Marius Backmann, Andreas Berg, Marie Kaiser, Michael Pohl, Raja Rosenhagen, Christian Suhm, Robert Velten

Pragmatism, Realism, and Science – From Argument to Propaganda

Introduction

Richard Rorty is known as a philosopher who does not want to be a traditional philosopher anymore. Instead of this he envisages becoming a ‘post-philosophical’ pragmatist living in a “culture without centre”1, in which no privileged or fundamental status is attributed to either philosophy or science. In order to reach this ‘post-philosophical’ culture, Rorty is eager to dismiss notorious philosophical debates and to replace them by pragmatist discourses. In particular, Rorty recommends abandoning the entire realism/antirealism debate. His main reasons for this are the enduring fruitlessness of the debate and the threat of scepticism it evokes.

Instead of adopting one of the traditional positions within the realism/antirealism debate, Rorty advocates the “Natural Ontological Attitude”2 (hereafter abbreviated as “NOA”) which was introduced into the debate on scientific realism by Arthur Fine.3 This debate is centred upon the question whether our most successful theories of the mature natural sciences deliver at least approximately true accounts of the physical world and whether there is such a thing as scientific progress by approximation to truth. Rorty answers both questions in the negative, at least so far as truth means some sort of correspondence relation between what theories say about the world and features of the world itself.

An adherent of NOA, however, refuses to get involved in a couple of, as she thinks, futile discussions on the scientifically adequate theory of truth or approximation to truth. When it comes to such metaphysical questions, a

‘knower’ (as we might call the defender of NOA according to Fine himself) or a Rortian pragmatist will remain silent or possibly express her disregard by an ironic smile.

In this paper we argue that Rorty dismisses the realism-antirealism debate too rashly. We will do this by means of investigating the impact this dismissal has on Rorty's account of the natural sciences.

In doing so, we are also concerned with Rorty's strategy to withdraw from arguments and to shift to propaganda which is typical of much of his reasoning. He seems, nonetheless, often to take part in the debate by giving special arguments, mainly directed against realism. But when faced with counterarguments he shifts to propaganda claiming that he is not willing to take part in the debate anymore, and dismisses it outright. He recommends the search for a new vocabulary which should (in a distant future) prove the absurdity of the ongoing debate. Corresponding with the steps of this strategy, we will meet Rorty on three different levels.

In the first part of our paper we meet Rorty on the level of argument and hope to show that Rorty's position is not at all to be located “beyond realism and antirealism”\(^4\), despite his claims to the contrary, and that his overall account of the epistemological status of the natural sciences is misleading.

In the second part we examine several problems that Rorty's pragmatist position faces in the light of actual scientific (and social) practice.

Finally, we try to meet Rorty on the level of propaganda and propagate – contrary to his pragmatism – the continuation of the realism/antirealism debate.

I  Rorty on Scientific Realism

In order to expel the natural sciences from the centre of our culture, Rorty tries to show that natural science is not a natural kind. He thinks so, on the basis that there is neither a special methodology by which natural science could be defined, nor a special relation between scientific theories and reality. According to Rorty’s pragmatist likings, only the Baconian criteria of prognostic success and manipulation of nature – both decisive for technical progress – will serve for the distinction of science from non-science\(^5\).

\(^4\) BRA.

Closely related to this line of arguing is Rorty’s dismissal of abductive reasoning or inference to the best explanation as a genuine logical tool for science. Furthermore, he distrusts the power of the so called no miracle-argument that is essential for a defence of scientific realism. The success of science, the realist concludes, would be a miracle if scientific theories were not at least approximately true. Rorty, however, tries to undermine this argument by asking whether there are different ways of testing the explanandum (the success of science) and the explanans (the truth of scientific theories). In his opinion, the idea of a (nearly) true theoretical description of the world as it is in itself, i.e., independent of our theoretical commitments, loses much of its cogency, if making true predictions is all we can ask for with regard to both a theory’s success and its truth. The notoriously troublesome realist’s conception of the relation between theory and world should therefore evaporate into a dim remembrance of what once was of serious philosophical concern.

Two aspects of Rorty’s criticism of scientific realism and his advocacy of NOA are questionable. First, there seems to be no dependence of scientific realism (or even the comprehensibility of the entire realism/antirealism debate) on the fact that science is a natural kind. Why should we dismiss the idea of science giving us a true picture of the world, since basic scientific methods, e.g., abductive reasoning, can certainly be successfully employed in non-scientific contexts of our daily life?

