

Dear Prof. Sharat Chandra, 31 July 93

Thanks for the draft. I now understand more than what I did earlier, but still feel rather out of depth.

I have enclosed two sheets

(A) → contains my summary of the arguments as I have understood them.

(B) → contains some queries etc., as marked on the draft.

I would like to know what you feel about these, when you have the time.

Best regards

————— Niranjan Moh

(A) The draft m/s, as I understood it. 31 July 93

1. ~~Since~~ In mammals, SRY is found only in males but not in females.

In other taxa, genes are same in both sexes, but dosages are different.

Are mammals, then, an exception?

This m/s argues that ~~mammals~~ mammalian sex determination is also dose dependent, ~~it~~ and not exceptional.

2. Evidences:

(i) Even in other systems, the dose-sensitivity of sex-determination is seen ONLY when many genes ~~are~~ <sup>copy number</sup> the dose of many genes is changed simultaneously, and NOT when only ~~a~~ for one gene alone.

(so one should not conclude dose independence from SRY alone).

(ii) In some taxa, imprinting ~~precedes~~ leads to changes dose in copy number, and thus to sex-determination.

Does this happen in humans/mammals also?

The WAGR <sup>(autosomal)</sup> gene shows this (imprinting, copy number sensitivity) phenomenon, and is involved in sex.

~~But this now weakens the case for the importance of X inactivation!~~

~~Does~~ ~~XX~~ inactivation in females may also be an example of ~~such a phe~~ a similar phenomenon, on a bigger scale.

This implies that two copies of X are bad. Two copies could lead to

- (i) inviability → but XXX with two active copies are fine.
- (ii) abnormal sexual development, for females (in particular, maleness)!

From this point onwards, the logic is not clear to me.

~~What are the~~ Details of what happens if there are additional copies of specific segments, are described all right.

However, how exactly this data supports (or refutes) the underlying model is clear, primarily because of my ignorance.

"Model predicts this, data shows this, the model is OK (or not OK)" is the format which I would find simpler to understand.

(B) queries / comments; minor & major.

31 July 1993

- (i) Is SRY ~~is~~ always present in the XX males (human or otherwise?) in two copies?
- (ii) Q1 → examples of sisters - a, sisters - b etc. reflect on VIABILITY or otherwise of dosage. Does it imply a role in sex determination per se of the dosage?
- (iii) Q2 → same as above. Does sex-specific lethality in any way have a bearing on sex determination?
- (iv) Q-3. Not clear what is being referred to - what has two copies in males & one in female? (maybe this is clarified later, but at this stage this sounds ~~also~~ unclear.)
- (v) Q-4 what does must precede mean here? would "precedes or occurs concurrently" be better? Or you are implying that there is evidence where inactivation or ~~imprinting~~ elimination does not take place if there is no imprinting?
- (vi) Q-5 Human sex in particular or mammalian sex in general.

PTO

(vii) Q6 <sup>(ii)</sup> what is the relevance of the statement here?

Does it imply that ~~it~~ imprinting is seen also in autosomal genes (in addition to the sex related genes mentioned earlier?).

Why the claim "twenty years after"? Would it help if the year of theory and year of exp. evidence are given?

(viii) Q7 Sentence sounds like a tautology or truism. Mutations in any gene involved in sex determination could lead to significant effects on sex determination.

~~(ix)~~ Q8 what does function properly mean here? ~~Both males and females~~ Males anyway have only one copy, and they function well.

~~This~~ Females, with two copies, may not function well.

Does this imply that ~~they~~ they will become more male-like, or simply unviable due to other reasons?

(x) Q9 This strongly implies that (a) male determination pathway is already present in females (b) X-inactivation suppresses this pathway and hence (c) If X-inactivation does not take place, XX should develop as males!

Is this what you want to imply?

But then, two active  $XX^s$  in  $XXX$  are still females!

What role does Y have now?

**Dose-sensitive genes, imprinting and human sex determination**

*SRY* in mammals appears unique among the sex determination genes that have been studied so far in that it is present in one sex but not in the other. In the other familiar taxa in which sex determination has a chromosomal basis, sex-determining genes are present in both males and females, but the two sexes differ from each other in possessing a subset of such genes in unequal copy numbers. The question has therefore arisen whether sex determination in mammals, unlike that in *Drosophila melanogaster*, *Caenorhabditis elegans* and others, is gene dose-independent. This question is addressed here by examining properties of the genes in *D. melanogaster* that confer dose dependence on the sexual phenotype. Evidence which suggests that human sex determination may not be exceptional in this regard is reviewed and the role of genomic imprinting in regulating the dosage of sex-determining genes discussed.

Fly sex determination is based on differences between XX and XY embryos in the copy number of particular X-linked genes, but varying the copy number of any one such gene has little or no effect on the sexual phenotype. Even *Sex-lethal* (*Sxl*), the important "switch" gene on the X chromosome, whose activity state determines whether an embryo develops into a male or a female, is not dose sensitive by itself : for instance, as many as four copies of (*Sxl*), added as duplications, have no effect on males. XX flies heterozygous for *Sxl*<sup>-</sup>, a null allele, are viable and fertile females. Similarly, no phenotypic effects are observed in XX flies heterozygous for recessive or null mutations in any of the four other sex determination genes on the X chromosome (*sisterless-a*, *sisterless-b*, *runt*, and *sans fille*), but an embryo doubly heterozygous for mutations in any two of them is inviable. Double heterozygotes for any one of these mutations and *Sxl*<sup>-</sup> are also lethal. Flies

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//

heterozygous for recessive mutations in the autosomal genes *transformer*, *transformer-2* and *intersex* are indistinguishable from wild-type, but double heterozygotes develop as intersexes.

This seems very relevant.

Q2 { There is also a sex-specificity to these dosage effects. When either *sis-a* or *sis-b* is duplicated in males, there is no significant effect on survival or phenotype, but duplication of both genes is lethal for males. Females die with increased copies of the autosomal gene *deadpan* (*dpn*), or extra copies of the X-linked gene *scute*<sup>+</sup> (*sc*<sup>+</sup>). On the other hand, males die with decreased copies of *dpn*<sup>+</sup> or extra copies of *sc*<sup>+</sup>. The functions of some of the early acting sex-determination genes are interchangeable. Deficiency for *sis-a* can be rescued by a duplication of *sis-b*. Duplications of either *sis-a* or *sis-b* can rescue a deficiency for *runt* and duplications of *runt* can partially rescue deficiencies for *sis-a* and *sis-b*.

