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Paradigms And Counter-Paradigms: The Interplay Of Science, Culture, And Objectivity

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This paper explores the intricate relationship between science and culture, examining how culture sometimes functions as a component of epistemology and, at other times, remains distinct from it. The first objective is to analyze how scientific ideas are shaped by cultural influences and, conversely, how they contribute to cultural transformations. The second aim is to investigate how scientific thought draws nourishment from the imaginative realm, shaping and expanding the boundaries of knowledge. The third focus is on the notion of objectivity, particularly in relation to cultural factors that shape the way we construct knowledge about the world. This inquiry also considers the possibility of contrastive sciences, highlighting the extent to which scientific developments are contingent on the socio-cultural contexts that influence them.

A foundational aspect of this discussion is an examination of epistemology itself—assessing its role in legitimizing a subject or issue under the framework of science. Additionally, this paper indirectly addresses the integration of ideas from the Global South into the scientific advancements of the Global North, interrogating the dynamics of knowledge exchange and influence. Ultimately, this study engages with the broader question: Is science a cultural universal?

In 1959, C. P. Snow in his lecture 'Two Cultures' proposed that there exists a rift between intellectuals who indulged in literature and the science. Scientists such as Einstein are not regarded as intellectuals despite their commendable work. In 1963, he revised his views and concluded that in the future communication between literary intellectuals and the scientists can be possible. He introduced the term 'third culture' which John Brockman borrowed and applied to the scientists and the philosophers who engaged with the public directly in order to propagate their ideas. Alan Sokal and Jean Bricmont have demonstrated how postmodern intellectuals have abused the concepts of science.

Thomas Gieryn in his article Boundary-Work and the 'Demarcation of Science from Non-Science' has clearly stated how scientists have used their ideologies to further their interest. He analyzes the public addresses of John Tyndall where he sets out the attributes of science, religion and mechanics. According to him, science is physical, and religion is metaphysical; religion is for emotional comfort and science brings technological progress. Tyndall challenged the public prayers held in the wake of national crises; they are superstitious, and he urged them to test their validity through experiment.

As we have seen above, the schism exists between many strands and spheres; it is not just based on geography and ethnicity. Consider the words of a computer scientist Roger, featured in Brockman's book that was on the editorial board of the Encyclopedia Britannica: "

The board, who are all these literary types, decided it would let computer people in, because the world was getting to be computerized. And Clifton Fadiman said that he supposed we'd have to resign ourselves to the fact that minds less educated than ours would soon be in charge of Encyclopedia Britannica. What's interesting about such people in the literary world is that they somehow think that if you don't know the classics you're uneducated, whereas it's O.K. for them not to know beans about science. And I don't understand why that's O.K." in Gieryn's article, we learn that the schism even exists between basic and applied science. Interestingly, science is labeled as 'practical' while contrasting with religion: it acquires 'theoretical status' when contrasted with mechanics. Gieryn also mentions the dispute between the phrenologist and the anatomists. Presently, phrenology is not valid; but during Victorian era they were rebuffed unfairly: phrenologists were not allowed to use lecture halls at the Edinburgh School of Arts; phrenological issues were rarely admitted to the proper forum for scientific debate. Thus a research program was wiped out unscientifically; it was categorized 'degenerative' without granting basic opportunity and basic protection. Moreover, this was all done to safeguard the profession. That's why Dorothy Nelkin suspects: "current theories about science do seem to call in question the image of selfless scientific objectivity and to undermine scientific authority, at a time when scientists want to claim their lost innocence, to be perceived as pure, unsullied seekers after truth." (76)

Popper's falsification as many implications in spite of convincing criticisms leveled against it, especially by the pure scientists. However, from relativistic or subjective purpose Popper's falsification may benefit us. Falsification hypotheses try to answer what is science what is not. According to Popper, a theory or hypothesis is scientific when it is refuted/falsified through tests. To understand Popper's falsification, it would be advantageous if we go through the historical and political circumstances prevailing between 1919 and 20's. In that time, it was common for scientists to get involved in political propaganda and thus there was a chance to lose their scientific ethics. Hence, Popper in advancing falsification is simply demanding the democratization of science. Popper especially mentions four theories which are candidates for acquiring scientific status. They are Einstein's Relativity, Marxism and psychology of Freud and Adler.

