	$K(p \wedge \neg Kp)$
2	$Kp \wedge K\neg Kp$
3	$Kp \wedge \neg Kp$
4	$\bot$

That's how Tennant solves this particular path of Fitch's paradox. To show that it really is impossible to deduce it, other methods have to be used, but that is not the purpose of this paper. Here, we will examine if Tennant's proposal is independently principled. He claims that it is; before he presents his proposal, he expresses that his mission is to[10] (page 246):

> ...restrict the principle (the anti-realist thesis) in a principled way, so that the argument (Fitch's paradox) cannot make use of the principle in the way it needs to...
>
> (My parentheses.)

Tennant seems conscious of the fact that his theory will be accused for being ad hoc, and therefore he already at the beginning points out that his ambition is to restrict the anti-realist thesis *in a principled way*. To do this, he tries to show that restrictions of the same sort will solve problems, not only concerning knowledge, but concerning two other personal attitudes towards propositions too, namely, *believing* and *wondering whether*. He means that this large amount of areas of use, shows that his solution is neutral with respect to the debate between realists and anti-realists, and therefore is independently principled. First, we will examine his proposal with respect to the concept of believing.

Following the analogy, Tennant[10](pages 247-252) assumes that:

$$p \rightarrow \Diamond Bp \tag{4}$$

This is of course meant to be the counterpart to (1), the anti-realist thesis. What it says is that, if p, then it is possible to believe that p. Thus, B is simply the operator that expresses that an agent, at sometime, believes that etc.. Like (1), (4) seems to be plausible, but Tennant will, with the aid of some logical rules, show that (4) causes propositions of the following sort to be impossible:

$$p \wedge \neg Bp \tag{5}$$

That (5) is impossible means that, there is no p such that no one believes or will believe that p. This conclusion is the counterpart of (2). And like (2), (5) simply is not acceptable. And for the same reasons too, of course there could have been a spider crawling around in my bathroom yesterday, without me or anybody else believing "there is a spider in my bathroom". Later, Tennant will come up with his solution to both Fitch's paradox, and this problem concerning believing.

To show that there is a problem in the first place, he cannot use the same logical rules as was used in Fitch's paradox, with K exchanged for B only, since the rule $Bp \rightarrow p$ is simply wrong; that someone believes that God exists does not imply that He does. Therefore, Tennant has to take another path to show that (4) and (5) are incompatible. This path is directed by the following logical inventions[10] (pages 247-248):

(i) *Rational commitment.* If $(p_1, ..., p_n) \rightarrow p$ and $Bp_1, ..., Bp_n$, then Bp. For instance, say that the both propositions "the sun shines" and "if the sun shines, the day is warm" together imply that "the day is warm". Then, if I believe that "the sun shines" and believe that "if the sun shines, the day is warm", I am committed to believe that "the day is warm" also. It would be irrational if I did not.

(ii) *Rule of credibility.* If $Bp, p \rightarrow \bot$, then $Bp \rightarrow \bot$. For instance, if the two propositions "there exists no belief" and "I believe that 'there exists no belief' " imply a contradiction, then "I believe that 'there exists no belief' " implies a contradiction by itself.

(iii) *Self-intimation.* If an agent possess an arbitrary attitude A towards p, then he or she believes that he or she does. Both $Ap \rightarrow BAp$ and $\neg Ap \rightarrow B\neg Ap$ holds. In the case of knowledge, this implies that, if I know p say, then I believe that I know p also. On the other hand, if I do not know p, then I believe that I do not know p. (This third rule is not used in the case of believing, but when the counterpart to Fitch's paradox is deduced for the case of *wondering whether*. The reason why it is still presented here, is that the rule itself concerns believing.)

Now Tennant has the tools to make an analogue[10] (pages 251-252) to Fitch's paradox for believing. As in the case of knowledge, Tennant assumes

that (4) holds. With his new rules, he will show that (5) leads to a contradiction. Just like Fitch does, Tennant applies (4) on (5), and gets the result that it is possible that:

> Someone believes both that p and that no one will ever believe that p.

For instance, say that: "I believe both that 'God exists' and that no one will ever believe that 'God exists' ". Something seems suspicious already, but let us clear it out. The rule *rational commitment* says that I am committed to believe any conclusion that can be drawn inside my large cluster of beliefs. In this case, the conclusion 'God exists' can be drawn, and I am therefore committed to believe that He does. Furthermore, the *rule of credibility* says that if a proposition together with the fact that someone believes in it imply a contradiction, then the believing act in question leads to a contradiction by itself. And in our example this is actually the case, since my believing that "God exists", which I as we saw was committed to, contradicts the latter conjunct in the original proposition, namely that "no one will ever believe that 'God exists' ". Therefore, (when (4) is applied) the assumption (5) implies a contradiction, and so must be false. More formally, the argument goes as follows:

1		$(p \wedge \neg Bp)$
2		$B(p \wedge \neg Bp)$
3		$(p \wedge \neg Bp)$
4		p
5		$(p \wedge \neg Bp) \rightarrow p$
6		Bp
7		$(p \wedge \neg Bp)$
8		$\neg Bp$
9		Bp
10		$\perp$
11		$\neg(p \wedge \neg Bp)$
12		$(p \wedge \neg Bp)$
13		$\perp$
14	$B(p \wedge \neg Bp) \rightarrow \perp$	

6 is a result of 2, 5 and *rational commitment*. 14 is a result of 1, 2, 13 and the *rule of credibility*.

The conclusion is, as in Fitch's paradox, that if a certain proposition is true, then it is believed. This is of course highly implausible and must be avoided. To do this, Tennnant suggests a restriction to the initial assumption (4), namely:

$$p \rightarrow \Diamond Bp, \text{ if } Bp \text{ is consistent} \tag{6}$$

That this restriction solves the new "believing-paradox" is clear. The actual conclusion in the formal argument given above is that the belief in that certain proposition, namely (5), implied a contradiction. Therefore, we cannot apply the new (6) on (5), and so the paradox will never emerge.