Thus the dose-dependent nature of sex determination in *D. melanogaster* is not attributable to any one gene. In XX flies, heterozygosity at a minimum of two loci is necessary to detect an effect of reduced gene dosage on sex determination. Dose sensitivity in this sense is a property of genes which function prior to *Sxl* activation as well as those which act subsequently. Going by this evidence, the fact that in mammals the expectation of a simple relationship between the effective dosage of a single gene and sex determination (one copy, female-two copies, male) has not been met is not unusual.

on? ~~on?~~

Q3 { Differential behaviour of homologous chromosomes, manifesting itself as inactivation or elimination of an entire haploid set or particular X chromosomes, is central to sex determination in several insect groups. Such differential behaviour is regulated by imprinting, the process by which a gene or chromosome is predetermined to function differently from its homologue in the same nucleus at a subsequent stage in development (Chandra and Brown, 1975). This less restrictive definition of imprinting would include not only

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those effects that are dependent on parent-of-origin, but also random inactivation of X chromosome in placental mammals. Genomic imprinting is strongly implicated in the sex determination process in mealybugs, scale insects and fungus gnats because it must precede or occur concurrently with the chromosome inactivation and elimination that characterize the genetic systems of these insects. At the beginning of embryonic development, all embryos are chromosomally identical, but elimination (of a haploid set in scale insects, and of X chromosomes in *Sciara*) and inactivation (of a haploid set in mealybugs) result in two classes of embryos with unequal gene copy numbers, either actually or in effect. Those embryos that have the higher gene copy number ( $2n$ ) develop into females and others with the lower copy number ( $n$ ) develop into males.

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26  
Human sex and genomic imprinting also seem inter-related because imprinting not only precludes parthenogenesis, it makes possible, through sexuality, the union of differentially imprinted 'male' and 'female' pronuclei without which normal mammalian embryogenesis does not occur. Autosomal imprinting has been demonstrated in man, twenty years after this possibility was raised on theoretical grounds. Since imprinting often leads to allele-specific inactivation, a reduction, from  $2n$  to  $n$ , in the effective dosage of the imprinted genes, would be expected. If sex determination genes are imprinted, significant effects on sex determination might follow. Brown and Chandra (1973) also drew a distinction between genes that are "sensitive" to parental origin and others which actually express differential behaviour.

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Mutations in either type of gene could lead to an effect on sex determination if the genes concerned are dose-sensitive and are involved in sex determination. A candidate autosomal gene, apparently subject to imprinting and affecting sexual development is WAGR, the gene at 11p13 responsible for Wilms tumour, aniridia and abnormalities in genital development. This oncogene is expressed at high levels in the developing gonad, Sertoli cells of the testis, epithelial cells of the ovary and in glomeruli of the kidney. Normal

development appears to require single-copy or "heterozygous" expression of this gene and gene dosage is apparently regulated through imprinting (inactivation) of one of the two alleles, usually the maternal allele. Loss of imprinting or duplication of the paternal allele results in two presumably active copies of the gene and this results in Wilms' tumor and anomalies in genital development. Thus WAGR illustrates the sensitivity of the developing urogenital system to gene dosage, provides a remarkable example of an autosomal gene required in single copy for normal development and the role of imprinting in regulating gene dosage during development.

X inactivation, which may be looked upon as representing an unusually high concentration of imprinted loci, could have two types of effect on sex determination :

(1) The first of these concerns those X-linked genes that may have homologs on the Y chromosome. X inactivation, by reducing the effective copy number of such genes, could bring about the familiar  $n-2n$  type of inequality between XX and XY embryos. If the inactivated segments on the X chromosome include Y-homologous sex determination genes, then X inactivation could have a role in sex determination (Chandra, 1985; 1986).

(2) (a) The second possible type of effect on sex determination would involve X-linked genes without homologs on the Y. If there are X-linked sex-determining genes which, like WAGR, function properly when their effective copy number is  $n$  but not when it is  $2n$ , then X inactivation may provide a means of ensuring their single-copy condition. If the human egg is primed to act, following fertilization, on  $n$  rather than  $2n$  copies of such X-linked genes, then it is to be expected that such priming would be maternally regulated and be independent of the type of sperm - X-bearing or Y-bearing - that fertilizes it. This may provide a basis for understanding why X inactivation is apparently under maternal

Fine

2.8  
Not  
very  
clear

control, occurs independently of the sex of the embryo, and independently of the number of X chromosomes present in excess of one.

(b) Under this type of effect, a selectionist view may require one to consider the possibility that X inactivation, because it normally occurs in the female, may promote femaleness.

Also fine

Evidence bearing on (1) and (2) are considered below.

In mouse, *SRY* transcription begins in 2-celled embryos and male and female embryos are distinguishable before implantation, suggesting that sex determination may begin before gonadal differentiation. On the basis of genetic and molecular analysis of familial XX maleness, it has been suggested that *SRY* negatively regulates a hypothetical gene *Z*, whose product functions in females and inhibits or otherwise negatively regulates the expression of genes for maleness. If there are targets of *Z* on the X chromosome, X inactivation may facilitate the negative regulation of such genes by reducing their effective copy number from  $2n$  to  $n$  in XX embryos. Since the probability of fertilization by Y-bearing and X-bearing sperm is equal, the mechanism to inactivate X chromosomes in excess of one would be expected to be common to all eggs if the single-copy condition of particular X-linked genes is to be maintained for the purposes of sex determination.

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In human 69, XXX triploids, there is no incongruity between the sex chromosome constitution and the sexual phenotype. In particular, there is no evidence that, by themselves, two active copies of the X chromosome that may be present in some XXX triploids can induce male differentiation. On the other hand, in nearly all live born, prematurely born and still born 69, XXY triploids, the external genitalia are ambiguous in spite of the presence of apparently normal Y chromosomes. A frequent finding is a small penis and no palpable testes. In one case, the external genitalia were female and there were no gonads or uterus (Schnizel *et al.*, 1975). A live born 71, XXXXY girl, with an ovary, fallopian tubes and uterus (Measwinkel-Mooij *et al.*, 1992) and

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a 70, XXYY foetus, in which the external genitalia were female but the gonads were male, have been reported. The reasons why male differentiation does not proceed normally in XXY triploids could be (i) the possible presence of two active copies of the X chromosome, (ii) the presence of an extra set of autosomes whose genes may be imprinted or not depending on the parental origin of the set, or (iii) the nonspecific effects of triploidy, or a combination of these causes.

Duplication of the distal segment of the short arm of the X chromosome appears to suppress maleness in individuals with an apparently normal Y chromosomes (Ogata *et al.*, 1992). Among the first six such cases reported, five had a 46, Y, Xp<sup>+</sup> karyotype and one, 46, X, Yp<sup>+</sup> (Stern *et al.*, 1990; Ogata *et al.*, 1992 and references therein). Most of the molecular evidence comes from the last case (Ogata *et al.*, 1992) in whom *SRY*, without any detectable mutation, was present. The region Xp21-Xp22.3 was present in two copies, both apparently active, one on the X chromosome and the other, as a translocation at the tip of the Y short arm. Since this segment of Xp is present in two copies in XXY individuals, who are phenotypically male, these results suggest a role for X inactivation in the sex determination process (Chandra, 1985, 1986). In three other cases, <sup>there was</sup> translocation of Xp <sup>material</sup> to Yq <sup>and</sup> ~~as well as~~ functional disomy for the Xp22 region ~~were demonstrable~~. In all three, there was evidence of interference with development of maleness, again possibly due to functional disomy of Xp.

There are atleast two cases of duplication of the Xp22 region in a male. In one of them, a complex rearrangement involving a minimum of two exchange events in the father resulted in an additional, apparently active Xp22.1. Xpter region at the tip of a chromosome 4 and improper transfer of Y material, including *SRY*, to Xp. One possible explanation for failure of maleness to develop in the nine Xp(dupl)Y cases referred to above may be that a critical sex-determining gene on Xp is disrupted during the formation of the

Dear Mr. Vedam, (1) AVP  
Draft, single space  
please  
show | 7 AUG 93

Thank you for your letter of 7 July,  
and the details about your data and proposed  
analysis. I'm sorry for the delay. Before we ~~average~~ <sup>meet</sup>  
~~in~~ Bangalore, <sup>we can discuss</sup> a few more points by correspondence.

