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ANTHROPOMETRIC SURVEY OF THE UNITED PROVINCES, 1941 : A STATISTICAL STUDY*

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*The present anthropometric survey of the United Provinces was undertaken in 1941 at the instance of Mr. M.W.M. Yeatts, the Census Commissioner of India, and Mr. B. Sahay, Superintendent, Census Operations, U.P. (1941), and conducted under the supervision of Dr. D. N. Majumdar of Lucknow University.

EDITORIAL NOTE

1. This is a composite paper by three persons, D. N. Majumdar, a trained anthropologist, and two statisticians. Certain portions of the paper would be primarily of interest to anthropologists, and certain portions to applied statisticians. It will be useful therefore to indicate the plan of the paper.

2. D. N. Majumdar gives in Part I of the paper a general account of the field survey which was personally conducted by him in connexion with the Population Census in India in 1941. He also gives a description of the definitions and technique used by him. The present material consist of measurements of about 12 characters for 2836 individuals belonging to 22 castes and tribes residing in the United Provinces of Agra and Oudh in India. The present measurements constitute one of the largest series of individual measurements in India taken by any single observer, and thus supplied valuable material for statistical purposes. This is why the individual measurements are being published in full at the end of this paper.

3. Part II of the paper is entirely statistical in nature and starts with a description of the arrangements for statistical analysis in Chapter 3, and an exposition of the basic statistical concepts in Chapter 4 which has been written especially for non-statistical readers. It then gives a general account, in Chapter 5, of statistical analysis of a standard type dealing with the normality of frequency distributions, and the linearity of regressions. The broad conclusion is reached that although there are significant deviations from normality the actual magnitude of such deviations is usually small so that for each group (caste or tribe) the individual measurements may be considered to conform approximately to the normal multivariate distribution.

4. The chief interest of the present material, from the statistical point of view, is the possibility of using the 'generalized distance,' (D^2 -statistic, introduced many years ago by the author of this note) for purposes of anthropological classification. The results obtained are discussed in Chapter 6. About 85 per cent of the total variance can be accounted for by variations in three different directions, indicating that the 22 different groups show a clear pattern in physical appearance. Further examination reveals the existence of three basic clusters called "B" (consisting of 2 Brahmin samples), "A" (consisting of 4 Artisan groups), and "T" (consisting of 8 Tribal groups including Tharus). Three groups (Chattri, Muslim, Agharia) occupy a position between Brahmins and Artisans; and one group (Chamar) comes between the Artisans and Tribals, so that the three basic clusters together with these four groups constitute a main sequence. Four other groups (Bhatu, Habru, Dom, and Bhil) show highly individual features and stand-out of the general scheme or main sequence.

5. This is as far as one can go on the basis of a purely statistical analysis. To assess the reasonableness or otherwise of the above results, it is necessary to refer to ethnological evidence. This has been undertaken in Part III of the paper by the senior author. Ethnological notes have been given as a supplement in Part III to furnish the background of social and cultural history. In Chapter 8, the results based on physical measurements are considered in relation to the ethnological evidence. Among the groups forming the main sequence, there is close correspondence between social status and resemblance in physical appearance to the Brahmins. In India, the change from more primitive to the more civilized conditions is apparently associated with increasing physical size (and narrow nasal breadth). Four or five groups which stand out of the main sequence also possess very peculiar cultural history. Results reached by the use of the 'generalized distance' are thus in broad conformity with available ethnological evidence. There are, however, a number of cases in which the physical evidence definitely indicates possible origins contrary to accepted opinion.

6. Part I and Part III are of special interest to anthropologists and readers interested in anthropological questions; Chapter 4 in Part II (dealing with basic statistical concepts) may also be of help to them. On the other hand, for statisticians Part II and appendices 1-6 would be of the greatest interest, while Part III would give them the broad anthropological results.

Calcutta,
21 April, 1949.

P. C. MAHALANOBIS

FOREWORD

By M. W. M. YEATTS

Census Commissioner, Indian Census 1941

Anthropology in India has too long been regarded as a peculiar concern of the census. When I took on that rather thankless task, I had many things to knock down and one of them was this. That did not, however, in any way mean that I lacked interest in, or rated low, the value and importance of anthropology and connected studies in India. On the contrary, India is one of the great storehouses of culture and cultures, and anthropology in competent hands should have been pursued earlier and wider.

To the mathematician the natural approach is to say, what are the facts? What do I know? Am I satisfied that what I think I know is really known? Can I attribute the range or value of these original data? and so on. In the light of his own answers to himself on these questions, he proceeds on his enquiry and arrives at conclusions. These conclusions he then tests against other phenomena and hopes to further thereby the knowledge he had developed. Measurement is the basis of geometry, and geometry was the basis really of mathematics. At any rate measurement is the basis of anything that professes to call itself a science, and anthropology has been slow in appreciating this fundamental principle.

We are to-day in an age dominated by, or which at any rate makes heavy calls on, the mathematics of large numbers, in other words, the science of probability. Now it is fundamental to probability that chance must have its way; calculations and conclusions based on the probability of this or that happening are spoiled from the beginning if we have a bias. No one can select without a bias, though some people think they can. A more insidious enemy is the unconscious bias which all of us have, and moreover one of which we might quite possibly never be aware. Thus if we are to use the mathematics of large numbers of probability, we must start by doing everything possible to see that the data we shall later tabulate or set forth in equations, series, or graphs, came to us through the effects of chance.

This is the principle of the random sample. Hard things have been said about sampling, but after analysis these charges would all be shown to lie not against sampling but against this or that sampler. Sampling in one form or another has run through social life ever since man ceased living on what he raised himself, but the would be sampler must be his own first, last, and worst critic. That is the golden rule.

Anthropology is a highly personal activity, one of the most personal that can be imagined. It calls for distinct qualities of understanding, human interest, and in fact for a type of mind and education that could with advantage be more common. But these very qualities, highly personal in themselves, are just those which, if uncorrected could corrupt any mathematical treatment of their observations. In fact, so long as it is a case of Mr. A studying people of tribe X, and recording personal impre-

ssions etc., that is one thing excellent of its kind. But when Mr. A says—"from the observations I have made, analysis shows that the characteristics of this tribe are 1, 2, 3, 4, 5"—he has entered a totally different field. Too often in the past he has not known it was different, but the distinction is vital.

Theoretically the perfect answer to this would be that every anthropologist should be an expert statistician, but the better answer is the one which Dr. Majumdar has given in this book, namely to associate with the anthropologist some collaborator who will scrutinize his figures from the expert angle, and he could not have chosen a better collaborator than Professor Mahalanobis.

I notice with particular interest the detail with which the author describes his processes of measurement. This again is in the sound scientific tradition.

I had some share in this in as much as it was one of the conditions I laid down before giving the Government Assistance Grant, to which the author has referred. Not that there was any objection from him ; on the contrary he welcomed the idea. And so we have in this small study an illustration of what should apply in all fields of knowledge namely, the readiness on our part to invite and welcome the skilled criticisms of someone else. I said once that the artist, of all men, must be free ; but I would extend that. Freedom in this sense is really the freedom from the fear of being shown wrong; and no true Scientist should have that fear.

I hope that the labour, enthusiasm, and skill represented by this book will serve as a model for anthropological work in India.

PART I. THE FIELD SURVEY

By D. N. MAJUMDAR

CHAPTER I. PREVIOUS WORK IN INDIA ON PHYSICAL ANTHROPOMETRY

I. RACIAL THEORIES AND ANTHROPOMETRIC EVIDENCE

Fifty years ago, Sir William Crooke on the result of anthropometric measurements taken on a large number of individuals belonging to the various castes and tribes of Northern India came to the conclusion that "there is no good ground for disputing the fact that the present races of Northern India are practically one people."¹ Looking at the table of the summary results of the anthropometric survey, carried out by himself, Surgeon Captain Drake-Brockman concluded, "one cannot but be struck with the result and notice the very slight material difference that exists, a fact which tends to prove beyond doubt that the racial origin of all castes must have been similar and that the foundation upon which the whole caste system in India is based, is that of function and not upon any real or appreciable difference of blood."² C. J. O'Donnell who subjected the figures prepared by Risley to a close analysis in the Bengal Census Report of 1891, wrote as follows, "The race theory of castes, on the other hand, is found to have practically no statistical support. Far from its being a law of caste organisation in Eastern India, that a man's social status varies in inverse ratio to the width of his nose, the utmost that can be predicted is that the average nasal index of a large number of the members of any caste indicates, in a very uncertain manner, the amount of aboriginal blood amongst its members, and thereby indirectly the greater or less respectability of the occupation followed."³

2. In the *Census of India, 1931* (Vol. 1(1) p. 439) Dr. J. H. Hutton writes, "the view that caste corresponds to race has here been rejected, as it is clear that the two do not coincide. The Brahman of the United Provinces has a long head (c.i. 73.1), he of Bengal a round one (c. i. 79.0); the cephalic index of the Chamar of the U. P. is 72.8, and that of the Bihar Chamar 76 and the same differences, which correspond, as explained later, to different migrations into India, are to be found likewise in other castes." This, however, does not dispute the racial basis of caste. It probably means that the Brahmins of Bengal differ from those of the United Provinces; but just as the Brahmins of the U. P. differ from the lower castes of the province, their colleagues in Bengal may have similar racial differences, with other castes recruited from the aboriginal substratum. Dr. Hutton agrees with Risley regarding the value of nasal index as a test of racial status, for he writes: "It cannot be denied that there is usually a clear relation between social status and the nasal index and that the latter varies according to the admixture of aboriginal, that is of proto-australoid, blood, though in regard to later immigrant strains caste cannot be similarly correlated

¹Crooke : *Castes and Tribes of North Western Provinces and Oudh*, Vol. 1, p. cxix.

²*Ibid.* p. xxxiii.

³*Ibid.* p. cxxvii.

to race on any systematic basis."⁴ As these statements are mostly based on anthropometric evidence it will be worthwhile to examine how far racial realities enter into the composition and structure of our stratified society.

2. PREVIOUS WORK IN ANTHROPOMETRY IN INDIA

3. Anthropometric measurements in India were first systematically taken by Sir Herbert Risley and were published as a volume of *Ethnographic Appendices to the Census Report of India, 1891*. The data analysed and reviewed formed the subject matter of a separate publication under the title of *The People of India*. Another book *The Castes and Tribes of Bengal* was published in 4 volumes which still remains an important source book of ethnographical origins in India. The difficulty of securing the services of trained anthropologists in those days must have been as great as it is even today, and the technique of measurement was also not sufficiently developed, so that doubts have freely been expressed by later workers about the reliability of the data and also of the methods of analysis used by Risley. Many of Risley's conclusions have been challenged by competent field workers, and Dr. J. H. Hutton had put the case for further anthropological work in India as follows: "His (Risley's) conception of India as isolated from the rest of Asia and inhabited entirely by barbarous tribes until the Aryan invasion of c. 1500 B.C., already impugned, has been proved to be erroneous by the discovery of Mohenjo-daro. His explanation of brachycephaly in the west of India as due to Scythian invasion in historic times has been justifiably attacked on the score that the population so introduced was never numerous enough to make a complete and permanent change in the somatic characteristics of the population."⁵ Similar objections have been taken against his hypothesis of the Mongolo-Dravidian origin of the Bengalees.

4. Such criticisms of Risley's conclusions do not by themselves prejudice the material which Risley had put on record. What matter most are the methods and technique of measurements Risley had adopted. P. C. Mahalanobis has analysed Risley's anthropometric data from Bengal⁶ and has found a number of more or less serious mistakes in the calculation of average values and records of individual measurements. Risley had published anthropometric data for some of the tribes and castes of the North Western Province and Oudh which constitute the present United Provinces. Apart from his technique which has not been accepted as correct in all details by most physical anthropologists, many of his individual data and the averages on the basis of which he made comparative study of races and racial traits have been found to be wrong⁷ and a thorough re-examination is necessary before the data could be used for purpose of racial comparisons.

⁴*Census of India, 1931*, Vol. 1(1), p. 439

⁵*Ibid.* preface.

⁶Mahalanobis, P. C. (1933): A revision of Risley's anthropometric data relating to the tribes and castes of Bengal. *Sankhyā*, Vol. 1(1), pp. 76-105.

⁷A discussion on this subject is reserved for a later publication.

5. But, however reliable the revised data may be from the statistical point of view, the fact that Risley's data were collected by 'four persons' whose training in anthropometry was of the 'correspondence' type and also the fact that the various field workers did not work under the direct supervision of any co-ordinating authority, have rendered the data of dubious value. As an anthropologist⁸ has pointed out, Risley's share in the collection of data lay in teaching the measurers, the use of instruments, in exercising a general supervision over the work and in supplying them with printed instructions regarding the technique of measurements and the selection of subjects.

6. Risley wanted presumably to determine the standard type of each caste and for this purpose "individuals of clearly exceptional features were excluded." This search for the standard type has naturally led to selection of subjects and it is difficult to say how far his instructions were carried out by his assistants, but it appears, as I have already pointed out in an earlier paper,⁹ that the selection has had significant effect on the calculated values for certain characters as the standard deviations of Risley's series tend in most cases to be lower than the values for corresponding characters in groups measured by other anthropologists.¹⁰

The actual instructions issued by Risley were as follows¹¹ :

"In selecting subjects, only adults between the ages of 25 and 45 should be taken. Accurate determination of age being of course impossible, those persons must be rejected who are obviously not fully grown or who appear to be over 45, deformed persons, dwarfs, cripples and men who have suffered from any disease affecting form of the nose. In measuring the higher castes it is as well also to reject persons of very black complexion and with very broad and depressed noses as in lower castes, men of very fair complexion and high caste type of features should be rejected. The object is to determine the *standard type* (italics mine) of each caste and for this purpose individuals of clearly exceptional features should be excluded." It is the latter part of the instructions affecting both the higher and lower castes, that anthropologists have taken exception to and for very good reasons.

7. In the United Provinces, Surgeon Captain Drake-Brockman undertook an extensive anthropometric survey the result of which was printed in the first volume of *Castes and Tribes of North Western Provinces and Oudh*, 1896. He is said to have measured about 4,906 subjects of all castes and tribes of these provinces but only a summary of the data is available, the individual measurements probably were not published. Regarding Brockman's methods all that we know is that 'only males of the age of 25 years and upwards have been selected as subjects for measurement on

⁸*Census of India, 1931*, Vol. 1(3), p. ii.

⁹Majumdar, D. N. (1938) : The relationships of the Austro-Asiatic tribes of India with special reference to the measurements of Hos and Saoras. *Proc. Indian Academy of Sciences*. Vol. 7 (1), p. 6.

¹⁰Morant, G. M. (1935) : An attempt to estimate the relative variabilities of various populations. *Zeitschrift für Rassenkunde*, Band 2(3).

¹¹*Census of India, 1931*, Vol. 1(3), p. 11.

account of their mature physical development."¹² Further, Drake-Brockman writes, "I have endeavoured to group the different castes under three main divisions, viz., Aryan, Medium and Dravidian; the Medium group contains a large number of castes which form more or less an intermediate type, and are not capable of being classified strictly under either of the other two main groups. The last group I have subdivided into (a) an Hinduised and (b) an aboriginal section to indicate more fully their status in the social scale."¹³

8. Apart from the fact that the terms 'Aryan' and 'Dravidian' are merely linguistic and have no racial significance, the basis of his selection is not clear. Drake-Brockman has not mentioned anything about his technique of measurements. Like Risley, he takes the nasal index as one of the 'best tests for racial distinction'. He finds that the Jats have an average nasal index of 55, which means that there must be quite a number of individuals among the Jats with a lower nasal index. Risley's range for nasal index for tribes and castes varies from 66.9 to 94.5, and evidently there must be a difference in technique between Risley and Drake-Brockman with regard to nose measurements. The latter's method of analysis is explained in his own words: "I have for purposes of easy comparison taken one hundred subjects from each of the main divisions promiscuously and irrespectively of caste in order to compare finally the highest with the lowest caste, the noblest born Aryan with the humblest born Dravid."¹⁴ As a supplement to Captain Brockman's note, tables of measurements carried out under the superintendence of E. J. Kitts were published by Crooke. These measurements refer to about 20 social groups of which there were 105 Sayads, the rest are made up of very small numbers from 25 to 50 most being between 25 and 30. Kitts also does not mention about the technique while the size of his samples is very small in some cases.

9. In view of the wide publicity of Risley's conclusions and also because of the doubts freely expressed by trained anthropologists regarding the reliability of the material, the need of taking fresh measurements was recognised by the Census authorities in 1931, and a racial survey of India was undertaken by Dr. B. S. Guha of the Zoological survey of India. The total number of persons measured by Guha was 2511. With the exception of 171 Nicobarese, all the subjects were said to have been measured by him. This survey, therefore, can claim certain advantages over those organised by Risley, Drake-Brockman and others, for in the interval between the surveys there have been conscious attempts at standardisation of anthropometric techniques and international agreements which in the hands of trained personnel should lead to the collection of comparable material.

10. Risley's work was first restricted to Bengal and then extended to other provinces of Northern India, and different people were entrusted with the task of measuring in different provinces while Guha's comprised the whole of India. Guha's

¹²Crooke: *Castes and Tribes of the North Western Provinces and Oudh*, Vol. 1, p. xxvii.

¹³*Ibid.* p. xxvii.

¹⁴*Ibid.* p. xxxiii.

own description is summarised in the following sentence: "As the funds available were limited and time none too long, a comprehensive scheme, embracing the majority of the castes and tribes of India was not practicable. It was necessary to restrict the scope of the work, but to make sure at the same time that the results of the survey were capable of yielding *positive results*"¹⁵ (italics mine).

11. While Risley's data are not usable for the reasons detailed above, Guha's individual measurements have not yet been published and until they are available (already 16 years have elapsed since they were recorded) we can neither check his conclusions nor compare his data with those collected by others. Recently¹⁶ Mrs. Karve has informed us that the Maratha measurements published in the Census Report of 1931, Vol. 1(3), were from Maratha students from the Fergusson College, Poona, and therefore, 'a very selected Maratha group,' and on enquiry at Ahmedabad, we learnt that the Bengali Brahmins and Kayasthas were partly measured by Guha from the employees of the Textile Mills, there. The 1931 survey did not indicate the locality of the people measured. The total number of people measured from Bengal did not exceed 200 persons, made up of 50 Brahmins, 100 Kayasthas and 50 Poda. It is necessary, I should think, to divide Bengal into several zones, deal with each separately and then compare with the others. One very great omission in the 1931 survey is the absence of anthropometric data for the Muslim population. There are 60 millions of Muslims in India and in some provinces they are in a majority. In Bengal, for example, the Muslims form more than 50% of the population while in some predominantly Muslim districts of Eastern Bengal, out of every 10 persons there are 8 or 9 Muslims. To disregard this aspect of India's demography leaves a serious gap in the conclusions. The Muslim population in India represents various racial strains. Hindu blood has filtered into Muslims and Muslim blood in Hindu veins in no uncertain way. Again, the 1931 survey included measurements of 50 U. P. Brahmins and 50 each of Malve Brahmins, Baghel Rajputs and Miscellaneous Rajputs. Even if we take these samples to belong to the United Provinces (no mention is made of the places where they were measured), the total number of subjects in the United Province for which means and standard deviations are given is only 200, a number which is clearly inadequate.

3. ANALYSIS OF ANTHROPOMETRIC DATA

12. Earlier anthropologists relied on the method of averages in interpreting anthropometric data. For example, Risley's hypothesis about the race elements in Indian population was based on his interpretation of the averages or mean values of metrical characters and he had not even worked out the standard deviations or the probable errors either of the means or of standard deviations, not to mention any comparison of the significant ratios. In an appendix to his *People of India*, Risley detailed the seriations of his data and that is all we know of his grouping technique. A mere comparison of the average cephalic and nasal indices, of stature and other charac-

¹⁵Census of India, 1931, Vol. 1(3), p. iii.

¹⁶Deccan College Monograph Series, No 2, Poona, 1948.

ters was considered enough evidence, for his elaborate and highly complex hypothesis of race origins which for long influenced Indian ethnological literature.

13. Lack of collaboration between statisticians and anthropologists has greatly retarded progress in physical anthropology, though in craniometry, the use of elaborate statistical tools had established the claims of this branch of science to special consideration. For example, Karl Pearson's method of Coefficient of Racial Likeness has been extensively used in craniometric work but not on the measurements on the living. As Mahalanobis had pointed out, "One of the principal objections against its use in this case has been the fact that the technique of measurement has not been standardised satisfactorily, and thus the data provided by different observers can seldom be compared with safety."¹⁷ Since then, international conferences have set up committees for standardisation of anthropometric measurements and it cannot be denied that some amount of standardisation has been effected, although much is still required. Conventions must be replaced by standardised methodology and adequate techniques of statistical analysis must be employed to test the data of physical anthropology. It is this recognition that made me seek the assistance of the Indian Statistical Institute. It is, I think, a happy augury for the future of physical anthropology that such collaboration has been possible and that statisticians could be interested in the data of physical anthropology.

14. Reverting to the use of statistical techniques by anthropologists, we find that the Coefficient of Racial Likeness method has been used on the material collected by Guha in connection with the anthropological survey of India in 1931, the results of which were published as Part III of the *Census of India, 1931*, Vol. 1. The statistical analysis of the data is based on 29 characters. Guha computed 627 crude Coefficients of Racial Likeness of which 520 were based on his own measurements.

15. Whatever tools we may choose to employ, it is necessary that the materials on which we work are complete and representative of the population dealt with. It cannot be denied that anthropometric data are somewhat less accurate than craniometric, for a living head cannot, for obvious reasons, be measured with so much accuracy as a skull. The vagueness of some of the landmarks in anthropometry and the scope for pressure in the measurement of certain anthropometric characters make anthropometry less reliable than craniometry and examples are not lacking where two investigators taking measurements on samples of the same population following similar technique have come to different results. There is a further difficulty with anthropometric data as "the problem of determining a sufficient number of head and body measurements which are all uncorrelated, or at least lowly correlated, with one another is yet unsolved, and the characters which are customarily determined have certainly not been chosen with this object in view."¹⁸ Even statistical tools have not been of great help in restoring the prestige of physical anthropology. In recent years doubts have

¹⁷Mahalanobis, P. C. (1930): A statistical study of certain anthropometric measurements from Sweden. *Biometrika*, Vol. 22, (1 and 2), p. 98.

¹⁸*Ibid.* p. 98.

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been freely expressed by competent statisticians about the reliability of the C.R.L. method. Prof. R. A. Fisher argued that "the C.R.L. is defective in that it takes no account of the correlation and covariation of different measurements but treats them as though they are statistically independent."¹⁹ "The effect of this," writes Fisher, "is to cause very high or very low values of the coefficient to occur more frequently by chance than they should."²⁰ These findings make it necessary to explore new tools and techniques of statistical analysis without, at this stage, discarding older tools, and the collaboration of the Statistical Laboratory Calcutta, must be considered highly opportune. For physical anthropology, particularly anthropometry, must pass rigorous tests of scientific scrutiny before being regarded as science, and statisticians may give anthropologists a new lead and a further lease of life. Both the hopes, I have reasons to believe, are possible to be realised by collaboration between the field anthropologist and the statistician.

4. INADEQUATE SIZE OF SAMPLES

16. Recent statistical analysis of anthropometric data has shown how unsafe it is to draw general conclusions from data based on a small number of individuals. Small samples are usually collected from one place or, at any rate, from a restricted area and are likely to be weighed unduly by local types or by the chance inclusion of individuals who may not represent the group. In the early days of biometry, "the fallacy of deriving conclusions of certain kinds from peculiarities of the curves of frequency distribution of measurements provided by samples, was stressed but the warning has not had much effect on anthropologists."²¹ The chief errors made with regard to the matter have, as pointed out by G. M. Morant, been in supposing (a) that a small sample is capable of giving an adequate estimate of the form of the distribution in the population sampled, and (b) that mere inspection of the diagram for a sample is sufficient to furnish the information required. "In general the samples from a particular population tend to give a closer and closer approximation either to the normal or to a very similar form of continuous curve according as their sizes are increased."²² And this makes it necessary that in order to get the proper frequency curve the sample should be sufficiently large in number. "Any anthropometric sample," writes E. A. Hooton, "consisting of a hundred persons or less is very unlikely to show either the full range of variation or a representative distribution of physical characters found in the population from which it is drawn."²³ Morant has argued that the size of the samples should not be such as would not yield any reliable results. As he says : "The anthropologist who deduces theories of racial mixture or relationship from

¹⁹Fisher, R. A. (1936): *The Coefficient of Racial Likeness and the future of craniometry. Jour. Roy. Anth. Institute*, Vol. 66, p. 62.

²⁰*Ibid.* p. 62.

²¹Hooton, E. A. (1939): *The American Criminal*, Vol. 1, Harvard University Press, p. 14.

²²Morant, G. M. (1939): *The use of statistical methods in the investigation of problem of classification in anthropology, Biometrika*, Vol. 31, p. 81.

²³Hooton, E. A. : *The American Criminal*. Vol. 1, Harvard University Press, 1939, p. 14.

the 'peaks' of small distributions is deceiving himself by building on a statistical foundation which is unsound owing to the inadequacy of the evidence."²⁴ Scanty samples of the Bhatias and the Doms who are criminal tribes in the U.P. may show significant statistical differences with the civil population, the members of other castes and tribes not so stigmatised, but we can never be certain that the differences are not due to chance or to personal equation unless the number of observations made is big enough to ensure a fair representation of the populations considered. There is a lot of truth in the statement that the "amount of confidence with which racial theories are made is very often inversely proportional to the evidence obtained from the physical data."

17. The average size of the samples of the 32 groups measured by Guha during the 1931 survey is 64.4; of the samples 5 were less than 50 (of which the Chenchus numbered 23 individuals), 18 were between 50 and 60, 4 between 60 and 100, and only 5 samples were above 100, the largest sample comprising 114 individuals was of the Orissa Brahmins. "It will be evident from the figures" wrote Dr. Guha, "that barring the Chenchus where out of a total adult male population of about 445, we have measured 23, the size of the samples was fair (italics mine) though not large in the majority of the cases."²⁵ A discussion on the size of samples which may be regarded as suitable for statistical analysis of anthropometric measurements is given in the second part.

18. An intensive study of Southern Indian racial types in the 1931 Survey, was based on 10 samples with a total of 500 individuals while the tribal groups measured numbered only 275 persons out of a total population of approximately 30 millions. From these 275 individual measurements, Guha found four racial types.²⁶

(1) A short, long and moderately high headed strain with often a strongly marked brow ridges, broad short face, the mouth slightly inclined forward and small flat nose with the alae extended.

(2) A dark pigmy strain having spirally curved hair, remnants of which are still found among the Kadars and the Pulayans of the Perambicullian hills.

(3) A brachycephalic Mongolian type constituting today the main component of Assam and North Burma.

(4) A second Mongoloid strain characterised by medium stature, high head and medium nose but exhibiting like (3) the typical Mongoloid characteristics of the face and the eye. This element constitutes, according to Guha, the major strain in the population of the hills and not inconsiderably that of the Brahmaputra Valley.

19. A similar analysis of anthropometric data from the Hos of Seraikela was made by A. N. Chatterjee a competent anatomist, who classified the Hos into six fundamental types²⁷ on the basis of four measurements and three indicial values cal-

²⁴*Ibid.* p. 84.

²⁵*Census of India, 1931*, Vol. 1(3), p. iv.

²⁶*Ibid.* pp. 112-13.

²⁷Chatterjee, A. N. and Das, T. C. : *The Hos of Seraikela*, Calcutta University.

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culated from the former, of the two groups of Hos, numbering 208 individuals. These types were :

- (1) Dolichocephalic-Hypsicephalic-Leptorhine
- (2) Dolichocephalic-Hypsicephalic-Platyrrhine
- (3) Dolichocephalic-Chamaecephalic-Platyrrhine
- (4) Dolichocephalic-Chamaecephalic-Leptorhine
- (5) Brachycephalic-Hypsicephalic-Platyrrhine
- (6) Brachycephalic-Hypsicephalic-Leptorhine

20. Chatterjee wrote: "The underlying predominant stratum seems to be the Proto-Negroid with indications of a faint strain of Proto-Australoid admixture. The Negrito subtype of the Palae-Alpine group, seems to have played some part in the formation of the type. The chronological relation and the extent of admixture between the Proto-Negroids and the Palae-Alpines we are not in a position to indicate from the physical data alone. The Caspian element seems to have played an important part in the evolution of the type and appears to have been longer in contact with the Proto-Negroids than the Alpines."

21. In a recent pamphlet on the '*Race Element in Indian Population*',²⁸ Guha derives the racial groups in India from six main races with nine sub-types as follows : (1) the Negrito ; (2) the Proto-Australoid ; (3) the Mongoloid, consisting of (i) Palae-Mongoloids of (a) long-headed and (b) broad-headed types, (ii) Tibeto-Mongoloids ; (4) the Mediterranean, comprising (i) Palae-Mediterranean (ii) Mediterranean and (iii) the so-called Oriental type ; (5) the Western Brachycephals, consisting of (i) the Alpinoid, (ii) the Dinaric, and (iii) the Armenoid ; and (6) the Nordic.

22. The difference between Guha and Baron Von Eickstedt who also took some physical measurements of Indian castes and tribes, lies perhaps in the fact that while the latter distinguishes three main races and 18 sub-races,²⁹ the former could find as many as six races and only nine sub-races. In this connection we may refer to R. B. Dixon's analysis of fundamental types on the basis of the measurements of a few individuals. He found a number of types from a small sample of 48 individuals. This is a method which would lead to results of a similar kind even among the most homogeneous groups.

23. I have pointed out elsewhere³⁰ how owing to the considerable variability exhibited by all unselected populations, it is evident that if one cares to analyse the

²⁸Guha : *Race Elements in the Indian Population*. (Oxford Pamphlet)

²⁹Eickstedt, E. F. Von. : *Die Rassengeschichte von Indien mit besonderer Berücksichtigung von Mysore. Zeits. Morph. Anth.*, Band 32, pp. 77-124.

³⁰Majumdar, D. N. (1938): *The Relationships of the Austro-speaking Tribes of India with special reference to the measurements of Hos and Sacras. Proc. Indian Academy of Sciences*, Vol. 7(1), p. 11.

measurements of any supposed homogeneous group one would certainly get all the 'fundamental types' within the same population.

24. Discussing the possibility of recognising intra-group differences, Morant writes as follows: "For practical purposes the most important conclusion to be derived from the forms of the distribution of anthropometric characters is that dissection of the samples treated into sub-samples which might be supposed to represent groups of different origins is impracticable."³¹

CHAPTER 2. COLLECTION OF ANTHROPOMETRIC DATA IN THE 1941 SURVEY

5. DIFFICULTIES OF FIELD WORK

25. While we recognise the limitations of the existing anthropometric data, we cannot at the same time ignore the handicaps natural to field surveys. A hundred or two hundred individuals of a particular community can be measured in a Laboratory if the latter is situated in the area inhabited by the community and if the leaders of the community recognise the value of such investigations or do not oppose them. This was done by N. Anandale whose data subsequently formed the subject of analysis and discussion by P. C. Mahalanobis.³² It has also been possible for me to test the blood of hundreds of students in the Laboratory who voluntarily submitted for blood-grouping because the Laboratory was situated within the University of Lucknow and was accessible to students. But field surveys require effort and initiative, plenty of resourcefulness and tact, and even then it is difficult to secure adequate material or subjects of investigation and it is indeed a hard task to secure measurements of a statistically adequate number of individuals.

26. In one of my tours in the Mirzapur district, I collected about 200 people belonging to the Kharwar tribe and started taking their measurements. When I had finished only a dozen measurements which were eagerly watched by the crowd, I found to my dismay the crowd thinning out and rapidly disappearing in spite of all the efforts of the local officers to keep them waiting. Nor could the constables and chowkidars trace these people in their villages for a couple of days. They simply refused to return to their villages, and their womenfolk showed not the slightest suspense about the behaviour of their menfolk or anxiety about their whereabouts. I was told that such experiences are common to the vaccinator and to the personnel of the public health services visiting rural parts.

27. The global war just ended had introduced complications in the job of the anthropologist. On one occasion when I went to measure the Bhatus of Moradabad

³¹Morant, G. M. (1935): An attempt to estimate the relative variabilities of various populations. *Zeitschrift für Rassenkunde.*, Band 2 (3).

³²Presidential Address to the Anthropology Section of the Indian Science Congress Association, 1925.

Criminal Tribes' Settlement I faced danger to my person, and it was the vigilance of the chowkidar that saved me from being a martyr to the cause of science. I had measured in the afternoon a batch of 50 Bhatu and I promised to measure the rest the next day. In the evening I found a number of women sitting in front of my room; their strength began to increase and at nightfall there was a rowdy crowd of women who demanded that I should release their husbands from military service for which they alleged I had taken the measurements. It was with great difficulty that we could convince the suspicious women that nothing would happen to their menfolk. When all arguments had failed, a counter question did the trick. I had not taken the chest measurements of the people, and I immediately put the question, 'why was it then that I did not take the chest girth, if it was for military service, chest girth was a necessary measurement'. This they immediately understood as on previous recruiting occasions chest girth was taken, both before and after deep breathing and they had noticed it. The criminal tribes are highly intelligent people, possess a strong commonsense, and that is why I think I could convince them.

28. Enthusiasm of a different kind greeted me in the Tarai. The Tharus live in a malarial climate but they are supposed to have developed an immunity against malaria. On enquiry, however, I could not find any absolute immunity, but the Tharus do resist infection more than their neighbours and malaria does not take a high toll from them though the incidence of malaria is pretty high among the floating population. Malaria in these parts has assumed alarming proportions. When I started my blood group tests, I naively explained how it might be possible to find out the cause of their comparative immunity, as also the susceptibility of particular blood-groups to malaria, and the women and children began to volunteer in ever increasing number for my tests, and soon it became impossible for me to do justice to the whole crowd. In many other centres that I visited, there were crowds of men and women, children and aged persons who wanted to get their blood tested, and volunteered to submit to all my anthropometric measurements and I found it difficult to reject their voluntary offer and had to improvise methods to evade taking genuine record of the measurements and of samples of blood. Such luck is rare I am told, but it did come to me.

29. The uncertainty of field work must therefore be faced. In spite of planning and precautions it is often impossible to secure the required number. For example, the Mohammedans of Bareilly some of whom I measured in a workshop run by the Indian Institute of Veterinary Research, Government of India, threatened to strike work as some of them were measured the previous day, the rest refusing to submit to such 'humiliation'. Later on I was told that they resented my taking facial measurements for which I had to touch their beard, an ignominy they would not tolerate. The same people, however, submitted to other tests and did not object to being weighed, and I could secure the weight and stature of a large number of Mohammedans from Bareilly.

6. GENERAL PLAN OF THE PRESENT SURVEY

30. In the scheme drawn up in consultation with Mr. M. W. M. Yeatts, the Census Commissioner, and Mr. B. Sahay, the Provincial Census Superintendent, we stipulated to measure 20 groups of 200 individuals each; not because there is any magic in the number but in order to reduce uncertainties arising from a small size sample. Except among the Tharus where both the sexes were measured, viz., 191 males and 181 females, the rest of the samples consisted of males only between the ages 18 and 48. A few measurements of persons above 48 were included, but they were pictures of health and not abnormal in any way. The estimates of age in the case of backward communities and primitive tribes were made by me from observation, in consultation with the tribal elders as the subjects themselves either did not know their age or were reluctant to give it out.

31. Excluding the Tharu females, 22 groups were measured. Two groups were of Brahmins, one from the eastern districts and the other representing western districts, both together totalling 175 individuals. One group consisted of 85 individuals the other of 90. The total number of persons belonging to the artisan castes measured in different parts of the Provinces was 392, comprising 68 Ahirs, 57 Kahars, 94 Kurmis and 173 others. If we combine the Brahmin groups and the artisans, the average size of the samples comes to approximately 164. Though I had tried to secure larger samples, circumstances, particularly the suspicion of the people exaggerated by the war efforts, combined to make our task difficult and I had to remain content with what I could secure.

32. The tribal groups were measured in the localities they inhabited for they were regional groups. The castes do not, however, have any regional affiliation, and several centres had to be visited for measuring the castes. The eastern Brahmins were measured in Gorakhpur, Basti and Gonda, the western Brahmins in Aligarh, Agra, Muttra, Jhansi and Allahabad. Some were measured in Lucknow; their birth places were both in the eastern and western districts of the Province. The artisan castes were measured in Mirzapur, Lakhimpur-Kheri, Pilibhit, Muttra, Jhansi, Agra, Allahabad, Benares, Cawnpore, Gorakhpur, Basti, Bareilly, Shahjahanpur, and Dehra Dun. The criminal tribes came from Moradabad, Cawnpore, Lucknow and Gorakhpur mostly from the Criminal Tribes' Settlements.

33. Attempts were made to pick up the sample at random as far as this was possible under field conditions. The number actually measured was usually less than the number who offered themselves for measurement. Methods that were improvised for randomising the samples could not be carried out fully due to the fact that our investigations were suspected from the beginning, and any overt attempt to eliminate particular individuals from the crowd was often interpreted as a device to book the rest for military service which was not looked upon with favour by rural crowds. In the case of the criminal tribes in settlements and outside, the subjects were selected at random; individuals belonging to tribal groups also did not openly resent being left out. The Tharus, however, were sore on the point and I had to measure all of them,

though the records were taken of those whose numbers were previously selected. Among the castes, the difficulty of choosing at random was great as they could not be made to assemble at any place, and house to house collection had to be done, but no two persons who were related by blood, or by marriage have been included in the same group unless it was by inadvertence. Whenever the subjects were gathered together for my investigation, the names were put down, and the number was selected at random according as they were odd or even. In spite of all that has been, or could have been done, I must admit that it was not possible to randomise human material in such a way as to preclude any possibility of selection. This difficulty increases as we proceed from lower to higher groups in the scale of social precedence.