The next analogue to Fitch's paradox is constructed by Tennant within the concept *wondering whether*(pages 252-259). For instance, when an agent

does not know that "God exists" he or she is in the position to *wonder whether* "God exists" or not. We shall use the operator W to indicate that someone, at some time, wonders whether. As in the case of believing, Tennant assumes the counterpart to the original anti-realist thesis:

$$p \rightarrow \Diamond Wp \tag{7}$$

That is, if p is true, then it is possible that someone, at some time, wonders whether p. This rule and this concept are extra important for Tennant, since he claims that they are neutral in the debate between anti-realists and realists. And if they are, his proposal that solves the paradox similar to Fitch's, will be valuable also to the realist, which in turn makes it more principled. But the procedure is the same, Tennant will deduce that (7) together with the truth of "there is a spider in my bathroom" implies that someone, at some time, actually wonders whether "there is a spider in my bathroom" (and later on, he will solve this paradox). The proposition he will use is, as before, of the form:

$$p \wedge \neg Wp \tag{8}$$

That is, there is a p that is true but of which no one will ever wonder whether. The negation of this, that will be deduced, is, there is no p such that, p is true and no one will ever wonder whether p. Tennant will later avoid this conclusion with another restriction similar to his solution to Fitch's paradox. But first, we will examine how the problem arise in the case of wondering whether. For this, further logical inventions are needed, except for those already introduced. These are[10] (pages 253-254):

(i) *(WB)*. Wp is inconsistent with Bp. This rule says that it is not rational to both believe that p and wonder whether p at the same time.

(ii) *(WB¬)*. $B\neg p$ is inconsistent with $W(p \wedge q)$, and similarly, Bp is inconsistent with $W(\neg p \wedge q)$. If the agent believes that "God exists" it is irrational for him or her to wonder whether " 'God exists' and 'there is a spider in my bathroom' ", since such a proposition demands that *both* conjuncts are true, which is already rejected by the atheist agent.

(iii) *(W¬B)*. $\neg Bp, W(p \wedge q) \rightarrow Wp$. That is, if an agent doesn't believe that p at the same time as he or she wonders whether $p \wedge q$, then he or she is actually wondering whether p.

With the aid of these new rules, Tennant shows that $W(p \wedge \neg Wp)$ leads to an inconsistency[10] (page 255). The first assumption is that:

> Someone wonders whether, p and no one will ever wonder whether p.

Now, if it is the case that someone, at sometime, believes, believed or will believe that p, then he or she can not wonder whether p, by rule *(WB)*. But is it possible for him or her to not wonder whether p? No, the fact that the agent does not wonder whether p implies that the agent believes in that he or she does not wonder whether p, by *self-intimation*, and this, together with the assumption that the agent believes that p implies by *rational commitment* that:

> The agent believes that, both p and that no one will ever wonder whether p.

This, combined with the first assumption and the rule *(WB)*, implies that the agent in the first assumption will never believe that p. But he or she will wonder whether p, as a result of the first assumption and *(W¬B)*. And again, wondering whether p implies that the agent believes that he or she is wondering whether p, by *self-intimation*. But this in turn contradicts the fact that he or she wonders whether, p and no one will ever wonder whether p, by *(WB¬)*. Thus, $W(p \wedge \neg Wp)$ leads to an inconsistency. More formally, the argument goes as follows:

1	$W(p \wedge \neg Wp)$	
2		Bp
3			Wp
4			$\bot$
5		$\neg Wp$
6		$B\neg Wp$
7		$B(p \wedge \neg Wp)$
8		$\bot$
9	$\neg Bp$	
10	Wp	
11	BWp	
12	$\bot$	

4 is the result of 2, 3 and *(WB)*. 6 is the result of 5 and *self-intimation*. 7 is the result of 2, 6 and *rational commitment*. 8 is from 1, 7 and *(WB)*. 10 is from 1, 9 and *(W¬B)*. 11 is from 10 and (SI). 12 is from 1, 11 and *(WB¬)*.

Thus, if (7) is true, (8) can not be, since they imply a possible contradiction (which is interpreted as an actual contradiction here). That is to say that, if p is true, then someone, at sometime, will wonder whether p. This is problematic for the same reasons as was presented in the cases of *knowing* and *believing*. Of course there can be true propositions of which no one will ever even wonder whether. But the conclusion of this paradox concerning *wondering whether* is that such propositions can not exist.

Not surprisingly, Tennant proposes a solution to this paradox also. And it is, of course, similar to the ones presented in the two other cases. His new proposal for wondering whether is:

$$p \rightarrow \Diamond Wp, \text{ if } Wp \text{ is consistent} \tag{9}$$

The paradox is solved, since the proposition that was used when the paradox emerged, is exactly one of them that are excluded in (9). To sum-

marize, Tennant[10] has established that there are counterexamples to the three following rules:

(i) $p \rightarrow \Diamond Wp$

(ii) $p \rightarrow \Diamond Bp$

(iii) $p \rightarrow \Diamond Kp$

In his opinion they should all be restricted in the same way, namely:

(i) $p \rightarrow \Diamond Wp$, if Wp is consistent.

(ii) $p \rightarrow \Diamond Bp$, if Bp is consistent.

(iii) $p \rightarrow \Diamond Kp$, if Kp is consistent.

These three analogues makes his proposal for solving the knowability paradox more principled, according to Tennant. That claim has been rejected by DeVidi and Kenyon[1]; this part of the debate will not be discussed here though. Another criticism that can be raised against Tennant is closely related to the notion of *cartesianity*. Before we examine the criticism, we will look at the concept itself. The definition has already been given, but what does *any proposition p where Kp doesn't lead to inconsistency* mean? Which propositions are excluded? Tennant gives an answer to that question[10] (pages 272-273):

> There are three broad kinds of anti-Cartesian proposition ϕ, corresponding to the kind of reason why knowledge that ϕ is impossible.
>
> First, the proposition ϕ itself may be inconsistent; whence the proposition that ϕ is known will be inconsistent. So, for example, any compound proposition of the form $(\phi \wedge \neg\phi)$ is anti-Cartesian.
>
> Secondly, knowledge of a (consistent) proposition ϕ may be impossible because the very act of considering or judging (falsely) that ϕ requires the falsity of (some consequence of) ϕ. A *fortiori* the proposition that ϕ is known is inconsistent. It is in this way that the proposition that no thinkers exist is anti-Cartesian.

> Thirdly, the proposition that ϕ is known may be logically inconsistent because of its own overall logical structure, involving iterations of K (and perhaps of other attitudes). Thus for any ϕ the proposition $(\phi \wedge \neg K\phi)$ is such that *that* $(\phi \wedge \neg K\phi)$ *is known* turns out to be logically inconsistent...

This list will be given again in the next section, where Hand and Kvanvig use it against Tennant. Thereby one can think that the proposal would cope as well without such a list, but that Tennant defines which propositions he intends to exclude from the original anti-realist thesis is actually important and not a mere adornment. This I will argue in section 7. But first, we will have a closer look at Hand and Kvanvig's criticism.

4 Hand and Kvanvig's criticism

In their article *Tennant on knowability* Hand and Kvanvig accuse[5] Tennant's solution for being ad hoc. They start their argument with distinguishing two versions of standard anti-realism, a distinction we have not discussed yet:

(i) $\forall p(p \rightarrow \Diamond Kp)$. That is, *for every* proposition p such that p is true, it is possible to know p. Hand and Kvanvig denotes this version as *actualist anti-realism*[5] (page 1).