Popper easily grants scientific status to Einstein's relativity, but for other theories he does not grant the status easily. For him they are like "primitive myths." He says that they resemble "astrology rather than astronomy." Particularly these three theories were analyzed through the problem of induction. The problem of induction is that our new observation gets clarified through the previous' experience. Thus Popper through the problem of induction discloses the holism and our obsession with confirmation. If we analyze his statements, we can grasp that a scientific theory which can be refuted has many rich factors. Einstein's relativity puts itself at risk by providing a variety of challenges for the observers. Thus, that theory will be constantly tested and the errors or false will be illuminated. With this dynamism we can achieve a new milestone or in Kuhn's word a paradigm shift. As we are discussing how rituals and myths may become sources for a scientific theory or hypotheses, it would be better to quote some words of Popper which clearly show that

> "At the same time I realized that such myths may be developed, and become testable; that historically speaking all — or very nearly all — scientific theories originate from myths, and that a myth may contain important anticipations of scientific theories. Examples are Empedocles' theory of evolution by trial and error, or Parmenides' myth of the unchanging block universe in which nothing ever happens and which, if we add another dimension, becomes Einstein's block universe (in which, too, nothing ever happens, since everything is, four-dimensionally speaking, determined and laid down from the beginning)."

Thus we have learnt Popper wants to liberate science from the dominating hands and he presses for a scientific ethics in which we can grasp his forthcoming open society model.

Gieryn writes on Science, Engineering and Public Policy of the National Academy of Sciences (NAS). In 1982, Ragon administration was worried that Soviet military has enhanced its force through utilizing American science and technology; hence transparent circulation of the scientific knowledge should be curbed. However, NAS panel which was appointed to look in to this matter advocated 'free communication' among scientists. The argument runs like this: the state always tries to control and manipulate the science according to its needs. On the other hand, scientists start to rumble as soon as they sense any controlling mechanism which

impedes their professional growth. Doing research now is not entirely an individual's endeavor; it is only his passion. He needs accommodation: financial support, access to knowledge banks and databases. In these circumstances, for a researcher it becomes inevitable to yield to external /power/forces. Hence the researcher has lost his 'innocence' as well as his creativity to a large extent. If we survey stories discoverers and inventors it appears that they discover/invent not through their professional training but through self- education, error and just by chance. Gieryn in his article quotes Victorian writer Samuel Smiles: "One of the most remarkable things about engineering in England is, that its principle achievements have been accomplished, not by natural philosophers nor by mathematicians, but by men of humble station, for the most part self-educated . . . The great mechanics . . . gathered their practical knowledge in the workshop or acquired it in manual labor.

Today, we will be considered as 'amateur' in one scientific discipline even though we got a Nobel Prize in another. Luis Alvarez, who won the 1968 Nobel Prize in Physics for his work on elementary particles, ten years later postulated the theory that the extinction of the dinosaurs had been caused by a massive asteroid colliding with Earth. Many scientists initially rejected this theory, but the theory was eventually accepted.

Arthur C. Clarke, science fiction writer, wrote a short technical paper in 1945 based on his experiences in several fields in which he had educated himself. Ignored at the time, the ideas set forth in that paper would eventually lead to a communications revolution. Thus, in the above examples, Feyerbend's maxim 'anything goes' seems to be working. He favors Epistemological anarchism: an onslaught on professionalization of science.

So far, we have learnt that science is creative process. Genesis of discovery/invention is always unsystematic; it is systematized when is made available for others to use. This is to ensure that the same results are obtained. For this sake, new terminology is coined; the theory is encoded in the mathematical language; finally, patent will be obtained and discovery/invention is documented. Unfortunately, this does not meticulously in non-European and non-American cultures. Hence ideas from those communities struggle to get scientific status. Recently, many people have undertaken the task of uncovering those hidden chapters in the history of science. The problem is most of the experts/academics are from the west and they may construct the obscure narrative as they don't have firsthand knowledge of those cultures. A reviewer of Dick Teresi's *Lost discoveries* utters: "On reading his account of his research for the book, one is tempted to perceive him as a newly converted zealot." Having begun as a critic of multicultural educational programs that propagated extravagant claims (ancient Egyptians flying over the Nile in gliders, etc.), Teresi set out to write a book proving that there is no evidence of science having been done in non-European cultures. He assembled an advisory team of scientists and historians with a variety of attitudes towards, and backgrounds in, multicultural studies, and wound up rejecting the "Greek origins" hypotheses." Still, non-western science is fancy and wonder for the west.