Second, Rorty himself cannot escape realism. He underpins his position in the philosophy of mind, which is a non-reductive physicalism, by a thoroughly realistic supposition, namely the existence of mind-independent causal relations that remain stable and constant under various descriptions. Rorty anticipates the realist’s demand for answering the question whether such causal relations constitute the real and true structure of a mind-independent world, or are simply due to a pragmatic or regulative ideal we pursue in doing research. In Rorty’s opinion, however, distinguishing between real and true causal relations on the one hand and ideals of research on the other, is just another case of being trapped in the dichotomy between scheme and content, i.e., the third dogma of empiricism. Moreover, he believes that Donald Davidson convincingly demonstrated that this distinction cannot be held on to and that we should

6 Cf. INSNK, S. 53.
7 Cf. INSNK, S. 54.
generally cease to separate features of the world as it is in itself from features of the world that obtain only for us.

In our view, this response to the realist’s challenge simply begs the question. If Rorty presupposes that we stand in causal relations with the world, and if he furthermore assumes that these relations remain constant under different descriptions (e.g., physical and mental descriptions), he has to face one of the two following consequences. Either he is forced to accept some sort of ontological realism, namely the thesis that at least the causal structure of the world is independent of us, hence a feature of the world in itself.10 Or Rorty is in need of a constructivist-like account of causality according to which causal relations are somehow imposed on the world by us, which would clearly amount to an antirealist position of the idealistic type.11

We do not see how a mere refusal to make a choice here, resulting in the dismissal of the entire realism/antirealism debate, can be anything more than the plain confession of the lack of any argument. Rorty claims that we should rather change the philosophical vocabulary. But this, in our opinion, simply amounts to an unfair withdrawal from argument in favour of a propagandist strategy. We will turn to this strategy in part (III), but before doing this we will investigate whether Rorty’s pragmatism as such can be regarded as a coherent approach.

II Pragmatism and Science

As we have seen, Rorty regards the debate between realists and antirealists as fruitless and, therefore, recommends its abandonment.12 Instead of continuing the debate, philosophers’ attention should focus on discussions which are more useful to society and lead to practical results. There seem to be at least three interlacing problems arising from this approach.

Problem A: It does not seem to be at all clear, whether we are really able to understand and evaluate what it means for a decision to be useful. Following Rorty, the concept of “being useful” surely cannot refer to something generally

---

10 According to Michael Devitt, ontological realism in that sense is all that is needed to deem Rorty as a realist, since there is, contrary to what Rorty claims, no further necessary relation between ontological realism on the one hand and a correspondence theory of truth on the other; cf. Devitt, Michael, 1987: “Rorty’s Mirrorless World”, in Midwest Studies in Philosophy, XII, S. 157-177.
11 The position of Thomas Kuhn faces the same problem.
12 TP, p. 57.
and necessarily true. What is meant by the expression „useful“ must at best depend on what a particular society, which commits itself to specific aims and values, can agree on. In some, if not in most cases, it will be defined by different parts of a society, or even by each individual member of it, in a quite different manner. Rorty obviously presupposes that most of his readers can agree on such aims as pluralism, liberalism, democracy, prosperity, wealth, and the prevention of suffering and humiliation, in short, a Rortian or Western perspective on a better future. Rorty apparently believes these aims to be so well established in our culture that they are not in need of any further or absolute justification.

In Truth and Progress, Rorty tries to capture a glimpse of what “useful” or — more generally — “better” might mean by giving the following tentative explanation: “Better is what will seem to be better for us in the future”\textsuperscript{14}. This vaguely characterizes those beliefs, theories, and actions as better ones, which a society (or part of a society or an individual) considers more comfortable, more coherent, or more helpful — simply somehow better for the achievement of the respective aims. Additionally, such beliefs, theories, etc. are supposed to be more adequate in order to solve problems and to be applicable to more relevant phenomena than others. Rorty admits that the criteria he offers for evaluating them are neither necessary nor sufficient to determine what the meaning of “better“ is or should be. Rather, he tries to convince us that it is not even urgent to delineate what is meant by “better” in advance, as we shall reach a sufficient agreement on the meaning of the term after a long and goal-defining discourse in society.