(ii) $\Box\forall p(p \rightarrow \Diamond Kp)$. That is, *it is necessary that*, for every proposition p such that p is true, it is possible to know p. This version is called *necessitarian anti-realism*[5] (page 3).

They argue that the anti-realist must endorse the *necessitarian anti-realism*, since[5](page 3):

> ...antirealism is committed to more than the mere claim that truth *happens* to be epistemic; it is *essential* to the nature of truth that it be epistemic.

Now, Hand and Kvanvig say[5] (page 3), consider a sentence like "no thinkers exist". This proposition will never be knowable in the *actualist anti-realism*, since it simply is not true (and the *actualist anti-realism* deals only

with our actual world). But according to the *necessitarian anti-realist*, the proposition is knowable if it is true in every possible world. Thus, in a possible world where there are no thinkers and where the proposition therefore is true, it is also knowable. But then it is possible that, a knowing thing (that knows that no knowing things exist) exists and, (since knowledge implies truth) that no knowing things exist. This is of course a possible contradiction, and, as before, we interpret that as an actual contradiction.

This means that the *necessitarian anti-realist* has two problems. First, the one caused by Fitch's paradox. Second, this problem concerning propositions such as "no thinkers exist". Hand and Kvanvig presents a way of getting rid of this cluster of troubles for the anti-realist would be to say[5] (page 4):

> ...all truths that do cause either the knowability paradox or the problem of existentially inconsistent propositions are necessarily knowable.

But such a restriction is clearly ad hoc, according to them[5] (page 3-4). And too bad for Tennant, his proposal for solving Fitch's paradox is "strikingly similar" to this restriction. To show this, Hand and Kvanvig highlight the list of *anti-cartesian* propositions[5] (page 2), that is quoted above. In short, there are three types of propositions that are excluded from the anti-realist thesis, namely:

(i) Propositions which are inconsistent in themselves.

(ii) Propositions which can be true, but where the very act of knowing them requires that they are false.

(iii) Propositions with a certain logical structure which make knowledge of them inconsistent.

Note that propositions that are logically inconsistent will never be true, and therefore they will never cause trouble to the anti-realist. Thus, the notion of *cartesianity* in fact only deals with propositions like "no thinkers exist" and propositions like the one used in the deduction of Fitch's paradox. And since Tennant says that p is knowable if it is true, if p is *cartesian*, he actually says the same as was quoted above, as an example of a terribly ad hoc thesis restriction. His proposal seems to be: the standard anti-realist view holds if the proposition involved does not cause any trouble. Hand and Kvanvig concludes[5] (pages 4-5):

> It is no less unprincipled to say that p is necessarily knowable except when the assumption that p is known is inconsistent than to say that p is necessarily knowable except when it is not.

Hand and Kvanvig offers a condition for a solution to Fitch's paradox in a principled way, this is their words[5] (page 2):

> To address the paradox in a philosophically substantive way, one must go beyond such arbitrary approaches. Realists do this by observing that truth is 'radically nonepistemic', thereby giving themselves a reason based on their conception of truth for denying (1). Tennant must do something comparable. We should expect him to find some feature of truth, antirealistically conceived, that disarms the paradox by allowing some truths to be unknowable.

Tennant's defense is surprising. He actually argues that it would be principled to say that p is necessarily knowable except when it is not. But fortunately to his proposal, he also argues that it is slightly different from such an approach.

5 Tennant's reply

In his *Is Every Truth Knowable? Reply to Hand and Kvanvig*, Tennant answers to the criticism from Hand and Kvanvig. According to him there is no reason whatsoever to claim that his modified anti-realism is ad hoc, since he has followed the general pattern for thesis restrictions, given below[9] (page 110):

> Thesis: $\forall\psi\Phi\psi$. Putative counterexample: φ
>
> Reason for saying it is a counterexample:
>
> $\forall\psi\Phi\psi$, $\varphi \vdash \bot$ (and both premisses are needed)
>
> Restricted Thesis in response to putative counterexample:
>
> $\forall\psi(\neg[\forall\theta\Phi(\theta), \psi \vdash \bot] \rightarrow \Phi(\psi))$
>
> The Restricted Thesis can be substantive, informative and important. The objection that the restriction invoked is *ad hoc* is groundless.

Tennant does not give any references to strengthen the claim that this is the general pattern for thesis restrictions to be chosen, or that it has any support in the philosophy of science, except for the following example, Tarski's rescue of the truth-predicate[9] (page 110):

> Thesis: $\forall\psi(\psi \leftrightarrow True(\psi))$
>
> Putative counterexample (Epimenides): This sentence is false
>
> Reason for saying it is a counterexample:
>
> $\forall\psi(\psi \leftrightarrow True(\psi))$, This sentence is false $\vdash \bot$
>
> Restricted Thesis in response to putative counterexample:
>
> $\forall\psi(\neg[\forall\theta(\theta \leftrightarrow True(\theta)), \psi \vdash \bot] \rightarrow (\psi \leftrightarrow True(\psi)))$
>
> The Restricted Thesis can be substantive, informative and important. The objection that the restriction invoked is *ad hoc* is groundless.

In short, the original thesis says that p if and only if p is true. For instance, "the sun shines" if and only if "it is true that the sun shines". But this thesis is rejected by the counterexample "this sentence is false". Therefore, according to Tennant's general pattern for thesis restrictions, Tarski can conclude that p if and only if p is true, as long as p fits into the theory. Tennant seems to think that Tarski's theory is well-established in philosophy, why he concludes that[9] (page 111):

> ...Tarski can hardly be accused of making an *ad hoc* restriction...

Now Tennant uses this general pattern of thesis restrictions on standard anti-realism and the counterexample that generates Fitch's paradox[9] (page 111):

> Thesis (Knowability principle): $\forall\psi(\psi \rightarrow \Diamond K(\psi))$.
>
> Putative counterexample (Fitch): There is an unknown truth
>
> Reason for saying it is a counterexample:
>
> $\forall\psi(\psi \rightarrow \Diamond K(\psi))$, There is an unknown truth $\vdash \bot$
>
> Restricted Thesis in response to putative counterexample:
>
> $\forall\psi(\neg[\forall\theta(\theta \rightarrow \Diamond K(\theta),\psi \vdash \bot] \rightarrow (\psi \rightarrow \Diamond K(\psi))$

> The Restricted Thesis can be substantive, informative and important. The objection that the restriction invoked is *ad hoc* is groundless.

