

PERSPECTIVE

# Rewriting the Contract with Science

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**DI<sup>3</sup>LOGUE**

Science, Scientists, and Society

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## Abstract

The social sciences stand at a critical juncture today; they have lost the capacity to intervene effectively and authoritatively in the public political discourses. Are our methodological practices responsible for this? Do we need to take a critical look at these practices and reassess them?

**Keywords.** Philosophy of science and social sciences; Relativism; Truth and justification; University; Democracy.

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## The Problem

During the 20<sup>th</sup> century, philosophers of science and social science were concerned overwhelmingly with identifying what can legitimately be called science and scientific knowledge, and, differentiating between science and other forms of learning. Indeed the distinction between science and other modes of cognition was central to the social and political imagination of the 20<sup>th</sup> century. But today we stand at the crossroads where the line separating science and non-science is becoming increasingly blurred. Whether it is a case of treating an illness or accepting what counts as evidence on the basis of which we can claim to know the truth (at least in a weak sense), in each case, different forms of knowing and learning are jostling for the same space and equal recognition.

Take, for instance, the case of dengue fever: the search on Google will reveal many more entries and ‘likes’ for such remedies as eating fresh papaya leaves, drinking papaya juice, *tulsi* water, *giloy*, etc., than monitoring platelet count. One will find a few references to the latter and occasionally an advisory to consult a doctor. The same goes for other conditions, such as cardiac arrest, liver or kidney malfunction, gout, etc. On social and historical issues too we have a variety of stories and representations circulating, both about the past and the present. It is said that aeroplanes and the internet existed in ancient India; that procedure for rhinoplasty had been spelt out in ancient texts some 2000 years ago; that Rana Pratap won the battle at Haldighati, etc. In many intellectual circles, these assertions are summarily dismissed as instances of fake news or ‘invented’ facts, but even this charge does not settle the issue; it does not win the argument, and we need to ask just why that is the case.

The problem before us is a serious one and we need to confront it head-on as the ‘new’ narratives are not thriving on ignorance; they are being widely circulated and forwarded by the educated middle class. The reproduction of such narratives cannot also be explained in terms of political power and ideology. While the latter may play a role, as social scientists we need to consider just why has the ground of discussion and debate changed so swiftly? Why has space previously occupied by specialists, historians, social scientists and trained medical practitioners, been ceded to parties and communities? If matters that were earlier settled in institutions of higher education are now being concluded in the political arena, then the fault must also lie with us in the academia. We must scrutinize our methodological and disciplinary practices to understand why power and politics rather than scientific exploration and explanation count for more even in the imagination of the middle class.

This paper tries to reflect on this issue. Instead of focusing on what politicians do, or how power manifests itself, it turns the gaze inwards to scrutinize our own methodological orientation and the crisis it has created. The predicament we face today is, to an extent, one of our own making; only when we recognize this, can we begin to address the challenges that confront us in society and in higher education.

The next few pages argue that in the second half of the 20<sup>th</sup> century there was a consensus of sorts on what should rightfully receive the status of knowledge (as opposed to other kinds of experiences and opinions). There was an accompanying agreement on what could legitimately be accepted and incorporated in textbooks; and what protocols were essential to justify a claim. Different disciplines (in the natural and the social sciences) had established methodological norms that had to be followed. However this consensus has gradually eroded and ‘solidarities’, political and ideological, have displaced acceptable modes of justification. In fact, the question of truth and justification has been surgically removed from the discourse. What we have, as a consequence, are competing assertions vying for attention and public space but no agreed-upon grounds for assessing them. The consequences of this are manifold and visible in different ways. Earlier, disciplines, like astrology, yoga, naturopathy were placed in forums outside the institutions of higher education. Today they are knocking on the doors of the University, asking not only to be admitted but to be treated at par with, and certainly not subordinate to, the designated sciences.