~~I~~ As I understand you For the time being, let me  
~~us~~ describe my questions as applied to one site only. You  
have written that the data is available on a "weekly  
basis" ~~is~~. Does it mean one day per week? Did  
you ~~sample~~ sample throughout the day? Were there  
many sample sessions? - morning & evening? How many  
net sweeps were there per session?

What I need to know is how many values  
do you have.

Then, if you have 10 netsweeps, do you have  
only the total, or individually for each net sweep?  
The 50 m<sup>2</sup> area, which you mention, was it the  
same all through sample? Do you have data say  
separately for the two 25 m<sup>2</sup> halves, or 5 <sup>quadrats</sup>  
& 10 m<sup>2</sup>?

All these would be useful to make out the  
variability in the data on the same day.

(2)

similarly, what does temp. mean? Is it the max/min/av. temp for that day? Is it the temp. recorded at the time of sampling?

While you would be the best judge of the system, I do not think that Temp, Rainfall & R.H. will by themselves govern the population. It may depend on the food (grass?), which may depend on the temp/rainfall etc. not on that day, but total rainfall say upto that day. If there is some seasonality, then it may also affect the population.

In any event, it would be worthwhile to examine this data. I hope that it is computerized. LOTUS 1-2-3 might be the simplest, but if you have done it in any other format, it is perfectly ok. To start with, among the data is in the form

- of columns such as
- col. 1 - Date etc. → If they are at fixed intervals, even serial no. is ok.
- col. 2 - Population
- col. 3 - Temp.
- col. 4 - Rainfall
- col. 5 - R.H.

(3)

With This ~~log~~ data, you may look at various graphs of

Populatio vs time,

Pop vs Temp,

Pop vs Rnf

~~Rnf~~ Rnf vs RH

etc.

In ~~total~~ ~~itself~~ you By looking at these graphs, you may get some idea.

It would also be good to look at

Pop (time  $t+1$ ) vs Pop (time  $t$ ).

You would know the life-history of the much better, so it may be possible to ~~make~~ <sup>guess</sup> ~~guess~~ when the next generation will appear, and what size it would be, given the size of this generation.

In short, I would like some more details about the data. I feel that some analysis can be done, but predicting population solely on abiotic factors may not be meaningful. You may have some other ideas & data (eg. amount of grass

at each site). <sup>(4)</sup> I would also like to know  
in a little more details on these matters.

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By now, you would have gone through the  
chapters on energetics by Prof. Mathurashan & Prof  
Kandian. 'Modelling energetics' is a ~~little~~  
a rather general description. It would be  
good if you let me know exactly what data  
you have (e.g., how many individuals, how many  
days, how many parameters per individual per day)  
and what are the key questions you would like to  
ask, it would be helpful for me to plan the analysis.

---

There has been no lapse on your part at all; it  
takes some time for me to describe what ~~data~~  
information I need, and you may not be able to anticipate  
that. ~~what~~ Please try to give as many details as possible,  
without affecting your other busy schedule. After 1-2  
envelopes of such letters, we would be in a position  
to discuss & analyze the data in person more effectively,  
with ~~the~~ my best wishes

Yours for the  
NV Joshi

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DR. N.V. JOSHI

12th January 1994

Dr. Darshan Shankar / D.K. Ved  
Foundation for Revitalisation of  
Local Health Traditions (FRLHT)  
50, MSH Layout, 2nd Stage  
3rd Main, Anandnagar  
BANGALORE 560 024.

Dear Sir,

Thank you for your letter 091/TAP/RES of 6th January 94. It would be a pleasure for me to be on the Technical Advisory Panel mentioned in your letter. I strongly feel that the importance of the work undertaken by FRLHT cannot be overemphasized.

Eventhough I am formally on the Faculty of the Centre for Ecological Sciences, my knowledge of ecology is strictly theoretical. I may be able to examine the projects from mainly the point of view of data analysis, and not so much from the ecological / biological aspect. With this limitation, if you feel that I would still be able to serve a useful role, I would certainly be happy to be on the panel.

May I add that, I would be happy to participate in the activities related to the objectives of the panel, regardless of whether I am in the panel or not, if any aspect related to data analysis is involved.

With best regards,

Yours faithfully,

  
N.V. JOSHI.

AVN

Thank,

Can you make two  
more printouts of mail hand

6th July 1994

DR. N.V. JOSHI

Dr. John V. Kingston  
Director & UNESCO Representative to India  
United Nations Educational, Scientific  
and Cultural Organisation  
UNESCO HOUSE, 8 Poorvi Marg  
Vasant Vihar, NEW DELHI 110057

Dear Dr. Kingston,

Sub.: Regional Workshop on  
Statistical Methods for Ecologists,  
Pune, India, 9-21 Jan 1995.

Your Ref. : Letter dated 24.05.94,  
bearing No. STATS.1471.

Thank you very much for your kind invitation. I would be very happy to speak on the suggested topics at the Regional Workshop on Statistical Methods for Ecologists on 17.1.95 and 18.1.95.

With kind regards,

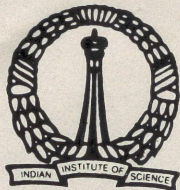
Yours sincerely,

N.V. JOSHI.

Copy forwarded with compliments to :

Dr. A.P. Gore  
Department of Statistics  
University of Poona  
PUNE

avn.



## CENTRE FOR ECOLOGICAL SCIENCES

INDIAN INSTITUTE OF SCIENCE  
BANGALORE-560 012. INDIA

*Office Copy*

DR. N.V. JOSHI

19th July 1994.

Dr. R.K. Bhattacharya  
Director  
Anthropological Survey of India  
27, Jawaharlal Nehru Road  
CALCUTTA 700 016

Dear Sir,

Sub.: Long term collaboration between Centre for Ecological Sciences, Indian Institute of Science, Bangalore, and Anthropological Survey of India, on Multivariate Statistical Analysis of the Data generated under the People of India project.

Your ref. : 50-7/92-93 Accts of 5/2/93 &  
DO 63-28/85-PMI(RM) Vol.XVI.

Please find enclosed

- (i) A copy of the report of the work carried out as a part of the above mentioned collaboration during the period April 1993-May 1994, and
- (ii) A statement of accounts duly prepared by the office of research schemes of our Institute,

for your perusal.

May I also request you to make arrangements to release the next installment of the grant of Rs. 4 lakhs, for the period April 1994-March 1995, at your earliest convenience ?

Thank you and with best regards,

Yours faithfully,

*N.V. Joshi*  
N.V. JOSHI.

Encl. : As stated above.

c.c:

1. Shri T.K. Sarkar, Officer-in-Charge, PMI(PC), ASI, Calcutta.
2. Prof. K.S. Singh, ASI, New Delhi.
3. Shri. Suresh Patil, ASI, Mysore.
4. Prof. Madhav Gadgil, CES, IISc., Bangalore.