Again, Hand and Kvanvig criticized Tennant's solution to Fitch's paradox to be no less unprincipled than a proposal saying: every truth is knowable except for those truths which are not. Tennant's answer is that even such a proposal would be principled, and since his modified anti-realism is better still, it is clearly not ad hoc.

6 Douven tries to rescue Tennant

In his *A Principled Solution to Fitch's Paradox* Douven[2] disagrees with Tennant and his general thesis of thesis restrictions, or at least, that it is sufficient for avoiding ad hocness. He also disagrees with Hand and Kvanvig, though. Compared to them, he has a slightly different idea of which conditions must be fulfilled for a solution to Fitch's paradox to be principled. Again, they stress that a principled solution must consist in a conception of truth which in turn must justify that some truths can be unknown. Douven replies[2] (pages 49-50):

> Why could it not be something about one's conception of, for instance, knowledge that explains what is wrong with (1)? Or something about the concept of belief, or about that of justification (or about both), which, at least on most current analyses of knowledge, are involved in (1) via the concept of knowledge?

Douven claims that Tennant's proposal is ad hoc as it stands, but also that it is equivalent with a modified anti-realism which is not, under the condition stated in his quote above. His principled version of Tennant's anti-realism is[2] (pages 58):

$$p \rightarrow \Diamond Kp, \text{ if } Bp \text{ is consistent} \tag{10}$$

That is, if p is true and Bp does not lead to an inconsistency, it is possible to know p. (10) is founded on the following claim:

$$Bp \text{ is consistent } \leftrightarrow Kp \text{ is consistent}$$

This, in turn, is what Douven tries to deduce in his paper. To do this, he uses some further rules:

(i) Kp is consistent $\rightarrow$ Bp is consistent. Why so? If knowledge is defined as justified true belief, we have that $Kp \leftrightarrow (p \wedge Bp \wedge Jp)$, where Jp is interpreted as: the agent in question, at the time in question, is justified in believing that p. This relation gives that, if Kp is consistent, then all the conjuncts $(p \wedge Bp \wedge Jp)$ is consistent, and thus also Bp, which was our concern.

(ii) Bp is consistent $\rightarrow$ αp is consistent. αp is interpreted as: the agent in question, at the time in question, asserts that p. "Occurently believing p stands to asserting p as the inner stands to the outer"(Douven, page 59/Adler, 2002). Asserting p and believing p is, in this view, two sides of the same coin. Therefore, Bp is consistent if and only if αp is consistent should hold, according to Douven.

(iii) αp is consistent $\rightarrow$ Kp is consistent. But assertion means more. Actually, when claiming that "I sit in front of my computer" I maintain that I know that "I sit in front of my computer" is true. This is claimed by Unger[12]; he argues: after an assertion by agent α, it is socially acceptable by agent β to ask "how do you know?", but α cannot get rid of β by claiming "I never said I knew". Therefore, an assertion implies the claiming of ones knowledge.

By combining (ii) and (iii) we get that:

$$Bp \text{ is consistent } \rightarrow Kp \text{ is consistent}$$

Together with (i), we have that Bp is consistent if and only if Kp is consistent. Thus, restricting (1) to cartesian truths is equivalent with restricting it to truths that are consistently believable. In other words, (10) is equivalent with Tennant's modified anti-realism. So, if (10) is principled, Tennant is rescued from the threat of ad hocness.

7 Discussion

In this section I will discuss two issues. First, I will examine whether Tennant's proposal is *scientifically progressive*. Soon I will have shown that it

indeed can be, and thereby my investigation will be on which conditions must be fulfilled for it to be. I will show that Tennant's general pattern for thesis restrictions, as was presented in section 5, generates theories that are not scientific at all, since the restricted theses that are generated are all tautologies. Therefore, Tennant must not intend to follow the pattern, or else his proposal will turn out to be necessarily true. Second, I will investigate Igor Douven's defense for Tennant's proposal. As mentioned, he intends to rescue it from the threat of ad hocness. I will argue though, that he does the opposite: the version he proposes is clearly less principled than Tennant's, and most likely he has weakened Tennant's original position also, since the paradox concerning believing and the knowability paradox are shown to be deeply dependent.

Thereby, the *wondering whether* paradox is of course the more important to make Tennant's proposal principled. If it is a proper analogy to the knowability paradox, I will not investigate here. It is not relevant at all to the question whether Tennant's proposal is scientifically progressive. In fact, it is highly relevant in the discussion concerning Douven's proposal: it would be a great advantage for Douven if the wondering whether paradox were not a proper analogy, but since he does not mention the concept at all in his article, I conclude that he thinks that his proposal is better than Tennant's anyhow - and *that* is what I will refuse in this section, and that is why I leave a discussion on the concept wondering whether to the future. Interested readers can have a look at DeVidi and Kenyon's article *Analogues of Knowability*[1] which deals with the question. Furthermore, I will take stand neither for nor against Tennant's proposal being ad hoc, since, to me, the question seems to be a mere matter of taste, when the concept wondering whether is not considered. The two results mentioned above are sturdier.

As Hand and Kvanvig point out, Tennant's proposal is suspiciously similar to a solution to Fitch's paradox which would clearly be ad hoc. Hand and Kvanvig do not mention Tennant's new concepts *believing* and *wondering whether*, whose corresponding paradox-solutions are meant to make his modified anti-realism more principled. These form a defense from ad hocness that is important though, and is examined further in the latter part of this section, where Douven is criticized. But first, we will give Tennant's answer to Hand and Kvanvig's criticism a closer look.

In short, Tennant states that there is a general way of restricting contradicted theses. If the old thesis, that is contradicted by some fact, is on the form: "all x are y", the new thesis should be on the form: "all z, such that z

does not contradict the formula 'all x are y', are y". According to Tennant, this general method only generates principled theories. For instance, the thesis "all swans are white" is contradicted by the fact that one swan is black. Therefore, it should, according to this general pattern of thesis restrictions, be modified into the new thesis: "all swans, that does not contradict the fact that all swans are white, are white". In other words, all swans are white, and if we find a swan that is not white, we will exclude it from our theory.

The last version seems to be an instance of the very essence of ad hocness - we simply exclude the counterexample from the theory without further explanation. Perhaps the problem is better highlighted when we apply the restriction method in a more "important" field of science. Let us say that we have a theory of gravity, that is supposed to hold for every massive body in the universe. Now, if we find out that some planet in the solar system, Jupiter say, does not follow the laws that are stated by this theory of gravity, we can not just exclude Jupiter from our theory, and say that "our theory holds, but it ranges not over Jupiter anymore".