Voices in support of such claims may have become more shrill and prominent today but it would be naïve to think that the change we are witnessing is on account of an ideological shift – a change in the preferences of a group or party. While the reception and public space that these views are getting may be explained in terms of shifts in ideological and political power in our society, this trend is visible in varying degrees in many other parts of the world. We must, therefore, take these developments, and the challenges they present, seriously and ask – i) how did we end up in the situation? Why has science (as it was understood in the 20<sup>th</sup> century) lost its privileged position and legitimacy? ii) How should we now think of knowledge, truth and science? And, what methodological protocols might be put in place, particularly while considering the claims of different fields and practices that find a place in institutions of higher learning? There is an urgent need to initiate a debate on these issues in the university as well as other public forums.

Philosophers of science have been dealing with questions of this kind for some time but most of those debates take the natural sciences as the point of reference. That is, they discuss what scientists, studying the natural sciences, do; they examine scientific theories (how they are arrived at and defended), the role of the scientist (individually and collectively) and the working of the laboratory. Their analyses hold important clues for the social sciences and the challenges they face but these need to be drawn out, reflected upon and interpreted in ways that address the concerns of the social scientists.

Given the current debates on epistemological issues, my repeated invocation of truth and science may appear problematic to many. In fact, after the interpretive turn in the social sciences and the tilt towards constructionism, social scientists are reluctant to use these terms and at times it seems that these concepts belong to an era gone by. Yet, in the current context, it is essential to bring these concepts back into our discussion with the awareness that in the post-enlightenment world, science cannot be equated with, or conceived as, a form of technocratic, instrumental rationality that describes the world as it is in neutral and moral terms. The task before us is to re-signify the idea of science and confront the challenge posed by relativism in the social sciences. Without it, both democracy and the liberal university may be under siege.

As was noted earlier on, I am concerned primarily with the social sciences. However, all through the 20<sup>th</sup> century, the discourse of the social sciences was to a considerable extent shaped by the debates in the philosophy of science. In fact, in the early part of the last century, the social scientists saw the natural sciences as the model or the prototype of what science is. Subsequent reflections and reconsiderations of the concept of science in the natural sciences had a profound influence on the thinking of these disciplines and it produced scepticism about achieving objectivity, truth or knowledge in the social sciences. Those who resisted the imposition of an external model on the social sciences and placed the category of meaning at the core of the social sciences too moved in a similar direction and gradually abandoned the quest for objectivity. The internal critiques of the sciences slipped gently into some form of relativism. The next section, therefore, turns to these internal critiques to understand how ideas of knowledge and truth changed dramatically over the last fifty years. Briefly exploring how these issues are addressed in the natural sciences, the paper turns to the social sciences to

reclaim the lost ground and brings back the question of justification into the discussions of the social sciences and the practices of the University.

## The Legacy of Internal Critiques

The publication of *The Structure of Scientific Revolutions* by Thomas Kuhn in 1962 changed the discourse of science in a very significant way. Up until then, most philosophers of social sciences (and to a considerable extent, philosophers of science), operated with what might be called the common sense idea of science. They presupposed the existence of an external reality independent of the knower and claimed that science offers a picture of that objective reality. As such, they assumed a distinction between subject and object, knower and known, and believed that scientists (natural and social) provide (or at least seek to provide) an accurate description of the external world, and explain why a certain phenomenon occurs at a given time. The actual narrative of the philosophy of science was obviously more complex than this. Even the Vienna Circle moved away from the simple picture theory, advanced by Wittgenstein in *Tractatus*. Moritz Schlick and others recognized that knowledge involved a triadic relationship between subject, object and language. Since observations were presented in and through language, there was no pure observation or language-independent observation. One had, therefore, to identify what is 'cognitively meaningful'; members of the Vienna circle also acknowledged the presence of concepts and theoretical terms in scientific theory. In fact, as language was the medium of representation, some even made an effort to create a more precise, physicalist language to ensure that words/concepts convey the same meaning to others (Carnap 1931 in Alston & G. Nakhnikian 1963).