Telephone: (91-80) 3340985 or (91-80) 3344411 Extn: 2506, Cable: CES, 'Science' Malleswaram, Bangalore. India

Telex: 0845-8349. Fax: 91-80-3341683

To,

Dr. R. K. Bhattacharya,

Director,

Anthropological Survey of India  
{ Calcutta }

Sub: Long term collaboration between Centre for Ecological  
Science, Indian Institute of Science, Bangalore, and  
Anthropological Survey of India, on  
Multivariate Statistical Analysis of the Data  
generated under the Project of India Survey.

yan sel. 50-7/92-93/ Acch d 5/2/93  
b DO. 63-28/85 - PMI (RM) Vol. XVI)

Dear Sir,

Please find enclosed ~~a~~

- (i) A copy of the report of the work  
carried out under the ~~above~~ as a part  
of the above mentioned collaboration  
during the period ~~April 1993 - 31 March 1994~~  
and May

AVN

Two copies

(Both to Calcu

+ 5 copies back to becc

(RSS, SP, NG, NUJ  
+ ~~AVN~~ AVN)

Thans

(ii) A statement & accounts, duly prepared by the office & research schemes, of our Institute, for your perusal.

May I also request you to make arrangements to ~~send~~ release the next installment of the grant, of Rs. 4 Lakhs, for the period ~~of~~ April 1994 - March 1995, at your earliest convenience.

Thank you & with best regards

Yours faithfully,

and a/c

- cc (i) J. K. Sankar - Officer-in-charge, I.M.I.  
(ii) Prof. K.S. Singh, An. S. I., New Delhi  
(iii) Mr. Suresh Patil, An. S. I., Mysore  
(iv) Prof. Madhu Gopal, CES, I.I.T., Bangalore.

**REPORT OF THE WORK CARRIED OUT IN CONNECTION WITH THE MULTIVARIATE STATISTICAL ANALYSIS OF THE DATA GENERATED UNDER THE PEOPLE OF INDIA PROJECT.**

The work carried out during 1993-1994 can be described under three broad categories :

- (i) checking the internal consistency of the traitwise data, and if necessary, reorganize it appropriately,
- (ii) explore the various methods of multivariate analysis so as to choose the more suitable ones for the data under consideration, and
- (iii) computerize the 1931 census data so that it can be linked with the POI data for further analysis.

The next three sections describe in detail the work connected with these three aspects.

**CHECKING INTERNAL CONSISTENCY AND REORGANIZATION OF THE DATA**

1. In the set of trait numbers 1, 2, 3 & 4 (identification local - transnational) sl. no. 3, 2 & 1 were made 0 when sl.no. 4 was 1. Again sl. no. 2 & 1 were made 0 when sl. no. 3 was 1. Again sl.no. 1 was made 0 when sl. no. 2 was 1. Lack of data was filled in consulting the writeups. After the corrections of sl.no. 1 to 4, the counts are as follows:

sl.no. 1 = 1085  
sl.no. 2 = 2750  
sl.no. 3 = 678  
sl.no. 4 = 122

2. If sl.no. 13 (migrated in recent years) was 1, sl. no. 10 (migration to present habitat) was made 1. Thus sl. no. 10 includes sl. no. 13. and sl. no. 10 increased from 2780 to 2813.
3. (a) In the set of trait numbers 14, 15, 16 & 17 (distribution: local-national), sl. no. 16, 15 & 14 were made 0 if sl. no. 17 was 1. Again sl. no. 15 & 14 were made 0 if sl. no. 16 was 1. Again sl. no. 14 was made 0 when sl. no. 15 was 1. After all these replacements in this set, the counts are as follows:

sl. no. 14 = 915  
sl. no. 15 = 1917  
sl. no. 16 = 830  
sl. no. 17 = 796

177 communities lack data on distribution (this is not filled in).

(b) Sl. no. 32 (island) was made zero for one community in Manipur.

4. The total number of combinations sl. no. 87 & 88 were 61.

(a) Either sl. no. 87 (occasional non-veg.) = 1 or sl. no. 88 (reg. non-veg) = 1, a new sl. no. was created, i.e., sl. no. 777 (non-veg). The total no of sl. no. 777 was 3970.

(b) If sl. no. 92 (non-veg beef, cow) = 1 and sl. no. 777 = 0, then sl. no. 777 was made 1. The number increased was 28, sl. no. 777 going up to 3998.

(c) If sl. no. 93 (non-veg beef, ox) = 1 and sl. no. 777 = 0, then sl. no. 777 was made 1. The total number updated to sl. no. 777 was 8, and the count increased to 4008.

(d) If sl. no. 94 (non-veg pork) = 1 and sl. no. 777 = 0, sl. no. 777 was made 1. With this total number of sl. no. 777 increased to 4018 by adding another 8.

(e) If sl. no. 94 (non-veg carrion) = 1 and 777 = 0, 777 was made 1. In this process sl. no. 777 increased by 1 and final count of non-vegetarians became 4019.

5. All communities thus reported as non-vegetarians (sl. no. 777) were compared with sl. nos. 77, 78, 79, 80, 81, 82 & 83 (which were reported as vegetarians of one or the other type) and the number of combinations with non-vegetarians (sl. no. 777) were found as follows :

sl. no. 777 with 77 =	182
78 =	107
79 =	138
80 =	121
81 =	35
82 =	37
83 =	36

6. Sl. nos. 77, 78, 79, 80, 81, 82 & 83 were made 0, if sl. no. 777 was 1.

7. (a) If sl. no. 92 (beef of cow) = 1 and sl. no. 93 (beef of ox) = 0, sl. no. 93 was made 1 (if they eat cow why not ox?). After clubbing sl. no. 93 became 949. Thus now sl. no. 93 is no-vegetarian with beef inclusive of cow and beef and sl. no. 92 specifically points to beef of cow.
- (b) If sl. no. 100 was 1 and sl. no. 102 was 0, sl. no. 102 was made 1, after clubbing sl. no. 102 became 688, i.e., now ragi includes nagli. sl. no. 100 is redundant.
8. (a) If sl. no. 125 (men take alcoholic drinks occasionally) = 1 or sl. no. 127 (men take alcoholic drinks regularly) = 1 a new sl. no. 778 was created, i.e., men take alcoholic drinks. Total no of sl. no. 778 updated is 3536.
- (b) If sl. no. 126 (women take alcoholic drinks occasionally) = 1 or sl. no. 128 (women take alcoholic drinks regularly) = 1 a new sl. no. 779 is created, i.e., (women take alcoholic drinks). Total no of sl. no. 779 is 1263.
9. If sl. no. 79 = 1 and sl. no. 80 = 0 then clubbed with sl. no. 80 was made 1. Thus sl. no. 80 represents vegetarians with egg and sl. no. 79 is redundant.

**Following are the counts of the combinations :**

10. If sl. no. 90 = 1 and sl. no. 777 = 1  
total no of combinations are 3339
11. If sl. no. 91 = 1 and sl. no. 777 = 1  
total no of combinations are 73
12. If sl. no. 90 = 1 and sl. no. 91 = 1  
total no of combinations are 26
13. If sl. no. 90 = 1 and sl. no. 777 = 0  
total no of combinations are 10
14. If sl. no. 91 = 1 and sl. no. 777 = 0  
total no of combinations are 2
15. The case of sl. no. 779 = 1 and 778 = 0  
(women drink men do not) were 11.
- If sl. no. 779=1 then 778 was made 1, consequently sl. no. 778 increased to 3547.
16. If sl. no. 78 (eat fish) = 1 and sl. no. 77 (pure veg.) = 1,  
then sl. no. 77 was made 0.