It is important though, to realize that Tennant's view is quite different from the monstrous version I have shaped above. Indeed, according to him, the new thesis should exclude *every* counterexample to the old one, not only the one that generated the change. To understand the importance of this difference, we have to examine a certain interpretation of ad hocness in his reply to Hand and Kvanvig. Normally, we count his arguments concerning *believing* and *wondering whether* as defenses against such accusations. But if his reply is correct, that discussion would be pointless, so he must intend to show something else. This other interpretation is the one used when examining whether physical theories, for example, are progressive or not. In his *Falsification and the Methodology of Scientific Research Programmes* Imre Lakatos expresses the condition for a theory to be scientific in the following way[7] (page 119):

> If we put forward a theory to resolve a contradiction between a previous theory and a counterexample in such a way that the new theory, instead of offering a content-increasing (scientific) *explanation*, the contradiction is resolved in a merely semantical, unscientific way. *A given fact is explained scientifically only if a new fact is also explained with it.*

This is said in the context of theory-series $T_1, T_2, T_3, ...$ where the subsequent theory is supposed to be an improvement of the preceding one. Fur-

thermore, Lakatos differs between theoretically and empirically progressive theories. According to him, a series of theories is theoretically progressive if[7] (page 118):

> ...each new theory has some excess empirical content over its predecessor, that is, if it predicts some novel, hitherto unexpected fact.

For example, the standard model of particle physics predicts that we are to find the Higgs boson, and according to already achieved facts, that is a novel and hithero unexpected one. Therefore, the standard model of particle physics is theoretically progressive. But the Higgs particle has not been found yet, which is necessary for the theory to be *empirically progressive*. As Lakatos writes[7] (page 118):

> Let us say that a theoretically progressive series of theories is also *empirically progressive*... if some of this excess empirical content is also corroborated, that is, if each new theory leads us to the actual discovery of some *new* fact.

If a series of theories is neither empirically nor theoretically progressive, Lakatos classify it as unscientific. That is, if a theory is at least *theoretically progressive* it is scientific. This is the notion we shall focus on here. Not because the other one is not important, but since it is not the purpose of this paper. To examine whether Tennant's proposal's predictions are correct - that is, if it is empirically progressive - would be to search for counterexamples etc. which is exactly what I have put outside the boundaries.

Thus, let us examine whether Tennant's proposal is *theoretically progressive*. First, I am to emphasize a note that Lakatos himself wrote concerning his own notions. As quoted he says that a theoretically progressive theory is to predict "some novel, hitherto *unexpected* fact". Lakatos thinks that it is important for the predicted fact to be unexpected[7] (page 118):

> If I already know P_1: 'Swan A is white', P_ω: 'All swans are white' represents no progress, because it may only lead to the discovery of such further similar facts as P_2: 'Swan B is white'. So-called 'empirical generalizations' constitute no progress. A *new* fact must be improbable or even impossible in the light of previous knowledge.

To me, this condition seems too strong. Again, if a series of theories is not progressive, Lakatos classify it as unscientific. And with respect to the last quote, Lakatos seems to say that a generalization as "all swans are white" is unscientific. But are not such generalizations important in science, even if they are so to say "trivial"? Suppose a young and unexperienced ornithologist asks the oldest and wisest member of the club: "I want to see a swan, how do I find one?" The wise member answers: "well, I have seen hundreds of swans during my life, and all of them have been white. Actually I had a friend once, who suspected that *every* swan was white. He travelled around the world to all countries and observed thousands and thousands of swans, trying to falsify this hypothesis, but he did not find any swan that was not white. Therefore, I recommend you to look for white things, since all swans seems to be white. But I must warn you: that theory is highly unscientific, since it predicts no unexpected facts." I disagree; all progress of science do not have to be brilliant. The most parts are performed by grass root scientists like the wise member's friend. Theories may predict unexpected facts, but it may also just *put words on a man's expectation.*

And what is unexpected anyway? Am I supposed to expect that swan B is white only because I have seen that swan A is white? Is it obvious which properties of an object, for example a swan, can be pointed out as "expected" towards the next instance of swans? Having the exact same colour seems to be such a feature according to Lakatos, but is it the same for every property? How about "being at the exact same spot"? Furthermore, Lakatos would have a problem pointing out who is to judge whether a fact is expected or not. I say: there is a clear line what a theory predicts, and what it does not predict. What is expected, is not that easy to point out.

With that slight difference from Lakatos own theory, I will now examine the notion of *theoretically progressive* theories. Especially, I will examine whether Tennant's general pattern for thesis restrictions generates theoretically progressive theories. Suppose we have the thesis T_1 that "every swan is white". Then, if we discover a black swan, we have to modify our thesis. If we propose T_2, that "every swan, except for the particular swan that was black and contradicted T_1, is white", have we then been scientifically progressive? No, since T_2 does not predict any new fact compared to T_1 (it only says that there is a black swan that we exclude from our theory). If we instead propose T_3, that "every swan, except those swans that contradicts T_1, is white", have we then been more scientific? Well, we have defined a set of objects that is not within the range of our theory. Therefore we can say: if you find an

object with the particular feature we pointed out, it will be excluded from our theory.

To point out such exceptions can indeed be scientific. I may have found out that only adult swans are white, so let us say I exclude juveniles from the theory. That restriction is theoretically progressive, as long as I predict swan children to be non-white also, because that is a new fact compared to the original theory. But the feature pointed out in T_3 is more problematic. The theory "every swan, except for those swans which contradict T_1, is white" is much alike "every swan, except for those swans which are not white, is white", which is no theory at all but a mere tautology that does not predict anything. Therefore, to be substantial, Tennant must, in his general pattern of thesis restrictions, intend something more with the part "...does not contradict the original theory..."

To clearify, imagine a series of numbers $a_1, a_2, a_3, a_4...$, for instance:

$1, 2, 4...$

Using induction, we can construct a theory of the whole series. Let us try the theory T_1: $a_i = 2^{i-1}$. This theory holds for a_1, since $1 = 2^{1-1} = 2^0$; for a_2, since $2 = 2^{2-1} = 2^1$ and for a_3, since $4 = 2^{3-1} = 2^2$. Thus, our theory holds for now. But imagine we keep examine the series, and see that it continues as follows:

$1, 2, 4, 9, 16...$

We have a counterexample, a_4 doesn't fit into our theory. Clearly, it would not be theoretically progressive to express a new theory T_2: $a_i = 2^{i-1}$ holds, except for a_4, since that does not predict any new fact compared to the preceding theory. For now, I will not give a theoretically progressive theory. Instead, let us examine the series of numbers further:

$1, 2, 4, 9, 16, 25, 36, 49, 64...$

It seems clear now that T_1, even as an approximation, simply is wrong. It is possible though, to suggest a theory T_3: $a_i = 2^{i-1}$ holds, except for those a_i which contradict T_1. In this case however, there is no difference with T_4: $a_i = 2^{i-1}$ holds for every a_i that does not diverge from $a_i = 2^{i-1}$, which as said is a tautology and therefore does not say anything at all. A stronger

theory, which at a first sight has the same extension, would be T_5: T_1 holds for a_1, a_2, a_3 and a_5 but nowhere else. Here the part "but nowhere else" rescues T_5 from being unscientific; it indicates that the theory predicts that a_4 and a_i where $i > 5$ diverge from $a_i = 2^{i-1}$, which is a new fact compared to the preceding theory. To conclude: T_3 is not theoretically progressive while T_5 is.