Logical positivists thus added a new layer of meaning to the existing conception of science. They altered the idea of objectivity embedded in the earlier understanding but did not relinquish the search for truth, or universal truth. Realizing that the presence of the subject could not be completely erased, they set about minimizing the space for subjectivity in scientific knowledge. At the end of the day, they continued to claim that scientific theories are, and must be, verifiable, and reducible to 'observation statements' or 'protocol sentences' (see Uebel 2007).

However, the internal critiques of science did not stop here. While logical positivists pointed to the absence of language-independent observation, later philosophers interrogated and redefined the relationship between observation and science. Hanson, Achinstein, to name a few, argued that scientific theories contained concepts that were not directly reducible to objects given in observation. While some concepts, such as, water, salt, may point to things that have a direct equivalent in the world, scientists use concepts like pressure, current, gravity, that do not refer to any directly observable object. These concepts were only indirectly observable: that is, we can only observe them with some instrument; one could specify operations which, if performed, would yield a certain observable effect. For instance, one could say that if the circuit is completed in the following way the bulb will light up, thereby indicating that the current is passing through at this time. Here too science still

focused on that which was given in observation albeit one could include concepts that could be translated into effects/phenomena that can be observed.

A stronger challenge came from the argument that observation involves naming something as X. To put it another way, philosophers of science nuanced the idea of observation further to suggest that – a) observation is not to be reduced to seeing; and b) seeing involves interpretation. In the first instance, it was argued that observation, that is considered to be the building block of science, is something more complex and varied than seeing an object. Often we place within the ambit of observed/observable things that we infer from the exercise of other sensory perceptions. For instance, we see clouds of smoke in a distance and infer that there is a fire there, even though we have not directly seen the flames. Similarly, on hearing the sound of dried leaves being crushed, we claim to know that a person was running across the field. Both kinds of assertions are accorded the status of observation statements. Hence, what it means to observe is a far more complex activity than we realize; and science is not to be reduced to things that are, or can be, seen.

Even more importantly, theorists of science maintained that a theory/conceptual schema is involved in the act of observation itself. Seeing involves identifying and naming the object. Kepler and Brahe may have the same ‘retinal impression’ or receive the same ‘stimuli’ when they observe the setting sun, but they see different things. That is, they organize these impressions differently and do not, in that sense, see the same thing (Hanson 1958 in Brown, Fauvel & Finnegan 1981). Seeing and naming are not, in this sense, two distinct activities in which the former is prior to the latter. I see an aeroplane in the sky or an eagle in the sky; I do not first see certain properties and then sit back and collate them together into some identifiable object that is then named. Seeing always involves naming, and this means that some conceptual schema on the basis of which we name different objects is already present in each and every observation. Since the schema is devised by the community of scientists or taken from the linguistic practices of a social community, the subject is actively present in the knowledge process.

Another line of argument brought the subject in by highlighting the place of interpretation in scientific inquiry. Karl Popper, for instance, argued that theory is involved in designing an experiment and the scientist also plays an active role in interpreting the findings of the experiment. In other words, interpretation was involved at many levels and even the establishment of so-called ‘verified facts’ is an outcome of interpretation. We could never say that a proposition has been verified fully or a conclusion tested completely.<sup>2</sup> All that scientists could do was to try and falsify a hypothesis, and so long as the hypothesis is not falsified we could take it to be true (Popper 1959 & Popper 1963). But here again, falsification was not a simple process based on pure observation. Observation of a single fact to the contrary rarely led to the rejection of the postulated claim.<sup>3</sup> An existing theory (or a set of propositions) is

given up only when the scientists have a new theory with greater explanatory potential (Lakatos 1977; Popper 1959).