Two aspects have to be considered here. The first aspect deals with the conditions, which are necessary in order to find an agreement. It seems to be clear, that such a process as finding an agreement is crucially dependent on the ability to understand, what it is that the respective opponent says. Donald Davidson and others\textsuperscript{15} have argued, that we have to apply the principle of charity in order to become enabled to understand what the speaker of a (foreign) language says and intends. Davidson claims that “as we must maximize agreement, or risk not making sense of what the alien is talking about, so we must maximize the self-consistency we attribute to him, on pain of not

\textsuperscript{13} TP, p. 41.
\textsuperscript{14} TP, p. 55.
\textsuperscript{15} See for instance Henderson, David K.: The Principle of Charity and the Problem of Irrationality (Translation and the Problem of Irrationality) in: Synthese 73 (1987), p. 225-252. He argues that at least at the beginning, when the development of a translation manual is at issue, the principle of charity is crucial in order to come to a first approximation of an understanding of the foreign language. In a second step, it has to be weakened in order to avoid the problem of irrationality, i.e. to make the expression of irrational beliefs and irrational actions, which is a well-documented fact in psychology and human sciences, possible in that language.
understanding *him*.\textsuperscript{16} If we are somehow not able to “interpret the utterances and other behaviour of a creature as revealing a set of beliefs largely consistent and true by our own standards, we have no reason to count that creature as rational, as having beliefs, or as saying anything”\textsuperscript{17}. The last point, the statement claiming that our own standards have to be the basis for evaluating the rationality which expresses itself in the utterances a speaker of a foreign language makes, seems important. Again, it says, that if we do not find a way to map our criteria of rationality and logic on a speaker’s utterances, we shall not count the speaker as rational at all, which seems to be in no way specific to foreign languages, but has to be construed as a general advice regarding the communication between different agents. Rorty, although he generally refers to Davidson in a very approving way, is probably not able to agree with him here, for Rorty cannot make the strong claim, that the ability to understand something is necessarily linked to a specific generally true concept of rationality, i.e. the one we use. Rorty claims, that what truth, moral standards and also what standards of rationality, logical laws and the like are depends on the conventions, a respective group of people has agreed on. This dependence makes the outcome a contingent and not a necessary one and Rorty mentions no further restrictions on the process of agreement itself. He must in consequence embrace the possibility that other standards of rationality exist and are in use, which are consistent in their own way of conceiving consistency and which involve their own ways of coming to an agreement, of defining and justifying the concept of being “useful”. Some will probably stop here and take this position as self-defeating, as not at all plausible, but if it is taken serious, it seems to be fairly ineffective and inappropriate to use our standards of rationality, when several groups with supposedly different standards each are involved. Actually it is hard to see, how any understanding or any further agreement could be reached on such a basis, if the standards of rationality involved differ in a significant degree. What are we to make out of this? Rorty might try to defend his position by saying, that we normally do not encounter such problems, as we all talk most of the times more or less along the same lines of logic and rationality, so that the question, whether or not the contingency of our own standards would pose a problem in discourse, is pragmatically irrelevant. But this reply can only beg the question, as it presupposes what Rorty himself cannot grant, i.e. that we all in fact do use the same general standards. So the problem of possibly different standards remains and allows the

\textsuperscript{16} Davidson, Donald: *Truth and Meaning* (1967)

\textsuperscript{17} Davidson, Donald: *Radical Interpretation* (1971)
unsatisfying possibility that we actually cannot come to an agreement on what “useful” means, because we generally cannot be sure whether we are able at all to make sense out of what other people are talking, as our standards of rationality simply do not apply to their reasoning.

In order to get rid of this unfavourable result it seems more plausible and even pragmatically a more viable method to avoid any relativistic notions regarding the standards of rationality and the laws of logic, as it seems difficult to see, what a logic, which deviates significantly from our logic, i.e. one which allows one or more forms of contradictions and paradoxes, could look like and how it could be used in order to establish any satisfactory cognitive theory\(^\text{18}\). Of course the arguments just mentioned are not sufficient to show, that other standards of rationality and logic are impossible. They only show, that it would be hard to form an empirically adequate theory, which explains the fact that we usually are able to come to an agreement without referring to universal concepts of rationality.