The first objection one raises against my reasoning is probably that one can not compare Tennant's *theoretical* theory with my examples which are of the *empirical* sort one finds in papers concerning the philosophy of science, and that there is a clear difference between the progress in logic and mathematics on the one hand and in empirical sciences on the other; therefore, one can argue, my analogies are invalid. I claim that there is no such difference. In his *Proofs and Refutations*[8] Imre Lakatos describes, convincingly to my mind, the development of mathematics. A teacher and his students are trying to come up with the correct relation between any polyhedron's amount of faces, edges and vertexes. A simple observation of a cube gives a first guess: there we have eight vertexes (V), twelve edges (E) and six faces (F), so the guess would be: $V+F-2=E$. This formula holds for a tetrahedron as well, since it has four vertexes, six edges and four faces, and $4+4-2=6$. But soon the society finds a counterexample anyway, so the first guess is refuted, and they have to put forward a new theory. This will in turn be refuted, and so on. The progress is not completely unlike the one I described in my own example concerning series of numbers above. That had a clear empirical character though, since we tried to give a general formula for some numbers. But that example can be changed: let us say that we are to check whether the theory $a^2 = 2^{i-1}$ for integer valued i holds. And as in Lakatos' case: the thesis is usable in the beginning, but soon it is refuted, and replaced by some other theory. My point in this, is that the progress described, matches the model for development in empirical sciences, and therefore my comparisons are in order.

Then, is Tennant's anti-realism a theory like T_3 or T_5? We recall that Tennant precised his notion of cartesian propositions, or more exactly, anti-cartesian ones. Firstly, they can be inconsistent in themselves, as the proposition $p \wedge \neg p$ for example. Secondly, knowledge of an anti-cartesian proposition may be impossible since the very act of considering them requires the falsity of the proposition. A proposition of this type is "no thinkers exist". Thirdly, a proposition may have a certain logical structure that makes it impossible to know, as the one used to deduce Fitch's paradox. Now, what Tennant says

in his proposal, at least in his *The Taming of The True*, is really that the anti-realist thesis still holds, but not for propositions that have the certain feature of being anti-cartesian. Thus it seems that Tennant's theory is like T_5. On the other hand, in his reply to Hand and Kvanvig, he obviously seems to be pleased with a theory like T_3. But as we have seen, the general pattern for thesis restrictions, that is put forward by Tennant in that paper, is not sufficient for creating a scientific theory. But there is more to it; his modified anti-realism (3) is slightly different from the theory that should be generated by his general pattern for thesis restrictions. As he writes, his proposal[9] (page 111):

> ...is even weaker than would still be justifiable on this general approach to restrictions.

I will now examine if this difference makes his proposal *theoretically progressive*. Again, Tennant's proposal (3) for solving Fitch's paradox was to restrict the anti-realist thesis (1) so that it ranges only over cartesian propositions p, which means that:

$$p \rightarrow \Diamond Kp, \text{ if } Kp \text{ is consistent}$$

On the other hand, Tennant's general pattern for thesis restrictions provides us with a different proposal. What it generates is: "every p (such that p does not contradict the theory: every q that is true is also knowable) is knowable if p is true". Formally:

$$\forall p(\neg[\forall q(q \rightarrow \Diamond Kq), p \rightarrow \bot] \rightarrow (p \rightarrow \Diamond Kp)) \tag{11}$$

The question is now, are the two versions equivalent? And if not, is (3) *theoretically progressive*? Tennant seems to think there is a difference, according to his quote above. But in what does this difference consist? Since $(p \rightarrow (q \rightarrow r)) \leftrightarrow ((p \wedge q) \rightarrow r)$, we can transform Tennant's proposal (3) into:

$$Kp \text{ is consistent } \rightarrow (p \rightarrow \Diamond Kp)$$

Thus, if (3) and (11) are to be equivalent, the following two, (12) and (13) are equivalent:

$$Kp \text{ is consistent} \tag{12}$$

$$\neg(\forall q(q \to \Diamond Kq), p \to \bot) \tag{13}$$

(13) implies (12), since the negation of (12) implies the negation of (13):

1	Kp is inconsistent
2	$Kp \to \bot$
3	$\forall q(q \to \Diamond Kq)$
4	p
5	$\Diamond Kp$
6	$\Diamond\bot$
7	$\bot$
8	$p \to \bot$
9	$\forall q(q \to \Diamond Kq) \to (p \to \bot)$
10	$(\forall q(q \to \Diamond Kq), p) \to \bot$

So the feature proposed by the general pattern of thesis restrictions is at most as strong as cartesianity. But are they equivalent? If the operator $\Diamond$ refers to logical possibility, they are. That p is logically possible is equivalent to the proposition that p is consistent. And the meaning of the antecedent in (13) is that, if we apply the rule $\forall q(q \to \Diamond Kq)$ on the example p, we can derive a contradiction. Therefore, to show that (12) implies (13), we will assume the negation of (13), applied on a certain p, and derive the negation of (12):

1	$(p \wedge Kp$ is consistent$) \rightarrow \bot$	
2		Kp is consistent
3			p
4			Kp is consistent
5		$p \rightarrow Kp$ is consistent
6		$\bot$
7	Kp is inconsistent	

In row 7, we have used rule (15) and 3.

Therefore, the $\diamondsuit$-operator in the theory must refer to some possibility weaker than logical possibility, for instance metaphysical possibility, since, otherwise Tennant's anti-realism will be equivalent with the unscientific one generated by his general pattern for thesis restrictions. There is of course another, perhaps even more important, reason for not interpreting the $\diamondsuit$-operator as logical possibility, a one that concerns Tennant's proposal (3) independently of how one is presenting the notion of cartesianity. If the $\diamondsuit$-operator is logical, Tennant's proposal, which is given again below, is a mere tautology:

$$(p \wedge \neg Kp \text{ is consistent}) \rightarrow \diamondsuit Kp$$

This is the case since what is said in the consequent is exactly that Kp is consistent. And to be a tautology is of course a catastrophy to any theory that wants to claim something new. Thus, the $\diamondsuit$-operator in Tennant's proposal must refer to something weaker than logical possibility. Only then, Tennant's theory is *theoretically progressive*.