> Teresi in his book further cites science magazine's list of 96 vital scientific achievements published in 2000: "Of those ninety-six achievements, only two were attributed to nonwhite, non-Western scientists: the invention of zero in India in the early centuries of the common era and the astronomical observations of Maya and Hindus in a.d. 1000. Even these two accomplishments were muted by the editors of Science. The Indians were given credit only for creating the "symbol for zero," rather than the concept itself. The Mayan and Hindu "skywatchers" (the word astronomer was not used) made their observations, according to the journal, for "agricultural and religious purposes" only."

What constitutes a paradigm is an important issue to know as Kuhn himself says in his Essential tension that it has two meanings. [Not exactly two but for the argument's sake the two meanings are used.] One is global like natural science where a group of scientists involving themselves in addressing a few questions that are not answered by the previous paradigm. Another is its subset which is like that sort which tries to solve the puzzle employed as models or exemplars. The first one is the disciplinary matrix where a set of scientists work towards a constellation.

The term discipline itself restricts the practitioners under that nomenclature to work with a common possession and the matrix shows the orderliness of that possession. According to Kuhn let us see how a community describes its observation of nature and that is done through Symbolic generalizations performing the function of defining the things that they deploy. This generalization is questioned by the revolutions usually as they are the scientific tautologies partially misguiding the ways in which nature is defined or sliced.

The third aspect in the disciplinary matrix that concerns Kuhn and which is necessary for our argument is the values and its role in judging or identifying the crisis. Values not only give the solution of the puzzle but also formulate it. What constitutes the value which identifies crisis is another sub question that we need to ask here. Crisis in the case of our argument is formed not in a single space but in different spaces constituting different cultural configuration. Why crisis? The reason is usually the incommensurability between the model that is used and the configurations. The same will be elaborated with an example later. The crisis is again solved with the counter paradigms where the model is approached in a way not designed by the global paradigm but according to the cultural configurations. In this case the paradigms are treated more as a pragmatic precondition than for a theoretical framework. There are some problems that we face in viewing paradigms in this context as one global and another as a kind of counter to it.

A trustworthy example for global counter paradigm is quoted in Teresi's book. Commonly it has established that due to Copernicus the entire science was freed from religious dogmatism. He expounded that the universe is heliocentric through improving Ptolemaic model. Now evidence tells that Islamic astronomer had already created a number of theorems in order to rectify Ptolemy's model. A paradigm is a reconstruction questioning the generalization of the older paradigm and establishes new fundamentals for furthering the solution to solve the problems. The same phenomenon is hard to see in our case where a counter instance of a

paradigm might question the fundamentals but not the aim of the reformulations. In a way we can say that crisis in applying a global theory may not lead to change the theory but surely it brings changes in the way of looking at the theory itself. But we should not forget that the seed of a new paradigm is germinated far before the realization of crisis and same happens with the counter paradigm cases also as they are generated by the factors that configure cultures which are usually to frame protective belts.

Kuhn sees no coherent development in the ontology of scientific theories succeeding after the other. The way theories answer the question would be different but that difference would not lead to progression in the pursuit of solving a puzzle. "There is I think no theory independent way to reconstruct phrases like 'really there'; the notion of a match between the ontology of a theory and its real counterpart in nature now seems to me illusive in principle." Here what he exactly says is that theories do not get formulated in succession and let us put another question here in this case. And that is, if it is not succession, do we have any chances of having adjacent possible. The same can be claimed by looking at the adjacent possible for most theories as well as too many scientific constructions as such, but at the same time he denies the temptation of calling this attitude as relativistic. Just to enunciate more on adjacent possible as counter theories or even paradigms for the global ones, let us look at what Kuhn says on the progressiveness of a scientific theory,

> "Scientific progress is not different from progress in other fields, but the absence at most times of competing schools that question each other's aims and standards make the progress of a normal-scientific community far easier to see."

