

Abusing Demography

Religious Demography of India by
A P Joshi, M D Srinivas and
J K Bajaj;
Centre for Policy Studies, Chennai,
2003;
pp xxii + 358, Rs 800.

D JAYARAJ, S SUBRAMANIAN

Who forsakes measure, measure forsakes.

I Motivation

The book under review, written by A P Joshi, M D Srinivas and J K Bajaj (two of whom, we understand, are physicists, and one is a metallurgist), is a product of research from the Centre for Policy Studies, Chennai. The Centre, according to information provided on the inside flap of the dust jacket, 'has been founded to initiate [the] effort of comprehending the Indian situation and to help in formulating a polity that shall provide all Indians with the challenge and the opportunity to get into the task of nation building with an abiding passion'. Among other works that have been produced at the Centre, as the dust jacket informs us, are writings with titles like *Timeless India: Resurgent India – A Celebration of the Land and People of India*, *Annam Bahu Kurvita: Recollecting the Indian Discipline of Growing and Sharing Food in Plenty*, and *Ayodhya and the Future India*.

This is an extended review of a book which – judged strictly according to its merit in terms of satisfying certain fairly undemanding canons of rigorous and responsible social science research – perhaps does not deserve the elaborate treatment to which it has here been submitted. If this essay is nevertheless plodding in pace and painstaking in length, it is because of our belief that the book's thesis, and the manner in which it has been sought to be justified, are both of

sufficiently serious societal import to warrant the most detailed repudiation one is capable of offering. The thesis, in capsule form, is that the threat to this nation's cultural homogeneity which is allegedly posed by the numerical strength of Christians and Muslims in the population is a growing one – one so large, indeed, that, by the beginning of the sixth decade of the 21st century, these two groups will achieve majority status in the combined population of India, Pakistan and Bangladesh. The prediction of population shares is achieved through the adoption of a statistical tool (that of regression analysis) which has all the trappings of a scientifically impregnable methodology. It is our contention – and one which we will substantiate – that neither the thesis nor the 'science' through which it seeks rationalisation can survive disinterested scrutiny.

We would like, in anticipation, to disavow ourselves of any desire to shoot the messenger(s) simply because we do not like the message. This is not to deny, of course, that we do not like the message. Of course we don't, but the reason we don't like it is that there is no demonstrated evidence for its plausibility: what is available, instead, is the exploitation, abuse and inappropriate application of statistical techniques in the cause of an unsustainable demographic thesis. The attendant flaws could be a product of ignorance, or a product of conscious error: neither explanation does the least service to science. In a spirit of clarification, we would like to add that we do not speak of science with a capital S – that version of the word which has attracted its own fanatical defenders, defenders for whom Science is a finished and perfect product, entirely bereft of holes or ambiguities or uncertainties. Good science is not like that: it never makes claims of infallibility, though it does punish the fallacious. Good science also does not expend too much energy on, say, demolishing the belief of some in a flat earth: at worst, such a belief is regarded as a mildly amusing eccentricity, one which does no serious harm to society

at large. But when unscientific beliefs are deeply injurious to the interests of peace, harmony, justice, law, order – in a word, humanity – and are, furthermore, sought to be justified precisely through recourse to 'science', then what we have on hand is nothing less than a serious assault on the truth. This warrants that the record be set right – the prime motivating factor underlying the present essay.

In what follows, we first present a more elaborate version of the authors' thesis. We then discuss a number of serious difficulties which inform the authors' analysis, difficulties which range over the classificatory schemes, the tests of confirmation, and the statistical procedures to which they resort in support of their thesis. The cumulative impact of these difficulties is, we believe, such as to radically undermine the credibility of the authors' claims. We repeat that the effort at such undermining would not have been worth it had we been dealing with some whimsical, and otherwise innocuous, violation of science. But there are larger issues at stake, as evidenced by the fact that the publication of *Religious Demography of India* has received financial support from the Indian Council of Social Science Research, and the book has been fulsomely endorsed by no less a personage than the deputy prime minister of India, L K Advani who, in a Preface to the volume (pp xv, xvi), says:

Rigorous and continuous observation and analysis of the changing demography of different religious groups in various regions of the country... is of paramount importance in maintaining the integrity of our borders, and peace, harmony and public order within the country...

...I congratulate the Centre for Policy Studies for their seminal work, and commend this work to all Indians, but especially to the political leaders, strategic thinkers, administrators and those entrusted with the task of keeping peace and order in the country.

Like all work of the Centre that I have had occasion to see, this book is based on rigorous, objective and painstaking compilation and analysis of enormous amount

of data and information. The book is likely to prove an invaluable handbook for political leaders, statesmen, administrators and social scientists of India, and for concerned leaders of several other countries.

Having taken stock of the difficulties informing the work under review, we attempt to place the particular problem of 'religious demography' within a larger context of social and economic reality, before concluding the essay with a few thoughts on both the proximate and the background factors that have instigated the review.

It is our desire, and has been our effort, to reach as wide a readership as possible. Even so, we can see that the non-specialist reader may have some genuine and unavoidable difficulty with those parts of the essay which deal with the technical aspects of the authors' forecasting methodology. The issues themselves are elementary for those with any training in these matters, but unhappily, mathematics employs a language which is not uniformly accessible by the general reader. We regret this, and crave the reader's indulgence toward those parts of the essay which may appear to be technically dense. A second feature of this essay to which we would like to draw attention is that despite – or perhaps because – of the gravity of the issues under consideration, we have been unable to resist the temptation of occasionally resorting to a bit of leg-pulling. The odd uncontrollable lapse into a lighter vein will not, we hope, be confused with a lack of proper seriousness – to which the length of this review essay, if nothing else, must stand testimony.

The cards are on the table, and there is a case for getting on with the job on hand.

II The Thesis

In providing a quick summary of the book's contents we cannot do better than make use of the authors' own *précis* of the book which is available in their Preface (pp xvii-xxii), and to which we resort liberally in what follows. (Extensive recourse to quotation also helps to keep possibly obtrusive commentary down to a minimum.)

The authors set a great deal of store by what they call the country's 'cultural homogeneity' which, in their perception, 'has come under stress during the last two hundred years or so', the cause of the stress

being 'the influence of modern ideologies that tend to look upon the homogeneity of India as a source of oppression and backwardness'. We are told that 'this ideological prejudice manifests in the public life of India in the name of protection of distinctive ways of life of religious minorities, especially those belonging to Islam and Christianity'. Why does cultural homogeneity find its way into a demographic study of our country? Because the 'two basic determinants of Indian demography' are 'the share of her people in the population of the world, and the civilisational and cultural homogeneity of her people'. Before we can speak of Indian demography, we need to be clear about what India is. In the cause of such clarity, it is pointed out that, for the purposes of the study undertaken in the book, the authors 'employ the term "India" for the geographical and historical India that encompasses the three countries into which India was partitioned in the course of the twentieth century'. (It is possible that some readers may here recognise the notion of *Akhand Bharat*.) Presumably in order to avoid all confusion, the authors are careful to introduce a convention whereby the 'individual countries separately are always referred to as Indian Union, Pakistan and Bangladesh.'