To conclude, Tennant's general pattern for thesis restrictions generates an anti-realism that is not theoretically progressive. Therefore, Tennant's version must look slightly different from such a theory. And it does, in two senses. Firstly, Tennant described when he first presented his proposal those counterexamples to the original theory which were to be rejected - that is, anti-cartesian propositions. Secondly, as a result in this thesis, he must not intend logical possibility in the consequent in (3), since that would make his

proposal equivalent to the one generated by his general pattern for thesis restrictions. This condition is given by other reasons too.

Having accepted Tennant's proposal as scientific in the sense that it is theoretically progressive, I will now examine whether it is independently principled in another sense. To precise this new notion, I will, again, have a look at Tennant's defense. According to the concluding words in his general pattern for thesis restrictions, he seems to think that a thesis is not ad hoc if it is substantive, informative and important. This is not a view that has reached consensus; as Igor Douven puts it[2] (page 51):

> ...many examples from the history of mathematics or from that of analytic philosophy could be adduced to buttress the claim that it is one thing for a restricted theory or principle to be substantive (and informative and important), and it is quite another for the restriction imposed upon the theory or principle to be non-ad hoc.

Douven mentions three examples from the history of science which he thinks are substantive, informative and important but ad hoc anyhow. The examples are Zermelo-Fraenkel set theory with the axiom of choice, Horwich's solution to the liar paradox, and Tarski's dito. I do not say that I agree with him concerning these examples, but conclude that there is no consensus that the conditions put forward by Tennant are sufficient for a theory to be independently principled. The lacking feature is the independent foundation in the theory. Actually, as we have seen Tennant was sensible to this once, when he first presented his proposal in *The Taming of The True*, namely, when he introduced the new personal attitudes *believing* and *wondering whether*. We have seen that there are paradoxes similar to Fitch's concerning these concepts also, and that they can be solved in a way strikingly similar to the way Tennant uses to solve Fitch's paradox. This is how he argues that his proposal is independently principled.

Back in the 17th century, when Newton presented his theory of gravity a number of *different* problems and phenomena were solved and explained. The movements of the planets and the laws of Kepler, the tide, apples that fall from the sky, comets - all of them were explained by Newton. He *unified* a number of different problems. That is the way in which the theory of gravity is independently principled, and that is the way in which Tennant's proposal might be principled to, with the aid of the two new concepts. Before

I examine whether he succeeds in his mission, I will analyze Igor Douven's attempt to rescue Tennant (assuming Tennant's proposal is ad hoc).

Douven tries in his *A Principled Solution to Fitch's Paradox* to show that Tennant's proposal is equivalent to a principled one. Here, I will not question whether the proposals are equivalent, but argue that Douven's is indeed less principled than Tennant's. And too bad for Tennant, he can not go back to his own proposal, since it is partly ruined by Douven's arguments. Again, Douven's new version (10) of Tennant's anti-realism (3) is:

$$p \rightarrow \Diamond Kp, \text{ if } Bp \text{ is consistent}$$

He does not really argue that this version is more principled than Tennant's. Indeed, the proposal solves both the paradox of knowability and the one concerning believing. His corresponding proposal for solving the believing paradox should be:

$$p \rightarrow \Diamond Bp, \text{ if } Bp \text{ is consistent}$$

Tennant solves the both paradoxes too, though. One may argue that Douven's advantage over Tennant is that, given his proposal, the two paradoxes are solved in ways that are more straightforwardly similar. But I claim that this is no advantage for Douven at all. As mentioned, a theory is strengthened if different problems and phenomena are explained by it. Newton explained both the movements of the planets and apples that fall. Indeed, the fact that these two phenomena are *different* is important to the theory. Imagine for instance that Newton instead had explained both the movements of the planets and the quite similar one of the Moon. Of course this set of explanations strengthen Newton's theory less than the one first mentioned. Douven can answer that the phenomena explained are different, but that his theory makes them look similar. Even such different phenomena as apples that fall from the sky and the movements of the planets seems similar to us, but only *since we already are aware of the theory that connects them*. My reply is that it is not Douven's theory that makes the phenomena alike, but his premises. The crucial part is his notion of *assertion*, which is closely related to both knowing and believing. My point is that, if one has assumed as a premise that knowing and believing are alike, one must not brag of how one showed them to be similar in the actual theory. That would be like begging the question.

So it does not seem that Douven's proposal has any advantage at all over Tennant's. Now I will show why Tennant's is favorable. As said, Tennant solves three paradoxes with his proposal. Two of those are taken care of by Douven also. But that is not the case with *wondering whether*. A generalization of Douven's proposal would be that, it is possible to maintain a given personal attitude towards a proposition p if p is true and if Bp does not imply a contradiction - this is what have been used in the two cases above. But when applied to the case of wondering whether, the proposal does not work anymore. The result is:

$$p \rightarrow \Diamond Wp, \text{ if } Bp \text{ is consistent}$$

But that is obviously false. Consider for instance a true proposition p, that I believe in. Thus we have that Bp, and also that: $\neg(BBp \rightarrow \bot)$, since p is true. But of course it would be a little peculiar by me, if I then started to wonder whether p, just like rule *(WB)* says: it is an inconsistent act. Therefore, Douven's proposal can not solve the wondering whether paradox. Tennant's proposal on the other hand does this. The most general way of describing his theory, is that, concerning any personal attitude A towards any proposition p, it is possible to hold the personal attitude A towards the proposition p if the proposition is true and if Ap is consistent. Formally:

$$p \rightarrow \Diamond Ap, \text{ if } Ap \text{ is consistent} \tag{14}$$

And apparently, this formula is applicable on knowing, believing and wondering whether, and, as Tennant himself has pointed out, it solves the three paradoxes. My quite obvious point is that Tennant's proposal *unifies* more phenomena than Douven's does, and therefore is preferable. Douven's theory might seem more attractive, since it in a sophisticated way explains the relation between *knowing* and *believing*, that is, how closely related they are and how knowledge is actually subordinate to belief. One can say that Douven's theory is better developed in what it ranges over, than Tennant's theory is in what that ranges over. Additionally, Tennant's proposal as it is expressed in (3) of course brings an annoying feeling of ad hocness to it, since the conjunct $\neg(Kp \rightarrow \bot)$ so immediately solves Fitch's paradox and, as one may think, only Fitch's paradox. Thereby Douven's proposal (10) seems more tempting, since its antecedent as it stands can solve two paradoxes. But one must not forget that Tennant's underlying proposal is (16) and not just (3), and this anti-realism is indeed more general than Douven's.