Is it true that the competing schools in the field of science are absent or are somewhat protective belts usually formed in the circle of the theories which perform dual function of immunization and repulsion? This question is asked as to see what can be called “competing schools”? Why do we not have something which will be counter at least to the ways in which certain things are formulated to frame things came out of global paradigms. Saying that there are no competing schools would make us see a protective belt usually formed to the whole theories that is formulated within the construct in the West itself.

Paradigms and counter paradigms and the ensuing conflicts would lead to a growth of science in its depth but not in its width. This is because of the reason that one of the resolutions of scientific revolutions is to make a choice to further the practice of what something can be called science. The conflict can also arise at the level of the knowing about the world which is more of a cultural configuration. This choice differs from one configuration to another. The choice is highly influenced by how we navigate the world and what precedes our knowing about. Pre paradigm period involves a debate and discussion over the "legitimate" methods of practicing the "knowing about". Let us assume that every paradigm has its own way of knowing that guides the community and also help to slice the world in a relatively new or in the same but assumedly different way in order to know the same.

Let us study how these paradigms are formed to which rules exist without the effect of paradigm. In this case the example that we are examining looks too practical to adjust it to the discussion of cultures and its relevance in framing the world view of science. As it is difficult to constitute the elements of a paradigm at the level of enframing of the same it is necessary to take a practical example on the basis of applicability. Stephen Tarrier, a Parisian obstetrician got inspired to make incubators when he was rambling around in a zoo by seeing how the eggs were hatched in warm incubator. Later he made the same by using hot water bottles and a wooden box which brought down the infant mortality rate in France almost to the half. Another person by name Alexander Loin improved upon it and exhibited as "Kinderbrutenstalt" and its English translation is quite funny as it says "child hatchery", which was accepted by the people and later it was installed in almost all state owned hospitals in France.

Let us take the same case and how it works in other countries suffering with the same problems. Many third world countries do suffer from high infant mortality rates and on an average we can take it as around 150 for thousand infants who die before crawling. The same incubators were used to an extent but failed to get the desired results as they were either unable to work in the conditions of the low maintenance and also serious lack of know-how in those developing countries regarding the usage of the machine. What is the alternative to solve or at least reduce the intensity of the problem? There are certain things that would work as counters to the global paradigm and can be called as counter or subtly adjacent paradigms which might work at the countries whose knowing about is not equal to that of the country that formulated the global paradigm.

An MIT professor named Timothy Prestero who visited these countries in 2006-7, thought of preparing an incubator with the available materials in those countries. Hence the idea of building an incubator with the help of parts of automobile cropped up and machine was built with the help of dashboard fans and sealed beam head lights. And it is called neo nurture incubators which required no technical personal to either repair or maintain the machines. These ideas that we are discussing are called the adjacent possible as designed by Stuart Kauffman. To get at the proper definition let us see,

> "The adjacent possible is a kind of shadow future, hovering on the edges of the present state of things, a map of all the ways in which the present can reinvent itself. Yet is it not an infinite space, or a totally open playing field. The number of potentials first-order reactions is vast, but it is a finite number, and it excludes most of the forms that now populate the biosphere. What the adjacent possible tells us is that at any moment the world is capable of extraordinary change, but only certain changes can happen." (56)

Adjacent possible is nothing but what Kauffman himself in other way called the ontology of emergence constituting un pre stated creativity of culture and biosphere. He uses the term emergence in slightly different ways; Emergence is a kind of replacement for a scientific world view that was prevalent in science called reductionism. Emergence as a concept can in a way satisfy both ontology and epistemology of the entity that we are discussing. And it involves what we call adjacent possible, and it is beyond mere happenings involving body, meaning and actions. Emergence is and it is nothing but a kind of unpredictable projection. Though the phrase is quite oxymoronic yet suits the bill, because emergence depends on the surroundings that are not pre stated.