While demographers are given to treating issues like age- and gender-specific mortality, fertility, life expectancy, ageing, and the sex ratio of a population as important components of their subject, the authors of the present book seem to regard 'cultural homogeneity' to be the pre-eminently urgent concern of Indian demographics. In this cause, they swiftly and instructively divide the Indian population into three groups – the group constituted by 'Indian Religionists', the group constituted by Muslims, and the group constituted by Christians. The partitioning of the population into the latter two categories is inspired by the fact that 'this book is concerned mainly with the heterogeneity introduced by Islam and Christianity'. The first group 'of course' includes 'besides the Hindus, many fairly large religious groups, like Sikhs, Buddhists and Jains, who are important on their own, and several smaller groups, some of whom, like Parsis and Jews, may not be of Indian origin.' Preservation of 'cultural homogeneity' is a matter of preserving, and presumably enhancing, the relative numerical strength of 'Indian Religionists'. Is this happening? No; and this, apparently, is the overriding crisis of Indian demographics.

Specifically, a survey of the share of 'Indian Religionists' in the total population of the Indian Union, Pakistan and Bangladesh (to wit, 'India') suggests to the authors that 'if the trend of decline seen during 1881-1991 continues, then the proportion of Indian Religionists in India is likely to fall below 50 per cent early in the latter half of the 21st century'. The heart of the book is the statistical analysis (on which more later) which leads to the prediction that 'Indian Religionists' will account for just 50 per cent of 'India's' population by the year 2061. The news relating to 'cultural homogeneity' in the Indian Union, considered by itself, is seemingly a little less daunting: 'Within Indian Union, the decline suffered by Indian Religionists during this period is less pronounced; their proportion declined from 86.64 per cent in 1901 to 85.09 per cent in 1991. This is largely because there was an increase of almost 3 percentage points in the proportion of Indian Religionists in Indian Union between 1941 and 1951, as a result of the forced and violent transfer of populations associated with Partition. Since 1951, the share of Indian Religionists within the Indian Union has declined by more than 2 percentage points.' However, 'As we have mentioned above, decline in the proportion of Indian Religionists within Indian Union has not been too remarkable, though they have lost about 2 percentage points of their share since Independence and Partition. But the detailed districtwise data analysed in the book shows that the decline has been fairly steep in certain geographically well-defined pockets of the country, while in most parts Indian Religionists continue to hold sway.'

So it would appear that there are parts of the Indian Union where 'cultural homogeneity' is not (yet) endangered: 'A very large part of Indian Union, comprising almost all of the north-western, western, central and southern states, has seen little decline in the proportion of Indian Religionists... Within the region there are only a few small pockets, where Christians or Muslims have any significant presence.' The situation, however, is not uniformly alike across the length and breadth of the country, as will be revealed by a minute scrutiny of the pages and pages of district-, city-, town-, and urban areas-level tables which the authors have so painstakingly compiled, that one may acquire an appreciation of those sites displaying a concentration of the Muslim and Christian populations. At a swift level of aggregation, 'Uttar

Pradesh, Bihar, West Bengal and Assam, and especially the border areas of these states ...constitute a region of high Muslim presence and growth. The share of Indian Religionists in this region is under great stress and is likely to remain so in the future; Indian Religionists have already turned into a minority in several districts of the region.' Furthermore, 'there is a third region of Indian Union comprising the extreme border areas – including Jammu and Kashmir in the north, Goa and Kerala in the West, Lakshwadeep and Nicobar Islands off the Indian Coast, and the states of the northeast – where Indian religionists do not have a dominating presence.'

In sum, what might be regarded as heartening for 'cultural homogeneity' in the 'religious demography of India' is largely a matter of the effect of the distant past on the present. 'India, on the whole, has resisted Christianisation; proportion of Christians in India remains around 2 per cent. And, India has not succumbed to the expansion of Islam like some other countries of Africa.' But can this be expected to hold for the future, given the perceived tendencies of the more recent past? There is, apparently, cause for anxiety here; for, 'Indian experience of the 20th century has not been nearly as robust as that of the other great non-Islamic and non-Christian civilisation of the world, China. During the course of the 20th century not only the proportion, but also the absolute number of Muslims in China has declined, and Christianity has failed to find any foothold there. India has not responded like China. Consequently, India has suffered partition, and several border areas of the post-partition Indian Union have become vulnerable to non-Indian Religionist influences.' The authors do not say if they believe India should yield to non-Religionist Chinese influences.

III Some Difficulties

The foremost question which the message of the above thesis must trigger in any unprejudiced reader's mind is: is the prognosis on which the message is based wholly credible? Of course, one could take the line – as in much of the Ayodhya discourse – that matters of faith are matters of faith, and not to be questioned through the obtrusion of the categories of fact, logic, and consistency. We refuse to do the authors the discredit of attributing any such stand

to them. Furthermore, and irrespective of what difference at the margin it may make to the arithmetic driving the prognosis, suggestions of carelessness with respect to detail or reasoning must be expected to detract from the force of the message, and tarnish the image of what one might call 'careful social science' – which, other things equal, makes for a dim prospect of persuading the unbeliever to faith. If there is, then, a case for casting the net of agreement as wide as possible, then there is also a case for addressing certain difficulties that can precipitate a crisis of credibility. With this in mind we detail, in what follows, some of the salient problems one encounters in achieving a complete identity of views with the authors on their thesis.

A first issue demanding attention relates to the classificatory scheme adopted by the authors in partitioning the population. Are Jews, Parsis, Sikhs, Jains and Buddhists wholly plausible candidates for being counted among the 'Indian Religionists'? Let us consider first the case of Jews and Parsis. In Table 2.1 of the book, Jews and Parsis are categorised as 'Other Religionists', but by the time we arrive at Table 2.6, these two groups have found their way into the category of 'Indian Religionists'. Notwithstanding their small number, to which the authors draw attention on p 25, one would have thought that there is a case for consistent classification: either Jews and Parsis are, or they are not, 'Indian Religionists'. Arising from which, if Christianity and Islam insinuated themselves from without into 'historical and geographical India', why, it could be asked, should Judaism and Zoroastrianism not be seen to be of similarly alien origin? Alternatively – and in a more relevantly unperturbed spirit – it must be contended that Christians and Muslims, too, should be seen to be integral members of the Indian Union, not least when their overwhelming sense of their own identity has privileged nationality over religion.