34. The general plan with regard to samples, may be briefly stated. The tribes and castes of the U.P. can be arranged in a parabolic form. If we put the apex of the parabola towards the east of the Provinces, say in Gorakhpur, both the arms of the parabola embrace all the tribes of the province, the upper arm representing the Mongoloid and Indo-Aryan tribes, the lower arm the Proto-Australoid and Dravidian speaking tribes. In the centre of this parabola are distributed a large number of criminal tribes who wander about as nomads, acrobats, snake-charmers and dealers in charms and narcotics. The various castes appear in varying strength in between the two tribal strata. The eastern districts have a preponderance of inferior castes and the western districts of higher castes, though the distribution of the latter in recent years has followed the progress in urbanisation. So far as the tribes were concerned, we had to visit the areas they inhabit and a few centres were chosen where the tribal groups were asked to attend. When two or more tribes assembled at one centre, they kept separate; under no circumstances it was possible to get a mixed crowd of tribal people; they always kept to their respective tribes and also to their own village. Ethnographers even today find it difficult to photograph members of two tribes together, as they resent being lumped up. The names of those assembled were put down by the local officials, the *patwaris* or assistants in Tehsils, and either the odd or even numbers were measured. In Mirzapur, we had to measure even old and infirm people to allay suspicion but these were excluded from the analysis.

35. In the case of castes, we divided the area within the parabola into four regions by simply drawing two perpendicular lines one crossing the other. The names of the districts were noted in separate slips, so that from each region we selected four districts with preponderance of the social groups we wanted to investigate. We tried to select the districts in such a way as to enable a sample of a suitable size being secured of each social group we wanted to measure. In selecting the districts we were guided by the local administrative officers, or forest officers who were of great help in securing for us the subjects we measured in several districts.

36. We usually visited a particular centre where a particular caste preponderated in the population, so that we could get measurements at centres of greatest concentration. When we got a crowd, we followed the procedure we adopted in the case of the tribes, so that our selection of samples from the tribal groups as also from the

lower castes was more or less randomised. Such efforts often landed me in great difficulty and involved expenditure for which I was not prepared. The time taken by the U. P. Survey was considerable; part of the delay in collecting the data was due to the fact that I was not a wholetime investigator and the work had to be carried out during University holidays.

7. ANTHROPOMETRIC TECHNIQUE AND INSTRUMENTS

37. The measurements were all taken by me and they were recorded by persons who were graduates either in physics or in mathematics. I was fortunate in securing the voluntary services of Dr. U. K. Bose, Ph.D., now pilot officer and meteorologist with the Government of India, Dr. Indrajit Singh, Ph.D., for some time a research student attached to the Anthropology Laboratory at Lucknow, Mr. P. R. Roy, artist, now in charge of the Benares School of Art; some of my students also accompanied me in my tours and rendered necessary help in recording the measurements. Particular mention should be made of my pupils Harbilas Mittal, Mahamad Mujtaba, Bal Krishna Singhanian, Suresh Chandra Jain and Miss Hawa Rehman, all post-graduate and research students in Anthropology of the Lucknow University. Occasionally I had to take the help of local officers and medical men, as for example, of Mr. N. K. Sen, Divisional Forest Officer, Haldwani. My *entourage* normally consisted of Mr. P. R. Roy, Dr. U. K. Bose, Dr. Indrajit Singh and my Laboratory peons Bhosiali and Hiralal whose services and blood samples were indispensable to our work. My assistants were asked to test my readings by suddenly interrogating me about a particular measurement of a previous subject so that I could measure him again and announce the data, a procedure which helped to check my measurements and also served to exercise a control over my work. When, for example, I was measuring somebody and my readings appeared doubtful to the recorder, I was asked to remeasure the person and this caution was of signal value in my work as I found out later on.

38. There were two considerations for selecting a small number of measurements. The larger the number of measurements taken on a subject the less the chance of the latter submitting to such ordeals. I could not therefore hope to collect a sufficiently large number of persons for the purpose, had I insisted on a large number of characters. We know that some anthropologists advocate the use of a large number of definite and indefinite characters for racial study and comparison. Chakladar in his Presidential address to the Anthropology Section of the 23rd Session of the Indian Science Congress Association, expressed his faith in number. In a paper read before the Jubilee Session of the Indian Science Congress he discussed the racial origins of the Kashmiris, on the basis of 22 measurements on the head, 30 measurements of the body proportions and 40 observations. All these were taken on 258 Kashmiris. The Kashmiris must be the most patient of people to submit to 92 tests without grumbling.

39. When we wanted to measure about 200 individuals of each tribe or caste we decided to reduce the number of measurements to the minimum necessary for a fairly satisfactory evaluation of racial comparisons. Besides, what is possible in the

Laboratory is hardly so (or even expedient) in the field, for while time is not a very important consideration in the Laboratory it is very much so in the field. Secondly, experience has shown that a small number of traits do not matter so long as these are selected for their stability and racial significance. Lastly, the developments of new statistical methods of multivariate analysis have revealed that the number of measurements need not be too large. Even with the small number of traits, the cost of statistical analysis has run into thousands of rupees. We have, therefore, taken those measurements, for which the landmarks are easy to find and which at the same time are more or less stable while those that involve large personal errors, as for example, the circumference of the head, were deliberately omitted.

40. We have not included any consideration of integumentary characters in this connection, as my experience with the standard charts has convinced me that it is extremely unsafe to describe these characters for any racial classification as the tropical climate, coupled with the fact that most people in India do not cover their body as in cold and temperate climates or do it so differently in different provinces, that it would be extremely hazardous to put the data under particular categories according to standard charts. The eye colour, for example, shows so fine differences that the investigator is likely to be misled by the dazzle of the tropical sun, if not by the fact of a large scale race admixture in the population. The integumentary data I have obtained, have not been used in this report. I may use them later on for what they are worth.

41. I was provided with two sets of anthropometric instruments usually required for field surveys and before we started for any centre both the sets were checked and measurements compared. The following comprised my mechanical outfit:

- (1) Anthropometer, manufactured by P. Hermann Rickenback & Sons. The joints were especially cleaned every time they were used, and the measurements checked at intervals. Also footplate for vertical holding of anthropometer.
 - (2) Sliding callipers
 - (3) Spreading callipers
- } Hermann Rickenback & Sons.
- (4) Steel metric tape, available with the Hermann Rickenback set.
 - (5) Head spanners. (G. D. William's Head spanner).
 - (6) Standard beam scales.
 - (7) Stangenzirkel.

42. The total number of individual measurements on any subject did not exceed sixteen, but usually the following twelve measurements were taken: (1) Stature, (2) Sitting Height, (3) Head Length, (4) Head Breadth, (5) Minimum Frontal Breadth, (6) Nasal Length, (7) Nasal Breadth, (8) Nasal Depth, (9) Total Facial Length, (10) Upper Facial Length, (11) Bizygomatic Breadth, (12) Bigonial Breadth. In some areas, Orbito-nasal Breadth and Orbito-nasal Arc were taken and also Auricular Height and Span.

(1) *Stature* was taken with the anthropometer. The subject was asked to stand with the heels together, arms hanging at the sides, shoulders erect, eyes horizontal the head always being in the ear-eye plane. The anthropometer was kept in front of the subject, the end of the butt upon the wooden footplate on which the subject also was asked to stand, but when the footplate was not available and the floor was level and hard, it was held on the floor with the axis vertical. The height was taken from the vertex.

(2) *Sitting Height* was taken with the anthropometer from the vertex to level of the plane, 'upon which the subject was seated in the most erect position possible.' A small wooden chair 35 c.m. high with separate $\frac{1}{2}$ " pieces to be used when required was carried along on which the subject was asked to sit keeping the thighs parallel and horizontal and the legs vertical. The lumbar curve was not allowed to be relaxed during measurement and care was taken to see that the spine was held in the erect standing position the head being held in the ear-eye plane. 'The gluteal and extensor muscles of the thigh were relaxed, the subject resting on the ischial tuberosities' (cf. Hooton : *The American Criminal*, Vol. 1, p. 38). The height was measured from the rear of the subject.

(3) *Head Length* was measured with the help of the spreading callipers. The maximum glabella-occipital length in the median sagittal plane was recorded. Standing on the left of the subject and holding callipers point between the thumb and first finger of the left hand it was placed on the glabella, the right hand moved the other callipers point up and down the median occipital line until maximum reading was obtained, while fixing the callipers point on the glabella, care was taken that no pressure was exerted.

(4) *Head Breadth*: The maximum breadth of the head perpendicular to the median sagittal plane was taken. The points of the callipers were applied lightly to the head, being kept in the same horizontal and lateral vertical plane. The points were moved forward and backward up and down till a maximum reading was obtained, the observer standing in front of the subject, holding the arms of the callipers just above their points.

(5) *Minimum Frontal Breadth* was taken with the spreading callipers, the smallest distance between the temporal crests on the frontal bone above the brow ridges; the points of nearest approach to the temporal crests were determined first by means of the thumb and the forefinger and the tips of the callipers were then applied to these parts.

(6) *Nasal Length* was measured from the nasion to sub-nasale. The sliding callipers were used and the upper point was the nasion located by running the thumb nail of the right hand up the bridge of the nose, until the edge of the thumb nail found the groove marking the naso-frontal suture, the lower point was the junction of the nasal septum with the lip. This measurement was the most difficult to take and the subject also showed uneasiness in some cases.

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(7) *Nasal Breadth* was the maximum breadth between the most lateral parts of the nasal alae. It is a contact measurement but no pressure was exercised.

(8) *Nasal Depth*: The distance of the sub-nasale from the pro-nasale was taken as Nasal Depth. The head was kept in the ear-eye plane.

(9) *Total Facial Length* was taken from the nasion to gnathion, midpoint on the lower border of the mandibular symphysis. The mouth of the subject as also the teeth were closed, the latter being kept in occlusion. The distance between the nasion and the point in the middle of the under surface of the mandible was measured while the subject was seated in a chair. It was found convenient to press the nail at the nasion to keep a mark. As this measurement followed the nasal length the nasion could be located without further search.

(10) *Upper Facial Length* was taken with the sliding callipers from the nasion to alveolar point. The lower point of the measurement was on the gums between the upper median incisor teeth. Although the point of the callipers was not actually contacted with the teeth or gum it was found hygienic to dip the points of the callipers in alcohol to sterilise them every time they were used and also to produce a psychological effect on the crowd so that there might be no objection against the measurements. A number of measurements had to be eliminated in individuals otherwise healthy, as their gums had receded due to dental diseases.

(11) *Bizygomatic Breadth* or the maximum diameter between the zygomatic arches was measured by "holding the callipers' arms near the extremities in the right and left hands between thumbs and second fingers and with the forefinger palpating to make sure that the calliper's points were actually on the zygomatic arches."

(12) *Bigonial Breadth*: The diameter between the gonion was measured by the spreading callipers, the arms of which were held in the hands and index finger located the most laterally projecting angles of the mandible at the junction of the ascending rami with the horizontal rami.

(13) *Head Height* was taken as the distance from vertex to middle of line connecting the centres of the auditory meatus. The head was kept in the eye-ear plane. The spanner was held in the left hand adjusted to the subject with the right hand and the scale so manipulated that it came in contact with the subject's vertex.

(14) *Weight* of the subjects was taken in plain clothes, without the shoes, and an allowance of 2 lbs was made for clothes. The dress of the various groups measured differed from caste to caste, some put on *pagris*, others like the Khasas put on heavy woollen coats and trousers, but the subjects were persuaded to remove unnecessary apparels and thus with the deduction of 2 lbs, the weights were reduced to nude weights. There is no likelihood of arriving at precision with regard to this measurement as the effect of a heavy stomach could not be estimated. Weights were recorded morning, noon and evening and as conditions could not be equalised in all cases, the data were not used for inter-group comparisons.

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PART II. STATISTICAL ANALYSIS

By P. C. MAHALANOBIS AND C. RADHAKRISHNA RAO

CHAPTER 3. ARRANGEMENTS FOR STATISTICAL ANALYSIS

43. The present measurements were taken by Dr. D. N. Majumdar in connexion with the Indian Census of 1941. In consultation with Mr. M. W. M. Yeatts (Census Commissioner), Dr. Majumdar decided to hand over the whole material to the Indian Statistical Institute for statistical analysis, and the Government of India sanctioned a grant of Rs. 4,000/- for this purpose. As standardized methods for the analysis of such material were not available, much experimentation was needed to develop a systematic procedure. The calculations were laborious and a good portion of the work had to be done over again for reasons explained below. The primary work of calculation amounted to 65 computer-months exclusive of inspection, supervision, analytic and technical work which, necessarily, had to be done by statisticians. The total expenditure was about Rs. 12,000/- out of which, as already stated, Rs. 4,000/- was received from Government, and the remaining portion was met by the Institute.

44. Owing to the war situation the senior author (P.C.M.) advised Dr. Majumdar to keep the original material in Lucknow and to send a copy to the Statistical Laboratory. These copies were received between April and August 1942. After the entry of Japan into the war a large portion of the Statistical Laboratory had been removed to Giridih, a place about 200 miles from Calcutta, as an evacuation measure, and it was decided to carry out the present project at Giridih. Owing to the war situation and interruption in communications between Calcutta and Giridih for a number of months in 1942 there were great difficulties in organizing the computational work properly. Standard forms were prepared for the calculation of the primary frequency constants and tables for mean values, standard deviations and coefficients of variation were ready by March 1943.

45. On scrutiny the senior author (P.C.M.), however, felt suspicious about certain primary entries and wrote to Dr. Majumdar on 24 April 1943 giving a list of entries which looked doubtful. Dr. Majumdar found that mistakes had been made at the stage of copying in all the cases pointed out by us with a few exceptions. A second batch of suspicious figures was sent to him on 30 July 1943, and many were found to be wrong on scrutiny.* It is worth noting that mistakes made in the copying stage were detected only because of the scrutiny at the stage of analysis which incidentally shows the advantage of carrying out large scale analysis of anthropometric material in collaboration with statistical workers.

46. Corrected values of the original entries were received in the Statistical Laboratory on 19 August 1943. Calculations involving a large number of individual frequency distributions had to be started afresh. The delay caused by the need of drastic revision completely upset the programme of work. By this time signs of the serious famine in Bengal had become clear; and, at the request of Government of Bengal, the Indian Statistical Institute undertook to conduct a survey of all principal

*The Rajwar nasal breadth figures are surprisingly small, and require further investigation.

crops in the province, and all the resources of the Institute had to be concentrated on this work. This inevitably meant interruption in the anthropometric work which could only be taken up at slack seasons.

47. Corrected tables of mean values, standard deviations, and coefficients of variation were, however, sent to Dr. Majumdar on 24 November 1943. The bulk of the statistical computation so far had been carried out under the technical supervision of Messrs. J. M. Sen Gupta and N. T. Mathew at Giridih. Progress of the more advanced analysis was, however, seriously hampered by pressure of crop survey work. Provisional results were ready by September 1944, and Dr. Majumdar came to the Statistical Laboratory at Giridih in October 1944 and went over the results with P. C. Mahalanobis in a general way. In the light of the joint discussions it was decided to carry out certain further investigations, and C. R. Rao started working on the present project early in 1945, and the advanced technical analysis was completed thereafter.

48. The first copy of the paper was sent to the press in 1946. Progress was delayed by the absence abroad from time to time of the senior author (P. C. M.), and the departure of C. R. Rao from India in July 1946. At the stage of proof correction discrepancies in some of the D^2 -values were detected, but no action could be taken as both the authors were out of India. In the summer of 1947, P. C. Mahalanobis during a short visit to Cambridge, discussed the position with C. R. Rao. It was then decided to recalculate the D^2 -values. As powerful mechanical computing equipment happened to be available in Cambridge, calculations were completed under the supervision of C. R. Rao using nine variates instead of five in the original calculations. Portions of the paper were rewritten and the matter finally discussed by the two authors in Cambridge in December 1947. It was only in the latter part of 1948 that the two authors of the statistical part could meet together in Calcutta and complete the statistical analysis which was extended to cover 12 characters in calculating D^2 -values.

49. At the last stage, it was felt that it would be desirable to discuss the results based on physical measurements in relation to the available ethnological evidence. Early in 1949, P. C. Mahalanobis compiled the Ethnological Notes on the different castes and tribes (given in the form of a supplement) and prepared the anthropological observations given in Part III of the paper. This is the long history of the paper, and its many vicissitudes in the course of preparation and publication from 1942 to 1949.* The authors of this paper owe a deep debt of gratitude to Prasad Banerjee for his most careful scrutiny of the Tables as well as the text at every stage.

*It had been originally arranged that this paper would be published in Vol. 9, Part 1 of Sankhyā; but for reasons explained above, publication was delayed. In anticipation of such earlier publication of the paper, C. R. Rao incorporated with acknowledgements certain results in his paper on, The utilization of multiple measurements in problems of biological classification in the *Jour. Roy. Stat. Soc.* Vol. X, No. 2, 1948, pp. 159-203.

CHAPTER 4. BASIC STATISTICAL CONCEPTS

50. There do not exist at present any generally accepted methods for the statistical analysis of anthropological measurements. In fact doubts have been expressed whether physical measurements are of any value in Anthropology. It has been therefore considered advisable to give in this chapter a general account of the statistical methods adopted by us. It should be emphasized that we are not anthropologists, and that our approach is definitely statistical.

51. Physical measurements on the living are being taken by anthropologists for a long time. These have been and can be used for many different purposes. But one main, perhaps the chief, object of taking such measurements appears to be to study the possibilities of classifying different groups of human beings in the form of a significant pattern. It is this aspect with which we shall be primarily concerned in the present report.

52. *The problem of classification:* The problem may be formulated in concrete terms. For the sake of simplicity, consider, say, three sets, S_1 , S_2 and S_3 , of measurements of anthropological characters of individuals belonging to three classes of human beings.

(a) The first question which arises is whether S_1 , S_2 and S_3 may be considered (in some significant sense) to have come from or to belong to the same identical group¹ of human population. If all three sets can be considered to have come from the same population, the problem of classification does not arise.

(b) If the three sets cannot be considered to have come from the same population, but must be treated as belonging to, say, three different populations, then other questions arise. For example, as judged by available measurements, does the group S_1 resemble the group S_2 more closely in physical appearance than group S_3 , or S_1 resembles S_3 more closely than S_2 ?

53. In order to answer the question (b) it is convenient to introduce the concept of a quantitative measure of 'group (or caste or tribal) resemblance;' or, more conveniently, the notion of 'group (or caste or tribal) separation or distance.' If a method for measuring such caste separation can be set up then it would be possible to speak of the generalized distance between S_1 and S_2 (which may be written, say as D_{12}), or the distance between S_1 and S_3 (which may be written as D_{13}), or that between S_2 and S_3 (D_{23}) etc. It would be also possible to compare the three distances D_{12} , D_{13} , and D_{23} . It may be found, for example, that D_{12} is very small in comparison with either D_{13} or D_{23} in which case one can speak of S_1 and S_2 being groups which are close together (in the characters measured) while S_3 is much farther away from S_1 and S_2 . Or, it may be found that all three distances are small in which case it would be obviously convenient to think of the three groups S_1 , S_2 and S_3 as forming a closely associated single cluster.

¹A neutral word 'group' is being deliberately used instead of 'race' in order to eliminate anthropological implications or ambiguities.

54. The same procedure can obviously be extended to more than three groups. Once a suitable measure of group distance is defined, it would be possible to calculate the actual magnitude of such distance between each pair of groups; and, on the basis of such group distances, to ascertain whether there is any significant patterning in the set of groups as a whole.

55. The present material consists of measurements of 12 physical characters relating to 2836 individuals belonging to 22 (excluding 181 Tharu females) different castes and tribal groups in the United Provinces of India all taken by Dr. D. N. Majumdar in 1941 in connexion with the Indian census of the same year. The first obvious question is, whether, as judged by the present physical measurements, all these castes and tribes can be considered, in some significant sense, to belong to the same homogeneous group of population. If not, do these 22 castes and tribes show any evidence of internal patterning or any kind of systematic classification in the sense that certain castes and tribes may be considered to be nearer to one another than others?

56. *Notion of 'group (caste or tribal) distance'*: The concept of group (caste or tribal) distance supplies a convenient tool for this purpose, and can be given suitable geometrical representation. Consider one single character, say, Nasal Length. The different castes and tribes can be arranged in an ascending or descending order in accordance with respective mean values of Nasal Length. Geometrically these values may be represented on a line on which the distance of a point from the origin is made equal to the mean value for the caste or tribe concerned. In this diagram, if two castes or tribes have nearly equal mean values of Nasal Length then the corresponding points would lie close to each other. On the other hand, if two castes or tribes have widely different Nasal Lengths then the corresponding points would be widely separated.

57. Nasal Length, however, is merely one of a number of characters. It is possible to show the position of the different castes and tribes, in respect of each one of the other characters, exactly in the same way as in the case of Nasal Length. Castes or tribes which are closely associated in Nasal Length may, however, be widely separated in Nasal Breadth. It is obviously necessary to consider the resemblance or separation in respect of all available characters. For the sake of simplicity, let us consider only two characters, say, Nasal Length and Nasal Breadth. In the present material there are measurements relating to 22 castes or tribes each of which has a mean value for Nasal Length and also for Nasal Breadth. These two mean values for each caste or tribe can be represented graphically by plotting mean values of Nasal Length along say the x -direction, and mean values of Nasal Breadth along the y -direction. Castes or tribes having nearly equal mean values in both characters would obviously be represented close to one another in the chart; groups having widely different mean values would be shown widely apart. Instead of representing the mean values of only two characters in two-dimensional chart, the position of mean values of three characters can be in the same way represented in a three-dimensional model. Extending the process still further, the position of 12 mean values for each caste or tribe can be represented in a

space of 12 dimensions. The separation or distance between the position of the mean values for any two groups (or castes or tribes) would then show the caste or tribal distance.

58. *Difference in weightage*: There are, however, two complications. First, the biological or anthropological implication of a difference of the same amount (as measured in, say, centimeters) is obviously not the same for all characters. For example, a difference of one centimeter (if this were possible) between the average Nasal Lengths of two castes would be quite a different matter from a difference of say one centimeter in the average stature of two castes. In other words, the biological or anthropological weightage is different for the different characters. In constructing a measure of caste or tribal distance it is necessary to make adjustments for such differences in weightage of the different characters.

59. *Correlation between characters*: Secondly, in the hypothetical chart described above, the two characters, Nasal Length and Nasal Breadth, are plotted along x and y -directions which are perpendicular to each other. Such representation is adequate where changes in Nasal Length and changes in Nasal Breadth are independent. In actual fact, however, this is not true. With increase in Nasal Length it usually happens that Nasal Breadth also increases. As a matter of actual observation, the same thing is found to be true of practically each pair of characters which have been so far used in anthropology. The degree of organic association between two characters is measured by the coefficient of correlation. The correlation may be either positive or negative. When the two correlated characters both increase or decrease at the same time, the correlation is called positive; when one increases as the other decreases or vice versa the correlation is called negative. The coefficient of correlation is defined in such a way that its numerical value lies between $+1$ and -1 . Sometimes, the correlation is numerically small, such as 0.0438 (pooled over all castes) between Nasal Breadth and Nasal Length in the present material; sometimes the correlation is quite high such as 0.6862 between Nasal Length and Upper Facial Length. It is clearly necessary to take the organic association or correlation between different characters into consideration in constructing a suitable measure of caste distance.

60. *The D^2 -statistic*: For adequate representation, it is thus necessary (a) to take more than one character into consideration at the same time; (b) to make suitable adjustments for differences in the biological weightage or scale of measurements for different characters; and finally, (c) to take into consideration the organic association or correlation between each pair of characters. This is exactly what has been done in formulating the D^2 -statistic or the square of a generalized distance which one of us (P. C. M.) had originally used (in a somewhat crude form) in a paper on *Analysis of Race Mixture in Bengal* which was given as the Presidential Address to the Anthropological Section of the Indian Science Congress Association in 1925 and published later in *Jour. Asiatic Soc. Bengal*, Vol. 23, p.p. 301-333.

61. A brief historical note and other technical details relating to the D^2 -statistic have been given in appendices. It may, however, be recalled that the idea of using such

a geometrical representation was explicitly formulated by the late Dr. Sir Brajendra Nath Seal² in his address on *Race Origin* delivered before the first Universal Races Congress in London in 1911. He had stated:

If the groups requiring to be arranged vary in ' n ' characters, and if biometric measurements are complete, the composite mean of the groups may be taken as the point of origin, and then the mean of the single characters for each group may be imagined as marked off on ' n ' co-ordinates, and the position in n -dimensional space of each group could be easily assigned.

When the position of the mean values are plotted in an appropriate n -dimensional cartesian space as suggested above (but after a transformation of the original characters into a series of linear compounds which are uncorrelated) the distance between the points representing any two groups as actually measured in the n -dimensional space would be numerically equal to the distance as calculated by the formula for D^2 as given in Appendix 3.

62. *Need of random samples:* Certain technical aspects of the problem must now be considered. In the above discussion it had been tacitly assumed that the 'true' mean values of the different characters (as well as the 'true' correlation coefficient between pairs of characters) were known for each caste or tribe. These 'true' values can, however, be calculated only in case every single individual in the group (say, adult males of each caste or tribe) has been measured which, however, is never feasible in practice. In this situation recourse must be taken to sampling methods, that is, to take measurements on a comparatively small number of individuals belonging to each caste or tribe. Attempts have often been made by anthropologists to select for this purpose (by visual examination or otherwise) individuals who were considered to be representative of the group under study. But, not merely in Anthropology but in every sphere of work in which the sampling method has been used, careful experimental investigations have shown that attempts to select so-called representative samples were usually unsuccessful, and had given wrong results due to the unconscious personal bias of the investigators making the selection. One fundamental principle is now universally accepted, namely, the need of selecting at random all individuals included in the same group for measurement. It is only when the sample is chosen at random that statistical methods can be validly used.

63. A little consideration will show in a general way as to why the principle of random sampling is so fundamental. Consider any group, say, adult male Chattris. It is clear that if, say, only the tallest Chattris are picked up for measurement then the average values based on such measurements would not be truly representative of the mean value for all Chattris. Again, suppose only Chattris who are well off, or who are extremely poor, or who are engaged in any particular occupation, or who form any

²I had the satisfaction of showing Dr. Seal before his death what kind of results could be obtained by using his notion of generalized distance in the case of the Bengal material which I discussed in the paper cited above. The present report gives further applications of the same method. P. C. M.

particular sub-class (defined in any possible manner whatsoever) are included in the sample, then the result may³ again differ from the 'true' mean value of the caste as a whole. It is thus essential to avoid including in the sample, individuals from any special sub-class in larger numbers than the true proportion of the sub-class in the whole population. Experimental work shows that whenever any observer attempts to make a so-called representative selection it leads to a special sub-class (arising from unconscious psychological bias or personal equation of the observer), and gives rise to mean values for the sample which differ appreciably from the mean value of the whole class and which differ also in variability and other characteristics of the frequency distribution. It follows inevitably that the observer must not have any choice in selecting the sample. The only way in which this can be guaranteed is to make the selection purely at random. In other words, it is only a purely random sample (which is not chosen according to any specifiable principle of selection whatsoever) that can be considered to be truly representative of the whole class.

64. *Method of selecting the present material:* The random selection of a sample is not always an easy task. To pick up a random sample in a demonstrably rigorous fashion requires very elaborate preliminary arrangements which are not often possible in practice. In this situation, rough and ready methods have to be used. The important point, however, is to exclude any personal bias on the part of the observer.

65. In the present investigation Dr. D. N. Majumdar went to each locality, and collected all healthy adult males between the ages of 18 and 48 (belonging to the caste or tribe under survey) who happened to be available, arranged them in serial order, just as they came and picked up either the odd or the even numbered individuals for measurement. The only restriction he used was to avoid measuring more than one person belonging to the same family, but did not use any other principle of selection. Strictly speaking, exclusion of more than one individual belonging to the same family makes the sample theoretically somewhat different from an ideal random sample. In estimating mean values, the only effect would be that arising from the varying number of adult males in the different families; such variations, however, must be small and almost certainly negligible. Variabilities in the present sample may also be slightly larger than those in the general population but this would make tests of significance err on the safe side. In any case, there is no difficulty in making valid comparisons among samples collected in the same way.

66. To sum up, Dr. Majumdar was fully aware of the need of selecting the individuals at random, and he took particular care to eliminate all choice on his own part. The present samples may therefore be treated as having been drawn, for all practical purposes, at random. As far as one can judge, the assumption of random-

³The word 'may' has been used intentionally to indicate the possibility of the mean value of the sub-class being practically the same as the mean value of the caste as a whole. The point to be emphasized, however, is that, without actual empirical investigation, it must be assumed that the mean value of any particular sub-class would in general differ from the mean value for the whole class or group.

ness is more true of the present material than of any other series of anthropometric measurements so far available in India.

67. *Sampling fluctuations*: In the present material the size of the sample varies from 57 to 197 and is, on an average, about 128 for each caste or tribe. The total number of individuals (adult males) in each caste or tribe is, however, often enormously greater — many lakhs or even millions in certain castes and tribes. The question therefore naturally arises as to how far mean values based on, say, only about 128 individuals can be accepted as being representative of true values for the whole group. This is essentially a matter of sampling theory. The only way to study the problem is to take repeated random samples, and then compare the results. This is exactly what has been done in statistical science, and it has been found that under certain well known conditions (to which reference is made later) it is possible to calculate from the measurements contained in the sample itself, the margin of sampling fluctuations of the mean value based on the sample. This margin is usually expressed in the form of what is called the 'standard error' of the mean.

68. *Standard errors*: The physical significance of the standard error can be grasped quite easily. To fix ideas, consider, for example, the average stature which is given as 163.33 cm. for Chattri based on measurements of 139 individuals included in the present sample with a standard error of 0.48 cm. in Table 6.1. Suppose that a very large number of similar samples, each consisting of 139 individuals, is drawn at random afresh, and the mean stature is calculated for each such sample. These new mean values would not be in general identical with the observed mean value (namely 163.33 cm.) of the present sample. Most of the new mean values would, however, lie close to the observed mean value. In fact, according to sampling theory,⁴ about 95 per cent of the new mean values would not differ from 163.33 cm. by twice the standard error (0.48 cm.), that is, would lie within the range of 162.37 cm. and 164.29 cm. Now consider another group, say Bhatu, for which the observed mean stature (based on a sample of 149 individuals) is 163.38 cm. with a standard error of 0.53 cm. The difference in stature between Chattri and Bhatu is thus only 0.05 cm. with a standard error of this difference of ± 0.72 cm. (which is calculated by taking the square root of the sum of the squares of the standard errors of the two mean values themselves). According to sampling theory, it is likely that if repeated samples are taken from both Chattri and Bhatu groups, observed mean values would in more than 45 per cent of cases be higher in the Bhatu samples than in the Chattri samples. In this situation it is clearly not possible, on the available evidence, to assert that Bhatu really has a higher stature than Chattri. In technical language, the difference in stature between Bhatu and Chattri is not significant on the available evidence.

69. On the other hand, consider the mean stature of 107 Agharias which is found to be 167.47 cm. with a standard error of 0.56 cm. This is 4.14 cm. greater than the mean stature of Chattris, while standard errors are 0.56 cm. and 0.48 cm. It is now

This is of course, an approximate figure without using any correction for finite size of samples.

possible to assert with confidence that the 'true' stature of Agharia is almost certainly higher than the 'true' stature of Chattri. Once standard errors are calculated, it is thus possible, on the basis of the theory of probability, to make valid comparisons between estimates of the 'true' mean values for whole populations from which the respective samples are drawn. This is the basic principle of statistical analysis.

70. Without entering into technical details, it may be mentioned that the magnitude of the standard error depends on two factors, namely, variations in the observed measurements in the sample, and the size of the sample. Variations in the sample can be most conveniently measured by obtaining the deviation in excess or defect of different measurements from the observed mean value of all measurements. If the size of the sample is n , that is, measurements are available for n individuals, then the number of such deviations from the mean value would also be n . These n deviations are then squared, added, and then divided by $n-1$ (and not by n for reasons of a theoretical nature); this gives what is called the variance. Extracting the square-root of this quantity is obtained the standard deviation of the sample which is usually denoted by s . Dividing the standard deviation of the sample s by the square-root of the size of the sample n ; that is, $s/\sqrt{n}$ supplies the standard error of the mean. This standard error gives a convenient statistical measure of the margin of fluctuations arising from sampling. The value of s is a characteristic of the population and remains more or less the same for samples drawn from the same population. The margin of sampling error can be, therefore, reduced by increasing the value of n , the size of the sample. In other words, the larger the size of the sample the smaller will be the margin of sampling error, and the nearer will be the sample value of the mean to the true mean value of the whole population.

71. *Size of samples:* The above discussion shows that in order that appropriate statistical methods may be used it is essential that the sample should be chosen at random. This would guarantee the validity of the results, that is, ensure that conclusions drawn from the sample by statistical analysis would have logical justification. The margin of error would, however, depend on the size of the sample. If the size is too small, the margin of error may be so large that the results, although valid, may have no significance. Consider, for example, two groups, Basti Brahmin and Bhatu (a criminal tribe) in the present material. It will be seen later that these two groups are sharply contrasted in physical appearance, and differ widely in Frontal Breadth for which the mean value for Basti Brahmin is 104.74 cm. with a standard error of 0.43 cm. and for Bhatu 99.34 cm. with a standard error of 0.47 cm. Compared with the margin of error (or standard error) the difference in mean values is highly significant, and leaves practically no doubt that the two groups are sharply differentiated in this character. Now suppose that the Frontal Breadth is measured of only 5 Basti Brahmins and of 5 Bhatu. If these individuals are drawn at random then mean values calculated on 5 measurements in each group would again supply valid estimates of respective mean values for Basti Brahmins and Bhatu. But these mean values would now have a much larger margin of error; and hence it may no longer be possible

to assert that the Basti Brahmin and Bhatu differ in respect of Frontal Breadth. A concrete numerical example may make the position clear. Five individuals were drawn at random from each group; serial nos. 4, 20, 71, 75, 83 for Basti Brahmins, and nos. 7, 24, 43, 70, 118 for Bhatu. The calculated mean values are 102.0 cm. and 102.4 cm. with standard deviations of 4.53 cm. and 5.45 cm. for Basti Brahmin and Bhatu respectively. The difference (as tested by the appropriate *t*-test with 8 degrees of freedom) is not significant showing that it is not possible on the available evidence to assert any differentiation between Basti Brahmin and Bhatu in Frontal Breadth based on measurements of only 5 individuals drawn at random from each group.

72. In order to make useful comparisons it is thus essential that the samples should not only be drawn at random but also that they should be of adequate size. In anthropology, on the whole, the need of using random samples is being gradually recognized. The size of the sample is, however, often still too small to enable significant conclusions being drawn therefrom. Elaborate classifications still continue to be made on the basis of measurements of 20 individuals or so which is usually inadequate for statistical purposes.

73. From Table (6.1) of mean values and standard errors it is noticed that standard errors in the present material are reasonably small. As brought out in later sections of the report, the size of the sample in the present investigation was in many cases adequate. For more detailed analysis or for the study of special problems it may be necessary to work with samples of a much larger size; but on the whole, samples of about 200 would appear to be adequate for comparisons of the kind considered in the present report.

74. *Uniform technique of measurements:* Besides randomization and adequacy of the size of the sample, there is another requirement of a general nature which may be considered here very briefly. When measurements are made of any anthropological character (say Nasal Length) for different castes and tribes it is obvious that the technique of making this particular measurement must be properly standardized,⁵ that is, the manner in which the measurement is taken must be the same in all cases. When the same observer (who is properly trained and has sufficient experience) takes all the measurements then it may be assumed that the technique remains the same. When the measurements are taken by different observers there is great risk of differences in technique occurring even without the knowledge of the observers themselves. Fortunately, in the present material all the measurements were taken by Dr. D. N. Majumdar himself and are, therefore, comparable among themselves.

75. *Normality of frequency distributions:* The sampling theory to which reference has been made so far is itself based on two important assumptions, namely, (a) that

⁵ Several years ago one of the authors (P. C. M) discussed this subject in a paper "On the need for standardization in measurements on the living" (*Biometrika*, 20A, pp. 1-31) in which it was shown how even leading anthropologists of the world had differed in the definition and technique of measurements of important anthropological characters so that probably 80 per cent of the material was not comparable.

the frequency distribution of measurements of each character (in the hypothetical complete population) is of the normal or Gauss-Laplacian type which is often called the 'curve of errors'; and (b) secondly, that each pair of characters is linearly correlated. The second assumption implies that when two characters or organs are correlated, for example, Head Length and Head Breadth, then, on an average, mean values of, say, Head Breadth for a group of individuals change proportionately (or linearly) to the corresponding mean values of Head Length for the same group of individuals.

76. Statistical tests of significance, that is, criteria for testing whether two or more samples belong to the same or different populations, as well as the formula for the generalized distance (D^2 -statistic) are all based on the above two assumptions. It is therefore necessary to test the validity of these assumptions for the present material. In the present scheme of analysis this has been the first step.