17. If sl. no. 80 (eat egg) = 1 and sl. no. 77 (pure veg.) = 1, then sl. no. 77 was made 0.
18. If sl. no. 91 (women cook non-veg. but not eat) = 1, and sl. no. 90 (women eat non-veg.) = 1, then sl. no. 90 was made 0.
19. If sl. no. 90 (women eat non-veg.) = 1 and 77 (pure veg.) = 1, then sl. no. 77 was made 0.
20. Sl. no. 174, 175 & 176 (self perception; high, middle & low) taken as a set, lack of data was noticed for 44 communities. Minor errors were corrected consulting the writeups.
21. If sl. no. 180, 181, 182 or 183 = 1 (Brahman, Kshatriya, Vaishya and Sudra), sl. no. 179 (recognize place in varna) was made 1 otherwise sl. no. 179 was made 0. In this process total no. of sl. no. 179 = 1 became 2757. Thus sl. no. 179 gives correct figure of how many communities recognize a place for themselves in varna system.
22. Sl. no. 184, 185 & 186 (other's perception; high, middle & low) taken as a set, it was observed that 55 communities lacked data. Minor errors were rectified after referring to writeups.
23. Sl. no. 194, 196, 197, 198 & 199 constitute a set giving information on the level of exogamy a community practice. Normally, exogamy cannot be at more than one level. It could be more than one if a community is heterogeneous or is in the process change in terms of rules of exogamy. Combinations in this set were checked for such cases. Then corrections were carried out for these combination categories recognizing the correct level of exogamy after consulting the writeups. However, 869 communities either lack data on exogamy or the rule of exogamy is not relevant to them.
24. If sl. no. 203 = 1 (FBD) or sl. no. 204 = 1 (MSD) then, sl. no. 202 was made 1, total no of sl. no. 202 increased to 548 which gives number of communities in which parallel cousin marriage is allowed.
25. In most of the cases where polygyny was reported (sl. no. 229 & 230), monogamy (sl. no. 226) was also reported. There were a few groups which reported only polygyny. These were checked with the writeups and it was found that monogamy is also permitted among them. Hence following corrections were made and monogamy increased from 4579 to 4610.
26. (a) If sl. no. 235=1, then sl. no. 208 was made 1, final total of sl. no. 208 increased to 2935. Thus sl. no. 208 now represents sororate junior and sl. no. 235 is redundant.

- (b) If sl. no. 234 = 1, then sl. no. 209 was made 1, final total of sl. no. 209 increased to 300. Now sl. no. 209 represents senior sororate and sl. no. 234 is invalid.
- (c) If sl. no. 233 = 1, then sl. no. 210 was made 1, final total sl. no. 210 increased to 1580. Thus sl. no. 210 gives the number of junior levirate and sl. no. 233 is invalid.
- (d) If sl. no. 232 = 1, then sl. no. 211 was made 1, final total sl. no. 211 increased to 279 which gives the number of senior levirate and sl. no. 232 is invalid.
27. If sl. no. 245 (bride price in cash) = 1 and sl. no. 246 (bride price in kind) = 1, then sl. no. 247 (bride price in cash and kind) was made 1, total number of sl. no. 247 increased to 708. Again if sl. no. 247 (bride price in cash and kind) = 1, then sl. no. 245 and 246 were made 0, which decreased to 593 and 119, respectively.
28. If sl. no. 249 (dowry in cash) = 1 or sl. no. 250 (dowry in kind) = 1, then sl. no. 251 (dowry in cash and kind) was made 1, total no of sl. no. 251 increased to 1907. Again if sl. no. 251 = 1, then sl. no. 249 and 250 were made 0 which decreased to 169 and 560, respectively.
29. In serial numbers 351, 352 and 353 (status of women: equal, high and low), a few communities were shown as dual status for women. This was checked with the writeups and corrections were made in case of such combinations. Data are lacking for this trait on 38 communities.
30. Sl. no. 367 (female circumcision) was made 0 in all 4635 records total no of zeros replaced were 3. This trait was reported to exist among Daudi Bohra, a Muslim trading caste, but there is no clear confirmation. As such this trait stands deleted.
31. In the set of sl. no. 375, 376 and 377 (trait on marriage feast) corrections were made as follows :
- |                          |      |                        |
|--------------------------|------|------------------------|
| If sl. no. 376 & 377 = 1 | then | sl. no. 376 was made 0 |
| 375 & 377 = 1            | then | 375 was made 0         |
| 375 & 376 = 1            | then | 375 was made 0         |
| 375, 376 & 377 = 1       | then | 375 & 376 was made 0   |
32. In the set sl. no. 400, 406 and 407 (mainly landowning, landholding and landless), 116 groups were reported to be mainly landowning and at the same time landless. This was

checked with writeups and were found to be mainly landowning and hence correction was made to sl. no. 407 which was reduced by 116. There are 508 groups which have no data on land or it is not applicable to them, 1795 groups are totally landless, 362 are both landholding and landless, another 497 fall between mainly landowning to landholding categories.

33. Sl. no. 409, 451 and 493 (fishing; C, T & NAQ ) were made 0 for the states of Manipur, Meghalaya, Nagaland, Arunachal Pradesh and Mizoram and files were created for reference to deletion are as follows :

409-code.fil	86 records
451-code.fil	104
493-code.fil	8

Fishing in these states is a past-time occupation of many tribes. This correction was suggested in Calcutta workshop.

34. In the set sl. no. 552, 553 and 554 (payment in kind, cash, and both) corrections are made as follows :

If sl. no.	553 & 554 = 1	then	sl. no.	553 was made	0
"	552 & 554 = 1	"	"	552 was made	0
"	552 & 553 = 1	"	"	552 & 553 were made	0
"	552, 553 & 554 = 1	"	"	552 & 553 were made	0
					554 was made 1

35. In the set sl. no. 635, 636, 637 and 638 (folk song sung by community, men, women and both, corrections are made as follows :

If sl. no.	638 = 1	then	sl. no.	made 0	635 was made 1
	637 = 1	then			635 "
	637 & 638 = 1		637	"	635 "
	636 & 637 = 1		636 & 637	"	635 "
	635, 637 & 638 = 1		637	"	
	635, 636 & 638 = 1		636	"	
	635, 636 & 637 = 1		636 & 637	"	638 "
	635, 636, 637 & 638 = 1		636 & 637	"	

In this set data are lacking on 937 groups or they do not have folksongs.

36. In the set of sl. no. 648, 649 and 650 (dancing : men, women and both) corrections are made as follows :

If sl. no.	649 & 650 = 1	then	sl. no.	649 made 0
	648 & 650 = 1			648 "
	648 & 649 = 1		648 & 649	"
	648, 649 & 650 = 1		648 & 649	"
				650 made 1

There are 2769 groups which do not have the trait of dancing

37. In the set sl. no. 682 to 685 (education favourable for boys, girls, partly for boys, girls), minor corrections were made for those groups which showed more than one trend after consulting the writeup.