Turning next to the Sikhs, should they be assimilated into the category of 'Indian Religionists' without their permission, and – as some might say – every now and then, and – as yet others may say – in order to secure this or that end? This is by no manner of means a mischievous question: for the fact is, that the Sikhs themselves don't always seem to be flattered by this expansive inclusiveness. A news item carried in the October 12, 2003 Chennai edition of *The Hindu* (p7) is a good example

of how offensive Sikhs can find it to be simply tagged on to Hindus: the report in question suggests that G S Tohra, the president of the Shiromani Gurdwara Parbandhak Committee and senior Akali leader, was seriously affronted by P Togadia's remark, in the context of mobilising participation for the October 17 rally at Ayodhya, that all Sikhs were Hindus first.

And what of Jains and Buddhists? The authors (p 17) state:

Of the nine religious groups listed in the census, five, Hindu, Sikh, Jain, Buddhist and tribal, constitute a distinct family. It can be said, with much truth, that these five spring from a common source; there is indeed a great deal in common in the fundamental doctrine and practice of these religions.

But isn't there something in India's history – notwithstanding concerted efforts at having it re-written – to suggest something like the persecution of Buddhists and Jains? And isn't the easy assimilation of Buddhists, like that of Sikhs, into the fold of 'Indian Religionists' just a trifle odd when juxtaposed against a recent event in Vadodara, reported, again, in *The Hindu* (Chennai edition, October 6, 2003; p 13), wherein the district administration invoked the new Anti-Conversion Act in Gujarat in order to prevent a mass conversion of dalits to Buddhism? (It is a different matter that the mass conversion happened, anyway, with a bang a few days later.)

The point is that one cannot be oblivious to the context in, and purpose for which, taxonomies of religion are created. The classificatory scheme adopted by a scholar of comparative religion interested in tracing the genealogy of alternative faiths must be expected to be driven by motivations which are not necessarily identical to those inspiring a classification effected by religious nationalists with an obvious interest in a certain sort of identity politics. Any symptoms of expediency or opportunism in the latter kind of classification, which is out of line with principles of exclusion or inclusion that are invoked in other contexts, must be expected to be recognised and commented upon.

Finally, the particular manner in which one chooses to divide up one's universe can cut both ways. Specifically, and in the present context, it is legitimate to ask the following question: given that Hinduism is undeniably an 'Indian Religionist' religion; that there is much that is 'robust' in the 20th century demographic

experience of 'the other great non-Islamic and non-Christian civilisation of the world, China'; that there is so much 'in common in the fundamental doctrine and practice' of Hinduism and Buddhism; given all of this, should not a properly ambitious view of 'Akhand Bharat' be a source of hope, rather than despair, for Indians seeking 'cultural homogeneity' in the demographic geography of a world that includes Nepal, China, Myanmar, Thailand, Laos, Cambodia...?

But setting aside the question of classification, and taking 'Indian Religionists' to mean just what the authors want the term to mean in their Table 2.6, let us review the population prospects of this group, the theme which is at the heart of the authors' own statistical concerns. It may first be noted that the authors nowhere provide any estimates of total projected populations, satisfying themselves only with estimates of population shares. What, one might wish to ask, will happen if we married the authors' predicted shares with independent estimates of population totals? The authors themselves ask and answer this question, and employ the occasion to adduce confirmation, from independent sources, of their prediction that 'Indian Religionists' will be driven to a share of about 55 per cent in 'India's' population by the year 2050. On p 38, they say:

Thus, if the trends of the last hundred years continue to persist in the future, then Indian Religionists shall become a minority in India in the near future.

This is an entirely statistical conclusion. It follows from the best possible fit of the available data of the last hundred years; it involves no assumptions. However, we can make an assessment of the plausibility of this conclusion by analysing the UN projections of the population of India. The latest UN estimates published in *World Population Prospects*, 2000 revision, place the medium estimates for the population of Indian Union, Pakistan and Bangladesh in 2050 at 1572, 344 and 265 millions, respectively. These estimates are based on detailed assumptions about various human development factors like the spread of literacy and acceptance of family planning. Following the current trends, we may assume that in 2050 Indian Religionists shall have a share of 80 per cent in the population of Indian Union...For Indian Religionists to have a share of 80 per cent in the population of Indian Union...towards the middle of the 21st century is a highly optimistic expectation...If we take the

share of Indian Religionists in the population of Indian Union at that stage to be 75 per cent, and apply it to the UN estimates for the total population, then the share of Indian Religionists in the population of India comes down to about 55 per cent in 2050.

The tone and implication of the preceding paragraph are wholly misleading: contrary to the authors' suggestion, there is, in fact, absolutely no 'assessment of the plausibility' of a 55 per cent share of 'Indian Religionists' in 'India's' 2050 population which is available from an analysis of 'United Nations projections of the population in India'. To see this, one only has to note that the UN estimates do not anywhere concern themselves with the population sizes of 'Indian Religionists', Muslims, or Christians. How then can these latter data be possibly employed as an independent test of 'plausibility'? The trick consists in the casual insinuation of the assumption that 'the share of Indian Religionists in the population at that stage (i.e., the year 2050) (will) be 75 per cent'. Where did the 75 per cent figure materialise from? Consider the following. According to the regression-based prediction (on which more later) of Joshi, Srinivas and Bajaj, the share of 'Indian Religionists' in 'India's' 2050 population will be 54 per cent. Applying this share to the United Nations' projected population of 'India' in 2050 yields an estimated population for 'Indian Religionists' in 2050 of 1,177.74 millions. Clearly, the 2050 population of 'Indian Religionists' within the Indian Union alone cannot exceed 1,177.74 millions; that is, the maximum share of 'Indian Religionists' in the Indian Union's 2050 population must be 1,177.74 millions divided by 1572 millions (which, to recall, is the UN's projected Indian Union population for 2050): this ratio works out

to 74.92 per cent – rounded off, let us say, to 75 per cent. Accident or design? Happenstance or the product of 'working backwards'? We will let the reader decide!