Thus, in many different ways, the idea that science embodies neutral and theory-independent knowledge and that scientific theories offer generalizations that are drawn from systematic observation was gradually being questioned and disputed. However, despite these different points of view, the scientific community held on to the belief that objective knowledge was possible; the idea of objectivity was redefined but a distinction was still maintained between subjective perspectives and scientific knowledge. Even when philosophers of science argued that a single evidence to the contrary may not lead to the rejection of a scientific theory they continued to affirm that ‘methodological falsification’ was possible. The scientists were willing to give up a theory and search for a new one: one that could explain these contrary occurrences. Hence, even as the ground was ceded to interpretation, the idea of science and the scientific theory was retained. In effect, this meant that explanations drawn from different modes of analysis could not be treated at par and accorded the same legitimacy.

This changed, to an extent, with Kuhn’s writings. *The Structure of Scientific Revolutions* offered a powerful account of the role of paradigms<sup>4</sup> in scientific investigation: science was a puzzle solving activity and the puzzle a group of scientists work upon, the methods they use, and what they consider to be a solution, depends upon the paradigm they use. There was no paradigm-independent way of evaluating the process or the end result. In other words, a community of scientists (and there could be more than one community at any given time) were the ‘producers’ and ‘validators’ of knowledge (Kuhn 1970), and one could not speak of a distant objective reality against which their findings could be checked – validated or falsified. Coupled with the view that a shift from one paradigm to another could not be explained rationally (Kuhn referred to it as *Gestalt* switch) the Kuhnian framework left decisions about truth claims dependent upon the judgment of the scientific community.

Kuhn went on to explain that his intention was to draw attention to the role of the scientific community and not reduce science to subjective beliefs. To his critics, he clarified that scientists (more than others) can and do come to an agreement and share goals and commitments. Hence, the decisions of the scientific community were not completely arbitrary and subjective, but his analysis postponed, almost indefinitely, the question of truth. This decoupling of science (and scientific inquiry) from the quest for truth fundamentally changed the

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[2] Lakatos made a distinction between naïve and methodological falsification: it was naïve to assume that a single observation could falsify a theory. Most of the time scientists try to explain why we did not observe what had been predicted. “...They solve (or dissolve) the apparent anomalies by auxiliary hypotheses or other ‘conventional stratagems’” (Lakatos 1970:105). A theory, as Popper himself clarified later, stands rejected or falsified only when we find a new theory with increased empirical content.

[3] The scientific community share a disciplinary matrix (a set of beliefs, values, conceptual vocabulary and techniques) and a set of exemplars (examples of puzzle solving).

[4] Reconstruction of the original context (in which the author lived) raised several methodological issues: for instance, how does one reconstruct the life of the other? Does such reconstruction require empathy with the other? How does one move between the life of the author (his/her biography) and the history of that period? All such methodological issues became irrelevant as the reader gained more autonomy over the text and the author became steadily irrelevant.

discourse of not just the sciences but also the social sciences. In anything, it had a deeper impact on the latter. The sciences could invoke a technical criterion; besides, as the sciences were marked by periods of 'normal science' where one paradigm dominates, there was a higher degree of agreement among the members of the scientific community on what is acceptable and designated as true, at least temporarily. The social sciences, where we have competing interests, paradigm-dependent knowledge not only ruled out the possibility of consensus, it suggested (or was interpreted to suggest) that different readings were equally valid and none could be justified to those outside the paradigm.

Kuhn had focused on the role of the subject; he did not question the existence of an external substance or objects; later-day philosophers, like Bruno Latour, did just that. If earlier theories brought the subject into the epistemological process, Latour destabilized the idea of the substance/object. The object was no longer seen as a passive entity, observed by and responding to the conditions created by the scientists, rather it was seen as an active entity, changing with the context/state of affairs and not reducible to a set of generalized properties (Latour 2005). The properties that were associated with an object, even a natural object, were those that emerged through institutionalized practices of the scientists. This idea – that the object is constructed, or 'compositional' - dismantled every aspect of the realist paradigm, and after this, it was even more difficult to speak of truth-claims. If there was no object with fixed generalizable properties, then what kind of truth claim could we have? This changed our conception of science and, coupled with the idea of paradigm driven knowledge, it tended to pull the social sciences further down the abyss of relativism.