77. *Asymmetry and Kurtosis*: The normality or otherwise of the frequency distributions of single characters have been investigated with the help of β_1 and β_2 coefficients first devised by Karl Pearson. For a truly normal distribution the theoretical value of β_1 is zero and that of β_2 is 3. It may be mentioned that β_1 is a measure of the skewness or lack of symmetry of the distribution on either side of the mean value. Value of (β_2-3) measures what is called the kurtosis (or flatness or degree of concentration round the mean value) of the distribution.

78. In samples of a finite size the observed value of β_1 and β_2 would, however, have certain margin of errors of sampling which can be calculated from the sample. If β_1 does not differ from zero within the limits of the calculated margin of errors of sampling then the distribution may be considered to be symmetrical. If the observed value of β_2 does not differ from 3 within the margin of sampling errors then kurtosis or flatness is of the normal type. Thus if β_1 is approximately zero and β_2 is also approximately 3 (within the margin of sampling errors) then the distribution may be treated as being practically of the normal type. On the other hand, if β_1 is significantly different from zero and/or β_2 is significantly different from 3 then the distribution must be considered to be of a non-normal type. A detailed investigation of normality or non-normality of the frequency distribution for each single character for each of the 22 castes and tribes (or 23 including Tharu females) is given in the next chapter.

79. *Linearity of regression*: The next step is the investigation of the linearity of regression for each pair of characters. The regression line or formula gives the mean value of one character (say, Head Breadth) when the mean value of a second character (say Head Length) is known for a group of individuals. For each pair of characters, there are thus two lines of regression, one for calculating mean values of the first character (say, Head Breadth) from known values of the second character (say, Head Length); and a second line of regression for calculating mean values of the second character (Head Length) from known values of the first character (Head Breadth). Working with p characters there will be obviously $p(p-1)/2$ pairs of characters for each caste or tribe. In Chapter 5, section 4 detailed investiga-

tions have been made for the 6 characters: Frontal Breadth, Bizygomatic Breadth, Nasal Length, Head Length, Upper Facial Length and Sitting Height. For these 6 characters there are 15 coefficients of correlation and 30 lines of regression for each caste or tribe. These were calculated and whether the regressions were linear or not was tested by appropriate statistical methods and the results are given in Chapter 5.

80. Broadly speaking, with the exception of a few groups (Basti Brahmin, Other Artisan, Chattri, Panika and Habru) the distributions are of the normal type. This result is, of course, necessarily only valid within the observed margin of sampling errors. If the size of the sample is increased, the distributions may show significant deviations from normality. The point to be emphasized is, however, that the magnitude of such deviations are likely to be so small as to make them of little practical importance for present purposes.

81. *Tests of significance*: After having settled that (a) the technique of measurement is uniform, (b) samples may be treated as random, and (c) observed distributions may be treated as being of the normal type for present purposes, the next step is to investigate whether the samples may be considered to have been drawn from the same population or from populations which differ appreciably in the observed anthropological characters. In most cases appropriate statistical tests showed that the samples must be considered to have been drawn not from the same but from populations having different anthropological characters. As already noted, the size of the sample in the present material was thus usually large enough to detect differences in the respective populations from which they were drawn. It is in this sense that the size of the sample may be considered to be adequate.

82. *Caste or tribal distances (D^2 -statistics)*: As the populations or castes or groups from which samples are drawn were found to have different anthropological characters, the next step was to see whether the castes or tribes could be classified in some kind of significant pattern. Values of the generalised distance (D^2 -statistic) were calculated separately for each pair of castes and tribes. A careful examination of the different characters indicated that the following nine characters were useful for this purpose: Frontal Breadth, Bizygomatic Breadth, Nasal Length, Head Length, Sitting Height, Stature, Head Breadth, Nasal Breadth, Nasal Depth. The remaining characters showed comparatively little differentiation among the present group of castes and tribes. The calculation of the D^2 -statistics was, therefore, based on these nine characters.

83. *Choice of characters*: A very important consideration is the choice of the particular anthropological characters which should be used for this purpose. This is a subject of great difficulty and still requires much patient investigation. Reasons of a purely computational nature make it desirable to limit the number of characters to something of the order of 8 or 10. It is obviously desirable that the characters selected should have high discrimination in the sense that differences between different groups would be large and statistically significant. It is also desirable

that the characters should be as independent (that is, should have as low correlations between one another) as possible. It is obviously not possible to prepare such a list on *a priori* grounds. As already stated, in the present material only about 9 characters out of 12 were found to have a sufficiently high discriminating power to make it worth while including them in the calculations for D^2 -statistics. Later on, all 12 character were used to calculate new values of D^2 , but the results remained fairly stable as shown in chapter 6, section 12. It is not certain, however, that these 9 or 12 are necessarily the most suitable characters. Further investigations may show that there are other characters which would serve the purpose still better.

84. This subject was considered at a symposium in the Anthropological Section of the Indian Science Congress Association at Benares in 1941 and reference may be made to the proceedings published in *Sankhyā*, Vol. 4, pp. 591-598. For progress in physical anthropology in India it is essential that attempts should be made to set up a standard list of characters. As pointed out at the symposium, the list may be either a single one for the whole of India or possibly may consist of two portions one of which would be basic for the whole country and the other would consist of different groups of characters which would be suitable for different regions or different strata of castes and tribes. The analysis of the present material indicates the way in which such lists can be set up in practice.

85. *Use of Indices:* For purposes of classification, anthropologists make extensive use of indices such as Cephalic, Nasal, Facial and Bizygomatic. In the present analysis we have not made any use of the indices. It has been shown in Appendix 2 that if correlations are properly taken into consideration (as in the D^2 -statistic), the indices do not supply any additional information. In fact the D^2 -statistic has been found to be more useful than indices for purposes of classification.

86. *Standard procedure of statistical analysis:* Finally, another aim has been kept steadily in view. Attempts have been made to explore the possibilities of setting up standard procedures for statistical analysis of anthropological measurements. Considerable experience has been gained in the course of the present study, and it is believed that tangible progress has been made. It will be convenient to consider these questions in greater detail after an account has been given of the results of the statistical analysis.

87. Results of the statistical analysis with relevant tables are given in Chapters 5 and 6. In order not to interrupt the general descriptive account, it has been considered advisable to give the technical and mathematical details and references in the form of a series of appendices which have been prepared by C. R. Rao. The general anthropological conclusions in non-technical terms are given in Chapter 8.

CHAPTER 5. NORMALITY OF FREQUENCY DISTRIBUTIONS

1. ASYMMETRY AND KURTOSIS

88. It has been observed that anthropological measurements relating to homogeneous populations (the definition of which must for the present be somewhat loose, but which may be interpreted in the sense of stable groups of human beings who have been inbreeding for some considerable time) have unimodal distributions in which asymmetry is usually small and the kurtosis is approximately the same as that of normal (Gauss-Laplacian) distributions. Asymmetry is measured by $\sqrt{\beta_1}$ which has the value zero, and kurtosis by (β_2-3) which has the value 0 for normal distributions. Deviations from these normal values, when significant, are therefore important features of the distribution. Values of $\sqrt{\beta_1}$ with its proper sign and β_2 are given in Table 1.1 for the present material for each character and each caste or tribe separately. It would be observed that values of both $\sqrt{\beta_1}$ and (β_2-3) are usually small.

89. The probability of occurrence of any observed value of $\sqrt{\beta_1}$ can be tested by the statistic

$$\omega_1 = \sqrt{\frac{\beta_1(N+1)(N+3)}{6(N-2)}}$$

which, for large N , can be used as a normal deviate. In the same way, the probability of departure from normality in kurtosis can be tested with the help of the normal deviate

$$\omega_2 = \left(\beta_2 - 3 + \frac{6}{N+1} \right) \sqrt{\frac{(N+1)^2(N+3)(N+5)}{24 N(N-2)(N-3)}}$$

90. Using the above statistics, the probability of getting values less than or equal to observed values of $\sqrt{\beta_1}$ (with its proper sign), and of β_2 were calculated and are also shown in the same Table 1.1. The frequencies of probabilities in each decile range for different characters are shown in Table 1.2 separately for $\sqrt{\beta_1}$ and β_2 . The distribution of these probabilities should be, theoretically, rectangular with an expected total of 27 in each overall decile range, and 2.25 for each individual character. In the case of $\sqrt{\beta_1}$ the observed value in the range 0 to 0.1 is 67 and in the range 0.1 to 0.2 is 31 indicating that in a number of instances asymmetry must be considered to be significant. A reference to Table 1.1 and Table 1.2 shows that in most cases there is a tendency towards negative skewness, that is, the value of the mean is less than the mode. There may be one or two cases of significant positive skewness but it is not possible to assert anything definitely with confidence in this matter. On the whole, deviations from symmetry, even when significant, are small in magnitude, largest values of $\sqrt{\beta_1}$ being 0.93 for Bhatu Head Length, -0.92 for Chattri Bizygomatic Breadth, -0.91 for Kurmi Nasal Depth, and of the order of 0.75 in four other cases.

TABLE 1.1 VALUES OF $\sqrt{\beta_1}$ AND β_2 WITH PROBABILITIES OF EXCEEDING THE OBSERVED VALUES ON THE HYPOTHESIS OF NORMALITY

name of group	Frontal Breadth					Bizygomatic Breadth					Nasal Length				
	N	$\sqrt{\beta_1}$	$p(\sqrt{\beta_1})$	β_2	$p(\beta_2)$	N	$\sqrt{\beta_1}$	$p(\sqrt{\beta_1})$	β_2	$p(\beta_2)$	N	$\sqrt{\beta_1}$	$p(\sqrt{\beta_1})$	β_2	$p(\beta_2)$
(0)	(1.1)	(1.2)	(1.21)	(1.3)	(1.31)	(2.1)	(2.2)	(2.21)	(2.3)	(2.31)	(3.1)	(3.2)	(3.21)	(3.3)	(3.31)
1 Brahmin (Basti B ₁)	86	-.0424	.44	3.2196	.72	86	+.1049	.66	2.8235	.41	86	+.1552	.73	2.1362	.05
2 Brahmin (others B ₂)	92	-.3220	.10	2.6019	.24	92	-.1503	.27	3.1852	.70	91	+.1025	.66	2.8429	.42
3 Agharia (Ag)	—	—	—	—	—	107	-.1245	.30	2.8209	.39	107	-.5442	.01	3.1916	.71
4 Chattri (Ch)	41	+.3428	.83	2.1922	.15	139	-.9205	.00	4.7224	.99+	139	-.1910	.18	4.1151	.99+
5 Muslim (M)	72	-.1212	.33	2.5805	.26	168	-.4794	.00	3.4986	.93	168	-.3820	.02	3.5670	.95
6 Bhatu (C ₁)	150	+.2585	.90	2.5861	.16	150	+.0412	.58	2.1763	.02	150	-.0100	.48	3.2926	.80
7 Habru (C ₂)	124	+.5236	.99	3.2776	.78	124	+.3844	.96	3.2041	.73	124	-.3950	.04	3.2613	.77
8 Bhil (Bh)	187	-.2159	.11	2.9169	.44	187	-.2784	.06	2.9247	.45	187	+.1000	.71	3.6763	.98
9 Dom (D)	113	+.1127	.69	2.3103	.07	113	+.3728	.95	2.8226	.39	113	0.0000	.50	2.5343	.16
10 Ahir (A ₁)	68	-.0265	.46	2.4159	.18	68	-.0806	.39	2.7554	.38	68	+.4118	.92	4.9300	.99+
11 Kurmi (A ₂)	94	-.6327	.00	3.8834	.98	94	-.1378	.29	3.2039	.72	94	-.0970	.35	3.0751	.61
12 Other Artisan (A ₃)	173	-.4294	.01	3.6288	.97	173	0.0000	.50	2.7275	.25	173	+.0173	.54	3.5545	.95
13 Kahar (A ₄)	57	+.6093	.97	2.9668	.55	57	+.3550	.87	2.3167	.15	57	-.5229	.05	2.8806	.48
14 Tharu (male) (Th ₁)	191	-.1296	.23	2.4631	.07	191	+.1480	.80	2.5039	.09	191	+.0600	.63	2.6996	.21
15 Chamar (Cm)	159	-.1269	.25	3.1182	.66	159	-.0707	.36	3.1009	.65	159	-.3382	.04	3.5053	.93
16 Chero (T ₁)	100	+.1082	.67	2.5405	.19	100	-.2010	.20	2.8322	.41	99	-.0995	.34	2.7573	.34
17 Majhi (T ₂)	156	-.4213	.01	3.4035	.88	156	-.1646	.20	2.8674	.40	156	+.1741	.81	2.5088	.11
18 Panika (T ₃)	158	-.3347	.04	3.4065	.88	158	+.3441	.96	2.9260	.46	157	+.1646	.80	2.9489	.48
19 Kharwar (T ₄)	92	-.2871	.12	2.7120	.32	197	+.0663	.65	2.4971	.08	197	-.1192	.25	3.3166	.84
20 Oraon (T ₅)	—	—	—	—	—	100	-.3828	.05	2.9445	.50	100	-.4992	.02	3.4894	.88
21 Rajwar (T ₁)	—	—	—	—	—	105	-.1619	.25	3.3265	.81	105	+.0693	.61	2.7217	.31
22 Korwa (T ₂)	—	—	—	—	—	01	-.5392	.01	3.9268	.98	101	-.0877	.36	3.3397	.81
23 Tharu (female)	182	-.4549	.01	3.2409	.78	182	-.3545	.02	3.3557	.87	182	-.2002	.13	3.1721	.72

TABLE 1.1 VALUES OF $\sqrt{\beta_1}$ AND β_2 WITH PROBABILITIES OF EXCEEDING THE OBSERVED VALUES ON THE HYPOTHESIS OF NORMALITY (Contd.)

name of group (0)	Head Length					Upper Face Length					Sitting Height				
	N	$\sqrt{\beta_1}$	$P(\sqrt{\beta_1})$	β_2	$P(\beta_2)$	N	$\sqrt{\beta_1}$	$P(\sqrt{\beta_1})$	β_2	$P(\beta_2)$	N	$\sqrt{\beta_1}$	$P(\sqrt{\beta_1})$	β_2	$P(\beta_2)$
	(4.1)	(4.2)	(4.21)	(4.3)	(4.31)	(5.1)	(5.2)	(5.21)	(5.3)	(5.31)	(6.1)	(6.2)	(6.21)	(6.3)	(6.31)
1 Brahmin (Basti B ₁)	86	+ .0707	.61	2.8677	.44	86	+ .1513	.71	3.6395	.93	85	+ .0529	.57	2.6224	.26
2 Brahmin (others B ₂)	92	— .3023	.12	2.7852	.37	92	0.0000	.50	2.6313	.26	92	— .1192	.32	3.2960	.77
3 Agharia (Ag)	107	— .0200	.46	2.8659	.42	107	— .0500	.42	3.4253	.86	107	+ .4848	.98	3.8632	.98
4 Chattri (Ch)	139	— .1490	.24	2.7761	.32	139	— .4916	.01	3.3489	.84	139	— .0656	.37	2.4515	.10
5 Muslim (M)	168	— .2315	.11	2.9741	.51	168	— .2865	.07	3.4442	.90	131	0.1652	.78	2.3426	.06
6 Bhatu (C ₁)	149	+ .9320	.99*	6.8172	.99*	150	— .0539	.40	3.2369	.77	57	— .1723	.29	4.4699	.99*
7 Habru (C ₂)	124	+ .3740	.95	5.6098	.99*	124	— .4355	.02	3.5305	.91	71	+ .1715	.73	2.6118	.28
8 Bhil (Bh)	187	+ .3270	.97	4.3036	.99*	187	+ .0100	.52	2.7121	.22	—	—	—	—	—
9 Dom (D)	113	+ .3730	.95	3.0670	.60	113	+ .2694	.88	2.6778	.26	102	— .3223	.08	3.2419	.74
10 Ahir (A ₁)	68	+ .2853	.83	3.0627	.61	68	— .3928	.08	2.7330	.36	68	+ .0200	.52	2.4624	.20
11 Kurmi (A ₂)	94	— .1025	.34	2.7520	.34	94	— .0671	.40	2.8111	.39	94	— .0700	.39	3.0344	.58
12 Other Artisan (A ₃)	173	+ .3122	.95	4.4552	.99*	173	+ .0200	.54	3.5002	.93	172	+ .7388	.99*	4.5286	.99*
13 Kāhar (A ₄)	57	+ .5213	.95	3.3755	.79	57	— .0520	.44	2.0546	.07	57	+ .1960	.73	3.0113	.58
14 Tharu (male) (Th)	191	— .1030	.28	3.4854	.93	191	+ .1786	.84	2.7621	.27	191	— .0283	.44	2.7696	.28
15 Chamar (Cm)	159	— .1396	.24	3.7229	.97	159	— .2375	.11	3.8124	.99*	159	— .1811	.18	2.3494	.05
16 Chero (T ₁)	100	+ .0458	.58	2.7810	.36	100	— .4604	.03	2.7898	.37	100	+ .5052	.98	3.5332	.90
17 Majhi (T ₂)	156	— .0529	.39	2.6336	.19	156	— .0863	.37	2.4696	.10	156	— .0843	.34	3.4235	.89
18 Panika (T ₃)	158	— .3197	.05	2.7539	.28	157	— .0141	.48	3.3068	.82	157	+ .4734	.98	3.1600	.70
19 Kherwar (T ₄)	197	— .1082	.27	3.4224	.91	197	+ .0520	.62	2.3699	.04	188	+ .0707	.65	2.9118	.43
20 Oraons (T ₅)	100	+ .4030	.95	3.5678	.91	100	— .0480	.42	3.1976	.71	99	— .0173	.48	3.1695	.69
21 Rajwar (T ₆)	105	+ .0224	.54	2.6117	.16	105	+ .1442	.73	2.8480	.41	105	+ .0539	.59	3.0608	.60
22 Korwa (T ₇)	101	— .0911	.35	2.9186	.48	101	0.0000	.50	2.7295	.32	99	— .7551	.00	4.5091	.99*
23 Tharu (female)	182	+ .1122	.73	3.1927	.74	182	— .0894	.31	3.2262	.77	—	—	—	—	—

TABLE 1.1 VALUES OF $\sqrt{\beta_1}$ AND β_2 WITH PROBABILITIES OF EXCEEDING THE OBSERVED VALUES ON THE HYPOTHESIS OF NORMALITY (Contd.)

name of group	Stature					Bigonial Breadth					Head Breadth				
	N	$\sqrt{\beta_1}$	$P(\sqrt{\beta_1})$	β_2	$P(\beta_2)$	N	β_1	$P(\sqrt{\beta_1})$	β_2	$P(\beta_2)$	N	β_1	$P(\sqrt{\beta_1})$	β_2	$P(\beta_2)$
(0)	(7.1)	(7.2)	(7.21)	(7.3)	(7.31)	(8.1)	(8.2)	(8.21)	(8.3)	(8.31)	(9.1)	(9.2)	(9.21)	(9.3)	(9.3)
1 Brahmin (Basti B ₁)	85	+ .7545	.99	4.2613	.99*	86	+ .0412	.56	3.5536	.90	86	— .3066	.12	3.2214	.73
2 Brahmin (others B ₂)	92	— .5241	.02	3.4545	.86	92	— .1257	.31	4.1616	.99*	92	— .0574	.41	2.8960	.46
3 Agharia (Ag)	107	+ .0436	.57	3.2287	.73	107	— .1622	.25	2.8361	.40	107	— .2651	.12	3.0075	.56
4 Chattri (Ch)	139	+ .2392	.87	3.0768	.61	139	— .2555	.11	3.4064	.87	139	— .5462	.00	3.0995	.64
5 Muslim (M)	168	— .0100	.49	3.3782	.87	168	— .3192	.04	2.7469	.27	168	— .5448	.00	3.8918	.99*
6 Bhatu (C ₁)	148	+ .1857	.82	3.2456	.77	150	— .3412	.04	3.6486	.96	150	— .5620	.00	2.8861	.42
7 Habru (C ₂)	122	+ .1520	.75	2.5987	.20	124	— .1058	.32	2.8119	.37	124	— .0200	.46	2.7568	.32
8 Bhil (Bh)	187	— .1025	.29	2.8441	.35	187	+ .2090	.88	2.8367	.35	187	— .2698	.06	3.3041	.84
9 Dom (D)	113	+ .1212	.70	2.8449	.41	113	— .5804	.00	3.1918	.71	113	— .2951	.10	3.3682	.84
10 Ahir (A ₁)	67	— .0557	.43	2.6524	.31	68	— .0224	.47	2.4184	.18	68	— .2540	.19	3.3436	.79
11 Kurmi (A ₂)	94	— .3274	.10	3.6322	.93	94	— .4193	.05	3.5249	.90	94	— .1811	.23	3.3202	.79
12 Other Artisan (A ₃)	173	+ .1208	.74	2.9720	.50	173	+ .2093	.87	3.1072	.65	173	— .2987	.05	3.2043	.75
13 Kahar (A ₄)	57	— .2853	.19	2.7403	.39	57	— .0748	.41	2.5814	.29	57	+ .7242	.99*	3.7433	.93
14 Tharu (male) (Th)	191	— .0141	.47	2.4900	.08	191	— .1786	.16	2.7586	.27	191	+ .3175	.96	3.0826	.63
15 Chamar (Cm)	159	— .1995	.15	3.2943	.81	159	— .0480	.40	2.5576	.14	159	— .0624	.37	3.7970	.99*
16 Chero (T ₁)	100	+ .1323	.70	2.8587	.42	100	— .4642	.03	3.0368	.58	100	— .3242	.09	3.1876	.71
17 Majhi (T ₂)	155	+ .0300	.55	2.6542	.20	156	+ .2234	.87	3.7626	.98	156	+ .0361	.57	3.6249	.96
18 Panika (T ₃)	157	+ .2012	.85	3.1105	.67	158	+ .1319	.75	2.9415	.48	158	— .1655	.19	3.6562	.97
19 Kharwar (T ₄)	197	+ .1273	.77	2.6154	.14	197	+ .1249	.76	2.9663	.50	197	— .4801	.00	4.1268	.99*
20 Oraon (T ₅)	99	+ .3142	.90	3.1627	.68	100	— .4279	.04	3.0648	.61	100	+ .0686	.61	3.6578	.94
21 Rajwar (T ₆)	105	— .0224	.47	3.7269	.96	105	— .3964	.05	2.9978	.55	105	+ .0100	.52	3.1892	.71
22 Korwa (T ₇)	101	+ .1960	.79	2.9150	.47	101	+ .4916	.98	3.2839	.77	101	+ .0200	.53	3.5545	.91
23 Tharu (female)	181	— .1603	.19	3.0782	.62	182	— .1353	.23	3.2832	.82	182	— .0671	.36	2.7119	.23

TABLE 1.1 VALUES OF $\sqrt{\beta_1}$ AND β_2 WITH PROBABILITIES OF EXCEEDING THE OBSERVED VALUES ON THE HYPOTHESIS OF NORMALITY (Cncl.)

name of group (0)	Nasal Breadth					Nasal Depth					Total Face Length				
	N	$\sqrt{\beta_1}$	$\sqrt{p(\beta_1)}$	β_2	$p(\beta_2)$	N	$\sqrt{\beta_1}$	$p(\sqrt{\beta_1})$	β_2	$p(\beta_2)$	N	$\sqrt{\beta_1}$	$p(\sqrt{\beta_1})$	β_2	$p(\beta_2)$
	(10.1)	(10.2)	(10.21)	(10.3)	(10.31)	(11.1)	(11.2)	(11.21)	(11.3)	(11.31)	(12.1)	(12.2)	(12.21)	(12.3)	(12.31)
1 Brahmin (Basti B ₁)	86	— .4825	.03	3.7447	.95	86	— .4093	.01	3.7024	.94	86	— .0806	.38	2.6471	.28
2 Brahmin (others B ₂)	91	— .0663	.40	3.2028	.71	91	— .1217	.32	2.7301	.33	92	— .4923	.02	3.3212	.79
3 Agharia (Ag)	107	— .2903	.11	3.2611	.76	107	— .3406	.07	3.3233	.80	107	— .2040	.19	3.3530	.82
4 Chattri (Ch)	139	— .2546	.12	2.9880	.53	139	+ .0721	.64	3.4465	.89	139	— .0539	.40	2.6245	.20
6 Muslim (M)	168	— .1735	.18	2.8486	.37	168	+ .2687	.93	3.2015	.74	168	— .1179	.26	2.5770	.14
6 Bhatu (C ₁)	150	— .2590	.10	2.9646	.50	150	— .5065	.00	3.3934	.87	150	— .2352	.11	2.8888	.43
7 Habru (C ₂)	124	— .2443	.13	3.7199	.97	124	— .2891	.09	2.7556	.31	124	— .4156	.03	3.3998	.86
8 Bhil (Bh)	187	+ .0990	.71	2.7960	.31	187	— .3496	.02	2.7558	.27	187	— .2926	.05	2.7128	.23
9 Dom (D)	113	— .3260	.07	3.0697	.61	113	— .2508	.13	4.2647	.99*	113	— .1622	.24	2.7497	.32
10 Ahir (A ₁)	68	+ .1982	.75	3.4593	.85	68	— .2419	.20	2.5862	.26	68	— .3169	.14	2.3826	.16
11 Kurmi (A ₂)	94	— .0100	.48	2.1679	.05	94	— .9050	.00	3.4520	.98	94	+ .0346	.56	2.3435	.10
12 Others Artisan (A ₃)	173	+ .3111	.95	2.9488	.48	173	— .5261	.00	4.4378	.99*	173	— .4148	.01	3.0654	.61
13 Kahar (A ₄)	57	— .5071	.05	3.2415	.73	57	+ .0949	.62	2.7660	.41	57	— .0436	.44	2.3139	.15
14 Tharu (male) (Th)	191	— .2872	.05	2.8505	.36	191	+ .1520	.81	2.6807	.20	191	+ .1939	.86	2.9681	.50
15 Chamar (Cm)	159	— .2437	.10	3.7130	.98	159	0.0000	.50	2.6880	.23	159	+ .0173	.64	2.7145	.25
16 Chero (T ₁)	100	— .1833	.22	2.7734	.36	100	— .5919	.01	4.1391	.99*	100	— .6347	.00	3.2814	.77
17 Majhi (T ₂)	156	+ .1575	.79	2.6952	.24	156	— .0200	.46	2.5221	.12	156	— .0224	.46	2.7581	.29
18 Panika (T ₃)	157	— .0656	.37	3.2261	.76	157	— .4019	.02	4.7165	.99*	157	+ .1378	.76	2.5269	.12
19 Kharwar (T ₄)	197	— .3931	.01	2.9983	.53	197	— .6384	.00	4.6806	.99*	197	— .1304	.23	2.9696	.50
20 Oraon (T ₅)	100	— .1655	.25	2.7352	.33	100	+ .0970	.66	2.6543	.26	100	— .2419	.16	2.1569	.04
21 Rajwar (T ₆)	105	— .3040	.10	2.9632	.52	105	— .1030	.33	2.4826	.15	105	+ .3282	.92	3.3534	.82
22 Korwa (T ₇)	101	— .2364	.16	3.3641	.82	101	— .3118	.10	3.1177	.65	101	— .0975	.34	3.0150	.57
23 Tharu (female)	182	— .4321	.01	3.8011	.99*	182	0.0000	.50	2.1413	.01	182	+ .0100	.52	3.5195	.94

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TABLE 1.2 FREQUENCY DISTRIBUTION OF PROBABILITY OF OCCURRENCE OF VALUES OF $\sqrt{\beta_1}$ AND β_2 IN OBSERVED SAMPLES BY CHARACTERS*

	$\sqrt{\beta_1}$													Total
Probability (0)	FB (1)	BzB (2)	NL (3)	HL (4)	UFL (5)	SH (6)	St (7)	BgB (8)	HB (9)	NB (10)	ND (11)	TFL (12)		(13)
0—·005	1	2	0	0	0	1	0	1	4	0	4	1	14	67
·005—·025	3	2	3	0	2	0	1	0	0	2	4	2	19	
·025—·1	2	2	3	1	3	1	1	6	4	6	3	2	34	
·1 —·2	2	2	2	2	1	1	3	2	4	6	2	4		31
·2 —·3	2	4	1	4	0	1	1	2	1	2	0	3		21
·3 —·4	1	2	3	3	4	4	0	2	2	2	2	3		28
·4 —·5	2	1	2	1	6	2	4	3	2	1	3	2		29
·5 —·6	0	1	1	2	2	3	2	1	3	0	0	3		18
·6 —·7	2	2	3	1	1	1	0	0	1	0	3	0		14
·7 —·8	0	0	2	1	2	3	6	2	0	3	0	1		20
·8 —·9	1	2	2	1	2	0	3	3	0	0	1	1		16
·9 —·975	1	3	1	6	0	0	1	0	1	1	1	1	16	26
·975—·995	2	0	0	0	0	3	0	1	1	0	0	0	7	
·995—1·00	0	0	0	1	0	1	1	0	0	0	0	0	3	
Total	19	23	23	23	23	21	23	23	23	23	23	23		270

β_2														Total
(0)	FB (1)	BzB (2)	NL (3)	HL (4)	UFL (5)	SH (6)	St (7)	BgB (8)	HB (9)	NB (10)	ND (11)	TFL (12)	(13)	
0—·005	0	0	0	0	0	0	0	0	0	0	0	0	0	15
·005—·025	0	1	0	0	0	0	0	0	0	0	1	0	2	
·025—·1	2	2	1	0	3	2	1	0	0	1	0	1	13	
·1 —·2	4	1	2	2	0	2	2	2	0	0	3	6		24
·2 —·3	2	1	1	1	4	3	1	3	1	1	4	4		26
·3 —·4	1	3	2	4	4	0	3	2	1	5	2	1		28
·4 —·5	1	5	3	3	1	1	3	3	2	1	1	3		27
·5 —·6	1	1	0	1	0	2	1	2	1	4	0	1		14
·6 —·7	1	1	1	2	0	2	4	2	2	1	1	1		18
·7 —·8	3	3	3	2	3	3	2	2	6	4	1	2		34
·8 —·9	2	2	4	0	3	1	3	3	2	2	3	3		28
·9 —·975	1	1	3	3	4	1	2	2	5	2	1	1	26	56
·975—·995	1	1	1	1	1	1	0	1	2	2	1	0	12	
·995—1·00	0	1	2	4	0	3	1	1	1	0	5	0	18	
Total	19	23	23	23	23	21	23	23	23	23	23	23	279	

*The following abbreviations have been used for the names of the characters. Frontal Breadth (FB), Bizygomatic Breadth (BzB), Nasal Length (NL), Head Length (HL), Upper Face Length (UFL), Sitting Height (SH), Stature (St), Bigonial Breadth (BgB), Head Breadth (HB), Nasal Breadth (NB), Nasal Depth (ND), Total Face Length (TFL).

TABLE (1.31) DISTRIBUTION OF SIGNIFICANT VALUES OF β_1 , β_2 BY CHARACTERS AND CASTES

	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL	Significant at 5% 1% Total		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)*	(14)	(15)
Significant values of β_1															
Brahmin (Basti B ₁)	-	-	-	-	-	-	++	-	-	-	+	-	1	1	2
Brahmin (others B ₂)	-	-	-	-	-	-	+	-	-	-	-	+	2	-	2
Agharia (Ag)	-	-	+	-	-	+	-	-	-	-	-	-	2	-	2
Chattri (Ch)	-	++	-	-	+	-	-	-	++	-	-	-	1	2	3
Muslim (M)	-	++	+	-	-	-	-	-	++	-	-	-	1	2	3
Bhatu (C ₁)	-	-	-	++	-	-	-	-	++	-	++	-	-	3	3
Habru (C ₂)	+	-	-	-	+	-	-	-	-	-	-	-	2	-	2
Bhil (Bh)	-	-	-	-	-	-	-	-	-	-	+	-	1	-	1
Dom (D)	-	-	-	-	-	-	-	++	-	-	-	-	-	1	1
Ahir (A ₁)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kurmi (A ₂)	++	-	-	-	-	-	-	-	-	-	++	-	-	2	2
Other Artisan (A ₃)	+	-	-	-	-	++	-	-	-	-	++	+	2	2	4
Kahar (A ₄)	+	-	-	-	-	-	-	-	+	-	-	-	2	-	2
Tharu (male) (Th)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chamar (Cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chero (T ₁)	-	-	-	-	-	+	-	-	-	-	+	++	2	1	3
Majhi (T ₂)	+	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Panika (T ₃)	-	-	-	-	-	+	-	-	-	-	+	-	2	-	2
Kharwar (T ₄)	-	-	-	-	-	-	-	-	++	+	++	-	1	2	3
Oraon (T ₅)	-	-	+	-	-	-	-	-	-	-	-	-	1	-	1
Rajwar (T ₆)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Korwa (T ₇)	-	+	-	-	-	++	-	+	-	-	-	-	2	1	3
Tharu (female)	+	+	-	-	-	-	-	-	-	+	-	-	3	-	3
Significant at 5%*	5	2	3	-	2	3	1	1	1	2	4	2	26		
Significant at 1%	1	2	-	1	-	2	1	1	4	-	4	1		17	
Total	6	4	3	1	2	5	2	2	5	2	8	3			43

Significant values of β_2

Brahmin (Basti B ₁)	-	-	-	-	-	-	++	-	-	-	-	-	-	1	1
Brahmin (others B ₂)	-	-	-	-	-	-	-	++	-	-	-	-	-	1	1
Agharia (Ag)	-	-	-	-	-	+	-	-	-	-	-	-	1	-	1
Chattri (Ch)	-	++	++	-	-	-	-	-	-	-	-	-	-	2	2
Muslim (M)	-	-	-	-	-	-	-	-	+	-	-	-	1	-	1
Bhatu (C ₁)	-	+	-	-	-	++	-	-	-	-	-	-	1	1	2
Habru (C ₂)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bhil (Bh)	-	-	+	++	-	-	-	-	-	-	-	-	1	1	2
Dom (D)	-	-	-	-	-	-	-	-	-	-	++	-	-	-	1
Ahir (A ₁)	-	-	++	-	-	-	-	-	-	-	-	-	-	1	1
Kurmi (A ₂)	+	-	-	-	-	-	-	-	-	-	+	-	2	-	2
Other Artisan (A ₃)	-	-	-	++	-	++	-	-	-	-	++	-	-	3	3
Kahar (A ₄)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tharu (Male) (Th)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chamar (Cm)	-	-	-	+	+	-	-	-	+	+	-	-	4	-	4
Chero (T ₁)	-	-	-	-	-	-	-	-	-	-	++	-	-	1	1
Majhi (T ₂)	-	-	-	-	-	-	-	-	+	-	-	-	1	-	1
Panika (T ₃)	-	-	-	-	-	-	-	-	-	-	++	-	-	1	1
Kharwar (T ₄)	-	-	-	-	-	-	-	-	++	-	++	-	-	2	2
Oraon (T ₅)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rajwar (T ₆)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Korwa (T ₇)	-	+	-	-	-	++	-	-	-	-	-	-	1	1	2
Tharu (female)	-	-	-	-	-	-	-	-	-	+	+	-	2	-	2
Significant at 5%*	1	2	1	1	1	1	-	1	2	2	2	-	14		
Significant at 1%	-	1	2	2	-	3	1	1	1	-	5	-		16	
Total	1	3	3	3	1	4	1	2	3	2	7	-			30

*The numbers refer to those significant at 5% only and not at 1%.

- Not significant; + significant at 5% only; ++ significant at 1%.

91. As regards β_2 also we find 15 values within the range 0 to 0.1 against the expected number 27 showing again that there exists significant deviations from normal kurtosis in certain cases. Out of 270 values of β_2 , 141 are greater than 3 and 129 are less than 3 indicating a slight preponderance of platy-kurtosis.

92. Values of $\sqrt{\beta_1}$ and β_2 significant at five and one per cent levels may be now considered in greater detail. The distribution of such values by characters and castes or tribes is given in Table 1.3. In the case of $\sqrt{\beta_1}$ it is noticed that 17 values, against the expected number 3, are significant at one per cent level showing an excess of 14 cases. Between 1 per cent and 5 per cent levels, the observed number is 26 against an expected value of 11 giving an excess of 15 significant values. From the marginal totals it will be also noticed that the largest number of significant values occur in Nasal Depth (8), Frontal Breadth (6), Sitting Height (5), and Head Breadth (5), and also to some extent in Bizygomatic Breadth (4). Furthermore, certain castes or tribes have a rather large number of significant deviations such as Other Artisan with 4, and Bhatu, Chattri, Muslim, Kharwar, Chero and Korwa and Tharu (female) with 3 each.

93. In the same way, for β_2 it is seen that Nasal Depth (7), Sitting Height (4), Nasal Length (3) and Head Length (3), Head Breadth (3) and Bizygomatic Breadth (3) have the largest number of deviations. As regards castes and tribes, it is noticed that a large number of deviations occur among Chamer (4), Other Artisan (3), Bhatu (2), Chattri (2) and Kharwar (2).

94. A joint consideration of $\sqrt{\beta_1}$ and β_2 shows interesting results. Nasal Depth, Sitting Height and Head Breadth give the largest number of deviations in both symmetry and kurtosis; Head Length has a large number of significant non-normal kurtosis; while Frontal Breadth and Bizygomatic Breadth show a number of significant cases of asymmetry at the 5 per cent level.