What the authors do tell us about the 75 per cent figure, vide the quote from p 38 supplied above, is what 'we may assume' 'following current trends'. But what, in fact, does the history of the 'religious demography of India' in the recent past suggest? From figures available in the authors' own Tables 2.6 and 2.7a, we have the following information on the Indian Union for the years 1931 and 1991 (population figures are in thousands):

If 'Indian Religionists' are to account for 75 per cent of the Indian Union's population in 2050, then Christians and Muslims (by virtue of being the culturally heterogeneous residual) must account for the remaining 25 per cent. With the best will in the world, one must find it a little – shall we say, extravagant – to note that the share of Christians and Muslims in the Indian Union went up from 14.85 per cent to 14.91 per cent (i.e., by 0.06 percentage points) in the 60-year period from 1931 to 1991, and then proceed to employ 'current trends' as a basis for assuming that over the next 60-year period, from 1991 to 2050, the share of Christians and Muslims will rise by 10.09 percentage points: the factor by which the predicted percentage point increase from 1991 to 2050 must exceed the actual percentage point increase (over the same number of years) from 1931 to 1991 is 16,817 per cent! There is another way of looking at it. From 1931 to 1991, the annual compound rate of growth of the 'Indian Religionist' population is 1.87 per cent, while that of Christians and Muslims is virtually the same, at 1.88 per cent. These trends can hardly be expected to prepare one for the assumption that the share of Christians

Table 1: Christians and Muslims in the Population of the Indian Union, 1931 and 1991

Year	Christian Population	Muslim Population	Christian and Muslim Population	Population of Indian Union	Share of Christians and Muslims in Population of Indian Union (Per Cent)
1931	5548	35818	41366	278530	14.85
1991	19651	106552	126203	846303	14.91

Source: The information on population totals is from Tables 2.6 and 2.7a of the book.

Table 2: 'Indian Religionists' in the Population of 'India', 1901 – 1991

Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991
P	0.77139	0.76403	0.75304	0.74747	0.73812	0.73088	0.71998	0.70484	0.69634	0.68026

Source: Table 2.11 of the book.

Figure 1: The Share of 'Indian Religionists' in 'India's' Population (1901-1991)

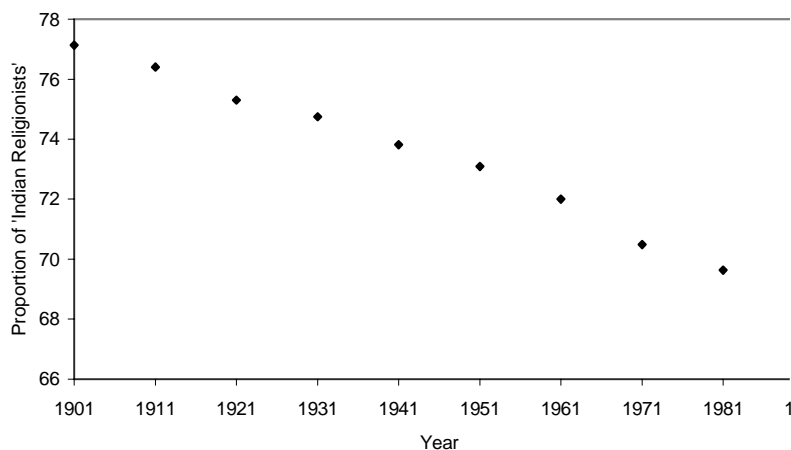
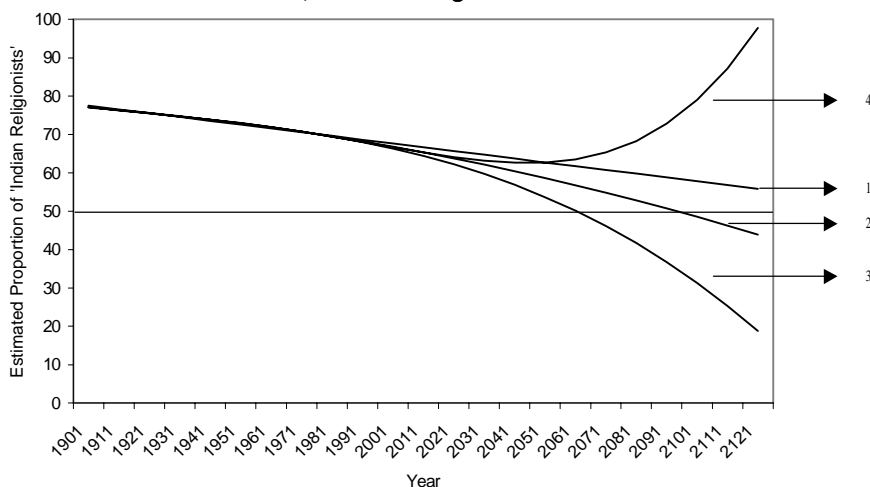


Figure 2: Proportion of 'Indian Religionists' in 'India's' Population as a Function of Time, Estimated Regression Curves



Note: '1' is the first-order polynomial specification; '2' the second-order specification; and so on.

and Muslims in 2050 will be 25 per cent: the respective compound rates of growth of the 'Indian Religionist' and Christian-plus-Muslim populations, over 1991-2050, would then have to be of the orders of 0.84 per cent and 1.95 per cent! These mind-bogglers, once they have been unravelled, constitute a clear pointer to the completely shocking manner in which the unsuspecting reader could be manipulated into buying the notion that the UN population projections serve as a corroborative means of 'assessing the plausibility of [the authors'] conclusion'.

This now brings us directly to the regression-based methodology adopted by the authors to arrive at their conclusion that 'if the trends of the last 100 years continue to persist in the future, then Indian Religionists shall become a minority in India in the near future'. 'This', as we have seen

in an earlier quote from the book, 'is an entirely statistical conclusion.' Let us pause a little over the statistics underlying the authors' 'statistical conclusion'. What the authors do is to first construct a time-series, consisting of ten observations, of the share of 'Indian Religionists' in 'India's' population – call this share p – for the years 1901, 1911, 1921, 1931, 1941, 1951, 1961, 1971, 1981, and 1991. This information, which is available in Table 2.11 of their book, is reproduced below:

The authors believe (p 37) that the... 10 data points, giving religious composition of Indian population from 1901-91, provide a sufficiently long time-series to statistically project the trend into near future... [W]e attempt such a projection by obtaining the best possible fit for the available data points and letting the resulting trend-line extend further into

future... The available data fits best to a polynomial equation of third order... [T]he fit obtained is quite good; R^2 -value for the fit at 0.9977 is almost near 1. Projections based on this fit should therefore be quite reliable... [T]he curve projected into the future [reaches] the 50 per cent mark just before 2061. Thus, if the trends of the last hundred years continue to persist in the future, then Indian Religionists shall become a minority in India in the near future.¹¹ [Footnote 11:] The data fits almost equally well to a second order equation. R^2 -value for this curve is 0.9967 and the fifty per cent mark is reached about 30 years later in around 2090.