The ontological side of emergence holds that views can be explained in terms of reductionism and new entities arise with their own causal power and remain as furniture in the world. The point that we need to know is how this counter paradigm is formed and why not the global paradigm itself cannot work in all the contexts. The plausible reason for this would be, even in the given example would be varied distribution of resources which might or might not help scientific communities to carry forth all the activities that are designed in the given paradigm. But reason seems to be more complicated and implicit than what is stated above. Do we not have an opportunity here to think about an implicit factor playing its major role in making these idea differences in constituting paradigms? Emergence is a kind of replacement for a scientific world view that was prevalent in science called reductionism. Emergence as a concept can in a way satisfy both ontology and epistemology of the entity that we are discussing. And it involves what we call adjacent possible, and it is beyond mere happenings involving body, meaning and actions. Let us see what this emergence is and it is nothing but unpredictable projections. Though the phrase is quite oxymoronic yet suits the bill, because emergence depends on the surroundings that are not pre stated. The ontological side of emergence holds that views can be explained in terms of reductionism and new entities arise with their own causal power and remain as furniture in the world.

To this point let us try to see how people are configured to go about the world in order to understand it. How do we understand the world and one assumption is slicing it. Yes, we go on slicing the world under different nomenclatures in order to know it. To know what constitutes slicing Let us take recourse to Husserl' Crisis of the European Science and later let us clarify why we need to know Husserl's life world to know about slicing the world.

According to Husserl, objectivity is referred to something out there. Propositions are rooted in the life world. Husserl zeros down the contradiction by saying that life world precedes all the experience and the subjective realm is conceded as objective as a concept after investigation in the physical world within the horizon of the logic that is framed by the communities. To quote him at length,

"They are logical wholes and logical parts made up of ultimate logical elements. To speak with Bolzano, they are "representations-in-themselves" ["Vorstellungen an sick"] "propositions in themselves," inferences and

proofs "in themselves," ideal unities of signification whose logical ideality is determined by their telos, "truth in itself."

But this or any other ideality does not change in the least the fact that these are human formations, essentially related to human actualities and potentialities, and thus belong to this concrete unity of the lifeworld, whose concreteness thus extends farther than that of "things." The same thing is true, correlative to this, of scientific activities—those of experiencing, those of arriving at logical formations "on the basis of" experience—activities through which these formations appear in original form and original modes of variation in the individual scientists and in the community of scientists: the original status of the proposition or demonstration dealt with by all."

Even the contrast is somewhat like this that objectivity of science also stands in the pre given subjective life world. Objectivity that we see the scientific activities are built by presupposing the results. Life world is subjective so our experience with the physical world would be subjective so how do we solve the problem of being subjective in terms of science is an important question which Husserl himself answers. It is somewhat like we are trying to establish the statements scientifically by accrediting a few characteristics to what we call science.

Life world is the pre-mentioned world, and human beings would streamline themselves according to their vocation or aim that they have collectively framed. After this life vocation using Husserl's own words the life horizon is enclosed and the community usually remains indifferent to the other set of vocation. This guides the truth and falsity related to that vocation and followed by the community as such. In this case the scientific community works somewhat like this and in Husserl's words,

> "The scientific world, the scientists' horizon of being, has the character of a single work or edifice growing in infinitum, upon which the generations of scientists, belonging to it correlatively, are unendingly at work."

The point we have to make with the word which is not here that is edifice and "work correlatively". This correlation is always rivals one way of work with that of the other. The "work" is done correlatively but this correlation is comprised of so much difference in the way the work is correlated that certain factors surely influences the presenting of the perception from that of the subjective realm to that of objective. Here the objective as a word understood as the way that is represented differently from what is perceived by the pre given life world which is present in vocation. Now let us again deal with the word correlative where the same would be different with the way the perceived is presented under a logical whole. The way of presenting would constitute one of the important aspects of epistemology as it involves concepts and the way discourse is formed to encircle the concepts. In this case we need to question the constituents of epistemology.

Postmodern epistemology is excessively skeptic; we must accept well established truths for our own benefit and also for general good. For example, South African president Thabo Mbeki considered HIV virus is not vital for causing AIDS. The president simply said that he was motivating for the open-minded exploration of the alternative theories. Laudan proposes that a scientist must two kinds of attitudes: first one is 'acceptance'; in this case, a theory is true and almost entire scientific community reached a consensus. In 'pursuit' scientist believes that something works but is not confident about that. We also must understand that natural science and social sciences have different goals: social sciences are oriented towards practical wisdom (phronesis) and natural sciences are oriented towards technical explorations (episteme).

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