COMMENTARY

An analysis of the case-histories of 262 children with acute paralytic poliomyelitis in Pondicherry showed that about 75% had received one or more unnecessary injections just before paralysis. These injections which included antihistamines, prostigmine, gentamycin, terramycin, penicillins, other antibiotics and vitamin B complexes, were given for fever and diarrhoea. There was little clinical justification either for the drugs or the giving by injection. Some children received six injections in a single day; others were given injections for several days after limbs were paralysed after a first injection. In children without injections, the chance of paralysis in left and right legs was equal. Injections changed the pattern of paralysis in the uninjected as well as in the injected limb. The number of legs paralysed and the severity of paralysis were increased by injections. Death in the acute illness was more likely following injections and recovery from muscle paralysis seemed less likely. This is very strong evidence that nearly three quarters of the children suffered unnecessary or more severe paralysis because of unnecessary injections[4].

The children who had received unnecessary injections were incubating a poliovirus infection in which wild poliovirus had already reached the spinal cord and was causing the fever. In those children whose legs were already programmed for paralysis, the paralysis was made more severe by injections. In other children the amount of virus which would have reached the spinal cord was sufficient only to produce a non-paralytic attack: in these children the injection triggered paralysis. The increase in severity and incidence of paralysis has been called aggrevation poliomyelitis and is similar to the previously known severity of polio after strenuous activity. Altogether nearly one half of the children had more severe paralysis because of the unnecessary injections. Nearly one third more would not have had paralysis without the unnecessary injections.

We estimate that in the ten years from 1980, as many as 600,000 Indian children may have been paralysed by unnecessary injections and another 900,000 may have suffered more severe paralysis.

The immunization programmes may reduce the prevalence of paralytic poliomyelitis but in times of war, civil unrest, floods, typhoons and earthquakes, the first casualty is the cold chain required for oral polio vaccine (OPV). Children become refugees in camps where disease is rampant. Injections are given and children are paralysed[5]. Inappropriate injections are an appropriate subject for investigation and intervention by Indian scientists.

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SCIENTIFIC CORRESPONDENCE

Remote sensing

In continuation of my rejoinder and the reply of Joshi[1], I would like to place the following points which need our readers attention:

1. The Ujjain district is well known for its basaltic plateau country and nowhere are the Vindhyan rocks exposed in this district. Joshi identifies the Vindhyans of Dhar district as that of the Ujjain district in a global context. Is it justified to identify Dhar district as Ujjain district and to report the Vindhyan rocks in Ujjain district, even in a global context? The caption given for plate 20 needs necessary corrections[2].
2. It is true that towards the SE margin, the Aravalli Supergroup of rocks are relatively unmetamorphosed. However, it does not mean that they are the sandstones and shales. Even the book edited by Roy[3], which has been referred to by Joshi also, does not indicate the presence of sandstone anywhere in the Aravalli Supergroup sequence. These relatively unmetamorphosed rocks are represented by the slates, phyllites and quartzites including dolomites.
3. The caption[2] given for the plate 23 describes 'the unmetamorphosed Aravalli Sandstone'. In his reply, everywhere Joshi has described 'these sandstones' as the 'basal quartzites' of the Lower Aravalli Supergroup. It is unclear whether the caption is correct or the reply!
4. The pre-Vindhyan quartzites present in the Bundi area, which also point to the precise location of the Great Boundary fault of Rajasthan (GBF) in this area, has been regarded as the Datunda quartzites[4]. It appears as patches and does not form continuous homoclinal ridges. The other pre-Vindhyan rocks (Aravalli Supergroup of Roy[3] *op. cit.*) present in the area are the slates, phyllites and dolomitic limestones — none of these form strike ridges.
5. The two stages of folding have been well documented in the Vindhyan rocks of the Chittaurgarh area[5] and hence, simply the presence of two stages of folding does not assign any age to the rocks of the Bundi area.
6. Several published literatures[6–12] clearly indicate that the homoclinal ridges and intervening valleys, extending from west of Bundi city up to Indargarh in a ENE–WSW trend, are the geomorphic features deve-

loped on the alternating orthoquartzites/sandstones, shales and limestones of the Upper Vindhyan sequence. Due to the tectonic stress generated by the GBF (at different times), these orthoquartzites/sandstones have undergone certain degree of metamorphism and only occasionally appear as quartzite.