95. A similar comparison among castes and tribes reveals that Other Artisan, Bhatu, Chattri, Kharwar and Korwa show the largest number of deviations in both $\sqrt{\beta_1}$ and β_2 while Muslim and Chero have a number of cases of deviations from symmetry.

96. As already stated, there are 14 excess values of $\sqrt{\beta_1}$ and 13 excess values of β_2 at one per cent level; and 15 excess values of $\sqrt{\beta_1}$ and 3 of β_2 between 1 per cent and 5 per cent levels, that is, 27 excess values at 1 per cent and 18 excess values at 5 per cent for both $\sqrt{\beta_1}$ and β_2 taken together. The 5 groups (Other Artisan, Bhatu, Chattri, Kharwar and Korwa) account for 10 excess values of $\sqrt{\beta_1}$ and 9 excess values of β_2 at one per cent level, or 19 altogether at one per cent level out of the observed excess values of 27. These castes and tribes may therefore be reasonably considered to be largely responsible for the observed deviations from normality in the 4 characters mentioned above.

TABLE 2.1. VALUES OF STANDARD DEVIATIONS WITH STANDARD ERRORS BY GROUPS AND CHARACTERS.

name of group	Frontal Breadth			Bizygomatic Breadth			Nasal Length			Head Length			Upper Face Length			Sitting Height		
	N	s.d. $\pm$ s.e		N	s.d. $\pm$ s.e		N	s.d. $\pm$ s.e		N	s.d. $\pm$ s.e		N	s.d. $\pm$ s.e		N	s.d. $\pm$ s.e	
(0)	(1.1)	(1.2)	(1.21)	(2.1)	(2.2)	(2.21)	(3.1)	(3.2)	(3.21)	(4.1)	(4.2)	(4.21)	(5.1)	(5.2)	(5.21)	(6.1)	(6.2)	(6.21)
1 Brahmin (Basti B ₁)	86	3.95	$\pm$.301	86	6.55	$\pm$.499	86	2.91	$\pm$.222	86	6.51	$\pm$.496	86	4.22	$\pm$.322	85	2.69	$\pm$.206
2 Brahmin (others B ₂)	92	4.82	$\pm$.355	92	5.14	$\pm$.379	91	3.26	$\pm$.242	92	7.23	$\pm$.533	92	4.02	$\pm$.296	92	2.84	$\pm$.209
3 Agharia (Ag)	—	—	—	107	4.51	$\pm$.308	107	3.27	$\pm$.224	107	7.80	$\pm$.533	107	4.78	$\pm$.327	107	3.18	$\pm$.217
5 Chattri (Ch)	139	3.97	$\pm$.449	139	5.75	$\pm$.345	137	3.51	$\pm$.212	139	6.63	$\pm$.398	139	3.81	$\pm$.229	139	4.36	$\pm$.262
5 Muslim (M)	72	3.70	$\pm$.308	168	4.56	$\pm$.249	168	3.69	$\pm$.201	167	6.08	$\pm$.333	168	3.99	$\pm$.218	131	3.64	$\pm$.225
6 Bhatu (C ₁)	150	5.73	$\pm$.331	150	4.84	$\pm$.259	150	3.48	$\pm$.201	148	6.94	$\pm$.403	150	4.15	$\pm$.240	57	2.67	$\pm$.250
7 Habru (C ₂)	124	4.58	$\pm$.291	124	5.84	$\pm$.371	124	3.10	$\pm$.197	124	6.04	$\pm$.384	124	3.94	$\pm$.250	71	3.32	$\pm$.279
8 Bhil (Bh)	187	3.97	$\pm$.205	186	4.48	$\pm$.232	187	3.29	$\pm$.170	187	5.88	$\pm$.304	187	4.47	$\pm$.231	—	—	—
9 Dom (D)	113	3.70	$\pm$.246	113	4.70	$\pm$.313	113	3.08	$\pm$.205	113	6.06	$\pm$.403	113	4.27	$\pm$.284	102	3.01	$\pm$.211
10 Ahir (A ₁)	68	3.31	$\pm$.284	68	4.19	$\pm$.359	68	3.75	$\pm$.322	68	6.09	$\pm$.522	68	4.31	$\pm$.370	68	2.60	$\pm$.223
11 Kurmi (A ₂)	94	3.30	$\pm$.241	94	4.51	$\pm$.329	94	3.53	$\pm$.257	94	6.45	$\pm$.470	94	4.30	$\pm$.314	94	2.96	$\pm$.216
12 Other Artisan (A ₃)	173	3.83	$\pm$.206	173	4.65	$\pm$.250	173	3.70	$\pm$.199	173	6.69	$\pm$.360	172	4.05	$\pm$.218	172	3.14	$\pm$.169
13 Kahar (A ₄)	56	3.71	$\pm$.351	57	4.39	$\pm$.411	57	3.78	$\pm$.354	57	6.87	$\pm$.643	57	4.24	$\pm$.397	57	3.16	$\pm$.296
14 Tharu (male) (Th)	191	3.43	$\pm$.176	191	4.44	$\pm$.227	191	3.51	$\pm$.180	191	5.78	$\pm$.296	191	4.51	$\pm$.230	191	3.00	$\pm$.154
15 Chamar (Cm)	159	3.67	$\pm$.206	159	4.82	$\pm$.270	159	2.93	$\pm$.164	159	6.42	$\pm$.360	158	3.78	$\pm$.213	159	3.73	$\pm$.209
16 Chero (T ₁)	100	3.33	$\pm$.236	100	4.30	$\pm$.304	99	3.28	$\pm$.233	100	6.48	$\pm$.458	100	4.14	$\pm$.293	100	2.84	$\pm$.201
17 Majhi (T ₂)	155	3.34	$\pm$.190	155	5.06	$\pm$.287	156	2.99	$\pm$.169	156	6.78	$\pm$.384	156	3.87	$\pm$.219	156	3.40	$\pm$.192
18 Panika (T ₃)	158	3.55	$\pm$.200	158	4.54	$\pm$.255	157	3.45	$\pm$.195	158	6.05	$\pm$.340	157	4.07	$\pm$.230	157	3.08	$\pm$.174
19 Kharwar (T ₄)	92	3.59	$\pm$.265	197	4.26	$\pm$.215	197	3.32	$\pm$.167	197	6.48	$\pm$.326	197	4.62	$\pm$.232	188	2.91	$\pm$.150
20 Oraon (T ₅)	—	—	—	100	4.81	$\pm$.340	100	3.32	$\pm$.235	100	6.06	$\pm$.428	100	4.19	$\pm$.296	99	3.13	$\pm$.222
21 Rajwar (T ₆)	—	—	—	105	3.95	$\pm$.273	105	3.50	$\pm$.242	105	6.10	$\pm$.421	105	4.15	$\pm$.286	105	2.70	$\pm$.186
22 Korwa (T ₇)	—	—	—	101	4.29	$\pm$.302	101	3.35	$\pm$.236	101	5.70	$\pm$.401	100	4.07	$\pm$.288	98	2.98	$\pm$.213
23 Tharu (female)	182	3.59	$\pm$.188	182	4.39	$\pm$.230	182	3.29	$\pm$.172	182	5.62	$\pm$.295	182	4.39	$\pm$.230	—	—	—

TABLE 2.1. VALUES OF STANDARD DEVIATIONS WITH STANDARD ERRORS BY GROUPS AND CHARACTERS (Contd.)

name of group (0)	Stature			Bigonial Breadth			Head Breadth			Nasal Breadth			Nasal Depth			Total Face Length		
	N	s.d	± s.e	N	s.d	± s.e	N	s.d	± s.e	N	s.d	± s.e	N	s.d	± s.e	N	s.d	± s.e
	(7.1)	(7.2)	(7.21)	(8.1)	(8.2)	(8.21)	(9.1)	(9.2)	(9.21)	(10.1)	(10.2)	(10.21)	(11.1)	(11.2)	(11.21)	(12.1)	(12.2)	(12.21)
1 Brahmin (Basti B ₁)	85	5.08±	.390	86	5.41±	.412	86	5.13±	.391	85	2.72±	.209	86	1.69±	.129	86	6.53±	.498
2 Brahmin (others B ₂)	92	5.76±	.425	92	5.04±	.372	92	4.71±	.347	90	2.37±	.176	91	1.74±	.129	92	6.87±	.506
3 Agharia (Ag)	107	5.77±	.395	107	5.74±	.392	107	4.85±	.332	107	2.32±	.159	107	2.17±	.148	107	6.12±	.418
4 Chattri (Ch)	139	5.69±	.341	136	5.05±	.306	139	5.23±	.302	137	2.46±	.148	139	1.60±	.096	139	5.96±	.357
5 Muslim (M)	168	5.91±	.322	168	5.12±	.279	168	4.43±	.242	168	2.71±	.148	168	1.90±	.104	167	5.92±	.324
6 Bhatu (C ₁)	149	6.50±	.377	150	4.49±	.259	150	4.34±	.251	150	2.66±	.154	150	2.12±	.122	149	5.95±	.345
7 Habru (C ₂)	124	7.68±	.488	124	4.44±	.282	123	4.82±	.308	124	2.45±	.156	124	1.92±	.122	124	6.68±	.424
8 Bhil (Bh)	186	5.48±	.284	187	5.11±	.264	186	4.29±	.222	187	2.41±	.125	186	1.74±	.090	187	6.66±	.345
9 Dom (D)	113	6.07±	.404	113	5.07±	.337	113	4.32±	.287	113	3.18±	.211	112	1.88±	.126	112	5.83±	.390
10 Ahir (A ₁)	67	5.03±	.434	68	4.60±	.394	67	4.11±	.355	68	2.29±	.196	68	1.96±	.168	68	6.44±	.552
11 Kurmi (A ₂)	94	5.32±	.388	94	5.66±	.413	94	4.40±	.321	94	2.34±	.171	94	1.71±	.125	94	6.44±	.470
12 Others Artisan (A ₃)	172	5.57±	.300	173	5.60±	.301	173	4.60±	.247	173	2.73±	.147	171	1.90±	.103	173	6.50±	.349
13 Kahar (A ₄)	57	6.05±	.567	57	5.67±	.531	57	4.69±	.439	57	2.23±	.209	57	1.85±	.173	57	6.05±	.566
14 Tharu (male) (Th)	191	5.22±	.267	191	4.65±	.238	191	4.65±	.238	191	2.39±	.122	191	1.60±	.082	191	5.65±	.289
15 Chamar (Cm)	158	5.52±	.311	159	5.65±	.283	159	4.29±	.241	159	2.29±	.128	159	1.58±	.089	158	5.96±	.335
16 Chero (T ₁)	100	5.34±	.378	100	4.60±	.325	100	4.45±	.315	100	2.54±	.180	100	1.57±	.111	100	6.12±	.433
17 Majhi (T ₂)	152	5.94±	.341	155	5.72±	.325	155	4.71±	.268	156	2.62±	.148	156	1.59±	.090	156	6.12±	.347
18 Panika (T ₃)	156	5.28±	.299	158	4.83±	.272	158	4.50±	.253	157	2.60±	.147	157	1.78±	.100	156	6.35±	.359
19 Kharwar (T ₄)	197	5.56±	.280	197	4.88±	.246	196	4.58±	.232	197	2.84±	.143	197	1.48±	.075	197	5.94±	.300
20 Oraon (T ₅)	99	6.00±	.426	100	4.85±	.343	100	4.07±	.288	100	2.63±	.186	100	1.58±	.112	100	6.55±	.463
21 Rajwar (T ₆)	105	5.53±	.382	105	4.71±	.325	105	3.85±	.252	105	2.58±	.178	105	1.53±	.106	105	5.79±	.399
22 Korwa (T ₇)	101	5.07±	.357	101	4.53±	.319	101	3.76±	.265	101	3.18±	.224	101	1.54±	.018	101	5.25±	.369
23 Tharu (female)	181	5.80±	.305	181	4.84±	.254	182	4.38±	.230	182	2.08±	.109	182	1.55±	.081	182	5.69±	.289

2. HOMOSCEDASTICITY

97. Values of standard deviations for each character and each caste or tribe are given in Table 2.1. It will be noticed that the standard deviations for any particular character are roughly of the same order for different groups. This was statistically tested in the following way. If $s_1^2, \dots, s_k^2$ are variances estimated on $n_1, \dots, n_k$ degrees of freedom then the statistic

$$M = n \log_e \frac{(n_1 s_1^2 + \dots + n_k s_k^2)}{n} - n_1 \log_e s_1^2 - \dots - n_k \log_e s_k^2$$

$$n = n_1 + \dots + n_k$$

can be used as χ^2 with $(k-1)$ degrees of freedom⁶. It may be seen from Table 2.2 that the χ^2 is significant for seven out of the 12 characters. Even taking into account the fact that the characters are correlated it can be concluded that significant differences exist. Since the magnitudes of differences are small, the pooled values of the variances for each character have been found and given in Table 3.3 for use in computing the generalized distances.

3. COEFFICIENTS OF CORRELATION

98. Coefficients of correlation between each pair of characters are given separately for each caste and tribe in Table 3.1 given in Appendix 6. On the whole, the correlation between the same pair of characters is not widely different for the different groups. There are, however, a number of exceptions. Whether the correlation (between any pair of characters) may be considered to be the same for different castes or tribes can be tested with the help of the following statistic :

$$\chi^2 = \Sigma(z_i - \bar{z})^2 (n_i - 3)$$

where $z_i = \log_e [(1+r_i)/(1-r_i)]$, and $\bar{z} = \Sigma(n_i - 3)z_i / \Sigma(n_i - 3)$, r_i being the coefficient of correlation for the i -th group and n_i the sample size on which r_i is calculated. The above statistic is distributed as chi-square with $(k-1)$ degrees of freedom where k is the number of castes.

99. As already mentioned only nine characters were used for the purpose of classification. The correlation coefficients between different pairs of these characters actually enter in the calculation of D^2 -statistics. The study of homogeneity of correlations was therefore confined to these nine characters. The results of the test of homogeneity of the correlation between each pair of characters for all castes and tribes are shown in Table 3.2 in which correlations which are

⁶This test actually underestimates significance so that when M is less than 5% or 1% value of χ^2 then the hypothesis of equality of variance cannot be rejected on the 5% or 1% level. On the other hand if M exceeds the significant value of χ^2 , then the significance will be established if $M' = M / [1 + c/3(k-1)]$ also exceeds this value where $c = (\Sigma 1/n_i - 1/n)$. There may arise a case when the significant value of χ^2 lies between M and M' in which case the accurate probability of M has to be calculated. This situation occurs only in rare cases.

TABLE (2.2) TEST FOR EQUALITY OF STANDARD DEVIATIONS IN ALL GROUPS FOR EACH CHARACTER

	Frontal Breadth	Bizygomatic Breadth	Nasal Length	Head Length	Upper Face Length	Sitting Height
χ^2 for all groups	105.55**	71.41**	29.00	30.65	22.32	47.62**
Degrees of freedom	17	21	21	21	21	20
	Stature	Bigonial Breadth	Head Breadth	Nasal Breadth	Nasal Depth	Total Face Length
χ^2 for all groups	49.42**	35.34*	30.31	46.29**	65.91**	20.63
Degrees of freedom	21	21	21	21	21	21

* indicates significance at 5% level.

** indicates significance at 1% level.

TABLE (3.2) TEST FOR EQUALITY OF COEFFICIENTS OF CORRELATION FOR EACH PAIR OF THE FOLLOWING NINE CHARACTERS

	Frontal Breadth	Bizygomatic Breadth	Nasal Length	Head Length	Sitting Height	Stature	Head Breadth	Nasal Breadth	Nasal Depth
Frontal Breadth	—	82.20** (17)	11.51 (17)	29.54* (17)	21.76 (15)	27.26 (17)	59.22** (17)	5.33 (17)	9.53 (17)
Bizygomatic Breadth	82.20** (17)	—	23.83 (21)	35.13* (21)	21.26 (20)	95.85** (21)	39.28** (21)	26.36 (21)	26.13 (21)
Nasal Length	11.51 (17)	23.83 (21)	—	11.45 (19)	16.71 (20)	30.16 (21)	37.05* (21)	9.84 (21)	27.95 (21)
Head Length	29.54* (17)	35.13* (21)	11.45 (19)	—	19.65 (20)	23.87 (21)	31.40 (21)	21.18 (21)	12.46 (21)
Sitting Height	21.76 (15)	21.26 (20)	16.71 (20)	19.65 (20)	—	182.72** (20)	27.05 (20)	21.65 (20)	20.68 (20)
Stature	27.26 (17)	95.85** (21)	30.16 (21)	23.87 (21)	182.72** (20)	—	15.58 (21)	21.85 (21)	28.40 (21)
Head Breadth	59.22** (17)	39.28** (21)	37.05* (21)	31.40 (21)	27.05 (20)	15.58 (21)	—	24.15 (21)	23.05 (21)
Nasal Breadth	5.33 (17)	26.36 (21)	9.84 (21)	21.18 (21)	21.65 (20)	21.85 (21)	24.15 (21)	—	14.82 (21)
Nasal Depth	9.53 (17)	26.13 (21)	27.95 (21)	12.46 (21)	20.68 (20)	28.40 (21)	23.05 (21)	14.82 (21)	—

* indicates significance at 5% level.

** indicates significance at 1% level.

Figures in brackets indicate degrees of freedom.

TABLE (3.3) POOLED ESTIMATES OF CORRELATIONS AND STANDARD DEVIATIONS

	FB	BzB	NL	HL	UFL	SH	St	BzB	HB	NB	ND	TFL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Frontal Breadth (FB)	—	·4930	·1139	·2270	·1384	·3012	·2173	·2238	·4461	·1831	·1243	·1500
Bizygomatic Breadth (BzB)	·4930	—	·1852	·2792	·2218	·2995	·2891	·4360	·5407	·2729	·1575	·2710
Nasal Length (NL)	·1139	·1852	—	·1758	·6862	·2170	·1974	·1108	·1735	·0438	·2910	·5520
Head Length (HL)	·2270	·2792	·1758	—	·2172	·2651	·2698	·2192	·1982	·1930	·1537	·3067
Upper Face Length (UFL)	·1384	·2218	·6862	·2172	—	·2275	·1899	·1611	·1401	·1169	·2739	·6569
Sitting Height (SH)	·3012	·2995	·2170	·2651	·2275	—	·5849	·2407	·2069	·1182	·2094	·2850
Stature (St)	·2173	·2891	·1974	·2698	·1899	·5849	—	·2103	·1927	·1412	·1774	·2500
Bigonial Breadth (BzB)	·2238	·4360	·1108	·2192	·1611	·2470	·2103	—	·2295	·1854	·1204	·1701
Head Breadth (HB)	·4461	·5407	·1735	·1982	·1401	·2069	·1927	·2295	—	·1413	·1308	·1825
Nasal Breadth (NB)	·1831	·2729	·0438	·1930	·1189	·1182	·1412	·1854	·1413	—	·1139	·0763
Nasal Depth (ND)	·1243	·1575	·2910	·1537	·2739	·2094	·1774	·1204	·1308	·1139	—	·2001
Total Face Length (TFL)	·1500	·2710	·5520	·3067	·6569	·2850	·2500	·1701	·1825	·0763	·2001	—
Standard Deviation	3·9200	4·5800	3·5000	6·6000	4·2200	3·2000	5·7400	5·0400	4·5000	2·5700	1·7500	6·1800

significant at one per cent level have been marked with 2 stars and those significant at 5 per cent level with one star. It will be noticed that no less than 8 (out of 36) correlations show significant deviations from homogeneity. All the correlations cannot be considered homogeneous. The differences in the actual numerical values of the correlations are, however, not large. In calculating the values of D^2 , these deviations from homogeneity have been ignored. The pooled values of the standard deviations and correlations which have been used in subsequent analysis are shown in Table 3.3.

100. From Table 3.3, it would be seen that all the correlations are positive. The frequency distribution is shown below.

TABLE 3.4 VALUES OF THE POOLED CORRELATION

	0-0.1	0.1-0.2	0.2-0.3	0.3-0.4	0.4-0.5	0.5-0.6	0.6-0.7	Total
Number	2	29	25	2	3	3	2	66
Accumulated total	2	31	56	58	61	64	66	66

It would be seen that 56 out of 66 correlations are less than 0.3 in value, and also that only 2 correlations are less than 0.1. In fact 54 out of 66 correlations have values between 0.1 and 0.3. On the whole, the different characters may be considered to have among themselves positive and moderately low values of correlation. It would be also noticed that the 3 characters UFL, TFL, and NL form a highly correlated group with $(UFL \times NL) = 0.6862$, $(UFL \times TFL) = 0.6569$, and $(TFL \times NL) = 0.5520$. HB, BzB, FB form another group of moderately correlated characters with $(HB \times BzB) = 0.5407$, $(HB \times FB) = 0.4461$, and $(FB \times BzB) = 0.4930$. BzB is also moderately correlated with BgB (0.4360); and FB has moderate correlation with SH (0.3012). St and SH are highly correlated (0.5849) as one would naturally expect.

4. LINEARITY OF REGRESSIONS

101. It was found that the distributions of the individual characters were nearly normal. For valid applications of the statistical methods adopted in the present report it is necessary that the joint distribution of the various characters should conform, as closely as possible, to the multivariate normal distribution. As there exists no single test to judge whether a sample has come from a multi-variate normal distribution, all that can be done is to study whether the sample conforms to the multivariate normal distribution in some of its important aspects. In a multi-variate normal distribution, the regression of any variate on any sub-set of the other variates is linear. This is a property which validates the use of the product moment correlation as a measure of organic relationship between two characters. It is of importance for the analysis adopted here to test whether the distributions of pairs of characters satisfy this property on the basis of observed samples. This property together with the normality of marginal distributions, however, form only a set of necessary but not sufficient conditions for a multivariate distribution to be of the normal type so that it cannot be

asserted definitely, on the basis of these tests alone, that the distribution of anthropological characters are of the multi-variate normal type.

102. Table 4.1 gives variance ratios (ratio of variance due to deviation from linear regression to residual variance) and the degrees of freedom for the six character which were chosen for the first set of calculations (Sitting Height, Head Length, Nasal Length, Upper Facial Length, Frontal Breadth and Bizygomatic Breadth). Significant values at 5 per cent level are marked with a single star and those at 1 per cent level with two stars. There are altogether 730 tests of which 20 shows significance at 1 per cent level and 39 only at 5 per cent level. Out of 30 tests for each of the groups, Other Artisan, Basti Brahmin, Chattri, Panika, Habru and Tharu female the number of significant cases at 5 per cent level are 5, 10, 6, 8, 3 and 4 respectively with a total of 20 significant at 5 per cent and 20 at 1 per cent. As these significant values are distributed over all the pairs of characters it may be concluded that the samples (assumed to have been obtained at random) show evidence of departure from linearity. No definite decision can be reached regarding the rest of the significant values as they could have occurred by chance, especially as the expected number of significant values at 5 per cent would be more than 5 per cent of the total tests because the deviations in one character are correlated with deviations in the other character.

103. Although there exists some evidence of departures from normality in symmetry, kurtosis and linearity of regressions as well as some evidence of heteroscedasticity and heterogeneity in correlations it must be emphasized that the deviations from normality are almost always small in actual magnitude. It is justifiable, therefore, for practical purposes, to use tests and measures based on the normal theory. It is worth mentioning here that this was also found to be the case with Risley's anthropological measurements relating to the castes and tribes of Bengal.⁷

104. Six characters (SH, FB, BzB, HL, NL; UFL) were selected by inspection for the original calculations of D^2 -statistics. More detailed examination led, however, to the selection of 9 characters, for reasons explained in section 7 for actual analysis, and the number of characters was finally raised to 12. The linearity of regression lines was, however, tested for the six characters originally selected for study. In view of the fact that the regressions were found to be generally linear, and as deviations from linearity, even when significant, were small in magnitude, it was not considered necessary to repeat the tests for the remaining characters.

5. COEFFICIENTS OF VARIATION

105. The coefficients of variation given in Table 5.1 are usually less than 4 per cent in the case of Stature, Sitting Height, Head Length, Head Breadth, Frontal Breadth and Bizygomatic Breadth; less than 6 per cent for Bigonial Breadth and Total Facial Length; less than 7 per cent for Nasal Length and Upper Facial Length, and usually less than 8 per cent for Nasal Breadth and Nasal Depth.

⁷Mahalanobis, P. C. and Bose, (Mrs.) Chameli (1941): Correlation between anthropometric characters in some Bengal castes and tribes. *Sankhyā*, Vol. 5, p.p. 249-260.

TABLE 4-1. TEST FOR LINEARITY OF REGRESSION : RATIO OF VARIANCE DUE TO DEVIATION
FROM LINEAR REGRESSION TO RESIDUAL VARIANCE

name of group (0)	Sitting Height $\times$ Head Length						Sitting Height $\times$ Nasal Length						Sitting Height $\times$ Upper Face Length					
	y on x			x on y			y on x			x on y			y on x			x on y		
	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio
	(1.1)	(1.11)	(1.2)	(1.3)	(1.31)	(1.4)	(1.5)	(1.51)	(1.6)	(1.7)	(1.71)	(1.8)	(1.9)	(1.91)	(1.10)	(1.11)	(1.111)	(1.12)
1 Brahmin (Basti B ₁)	5	78	1.10	9	74	1.08	5	78	.91	5	78	1.76	5	78	2.79*	9	74	1.65
2 Brahmin (others B ₂)	6	84	2.18	11	79	.91	6	83	1.69	7	82	.72	6	84	1.91	8	82	1.09
3 Agharia (Ag)	7	98	1.35	12	93	.58	7	98	.19	7	98	.84	7	98	.60	12	93	1.25
4 Chattri (Ch)	8	129	.69	9	128	1.60	8	129	.37	9	128	.54	8	129	.28	10	127	.73
5 Muslim (M)	7	122	1.74	10	119	2.43*	7	122	.84	10	119	1.47	7	122	1.15	9	120	.84
6 Bhatu (C ₁)	6	49	.47	11	44	.65	6	49	1.84	6	49	2.27	6	49	.65	6	49	3.08*
7 Habru (C ₂)	7	62	1.66	8	61	.38	7	62	1.31	7	62	.68	7	62	1.20	10	59	.12
8 Bhil (Bh)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9 Dom (D)	9	93	.83	10	90	1.50	7	93	.23	6	94	.72	7	93	.37	9	91	.50
10 Ahir (A ₁)	4	62	1.05	8	58	.34	4	62	1.92	8	58	.44	—	—	—	—	—	—
11 Kurni (A ₂)	6	86	.74	9	83	.46	6	86	1.23	8	84	1.38	6	86	.95	8	84	.60
12 Other Artisan (A ₃)	7	163	2.69*	10	160	.79	7	163	1.91	9	161	.90	7	163	1.50	9	161	.47
13 Kahar (A ₄)	7	48	.65	10	45	.81	7	48	1.73	7	48	2.28*	7	48	1.22	8	47	.67
14 Tharu (male) (Th)	7	182	.27	8	181	.58	7	182	.31	8	181	.46	7	182	2.28**	11	178	.63
15 Chamar (Cm)	8	149	1.27	11	146	1.56	8	149	1.00	7	150	1.14	8	149	.54	10	147	1.18
16 Chero (T ₁)	6	92	.35	10	88	.53	6	91	.87	7	90	.36	6	92	.60	8	90	1.04
17 Majhi (T ₂)	8	146	2.60*	11	143	1.19	8	146	.68	6	148	1.03	8	146	.64	8	146	.98
18 Panika (T ₃)	7	148	.66	9	146	1.66	7	148	.97	8	147	2.13*	7	148	.73	9	146	3.25*
19 Kharwar (T ₄)	6	180	.87	11	175	.41	6	180	.62	9	177	.90	6	180	.69	10	176	1.03
20 Oraon (T ₅)	7	90	.65	10	87	1.20	7	90	.50	7	90	1.40	7	90	.56	10	87	.31
21 Rajwar (T ₆)	6	97	1.02	8	95	1.19	6	97	2.26*	8	95	1.72	6	97	1.19	9	94	.54
22 Korwa (T ₇)	7	90	1.01	9	88	.04	7	90	1.05	7	90	.97	7	90	.96	9	88	.68
23 Tharu (female)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* significant at 5%
** significant at 1%

N₁ = degrees of freedom due to deviation from linear regression
N₂ = residual degrees of freedom

TABLE 4:1 TEST FOR LINEARITY OF REGRESSION: RATIO OF VARIANCE DUE TO DEVIATION FROM LINEAR REGRESSION TO RESIDUAL VARIANCE (Contd.)

name of group	Sitting Height $\times$ Frontal Breadth						Sitting Height $\times$ Bigonial Breadth						Head Length $\times$ Nasal Length					
	y on x			x on y			y on x			x on y			y on x			x on y		
	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio
(0)	(6.0)	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)	(7.0)	(7.1)	(7.2)	(7.3)	(7.4)	(7.5)	(8.0)	(8.1)	(8.2)	(8.3)	(8.4)	(8.5)
1 Brahmin (Basti B ₁)	5	78	.56	9	74	.73	5	78	.50	3	70	.98	10	74	1.85	5	79	2.37*
2 Brahmin (others B ₂)	6	84	.41	10	80	2.29*	6	84	1.79	11	79	.98	11	78	.70	7	82	1.28
3 Agharia (Ag)	—	—	—	—	—	—	7	98	1.53	10	95	.93	12	93	1.24	7	98	.73
4 Chattri (Ch)	7	32	2.00	6	33	.53	8	129	1.04	12	125	.79	9	128	1.01	9	128	1.32
5 Muslim (M)	5	28	.87	6	27	1.55	7	122	1.46	10	119	1.17	10	156	.63	10	156	1.14
6 Bhatu (C ₁)	6	49	.94	8	47	1.06	6	49	.38	8	47	1.44	10	138	1.36	8	140	.60
7 Habru (C ₂)	7	162	.79	6	63	.76	7	62	.94	11	58	.96	9	113	.99	8	114	1.13
8 Bhil (Bh)	—	—	—	—	—	—	—	—	—	—	—	—	10	175	1.00	9	176	1.49
9 Dom (D)	7	93	1.21	7	93	.79	7	93	1.22	10	90	1.47	10	101	1.50	6	105	.48
10 Ahir (A ₁)	4	62	.71	6	60	1.38	4	62	1.01	8	58	.87	8	58	.61	8	58	.17
11 Kurmi (A ₂)	6	86	1.14	8	84	.68	6	86	1.08	10	82	1.27	9	83	1.05	8	84	.55
12 Other Artisan (A ₃)	7	163	.96	10	160	.74	7	163	.77	9	161	1.14	11	160	1.76	10	161	2.06*
13 Kahar (A ₄)	7	48	1.15	7	48	.49	7	48	1.79	8	47	1.32	10	45	1.39	7	48	1.80
14 Tharu (male) (Th)	7	182	1.26	8	181	.28	7	182	1.41	9	180	2.36*	8	181	1.36	8	181	1.00
15 Chamar (Cm)	8	149	.46	9	148	.93	8	149	1.43	11	146	.70	11	146	.68	7	150	.46
16 Chero (T ₁)	6	92	1.02	6	92	.89	6	92	.38	10	88	1.48	10	87	1.20	7	90	.83
17 Majhi (T ₂)	8	146	1.69	8	146	.93	8	146	.67	11	143	1.62	11	143	.96	6	148	1.80
18 Panika (T ₃)	7	148	.37	8	147	.59	7	148	.64	10	145	1.22	9	146	2.33*	8	147	2.08*
19 Kharwar (T ₄)	6	84	2.26*	8	82	1.18	6	180	.29	10	176	.65	11	184	.55	9	186	.75
20 Oraon (T ₅)	—	—	—	—	—	—	7	90	.68	10	87	1.56	10	88	.93	7	91	1.00
21 Rajwar (T ₆)	—	—	—	—	—	—	6	97	2.65*	9	94	1.35	8	95	.46	8	95	.30
22 Korwa (T ₇)	—	—	—	—	—	—	7	90	1.85	9	88	.49	9	90	1.54	8	91	.80
23 Tharu (female)	—	—	—	—	—	—	—	—	—	—	—	—	9	171	1.34	8	172	4.35**

* significant at 5%
** significant at 1%

N₁ = degrees of freedom due to deviation from linear regression
N₂ = residual degrees of freedom.