## Social Critiques of Science

There was yet another line of attack, and this came from the sociologists of science. Even those who did not give up the idea of checking theories against reality, however theory-laden that might be, spoke of power equations within the scientific establishment and the effect this has in the laboratory, in the shaping of research agendas and decisions taken by the scientific community (Barnes 1972). Others pointed to the manner in which science privileged the specialist and the knowledge of the experts over all other forms of experience and knowledge. Driven primarily by the technical interest – namely, control over the object - science was accused of delegitimizing local knowledges, which communities of practitioners (for instance, peasants, tribal populations) had achieved through generations of practice (see, for instance, Nandy 1990). Science, in this debate, came to be associated with value-less (rather than value free) knowledge that was open to appropriation for different purposes while local and indigenous knowledge was seen as being holistic, sensitive to the object it was dealing with (for instance, nature), and mindful of other species and future generations. If the former argument pointed to the operation of power in science/scientific communities, the latter criticized the power exercised by the knowledge that was labelled as science. Once again, for different reasons, science could no longer claim to offer knowledge that was free of prejudices and backed by indubitable proof. In fact, the critic's privileged the lived experiences of



communities the wisdom embodied in them. From their perspective, ways of life that had existed and survived over a period of time must have something inherently valuable in them.

Collectively, these critiques – some arising from within the scientific community and those studying the working of the scientific community/ies – and others that came from social scientists looking from the outside at the effects of science and scientific rationality, dislodged the privileged position that science enjoyed in much of the 20<sup>th</sup> century. They also blurred the distinction between science and non-science. It seemed that all forms of inquiry were beset with the same difficulties and none could claim to arrive at the truth. There was an accompanying suggestion: namely, insights that had previously been dismissed as untruths by the scientific community had some value and this needed to be recognized and accommodated in the institutions of learning. Indeed, some analysts went so far as to say that they must be placed alongside, and to an extent even favoured, over science.

These social critiques of science had a profound impact on the social sciences as the idea of truth was already under siege from other schools of thought -from post-positivist to the historicist tradition. The former (as was observed in the last section) gave more importance to theory and interpretation in the process of knowing. Although they did not deny the existence of an external world (independent of the knower) they maintained that we know the world only through the categories we employ and the latter may change from one theory to another. Following upon this, it could be (and indeed was) argued that what social scientists present as knowledge is constructed (rather than given), and accorded certain relevance and significance on the basis of the theoretical predilections of the investigator. Multiple narratives were therefore inescapable, and one could leap forward to proclaim that there was no way of favoring one narrative over another.

The historicist tradition too moved towards a similar conclusion. In the 19<sup>th</sup> century, when philosophers emphasized the historicity of the text, the idea of objective knowledge was still retained. The reader was expected to follow certain interpretative procedures (historical and linguistic) to reconstruct the context in which the author lived, and on that basis recover the meaning of a text or what the text says, with a considerable degree of certainty.<sup>5</sup> However, later on, when the focus shifted to the historicity of the reader, the situation changed dramatically, as the idea of history itself changed without much discussion. Previously, history denoted a shared ground that alters with time due to changes in material/objective and subjective conditions; but for a period, it provides a common context of experience. By this reckoning, historicity of the reader should have given us plurality of readings located in different historical contexts and by default some sameness or consensus of meaning within a historical world. However, this was not the case. In Gadamer's framework (which shaped this debate), the individual imperceptibly became the point of reference. Instead of conceding space to different narratives arising in different historical contexts, social scientists converged their focus on a specific conjuncture.<sup>6</sup> Every individual, situated as they are in different paradigms and settings, could read the text in their own way. Every reading involved, what Gadamer termed as, 'fusion of horizons,' but that is all that could be said. It seemed meaningless to raise questions about the adequacy of the offered explanation and

understanding (Gadamer 1979). As Habermas pointed out, one could no longer distinguish between understanding and ‘misunderstanding’ (see Ricoeur 1973).