**MULTIVARIATE ANALYSIS OF THE DATA ON TRAITS:  
WHEN WILL A TRAIT BE SEEN?**

As a case study, the investigation for the trait of desired number of offspring ( 1-2, 3 and 4 or more) is described. The objective here is to identify the set of traits associated with the preference for a small family (and also those which go together with a large family) along with some measure of the relative magnitudes of their influences. Primarily, the analysis is confined to 1-2 versus 4 or more. However, dichotomies like 1-2 and 3 versus 4 or 1-2 versus 3 and above are also considered. The more elaborate logistic regression using the three as multiple response categories may also be attempted in future.

**Association between traits**

For a pair of traits, a measure of association is to be computed, based on their co-occurrence (or avoidance of occurring) in the same community. These may be computed for all-India, as well as for states/UTs, or zones separately. These measures could be used for carrying out clustering of traits by a variety of algorithms.

For the analysis which follows, Pearson's product-moment correlation coefficient has been used as a primary measure of association, and statistical significance has been tested using the Bonferroni criterion since multiple comparisons are involved.

Only those traits which are shown by at least 30 communities have been included in the analysis. The number of traits comes down to about 700 as a result. This cut-off is arbitrary, and may be replaced by other criteria.

The Goodman-Kruskal index, based on the reduction in the number of erroneous prediction of one trait, based on the knowledge of the presence or absence of another trait, has also been used. In general, association is considered worthy of further consideration only if it is high on both these counts.

Other possible measures may include :

- (i) the chi-square statistic of the 2X2 contingency table,
- (ii) the difference in the proportion of say trait i, between two groups, one with trait k and the other without,
- (iii) log-odds ratio etc.

## Short-listing of traits

The traits which showed a significant correlation at 0.05 level, and a non-zero association by Goodman-Kruskal index have been identified; this number comes to about a hundred. For further multivariate analysis, only these traits have been included. Described below are some attempts at the multivariate statistical analysis. Most of the analysis has been carried out only for the south zone due to a higher homogeneity, distinctness and stability of culture.

### (i) The chi-square criterion :

Identify that trait which has the largest value of chi-square for the 2 x 2 contingency table (2 vs 4 family size, presence/absence of the trait). This turns out to be 'Family planning favoured'.

Next, 2 x 4 contingency tables are considered, with Family Planning Favoured as one of the traits, and each of the other traits one by one. Here, chi square is maximum when the next trait to be included is 'Use Modern methods of family planning'.

In an analogous manner, examination of 2x8 tables leads to 'Savings favoured' and 2x16 tables yield 'Community has teachers'. One can continue in this manner to add more traits.

However, this may not be the best method because the contribution to the chi square value is very unequal for the different cells. Secondly, it is not easy to judge the relative contributions of the traits. Thirdly, the highest and the next highest may be quite close, so the choice of the 'best' may not necessarily be the most appropriate. Fourthly, this does not consider all possible triplets, say, since the first trait used is 'frozen'.

### (ii) Nested analysis using Pearson's $r$ :

In this approach, the trait with a highest correlation with a small family size is identified, which turns out to be 'family planning favoured' ( $r=0.585$ ). Next, only amongst those communities which show this trait, the trait with highest correlation is identified, which is 'annaprashana' ( $r=0.2961$ ). One can continue in this manner to find a set of traits in a hierarchical manner.

The disadvantage is that the number of communities in the set at each subsequent stage becomes smaller. The advantage is that the traits whose influence is due to their being associated with the first trait are automatically eliminated.

(iii) Goodman-Kruskal's predictability index :

In the south zone, 251 communities prefer 2 children, while 160 prefer 4 or more children. In the absence of any other information, by predicting that all the communities prefer two children, there will be 251 correct and 160 wrong predictions, thus 0.389 being the proportion of errors in the prediction. The trait with highest predictability for a small family size is 'family planning favoured'; knowing the presence or absence of this trait reduces the number of errors to 81. The next trait whose knowledge leads to a maximum reduction in the number of errors is 'scheduled castes', whereby 74 errors remain. The next trait 'child labour' reduces six more errors and so on. With the knowledge of 15 traits, a perfect prediction can be made.

(iv) Multiple regression on log-likelihood ratios :

If  $f_2$  and  $f_4$  are the proportions of communities showing preference for 2 and 4 children, one can write down the regression equation for predicting the proportions of such communities in the presence and absence of a trait as

$$\ln (f_2/f_4) = A + B.X$$

where A and B are constants, and  $X=0$  or 1, depending whether a trait is present or absent. For two or more traits, this equation becomes

$$\ln (f_2/f_4) = A + B_1.X_1 + B_2.X_2 + \dots + B_n.X_n$$

with  $n$  traits, there would be  $2^{n-1}$  classes, and the  $n+1$  constants can be determined from the regression equation.

To begin with, by carrying out the regression analysis for all pairs of traits, the pair which shows the least mean square error is identified. At the next stage, one trait from the remaining set is added to these two, and the mean square error obtained for all such triplets. The trait which gives the smallest m.s.e. is retained for the next stage. At every stage, whether the regression coefficients are significantly different from zero is determined. The process is terminated when addition of one more trait leads to at least one regression coefficient not significantly different from zero.

The advantage of the method is the automatic termination, and the knowledge of the relative importance of the traits as seen by their regression coefficients. Thus, one set obtained from the analysis is :

Constant = 1.0472

Savings favoured, coefficient = 0.9028

Girls study upto post-graduate level = 0.5721

Trapping of birds and animals as a traditional occupation = -0.6509

Religion muslim = -0.6742

Nuptial at grooms residence = -0.7346  
Labour as current occupation = -0.6161  
Remarriage of widows permitted = -0.6648

The signs of the coefficients (+ve preferring a small family, -ve for a large family), at least for some of the traits are not inconsistent with what one expects.

The disadvantages are (a) the goodness of fit criterion rejects all such fits, (b) number of classes becomes large rather rapidly with the number of variables, so the number of communities in each class may be small (though this has been to some extent corrected for by using the weighted least square approach), and (c) as usual, the choice of subsequent traits is dictated by the earlier traits.

Two other techniques which may be used for subsequent analysis are : (i) Discriminant analysis, which gives weightages for different variables to optimally bring out the differences between two or more prespecified groups, and (ii) Canonical correlations, which may be used to correlate two groups of traits (or perhaps communities).

**(v) Selecting traits based on correlations in different subsets:**

An alternative way of selecting important traits correlated with a particular trait is to look for correlations in various subsets. Thus, within the south zone, correlations have been calculated for 2 vs 4, 2 vs 3&4 and 2&3 vs 4, as different ways of classifying small and large family size preferences. Those traits which show a significant positive correlation in all the three categories may be regarded as the most important, and the index of importance may be the average correlation coefficient. Next one can use those which are significantly positive correlation in at least two groups, etc. In the south zone, this leads to

- Savings favoured
- Community has scholars
- Education for girls is favoured
- Community has Engineers/doctors
- Annaprashan ceremony
- Education for boys is favoured
- Kanyadan exists
- Girls study upto college level

as traits significantly positive in all three classifications, and

- Child labour
- Self perception : low
- Landless community
- Remarriage : widow

as traits significantly negatively correlated in all the three.