Letting t stand for time, where apparently each unit of time stands for a calendar year (with 1901 normalised to zero), the estimated regression equation is presented as:

$$p = -5 \times 10^{-6} t^3 + 3 \times 10^{-4} t^2 - 0.09 t + 77.14$$

$$R^2 = 0.9977$$

Assuming, for the moment, that it is meaningful at all to project population shares in this manner, we would like to invite attention to a few critical difficulties.

First, the authors speak of 'project[ing] the trend into the near future'. As it happens, the time-span into the future (1991-2061) over which the projection is made is 70 per cent of the time-span covered by the data points (1901-1991)!

Second, consider Figure 1, which is a scatter diagram of the observed data points: there is nothing in the diagram to suggest that a third degree polynomial should be preferred over a straightforward linear trend line. Indeed, it is well known that, when it comes to predicting, the divergence between the estimates of first and higher-order polynomials can keep diverging with time, while both estimates may fit the observed data points (especially if they are few in number) reasonably alike: in the absence of strong prior theoretical grounds, therefore, it would be generally regarded as risky to fit higher-order polynomial functions to the observed data.

Third, we have ourselves tried out estimating equations for first, second, third and fourth order polynomials. The results are summarised in Table 3. (Figures in brackets relate to the standard errors of the estimated coefficients of the regression equation; an asterisk signifies that the estimated coefficient is significant at a 99 per cent level of confidence; t stands for time, the unit of time being a decade, corresponding to the intervals in which the data points are available, and 1901 is

normalised to zero; and R^2 stands for the coefficient of determination, or the proportion of the total variation of p explained by all the regressors employed):

The various estimating equations presented in Table 3 are plotted in Figure 2.

The authors, as we have seen earlier, say that ‘the available data fits best to a polynomial equation of third order’. From the passage quoted earlier, it appears that the authors’ criterion of ‘goodness of fit’ is simply a matter of which estimating equation yields the highest R^2 -value. It can be seen from Table 3 that, as we proceed from the first-order polynomial specification to the fourth-order polynomial specification, there are minute changes in the R^2 -value, but all the same, it keeps increasing (however marginally). By the time we arrive at the fourth-order case, the curve of p as a function of t initially declines, but thereafter rises at an increasing rate, so that, by the year 2111, for instance, the share of ‘Indian Religionists’ in the population of ‘India’ is predicted to be as high as 86.48 per cent! This simply flies in the face of the authors’ thesis, does it not? And yet, if one insists on the R^2 criterion for goodness-of-fit, it is to the fourth-order polynomial that one should be led (at least from among the specifications we have tried out).

Of course – fourthly – one can also fault second- and higher-order polynomial specifications on grounds of the problem of multicollinearity (notice that t , t^2 , t^3 , etc, must be expected to be highly correlated with each other) – not, we hasten to add, that the authors seem to be the least bit concerned by this when they advance the virtues of the third-order specification. Nor do they seem to be concerned about the standard errors in the estimated slope coefficients (for the only equation they present, the standard errors are not even reported). As Table 3 reveals, the t -coefficient (a_2) is significant (at a 99 per cent level of confidence) in the first three estimating equations, but not in the fourth (where it becomes significant only at the 95 per cent level); a_3 is also significant in the second-order polynomial specification; but neither of a_3 nor a_4 is significant in the authors’ preferred third-order specification; and likewise none of a_3 nor a_4 nor a_5 is statistically significant in the fourth-order polynomial. Further, the standard errors of all relevant coefficients keep increasing as the order of the polynomial increases. Additionally, a simple cross-check on the plausibility of the relationships estimated

is available through ‘back-projection’, or ‘prediction into the past’. By this reckoning, the first-order specification suggests, least implausibly, that the share of ‘Indian Religionists’ in the share of ‘India’s’ population in 1781 was 89.31 per cent; the second-order specification estimates this share at 78.75 per cent; and the third-order specification – the authors’ favoured equation – places the figure at 99.70 per cent, implying that there were no Muslims in India less than one hundred years after Aurangzeb, nor Christians at a time when the Company had established itself in the country. So – in a spirit of the greatest tentativeness, of course – one is led to suggest that if one must choose among the four estimating equations presented in Table 3, one may wish to settle for the first-order polynomial specification, as the least objectionable of the specimens on display. But – and here is the rub – this equation predicts that the share of ‘Indian Religionists’ in ‘India’s’ population will hit 50 per cent only in 2181. This outcome has clearly diminished scare-value in relation to the authors’ prediction of 2061; and there is little, surely, to be gained, in terms of alerting the populace to a stance of urgency, if the prospect of minority-status is a good 178 years away.

Fifthly and briefly, what are the options confronting one with a vested interest in painting a doomsday scenario of minority status for the ‘culturally homogeneous’ population? The linear specification may be the statistically least objectionable, but it projects minority status too far into the future to be of much use. If one allows R^2 to rule the roost, one must plump for the quartic specification – which never projects minority status! One must conclude that the choice of the third-order specification (the one advanced by the authors) is cautious, politic – and foundationally devoid of rationale. The collapse of the carefully constructed house of cards is complete.

Nevertheless, it is interesting to ask what kinds of scenarios might emerge if one were to apply the JSB Forecasting Technique (so named out of deference for the authors’ distinctive contribution to Demographic Statistics) to other settings. By way of two minor, examples, of wholesale ludicrousness, it can be shown (employing third- and first-order specifications respectively) that (i) Asians will account for just a little over 50 per cent of the US population by 2140; and (ii) girls will account for 80 per cent of all elementary school enrolment in India by 2116 (details of data and methodology are available with the reviewers on request). An even more proximately urgent application of the JSB technique emerges – given a certain perspective – from the imperative of taking a properly austere view of India’s ‘cultural homogeneity’, which arguably demands focusing exclusive attention on what has been happening, and can be predicted to happen, to the proportion of Hindus in the population of ‘India’. When, it might be asked, will Hindus just attain a 50 per cent share in the population of ‘India’?

To answer this question, let us adopt the same method as the authors of this book do, namely, use information on the proportion of Hindus in the population of ‘India’ (ten observations, at decadal intervals, from 1901 to 1991), in order to estimate a third-order polynomial regression equation of the share of the Hindu population (p_H) as a function of time (t), and then employ the estimated equation for the purpose of predicting, through extrapolation, the point of time at which p_H becomes 50 per cent. Data on the proportion of Hindus in ‘India’s’ population for the period 1881 to 1941, at decadal intervals, are directly available in Table 2.2 of the book. For the period 1951-91, we have used information on the size of the Hindu and total populations for the Indian Union, Pakistan, and Bangladesh respectively, as presented in Tables 2.7, 2.8, and

Table 3: Proportion of ‘Indian Religionists’ in ‘India’ as a Function of Time – Regression Results for Alternative Estimating Equations

Estimating Equation	Estimated Coefficient					R^2
	a_1	a_2	a_3	a_4	a_5	
$p = a_1 + a_2 t$	77.4945	-0.9847* (0.0411)				0.9863
$p = a_1 + a_2 t + a_3 t^2$	77.0146	-0.6247* (0.0797)	-0.0400* (0.0085)			0.9967
$p = a_1 + a_2 t + a_3 t^2 + a_4 t^3$	77.1388	-0.8519* (0.1660)	0.0265 (0.0443)	-0.0049 (0.0032)		0.9976
$p = a_1 + a_2 t + a_3 t^2 + a_4 t^3 + a_5 t^4$	77.1778	-1.0144 (0.3189)	0.1177 (0.1566)	-0.0212 (0.0269)	0.0009 (0.0015)	0.9978

Source: Computations based on data in Table 2 supra.