Within the Gadamerian framework, a fusion of horizons held many possibilities; it could end up affirming our initial beliefs/pre-judgments or challenging them. There was no way of deciding between competing readings and Gadamer also had little space for discussions across groups of readers. Instead of being the collective ground on which we stand, history became an individualized point of location and assertion, allowing for a variety of interpretations. Those who wanted to destabilize the dominant narrative privileged the perspective of the marginalized but they too offered no basis for bringing back the idea of truth or objectivity. There was a political and ideological rationale offered, but that is about all. One could ask: from whose perspective was the narrative constructed? But in a framework where truth was considered to be a tool in the hands of the powerful and all narratives were constructs, there was no need or reason to, debate the objectivity of the narrative, let alone focus on the grounds for justifying the narrative.

It is not my intention to dwell on the debates around the question of interpretation. The only point that I want to underscore here is that the idea of truth came under attack from diverse perspectives. In the social sciences, the idea of science and truth was, for a while, displaced by interpretation but the latter gradually came to represent the mere act of reading with an open mind. It treated all practices (be it, reading a written text, or living a life or analyzing a socio-cultural organization) alike and gave freedom to the subject to shape them in accordance with her/his own preferences and prejudices. This mode of reasoning had the potential of destabilizing existing hierarchies and structures of power but it also lent legitimacy to all representations of the present and the past.

Collectively, this frame of reference in the social and cultural sciences coupled with the internal and external critiques of science have engendered the present crisis: one where the distinction between science and other kinds of learning and doing has been blurred and all narratives are seen as interpretation offered by the investigator. Hence, they vie for the same space and legitimacy, and people can choose between them depending upon their personal or ideological preferences.

### **Ditching Relativism, Reclaiming Science**

The challenge confronting the social sciences is thus a serious one, and we need to respond to it with some urgency. The issue before us is - how to reimagine the idea of science/scientificity while abandoning the realist assumptions of enlightenment theorization. This is not an easy

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[5] This shift went along nicely with the Kuhnian understanding that location in a paradigm matters; we could only have a shared view within a paradigm, and when more than one paradigm prevails, multiple narratives and accounts exist.

[6] The interpretive framework recognized the presence of the social in discussions of the rational, and for this reason, backed free play of interpretation. But ceding the ground to the social so completely has also prevented the social sciences from serving the critical interest.

task but, to assure ourselves that this is not an impossible task, we can examine how philosophers of science have attempted to rescue critiques of realism (as well as nominalism) from relativist readings.

Philosophers of science, who were challenging the possibility of knowing the external world as it is, did not advocate or push their argument in the direction of scepticism or relativism. Often they were replacing one criterion of truth with another. Take, for instance, the work of Thomas Kuhn: in ruling out the possibility of any paradigm-independent knowledge, he set aside the correspondence theory of truth. But this did not imply that all theories and explanations were equally acceptable. He invoked logical and aesthetic criteria to explain how shifts occur from one paradigm to another.

In the Kuhnian framework, we may not be able to offer a rational criterion to explain paradigm shifts, but we can nevertheless say that the chosen paradigm offers a better account of the given reality. In determining what is better or more adequate, the issue of 'internal and external consistency' is considered by the scientific community. Scientists assess on the basis of 'simplicity, scope, comprehensiveness' of a theory; they consider if a theory is 'simple, self-consistent, and plausible,' and 'compatible...with other theories currently deployed' (1970:185). Scientists take these elements into account while assessing a theory; they invoke these criteria to persuade each other of the truth of their claims and, eventually, a consensus is reached within the scientific community about what is acceptable and adequate. In other words, even though research is guided by a paradigm and its disciplinary matrix, there is communication with others outside the paradigm and an effort is made to build a consensus about the validity of the offered claims by persuading other members of the scientific community.