TABLE 4.1 TEST FOR LINEARITY OF REGRESSION: RATIO OF VARIANCE DUE TO DEVIATION FROM LINEAR
REGRESSION TO RESIDUAL VARIANCE (Contd.)

name of group (0)	Head Length $\times$ Upper Face Length						Head Length $\times$ Frontal Breadth						Head Length $\times$ Bigonial Breadth					
	y on x			x on y			y on x			x on y			y on x			x on y		
	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio
	(9.0)	(9.1)	(9.2)	(9.3)	(9.4)	(9.5)	(10.0)	(10.1)	(10.2)	(10.3)	(10.4)	(10.5)	(11.0)	(11.1)	(11.2)	(11.3)	(11.4)	(11.5)
1 Brahmin (Basti B ₁)	10	74	2.95**	9	75	1.75	10	74	2.51*	10	74	1.44	10	74	2.96**	13	71	1.27
2 Brahmin (others B ₂)	11	79	1.06	8	82	.47	11	79	.51	10	80	.93	11	79	.35	11	79	.63
3 Agharia (Ag)	12	93	.93	12	93	.84	—	—	—	—	—	—	12	93	.60	10	95	.83
4 Chattri (Ch)	9	128	1.32	10	127	1.03	7	32	1.53	6	33	1.19	9	128	2.58**	12	125	1.03
5 Muslim (M)	10	156	.81	10	156	2.04*	7	63	.60	7	63	.48	10	156	.55	10	156	.80
6 Bhatu (C ₁)	10	138	.75	11	137	.09	10	138	1.89	13	135	1.53	10	138	2.22*	8	140	.60
7 Habru (C ₂)	9	113	.69	10	112	.61	9	113	1.07	9	113	.87	9	113	1.39	11	111	2.10*
8 Bhil (Bh)	10	175	2.00*	10	175	.60	10	175	1.38	8	177	21.65**	10	175	1.21	11	174	.76
9 Dom (D)	10	101	1.00	9	102	.86	10	101	.69	7	104	.24	10	101	1.36	10	101	1.45
10 Ahir (A ₁)	8	58	.83	9	57	1.10	8	58	.58	6	60	.94	8	58	1.11	8	58	1.08
11 Kurmi (A ₂)	9	83	1.27	8	84	1.01	9	83	.54	8	84	1.77	9	83	1.49	10	82	1.82
12 Other Artisan (A ₃)	11	160	1.45	10	161	1.67	11	160	1.87*	10	161	1.14	11	160	1.39	10	161	1.31
13 Kahar (A ₄)	10	45	1.35	8	47	.79	10	45	1.04	7	48	3.50**	10	45	1.80	8	47	.19
14 Tharu (male) (Th)	8	181	1.08	11	178	.86	8	181	1.04	8	181	.97	8	181	1.25	9	180	.66
15 Chamar (Cm)	11	146	1.03	10	147	.69	11	146	1.49	9	148	.81	11	146	1.43	11	146	1.11
16 Chero (T ₁)	10	88	.94	8	90	.86	10	88	.66	6	92	1.05	10	88	.57	10	88	.74
17 Majhi (T ₂)	11	143	.78	8	146	1.12	11	143	.88	8	146	.27	11	143	.92	11	143	1.41
18 Panika (T ₃)	9	146	1.27	9	146	1.68	9	146	1.93	8	147	.76	9	146	1.65	10	145	1.58
19 Kharwar (T ₄)	11	184	1.09	10	185	.60	10	80	.44	8	82	1.24	11	184	1.16	10	18	1.62
20 Oraon (T ₅)	10	88	1.81	10	88	.44	—	—	—	—	—	—	10	88	1.73	10	88	1.11
21 Rajwar (T ₆)	8	95	.75	9	94	.64	—	—	—	—	—	—	8	95	1.44	9	94	.87
22 Korwa (T ₇)	9	90	1.93	8	91	1.25	—	—	—	—	—	—	9	90	1.13	10	89	.89
23 Tharu (female)	9	171	.98	11	169	1.19	9	171	2.40*	9	171	1.09	9	171	.98	11	169	.81

* significant at 5%
** significant at 1%

N₁ = degrees of freedom due to deviation from linear regression
N₂ = residual degrees of freedom

TABLE 4.1 TEST FOR LINEARITY OF REGRESSION: RATIO OF VARIANCE DUE TO DEVIATION FROM LINEAR
REGRESSION TO RESIDUAL VARIANCE (Contd.)

name of group	Nasal Length $\times$ Upper Face Length						Nasal Length $\times$ Frontal Breadth						Nasal Length $\times$ Bigonial Breadth					
	y on x			x on y			y on x			x on y			y on x			x on y		
	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio
(0)	(12.0)	(12.1)	(12.2)	(12.3)	(12.4)	(12.5)	(13.0)	(13.1)	(13.2)	(13.3)	(13.4)	(13.5)	(14.0)	(14.1)	(14.2)	(14.3)	(14.4)	(14.5)
1 Brahmin (Basti B ₁)	5	79	.84	9	75	2.86**	5	79	.94	9	75	.75	5	79	3.01*	13	71	2.34*
2 Brahmin (others B ₁)	7	82	.57	8	81	1.19	7	82	.55	10	79	1.58	7	82	.89	11	78	.77
3 Agharia (Ag)	7	98	.63	12	93	1.32	—	—	—	—	—	—	7	98	.29	10	95	.79
4 Chattri (Ch)	9	128	1.57	10	127	2.62**	5	34	3.10*	6	33	1.16	9	128	1.66	12	125	1.44
5 Muslim (M)	10	156	.12	10	156	.55	6	64	.91	7	63	3.06**	10	156	1.03	10	156	1.29
6 Bhatu (C ₁)	8	140	.82	11	137	1.02	8	140	.40	13	135	1.15	8	140	.25	8	140	.47
7 Həbru (C ₂)	8	114	.37	10	112	1.84	8	114	1.01	9	113	2.22*	8	114	.88	11	111	1.16
8 Bhil (Bh)	9	176	1.86	10	175	.38	9	176	1.26	8	177	1.28	9	176	.95	11	174	.62
9 Dom (M)	6	105	.63	9	102	1.45	6	105	.26	7	104	1.30	6	105	1.27	10	101	1.01
10 Ahir (A ₁)	8	58	1.77	9	57	2.25*	8	58	.57	6	60	2.28*	8	58	1.69	8	58	1.52
11 Kurmi (A ₂)	8	84	1.01	8	84	1.06	8	84	1.06	8	84	.60	8	84	1.11	10	82	.72
12 Other Artisan (A ₂)	10	161	5.40**	10	161	4.67**	10	161	.84	10	161	.93	10	161	.59	10	161	2.00*
13 Kahar (A ₁)	7	48	2.14	8	47	.73	7	48	2.13	7	48	.48	7	48	.86	8	47	1.80
14 Tharu (male) (Th)	8	181	.25	11	178	.34	8	181	.58	8	181	.83	8	181	.32	9	180	.75
15 Chamar (Cm)	7	150	1.96	10	147	.75	7	150	.51	9	148	.95	7	150	1.53	11	146	.37
16 Chero (T ₁)	7	90	.16	8	89	.99	7	90	1.33	6	91	.55	7	90	.46	10	87	.92
17 Majhi (T ₁)	6	148	.87	8	146	.58	6	148	.29	8	146	.76	6	148	.83	11	143	1.32
18 Panika (T ₁)	8	147	16.92**	9	146	15.57**	8	147	1.38	8	147	1.53	8	147	3.68**	10	145	2.28*
19 Kharwar (T ₁)	9	186	2.13*	10	185	.49	7	83	.71	8	82	.04	9	186	.65	10	185	.24
20 Oraon (T ₂)	7	91	1.21	10	88	1.12	—	—	—	—	—	—	7	91	.88	10	88	.76
21 Rajwar (T ₂)	8	95	.68	9	94	1.03	—	—	—	—	—	—	8	95	.78	9	94	1.43
22 Korwa (T ₁)	8	91	.42	8	91	.66	—	—	—	—	—	—	8	91	.62	10	89	1.02
23 Tharu (female)	8	172	1.13	11	169	.37	8	172	1.59	9	171	1.89	8	172	1.42	11	169	2.19*

* significant at 5%

** significant at 1%

N₁ = degrees of freedom due to deviation from linear regression

N₂ = residual degrees of freedom

TABLE 4-1 TEST FOR LINEARITY OF REGRESSION: RATIO OF VARIANCE DUE TO DEVIATION FROM LINEAR
REGRESSION TO RESIDUAL VARIANCE (Concl'd.)

name of group (0)	Upper Face Length $\times$ Frontal Breadth						Upper Face Length $\times$ Bigonial Breadth						Frontal Breadth $\times$ Bigonial Breadth					
	y on x			x on y			y on x			x on y			y on x			x on y		
	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio	N ₁	N ₂	ratio
	(15.0)	(15.1)	(15.2)	(15.3)	(15.4)	(15.5)	(16.0)	(16.1)	(16.2)	(16.3)	(16.4)	(16.5)	(17.0)	(17.1)	(17.2)	(17.3)	(17.4)	(17.5)
1 Brahmin (Basti B ₁)	9	75	1.00	9	75	1.69	9	75	3.05**	13	71	1.59	9	75	2.82**	13	71	1.61
2 Brahmin (others B ₂)	8	82	.85	10	80	1.30	8	82	.36	11	79	.74	10	80	1.32	11	79	1.42
3 Agharia (Ag)	—	—	—	—	—	—	12	93	1.01	10	95	2.17*	—	—	—	—	—	—
4 Chattri (Ch)	7	32	1.21	6	33	3.17	10	127	1.22	12	125	.40	6	33	.59	10	29	2.61*
5 Muslim (M)	7	63	1.41	7	63	1.77	10	156	1.07	10	156	.66	7	63	1.49	9	61	.61
6 Bhatu (C ₁)	11	137	1.13	13	135	.81	11	137	.94	8	140	.75	13	135	1.18	8	140	1.70
7 Habru (C ₂)	10	112	2.82**	9	113	1.69	10	112	.59	11	111	.53	9	113	1.34	11	111	.97
8 Bhil (Bh)	10	175	.66	8	177	.73	10	175	.79	11	174	1.05	8	177	.51	11	174	.41
9 Dom (D)	9	102	.53	7	104	1.82	9	102	.76	10	101	1.26	7	104	.46	10	101	1.85
10 Ahir (A ₁)	9	57	.93	6	60	3.37**	9	57	.56	8	58	1.17	6	60	2.00	8	58	1.37
11 Kurmi (A ₂)	8	84	1.21	8	84	.70	8	84	.77	10	82	1.22	8	84	.88	10	82	1.34
12 Other Artisan (A ₃)	10	161	.39	10	161	.63	10	161	.79	10	161	1.76	10	161	.59	10	161	1.02
13 Kahar (A ₄)	8	47	.45	7	48	.60	8	47	1.09	8	47	1.24	7	48	2.16	8	47	2.41*
14 Tharu (male) (Th)	11	178	.63	8	181	1.03	11	178	.37	9	180	.26	8	181	.12	9	180	.53
15 Chamar (Cm)	10	147	1.52	9	148	1.25	10	147	1.87	11	146	.48	9	148	.78	11	146	1.12
16 Chero (T ₁)	8	90	.66	6	92	.26	8	90	.40	10	88	1.49	6	92	.59	10	88	1.59
17 Majhi (T ₂)	8	148	1.21	8	146	1.59	8	146	.69	11	143	1.23	8	146	.22	11	143	2.15*
18 Panika (T ₃)	9	146	.72	8	147	1.32	9	146	.31	10	145	1.64	8	147	1.12	10	145	1.26
19 Kharwar (T ₄)	9	81	.62	8	82	.82	10	185	.60	10	185	.63	8	82	2.31*	9	81	1.10
20 Oraon (T ₅)	—	—	—	—	—	—	10	88	.36	10	88	.78	—	—	—	—	—	—
21 Rajwar (T ₆)	—	—	—	—	—	—	9	94	.83	9	94	1.17	—	—	—	—	—	—
22 Korwa (T ₇)	—	—	—	—	—	—	8	91	.40	10	89	.58	—	—	—	—	—	—
23 Tharu (female)	11	169	1.42	9	171	1.55	11	169	.95	11	169	2.95**	9	171	1.63	11	169	.92

* significant at 5%
** significant at 1%

N₁ = degrees of freedom due to deviation from linear regression
N₂ = residual degrees of freedom

TABLE 5.1 VALUES OF COEFFICIENTS OF VARIATION WITH STANDARD ERRORS BY GROUPS AND CHARACTERS

name of group	Frontal Breadth			Bizygomatic Breadth			Nasal Length			Head Length			Upper Face Length			Sitting Height		
	N	C.V. $\pm$ S.E.		N	C.V. $\pm$ S.E.		N	C.V. $\pm$ S.E.		N	C.V. $\pm$ S.E.		N	C.V. $\pm$ S.E.		N	C.V. $\pm$ S.E.	
(0)	(1.1)	(1.2)	(1.21)	(2.1)	(2.2)	(2.21)	(3.1)	(3.2)	(3.21)	(4.1)	(4.2)	(4.21)	(5.1)	(5.2)	(5.21)	(6.1)	(6.2)	(6.21)
1. Brahmin (Basti B ₁)	86	3.77	$\pm$.306	86	4.91	$\pm$.382	86	5.68	$\pm$.459	86	3.39	$\pm$.229	86	6.38	$\pm$.459	85	3.11	$\pm$.230
2. Brahmin (others B ₂)	92	4.61	$\pm$.370	92	3.87	$\pm$.295	91	6.46	$\pm$.446	92	3.78	$\pm$.295	92	6.16	$\pm$.444	92	3.30	$\pm$.221
3. Agharia (Ag)	—	—	—	107	3.42	$\pm$.205	107	6.61	$\pm$.481	107	4.08	$\pm$.274	107	7.46	$\pm$.481	107	3.79	$\pm$.274
4. Chattri (Ch)	139	3.81	$\pm$.454	139	4.37	$\pm$.240	137	6.65	$\pm$.402	139	3.44	$\pm$.180	139	5.90	$\pm$.361	139	5.30	$\pm$.301
5. Muslim (M)	72	3.58	$\pm$.334	168	3.46	$\pm$.164	168	7.19	$\pm$.384	167	3.19	$\pm$.164	168	6.21	$\pm$.328	131	4.45	$\pm$.248
6. Bhatu (C ₁)	150	5.77	$\pm$.348	150	3.35	$\pm$.173	150	6.69	$\pm$.406	148	3.73	$\pm$.233	150	6.29	$\pm$.348	57	3.16	$\pm$.281
7. Habru (C ₂)	124	4.58	$\pm$.318	124	4.45	$\pm$.254	124	6.16	$\pm$.382	124	3.23	$\pm$.191	124	6.09	$\pm$.382	71	3.89	$\pm$.336
8. Bhil (Bh)	187	3.84	$\pm$.207	186	3.41	$\pm$.156	187	6.77	$\pm$.364	187	3.23	$\pm$.155	187	7.18	$\pm$.364	—	—	—
9. Dom (D)	113	3.55	$\pm$.267	113	3.54	$\pm$.266	113	6.12	$\pm$.401	113	3.25	$\pm$.200	113	6.46	$\pm$.401	112	3.58	$\pm$.281
10. Ahir (A ₁)	68	3.22	$\pm$.258	68	3.18	$\pm$.258	68	7.65	$\pm$.690	68	3.25	$\pm$.258	68	6.87	$\pm$.603	68	3.09	$\pm$.258
11. Kurmi (A ₂)	94	3.22	$\pm$.219	94	3.42	$\pm$.219	94	7.16	$\pm$.513	94	3.42	$\pm$.219	94	6.69	$\pm$.513	94	3.55	$\pm$.292
12. Other Artisan (A ₃)	173	3.74	$\pm$.215	173	3.54	$\pm$.215	173	7.59	$\pm$.433	173	3.87	$\pm$.215	172	6.38	$\pm$.325	172	3.78	$\pm$.216
13. Kahar (A ₄)	57	3.65	$\pm$.379	57	3.36	$\pm$.281	57	7.78	$\pm$.754	57	3.64	$\pm$.375	57	6.81	$\pm$.659	57	3.87	$\pm$.375
14. Tharu (male) (Th)	191	3.43	$\pm$.154	191	3.37	$\pm$.154	191	7.04	$\pm$.360	191	3.08	$\pm$.154	191	7.05	$\pm$.360	191	3.59	$\pm$.205
15. Chamar (Cm)	159	3.58	$\pm$.225	159	3.70	$\pm$.225	159	6.05	$\pm$.338	159	3.44	$\pm$.168	158	6.03	$\pm$.339	159	4.64	$\pm$.281
16. Chero (T ₁)	100	3.29	$\pm$.212	100	3.30	$\pm$.212	99	6.85	$\pm$.500	100	3.46	$\pm$.212	100	6.59	$\pm$.497	100	3.56	$\pm$.283
17. Majhi (T ₂)	155	3.26	$\pm$.171	155	3.85	$\pm$.228	156	6.39	$\pm$.341	156	3.62	$\pm$.227	156	6.37	$\pm$.341	156	4.26	$\pm$.327
18. Panika (T ₃)	158	3.48	$\pm$.169	158	3.48	$\pm$.169	157	7.31	$\pm$.397	158	3.25	$\pm$.169	157	6.61	$\pm$.397	157	3.92	$\pm$.226
19. Kharwar (T ₄)	92	3.50	$\pm$.295	197	3.25	$\pm$.151	197	6.87	$\pm$.354	197	3.49	$\pm$.151	197	7.31	$\pm$.354	188	3.62	$\pm$.207
20. Oraon (T ₅)	—	—	—	100	3.69	$\pm$.283	100	6.98	$\pm$.497	100	3.20	$\pm$.212	100	6.80	$\pm$.497	99	3.86	$\pm$.285
21. Rajwar (T ₆)	—	—	—	105	3.05	$\pm$.207	105	7.27	$\pm$.485	105	3.26	$\pm$.207	105	6.61	$\pm$.485	105	3.33	$\pm$.207
22. Korwa (T ₇)	—	—	—	101	3.29	$\pm$.211	101	7.16	$\pm$.495	101	3.04	$\pm$.211	100	6.72	$\pm$.497	98	3.67	$\pm$.286
23. Tharu (female)	182	3.69	$\pm$.210	182	3.50	$\pm$.210	182	7.14	$\pm$.369	182	3.11	$\pm$.157	182	7.44	$\pm$.369	—	—	—

TABLE 5.1. VALUES OF COEFFICIENTS OF VARIATION WITH STANDARD ERRORS BY GROUPS AND CHARACTERS (Concl'd.)

name of group	Stature			Bignonial Breadth			Head Breadth			Nasal Breadth			Nasal Depth			Total Face Length		
	N	c.v	± s.e	N	c.v	± s.e	N	c.v	± s.e	N	c.v	± s.e	N	c.v	± s.e	N	c.v	± s.e
(0)	(7.1)	(7.2)	(7.3)	(8.1)	(8.2)	(8.3)	(9.1)	(9.2)	(9.3)	(10.1)	(10.2)	(10.3)	(11.1)	(11.2)	(11.3)	(12.1)	(12.2)	(12.3)
1. Brahmin (Basti B ₁)	85	3.09±	.230	86	5.38±	.382	86	3.67±	.306	85	7.45±	.540	86	6.61±	.536	86	5.52±	.459
2. Brahmin (others B ₂)	92	3.49±	.221	92	5.04±	.370	92	3.37±	.221	90	6.55±	.524	91	7.02±	.521	92	5.91±	.444
3. Agharia (Ag)	107	3.45±	.205	107	5.86±	.412	107	3.46±	.205	107	6.46±	.412	107	9.18±	.620	107	5.29±	.343
4. Chattri (Ch)	139	3.48±	.180	136	5.07±	.304	139	3.62±	.240	137	6.90±	.417	139	6.49±	.361	139	5.06±	.301
5. Muslim (M)	168	3.64±	.219	168	5.11±	.274	168	3.22±	.164	168	7.46±	.384	168	7.74±	.439	167	5.06±	.274
6. Bhatu (C ₁)	149	3.98±	.232	150	4.47±	.231	150	3.13±	.173	150	7.46±	.406	150	8.45±	.465	149	5.06±	.290
7. Habru (C ₂)	124	4.66±	.318	124	4.42±	.254	123	3.51±	.255	124	6.85±	.447	124	7.95±	.511	124	5.80±	.382
8. Bhil (Bh)	186	3.36±	.156	187	5.19±	.259	186	3.12±	.156	187	6.42±	.311	186	7.24±	.365	187	5.94±	.311
9. Dom (D)	113	3.64±	.266	113	5.07±	.333	113	3.14±	.200	113	8.34±	.536	112	7.43±	.470	112	4.85±	.335
10. Ahir (A ₁)	67	3.12±	.259	68	4.66±	.430	67	2.97±	.259	68	6.44±	.516	68	8.05±	.690	68	5.63±	.516
11. Kurmi (A ₂)	94	3.30±	.219	94	5.71±	.439	94	3.19±	.219	94	6.45±	.439	94	7.13±	.513	94	5.56±	.439
12. Others Artisan (A ₃)	172	3.44±	.162	173	5.65±	.324	173	3.36±	.161	173	7.53±	.433	171	8.00±	.435	173	5.64±	.324
13. Kahar (A ₄)	57	3.77±	.375	57	5.69±	.564	57	3.44±	.281	57	6.18±	.564	57	7.76±	.754	57	5.28±	.470
14. Tharu (male) (Th)	191	3.19±	.154	191	4.65±	.257	191	3.42±	.154	191	6.30±	.308	191	7.37±	.360	191	4.98±	.257
15. Chamar (Cm)	158	3.43±	.169	159	5.18±	.281	159	3.15±	.168	159	6.29±	.338	159	6.78±	.395	158	5.27±	.282
16. Chero (T ₁)	100	3.29±	.212	100	4.61±	.354	100	3.29±	.212	100	6.53±	.497	100	6.92±	.497	100	5.34±	.354
17. Majhi (T ₂)	153	3.63±	.209	155	5.76±	.342	155	3.47±	.171	156	6.67±	.398	156	7.09±	.398	156	5.42±	.284
18. Panika (T ₃)	156	3.30±	.170	158	4.95±	.282	158	3.33±	.169	137	6.84±	.397	157	7.93±	.454	156	5.62±	.318
19. Kharwar (T ₄)	197	3.46±	.151	197	4.95±	.233	196	3.35±	.152	197	7.37±	.354	197	6.65±	.354	197	5.21±	.252
20. Oraon (T ₅)	99	3.72±	.288	100	4.97±	.354	100	2.97±	.212	100	6.99±	.497	100	7.68±	.569	100	5.78±	.426
21. Rajwar (T ₆)	105	3.46±	.207	105	4.85±	.346	105	2.66±	.207	105	7.27±	.485	105	7.26±	.485	105	5.07±	.346
22. Korwa (T ₇)	101	3.20±	.211	101	4.65±	.353	101	2.79±	.211	101	8.00±	.566	101	7.21±	.495	101	4.71±	.353
23. Tharu (female)	181	3.84±	.211	181	5.20±	.263	182	3.33±	.157	182	5.84±	.316	182	8.04±	.422	182	5.40±	.263

CHAPTER 6. CASTE AND TRIBAL DIFFERENCES

6. MEASURES OF GROUP DIVERGENCE

106. *Mean values.* The observed mean values with corresponding standard errors and sizes of samples are given in Table 6.1 for each group (caste or tribe) and each character separately. The likeness or divergence in physical appearance has to be judged primarily on the basis of these mean values. For any two groups, if the mean values are nearly the same then the physical appearance, on an average, would also be much the same. On the other hand, if differences between corresponding mean values are large then the physical appearance also must differ quite widely. The first thing to be done is to set up a convenient measure of the generalized divergence.

107. Consider k populations with mean values of p characters

$$m_{11}, m_{12}, \dots, m_{1k}; m_{21}, m_{22}, \dots, m_{2k}; \dots; m_{p1}, m_{p2}, \dots, m_{pk}$$

where m_{ij} is the mean value of the i -th character for the j -th group. Let α_{ij} be the covariance between the i -th and j -th characters when $i \neq j$ and the variance of the i -th character when $i = j$. The divergence coefficient is necessarily built out of the components which do not satisfy the equalities

$$m_{i1} = m_{i2} = \dots = m_{ik}$$

for $i = 1, 2, \dots, p$. With proper adjustments for the variances and covariances of the various characters one can construct the quantity

$$V_p = \Sigma \Sigma \alpha^{ij} \beta_{ij}$$

where α^{ij} is the co-factor of α_{ij} in the determinant $|\alpha_{ij}|$ divided by the value of the determinant, and

$$\beta_{ij} = \frac{\Sigma_r (m_{ir} - \bar{m}_i)(m_{jr} - \bar{m}_j)}{r} \text{ where } \bar{m}_i = \frac{\Sigma_r m_{ir}}{k}.$$

This measure is called the *Generalized Variance* of populations with respect to the given p characters, and is written as V_p . This is a perfectly general expression which can be used to measure the divergence of any number of groups describable by a given number of characteristics provided the groups are homogeneous with respect to internal variances and covariances of the several characters.

7. CHOICE OF CHARACTERS

108. The generalized variance may be defined with respect to a permanent panel of characters selected for reasons of an anthropological nature. They may be chosen, for example, to verify or to reject any existing theory regarding the variation of specified characters from group to group and to determine the anthropological status of each group in relation to others.

TABLE 6.1. MEAN VALUES WITH STANDARD ERRORS BY GROUPS AND CHARACTERES

name of group	Frontal Breadth			Bizygomatic Breadth			Nasal Length			Head Length			Upper Face Length			Sitting Height		
	N mean $\pm$ s.e			N mean $\pm$ s.e			N mean $\pm$ s.e			N mean $\pm$ s.e			N mean $\pm$ s.e			N mean $\pm$ s.e		
	(1.1)	(1.2)	(1.21)	(2.1)	(2.2)	(2.21)	(3.1)	(3.2)	(3.21)	(4.1)	(4.2)	(4.21)	(5.1)	(5.2)	(5.21)	(6.1)	(6.2)	(6.21)
1 Brahmin (Basti B ₁)	86	104.74 $\pm$.426		86	133.36 $\pm$.706		86	51.24 $\pm$.314		86	191.92 $\pm$.702		86	66.16 $\pm$.455		85	86.43 $\pm$.292	
2 Brahmin (others B ₂)	92	104.46 $\pm$.502		92	132.68 $\pm$.536		91	50.40 $\pm$.342		92	191.35 $\pm$.754		92	65.26 $\pm$.419		92	86.25 $\pm$.296	
3 Agharia (Ag)	—	—	—	107	131.90 $\pm$.436		107	49.50 $\pm$.316		107	191.02 $\pm$.754		107	64.06 $\pm$.462		107	84.03 $\pm$.307	
4 Chattri (Ch)	139	103.98 $\pm$.635		139	131.70 $\pm$.488		137	52.72 $\pm$.300		139	192.58 $\pm$.562		139	64.66 $\pm$.324		139	82.25 $\pm$.370	
5 Muslim (M)	72	103.28 $\pm$.436		168	131.52 $\pm$.352		168	51.38 $\pm$.285		167	190.78 $\pm$.471		168	64.24 $\pm$.308		131	81.83 $\pm$.318	
6 Bhatu (C ₁)	150	99.34 $\pm$.468		150	133.55 $\pm$.366		150	52.06 $\pm$.284		148	186.10 $\pm$.570		150	65.94 $\pm$.339		57	84.40 $\pm$.354	
7 Habru (C ₂)	124	100.18 $\pm$.411		124	131.16 $\pm$.524		124	50.30 $\pm$.278		124	186.94 $\pm$.542		124	64.64 $\pm$.354		71	85.55 $\pm$.394	
8 Bhil (Bh)	187	103.36 $\pm$.290		186	131.18 $\pm$.328		187	48.60 $\pm$.241		187	181.87 $\pm$.430		187	62.18 $\pm$.327		—	—	—
9 Dom (D)	113	104.16 $\pm$.348		113	132.64 $\pm$.442		113	50.34 $\pm$.290		113	186.40 $\pm$.570		113	66.20 $\pm$.402		102	84.19 $\pm$.298	
10 Ahir (A ₁)	68	102.76 $\pm$.401		68	131.70 $\pm$.508		68	48.98 $\pm$.455		68	187.45 $\pm$.738		68	62.80 $\pm$.523		68	84.35 $\pm$.315	
11 Kurmi (A ₂)	94	102.62 $\pm$.340		94	131.82 $\pm$.465		94	49.22 $\pm$.364		94	188.86 $\pm$.665		94	64.32 $\pm$.444		94	83.41 $\pm$.305	
12 Other Artisan (A ₃)	173	102.44 $\pm$.291		173	131.30 $\pm$.354		173	48.72 $\pm$.281		173	187.69 $\pm$.509		172	63.40 $\pm$.309		172	83.09 $\pm$.239	
13 Kahar (A ₄)	56	101.68 $\pm$.496		57	130.70 $\pm$.582		57	48.62 $\pm$.501		57	188.83 $\pm$.910		57	62.30 $\pm$.562		57	81.47 $\pm$.418	
14 Tharu (male) (Th)	191	100.00 $\pm$.248		191	131.68 $\pm$.321		191	49.94 $\pm$.254		191	187.78 $\pm$.418		191	63.90 $\pm$.306		191	83.57 $\pm$.217	
15 Chamar (Cm)	159	102.62 $\pm$.291		159	130.28 $\pm$.382		159	48.50 $\pm$.234		159	186.85 $\pm$.509		158	62.64 $\pm$.301		159	80.39 $\pm$.296	
16 Chero (T ₁)	100	101.40 $\pm$.333		100	130.00 $\pm$.430		99	47.88 $\pm$.330		100	187.09 $\pm$.648		100	62.82 $\pm$.414		100	79.67 $\pm$.284	
17 Majhi (T ₂)	155	102.56 $\pm$.268		155	131.34 $\pm$.406		156	46.70 $\pm$.239		156	187.12 $\pm$.543		156	60.68 $\pm$.310		156	79.89 $\pm$.272	
18 Panika (T ₃)	158	102.14 $\pm$.283		158	130.44 $\pm$.361		157	47.22 $\pm$.276		158	186.34 $\pm$.481		157	61.66 $\pm$.325		157	78.71 $\pm$.246	
19 Kharwar (T ₄)	92	102.34 $\pm$.374		197	131.22 $\pm$.304		197	48.34 $\pm$.236		197	185.92 $\pm$.462		197	63.16 $\pm$.329		188	80.31 $\pm$.212	
20 Oraon (T ₅)	—	— — —		100	130.14 $\pm$.481		100	47.54 $\pm$.332		100	189.43 $\pm$.606		100	61.58 $\pm$.419		99	81.01 $\pm$.315	
21 Rajwar (T ₆)	—	— — —		105	129.48 $\pm$.386		105	48.12 $\pm$.342		105	186.73 $\pm$.595		105	62.72 $\pm$.405		105	81.25 $\pm$.264	
22 Korwa (T ₇)	—	— — —		101	130.34 $\pm$.427		101	46.72 $\pm$.333		101	187.48 $\pm$.567		100	60.48 $\pm$.407		98	81.16 $\pm$.301	
23 Tharu (female)	182	97.22 $\pm$.266		182	125.46 $\pm$.325		182	46.00 $\pm$.244		182	180.97 $\pm$.417		182	59.04 $\pm$.325		—	— — —	

TABLE 6.1. MEAN VALUES WITH STANDARD ERRORS BY GROUPS AND CHARACTER (Concl'd.)

name of group	Stature			Bigonal Breadth			Head Breadth			Nasal Breadth			Nasal Depth			Total Face Length		
	N	mean $\pm$ s.e		N	mean $\pm$ s.e		N	mean $\pm$ s.e		N	mean $\pm$ s.e		N	mean $\pm$ s.e		N	mean $\pm$ s.e	
	(7.1)	(7.2)	(7.21)	(8.1)	(8.2)	(8.21)	(9.1)	(9.2)	(9.21)	(10.1)	(10.2)	(10.21)	(11.1)	(11.2)	(11.21)	(12.1)	(12.2)	(12.21)
(0)																		
1 Brahmin (Basti B.)	85	164.51	$\pm .551$	86	100.49	$\pm .583$	86	139.88	$\pm .553$	85	36.55	$\pm .295$	86	25.49	$\pm .182$	86	118.30	$\pm .704$
2 Brahmin (others B.)	92	165.07	$\pm .600$	92	100.13	$\pm .525$	92	139.50	$\pm .491$	90	36.13	$\pm .250$	91	24.74	$\pm .182$	92	116.26	$\pm .716$
3 Agharia (Ag)	107	167.47	$\pm .558$	107	98.03	$\pm .555$	107	140.04	$\pm .469$	107	35.87	$\pm .224$	107	23.63	$\pm .210$	107	115.64	$\pm .591$
4 Chattri (Ch)	139	163.33	$\pm .482$	136	99.74	$\pm .433$	139	138.72	$\pm .427$	137	35.64	$\pm .210$	139	24.73	$\pm .136$	139	117.80	$\pm .505$
5 Muslim (M)	168	162.45	$\pm .456$	168	100.13	$\pm .395$	168	137.40	$\pm .342$	168	36.36	$\pm .209$	168	24.49	$\pm .147$	167	117.02	$\pm .458$
6 Bhatu (C.)	149	163.38	$\pm .532$	150	100.49	$\pm .367$	150	138.58	$\pm .354$	150	35.65	$\pm .217$	150	25.09	$\pm .173$	149	117.48	$\pm .487$
7 Habru (C.)	124	164.91	$\pm .690$	124	100.55	$\pm .399$	123	137.40	$\pm .435$	124	35.82	$\pm .220$	124	24.19	$\pm .172$	124	115.02	$\pm .600$
8 Bhil (Bh)	186	162.92	$\pm .402$	187	98.42	$\pm .374$	186	137.62	$\pm .314$	187	37.49	$\pm .176$	186	24.05	$\pm .128$	187	112.22	$\pm .487$
9 Dom (D)	113	166.53	$\pm .571$	113	99.95	$\pm .477$	113	137.52	$\pm .406$	113	38.11	$\pm .299$	112	25.33	$\pm .178$	112	120.18	$\pm .551$
10 Ahir (A ₁)	67	161.37	$\pm .614$	68	98.84	$\pm .558$	67	138.12	$\pm .502$	68	35.60	$\pm .278$	68	24.29	$\pm .238$	68	114.36	$\pm .781$
11 Kurmi (A ₂)	94	161.35	$\pm .549$	94	98.96	$\pm .584$	94	137.86	$\pm .454$	94	36.21	$\pm .241$	94	24.03	$\pm .176$	94	115.80	$\pm .664$
12 Other Artisan (A ₃)	172	161.34	$\pm .424$	173	99.20	$\pm .426$	173	136.84	$\pm .350$	173	36.27	$\pm .208$	171	23.73	$\pm .145$	173	115.24	$\pm .494$
13 Kahar (A ₄)	57	160.53	$\pm .812$	57	99.68	$\pm .751$	57	136.28	$\pm .621$	57	36.61	$\pm .295$	57	23.84	$\pm .245$	57	114.62	$\pm .801$
14 Tharu (male) (Th)	191	163.33	$\pm .377$	191	100.01	$\pm .336$	191	135.90	$\pm .336$	191	37.90	$\pm .173$	191	21.72	$\pm .116$	191	113.60	$\pm .409$
15 Chamar (Cm)	158	161.88	$\pm .439$	159	97.43	$\pm .400$	159	136.40	$\pm .340$	159	36.35	$\pm .182$	159	23.27	$\pm .125$	158	113.00	$\pm .474$
16 Chero (T ₁)	100	162.03	$\pm .534$	100	99.77	$\pm .460$	100	135.48	$\pm .445$	100	38.88	$\pm .254$	100	22.64	$\pm .157$	100	114.70	$\pm .612$
17 Majhi (T ₂)	153	162.96	$\pm .482$	155	99.35	$\pm .460$	155	135.92	$\pm .378$	156	39.24	$\pm .210$	156	22.37	$\pm .127$	156	112.86	$\pm .490$
18 Panika (T ₃)	156	159.76	$\pm .423$	158	97.64	$\pm .384$	158	135.10	$\pm .358$	157	38.05	$\pm .208$	157	22.40	$\pm .142$	156	112.96	$\pm .508$
19 Kharwar (T ₄)	197	160.79	$\pm .396$	197	98.57	$\pm .348$	196	136.74	$\pm .327$	197	38.47	$\pm .202$	197	22.19	$\pm .105$	197	114.16	$\pm .424$
20 Oraon (T ₅)	99	161.45	$\pm .603$	100	97.70	$\pm .485$	100	136.86	$\pm .407$	100	37.66	$\pm .263$	100	20.60	$\pm .158$	100	113.38	$\pm .655$
21 Rajwar (T ₆)	105	159.71	$\pm .540$	105	97.10	$\pm .460$	105	137.16	$\pm .356$	105	35.41	$\pm .252$	105	21.10	$\pm .149$	105	114.22	$\pm .465$
22 Korwa (T ₇)	101	158.17	$\pm .504$	101	97.49	$\pm .451$	101	134.62	$\pm .374$	101	39.78	$\pm .316$	101	21.44	$\pm .153$	101	111.28	$\pm .522$
23 Tharu (female)	181	151.13	$\pm .431$	181	93.05	$\pm .360$	182	131.42	$\pm .325$	182	35.62	$\pm .154$	182	19.34	$\pm .115$	182	105.32	$\pm .422$

109. An important object of biometric work and particularly of physical anthropology is the classification of different populations into various anthropological groups, a problem which, in abstract theory, may require the consideration of a large number of characters. But actual biometric studies have shown that stable judgements can be often reached even with the use of a comparatively small number of characters. This raises the question of determining an efficient set of a *fixed number* of characters, and investigating the effect of increasing the number of characters. The characters can be selected in such a way that the generalized variance is made a maximum over sets of p characters. The relative gain in using $(p+1)$ characters over p characters can be then measured conveniently by the ratio of the maximum (or average) value of V_{p+1} (the generalized variance for $p+1$ characters) to the maximum (or average) value of V_p (the generalized variance for p characters).

110. A preliminary examination of mean values indicates that the groups Chero, Majhi, Panika, Kharwar, Oraon, Rajwar, and Korwa are sharply differentiated from the rest. These 7 samples may be considered to form the Tribal cluster. (Tharu female occupies a distinct position and need not be considered further). The remaining samples may be called the caste or non-tribal cluster. The aim of further analysis is to find the internal patterning of these two clusters. The selection of characters must therefore have reference to the set (tribal or caste) within which discrimination is sought to be maximized. If $V_p^{(1)}$ and $V_p^{(2)}$ denote the generalized variance arising from the first (tribal) and the second (non-tribal) groups then a set of p characters can be selected so as to maximise $V_p^{(1)} + V_p^{(2)}$. If all the castes and tribes are to be discriminated by the same panel of characters, then this method would supply the appropriate solution. For best discrimination within each group, the panel must be chosen so as to maximise either $V_p^{(1)}$ or $V_p^{(2)}$ separately.

111. The best set of one or two discriminating characters can be chosen from Tables 7.1 and 7.2. From Table 7.1 we find that SH is the best discriminating single character for the non-tribal groups, and other useful characters are HL, NL, St and FB in order of importance. In the case of tribal, NB is the best and SH, FB and NL are next in order of importance. There is no single character which maximises V_1 for tribal as well as for non-tribal groups. If we are guided by the principle of maximising $V_1^{(1)} + V_1^{(2)}$ then SH comes out as the best. From the last column, we find that for tribal and non-tribal groups taken together ND gives the maximum discrimination. But individual divergences for this character for the tribal and non-tribal groups are not of the same order so that this character is best suited to distinguish the tribal from non-tribal samples. Bigonial Breadth (BgB), as can be seen from Table 7.1, has the lowest value of the generalized variance. It is also fairly highly correlated with BzB ($r = 0.4360$). It seems, therefore, quite safe to reject BgB.

112. With the addition of each new character, the increase in the measure of the generalized divergence decreases. Combinations with high interracial correlations would give proportionately smaller increments. From the Tables (7.1) and (7.2) it

TABLE 7.1 VALUES OF GENERALIZED VARIANCES FOR DETERMINING THE BEST SINGLE CHARACTER.

	castes	tribes	castes and tribes	
			separately (1) + (2) = (3)	jointly (4)
	(1)	(2)	(3)	(4)
SH	·2405	·1603	·4008	·4598
NB	·0820	·2575	·3395	·2481
ND	·1216	·2100	·3316	·6309
FB	·1254	·1051	·2305	·1406
NL	·1573	·0716	·2289	·2169
HL	·1878	·0221	·2090	·1311
St	·1282	·0670	·1952	·1468
UFL	·0978	·0661	·1639	·1474
TFL	·1003	·0237	·1320	·1176
BzB	·0881	·0440	·1321	·0906
HB	·0831	·0317	·1148	·1024
BgB	·0234	·0428	·0662	·0476

TABLE 7.2 VALUES OF GENERALIZED VARIANCES FOR DETERMINING THE BEST TWO CHARACTERS

FB, SH	·4642	·3512	·8154	·6193
NB, SH	·3270	·4572	·7842	·7034
NB, ND	·1982	·4671	·6653	·9368
NL, SH	·3544	·2221	·5765	·6220
HL, SH	·3748	·1880	·5628	·5928
St, SH	·2451	·3306	·5757	·6214

appears that the characters SH, FB, HL, NL, NB, and ND are useful for the discrimination of all the groups. To these may be added St and HB which are standard measurements used for discrimination. Mean values of FB are missing for 4 of the 22 groups; for the purpose of comparing all the 22 groups, it has been replaced by BzB, a character which is appreciably correlated ($r = .4930$) with FB and for which the mean values are available for all the groups. In some cases where the mean values of both the measurements FB and BzB are available, the 9 characters used for comparison are HL, HB, FB, BzB, NL, NB, ND, St, and SH. Finally all the available 12 characters (including UFL, BgB and TFL) have been used to test the adequacy of the 9 chosen characters for classification purposes.

8. VALUES OF THE GENERALIZED DISTANCE

113. The square of the generalized distance D^2 between two groups as estimated with respect to p characters is

$$D^2 = \sum_{i=1}^p \sum_{j=1}^p s^{ij} d_i d_j$$

where (s^{ij}) is the matrix inverse to the pooled dispersion matrix (s_{ij}) and d_i is the difference in mean values for the i -th character. This formula is not useful in practice as the calculation of the inverse matrix and the further computation of the quadratic form in the differences of mean values become extremely labourious when the number of characters exceeds 4 or 5. If the characters had been independent then the formula for D^2 would be simply the sum of squares of differences in mean values for the various characters. But when the characters are correlated, as is usually the case with biological populations, they may be replaced by a set of *transformed characters* which are linear functions of the observed characters and are mutually uncorrelated. When once these transformed characters are obtained, the calculation of D^2 reduces to finding the simple sum of squares.

