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CORRESPONDENCE

ISRO spy scandal

I read the correspondence entitled 'ISRO spy scandal – An unending witchhunt' (Dhawan, S. *et al.*, *Curr. Sci.*, 1997, **72**, 359). The charge against one of the ISRO's scientists S. Nambinarayanan was that 'he handed over drawings and documents relating to Viking engine and cryogenic technology to foreign/enemy countries in exchange for a large amount of money in US dollars'. The authors of the correspondence have given full details of the CBI findings and the verdict of the Chief Judicial Magistrate, Ernakulam which completely absolved Nambinarayanan of any wrong doing. They have concluded that 'there is no evidence to prove that espionage ever took place or that documents or money exchanged hands or that the accused including Mr S. Nambinarayanan benefited financially from these dealings'. If these statements are correct, it is really strange to see that Kerala High Court after going through all the evidence and statements on record has ordered further investigations in this case. After reading the order of the Kerala High Court, the authors have strongly argued the innocence of Nambinarayanan by saying that 'the clearance recently accorded by the Kerala High Court to further investigate the case will drag Nambinarayanan and his family through another period of misery'. I am also a space scientist and understand the whole case. Despite all the arguments placed by the authors, it is certain that the Kerala High Court Judge must have found enough reasonings in the CBI and Chief Judicial Magistrate, Ernakulam reports to order further enquiry. None of these reasonings are given by the authors except saying that further enquiry will drag Nambinarayanan and his family through another period of misery. In fact the basis for ordering further inquiry is the point of frontal attack. A good job done in elaborating this point could have provided relief to Nambinarayanan. As such the correspondence provides no relief to the incumbent. If the authors really wish to provide relief to Nambinarayanan, they should submit an *appeal* to the President of India questioning the basis on which Kerala High Court ordered further enquiry resulting into continued agony to Nambinarayanan. If favourable, the Presidential order on their appeal would constitute a meaningful relief to the sufferings of the incumbent. Writing one-sided and incomplete letters may not provide any relief to the incumbent and may even go against Nambinarayanan.

The authors have brought out some interesting facts which have been felt by many of the space scientists but it has not been stated in so many words. They say that 'like many large organizations, the Indian Space Research Organization tends to suffer from petty jealousies and professional rivalries that get translated into personal animosities'. In addition, ISRO may not be free from subjective personnel promotions and misappropriations in financial deals. The statement though made with a different objective and argument in mind, is literally correct for the present-day functioning of ISRO as a National Scientific Organization. I have had opportunities to work for and visit the NASA (USA) and ESA (European) organizations which very closely involve University's scientists and engineers. It is unfortunate to see that the space science in India though born on the University campuses has slowly drifted into the clutches of the Government Organizations. If this continues, within course of time, ISRO may become the epicentre of many more such cases. It is high time to review the functioning of ISRO objectively and ensure that it functions as an organization solely dedicated to the national cause.

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A scientist willingly working in strategic areas of research of a state or for profit-making activities of a company has inevitably to face associated professional hazards. No responsible government can afford to be complacent in safeguarding the national interest.

Unfortunately, the Second World War, and recently corporation-controlled trade wars have exposed the vulnerability of scientists to espionage issues. The espionage threat is integral to any secret research project, though sometimes honest scientists are tormented for no fault of their own. Robert Oppenheimer and David Bohm faced persecution, perhaps for political reasons.

I think the ISRO spy scandal should be viewed in this background. The most sensible approach open to an honest scientist is to get honourable acquittal through the court of law. Those who know that S. Nambinarayanan is not at all involved in this espionage case could provide him moral support, and help him to fight the case. Regrettably, the kind of intervention made in a recent letter (Dhawan, S. *et al.*, *Curr. Sci.*, 1997, **72**, 350) is likely to increase the problems of Nambinarayanan, and would harm

Indian science. The authors of the letter have been in close proximity to political power, and at the helm of affairs in the country. Surely they would not be unaware of the low credibility of the CBI, and yet they have quoted the CBI report as a gospel truth. The verdict given by the Chief Judicial Magistrate is mentioned approvingly. However, subsequent judicial action of the Kerala High Court is questioned. Will this help Nambinarayanan? The authors write: 'These dangerous trends, if allowed to continue, can demotivate and demoralize the many hard working and dedicated professionals who have made Indian achievements in these areas possible, usually for paltry compensations. Such actions are likely to derail these programmes and adversely affect the national interest more severely than any foreign hand'. What does 'paltry compensation' mean? Does patriotism need compensation? And, finally do we not find in the last sentence of the quote above an echo of the threat issued by the politicians against so-called judicial activism?

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Life in extreme environments

Although the earliest of life forms are believed to be of thermophilic origin[1], metabolism in most plants is adversely effected above 40°C. The lower optimal range for most species is influenced by earth's mean surface temperature, estimated[2] to be at 15°C. In higher plants, 10–35°C is optimal for photosynthesis[3], whereas extreme limits for active metabolism are around sub zero and up to 50°C in some alpine[4] and desert plants[5], respectively. 'Plant life under extreme environments' (H. Y. Mohan Ram and Promila Gupta, *Curr. Sci.*, 1997, **72**, 306–315) are the adaptive responses under these conditions.

However, the 3850 million years history of life[6] on this planet has evolved other glaring extremities, in the world of microbes. The development of succession flora in decomposing litter biomes is constantly modulated by the changing temperature regimes. The extreme and optimal temperature ranges are redefined each time one set of microbial population replaces the other. Sulphur oxidizing bacteria near hot water springs dwell at temperatures otherwise lethal for life. Infact, temperature as high as 80°C is the lower extreme limit below which certain archaeobacteria cannot survive[7].

Restriction of these organisms to specific niches may term rest of the environment as extreme! Perhaps not always. Crenarchaeota, an exclusive class of organisms, were long thought to be exclusively restricted to extreme environment of hot springs, but their recent discovery in marsh and lake sediments, and Antarctic ocean[8] has not only changed the existing concepts on microbial nomenclature but revealed greatest 'plasticity' that life can afford[9].

Life's endeavour to constantly proliferate in extreme of environments, goes a step further in the functional capacity of 'non-solar organisms', providing new hope of sustenance even when the lid of darkness may nudge down to seal life on earth[10].

Lastly, it would be of interest to look for organisms having a kind of facultative ability to shift from light to thermal-harvesting mechanisms, remembering that the first life forms used energy sources other than visible spectra of sunlight[1].

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