Similarly, questions of justification and adequacy are not given up in Bruno Latour's framework. In the scientific community, there is discussion about good and bad experiments, adequate and less adequate interpretation. Even if we cannot know or assume the existence of the thing-in-itself, for Latour, there remains the need for, as well as the possibility of, offering justifications. Scientists may work with specific paradigms; they may make sense of things only in terms of specific practices that define a web of relationships, but they continuously seek to persuade others through a set of justifications ([Latour 2005](#)). I have drawn on these two examples only to reiterate that rejection of the correspondence theory of truth as well as the presence of the social need not leave us with relativism. Philosophies of science have made an effort to try to re-configure the idea of science taking cognizance of the presence of the social along with the rational (see [Longino 2002](#)). The social sciences need to do the same and consider how the space conceded to constructionism and interpretation do not leave us at the precipice of relativism.

Social scientists have, however, been reluctant to move in this direction for two reasons: one, the debates within the social sciences invariably dwelt on the difference between the natural and the social sciences. If some spoke of the difference in the purpose of the two sciences, others suggested a difference of 'degree' on account of the subject (namely, human beings rather than natural objects) they dealt with. In each case, the assumption was that the social sciences cannot, or should not, follow in the footprints of the sciences. Two, by the end

of the twentieth century, social theorists were increasingly of the view that the social sciences must serve a critical or emancipatory interest (Habermas 1972). The hard sciences served a technical interest; hence, in these disciplines questions of truth and falsehood could be settled on the basis of technological applications and innovations engendered by a theory. The social sciences, by contrast, were expected to perform a critical purpose: i.e., push for exposing and deconstructing our prejudices. Technical and predictive certainty was therefore not enough. Critique required dismantling the prejudices of the present; one needed new ways of reading the past and the present – something that needed a shift to creative interpretation, including Nietzsche's dictum, creative misinterpretation.

The emphasis accordingly was on new ways of reading and presenting the otherwise familiar narratives. Alternately, building on the belief that narratives were the construction of the knower, and they served certain social and political purposes, the emphasis now was on multiple and diverse interpretations (Derrida 1974). The ground ceded to the social (in particular, the presence of power) thus made questions of truth and justification insignificant, if not also modes of entrapment.

The interpretive turn in the social sciences had the potential of destabilizing the dominant narrative of our time as well as the dominant narrative in a given society. But it also left the door wide open to the construction of multiple accounts, drawing upon divergent sources. One could invoke local community knowledge for sustainable agrarian practices as well as for observing certain social practices and handing down specific accounts of events. Memory, tradition, religion and culture could be drawn upon to offer remedies for illness, an account of the past, or even for mapping culturally significant places. In other words, the silences and the gaps in history could be filled in different ways to offer divergent narratives of events and personalities. The emphasis on multivocality and the perception of such difference as desirable was thus open to a variety of uses. Philosophies of science had stressed the role of the investigator, the historian and the social scientists in the process of cognition but they did not attach a positive value to it; that is, the presence of the social posed a challenge and one had to find ways of going beyond it to reach out to other scientific communities. In the social sciences, several schools of thought, particularly the post-modernists and the post-structuralists, favored and valued the presence of diverse narratives in the hope of destabilizing the dominant structure. However, once plurality became an end in itself, and was positively weighted, it was open to diverse usages. Plurality of this kind ceased to be enabling and, as we have witnessed in our own lifetime, it has yielded endless conflict (involving clashes between holders of divergent perspectives and narratives) that can supposedly never be settled. Politics of violence has flourished in this framework.