A manuscript discussing the above results, and dealing mainly with the methodological issues in the analysis of this data, is currently under preparation.

## COMPUTERIZATION OF THE 1931 CENSUS DATA

During the year 1993-94, computerization of district-wise population figures from 1931 Census was taken up mainly for two reasons:

1. For district-wise analysis of POI data, an estimate of population of different communities in various districts was essential. It was also necessary to have complete data on district-wise distribution of communities for taking analysis down to district level.
2. In addition to building up data on district-wise distribution of communities, computerization of 1931 Census gave a chance make comparative study of communities covered in POI project and those mentioned in the 1931 Census.

The above work involved feeding of 31752 entries from 1931 Census. After the feeding was over, equivalence between community names which occurred in 1931 and in POI project was established. Further, equivalence between the districts of 1931 and present day districts was also established.

Details of computerization work on various provinces/states of 1931 Census is given below :

Slno.	Province/ State	No. of entries
1	Ajmer State	243
2	Andaman & Nicobar	104
3	Assam Province	1055
4	Baroda State	1376
5	Central Provinces & Berar	3401
6	Bihar & Orissa	1116
7	Bombay Province	4102
8	Calcutta Residency	514
9	Central India Agency	4276
10	Cochin State	128
11	Coorg State	47
12	Delhi Residency	143
13	Gwalior State	2346
14	Dominion of H.E.H. Nizam	801
15	Jammu & Kashmir State	1282
16	Mayurbhanj State	526
17	Punjab Province	6209
18	Rajputana Agency	578
19	Travancore State	875
20	Western India Agency	2630
Total		31752

A preliminary analysis of 1931 Census and POI data is reported in the following :

Among 2753 unique communities:

		Unique Communities
I	Population /distribution available only in 1981...	281 (144 only in 1981 137 in 1981 and also in gazetteers)
II	Population /distribution available only in 1931...	582 (318 only in 1931 264 in 1931 and also in gazetteers)
III	Population /distribution available both in 1981 and 1931	376 (158 in 1931 & 1981 218 in 1931, 1981 & also in gazetteers)
IV	Distribution available only in gazetteers and monographs	224
V	Nothing	1290
	Total	2753

Among 4635 communities

I	Population /distribution available only in 1981...	381 (190 only in 1981 191 in 1981 and also in gazetteers)
II	Population /distribution available only in 1931...	1431 (684 only in 1931 747 in 1931 and also in gazetteers)
III	Population /distribution available both in 1981 and 1931	1044 (432 in 1931 & 1981; 612 in 1931, 1981 & also in gazetteers)
IV	Distribution available only in gazetteers and monographs	313
V	Nothing	1466
	Total	4635

If we go by unique communities, we do not have distribution for 47%, but by the 4635 yardstick, the gap is for 32% of the communities.

Out of 1466 (nothing) + 313 (gazetteers) = 1779 communities, 1337 are found only one state while 177 in 72 states (177\*x=442). Thus it would appear that the communities for which population figures are not available are small communities found in one state and probably confined to few districts. This is expected as the 1931 census has a cut off and do not give figures for communities less than 1% or 0.5% or something like "representing four per mille of the total population" .

Further, within these 1779, the breakup is as follows:

Subgroups	427
Christian	95
Muslim	39
Jain	22
Sikh	13
Bania	14
Brahmin	65
	-----
	675
- overlap	61
	- - -
	614
	-----

For the above 614, it is unlikely that population figures are available. We will then be left with 1165 elements of 4635 or 974 unique of the same (around 25%). These communities are a mixed lot as follows.

II. Non-equitable groups:

Communities like Bahai, Bengali, Irani, Indo-Vietnamese, Ex-servicemen, Iraqi, Srilankan repatriates, etc.

III. New communities:

Bishnupriya-Manipuri, Shia Imami Islami, Desh Bhandari, Rama Kshatriya, Quam-E-Punjabian, Parkavakulam, etc.

IV. There are some duplicate unique codes for the same community in 2753 (e.g.: Chattada Shri Vaishnava/ Satani )

V. There are some duplicate communities in POI itself e.g.. Dombari = Kolhati, Nishi = Bangni, etc.

After a careful study, the gap may come down by another 200 or so i.e. around 700 unique. Out of these for some 200 or 300 we may never get any equivalence in old records. Finally, for some 200 or 300, population could be available in censuses before 1931.

ANM, Could you site ~~a~~ directly a final  
print out on letterhead? Thanks

Dear Dr. Bhattacharya, 4 Aug 1994

I trust you have received my  
letter of 19<sup>th</sup>, along with the report  
of work done for 1993-94; ~~which~~  
~~was~~ sent by courier.

My I request you to respond  
to that letter, and make arrangements  
for release the next installment  
of the grant of Rs. 4 lakhs, for the  
period - April 1994 - March 1995,

at your EARLIEST CONVENIENCE!

Thank you & best regards  
yours faithfully  
N V Joshi

ABSTRACT FOR THE FIRST WORLD CONGRESS ON  
COMPUTATIONAL MEDICINE, PUBLIC HEALTH AND BIOTECHNOLOGY  
24-28 APRIL 1994, AUSTIN, TEXAS, U.S.A.

C:\COMVET94  
AB502

To,  
Prof. Matthew Witten,  
Conference Chairman, COMPMED94

6-Dec-1994

Dear Prof. Witten,

May I request you to consider the enclosed abstract for inclusion  
in COMPMED 94?

We would prefer it to be a CONTRIBUTED PAPER, else as a POSTER.

It may be included in the session on (i) Computational Veterinary  
Medicine, else in (ii) Computational Disease Modelling, else in (iii)  
Computational Demography, Epidemiology and Statistics/Biostatistics.

With Best regards,  
Yours Faithfully,

N. V. Joshi  
(cesnj@ces.iisc.ernet.in)

-----  
Epidemiological and Evolutionary Dynamics of PPR Virus :

Some Mathematical Models

N. V. Joshi\* and M. S. Shaila+

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The pestes-des-petit-ruminant virus (PPRV) is closely related to the  
Rinderpest virus (RV), but differs from it in its narrower host range;  
while RV infects most cloven-hooved animals (cattle, sheep, goats  
etc.), PPRV is specific only to sheep and goats. While RV epidemics  
are known to have occurred in South India since last century, reports  
of PPRV outbreaks are of much more recent origin.

Mathematical models describing RV epidemics have been successfully  
developed, but those for PPRV are lacking. This presentation describes  
deterministic and stochastic models for the spread of PPRV and RV in a  
population of small ruminants composed of many isolated herds which  
occasionally intermingle - a situation normally prevalent in South  
India. Effects of (a) herd sizes (b) mixing rates and (c) extent of  
cross-protection on the magnitudes of outbreaks of PPRV will be  
discussed. Application of the model for planning efficient vaccination  
strategies will be outlined. Possible evolutionary outcomes of the  
competition between the viruses will also be reported.