The second aspect deals with the estimation and evaluation of future use. As Rorty refuses to give us a specific criterion in advance, the use, which the subsequent decisions have had, can only be properly evaluated in retrospect. But whether a decision is useful at all to society, is a question which should be thoroughly considered, since what is considered useless today could turn out to be extremely useful tomorrow or vice versa.

Let us explain this by means of the natural sciences: How are we supposed to know whether a battery of particularly expensive scientific experiments will eventually lead to the development of some useful devices in an unknown future? The employment of the Baconian criteria of science (control, forecast) would expect too much from the respective experts. It is impossible to decide which activities will lead to technological improvements in the long run (as nobody could have foreseen that quantum mechanics would lead to semiconductor-technology).\(^\text{19}\) It seems to be more useful to technological progress to accept natural sciences as a natural kind, which implies that they have their own methods by which we investigate the (mind-independent)

---

\(^{18}\) For such a concept of minimal rationality see Cherniak, Christopher: Minimal Rationality in: Mind (1981) Vol. XC, p.161-183. Cherniak argues that - for understanding what it is to have a belief - some minimal deductive abilities, such as the ability to form useful inferences and the ability to eliminate inconsistencies in the belief set, are indispensable.

\(^{19}\) The decision of how to distribute limited resources of a society could be made on the basis of Rorty’s pragmatic considerations. But this should not be mixed up with the definition of science. It is absurd to claim that a physicist who is denied the public funding of, e.g., a very expensive particle accelerator will, in consequence, not be called a scientist any longer.
world.\textsuperscript{20} Somewhat similar problems can also be exemplified in other fields, in ethics for instance.\textsuperscript{21}

Problem B: It remains at least vague as to what the exact consequences of pragmatism are, if we follow Rorty’s suggestions regarding the notion of usefulness in the context of science and scientific practice. According to our interpretation, Rorty claims that there is a difference between traditional philosophy and pragmatism, especially when it comes to estimating their respective influences on the sciences as parts of a society. Rorty underscores the view that traditional philosophy does not have any, or at best a very marginal, influence on what and how scientists think and act. Thus, Rortian pragmatism does not substitute former philosophy. Rather, it introduces itself as an entirely new paradigm for the organization of a liberal society that lacks any kind of institution so central or predominant as, for example, science in contemporary Western countries.

Rorty envisages pragmatism – at least in the long run – to result in significant improvements of the social development. What this means, however, remains obscure and sketchy at best. The pragmatist scientist that Rorty has in mind can be characterized as someone who has successfully managed to forget all about the old philosophical dichotomies as well as the classical philosophical problems, and who is therefore able to contribute to a productive and useful discourse within a more liberal and pluralistic society.\textsuperscript{22}

We think that there are at least three points on which a further clarification is necessary. First, what consequences does Rortian pragmatism have – or should have – for the attitudes and convictions scientists have regarding their work? Second, what consequences follow from the scientists’ attitudes towards society in general, and towards the sciences in particular, and in what respect can pragmatist scientists be “better citizen[s] of a better academic community”? Third, does Rortian pragmatism result in a significant change of scientific practice, including experimental methods and the testing of hypotheses? And to what consequences does this change finally lead to?

\textsuperscript{20} This does not mean that scientific realism is right, because antirealist philosophers of science would agree with this description of science but differ on the epistemological status of scientific theories.

\textsuperscript{21} We cannot go into a deeper elaboration here. In short, we are inclined to believe that a society’s fate is a better one – even in a Rortian sense –, if the project of giving moral judgement a proper foundation is not rejected. Even if binding and explicit criteria lack that proper foundation yet, they might still offer a more effective means of improving a society than the merely formal criteria Rorty offers.

\textsuperscript{22} TP, p.76.
Problem C. It might be worth considering, whether it is utopian to assume that members of today’s scientific communities would accept a pragmatist conception of natural sciences in the long run. Paradoxically, from a pragmatic perspective it seems to be much more useful to stick to a realist than to a pragmatist position. Authority, social and economical influence, and a high social status in general, which are usually attributed to scientists in modern societies, depend heavily on the assumption that scientists are, or at least pretend to be, discoverers of mind-independent features of an objective world, i.e., realists. To abandon this realist attitude, be it adopted truly or not, could end up in a breakdown of the sciences’ privileged position in society and the high esteem they are held in. Clearly, this is a consequence many scientists may not be willing to accept, and more pressing for a pragmatist approach, should not accept for pragmatic reasons. Moreover, Rorty’s idea of a culture without centre aims at a society, where the predominant status of any part of a society can be nothing more than temporary. We do not see, though, how even a society of pragmatists could come to a point where the predominant status of science would be denied. At least up to now, science has been extremely useful to society, so that, for pragmatic reasons again, this status is attributed to science, and there is no reason to think that this is going to change.