Both pragmatism as well as the pursuit of critical interest<sup>7</sup> make it imperative for us to move beyond the simple celebration of multiplicity and bring in the question of justification. Rejection of the realist paradigm may have limited the possibility of asserting claims of truth, but there is still the possibility of raising questions of justification, and this is what we need to bring back into our social and political discourses. Each discipline needs once again to debate and put in place methodological protocols for justifying what counts as evidence, the lexical ordering of different sources, and debate questions of coherence and consistency. How does

one deal with an account that does not cohere with the state of material and technological development in a society? What weightage should be given to agent's self-perception? Should we accord primacy to the way people in a given place represented themselves over later-day representations? Methodological issues of this nature, on the basis of which we can discuss the adequacy of an account, have to be brought in more vigorously, and a consensus reached on what cannot be ignored in presenting a narrative. Even if we cannot place these protocols in the public domain where competitive politics orders the discursive, at least in the university there must be room for the latter.

At a more general level, one needs to re-signify the idea of science and reclaim it in institutions of higher education. Disciplines that identify themselves as a science, as distinct from other modes of knowing, must display three attributes: i) they should be marked by the presence of more than one paradigm. While one paradigm may be dominant at a given time, other paradigms should have existed at least over time; ii) they must be open to critique and scrutiny by the community of peers; and iii) scientists/practitioners must be ready to give up their paradigm and look for an alternative set of theoretical propositions.

Science, as a form of knowledge, requires justification and an effort to build a consensus around what is accepted as true at a given time. At the same time, it also requires a willingness to be challenged and questioned about the propositions we make. Both elements are equally important and modes of inquiry that do not meet these requirements cannot, and should not, be equated with science. For this reason, the mere presence of a paradigm of understanding or a general theory is not by itself enough; there must be, at least over time, a contest between paradigms. The absence of such public contestations places the observations and experience in that field of learning in a space outside of science.

The grounds on which certain assertions are made must also be publicly available and open to scrutiny by all. The knowledge that finds its way in educational institutions at all levels has to be open to such contestation so that others are or can be, persuaded of the adequacy (if not the validity) of the offered explanation. Paradigms are not separate islands whose life and meaning is unknown to others. They may offer different ways of perceiving and thinking but the meaning of the asserted claims is, to some extent, available to others; hence, communication and discussions can take place across paradigms. As scientists, practitioners should also be prepared to recognize, what Kuhn calls, 'anomalies': things that cannot be explained within one's paradigm. If one refuses to acknowledge anomalies, one is also likely to resist questioning of the framework we are using. To arrive at knowledge that can be designated as science, one must recognize both what can be explained so far, from within our disciplinary matrix, and what requires further research and what does not fit easily within our framework. It is the recognition of the limits of one's paradigm that allows, and pushes for, the search of alternative theories and explanations.

Disciplines and bodies of knowledge that vie for space within the university, and desire to be designated as social science, cultural science or natural science, must aspire to meet these criteria. In society, there will be other kinds of experiences and learning, including applications based on a given theory or practices that are able to read symptoms and suggest solutions, but they should occupy a separate space in society and must be treated differently

from disciplines and fields of inquiry that are designated as science. It is not even necessary to affirm the superiority of one kind of knowing over another, but it is nevertheless important to recognize the difference in these modes of inquiry and thinking; and above all, place only those that aspire to be a science within the university.

Science requires certain values: moderate scepticism, humility, willingness to be contradicted, and a willingness to admit that our conclusions and statements may not represent the truth. Sustaining these values, in turn, requires an environment in which truth is not forced upon us but emerges out of debate and discussion across different paradigms. The danger with relativism is that it nurtures only solidarities and allows power to prevail; it eclipses the need for justification and for offering good reasons for asserting certain claims. None of these can sustain either a democratic society or a liberal university. We need to rewrite the contract with science if we are to retrieve space for a meaningful engagement with the society and culture.

[1] The idea of complete testability and complete verifiability is already set aside by Carnap.

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