2.9 of the book: for each relevant year, the sum of the Hindu population across the three countries, divided by the sum of the total population across the three countries, yields the share of Hindus in 'India's' population. These data are summarised in Table 4.

Normalising 1901 to 0, and treating a decade as a unit of time, a third-order polynomial regression of p_H on t yields the estimating equation

$$p_H(t) = 72.768133 - 1.537537t \\ (1.0184491) \\ + 0.3924132t^2 - 0.035084t^3 \\ (0.2720319) \quad (0.0198347)$$

$$R^2 = 0.852870.$$

Employing this equation, it emerges that by the year 2021 the share of Hindus in the population of 'India' will be 50.20 per cent. Hindus reduced to a minority in Akhand Bharat in less than twenty years from now?! Even staunchly paranoid patriots must be expected to blink at this prediction. But there is worse to follow. If the technique of prediction just outlined is to be believed, the share of Hindus in the population of India should hit zero by around the year 2065. (To make a clean breast of things, we have actually employed Cardan's Formula for the solution of the cubic equation $t^3 + a_1t^2 + a_2t + a_3 = 0$; and, as nearly accurately as we can predict, the appointed day of doom should be December 26, 2063.)

If anybody should regard the prognoses contained in the immediately preceding paragraphs as being absurd and puerile and offensive and in thoroughly bad taste, they would be completely right. They would also need to have it pointed out to them that all we have done is to faithfully replicate the technique employed by the authors in related settings of forecasting population shares. There is, after all, an ancient piece of folk justice anent sauce, the goose, and the gander... The old English proverb with which we began this review ('who forsakes measure, measure forsakes') acquires a particular salience here: it points to the consequence of violating 'measure' in two of that word's connotations – one of which is a sense of proportion, and the other is a sense of arithmetic.

To obtain a feel for why one may disbelieve the prediction, based on the JSB forecasting technique, that, say, Asians will swamp the US by the year 2200, a simple illustrative, example, may be considered. Suppose one is interested in projecting the cropping pattern in a

certain well-defined geographical area. In particular, one wishes to know, let us say, what the proportion of cropped area under paddy is likely to be in some time from now. Let us imagine that the share of paddy has steadily risen from 20 per cent of cropped area to 65 per cent over the last one hundred years. Does one simply regress the observed shares against time, and, on the basis of the fitted curve that yields the highest R^2 -value, proceed to extrapolate to the date one desires? It is hard to imagine that even a student writing a term-paper in a beginner's course on statistics will attempt to get away with something like this. A less frivolous approach will invite the student to identify the factors that may be expected to have a bearing on the production of paddy: factors such as the cost of cultivation, prices ruling in the market, the availability of labour, the availability of high-yielding crop varieties, the availability of irrigation, and so on; the student would then study the behaviour of these determining factors, attempt to analyse the likely trends they will describe, and, through that route, try and analyse the likely trend in the cultivation of paddy. To take a simplified view of matters, suppose the availability of irrigation to be the only factor that affects the decision to raise paddy. If the hundred-year period over which the observed share of paddy has risen from 20 per cent to 65 per cent is also the period over which irrigation has improved from a low base to its full potential, would it make any sense at all to predict the share of paddy in the future on the basis of a 'best-fit curve' obtained by regressing the

observed shares against time? Obviously not: if irrigation is what determines the output of paddy, and if the extent of irrigation has plateau-ed off at its saturation level, then the output of paddy must also be expected to plateau off.

Likewise with projecting population shares. The rate of growth of a population is a function of mortality rates, fertility rates, and migration rates. Demographers typically look at the behaviour of these rates, and at the behaviour of the factors, in turn, which affect these rates, in order to form a view of the likely magnitude of population growth. It is a commonplace that in societies with low levels of human development, both mortality and fertility rates are likely to be high. As development occurs, mortality and fertility rates decline, and the society goes through a demographic transition on its way to achieving a stable population status. (The process can, of course, be disrupted by unforeseen and cataclysmic events like large-scale wars, epidemics, or famines.) Different countries, and also different regions and communities within a country, can, of course, be expected to describe their respective demographic transitions at different rates, depending upon their generalised levels of well-being and the rates at which these change. Among groups whose fertility rates are moving toward the replacement rate, some groups may be expected to arrive at this rate earlier than others. Until the latter group catches up with the former, the relative share of the latter will rise. But obviously not for ever! It is stable population shares, if any, that one should be interested in. And, indeed, in a widely-

Table 4: Hindus in the Population of 'India': 1901-1991

Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991
p_H	0.72873	0.71681	0.70733	0.70666	0.69457	0.72385	0.70690	0.68027	0.67121	0.65652

Source: Figures for 1901-1941 are from Table 2.2 of the book; figures for 1951-1991 have been computed from information in Tables 2.7, 2.8 and 2.9.

Table 5: Fertility and Religion

Religion	TMFR (Census 1971)		TMFR (Census 1981)		TFR: NFHS-1 (1992-93)	TFR: NFHS-2 (1998-99)
	Rural	Urban	Rural	Urban	Total	Total
Hindus	5.4	4.4	4.4	3.6	3.30	2.78
Muslims	6.2	5.3	5.1	4.5	4.41	3.59
Christians	6.1	5.0	4.5	3.9	2.87	2.44

Note: TMFR stands for Total Marital Fertility Rate, and TFR for Total Fertility Rate.