One might think that Tennant's theory lacks an explanation why the possibility to wonder whether, believe and know propositions p, all should be enclosed by similar conditions. One way to unify the concepts, is to say that they are all "truth-directed" - that is, an agent that either wonders whether, believes or knows a proposition p is, so to say, aiming on the truth. And when one is aiming on the truth, one is of course only rational if one examines whether ones investigation processes are consistent. And remember: this whole discussion is built upon premises that obliges agents to be rational - that is, premises like *rational commitment* etc. To contrast, let us consider a personal attitude that is more fundamental than any of the ones discussed, namely *grasping*. Let Gp mean that an agent *grasps* that p. Then it would be an anti-realist triviality to say that:

$$p \rightarrow \Diamond Gp$$

That is, if p is true, then it is possible for an agent to grasp that p. Until this point, *grasping* looks very much like the other personal attitudes introduced in the paper. But there is a difference: grasping is not truth-directed - when one grasps, one is not aiming on the truth. Consider the following proposition - the corresponding ones have all implied contradictions, and been the foundations of the Fitch's paradox look-alikes:

$$\Diamond G(p \wedge \neg Gp)$$

That is, it is possible to grasp that, both p and that it is not possible to grasp p. That the proposition will not lead to a contradiction gets clearer when it is expressed differently: it is possible to understand the meaning of a sentence that says, both that "the sun shines" and that "it is not possible for anyone to grasp a sentence that says 'the sun shines' ". Of course we can *grasp* such propositions. This difference emerge from the fact that wondering whether, believing and knowing are truth-directed, while grasping is not. And this difference should, in the formalized anti-realist theses, be expressed as in (16), Tennant can claim.

So Tennant would better stick to his own proposal. Too bad for him, it is badly wounded by Douven's analysis. What was three different paradoxes before, is now only two: *wondering whether* and *believing/knowing*. The two latter may have been objects of two different paradoxes, but since these two obviously can be solved in such a common manner, their relative independence are seriously put into question. Tennant may still argue that they,

as we saw in section 3, emerged in different ways, but I claim the opposite. Although the deduction of the believing paradox at first sight seem different from that of Fitch's paradox, one can literally exchange the operator B against the operator K in it, and get a deduction for the knowability paradox instead. All you have to do is to accept that *Rational commitment* and *Rule of credibility* hold for not only for believing but also for knowledge, which is quite easily done, especially when you have in mind that Tennant created those rules with the certain intention to derive the believability paradox.

Two conclusions are to be drawn. Firstly, that Douven really does not succeed in his intention to rescue Tennant's theory from the threat of ad hocness. Secondly, that the paradox concerning wondering whether seems more and more important to make Tennant's proposal principled. But as mentioned, I am not to investigate here whether that is sufficient.

8 Summary

I have given a summary of Fitch's paradox, the result says that one can derive that every true proposition is known from the seemingly innocent premise that every true proposition is knowable. Thereby Neil Tennant's proposal for solving this paradox was introduced. Its main idea is to restrict the original anti-realist thesis - that every true proposition is knowable - to propositions p that are true and are such that Kp is consistent. As was observed later in the thesis, this proposal can be accused for being *ad hoc*. But Tennant prevents this criticism by constructing corresponding paradoxes to the two concepts believing and *wondering whether* and solving them in a similar fashion as when he solved Fitch's paradox. As I have pointed out, Tennant's underlying proposal is that, if a proposition p is true it is possible to maintain an arbitrary, truth-directed, personal attitude towards p, given that maintaining that certain personal attitude towards p is a consistent act. After the accusation he answered in a different way, though. He presented a general pattern for thesis restrictions, in which his proposal fits, and therefore it is not ad hoc, according to Tennant.

But I have shown that, if he would follow his general pattern, he would end up with a theory as pointless as a one that says "every swan is white, except for those swans that are not white" - that is, he claims something that is necessarily true. While discussing this matter, I also showed that Tennant's $\Diamond$-operator must refer to something weaker than logical possibility - for the

theory to be *theoretically progressive*, that is. And of course, I discussed how a concept like "theoretically progressive" - which is most oftenly seen in empirical sciences and not in philosophy - should be interpreted here.

As we have seen, Igor Douven was not satisfied with Tennant's defense for his own proposal either. Douven proposes another solution to Fitch's paradox: that p implies that it is possible to know p, if *the belief that* p is consistent. For some reason Douven thinks that this solution is independently principled, and that Tennant's proposal is not. But as I have pointed out, Douven's proposal is clearly less principled that Tennant's. While Tennant *unifies* three phenomena: believing, knowing and wondering whether, Douven unifies only two of them. This is because his analysis is not applicable on wondering whether.

References

[1] D. DeVidi and T. Kenyon. Analogues of knowability. *Australasian Journal of Philosophy*, 81(4):481–495, 2003.

[2] I. Douven. A principled solution to fitch's paradox. *Erkenntnis*, 62(1):47–69, 2005.

[3] D. Edgington. The paradox of knowability. *Mind*, 94(376):557–568, 1985.

[4] F.B. Fitch. A logical analysis of some value concepts. *The Journal of Symbolic Logic*, 28(2):135–142, 1963.

[5] M. Hand and J.L. Kvanvig. Tennant on knowability. *Australasian journal of philosophy*, 77(4):422–422, 1999.

[6] T. Johansson. Williamsons invändning mot Tennants lösning på Fitchs paradox. *Filosofisk tidskrift*, 33(2):38–47, 2012.

[7] I. Lakatos. Falsification and the methodology of scientific research programmes' in i. lakatos and a. musgrave (eds.): Criticism and the growth of knowledge. In *Proceedings of the International Colloquium in the Philosophy of Science*, pages 91–1.

[8] I. Lakatos. *Proofs and refutations: The logic of mathematical discovery*. Cambridge Univ Pr, 1976.

[9] N. Tennant. Is every truth knowable? Reply to Hand and Kvanvig. *Australasian journal of philosophy*, 79(1):107–113, 2001.

[10] N. Tennant. *The taming of the true*. Oxford University Press, USA, 2002.

[11] N. Tennant. Williamson's woes. *Synthese*, 173(1):9–23, 2010.

[12] P. Unger. *Ignorance: A case for scepticism*. Oxford University Press, USA, 1975.

[13] J. Van Benthem. What one may come to know. *Analysis*, 64(282):95–105, 2004.

[14] T. Williamson. Intuitionism disproved? *Analysis*, 42(4):203–207, 1982.

[15] T. Williamson. On the paradox of knowability. *Mind*, 96(382):256–261, 1987.

[16] T. Williamson. Tennant on knowable truth. *Ratio*, 13(2):99–114, 2000.