Apart from the problems discussed so far, we consider it to be a much more plausible assumption that philosophical debates do have a direct influence on scientists and their practices. As Rorty’s fellow philosopher of science, Arthur Fine, pointed out within his reconstruction of Einstein’s philosophical attitudes, at least the two fundamental revolutions in physics of the 20th century were strongly motivated by an antirealist perspective. If this is correct, scientific developments heavily rely on a direct connection between philosophy and science, which Rorty seems to disbelieve.

At this point, one could argue that it is a rather empirical question whether physicians or other scientists are participating in philosophical debates. It can even be argued that most of the scientists do not care about such rather obscure things like philosophy. On the other hand, Fine has, as stated above, shown quite clearly that some of the most respected scientists very well did. The question arises how one can avoid reflecting about the status of scientific theories or even physical laws when doing research that seems to defy common

---

23 NOA, p. 124.
24 Whether Fines position that we need NOA is really plausible if we take his description of Einstein and Bohr serious is another critical point.
theories and laws that seemed to work perfectly well. Of course, this problem is more likely to show up at scientific revolutions. This explains why most scientists do not care about the philosophy of science, as one could try to maintain. Scientific revolutions have always been the work of only a handful of radical minds. It seems implausible that a person at such a high level of reflection ignores the consequences of her work.

In contrast to Rorty, we think that modern physics provides a good example of how philosophical assumptions turn out to be fruitful for scientific progress. We therefore do not see why a scientist should subscribe to a pragmatic understanding of science. On the contrary, adopting a pragmatic stance would deprive him of his motivational and inspirational force which enables him to develop new ideas and methods.

In sum, as we do not see any convincing reasons for either society or scientists to accept the pragmatic view of science, the question arises as to how Rorty is able to imagine pragmatism to come into force at all.

III Counterpropaganda

Let us now switch to the propagandist level of discourse. Rorty could still try to sabotage our efforts by claiming that we misinterpreted his approach as a special form of antirealism, hence, unfairly attempt to force him back into a philosophical debate which he considers to be useless. Since it is the aim of Rorty’s pragmatism to get rid of fruitless philosophical controversies altogether, we should, he suggests, envisage a new vocabulary completely incommensurable with the conceptual frameworks of traditional philosophy.

The problem, however, is that such a vocabulary does not yet exist. It is therefore exceedingly difficult for Rorty not to fall back into old dichotomies when he tries to advocate pragmatism. Nevertheless, he advises that we “create causes for forgetting old controversies, which are not reasons for forgetting them.” A “temporary forgetfulness” about old controversies might lead to the development of a new vocabulary and to a withdrawal from traditional philosophical disputes. The stress on “causes” rather than on “reasons” clearly indicates that here Rorty switches from argument to propaganda. He tries to convince us that pragmatism is a standpoint beyond realism and antirealism not

25 This one is really an empirical question.
26 BRA, S. 114.
27 Ibid.
only by giving arguments that are directed against one or the other, but also by propagating the abandonment of the whole debate.

By changing the level of discourse from argument to propaganda, Rorty necessarily evokes anti-pragmatist propaganda a brief sketch of which we are now going to give. Anti-pragmatist propaganda is to be located on a meta-philosophical level beyond any traditional philosophical debate, which brings it on a par with Rorty’s pragmatism. In particular, we will try to urge the continuation of the realism/antirealism debate and highlight its many advantages.