Source: Census data are from Census of India 1981: Occasional paper No. 13 of 1988: Fertility in India: An Analysis of 1981 Census Data, Demography Division, Office of the Registrar General of India, New Delhi; NFHS data are from National Family Health Survey-1, 1992-93 (NFHS-1, a 1995 publication of the International Institute for Population Sciences, Bombay); and the National Family Health Survey-2, 1998-99 (NFHS-2, a 2000 publication of the International Institute for Population Sciences, Mumbai and ORC Macro, Calverton, Maryland, USA).

respected study on India's population, the economic demographer Robert Cassen (1978) assessed the share of Muslims in the Indian Union's population, after stability had been achieved, to be in the region of 13.3 per cent, some 2 percentage points higher than what it was in 1971. As he puts it [Cassen op cit: 57]:

Under most plausible demographic assumptions therefore the relative weight of Hindus and Muslims in the population is unlikely to alter a very great deal. For that to happen one would have to assume a discrepancy between the decline in one rate of growth and the other which seems quite unrealistic. Thus if, as is sometimes alleged, Hindus maintain high fertility or oppose family planning because they fear being numerically overtaken by Muslims, such fear seems to have little empirical or quantitative basis.

And not a mention of Cassen's seminal work in the book under review! What, with all the restraint at one's command, can one say of the quality of scholarship which has informed the authors' treatment of such a deeply sensitive subject as they have chosen to investigate? Debatable classification, misleading tests of confirmation, profoundly inappropriate applications of statistical forecasting techniques, seriously deficient citation of important peer-research: the list must speak for itself.

IV The Larger Picture

If the claim is that the fertility rate for Muslims and Christians has been historically higher than that for Hindus, the claim is a valid one. This continues to be valid for Muslims, but not for Christians. Table 1.1 in Sriya Iyer (2002) indicates (citing Shariff 1999 as the source) that the total fertility rate (TFR) in 1995 was highest for Muslims, followed by the rate for Hindus, and then that for Christians. Fertility rates have, of course, been declining for all three groups; and the gap between Muslims and Hindus has been narrowing: this is revealed by both Census and National Family Health Survey (NFHS) data. Table 5 presents data on religion-wise fertility rates for three recent decades.

It is also worth noting that the fertility rate of Muslims is wholly comparable to the fertility rate of the scheduled castes among the Hindus. What is of interest is the question of what accounts for inter-group variations in fertility rates. It is, by this time, again a demographic common-

place that fertility is a declining function of levels of well-being. Literacy, especially female literacy, has a dampening effect on fertility (see, for example, the work of Dreze and Murthi 2001; and that of Van de Kaa 1996). A 1997 publication from the office of the Registrar General of India (Occasional paper 1: *District Level Estimates of Fertility and Child Mortality for 1991 and Their Interrelations with Other Variables*) has an illuminating account of the factors affecting fertility. Using data from 452 districts in which the census of 1991 was conducted, the study seeks to analyse the impact of a set of socio-economic characteristics on the behaviour of the total fertility rate. The results of a multiple linear regression exercise suggest

that the socio-economic characteristics which significantly affect the level of the TFR, in descending order of importance, are: the female literacy rate; the female work participation rate; the under-2 child mortality rate; the proportion of households having the facility of a toilet; the proportion of female workers in secondary and tertiary sectors of the economy; the under-5 child mortality rate; the proportion of married females in the age-group 15-44; the proportion of married females in the age-group 15-19; the proportion of married females in the age-group 20-24; female mean age at marriage; and the infant mortality rate.

To get a clearer picture of the relationship between levels of well-being and levels

Table 6: Well-Being and Fertility

Well-Being Indicator	Fertility Indicator					
	Crude Birth Rate			Total Fertility Rate		
	Rural	Urban	All	Rural	Urban	All
<i>Education</i>						
<i>(Survey 1978)</i>						
Illiterate				4.74		4.00
Literate (below Primary School)				3.85		3.27
Middle School Complete				3.61		2.61
Matric or High School and above				2.48		1.88
<i>(NFHS-1 1992-93)</i>						
Illiterate						4.03
Literate (below Middle School)						3.01
Middle School Complete						2.49
Matric or High School and above						2.15
<i>NFHS-2 (1998-99)</i>						
Illiterate						3.47
Literate (below Middle School)						2.64
Middle School Complete						2.26
Matric or High School and above						1.99
<i>Access to Infrastructural Facilities (1978)</i>						
Water Supply			33.4			
– Difficult Access			29.7			
– Easy Access						
Bus Stand			33.3			
– Difficult Access			31.0			
– Easy Access						
Railway Station			32.7			
– Difficult Access			28.8			
– Easy Access						
High/Higher Secondary School			33.1			
– Difficult Access			30.0			
– Easy Access						
Post Office			33.6			
– Difficult Access			31.3			
– Easy Access						
Medical Facilities			34.6			
– Difficult Access			30.1			
– Easy Access						
<i>Standard of Living (1998-99)</i>						
– Low						3.37
– Medium						2.85
– High						2.10
<i>Source of Lighting (1978)</i>						
Oil lamp			33.0	30.0		
Electric lamp			28.9	24.8		
<i>Monthly Per Capita Expenditure (1978)</i>						
<Rs 50			36.6	33.9		
Rs 51 – 100			29.3	27.4		
Rs 101 and above			19.9	18.3		

Source: As detailed in text.

of fertility, it is instructive to look at selected statistics available in three sources: *Levels, Trends and Differentials in Fertility 1979* (a publication of the Vital Statistics Division of the Office of the Registrar General of India); the *National Family Health Survey-1, 1992-93* (NFHS-1, a 1995 publication of the International Institute for Population Sciences, Bombay); and the *National Family Health Survey-2, 1998-99* (NFHS-2, a 2000 publication of the International Institute for Population Sciences, Mumbai, and ORC Macro, Calverton, Maryland, US). Table 6 presents information on fertility classified by levels of well-being, as measured by educational status; access to infrastructural facilities; standard of living (an index constructed for each household by aggregating the scores with respect to 'house type', 'toilet facility', 'source of lighting', 'main fuel used for cooking', 'source of drinking water', 'separate room for cooking', 'ownership of house', 'ownership of agricultural land', 'ownership of irrigated land', 'ownership of livestock', and 'ownership of durable goods'); source of lighting; and monthly per capita expenditure. (The years for which the data have been provided should facilitate identification with the corresponding data-source). Table 6 clearly reveals that urban fertility levels are systematically lower than rural levels; that fertility is a declining function of educational attainment; that difficulty in access to infrastructural facilities promotes fertility; that fertility is inversely related to the standard of living; and that fertility improves (that is, declines) with income.

If the Muslim fertility rate is high in relation to the Hindu fertility rate, it is instructive to note that the Muslim population also fares relatively badly on the deprivation front (just as the scheduled castes among the Hindus, also with a high fertility rate, do). Table 7, employing National Sample Survey (55th Round) data, presents a comparative picture of Hindus and Muslims in the dimension of well-being.

The figures presented in Table 7 speak very plainly for themselves. Whether we speak of education or employment or income, when the concern is with 'welfare' indicators, the headcount ratios for Hindus are higher than those for Muslims; while when the concern is with 'illfare' indicators, the headcount ratios for Muslims are higher than those for Hindus.