7. Going further NE of Bundi area towards Ranthambhor, the outcrop width of the Vindhyans gradually decreases. Here it is sandwiched between the Bundelkhand Massif and the Aravalli Orogen. The pre-Vindhyan Ranthambhor quartzites are directly juxtaposed with the Upper Vindhyan sandstones, which, in this area due to extreme compression, have also become quartzitic in nature. The two quartzites look very similar and cannot be distinguished without a careful field investigation. A fault scarp of the GBF, often, marks the boundary between the two. The horizontal distance between the GBF and the Chambal lineament is minimum in this locality and the Vindhyan block appears to be compressed along these two megalineaments.

I hope the evidences cited, herein, may be enough to make necessary corrections in the annotation of the image of the Bundi area (plate 23) and also of the Dhar area (plate 20).

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Ashok Kumar Joshi replies:

The objective of the publication was to show the usefulness of IRS-1A data for various applications, and, in particular, the plates were used to demonstrate some interesting areas, not to report or publish something new about these areas. The points raised by Verma are a part of R&D, which certainly was not the aim of the said captions.

Further, the details were collected from well-known published text, not the papers or views of the individual authors, as mentioned in the earlier reply, which extends beyond the areas given in the figures.

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On the one hand...

Petsko[1] commenting on the total chemical synthesis of a D-enzyme by Milton *et al.*[2] and its implications, seems to rely rather too heavily on the random choice model of biological evolution of L-form of life. This apparently is a view shared by most modern biochemists as noted by Milton *et al.* (see foot note 4, page 1447 of ref. 2). While the earlier attempt to explain chiral preference in the biological world as possibly arising out of inherently asymmetric β-decay process[3] is cited[1], both the authors seem to dismiss the effects as probably not sufficient for explanation of the observed preferences. The symmetry breaking interactions exemplified by the β-decay process, originally cited as possible influencing factor[3], has, in recent times, been augmented by the 'Weak Neutral Current' (WNC) theory of elementary particle interactions[4,5]. This is more significant and leads to the result that all atoms and achiral molecules as well as enantiomers are expected to be optically active to electromagnetic radiation and to polarized matter waves. Optical rotation in single species of atoms has been detected confirming the theory[6]. Also, enantiomeric molecules tend to have different electronic binding energies. Mason[7] has shown that L-amino acids come out with energy advantages over D-amino acids, although the energy difference is quite small (one part in 10^{17}). However small this energy difference is its significance cannot be underestimated since, from the point of view of chemical and biological evolution, it is not the smallness that really counts but the finiteness. Since the other major player in this game of evolution is time, which is operative at astronomical level of millions of years, the combination of this with chemical/biochemical reactions (in the subsecond regimes) could bring the whole phenomenon into one of finite and possible *realizability—an argument so forcefully* put forward by Wald[8] four decades ago in the context of spontaneous chemical evolution. Estimates of time scales required for such tilting the channel into one pathway over the other based on enantiomeric energy difference are available[9] and are in the range of tens of thousands of years. Thus even if we allow for probable errors in estimates, the cumulative effect could lead to the observed preference of the L-form over the D-form during the evolutionary time-scale envisaged. It is of interest to point out that the recent results of Engel *et al.*[10] would indicate that the characteristic chirality of biochemistry on earth may have been caused ultimately by an asymmetry already existing in the amino acids in the solar system.

Chirality being a fundamental aspect, is not peculiar to only biological molecules but is reflected in all forms of matter including the inorganic world. This has led some to seek and interpret observed difference in relative occurrence of L and D forms of rockcrystals (quartz) on the earth's crust[7]. A slight excess of one form of quartz over its chiral mate experimentally recorded in