

Invariance principles and belief structures

I was intrigued by an interesting idea of Parasnis¹ to use invariance principles for labelling the belief structures of some prominent personalities discussed by Sorkhabi². Now taking the analogy deeper for deriving the 'physical' consequences, it is tempting to set the idea of 'invariance principle' in the physics jargon, where it goes by the alternative name of 'symmetry principle'. A symmetry principle can be classified in terms of 'strong' (which remains unbroken), or 'weak' (which gets broken in varying degrees) according to the quality of the invariance or 'conservation' it is supposed to convey. Classical examples of strong symmetry are translational and rotational symmetries which give rise to conservation of momentum and angular momentum respectively, and gauge symmetry of the electromagnetic interaction which causes 'charge' conservation. Broken symmetries came into prominence much later in the context of weak interactions, when it was found that the gauge symmetry associated with beta decay-like processes gets spontaneously broken, giving rise to the masses of gauge bosons (Glashaw–Salam–Weinberg theory).

Against this background, the label 'objective reality' for Einstein must be regarded as a strong symmetry, not just because it has come from the greatest scientist after Newton, but because the idea has still held its ground in the face of a hot debate on the status of the foundations of quantum theory even today. Tagore, the Nobel laureate poet-thinker had firmly established his philosophy of 'beauty and symmetry in nature' through the power of his pen, which transcended the formidable barrier between science and philosophy on a universal scale. Hence his invariance principle has also passed the test of 'strong symmetry', which remains firmly unbroken. Then Gandhi through his unique experiment on non-violent struggle on a global scale, had

given a new dimension to the passive resistance movement. Its successful emulation by others across the globe, notably Martin Luther King in America, has *ipso facto* given his suggested invariance principle 'truth and non-violence' an unbroken symmetry status, at the practical level, valid under a wide range of conditions.

To continue the discussion in the same strain, the rather long invariance principle suggested for Nehru, 'Democracy and scientific temper at home, and neutrality and peace in international politics', did not gel with a nation of simple, unsophisticated folks, nor did it eventually work at the international level under a unipolar world. Therefore, it must be regarded as a broken symmetry in the physics jargon at the human level of realization. Of course, if 'charisma and diplomacy' could be regarded as an invariance principle for Nehru, it would emerge consistent with a 'strong' or unbroken symmetry, except that a personal quality does not qualify for a belief structure with which each of these great men has been so labelled.

An alternative belief structure could come from the phrase 'scientific temper', which forms part of the Parasnis' invariance principle. And now it has been extolled as India's contribution to international science³! Unfortunately, the 'selling power' of this phrase so far has been rather poor, according to the figures given (four out of 150)³. But never mind, India has exported more substantial science than this nice phrase.

1. Parasnis, A. S., *Curr. Sci.*, 2005, **89**, 7.

2. Sorkhabi, R., *Curr. Sci.*, 2005, **88**, 1187–1191.

3. Ravi, Anuradha, *Curr. Sci.*, 2005, **89**, 239.

A. N. MITRA

244 Tagore Park,
Delhi 110 009, India
e-mail: ganmitra@nde.vsnl.net.in

Response:

The idea of looking at Einstein–Gandhi distance relationship in terms of life's invariant principles was suggested to me by B. D. Nageswara Rao, in January 2005 when we were talking about my book *Einstein's Relativity for the Uninitiated*, that is now in print. The idea of Nehru's invariant principles had come to me in 1989, when writing a proposal for a study of his contribution to the development of Indian science. In my letter I included Tagore (rather than other Indian greats), simply because Sorkhabi's paper talked of him.

Admittedly, the extension done by Mitra by looking at invariant principles as symmetry principles did not find place in our discussion. The extension seems not only interesting but also perfectly valid.

The unfortunate dismissing by many Indian scientists of Nehru's philosophy of scientific temper for India has been the main stumbling block in the people of India not 'gelling [sic]' with it. My letter says '...scientific temper at home...'; by definition, no export is implied.

In an interview given to visual media when Abdus Salam was visiting India, some years before he died, he had said that 'No worthwhile modern science has been created by any Asian country'. (These words are from my memory; his exact words may be slightly different.) Export cannot be achieved without a commodity that is created. Nevertheless, that is not the topic of the current discussion.

A. S. PARASNIS

F-17, Chaitravan Residency,
127/2 Aundh,
Pune 411 007, India
e-mail: yohann03@vsnl.net