114. A very simple method of constructing the transformed characters is explained in Appendix 5. If $x_1, \dots, x_q$ are the values of the original characters in standard deviation units then the transformed characters $y_1, \dots, y_q$ with unit variances are defined by

$$y_1 = x_1$$

$$y_2 = a_{21}x_1 + a_{22}x_2$$

$$\dots \quad \dots$$

$$y_q = a_{q1}x_1 + \dots + a_{qq}x_q$$

The advantages in obtaining such a system of uncorrelated variables by a proper choice of the coefficients are two fold. The first is that D^2 can be calculated as a simple sum of squares. The second is that the sum of squares arising out of r of the variables $y_1, \dots, y_r (r < p)$ gives the D^2 with respect to the r original characters $x_1, \dots, x_r$, so that the increase in D^2 by the addition of the characters $x_{r+1}, \dots, x_q$ can be simply measured by the sum of squares corresponding to $y_{r+1}, \dots, y_q$. The amount contributed by these additional characters enables one to judge their importance in the problem of classification. In the present case the transformed characters $y_1, y_1, \dots, y_9$ obtained by the method explained in Appendix 5 are listed below. The original characters expressed in standard deviation units are written in lower case. Thus (hl) stands for (HL) expressed in standard deviation units for Head Length.

$y_1 = Y_1 = \text{hl}$	
.980162 $y_2 = Y_2 = \text{hb}$	— .198200 Y_1
.822702 $y_3 = Y_3 = \text{bzb}$	— .505209 Y_2 — .279200 Y_1
.970893 $y_4 = Y_4 = \text{nl}$	— .097610 Y_3 — .144326 Y_2 — .175800 Y_1
.953943 $y_5 = Y_5 = \text{nb}$	+ .023239 Y_4 — .246667 Y_3
	— .107261 Y_2 — .193000 Y_1
.944814 $y_6 = Y_6 = \text{nd}$	— .069643 Y_5 — .258066 Y_4
	— .094404 Y_3 — .104439 Y_2 — .153700 Y_1
.924222 $y_7 = Y_7 = \text{st}$	— .084080 Y_6 — .045612 Y_5 — .122926 Y_4
	— .211917 Y_3 — .144918 Y_2 — .269800 Y_1
.788187 $y_8 = Y_8 = \text{sh}$	— .507938 Y_7 — .115274 Y_6 — .018904 Y_5
	— .141858 Y_4 — .217927 Y_3 — .160669 Y_2 — .265100 Y_1
.826753 $y_9 = Y_9 = \text{fb}$	— .162016 Y_8 — .054612 Y_7 — .027845 Y_6
	— .044106 Y_5 + .006423 Y_4 — .335334 Y_3
	— .417533 Y_2 — .227000 Y_1

115. The normalised mean values (expressed in standard deviation units and adjusted to add up to zero) of the actual characters are given in Table (8.1) and the corresponding transformed variates $y_1, \dots, y_8$ are given in Table (8.11). Automatic check is provided in the calculations of the y 's as each column in Table (8.11) adds up to zero.

116. The actual value of D^2 between any two groups, based on the 8 characters HL, HB, BzB, NL, NB, ND, St, SH, is obtained by taking the differences of the values of $y_1, y_2, \dots, y_8$ for the two groups from Table 8.11 and taking the sum of their squares. The 231 values of D^2 , thus calculated by considering all possible pairs from the 22 groups (excluding Tharu females) are given in Table (8.2). In this table, the name of the group from which the D^2 values are measured is given at the top of each column and the names of the groups are arranged in each column in increasing order of D^2 . The following symbols have been used to denote the different groups for convenience of reference.

$A_1 = \text{Ahir (Artisan)}$	$Bh = \text{Bhil}$	$T_1 = \text{Chero}$
$A_2 = \text{Kurmi (Artisan)}$	$C_1 = \text{Bhatu}$	$T_2 = \text{Majhi}$
$A_3 = \text{Other Artisan}$	$C_2 = \text{Habru}$	$T_3 = \text{Panika}$
$A_4 = \text{Kahar (Artisan)}$	$Ch = \text{Chatrī}$	$T_4 = \text{Kharwar}$
$Ag = \text{Agharia}$	$Cm = \text{Chamar}$	$T_5 = \text{Oraon}$
$B_1 = \text{Basti Brahmin}$	$D = \text{Dom}$	$T_6 = \text{Rajwar}$
$B_2 = \text{Other Brahmin}$	$M = \text{Muslim}$	$T_7 = \text{Korwa}$
		$Th = \text{Tharu Male}$

117. To test the significance of a calculated D^2 between two groups for which samples of sizes n_1 and n_2 are available one can use, since the dispersion matrix has a very large number of degrees of freedom, $n_1 n_2 D^2 / (n_1 + n_2)$ as χ^2 with p degrees of freedom where p is the number of characters used.

118. In the present case, on testing the significance of the 231 values of D^2 it was found that all are significant except 3 which are marked as n.s. (not significant) in table (8.2). The two Brahmins (B_1 and B_2) are not significantly differentiated. The Artisan Kahars (A_2) are not significantly different from Ahirs (A_1) and from Other

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TABLE (8.1) NORMALISED MEAN VALUES OF CHARACTERS

	<i>fb</i>	<i>b:b</i>	<i>nl</i>	<i>hl</i>	<i>ufl</i>	<i>sh</i>	<i>st</i>	<i>bpb</i>	<i>hb</i>	<i>nb</i>	<i>nd</i>	<i>tl</i>
1 Brahmin (Basti B.)	·585	·435	·575	·590	·643	1·216	·348	·281	·580	·176	1·180	·535
2 Brahmin (others B.)	·513	·286	·335	·504	·430	1·160	·446	·209	·495	·339	·751	·204
3 Agharia (Ag)	—	·116	·077	·454	·146	·466	·864	—	·615	·441	·117	·103
4 Chattri (Ch)	·391	·072	·997	·690	·288	—	·143	·132	·322	·530	·745	·454
5 Muslim (M)	·212	·033	·615	·417	·188	—	·010	·209	·029	·250	·608	·327
6 Bhatu (C.)	—	·476	·809	—	·591	·610	·151	·281	·291	·526	·951	·402
7 Habru (C.)	—	·046	·306	—	·164	·941	·418	·292	·029	·460	·437	·003
8 Bhil (Bh)	·283	·041	·180	—	·932	—	·071	—	·078	·190	·357	—
9 Dom (D)	·437	·277	·317	—	·246	·653	·700	·173	·056	·431	1·088	·840
10 Ahir (A.)	·080	·072	—	·071	—	·153	·566	—	·189	—	·494	—
11 Kurni (A.)	·044	·098	—	·003	·127	·207	·272	—	·131	·308	·345	·129
12 Other Artisan (A.)	—	·015	—	·145	—	·011	·172	·204	·025	—	·174	·038
13 Kahar (A.)	—	·146	—	·174	·122	—	·334	—	·120	·153	·237	—
14 Tharu (male) (Th)	—	·068	·203	—	·037	·108	·143	·185	·304	·349	—	·228
15 Chamar (Cm)	·044	—	·238	—	·178	—	·110	—	·103	·254	—	·326
16 Chero (T.)	—	·268	—	·385	—	·141	—	·138	·398	·731	—	—
17 Majhi (T.)	·029	—	·006	—	·137	·055	—	·054	—	·871	—	—
18 Panika (T.)	—	·079	—	·574	—	·255	—	·285	—	·408	—	—
19 Kharwar (T.)	—	·028	—	·254	—	·319	—	—	·118	·571	—	—
20 Oraon (T.)	—	—	·203	—	·483	·213	—	—	—	—	—	—
21 Rajwar (T.)	—	—	·413	—	·317	—	—	—	—	—	—	—
22 Korwa (T.)	—	—	·225	—	·717	—	—	—	—	—	—	—

TABLE 8.11 MEAN VALUES OF TRANSFORMED CHARACTERS

	y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8
1 Brahmin (Basti B ₁)	·590	·472	·044	·413	— ·355	1·014	·000	1·036
2 Brahmin (others B ₂)	·504	·403	— ·066	·201	— ·483	·655	·226	·987
3 Agharia (Ag)	·454	·536	— ·335	— ·053	— ·543	·072	·809	— ·062
4 Chattri (Ch)	·690	·189	— ·260	·896	— ·639	·484	— ·154	— ·442
5 Muslim (M)	·417	— ·055	— ·068	·571	— ·312	·458	— ·210	— ·425
6 Bhatu (C ₁)	— ·292	·356	·463	·796	— ·611	·809	— ·037	·481
7 Habru (C ₂)	— ·164	·063	— ·038	·339	— ·441	·426	·438	·876
8 Bhil (Bh)	— ·932	·268	·105	— ·064	·334	·485	·239	·030*
9 Dom (D)	— ·246	·109	·356	·326	·422	1·035	·595	·071
10 Ahir (A ₁)	— ·087	·210	— ·010	— ·087	— ·578	·579	— ·232	·793
11 Kurmi (A ₂)	·127	·108	·011	— ·043	— ·364	·369	— ·283	·412
12 Other Artisans (A ₃)	— ·051	— ·088	·052	— ·132	— ·293	·253	— ·193	·351
13 Kahar (A ₄)	·122	— ·250	— ·069	— ·159	— ·147	·316	— ·357	— ·199
14 Thiaru (male) (Th)	— ·037	— ·303	·277	·236	·353	— 1·102	·207	·398
15 Chamar (Cm)	— ·178	— ·162	— ·132	— ·148	— ·188	·015	·009	— ·707
16 Chero (T ₁)	— ·141	— ·377	— ·088	— ·309	·848	— ·382	·058	— ·941
17 Majhi (T ₂)	— ·137	— ·278	·207	— ·696	·911	— ·482	·217	— ·957
18 Panika (T ₃)	— ·255	— ·440	·105	— ·489	·494	— ·444	— ·318	— 1·042
19 Kharwar (T ₄)	— ·319	— ·056	·102	— ·205	·643	— ·689	— ·187	— ·560
20 Oraon (T ₅)	·213	— ·136	— ·316	— ·490	·296	— 1·593	·004	— ·282
21 Rajwar (T ₆)	— ·196	·015	— ·445	— ·256	— ·523	— 1·235	— ·225	·017
22 Korwa (T ₇)	— ·082	— ·584	·105	— ·647	1·176	— 1·043	— ·606	·165
Total (check)	·000	·000	·000	·000	·000	·000	·000	·000

*The mean sitting height for Bhil not being available, the general average is substituted (which is necessarily arbitrary) to make further calculations complete.

Artisan (A₃). The non-significance of these three values of D^2 does not prove that the samples are drawn from the same population but does show that, in the characters used for calculating D^2 , the differences between these groups are too small to be detected by samples of the present size. The groups are likely to be differentiated if the size of the samples is sufficiently increased or if other characters are used unless the two groups really belong to the same population. Groups for which the values of D^2 are not significant may, however, be treated provisionally, on the basis of available evidence, as being closely associated.

TABLE 8.2 VALUES OF D² BASED ON EIGHT CHARACTERS
ARRANGED IN INCREASING ORDER OF MAGNITUDE WITH RESPECT TO EACH GROUP

(1)	(1.1)	(2)	(2.1)	(3)	(3.1)	(4)	(4.1)	(5)	(5.1)	(6)	(6.1)	(7)	(7.1)	(8)	(8.1)	(9)	(9.1)	(10)	(10.1)	(11)	(11.1)
Brahmin Bsati (B ₁)	Brahmin Others (B ₂)	Agharia (Ag)	Chatri (Ch)	Muslim (M)	Bhatu (C ₁)	Habru (C ₂)	Bhil (Bh)	Dom (D)	Ahir (A ₁)	Kurmi (A ₂)											
B ₁ .27ns	B ₁ .27ns	B ₂ 1.94	M .39	Ch .39	C ₂ 1.12	B ₂ .69	D 1.15	Bh 1.15	A ₂ .30 ns	A ₂ .11 ns											
A ₁ 1.13	C ₂ .69	A ₂ 1.95	A ₄ 2.03	A ₄ .78	A ₁ 1.26	A ₁ .71	A ₂ 1.65	C ₂ 1.95	A ₂ .48	A ₁ .30 ns											
C ₂ 1.32	A ₁ .73	C ₂ 2.00	A ₂ 2.11	A ₂ 1.21	B ₁ 1.53	A ₂ .98	Cm 1.91	C ₁ 1.98	C ₂ .71	A ₄ .58											
A ₂ 1.44	A ₂ .98	A ₁ 2.07	Ag 2.33	Cm 1.23	A ₂ 1.56	A ₂ .99	A ₂ 2.07	A ₁ 2.20	B ₂ .73	B ₂ .98											
C ₁ 1.53	A ₂ 1.45	Cm 2.12	C ₁ 2.50	A ₂ 1.37	B ₂ 1.63	C ₁ 1.12	A ₂ 2.09	A ₂ 2.34	B ₁ 1.13	C ₁ .98											
A ₁ 2.11	C ₁ 1.63	M 2.18	Cm 2.50	C ₁ 2.07	A ₁ 1.73	B ₁ 1.32	C ₂ 2.17	M 2.47	C ₁ 1.26	M 1.21											
D 2.82	Ag 1.94	Ch 2.33	A ₄ 2.58	Ag 2.18	D 1.98	D 1.95	A ₁ 2.38	A ₁ 2.50	A ₄ 1.52	B ₁ 1.44											
M 2.83	M 2.61	A ₄ 2.40	B ₂ 2.81	A ₂ 2.33	M 2.07	Ag 2.00	T ₄ 2.50	A ₁ 2.75	M 2.33	C ₁ 1.56											
Ch 2.98	A ₄ 2.68	A ₁ 2.58	B ₁ 2.98	D 2.47	Ch 2.50	Bh 2.17	C ₁ 2.56	B ₂ 2.78	Bh 2.38	Cm 1.69											
Ag 3.17	D 2.78	B ₁ 3.17	A ₁ 3.18	C ₂ 2.53	Bh 2.56	A ₄ 2.31	T ₁ 3.10	B ₁ 2.82	Ag 2.58	Ag 1.95											
A ₄ 3.26	Ch 2.81	D 3.21	C ₂ 3.23	B ₂ 2.61	A ₄ 2.77	M 2.53	M 3.15	Cm 2.90	D 2.75	Bh 2.07											
Bh 4.41	Bh 3.79	Bh 3.46	D 3.84	B ₁ 2.83	Ag 3.50	Cm 3.22	Ag 3.46	Ag 3.21	Cm 2.94	Ch 2.11											
Cm 5.40	Cm 4.32	C ₁ 3.50	Bh 5.01	Bh 3.15	Cm 3.75	Ch 3.23	T ₂ 3.49	Ch 3.84	Ch 3.18	D 2.34											
Th 6.51	Th 5.04	T ₄ 3.53	T ₄ 5.36	T ₁ 3.42	Th 5.50	Th 3.51	T ₂ 3.58	T ₁ 4.35	T ₄ 4.16	T ₄ 3.12											
T ₄ 7.69	T ₄ 5.71	Th 4.16	T ₄ 5.46	T ₁ 3.58	T ₄ 6.22	T ₄ 4.47	B ₂ 3.79	T ₄ 4.41	Th 4.49	Th 3.26											
T ₄ 7.97	T ₄ 6.72	T ₁ 4.39	T ₁ 5.75	T ₁ 3.61	T ₄ 6.49	T ₄ 5.22	Th 3.90	T ₂ 4.97	T ₄ 5.11	T ₄ 3.35											
T ₂ 9.10	T ₁ 7.88	T ₁ 4.79	Th 5.83	Th 4.23	T ₁ 7.60	T ₁ 6.48	B ₁ 4.41	Th 5.06	T ₁ 6.20	T ₁ 3.65											
T ₁ 9.63	T ₄ 8.23	T ₁ 4.87	T ₁ 5.87	T ₄ 4.31	T ₁ 7.66	T ₁ 6.85	T ₄ 4.75	T ₂ 5.29	T ₁ 6.45	T ₂ 4.17											
T ₂ 10.21	T ₂ 8.37	T ₂ 5.29	T ₂ 7.39	T ₂ 4.88	T ₂ 8.83	T ₂ 7.10	Ch 5.01	T ₄ 7.71	T ₂ 7.16	T ₂ 5.16											
T ₁ 10.29	T ₂ 8.77	T ₂ 5.41	T ₂ 7.50	T ₁ 5.88	T ₂ 9.93	T ₂ 7.31	T ₂ 5.56	T ₁ 7.85	T ₁ 7.20	T ₂ 5.22											
T ₂ 10.41	T ₂ 9.07	T ₂ 8.30	T ₁ 9.91	T ₁ 7.01	T ₂ 10.18	T ₁ 7.79	T ₂ 6.30	T ₂ 8.78	T ₂ 7.26	T ₂ 5.43											

NS = not significant at 5% level.

TABLE 8.2 VALUES OF D^2 BASED ON EIGHT CHARACTERS
ARRANGED IN INCREASING ORDER OF MAGNITUDE WITH RESPECT TO EACH GROUP (Concl'd.)

(12) (12·1)	(13) (13·1)	(14) (14·1)	(15) (15·1)	(16) (16·1)	(17) (17·1)	(18) (18·1)	(19) (19·1)	(20) (20·1)	(21) (21·1)	(22) (22·1)
Artisan others (A_2)	Kahar (A_1)	Tharu (Th)	Chamar (Cm)	Chero (T_1)	Majhi (T_2)	Panika (T_2)	Kharwar (T_1)	Oraon (T_2)	Rajwar (T_1)	Korwa (T_1)
A_2 11.18	A_1 4.3	T_2 1.72	A_1 5.59	T_2 2.29	T_1 2.29	T_1 3.37	T_1 4.48	T_1 1.20	T_2 1.20	T_1 1.64
A_1 4.3	A_2 5.58	T_1 1.79	T_2 1.15	T_1 3.37	T_2 5.56	T_2 5.56	T_2 5.56	T_2 1.60	Th 2.41	T_2 2.13
A_1 4.48	Cm 5.59	T_2 2.01	M 1.23	T_1 4.48	T_1 7.77	T_1 5.56	T_2 7.77	Th 1.72	T_1 2.31	Th 2.29
C_2 9.9	M 7.8	T_1 2.29	A_2 1.28	Cm 1.36	Cm 1.99	Cm 1.15	Cm 1.33	T_2 2.13	Cm 2.39	T_1 2.41
Cm 1.28	A_1 1.52	A_2 2.65	T_1 1.33	A_1 2.31	T_2 2.43	A_1 2.02	T_2 1.60	T_1 2.48	A_2 2.67	T_2 2.43
M 1.37	T_1 2.02	Cm 2.75	T_2 1.36	T_2 2.41	T_1 2.57	T_2 2.44	T_1 1.64	T_2 2.53	A_1 2.93	T_2 2.44
B_2 1.45	Ch 2.03	T_1 3.02	A_2 1.69	T_2 2.48	A_1 3.09	T_2 2.53	Th 1.79	T_2 2.57	A_2 3.12	T_2 3.92
Bh 1.65	T_1 2.04	A_1 3.24	Bh 1.91	Th 3.02	Th 3.42	A_2 3.35	A_1 2.04	Cm 3.25	T_2 3.36	A_1 4.21
C_1 1.73	Bh 2.09	A_2 3.26	T_2 1.99	Bh 3.10	Bh 3.58	T_2 3.36	T_2 2.31	A_1 4.17	Ag 3.53	Cm 4.50
Ag 2.07	T_2 2.31	T_2 3.42	Ag 2.12	A_2 3.58	A_2 4.25	Th 3.42	Bh 2.50	A_2 4.53	T_2 3.92	A_2 4.56
B_1 2.11	C_2 2.31	T_2 3.42	T_2 2.39	M 3.58	T_2 4.47	Bh 3.49	A_2 2.67	Ag 4.87	T_2 3.89	A_2 5.43
D 2.20	Ag 2.40	C_2 3.51	Ch 2.50	A_2 3.65	M 4.88	M 3.61	A_2 3.35	A_2 5.22	A_1 4.16	Bh 5.56
Ch 2.58	D 2.50	Bh 3.90	Th 2.75	T_2 3.89	D 4.97	A_2 4.17	M 3.42	M 5.88	M 4.31	M 7.01
Th 2.65	B_2 2.68	Ag 4.16	D 2.90	D 4.35	A_2 5.16	D 5.29	Ag 4.39	Bh 6.30	T_2 4.47	A_1 7.20
T_1 2.67	C_1 2.77	M 4.23	A_1 2.94	Ag 4.79	Ag 5.29	Ag 5.41	D 4.41	C_2 7.10	C_2 4.47	C_2 7.79
T_2 2.67	T_2 2.93	A_2 4.49	C_2 3.22	Ch 5.75	A_2 7.26	Ch 5.87	A_2 5.11	A_2 7.16	Bh 4.75	D 7.85
T_1 3.35	T_2 3.09	B_2 5.04	T_2 3.25	A_2 6.45	C_2 7.31	A_2 6.20	C_2 5.22	Ch 7.50	Ch 5.36	Ag 8.30
T_1 3.58	Th 3.24	D 5.06	C_1 3.75	C_2 6.48	Ch 7.39	C_2 6.85	Ch 5.46	B_2 8.23	B_2 5.71	B_2 9.07
T_2 4.25	B_1 3.26	C_1 5.50	B_2 4.32	C_1 7.66	B_2 8.77	C_1 7.60	C_1 6.22	D 8.78	C_1 6.49	Ch 9.91
T_2 4.53	T_2 4.17	Ch 5.83	T_2 4.50	B_2 7.88	C_1 8.83	B_2 8.37	B_2 6.72	C_1 9.93	D 7.71	C_1 10.18
T_2 4.56	T_2 4.21	B_1 6.51	B_1 5.40	B_1 9.10	B_1 10.21	B_1 9.63	B_1 7.97	B_1 10.41	B_1 7.69	B_1 10.39

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119. Treating D^2 as the square of a generalised distance or an index of overlapping individuals (refer Appendix 3) between two populations it can be used for purposes of classification. By classification is meant, in the first place, a division of all the groups into a number of clusters such that the groups within any cluster are close together, i.e. have a smaller D^2 among themselves than those from groups belonging to two different clusters. No formal rules can, however, be laid down for this purpose and the classification must proceed by actual scrutiny of D^2 values as given in Table (8.2). The classification thus arrived at may be checked up by a study of the differences in individual characters for any two groups within a cluster. A slightly different method of classification using the configuration of *canonical* variates is developed in a later section. The procedure by the method of D^2 values is explained below.

120. It would be noticed that all the 22 groups fall into two distinct clusters which may be distinguished by T (tribal) and G (general) classes with Chamar and Tharu forming border line cases. The members of the T-cluster, namely Chero (T_1), Majhi (T_2), Panika (T_3), Kharwar (T_4), Oraon (T_5), Rajwar (T_6) and Korwa (T_7) are sharply differentiated from the rest with the generalized distance between any two of them being in general less than that between a member of this T (tribal) class and any other group. Among the seven tribal samples, Chero (T_1), Majhi (T_2), Panika (T_3) and Kharwar (T_4) are close to one another, and form a sub-cluster; Oraon (T_5) and Rajwar (T_6) and Korwa (T_7) are also somewhat close.

121. The G-cluster also shows distinct evidence of patterning within itself. To get a clearer view of the inter-relationships, the D^2 for all pairs of groups in the G-cluster (except Agharia (Ag) for which the mean value of FB is not available) have been calculated by using all the 9 transformed variates, i.e. using the characters HL, HB, BzB, NL, ND, St, SH, FB, and tabulated in Table (8.21) in a manner similar to that adopted in Table (8.2). As observed before, these are derived from the D^2 's of Table (8.2) based on the 8 characters by adding the square of difference in the ninth transformed character y_9 . The mean values of y_9 for groups other than those in the T-cluster (and Ag for which the mean value is missing) are given below.

Name of the group.	B ₁	B ₂	Ch	M	C ₁	C ₂	Bh
Mean y_9 .	126	.143	.378	.276	-1.270	-.823	.318
Name of the group.	D	A ₁	A ₂	A ₃	A ₄	Th	Cm
Mean y_9 .	.325	-.078	-.079	.001	-.075	-.737	.254

122. The internal patterning has become more definite by the use of FB as an additional character. The two Brahmins, Basti (B_1) and Others (B_2) cluster together and so also the four Artisans Ahir (A_1), Kurmi (A_2), Others (A_3) and Kahar (A_4) which

TABLE 8.21 VALUES OF D^2 BASED ON 9 CHARACTERS ARRANGED IN INCREASING ORDER OF MAGNITUDE WITH RESPECT TO EACH GROUP OF THE GENERAL CLUSTER

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Brahmin Basti (B ₁)	Brahmin Others (B ₂)	Chattri (Ch)	Muslim (M)	Bhatu (C ₁)	Habru (C ₂)	Bhil (Bh)	Dom (D)	Alhir (A ₁)	Kurmi (A ₂)	Artisan Others (A ₃)	Kahar (A ₄)	Tharu (Th)	Chamar (Cm)
B ₂	.27	B ₁	.27	M	.40	C ₂	1.32	A ₁	.26	A ₁	.12	A ₂	.43	A ₃ 3.19 A ₄ .69
A ₁	1.17	A ₁	.78	A ₂	2.12	A ₁	.90	A ₁	.49	A ₁	.30	A ₁	.43	A ₂ .58 C ₂ 3.51 M 1.22
A ₂	1.48	A ₂	1.03	A ₂	2.24	Cm	1.22	A ₂	.98	A ₂	.53	A ₂	.58	A ₂ .69 A ₃ 3.72 A ₄ 1.35
A ₃	2.13	A ₃	1.47	Cm	2.52	A ₃	3.35	A ₃	3.35	B ₂	1.63	Cm	2.23	A ₃ 3.74 A ₄ 1.81
C ₂	2.23	C ₂	1.63	A ₁	2.72	A ₁	3.48	A ₁	3.48	A ₁	1.67	A ₁	2.24	A ₁ 3.78 Bh 2.23
M	2.86	M	2.62	B ₂	2.87	B ₂	3.61	D	2.11	C ₂	2.43	A ₁	2.66	A ₁ 4.93 Ch 2.52
D	2.86	A ₂	2.72	B ₁	3.05	B ₁	4.20	B ₂	2.81	M	2.45	C ₂	1.67	Ch 2.24 Bh 5.01 D 2.91
Ch	3.05	D	2.81	A ₃	3.38	B ₂	2.62	M	4.46	Bh	2.43	M	3.16	D 2.66 M 5.25 A ₄ 3.05
A ₄	3.30	Ch	2.87	D	3.84	B ₂	2.86	B ₂	3.82	Cm	2.91	C ₂	2.68	Ch 2.12 B ₁ 2.13 B ₂ 2.72 C ₁ 5.68 Th 3.74
C ₁	3.48	C ₁	3.61	C ₂	4.68	Bh	3.16	Bh	5.08	Th	3.51	B ₁	4.45	B ₂ 5.82 B ₄ 4.34
Bh	4.45	Bh	3.82	Bh	5.02	C ₂	3.74	Ch	5.25	M	3.74	Th	5.01	D 2.41 Ch 2.72 B ₁ 3.30 D 6.18 C ₁ 4.38
Cm	5.42	Cm	4.34	C ₁	5.25	C ₁	4.46	Th	5.68	Cm	4.38	Ch	5.02	C ₁ 4.52 Ch 3.38 C ₂ 2.98 Th 3.19 Th 3.78 Ch 7.07 B ₁ 5.42
Th	7.25	Th	5.82	Th	7.07	Th	5.25	Cm	6.07	Ch	4.68	C ₁	5.08	C ₁ 3.35 C ₂ 4.20 B ₁ 7.25 C ₁ 6.07

appear to be linearly arranged in the order A_1, A_2, A_3 , and A_4 with A_4 farther off from A_1 . Bhatu (C_1) and Habru (C_2) go together with C_2 nearer the Brahmin and Artisan clusters and C_1 far removed from them. Bhil (Bh) and Dom (D) are rather close, and so also are Muslim (M) and Chatri (Ch). Tharu (Th) occupies a distinct position far away from all the groups considered above. In fact Tharu occupies an intermediate position between the Tribal and the General clusters, and has greater affinities with the former. Chamar (Cm) also occupies a distinct position far removed from the Brahmins (B_1, B_2), Bhatu (C_1), Habru (C_2) and Tharu (Th) but closer to the rest of the members of the G-cluster.

123. Tables (8.2) and (8.21) broadly indicate the following classification.

(1) There are two distinct clusters, one comprising the tribal groups ($T_1, T_2, T_3, T_4, T_5, T_6, T_7$) and the other general groups ($A_1, A_2, A_3, A_4, Ag, B_1, B_2, Bh, C_1, C_2, Ch, D$).

(2) Tharu (Th) and Chamar (Cm) form borderline cases with Th having more affinities with the T-cluster; and Cm with the G-cluster.

(3) There is an internal patterning in the T-cluster with T_1, T_2, T_3 , and T_4 forming sub-cluster.

(4) The internal patterning in the G-cluster is more complicated. The Artisans A_1, A_2, A_3, A_4 and the Brahmins B_1, B_2 form distinct sub-clusters. Chatri (Ch) and Muslim (M); Bhil (Bh) and Dom (D); Bhatu (C_1) and Habru (C_2), are pairs which are somewhat similar. Agharia (Ag) has a position somewhere in the centre of these various sub-clusters of the G-cluster.

9. INTRA-CLUSTER STUDY

124. The classification obtained in the previous section is based on the 9 characters selected for use in the calculation of D^2 values. A detailed study based on the examination of the differences of means of all the characters for which measurements are available is, however, of importance as this will show whether the 9 characters already used are adequate for purposes of classification or whether the groups which are indistinguishable or which form sub-clusters (as explained above) become differentiated when other characters are taken into consideration. The following method of analysis is convenient for this purpose.

125. For each character, the mean of mean values for all groups (castes and tribes) is adopted as the base or origin and is subtracted from the mean value of the same character for each group. This difference is then divided by the pooled intra-group standard deviation to obtain the normalized deviation of the mean. These normalized deviations of the mean values are given for all characters for each group in Table 8.1 and are plotted in the accompanying charts.

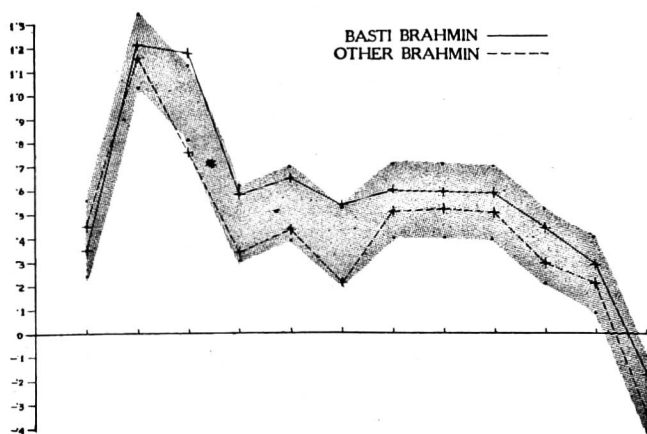
ST SH ND NL UFL TFL HL FB HB B₂B B₀B NB

Chart 9.1. A comparative study of the two Brahmin groups.

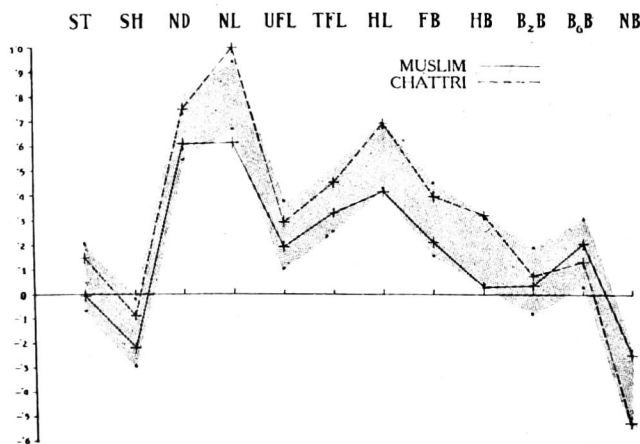


Chart 9.2 A comparative study of Muslims and Chattris.

126. *Brahmin groups* (B_1 and B_2): Chart 9.1⁸ gives the comparative picture of the two types of Brahmins. They are close together except in Nasal Depth and Total Face Length which indicate significant differences. Basti Brahmins have larger values for most of the characters.

⁸ The shadow in the chart corresponds to a 5% confidence belt within which the points corresponding to the groups are expected to lie if the two groups are not different. If the points lie outside then significant differences will be indicated.

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ST SH ND NL UFL TFL HL FB HB B₂B B₆B NB

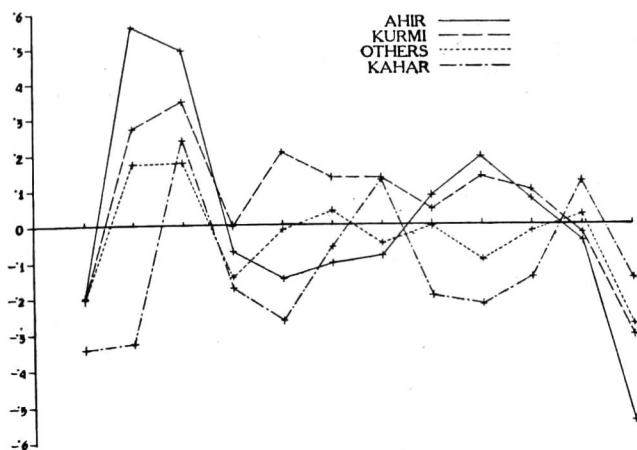


Chart 9.3 A comparative study of the four Artisan Groups.

ST SH ND NL UFL TFL HL FB HB B₂B B₆B NB

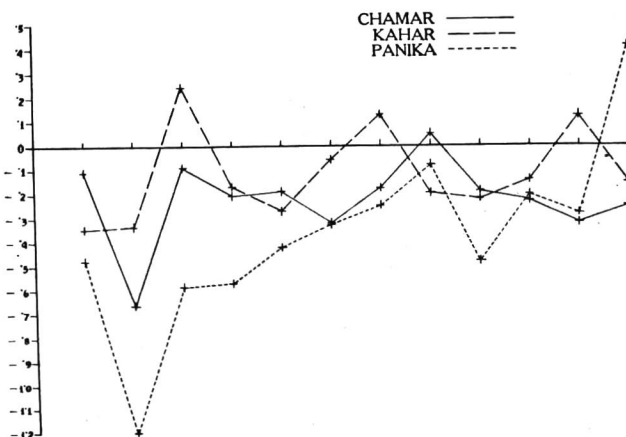


Chart 9.4 A comparative study of Chamar, Kahar and Panika.

127. *Muslim and Chattri*: These two groups given in Chart 9.2 are close to one another, but the latter has larger measurements. Muslim is significantly differentiated from Chattri in Nasal Length and Head Length.

128. *Artisan*: Chart 9.3 gives a representation of the four Artisan groups Ahir, Kurmi, Other Artisan and Kahar. All of them are close to one another. Ahir, Kurmi and Other Artisan do not differ significantly in any of the characters studied. Kahar differs significantly from the rest of the Artisan groups in Sitting Height, and has smaller values for most of the measurements.

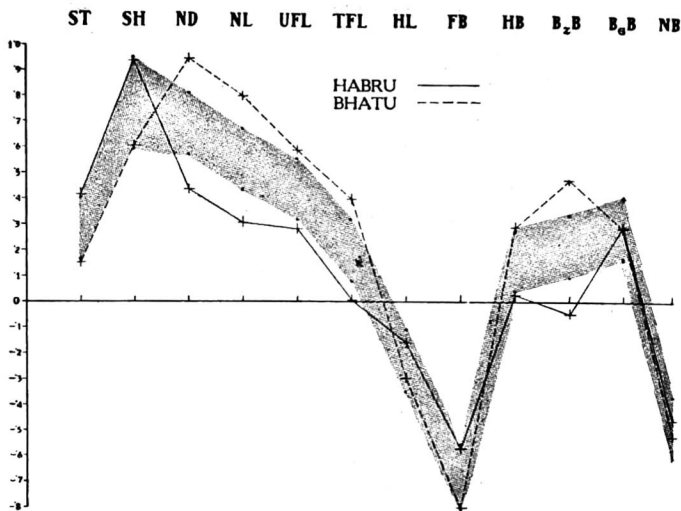


Chart 9.5 A comparative study of the criminal tribes Habru and Bhatu.

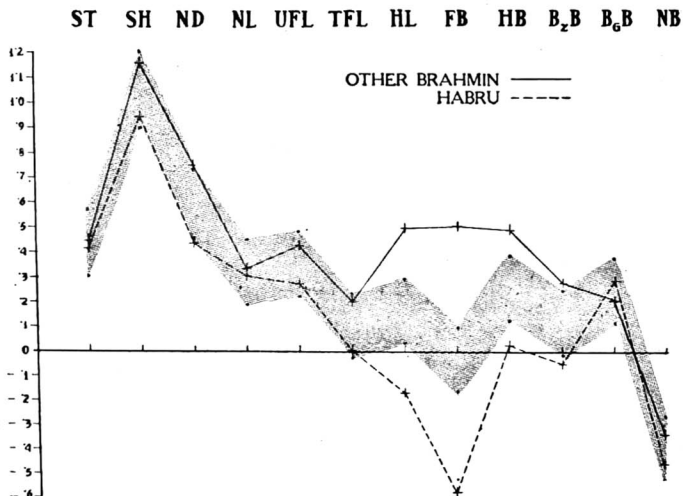


Chart 9.6 A comparative study of other Brahmins and Habru.