Table 5 suggests that fertility rates for Muslims are higher than those for Hindus;

Table 6 suggests that fertility is a declining function of well-being; and Table 7 suggests that Muslims experience greater deprivation than Hindus do on a number of fronts that might be expected to affect fertility. Putting these facts together yields an hypothesis that is shared by many demographers, namely, that differentials in fertility across religious groups may have little to do with the intrinsic 'religiosity' of the groups, but possibly much to do with the differentiated distribution of well-being among the different groups. This is a major aspect of the problem that has been carefully researched and presented, employing the results of a micro-survey undertaken in Karnataka, in Sriya Iyer's important book *Demography and Religion in India* [Iyer 2002 op cit]. We do not wish to labour the point any further: for one thing, the point, we believe, has been made; for another, we are beginning to acquire a morose sense of doing all the authors' work for them. What remains is simply and briefly to note that the myths of lust, promiscuity, polygamy, 'hum paanch, hamare pacchees', have been exploded again and again; and these are no less myths when they re-appear, disguised in the clothes of a third-order polynomial equation, as social science.

Finally, it must be clarified, if clarification is necessary, that we do not regard unbridled fertility as a virtue; nor are we against demographic exercises aimed at studying population trends based on a partitioning of the universe in terms of religion, or race, or region, or caste. What

is relevant to both judgment and study is the context of appraisal. If the source of interest resides in seeking to establish patterns of association and causation, which in turn may be expected to provide the basis for strategies directed toward enhancing personal and social good, with due sensitivity to the compulsions of group-affiliation and identity, what objection can one possibly have? If, on the other hand, the source of interest resides in a pre-conceived determination to discover nightmarish dystopias of the 'swamping' of one group by another, and the like, then it is hard to find anything of value in either the underlying motivation or the final destination of such exercises.

Conclusion

It will be agreed, we think, that on the whole we have dealt cheerfully with this book. By and large, we have made an effort to review it in a spirit of equanimity and even, sometimes, laughter; and we hope we do not have to apologise for our occasional lapses against the spirit of *gravitas*. At one level, it would have been hard to adopt a consistently grim-death, poker-faced approach to the book, given its comical mix of pomposity of purpose and slightness of content. But at another level, it was even harder not to be angered by the book. We are, after all, Indians who, though we may not be self-consciously engaged at all times in the task of nation-building, are also not interested in nation-breaking: we certainly have no complaints with the strains of *mian ka malhaar*, nor

Table 7: Religion and Well-Being

Well-being Indicator	Population Group							
	Rural Males		Rural Females		Urban Males		Urban Females	
	H	M	H	M	H	M	H	M
<i>Education</i>								
<i>(Persons aged 15 and above)</i>								
Illiterates	36.8	40.9	65.8	66.4	12.9	25.9	30.6	44.5
Graduates and above	3.5	2.1	0.9	0.4	17.4	6.0	10.9	3.4
<i>Employment</i>								
Work Participation Rate	53.7	47.8	31.4	16.2	52.5	49.6	14.5	9.8
Unemployment Rate	1.6	2.2	0.9	1.8	4.6	4.6	5.2	6.7
Salaried Workers	8.9	7.4	3.2	2.5	43.7	30.0	33.8	17.5
<i>Income Poverty</i>								
Population with a consumer expenditure level not exceeding Rs 340 in the rural areas and Rs 425 in the urban areas								
	37.2	39.5	39.0	42.1	20.9	38.9	23.0	41.6
<i>Income Affluence</i>								
Population with a consumer expenditure level exceeding Rs 615 in the rural areas and Rs 1120 in the urban areas								
	14.6	12.5	13.6	11.2	17.6	6.3	16.4	5.2

Note: 'H' stands for Hindus and 'M' stands for Muslims; all figures are in per cent terms.

Source: The figures presented in the tables are all derived from data in National Sample Survey Report No 468 (55th Round): *Employment and Unemployment Situation Among Religious Groups in India, 1999-2000*, NSSO, Ministry of Statistics and Programme Implementation, Government of India, 2001.

with the Basilica of San Thome in Chennai; and we are proud of Mohammed Rafi and the Nawab of Pataudi, just as we are of J C Kumarappa and Mother Theresa. This being the case, we – along, we have no doubt, with countless other of our compatriots – find it gratuitously offensive to have the discipline of demography treated as an excuse to isolate ‘the heterogeneity introduced by Islam and Christianity.’ Everything considered, we believe that, in briefly summing up, we should now allow ourselves – in a compromise between levity and anger – the luxury of a measure of seriousness.

This book, we are afraid, is intellectually trivial. We choose our words advisedly: the book *is* intellectually trivial, and we *are* afraid. Why should one be afraid of the intellectually trivial? The answer resides in history: nonsense has never deterred the march of folly, least of all of dangerous folly. The targeting, isolation, denigration, demeaning, and demonisation of groups of people on the basis of their affiliation to religion or race has never been inspired by wisdom and sense, only by their antithesis. And when demagoguery is buttressed by the academic trappings of scientific rigour, then the need for academic repudiation becomes so much the more urgent: the effort we have expended on this review is a testimony to that urgency, rather than to any serious (as opposed to merely solemn) scientific content there may be in the book. Stephen Jay Gould’s massive endeavour of scruple – through his book *The Mismeasure of Man* (1997) – in exposing the dangerous inanities of ‘evidence’ adduced to uphold the theory of intellectual ability being a function of racial origin is a great and inspiring example of the unmasking of bad statistics in the cause of bad science in the cause of divisively and hierarchically classificatory demographics. The situation becomes particularly grim when these ominous tendencies begin to become institutionalised in the organs of state. It is a matter of deep concern, in this context, that the book under review has actually been published with financial support from the Indian Council of Social Science Research.

The malady lies deep, and is buried in a view of the world that cannot let the past be. We do not speak of the historian’s past, which is sought to be understood through fact, evidence, and humane re-construction. We speak of that past which is the distilled essence

of a defective memory and distorted mythologising; which is manufactured by some obscure desire for harbouring a resentment and nursing a grievance; which lacerates both the self and the other in its rooted inimicality to the possibility of peace in the present and the prospect of progress in the future. [EW]

[The authors would like to thank, without implicating, the following people for the trouble they have taken in commenting on an earlier version of this essay: Prabha Appasamy, Robert Cassen, Achin Chakraborty, Tim Dyson, S Janakarajan, Suguna Ramanathan, C Rammanohar Reddy, Shiva Shankar, Arul Shankar, Kaushik Sunder Rajan, and Rajeswari Sunder Rajan.]

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