Rorty claims that philosophical debates have been long and fruitless, and especially, that there has not been any significant progress in the realism/antirealism debate in the last four or five decades. We consider this as a quite unfair evaluation. Beginning from logical positivism, Popper’s falsificationism, Lakatos’ considerations regarding scientific research programmes, and Kuhn’s constructivism and continuing up to recent approaches such as van Fraassen’s constructive empiricism, or Boyd’s naturalism, the debate has produced a large amount of quite fruitful results. During this development, new aspects of scientific research in general, as well as scientific theories in particular, have been envisaged and discussed continuously. As a result, we are endowed today with a richer and much more differentiated picture of science than ever before. In our view, the enduring vividness of the debate is not, as Rorty wants us to believe, due to its inability to solve problems and its overall fruitlessness. Rather, it shows its enormous practical significance and the permanent enrichment it gives to science, by introducing new ideas of great interest for scientists which are worth discussing in the scientific communities. Particularly in the light of recent developments in the realism/antirealism debate, it seems plausible to adopt an optimistic stance towards the solution of at least some of the debate’s most fundamental questions. Why should we wish to get rid of a theoretically fruitful and action-guiding tradition of philosophical problems?

More importantly, however, we do not regard it as the main task of philosophy to solve or dissolve problems, but, quite the opposite, to develop conceptual frameworks and theoretical problems that lead to further vivid and fruitful discussions. We think that the development of problems as such can be a very fruitful activity, as it opens new perspectives on a certain topic and thereby helps us to bring into view different aspects of it. Moreover, the establishment of new methods and approaches is very often due to the acceptance of a
problematic setting. In sum, being occupied with complex philosophical problems rather increases than diminishes man’s creativity.

As a consequence of this consideration, we do not understand Rorty in his desire to abandon the idea of truth as a goal for philosophy. The pursuit of truth seems to be an essential aspect of intellectual fantasy and creativity.

A further consideration that can be put forth in favour of the relevance of the realism/antirealism debate is of pragmatic character. Obviously, many people feel a strong need for pursuing truth. Rorty’s recommendation is to simply forget about such philosophical inclinations, as they are likely to lead to a dogmatic, anti-liberalist view. But can Rorty decide which needs are good, and should therefore be satisfied, and which are the bad ones we should forget about?

Moreover, giving up absolute truth as a guiding idea seems to lead to relativism. Rorty himself doesn’t want to be a relativist and tries to avoid it by invoking the idea of ethnocentrism. According to ethnocentrism we should try to find out what truth means for us, i.e. in the context of our culture or society, and not what it could mean universally. From an ethnocentrist point of view truth can only be construed as “acceptable for us at our best”. However, it seems to be unclear whether the ethnocentrist move can prevent Rorty from embracing relativism. To believe that truth can only be the truth of a particular community or culture simply amounts to cultural relativism. Accepting the values of one’s culture and, at the same time, acknowledging that these values are dependent on contingent cultural developments obviously results in a cynical position in the uneasy neighbourhood of relativism.

Contrary to Rorty’s advice, philosophy should be considered as a special way of life that includes a passionate desire to solve philosophical problems rather than rejoicing in their total dissolution. Those taking part in philosophical

---

28 TP, p. 77-79.
29 Susan Haack, for example, characterizes Rorty’s ethnocentric position as cynical, “because if one really believed that criteria of justification are purely conventional, wholly without objective grounding, then, though one might conform to the justification practices of one’s own epistemic community, one would be obliged to adopt an attitude of cynicism towards them, to think of justification always in covert square quotes, (...) one cannot coherently engage fully – non-cynical – in a practice of justifying beliefs that one regards as wholly conventional. For to believe that p is to accept p as true.”
30 WuF, S. 76.
31 Susan Haack made a somewhat similar point in her essay „Vulgar Pragmatism: An Undefying Prospect“. She characterizes Rorty’s position as cynical, “because if one really believed that criteria of justification are purely conventional, wholly without objective grounding, then, though one might conform to the justification practices of one’s own epistemic community, one would be obliged to adopt an attitude of cynicism towards them, to think of justification always in covert square quotes…. [O]ne cannot coherently engage fully – non-cynically – in a practice of justifying beliefs that one regards as wholly conventional. For to believe that p is to accept p as true.”
debates are not bored by troublesome problems, but rather with the lacking of problems to be solved!

Let us formulate a final statement against pragmatism: We happily invite everyone to join the debate on realism and antirealism and beg philosophers not to be blinded by rash and seemingly viable dissolutions of hard problems. We hope that the promising project of philosophy that began millennia ago can be continued. Perhaps even Rorty’s philosophy might help with this. We refuse however to abandon philosophical debates simply on the ground that old challenges like the quest for truth and realism have yet to be met.

References