129. *Chamar*: Chart 9.4 shows the comparative position of Chamar and the two groups Kahar (Artisan) and Panika. Chamar is clearly differentiated from the tribes in having larger body and nasal measurements. With respect to all the characters studied, Chamar has smaller values than the Artisans but is nearer to the Artisans than to the tribal groups.

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130. *Bhatu and Habru*: - From Chart 9.5 it is seen that Bhatu and Habru resemble each other in having a small Head Length and a low Frontal Breadth which distinguish them from all the other castes and tribes. Habru has larger body characters and Bhatu larger nasal characters. Significant differences occur in Nasal Depth, Nasal Length, Bizygomatic Breadth, Upper Face Length and Total Face Length. Chart 9.6 shows the differences between Habru and Other Brahmin which have been found to be somewhat close according to the D^2 -values based on 8 chosen characters. Habru resembles Other Brahmin in body and nasal characters but is clearly differentiated in Head Length, Frontal Breadth, Bizygomatic Breadth, and Head Breadth. The D^2 -values based on 9 characters (including Frontal Breadth) clearly differentiates the Bhatu-Habru cluster from the Brahmin cluster.

131. *Bhil and Dom*: From Chart 9.7 it is seen that Bhil and Dom are clearly differentiated, and differ significantly in Stature, Head Length, Upper Face Length, Nasal Length, Nasal Depth and Total Face Length. Though Bhil is nearer to Dom than the other groups according to D^2 values, they are quite distinct.

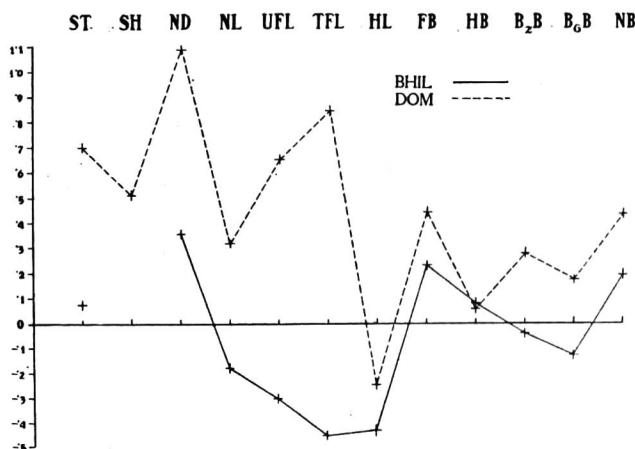


Chart 9.7 A comparative study of Bhil and Dom.

132. *Tribal group*: Chart 9.8 represents Chero, Majhi, Panika and Kharwar; and Chart 9.81, represents Oraon, Rajwar and Korwa. The tribal groups generally resemble one another except in nasal characters. Chero, Majhi, Panika, and Kharwar are close to one another, while Oraon, Rajwar and Korwa are differentiated from the rest of the tribal groups. The characters in which the T-groups are significantly different from one another are given below in Table 9.82. This table clearly indicates that the tribal groups can be best classified (as observed earlier in the section on

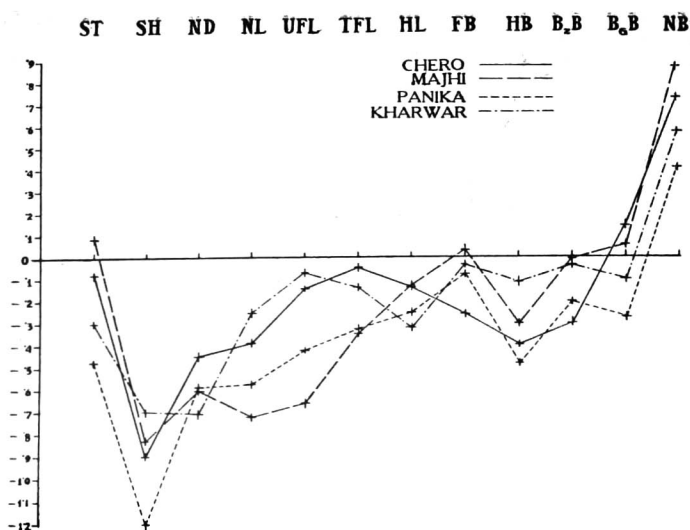


Chart 9.8 A comparative study of the four tribal groups forming a sub-cluster.

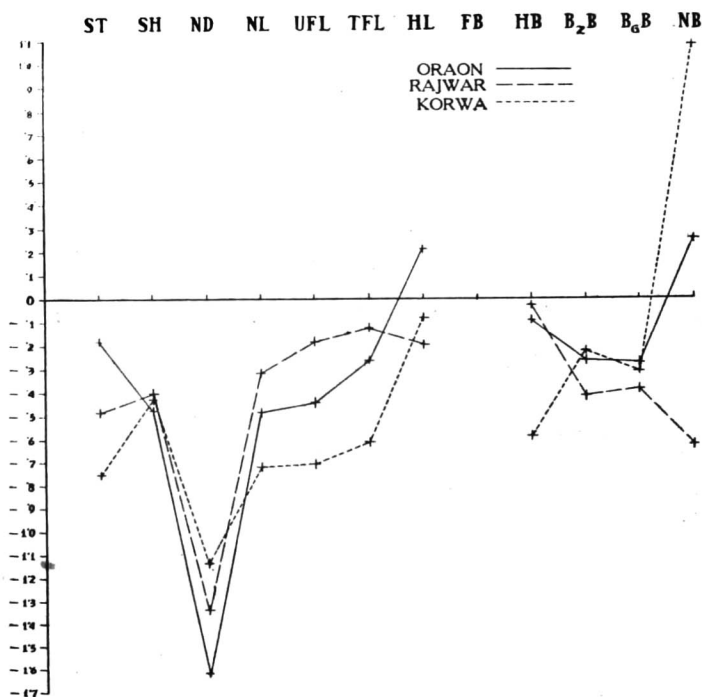


Chart 9.81 A comparative study of three tribal groups forming a sub-cluster.

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choice of characters), according to the nasal characters, Nasal Length, Nasal Depth and Nasal Breadth and the two body characters, Stature and Sitting Height.

TABLE 9-82 THE CHARACTERS IN WHICH CHAMAR AND THE TRIBAL GROUPS DIFFER SIGNIFICANTLY AT 1% LEVEL

	Chamar	Chero	Majhi	Panika	Kharwar	Oron	Rajwar	Korwa
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Chamar	—	ND, NB B ₂ B	NB, NL UFL, B ₂ B	NB, SH	ND, NB	HL, ND NB	ND, st	st, UFL NL, ND NB, HB
Chero	ND, NB B ₂ B	—	UFL	B ₂ B	—	ND, NB B ₂ B	ND, NB B ₂ B	st, SH UFL ND TFL, B ₂ B
Majhi	NB, NL UFL, B ₂ B	UFL	—	st, NB B ₂ B	st, NL NB, UFL	HL, ND NB, B ₂ B	SH, st UFL, NL NB, ND	SH, st ND, B ₂ B
Panika	NB, SH	B ₂ B	st, NB B ₂ B	—	SH, UFL NL	SH, HL ND, HB	SH, ND NB, HB	SH, ND NB
Kharwar	ND, NB	—	st, NL NB, UFL	SH, UFL NL	—	HL, UFL ND	B ₂ B, ND NB	st, UFL NB, NL ND
Oron	HL, ND NB	ND, NB B ₂ B	HL, ND NB, B ₂ B	SH, HL ND, HB	HL, UFL ND	—	HL, NB B ₂ B	st, NB HB
Rajwar	ND, st	ND, NB B ₂ B	SH, st UFL, NL ND, NB	SH, ND NB, HB	B ₂ B, ND NB	HL, NB B ₂ B	—	NB, HB UFL
Korwa	st, UFL NL, HB ND, NB	SH, st UFL, ND TFL, B ₂ B	SH, st ND, B ₂ B	SH, ND NB	st, UFL ND, NL NB	st, NB HB	NB, HB UFL	—

10. INTER-CLUSTER STUDY

133. In order to make inter-cluster comparisons, average values were calculated for each character over all castes or tribes forming composite clusters and sub-clusters; and these are shown plotted in Chart 10.1. There are four fundamental clusters with special characteristics of their own. This classification fits in generally with the social status of the castes and tribes forming the different clusters, and may be adopted as the basic classification with respect to which the position of any group not belonging to the above clusters may be studied. A general description of the clusters is given below.

(1) The Brahmin or (B)-cluster is formed by the two Brahmin groups, Basti (B₁) and others (B₂), which possess well developed body characters (tall Stature and high Sitting Height) and also well-developed facial characters.

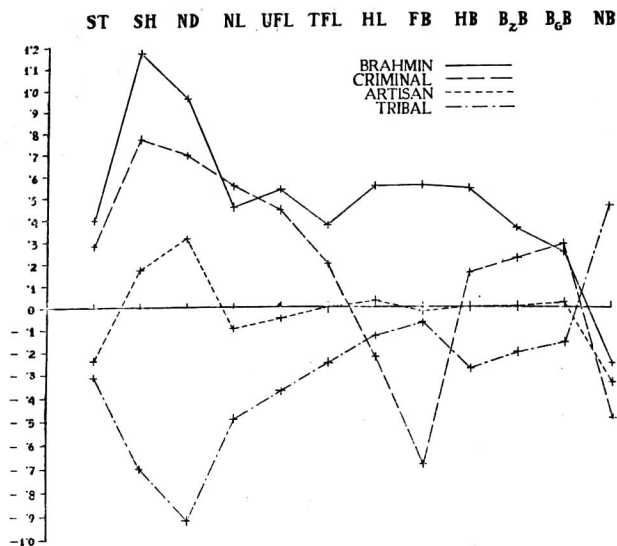


Chart 10.1 The intercluster comparisons.

(2) The Artisan or (A)-cluster consisting of Ahir (A_1), Kurmi (A_2), Other Artisan (A_3) and Kahar (A_4) generally has characters of a medium size.

(3) The Tribal or (T)-cluster consisting of Chero (T_1), Majhi (T_2), Panika (T_3), Kharwar (T_4), Oraon (T_5), Rajwar (T_6) and Korwa (T_7) has short Stature and low Sitting Height, smaller facial characters, and flat nose.

(4) The two criminal tribes, Bhatu (C_1) and Habru (C_2) are somewhat close, and may possibly be considered to form a C-sub-cluster; but much weight cannot be attached to it as the two groups are quite definitely differentiated. ($D^2 = 1.12$ for 8 characters). Tharu (Th) and Chamar (Cm) are borderline cases; while Bhil (Bh) and Dom (D) do not fall into any cluster.

(5) Agharia (Ag), Chattri (Ch), and Muslim (M) show some resemblance to the two Brahmin groups (B_1 and B_2 , or to the B-cluster). These five groups (which have a high social status) may indeed be considered to constitute a broader H-cluster.

11. CLASSIFICATION WITH THE HELP OF CANONICAL VARIATES

134. Anthropologists have sometimes used a single character or sometimes a binary or a tertiary combination of characters for distinguishing racial types. A more flexible method would be to replace the measurements on a large number of charac-

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ters (all of which contribute in some degree or other towards discrimination) by a relatively few measurements obtained as linear combinations of the larger number of measurements. The compounding coefficients are chosen in such a way that the new sets of variates can be arranged in a decreasing order of capacity for discrimination. These may be called canonical variates. The manner in which these compounding coefficients are chosen shows that they have special reference to the groups under consideration.

TABLE 11.1 VARIANCES AND CO-VARIANCES BETWEEN THE GROUPS
FOR EIGHT TRANSFORMED CHARACTERS

	y_1	$-y_2$	y_3	y_4	y_5	y_6	y_7	y_8
y_1	·1304	·0313	·0337	·0547	·0873	·0443	·0001	·0433
y_2	·0313	·0884	·0070	·0758	·1183	·1416	·0469	·1051
y_3	·0337	·0070	·0467	·0144	·0417	·0473	·0003	·0187
y_4	·0547	·0758	·0144	·1780	·1494	·2049	·0308	·1090
y_5	·0873	·1183	·0417	·1494	·3046	·2141	·0196	·1767
y_6	·0443	·1416	·0473	·2049	·2141	·5500	·0610	·1931
y_7	·0001	·0469	·0003	·0308	·0196	·0610	·1056	·0270
y_8	·0433	·1051	·0187	·1090	·1767	·1931	·0270	·3800

135. Using the mean values of the transformed characters $y_1, \dots, y_8$ for all the groups from Table 8.11, the variances and covariances between the groups are calculated and set out in Table 11.1. If a_{ij} represents the quantity in the i -th row and the j -th column in Table 11.1, and λ the variance between the groups of a linear compound $l_1y_1 + \dots + l_8y_8$, then the compounding coefficients corresponding to a stationary value of λ can be solved from the equations

$$\begin{aligned}
 l_1(a_{11}-\lambda) + l_2 a_{12} + \dots + l_8 a_{18} &= 0 \\
 l_1 a_{21} + l_2(a_{22}-\lambda) + \dots + l_8 a_{28} &= 0 \\
 \dots &\dots \dots \\
 l_1 a_{81} + l_2 a_{82} + \dots + l_8(a_{88}-\lambda) &= 0
 \end{aligned}$$

The equation giving the maximum, minimum and the intermediate stationary values of λ is

$$\begin{vmatrix}
 a_{11}-\lambda & a_{12} & \dots & a_{18} \\
 a_{21} & a_{22}-\lambda & \dots & a_{28} \\
 \dots & \dots & \dots & \dots \\
 a_{81} & a_{82} & \dots & a_{88}-\lambda
 \end{vmatrix} = 0$$

There are eight values of λ satisfying this equation and they are called *canonical variances*. Corresponding to each value of a canonical variance, there is a *canonical vector* ($l_1, \dots, l_8$) obtainable as described above. The linear compound $l_1 y_1 + \dots + l_8 y_8$ associated with a canonical vector is called a *canonical variate*. As explained in Appendix 4, the k canonical variates corresponding to the first k canonical variances in decreasing order of magnitude supply the best k -dimensional representation of the various groups.

136. The process of obtaining the canonical vectors by numerical methods is very laborious specially when the number of variates exceeds 4 or 5. In the present case solutions were obtained with the use of Mallock's Machine housed in the Mathematical Laboratory, University of Cambridge. We are indebted to Dr. M. V. Wilkes for his valuable assistance in actually solving these equations.

137. Out of the 8 roots with a total of 1.7837, the first three roots are $\lambda_1 = 1.0029$, $\lambda_2 = .2745$, $\lambda_3 = .2087$ adding up to 1.4861. These three roots together account for about 83 percent of the total variance. The other five roots are all less than .08 and individually contribute very little to the discrimination of the various groups. Two or three-dimensional models giving the positions of the various castes and tribes with respect to the first two or three canonical variates can, therefore, give a good idea of the configuration in the total character space.

138. The first three canonical vectors and the mean values of the canonical variates for all the groups are given in Tables 11.2 and 11.3 respectively. The mean values of y_9 , the ninth transformed character, have also been given for some groups in Table 11.3. It may be observed that y_9 being independent of $y_1, \dots, y_8$ is also independent of the canonical variates which are built out of the latter set. This transformed character is actually used, at a later stage, in conjunction with the first three canonical variates to discriminate the non-tribal groups. Effective check over the whole set of calculations (leading to the results of Table 11.3) is provided by the totals and the variances in each column. The totals are zero, and the variances correspond to the canonical variances. In the present case there is good agreement up to three figures which is the maximum accuracy attainable with Mallock's Machine.

TABLE 11.2 CANONICAL VECTORS CORRESPONDING TO FIRST THREE CANONICAL VARIANCES

	y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8
λ_1	.128	.244	.020	.333	-.439	.648	.091	.438
λ_2	-.214	-.055	.183	.066	.329	.648	.094	-.614
λ_3	-.445	-.057	.312	-.290	.506	.116	.049	.624

139. A glance at Table 11.3 shows that the first canonical variate corresponds to a general factor indicating a sharp discrimination of the Tribal from the General cluster. It also gives the best single function with which groups within the Tribal as well as the General clusters can be best discriminated. The second canonical

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variate shows larger variation for members of the Tribal-cluster and hence is more useful for discriminating between the members of this cluster. On the other hand, the third canonical variate has greater variance for members of the General-cluster and is thus more useful for discriminating between the members of that cluster. The position is shown graphically in Charts 11.31, 11.32 and 11.33 giving the representations of the variates (λ_1 , λ_2), (λ_1 , λ_3) and (λ_2 , λ_3) respectively.

TABLE 11.3 MEAN VALUES OF THREE CANONICAL VARIATES FOR ALL THE GROUPS AND y_p FOR NON-TRIBAL GROUPS

groups		λ_1	λ_2	λ_3	y_p
1. Brahmin (Basti)	B ₁	1.596	-.213	.226	.126
2. Brahmin (Others)	B ₂	1.318	-.448	.150	.143
3. Agharia	Ag	.496	-.209	-.592	—
4. Chattri	Ch	.814	.214	-1.129	.378
5. Muslim	M	.457	.374	-.698	.276
6. Bhatu	C ₁	1.323	.205	.178	-1.270
7. Habru	C ₂	1.000	-.319	.384	-.823
8. Bhil	Bh	.681	.955	.556	.325
9. Dom	D	.129	.628	.701	.318
10. Ahir	A ₁	.966	-.323	.299	-.078
11. Kurmi	A ₂	.582	-.194	.052	-.079
12. Other Artisan	A ₃	.358	-.150	.161	.001
13. Kahar	A ₄	.051	.209	-.209	-.075
14. Tharu	Th	-.671	-.732	.382	-.737
15. Chamar	Cm	-.331	.396	-.457	.254
16. Chero	T ₁	-1.240	.629	-.081	—
17. Majhi	T ₂	-1.425	.632	.099	—
18. Panika	T ₃	-1.291	.550	-.198	—
19. Kharwar	T ₄	-1.112	.168	.105	—
20. Oraon	T ₅	-1.461	-.890	-.298	—
21. Rajwar	T ₆	-.699	-1.061	-.410	—
22. Korwa	T ₇	-1.541	-.421	.779	—
total (check)		0	0	0	
variance (check)		1.0029	.2748	.2095	

140. These charts supply only an approximate picture of the actual configuration of the various groups since about 17 percent of the variation between the groups is not accounted for by the first three canonical variates. It would be necessary to calculate the other canonical variates to obtain the complete configuration of groups

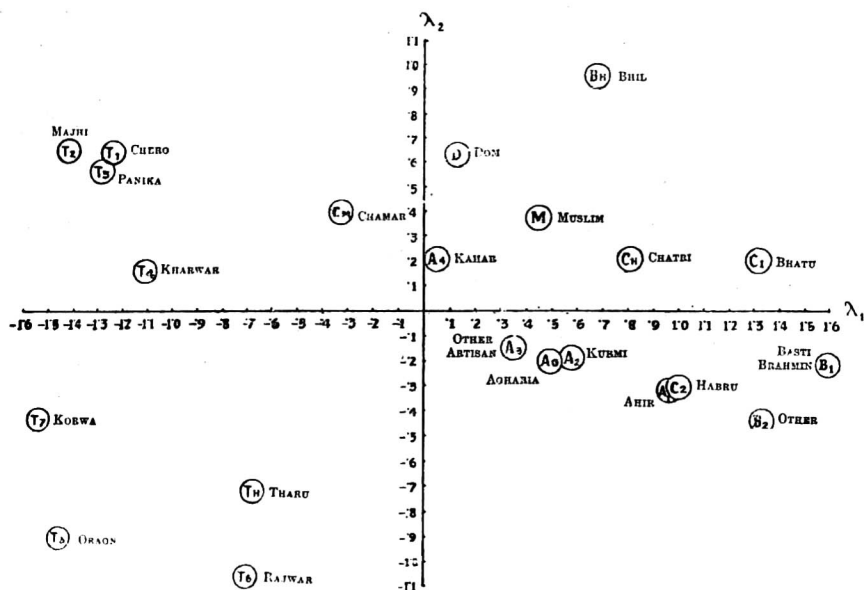


Chart 11.31 U. P. Anthropometry (1941) : Caste and Tribal Constellations (λ_1, λ_2)

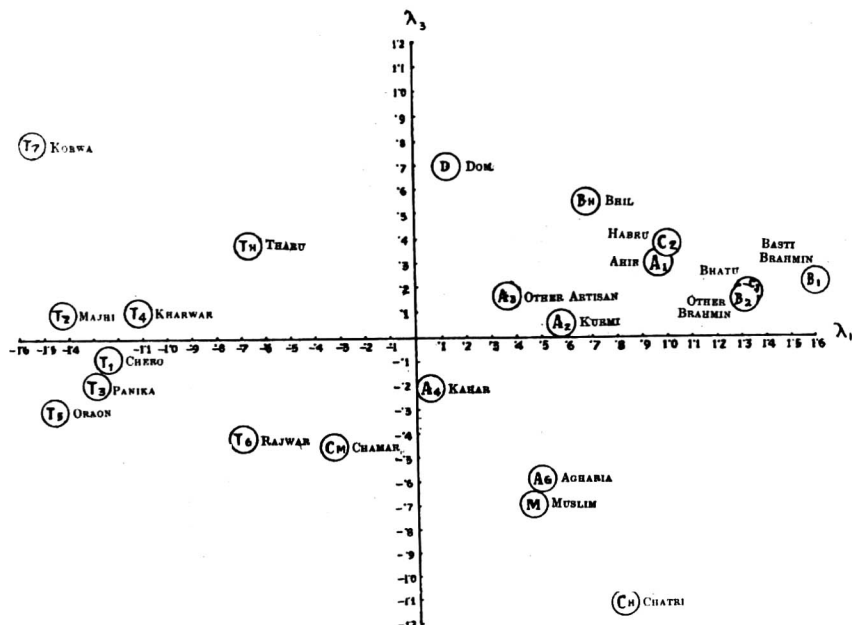


Chart 11.32 U. P. Anthropometry (1941) : Caste and Tribal Constellations (λ_1, λ_3)

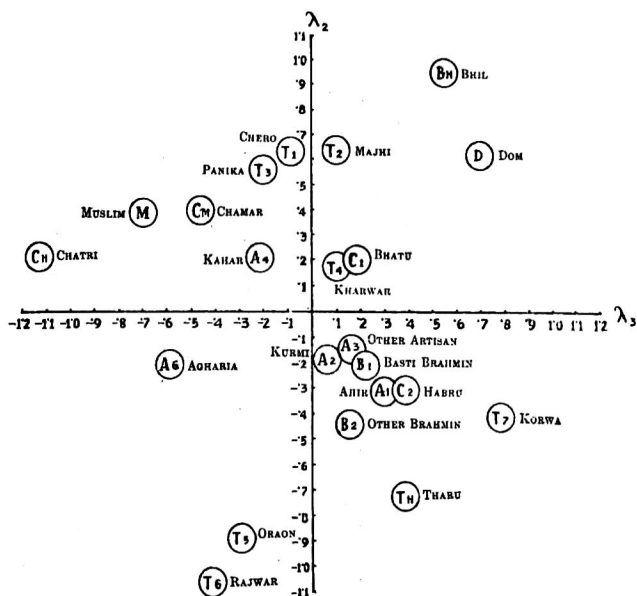


Chart 11.33 U. P. Anthropometry (1941) : Caste and Tribal Constellations (λ_1, λ_2)

deduced from the D^2 analysis. If the first three variates absorb a high percentage of the variation then a three dimensional model would supply a good picture of the configuration in the total character space. In the present case the sub-clusters in the General-cluster are not properly differentiated since the best discriminating character Frontal Breadth is not included in the general canonical analysis. To bring this analysis in line with the classification based on all the 9 selected characters, one may go a step further and use the three canonical variates in conjunction with y_9 . The variances and covariances arising out of these four variates between 14 members of the General-cluster excluding Agharia are given in Table 11.4.

TABLE 11.4 VARIANCES AND COVARIANCES FOR THE VARIATES $\lambda_1, \lambda_2, \lambda_3$ AND y_9

	λ_1	λ_2	λ_3	y_9
λ_1	.3900	-.0261	.0227	-.0285
λ_2	-.0261	.1969	-.0193	.0945
λ_3	.0227	-.0193	.2361	-.0760
y_9	-.0285	.0945	-.0760	.2334

Out of a total variance of 1.0565, the first three canonical variances $\lambda'_1 = .4210$, $\lambda'_2 = .3270$, $\lambda'_3 = .2025$ account for 90 percent. The canonical vectors correspond-

ing to the first three canonical variances are given in Table 11.5 and the mean values of canonical variates for 14 members of the G-cluster are given in Table 11.6.

TABLE 11.5 THE CANONICAL VECTORS CORRESPONDING TO THREE CANONICAL VARIANCES

	λ_1	λ_2	λ_3	y_0
λ_1'	.825	-.286	.292	-.391
λ_2'	.564	.383	-.439	.792
λ_3'	.015	.575	.792	.206

TABLE 11.6 MEAN VALUES OF THE FIRST THREE CANONICAL VARIATES OF 14 MEMBERS OF THE G-CLUSTER

groups		λ_1'	λ_2'	λ_3'
1 Brahmin (Basti)	B ₁	1.394	.793	.106
2 Brahmin (other)	B ₂	1.203	.589	-.090
4 Chattri	Ch	.133	1.258	-.681
5 Muslim	M	-.042	.869	-.274
6 Bhatu	C ₁	1.581	.003	.017
7 Habru	C ₂	1.350	-.208	-.034
8 Bhil	Bh	.324	.696	1.067
9 Dom	D	.007	.192	.984
10 Ahir	A ₁	1.007	.244	.049
11 Kurmi	A ₂	.582	.185	-.078
12 Other Artisan	A ₃	.385	.074	.047
13 Kahar	A ₄	-.050	.157	-.061
14 Tharu	Th	.055	-1.258	-.280
15 Chamar	Cm	-.619	.314	-.087

141. The two dimensional Charts 11.61, 11.62 and 11.63 representing the above 14 groups with respect to (λ'_1, λ'_2) , (λ'_1, λ'_3) and (λ'_2, λ'_3) respectively give the internal patterning of the members in the G-cluster. The general conclusions are the same as those already reached by considering the D² values. The third canonical variate brings out the distinct nature of the two groups Bhil and Dom on one hand and Muslim-Chattri subcluster on the other. The third variate is not, however, useful for a general discrimination of the various subclusters. It must be remembered that the above canonical variates have been built out of the three canonical variates derived earlier and y_0 . This is only an approximate analysis but will not differ very much from the canonical analysis of $y_1, \dots, y_9$ taken together.

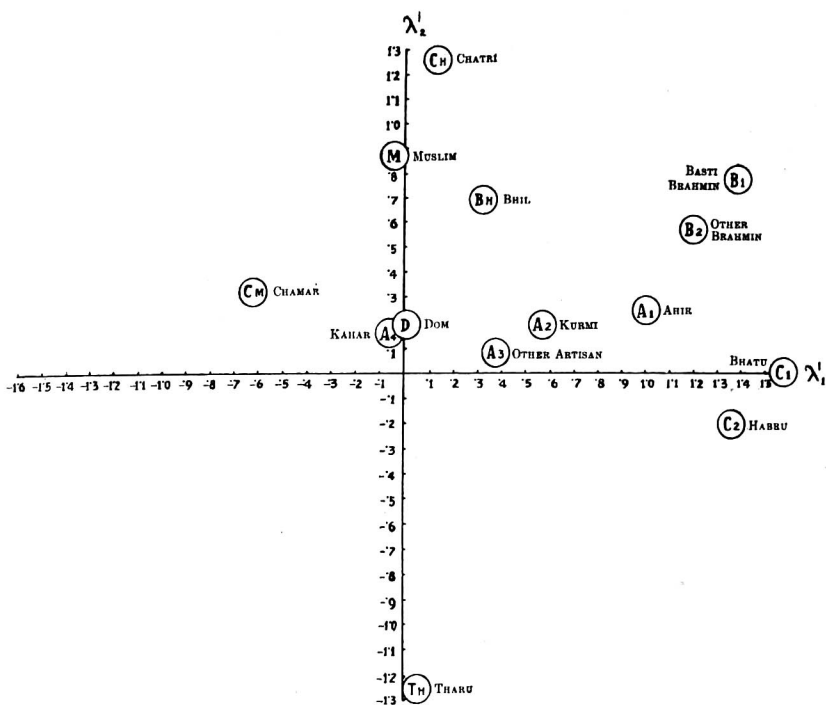


Chart 11.61 U. P. Anthropometry (1941) : Distribution of Groups in the General Cluster (λ'_1 , λ'_2)

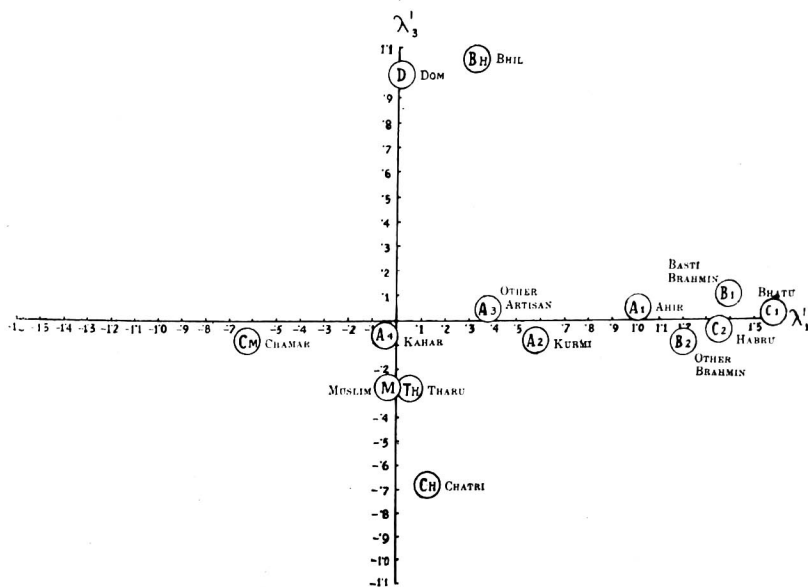


Chart 11.62 U. P. Anthropometry (1941) : Distribution of Groups in the General Cluster (λ'_1 , λ'_3)

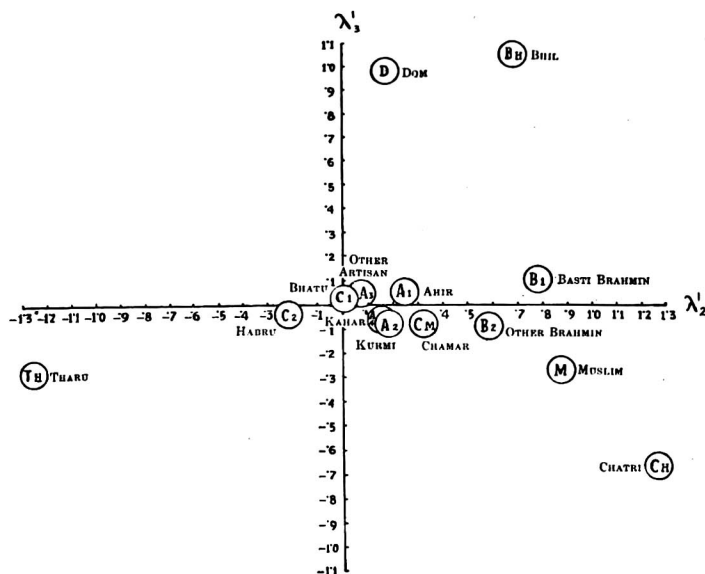


Chart 11.63 U. P. Anthropometry (1941) : Distribution of Groups in the General Cluster (λ'_2 λ'_1)

12. D^2 -ANALYSIS BASED ON ALL THE TWELVE AVAILABLE CHARACTERS

142. In section 9, a comparison has been made of the groups, with the help of charts, in each of the 12 available characters separately. Since the correlations of the various characters are not taken into consideration in constructing these charts, it is difficult to judge from their study the adequacy of a subset of characters for purposes of classification. It was, however, observed that when the D^2 , based on the 9 characters, between any two groups was small (or large) the differences in the means of omitted characters were also, on the whole, small (or large). This shows that a smaller D^2 (even when based on only 9 characters) indicates closer resemblance in all the characters than a larger D^2 . In such a situation an analysis with 9 characters would supply approximately the same kind of configuration as that with a higher number of characters.

143. To investigate further the question of adequacy (or otherwise) of using nine characters, it was decided to compute the D^2 's based on all the twelve available characters, and compare these D^2 -values with those based on the chosen set of 9 characters. The D^2 -values based on 12 characters can be easily calculated from the D^2 -values based on 9 characters by adding to the latter the sum of squares of differences of mean values of 3 transformed characters involving the additional 3 characters. The three transformed characters involving UFL, BgB and TFL are given below.

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144. The mean values of the above transformed characters for the groups of the General-cluster is given in Table 12.1, and the D^2 -values based on 12 characters are given in Table 12.2. The difference between D^2 -values based on 12 and 9 characters are shown in adjoining columns in Table 12.2.

$$\begin{aligned}
 .710447 y_{10} = Y_{10} &= ufl - .008642 Y_1 - .046885 Y_2 - .011565 Y_3 \\
 &\quad - .062088 Y_4 - .056474 Y_5 - .660983 Y_6 \\
 &\quad - .165662 Y_7 - .101019 Y_8 - .217200 Y_9 \\
 .885511 y_{11} = Y_{11} &= b_2b - .055612 Y_{10} + .019078 Y_1 - .088691 Y_2 \\
 &\quad - .067060 Y_3 - .036231 Y_4 - .059661 Y_5 \\
 &\quad - .019099 Y_6 - .414873 Y_7 - .193662 Y_8 \\
 &\quad \quad \quad - .219200 Y_9 \\
 .773343 y_{12} = Y_{12} &= tfl + .004951 Y_{11} - .485017 Y_{10} + .031139 Y_1 \\
 &\quad - .091072 Y_2 - .076982 Y_3 - .009811 Y_4 \\
 &\quad + .017165 Y_5 - .496932 Y_6 - .183026 Y_7 \\
 &\quad \quad \quad - .126689 Y_8 - .306700 Y_9
 \end{aligned}$$

145. The most striking effect of including the three additional characters (Upper Face Length, Total Face Length, and Bigonial Breadth) is to demarcate the Doms more clearly and distinctly from practically all the 13 other groups included in the analysis based on 12 characters. Chattris become more clearly separated from Brahmins, from the two criminal tribes Habrus and Bhatus, from the Artisans and from Doms. Muslims also get more distinctly separated from Brahmins and some of the Artisans, but are not differentiated more sharply from Chattris; Tharus, on the whole, also get more clearly demarcated.

TABLE 12.1 MEAN VALUES OF THE TRANSFORMED CHARACTERS y_{10} , y_{11} , y_{12}

	y_{10}	y_{11}	y_{12}
1. Brahmin (Basti)	.165	-.059	-.071
2. Brahmin (Others)	.152	-.046	-.307
3. Chattri	-.561	.119	.074
4. Muslim	-.350	.230	.136
5. Bhatu	.031	.067	-.128
6. Habru	.095	.258	-.350
7. Bhil	-.211	-.057	-.157
8. Dom	.483	-.041	.624
9. Ahir	-.178	-.096	-.074
10. Kurmi	.255	-.100	-.017
11. Other Artisan	.107	.032	.084
12. Kahar	-.225	.235	.168
13. Tharu (male)	-.013	.133	-.486
14. Chamar	.014	-.166	-.145

146. The general conclusions based on nine characters are, however, not altered in any appreciable manner. This shows that the analysis based on the nine selected characters was adequate (as compared to the analysis based on twelve characters) in the sense of supplying stable conclusions relating to the groups considered in the present paper. It is, however, not possible to assert anything definite as to

whether these conclusions would remain fairly stable or not in case other new characters are included in the analysis. This is a matter of contingent fact which can be settled only by reference to actual observations.