तार : मानवविज्ञान  
Tele : ANTHROPOS  
दूरभाष | Dial : 249-8731  
8733, 34  
टेलिक्स | Telex : CA 2093

संख्या | No. 63-28/85-PMI(RM) (VOL. XVII)  
भारतीय मानवविज्ञान सर्वेक्षण  
ANTHROPOLOGICAL SURVEY OF INDIA  
भारत सरकार | GOVERNMENT OF INDIA  
भारतीय संग्रहालय | INDIAN MUSEUM  
27, जवाहरलाल नेहरू रोड, कलकत्ता-700016  
27, Jawaharlal Nehru Road,  
Calcutta-700016

दिनांक | Dated 24/8/95. 19

To,  
Dr. N. V. Joshi,  
Centre For Ecological Sciences,  
Indian Institute of Science,  
Bangalore-560 012

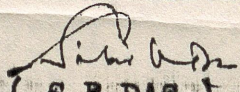
Sir,

1 || I am directed to inform you that the data on 'People of India' project which were being analysed by your centre should not be published in any form without prior approval of the Anthropological Survey of India.

2 || In this connection, I am also request you to send a detailed expenditure statement on upto date account and also the present status on progress of work immediately.

3 ||

Yours faithfully,

  
( S R DAS )  
Officer-in-Charge  
PMI(RM)

Dear Dr. Das,

Thank you for your letter.

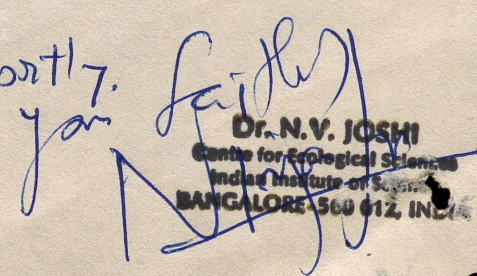
1. please be advised that the C.E.S. has neither the desire, nor the authority to publish the POI Data.

The results of the analysis done at the C.E.S. will be published in collaboration with ANSI as earlier, and comments, criticism and advise on pre-publication drafts would be most welcome.

2. The official statement & accounts, obtained from concerned authorities, is enclosed.

3. Progress report will be sent shortly.  
With best wishes

4 Sept 1995 enc:aa

  
Dr. N. V. JOSHI  
Centre for Ecological Sciences  
Indian Institute of Science  
BANGALORE-560 012, INDIA

Centre For Ecological Sciences  
**INDIAN INSTITUTE OF SCIENCE**

BANGALORE - 560 012  
INDIA

To,  
The Editor,  
Current Science

13 Dec 1995

Sub: Internet / World-wide-Web

Dear Sir,

① The contents pages of Current-Science <sup>have</sup> ~~has~~ been available on the world-wide-web for the last several months; A brief item describing this has been enclosed alongwith.

May I request you to consider it for publication in Current Science?

② Prof. N. Vishvanadham has made ~~a home~~ put considerable amount of information ~~on the WWW~~ about the Indian Academy of sciences. If you'd like that too to be announced, you may get in touch with him.

③ I wonder if it would be a useful exercise



if Current Science invites brief (2-3 paragraphs)  
news items from manager & WWW sites in  
India which may have ~~some~~ useful scientific information  
— eg., the ~~virus data~~ animal virus database  
at bioscience in Mumbai by Prof. Ashok Kolaskar.

If this is acceptable, ~~I can get in touch~~  
and if any input from my side would be useful  
in this connection - eg. way to the concerned  
people, draft an announcement etc, I would  
be happy to do so.

with best regards

Yours  
R.C.

To  
Prof. A.P. Gore  
Professor and Head  
Dept. of Statistics  
University of Pune  
Ganesh Khind  
Pune - 411 007

Dear Prof. Gore,

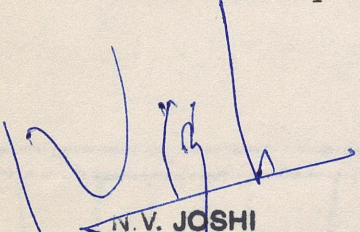
Please find enclosed herewith THREE copies of the revised m/s

Hierarchical partitioning of tree diversity across spatial scales:  
A case study from the Nilgiri Biosphere Reserve, Southern India

by Mr. H.S. Suresh, Dr. R. Prabhakar and myself.  
I hope the revised version is satisfactory.

Thanking you and with best regards,

Yours faithfully

  
N.V. JOSHI  
Centre For Ecological Sciences  
Indian Institute of Science  
Bangalore - 560 012, India.

18 Sept 97

encl : Three copies of the m/s (12 pages of text + 6 figures)

To  
Dr. Avinash Upadhyay  
Prachi, 23 Vidya Vihar,  
Rana Pratap Nagar,  
Nagpur 440022

20 Sept 1999

Dear Sir

Thank you for your courteous letter of 10 Aug 1999, and for agreeing to consider reviewing the book titled "Diary of Asutosh Mookerjee" for Current Science.

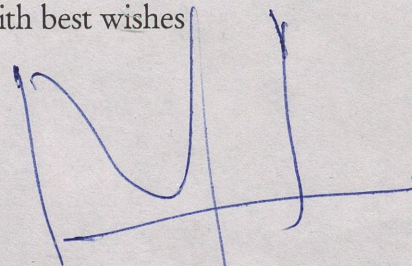
Though the actual title is "A Diary of Sir Asutosh Mookerjee", you seem to have divined the contents without looking at the book - your title seems technically more appropriate (and I hope you do not mind such a cryptic statement).

It is the privilege of the reviewer to keep the copy of the book. Generally, a review is expected in about two months, is subjected to the usual refereeing process. Suggestions from you in this regard are welcome, though as always, the editors would make the final decision.

As you probably know, this whole exercise started due to the interest and initiative of Dr. S.K. Bhattacharjee of the Molecular Biology and Agriculture Division of BARC, Bombay. The complimentary copy of the book was sent to me by Shri Chittatosh Mookerjee (of 126, Asutosh Mookerjee Road, Calcutta - 700 025), and he had also requested that if any review is published, a reprint of the same may be sent to him. So, apart from Current Science, in case you or any of your colleagues decide to review the book for some other periodical as well, could you please consider his request as well?

Thanking you and with best wishes

Cc. Editor, Current Science



N.V. Joshi

Dr. N.V. JOSHI  
Centre For Ecological Sciences  
Indian Institute of Science  
Bangalore - 560 012, India.

To  
The Editors  
Current Science  
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Bangalore - 560 080

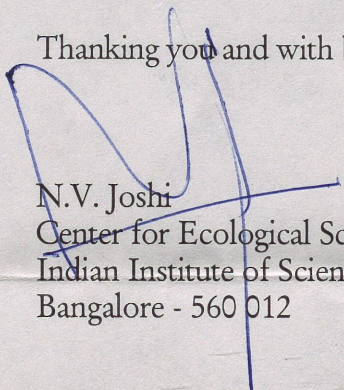
Subject: Resignation <sup>from</sup> ~~to~~ the Editorial Board of Current Science

Dear Sirs,

May I request you to relieve me from the membership of the Editorial Board of Current Science with immediate effect (Wednesday, 29 September 1999)?

I request that this letter may be treated as my resignation letter, if formal procedural matters so require.

Thanking you and with best regards

  
N.V. Joshi  
Center for Ecological Sciences  
Indian Institute of Science  
Bangalore - 560 012

29 Sept 1999