TABLE 12.2 VALUES OF D^2 BASED ON TWELVE CHARACTERS ARRANGED IN INCREASING ORDER OF MAGNITUDE WITH RESPECT TO EACH GROUP OF THE GENERAL CLUSTER AND THE EXCESS OVER THE D^2 VALUES BASED ON 9 CHARACTERS*

(1) (1.1) (1.2)	(2) (2.1) (2.2)	(3) (3.1) (3.2)	(4) (4.1) (4.2)	(5) (5.1) (5.2)	(6) (6.1) (6.2)	(7) (7.1) (7.2)
Brahmin Basti (B ₁)	Brahmin Others (B ₂)	Chattri (Ch)	Muslim (M)	Bhatu (C ₁)	Habru (C ₂)	Bhil (Bh)
B ₁ .33 .06	B ₁ .33 .06	M .46 .06	Ch .46 .06	C ₁ 1.41 .09	C ₁ 1.41 .09	A ₁ 1.92 .17
A ₁ 1.29 .12	A ₁ .95 .17	A ₁ 2.37 .13	A ₁ .92 .02	A ₁ 2.75 .07	A ₁ 1.54 .28	D 2.24 .09
A ₁ 1.49 .01	A ₁ 1.13 .10	A ₁ 2.84 .72	Cm 1.59 .37	A ₁ 3.07 .09	B ₂ 1.73 .10	Cm 2.29 .06
A ₁ 2.16 .03	A ₁ 1.63 .16	Cm 2.98 .46	A ₁ 1.59 .14	A ₁ 3.40 .05	A ₁ 1.79 .26	A ₁ 2.43 .19
C ₁ 2.41 .18	C ₁ 1.73 .10	A ₁ 3.17 .45	A ₁ 1.95 .61	B ₁ 3.51 .03	A ₁ 1.91 .24	A ₁ 2.47 .24
M 3.25 .39	M 3.14 .52	B ₁ 3.55 .68	A ₁ 2.63 .18	B ₁ 3.67 .06	B ₁ 2.41 .18	A ₁ 2.54 .01
D 3.44 .58	A ₁ 3.16 .44	A ₁ 3.59 .21	B ₁ 3.14 .52	A ₁ 4.38 .18	Bh 2.66 .23	C ₁ 2.66 .23
C ₁ 3.51 .03	Ch 3.55 .69	B ₁ 3.63 .58	B ₁ 3.25 .39	M 4.70 .24	A ₁ 3.24 .37	M 3.35 .19
A ₁ 3.60 .30	C ₁ 3.67 .06	Bh 5.23 .21	Bh 3.35 .19	Bh 5.15 .07	D 3.30 1.19	B ₁ 3.97 .15
Ch 3.63 .58	D 3.78 .97	D 5.26 1.42	D 3.47 1.00	D 5.30 .78	Th 3.55 .04	B ₁ 4.60 .15
Bh 4.60 .15	Bh 3.97 .15	C ₁ 5.31 .63	C ₁ 4.17 .43	Ch 5.65 .40	M 4.17 .43	C ₁ 5.15 .07
Cm 5.46 .04	Cm 4.40 .06	C ₁ 5.65 .40	C ₁ 4.70 .24	Th 5.81 .13	Cm 4.61 .23	Th 5.19 .18
Th 7.49 .24	Th 5.91 .09	Th 7.69 .62	Th 5.76 .51	Cm 6.12 .05	Ch 5.31 .63	Ch 5.23 .21

TABLE 12.2 (Concl'd.)

(8) (8.1) (8.2)	(9) (9.1) (9.2)	(10) (10.1) (10.2)	(11) (11.1) (11.2)	(12) (12.1) (12.2)	(13) (13.1) (13.2)	(14) (14.1) (14.2)
Dom (D)	Ahir (A ₁)	Kurmi (A ₂)	Artisan Others (A ₃)	Kahar (A ₄)	Tharu (Th)	Chamar (Cm)
Bh 2.24 1.09	A ₁ .49 .19	A ₁ .17 .05	A ₂ .17 .05	A ₁ .59 .16	A ₁ 3.54 .35	A ₁ 1.01 .32
A ₁ 2.75 .44	A ₁ .61 .12	A ₁ .49 .19	A ₁ .59 .16	A ₁ .96 .38	C ₁ 3.55 .04	A ₁ 1.45 .10
A ₁ 2.88 .47	B ₁ .95 .17	A ₁ .96 .38	A ₁ .61 .12	M .92 .02	Cm 3.94 .20	M 1.59 .37
C ₁ 3.30 1.19	B ₁ 1.29 .12	B ₁ 1.13 .10	Cm 1.45 .10	Cm 1.01 .32	A ₁ 4.06 .34	A ₁ 1.89 .08
B ₁ 3.44 .58	C ₁ 1.54 .28	B ₁ 1.49 .01	M 1.59 .14	A ₁ 1.69 .17	A ₁ 4.26 .48	Bh 2.29 .06
A ₁ 3.45 .79	A ₁ 1.69 .17	C ₁ 1.79 .26	B ₁ 1.63 .16	Ch 2.37 .13	A ₁ 5.18 .25	Ch 2.98 .46
M 3.47 1.00	Bh 2.54 .01	Cm 1.89 .08	C ₁ 1.91 .24	Bh 2.43 .19	Bh 5.19 .18	A ₁ 3.10 .05
B ₁ 3.78 .97	M 2.63 .18	M 1.95 .61	Bh 1.92 .17	B ₁ 3.16 .44	M 5.76 .51	D 3.93 1.02
A ₁ 3.84 .93	C ₁ 2.75 .07	Bh 2.47 .24	B ₁ 2.16 .03	C ₁ 3.24 .37	C ₁ 5.81 .13	Th 3.94 .20
Cm 3.93 1.02	Cm 3.10 .05	Ch 2.84 .72	D 2.75 .44	D 3.45 .79	B ₁ 5.91 .09	B ₁ 4.40 .06
Ch 5.26 1.42	Ch 3.59 .21	D 2.88 .47	Ch 3.17 .45	B ₁ 3.60 .30	B ₁ 7.49 .24	C ₁ 4.61 .23
C ₁ 5.30 1.78	D 3.84 .93	C ₁ 3.07 .09	C ₁ 3.40 .05	Th 4.26 .48	D 7.69 1.51	B ₁ 5.46 .04
Th 7.69 1.51	Th 5.18 .25	Th 4.06 .34	Th 3.54 .35	C ₁ 4.38 .18	Ch 7.69 .62	C ₁ 6.12 .05

*The columns (.1) give the D^2 -values based on 12 characters and the columns (.2) the excess over the D^2 -values based on the 9 characters given in Table 8.2.

CHAPTER 7. SUMMARY OF STATISTICAL RESULTS

147. *Conformity to multi-variate normal distributions:* It is convenient at this stage to give a summary of the statistical results. The detailed analysis in this part has shown that the individual measurements considered in this paper conform in a general way to multi-variate normal distributions. With the available size of samples (57 to 197; general average, 128) deviations from normality were rare. But the important feature is that even when deviations from the normal distribution (single frequency), or deviations from linearity of regressions are significant, the actual magnitude of such deviations are usually small. With increasing size of samples, it is likely that deviations from normality of distribution or from linearity of regression would become increasingly more frequent, but the magnitude of the deviations is likely to be small. It should be thus possible to use the theoretical apparatus based on the assumption of normal distributions at least in an approximate manner. This result for the present material thus corroborates previous results of the same type based on other anthropological materials.

148. *Variances and correlations:* The intra-group variance (for each character) and the co-efficient of correlation (for each pair of characters) are not exactly constant for all groups but differ to some extent for different groups. The magnitude of such differences are, however, usually small, and it was decided to use the pooled intra-group variances and the pooled intra-group co-efficients of correlation as constants for purposes of calculation of the D^2 -values. This procedure gave at least useful approximate results. It is, however, possible and desirable to study in detail the observed differences between the different groups in variances and co-efficients of correlation. Basic material for this purpose is available in the present paper.

149. *Size of samples:* Using standard tests of divergence, it is seen that with 3 exceptions (Basti and other Brahmins; Ahir and Kurmi Artisans; and Kurmi and other Artisans), the 22 samples (as also Tharu females) are statistically differentiated so that they may be considered to have come from populations which differ significantly in the physical characters under review. The three pairs which showed no significant differences are closely associated groups. The observed differences in these cases would, however, have been statistically significant if they were based on samples of nearly double the present size. For example, samples of about 150 each of the two groups of Brahmins (instead of present size 85 and 92) would have made the observed D^2 -value significant.

150. On the other hand, samples of less than the present size (ranging from 57 in the case of Artisan Kahar to 197 in the case of Kharwar) would have been sufficient to establish significant differences in most cases. If the size of the samples in each group is halved, only 8 more pairs would have shown non-significance. The four Artisan groups would not have been differentiated; nor Chamars and Artisan Kahars; Chattris and Muslims; Majhis and Panikas; and Majhis and Kharwars. For the statistical analysis of groups such as those under review, samples of size 150 to

200 would seem to be quite adequate; samples of about 100 each would suffice in most cases; but it would be risky to reduce the size of samples below 60 or 70.

151. *Between group variance:* For all groups the total variance for 11 characters which are available for all the samples is 1.9216 out of which 1.7837 or 92.8% is accounted by the 8 characters included in the first analysis. The first three canonical variates (based on 8 characters) have a variance of 1.4861 or 77.3% of the total variance. Among these three again, the first canonical variate (λ_1) has a variance 1.0029 (or 52.2%); the second canonical variate (λ_2) has 0.2745 (or 14.3%); and the third (λ_3), 0.2087 (or 10.9%). Of the total variance, the three canonical variates ($\lambda_1, \lambda_2, \lambda_3$) taken together account for a variance of 1.4861 or 77.3%. It is thus noticed that the greater part of the total variance, namely, 77.3% is accounted for by three linear compounds, while the remaining 22.7% is distributed over the other 8 canonical variates. Further, the square root of the variances for the first three canonical variates are respectively 1.00, 0.52, and 0.46. The groups under review in the present paper thus have a scatter in the three directions of the first three canonical variates of something like an elongated ellipsoid with axes proportional to 1.00, 0.52 and 0.46.

152. The non-tribal groups have a total variance for 11 characters of 1.2573 and for all 12 characters (Facial Breadth being the twelfth) of 1.4827. Out of this, 8 characters (without FB) account for 1.1090 or 74.8%, and 9 characters (including FB) for a variance of 1.3345 or 90% of the total variance. In this case the canonical co-ordinates absorb a somewhat lower proportion of the total variance. The first canonical variate (λ'_1) has a variance of 0.4210 or 28.4%; the second (λ'_2) of 0.3270 or 22.5%; and the third (λ'_3) of 0.2025 or 13.7%. All three canonical variates taken together have a variance of 0.9505 or 64.7% of the total variance. Taking the square root of the variance of the first three canonical variates the scatter of the non-tribal groups may be represented by an ellipsoid with axes proportional to 0.65, 0.57 and 0.45. The scatter is now far more spherical in shape and account for only 64.7% as compared to 77.3% with an elongated ellipsoid in the case of the scatter of tribal and non-tribal groups taken together.

153. From the point of view of physical anthropometry, the most important result which comes out in the present analysis is the fact that a great deal of the variation or scatter is confined to three or four dimensions. This shows that variations between different groups have a definite pattern which may be now considered in some detail.

154. *Three basic clusters:* There is clear evidence of the existence of three distinct clusters consisting of (1) the two Brahmin samples forming what may be called the B-cluster; (2) the four Artisan groups (A_1, A_2, A_3 , and A_4) and possibly Chamar (C_m or possibly A_5) forming the Artisan or A-cluster; and (3) the seven tribal groups Chero (T_1), Majhi (T_2), Panika (T_3), Kharwar (T_4), Oraon (T_5), Rajwar (T_6), and Korwa (T_7) constituting the T-cluster with Tharus forming a border-line case.

155. *B-cluster (Brahmins):* The D^2 -value between the two Brahmin samples is 0.33 (based on 12 characters) and is non-significant showing that these two samples

are closely associated. The B-cluster is sharply differentiated from all other groups, but to the largest extent from the Tribal groups (T-cluster).

156. *T-cluster (Tribal groups)*: The T-cluster shows indeed a sharp contrast to the Brahmins, and have practically opposite characteristics to the Brahmins in every physical feature under review. Within the T-cluster itself, the four tribes Chero (T_1), Majhi (T_2), Panika (T_3), and Kharwar (T_4) form a sub-cluster with D^2 -values less than one among these four tribes. Oraon (T_5) and Rajwar (T_6) are somewhat close; but Rajwars have a most remarkable feature, namely, the narrowest nasal breadth among all the groups, which is most surprising and requires further study. Korwas (T_7) in almost every character come at the opposite end from the Brahmins. Tharus show some resemblance to the tribal groups, but also have their own peculiarities which separate them from the others.

157. *A-cluster (Artisans)*: In physical appearance the Artisans occupy a middle position between the Brahmins and the Tribal groups. There is a definite patterning among the Artisans, with Ahir (A_1) nearest the Brahmins followed in order by Kurmis (A_2), other Artisans (A_3), and Kahars (A_4) which are farthest away from Brahmins and nearest to the Tribal groups. Chamars (Cm) occupy a position between Kahars and the tribal groups and are on the border-line of the A-cluster.

158. *Chattris (Ch) and Muslims (M)*: Although Chattris are Hindus and have no social connexion (possibly of marriage) with Muslims, these two groups are very close in physical appearance with a value of $D^2=0.46$ (12 characters) which although statistically significant is quite small. These two groups may be therefore considered to have formed a sub-cluster occupying a position between the B-cluster and the A-cluster, but somewhat nearer to the Artisans than to the Brahmins. They are, of course, very far from the T-cluster.

159. *Agharias (Ag)*: The Agharias are somewhat quite close to the Artisans, and about the same distance from the Brahmins, and the Chattri-Muslims, but further off from the Tribal groups. They can be thus broadly grouped with Chattris and Muslims occupying roughly a position between the Brahmins and the Artisans but somewhat closer to the latter.

160. *Bhatu (C₁) and Habrus (C₂)*: These two so-called criminal tribes are clearly differentiated ($D^2=1.41$ on 12 characters) but in certain ways form a sub-cluster which is, strangely enough, nearest to the Brahmins, and quite close to the Artisans. They are further off from the Chattri-Muslims and Agharias, and still further away from the T-cluster. These two castes thus occupy very individual positions.

161. *Doms (D) and Bhils (Bh)*: These have a D^2 -value of 2.24 (12 characters) and are entirely distinct from each other. They are both also very clearly differentiated from the Brahmins, Chattris, Agharias and Muslims as well as from the Artisans, and the two criminal tribes, Bhatu and Habrus, and even more sharply from the tribal groups.

162. *The general picture:* The D^2 -values thus supply a general picture of the following kind. There are three well-demarcated clusters, the Brahmins (B-cluster) at the top of the Hindu social hierarchy; the Artisans (A-cluster) in the middle; and the tribal groups (T-cluster) at the bottom. Among the tribals, a small sub-cluster is formed by Cheros (T_1), Majhis (T_2), Panikas (T_3) and Kharwars (T_4); Oraons (T_5) and Rajwars (T_6) are somewhat close while Korwas (T_7) occupy the very bottom place farthest away from the Brahmins.

163. Chattris (Ch) and Muslims (M) form a sub-cluster and together with Agharias (Ag) occupy a position between the Brahmins (B-cluster) and the Artisans (A-cluster) but somewhat closer to the latter.

164. The two criminal tribes Bhatu (C_1) and Habrus (C_2), and Doms (D), and Bhils (Bh) have highly individual features of their own, and stand apart from the other groups which form a main sequence. Each of these four groups has in fact a distinct position of its own, and cannot be fitted into the general scheme determined by the three basic clusters (B), (A), and (T). Tharu has also a place of its own somewhere on the border line of the T-cluster but quite distinct from the tribal groups. Finally, Chamar is also a border line case separating the higher castes and tribals but nearer to the Artisans.

165. This is as far as one can go on the basis of the D^2 -values themselves. To make further progress, it is necessary to take into consideration the social and cultural history of the tribes and castes, that is, the known ethnological evidence. This is the task taken up in the next part of the study.

PART III. ANTHROPOLOGICAL OBSERVATIONS

By P. C. MAHALANOBIS

CHAPTER 8. PHYSICAL APPEARANCE IN RELATION TO ETHNOLOGICAL EVIDENCE

166. So far we have considered the results which can be reached by the exclusive use of D^2 -values (that is, with the help of the generalized distances, between castes and tribes based entirely on abstract statistical concepts). How far these results are reasonable (or otherwise) can be judged only by comparison with social and cultural history and ethnological knowledge about the different castes and tribes. For this purpose I have collected relevant information from Census reports and other publications and also from the manuscript notes sent to me by Dr. D. N. Majumdar. This material is given at the end of this chapter as Ethnological Supplement.

167. These notes supply the basic material for the ethnological observations made in the present chapter. Persons not familiar with the social and cultural history of the castes and tribes under study would find it convenient to read the ethnological notes before reading this chapter. Detailed references are not being given here as such references will be found in ethnological notes in the case of each observation of an ethnological character made in the present chapter.

1. THE BACKGROUND OF INDIAN HISTORY

168. Present knowledge about the history of ancient India points to several distinct ethnological and cultural strata. It is generally believed that the original inhabitants of India belonged to primitive races scattered over the whole country who spoke languages of the Austric family. It is also generally agreed that the existing hill and forest tribes are the remnants or representatives of the autochthonous people admixed to some extent with later immigrants. These tribes are characterised by a dark skin, a broad nose, and coarse features. Most of these primitive tribes speak languages of the Austric family; and some of the tribes which speak languages belonging to other families are believed to have formerly used Austric languages.

169. A large number of tribes and castes in the South India speak languages of the Dravidian family. From the presence of certain words and sounds of Dravidian origin in the languages spoken in Northern India, (and the existence of Dravidian speaking islands like the Brahui speaking group in the North-West), it is generally believed that Dravidian languages were once spoken over a large part of the country. Since the discovery of the Indus Valley civilization in the 1920's there is a view that the Dravidian speaking groups are remnants or representatives of the people who entered India from the North-West, possibly from the direction of Mesopotamia, and who built up the Indus Valley civilization in India covering a wide area extending to the Gangetic plains. It is possible that there were many waves of immigration of these people; and the Indus Valley archaeological remains are usually placed broadly between 4000 and 2000 B.C.

170. It is believed that a little later, somewhere about 2000 or 1500 B.C., an altogether different kind of people, possibly from Central Asia, began to enter India through the North-West who definitely spoke Indo-European (or as they are sometimes called, Aryan or Indo-Aryan) languages and who established the Vedic culture in India. These groups of people first settled in the Punjab in North-Western India and then gradually spread to the east and to the south of the country. The earlier Dravidian speaking people were probably pushed to the south; and the Indo-Aryan languages in course of time superseded other languages in Northern India.

171. The Vedic age was succeeded by the classical age (of which traditional and legendary accounts are preserved in the two great epics, Mahabharata and Ramayana), and was followed by the Buddhist period of Indian History which began in the 6th century B.C. During the next five or six centuries came the Persians and Greeks; and after them the Scythians and the Kushans from Central Asia. In the 5th century A.D. other invaders from Central Asia, the Huns, entered Northern India. Muslim invasions began with the advent of the Arabs in the 8th century A.D., and continued until the 16th century and brought in many different groups of people like Arabs, Pathans, Turks and Moghals. A certain amount of infiltration of Sino-Tibetan groups over the Himalayas or through the north-east land frontier has also occurred from time to time. Finally, in the 16th and 17th centuries Europeans (Portuguese, French and British) began to come to India and some of them made India their home. In recent years there were also invasions from Burma and some influx of Mongolian groups into Assam and North-East India.

172. As Hutton¹ observes: "It is from such diverse elements that the peoples of India are derived, and although the development of the caste system and its stabilization have crystallized the peoples of India into a large number of fairly 'watertight' communities, the barriers between them were less rigid while the system was in its early development than they are now, and even now they are not all immutable. Consequently the differences between caste and caste, in so far as they are racial are rather differences of degree of mixture than absolute differences of race and type."

2. GENERAL OBSERVATIONS ON THE CASTE SYSTEM

173. At the time of the Census in 1941 (when the measurements under review were taken) India contained some 390 millions of people inhabiting a natural geographical unit. It was composed of "different elements of great diversity, of different creeds, different customs, and even different colours" having however much in common. As Hutton² observes: "Geographic circumstances have imposed a certain unity on the inhabitants of the peninsula, whereas the diverse origins of the people have dictated variety." The Hindu society gradually evolved into a single system with a great deal of historical stability. Within this single system, as Hutton³ observes:

¹ Hutton, J. H. : *Caste in India*, Cambridge University Press, 1946, p. 6.

² *Ibid.* p. 1.

³ *Ibid.* p. 1.

"Each caste is a social unit in itself. The customs by which it lives are generally different in some respects from those of other castes. Persons of one caste do not marry those of another. The extent to which persons of one caste will eat or drink with those of another is strictly limited by unwritten laws and everybody knows who is affected by them. Even a change of religion does not destroy the caste system, for Muslims, who do not recognize it as valid, are often found to observe it in practice and there are many Muslim castes as well as Hindu; and when some reforming body breaks away from Hinduism and repudiates caste, it becomes something very like a new caste of its own. Jews and Christians also in India often form castes or bodies analogous to castes.

"There are thought to be some 3000 castes in India; and it would need an encyclopaedia to deal with them all. Some are derived from tribal or racial elements, some are occupational, being of the nature originally perhaps of guilds of artificers or craftsmen, some are territorial, some religious, and so forth. The original bond which united the members of a caste has often been different in different cases, but it is suggested that the society of the country as a whole has been built up by the integration of these different units into an organic community, and one into which a new unit is fitted without difficulty, while any group that breaks away from other units can as easily form itself into a new cell within the structure, and will indeed find it almost impossible to do anything else."

174. On the side of linguistics, at one time the non-Aryan or non-Indo-European languages were all lumped together under one single name as 'Dravidian'. Grierson's magnificent survey of the languages of India showed however that languages classified under the name Dravidian belonged broadly to two different families, one speaking languages of the true Dravidian family (Telugu, Tamil, Malayalam, Kanarese and a few others), and the other speaking languages of an entirely different type belonging to the Austric family (which includes the so-called Kolarian languages spoken by the Munda and Oraon tribes as well as the languages of the Bhils, Santals etc.) A distinction must therefore be made between the two so-called Dravidian groups which are now represented (either racially and ethnologically and/or linguistically) by the people in the south speaking Telugu, Tamil, Malayalam, Kanarese etc., and the other big group speaking languages belonging to the Austric family.

175. This in brief is the cultural and ethnological background of modern India. The question immediately arises to what extent do the present inhabitants of the United Provinces represent the different racial and cultural strata of the past. The material reviewed in the paper is much too meagre to enable any definite conclusions being drawn. Tentative suggestions and even speculative observations are however worth while as a guide to future research.

3. THREE BASIC CLUSTERS

176. A study of D^2 -values has already revealed the existence of three basic clusters: (1) the two Brahmin samples forming the B-cluster; (2) the four Artisan

groups (Ahir, Kurmi, other Artisans, and Kahar) constituting the A-cluster; and (3) the Tribal groups (Chero, Majhi, Panika, Kharwar, Oraon, Rajwar, and Korwa) forming the T-cluster. It is now intended to make a closer examination of the results based on physical measurements in relation to ethnological knowledge and social and cultural history of the various tribes and castes.

177. *The B-cluster (Brahmins)*: The value of D^2_{12} for Basti and Other Brahmins is 0.33 (based on twelve characters⁴) and is statistically non-significant showing that the two groups resemble each other very closely. Basti Brahmins are of a larger build in every one of the 12 characters except height, but the differences are small and non-significant for samples of size of about 85 and 92 respectively. These two samples may therefore be considered together as a B-cluster.

178. On the whole, the Brahmins are distinctly of a larger build than other castes and tribes. With two exceptions (Agharia and Dom) they are the tallest and have the largest sitting height (which particular character varies widely from group to group). The Brahmins have medium nasal length, highest nasal depth, and narrow nasal breadth (not the narrowest, being wider than the nasal breadth of 4 or 5 groups). The size of the head is big with the largest head length (with the exception of Chattris), and the largest head breadth (with the exception of Agharias). Upper facial length is the largest and the total facial length larger than most of the other groups. The width of the face is also large; facial breadth being the widest and bizygomatic and bigonial breadths widest with only a few exceptions.

179. The Brahmins were traditionally the priestly class occupying the highest social status in the Vedic age, and have retained their position at the apex of Hindu society up to the present time. They are clearly and unmistakably differentiated from all other groups; and may reasonably be considered to be the modern representatives of the highest layer of the Vedic people speaking Indo-European or Indo-Aryan languages.

180. *The T-cluster (Tribal Groups)*: The Tribal groups (T-cluster) representing the aboriginal people of India show a sharp contrast to the Brahmins (B-cluster) in physical appearance, and have definitely opposite characteristics as can be easily seen in the character profile Chart 10.1. The Tribal groups have short or the shortest stature; the smallest sitting height; small or the smallest nasal length; and smallest nasal depth; but the widest nasal breadth. They have a much smaller head length (appreciably smaller than the Brahmins), and the smallest head breadth (much smaller than others). Both upper and total facial lengths, and frontal, bizygomatic and bigonial breadths are appreciably smaller than others (with one or two exceptions). The tribal groups are thus most prominently differentiated from the other groups by a generally smaller build, short stature, smallest sitting height, and very wide nasal breadth.

⁴ The square of the 'generalized distance' based on p characters is represented by D^2_p . The values of D^2_8 , D^2_9 and D^2_{12} are given in Tables 8.2, 8.21 and 12.2 respectively.

181. The tribal groups usually live in the hill and forest tracts of the country; mostly speak languages of the Austric family and have no written script. Their way of life is usually primitive, and they have social customs and religious practices which differ widely from those prevalent among the Brahmins and other high castes in Hindu society. As already noted, they are usually identified with the primitive aborigines of India, and occupy a position at the bottom or even outside the pale of Hindu society.

182. The Brahmins (B-cluster) and the Tribal groups (T-cluster) thus occupy the two extreme ends of the Hindu social hierarchy. In physical appearance also these two clusters offer the greatest contrast. It will be noticed in Table 8.2, the Tribal groups come at the bottom, that is, have the highest values of D^2 with respect to the Brahmins. Conversely, Basti Brahmin (B_1) occupies the bottom place in the D^2 -tables for all Tribal groups in the same Table 8.2; and Other Brahmin (B_2) usually occupies a low place. The values of D^2 between the Brahmins and the Tribal groups are indeed large, and range from 5.71 to 10.41. The two most sharply contrasted groups in the social hierarchy are thus also farthest apart in physical appearance as measured by the 'generalized distance'. Evidently the generalized distance (which measures the dissimilarity in physical appearance) leads to results which are in agreement with accepted ethnological views so far as the two clusters, Brahmin and Tribal, are concerned.

183. *The A-cluster (Artisans)*: In between the Brahmins and the Tribes, comes the third distinct cluster consisting of the Artisans, Ahirs (A_1), Kurmis (A_2), other Artisans (A_3) and Kahars (A_4). They have medium or moderate values of all characters under review. In fact, with the single exception of nasal breadth, the Artisans have features which are smaller than those of the Brahmins but bigger than those of the Tribal groups. They have a narrow nasal breadth (resembling the Brahmins) which differentiates them distinctly from the Tribal groups which have wide nasal breadth.

184. There is a definite patterning among the four Artisan groups with the Ahirs (A_1) nearest the Other Brahmins, $D^2_{12}=0.95$; followed in order by Kurmis (A_2), $D^2_{12}=1.13$; Other Artisans (A_3), $D^2_{12}=1.63$; and Kahars (A_4), $D^2_{12}=3.16$, which are farther away from the Brahmins and which show greater resemblances to the Tribes than the other three Artisan groups. Ahir (A_1), Kurmi (A_2), Other Artisan (A_3), all have features nearer the Brahmins than the Tribal groups, for example, they have a medium stature somewhat taller than the Tribes; moderate or fairly large sitting height; moderate or medium build of head and face, and narrow nasal breadth. Kahars (A_4) are shorter in stature; have a smaller sitting height; a somewhat smaller build of head and face; and a medium nasal breadth.

185. Let us now consider the social history. The Ahirs, traditionally a pastoral group, are a widely distributed caste of herdsmen and agriculturists. Kurmis are a very important cultivating caste engaged in farming as well as trade. Kahars are primarily a menial caste and work as domestic servants, carriers, watermen, fishermen, basket-makers etc. Other Artisans consist of about 18 different groups (such as oil-

presser, potter, cultivator, brass-worker, iron-worker etc.) These groups occupy the middle layer of Hindu society, and the ranking in order of social status is broadly: Ahir, Kurmi, and then Kahar.

186. Traditionally the Ahirs trace their descent from the Yadavas to which the god Krishna belonged. There are other traditions, of the Ahirs having descended from Brahmin or from Kshatriya men and women of lower castes. There are still other traditions of Scythian origin (from the tribe of Abars), and of their having been in the Indus Valley at a very early period in the History of India and of having given more than one dynasty to local thrones. In any case there cannot be any doubt of their being very old inhabitants of India. According to one view, they were in India before the time of Alexander.

187. The origin of the Kurmis is obscure. There are three views: (1) that there are two distinct classes of Kurmis, one Aryan and the other Dravidian or pre-Aryan; (2) that they are primarily of Aryan stock modified to varying extent by mixture with the aboriginal people; and (3) that they are originally of Dravidian or pre-Dravidian stock with mixture with the immigrants.

188. The Kahar, according to Brahmanical traditions, is a mixed caste descended from a Brahmin father and a Nishada or Chandala mother. According to one view, they are a true Aryo-Dravidian people; and according to another, they are derived from the union of high caste women and low caste men. It is a curious feature that they consider themselves to be *gurus* (spiritual guides) of the Brahmins, and would not accept Brahmins as their *gurus*.

189. All these three castes occupy a respectable position in Hindu society; Brahmins and higher castes can usually drink water and eat *pakki* food from their hands. Marriage usually takes place in infancy, but widow marriage is permitted. The dead are usually cremated but sometimes buried. Religious ceremonies for Ahirs and Kurmis are performed by Brahmins in the usual way, but Kahars do not accept the Brahmins as their spiritual guides. Panchayats are well-organized in every caste.

190. We have already seen that the Artisan-cluster occupies an intermediate position between the Brahmin-cluster and the Tribal-cluster. In fact the A-cluster is nearer to the B-cluster as judged by the D^2 -values between members of different clusters. Not only this, the ranking in social status (Ahir, Kurmi, Kahar) is exactly the same as ranking in regard to similarity of physical resemblance with the Brahmins. In other words, social status corresponds closely to physical resemblance with Brahmins.

191. These middle groups are widely distributed and form a very numerous section of Hindu society. They constitute an integral part of Hindu society; and show a pattern of affiliations to the Brahmins on one hand and to the Tribal groups on the other. Who then are these Artisans? What is their origin? Do they represent a mixture of the Vedic people with tribal groups? Or do they represent some of the Indus Valley people, possibly of medium social rank, who stayed behind in the north

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and were gradually absorbed within Hindu society ? What are their connexions with the Dravidian-speaking groups of the south ? These are intriguing questions. It would be of great interest to make comparative studies with the tribes and castes in south India, and it is to be hoped that necessary material in the form of individual measurements from the south would be secured at an early date.

4. CHAMARS

192. The Chamars are far off from the Basti Brahmins ($D^2_{12}=5.46$) in physical appearance; but resemble the Kahars (A_4) to a considerable extent, the value of D^2_{12} is 1.01 which is significant but not too large. The Chamars are somewhat taller and have a large facial breadth but are otherwise of smaller build than the Kahars or other Artisans. The Chamars, thus, may possibly be classed with the Artisans, but further away from the Brahmins than the Kahars. For example, in comparison with Ahirs, Chamars have much smaller sitting height and are smaller in build in all other characters except nasal breadth which is wider. Thus Chamars show some resemblance to the Tribal groups in practically every character, but are clearly differentiated from them.

193. The Chamars present a number of very interesting features. Traditionally workers in leather, they are an important caste and are very widely distributed, and have many occupations (such as field labour, ploughmen, carters, menial work etc.) other than the traditional one indicating the possibility of their original occupations having been extremely generalized. They occupy a very low position in Hindu society, and rank even lower than some of the Tribal groups; and are considered impure because they 'eat beef, pork, and fowls, all abomination to the orthodox Hindus.' They have well organized and influential panchayats or tribal councils. Widow marriage and divorce are fully recognized. Adult marriage was possibly prevalent in earlier times, but there is an increasing tendency to the adoption of infant marriage. Ordinarily dead bodies are cremated. They conform to the popular type of village Hinduism but many of them dispense with the service of Brahmins.

194. On the physical side, the view that they are hardly distinguishable in point of physical appearance from the Tribal groups is not corroborated by the present material. On the contrary, the Chamars resemble the Artisans to a large extent, so much so in fact that the Chamars can perhaps be included in the A-cluster occupying a position farthest away from the Brahmins and nearest the Tribal groups.

195. Who then are the Chamars ? Are they the modern representatives of a pre-Vedic people of medium or low rank who were forced to occupy a degraded position by the victorious Vedic people, and who began to be slowly integrated with Hindu society in more recent times ? It is interesting to note that Chamars are very widely distributed over the whole country. A comparative study of physical measurements of different sections of Chamars now living in different parts of India, and also a comparison with some of the Dravidian speaking groups in the south may throw

a great deal of light on the origin not only of Chamars but of other groups occupying the middle layers of Hindu society.

5. CHATTRIS AND MUSLIMS

196. Chattris and Muslims both have physical features broadly intermediate between Brahmins and Artisans. Chattris have a smaller stature and an appreciably smaller sitting height than the two Brahmin groups. As compared to Basti Brahmins ($D^2_{12}=3.63$), Chattris have an appreciably greater nasal length and a slightly greater head length but have smaller values in all other characters. This is also true in comparison with other Brahmins ($D^2_{12}=3.55$); with the exception that Chattris have in addition a somewhat larger total facial length.

197. On the other hand, compared to Ahirs ($D^2_{12}=3.59$), Chattris have an appreciably smaller sitting height, about the same values for bizygomatic breadth and nasal breadth but otherwise a larger build. Compared to Kahars ($D^2_{12}=2.37$) or Chamars ($D^2_{12}=2.98$), Chattris have a larger build in all characters except, of course, nasal breadth, which is even narrower than Brahmin's.

198. Muslims also show generally similar characteristics. Compared to Basti Brahmins ($D^2_{12}=3.25$), Muslims have about the same values for nasal length, bizygomatic breadth, and nasal breadth but otherwise are of a smaller build. Compared to Other Brahmins ($D^2_{12}=3.14$), Muslims have a somewhat bigger nasal length and slightly bigger total facial length and nasal breadth but otherwise have a smaller build. Compared to Ahirs ($D^2_{12}=2.63$), Muslims have a much shorter sitting height and slightly smaller head breadth but have otherwise a larger build. But compared to Kahars ($D^2_{12}=0.92$), Chamars ($D^2_{12}=1.59$), Muslims, like Chattris, are of a larger build.

199. Chattris and Muslims are quite similar in physical appearance and have a value of D^2_{12} equal to 0.46 which is small although statistically significant. With samples of size 139 for Chattris and 168 for Muslims, these two groups are clearly differentiated in only two characters, Chattris having an appreciably larger total facial length and a larger nasal length. Chattris and Muslims may therefore be considered to have formed a sub-cluster which is closer to the A-cluster than to the B-cluster, but much further off from the T-cluster. These two groups are thus somewhat like the Artisans but are clearly differentiated from them as also from the Brahmins and still more so from the Tribal groups.

200. The Chattris come just after the Brahmins in social status. They are a fighting and land-owning caste of Northern India and traditionally claim to be the representatives of the ancient *Kshatriya* (the second *varna* of the fourfold Vedic classification). They belong in a general way to the big (and rather ill-defined) group of Rajputs who probably rose to power in the 7th century A.D.

201. Muslims form an interesting group. They are completely outside the pale of Hindu society, and yet closely resemble the Chattris in physical appearance,

and do not differ more than the Chattris from the Brahmins or the Artisans. The Chattris and the Muslims have been living in the same region and have been holding a high position in society for many centuries. The Chattris also have a tradition of close connexion with administrative work under the Moghal rulers. The Chattris and Muslims, as already noted, are very close in physical appearance. What does this mean? Has there been any intermixture among the two (surreptitious or half recognized) in historic times? Or does it mean that the upper class U.P. Muslims represent, in a large measure, converts from Hindus of the same or similar social status as the Chattris and Brahmins? These are questions which require further investigation on both physical and ethnological sides.

6. AGHARIAS

202. In the D^2 -table for Agharias, it will be noticed that all the Tribal groups are placed at the bottom with D^2 -values ranging between 3.53 and 8.30. Agharias are thus clearly separated from the Tribal groups. They, however, show somewhat greater resemblance to most of the non-Tribal groups with moderate D^2 -values: Other Brahmins ($D^2=1.94$), Habrus ($D^2=2.00$), Other Artisans ($D^2=2.07$), Chamars ($D^2=2.12$), Muslims ($D^2=2.18$), Chattris ($D^2=2.33$), and Ahirs ($D^2=2.58$) but are, of course, clearly differentiated from all these groups. The distances from clusters show that they come between the Brahmins and the Artisans but are clearly differentiated from the Tribes. Agharias thus occupy a somewhat special position in relation to other groups. Compared to the Basti Brahmins (B_1), Agharias (Ag) are taller but have a much smaller sitting height and have an appreciably smaller build in every character including nasal breadth. On the other hand, contrasted with the Ahirs, the Agharias are much taller; have about the same sitting height, a larger head and a larger facial and nasal length but a smaller nasal depth. Compared with the Kahars, Agharias have a larger build in every character but much narrower nasal breadth.

203. Socially, the Agharias are a sub-group of Khattris, a mercantile caste which has its origin in the Punjab but are found in large numbers in the United Provinces. Trade is their main occupation, but they are also civil administrators, do literate work of all kinds, and are, moreover, priests of the Sikhs. They have settled in Afghanistan and have found their way into Central Asia. They have been living for a long time in the Mahommedan capitals of Lahore, Delhi, Agra, Lucknow etc., and have accepted many Muslim customs.

204. There are traditions connecting them with both Brahmins and Khatriyas. There is another suggestion that they are the modern representatives of a people occupying the trans-Indus region at the time of Alexander's invasion.

205. As already noted, they have a high social status. The Saraswat Brahmins eat food cooked by them. Their domestic ceremonies are of the standard orthodox type. Widow re-marriage is forbidden. There is one peculiar custom which is worth noting. Although they are not usually military in character, they are quite capable of using the sword when necessary. And they are known to worship their

sword and other weapons; and at marriage the bridegroom rides on a mare or pony with sword in hand.

206. The Agharias, on the whole, thus appear to be a very old people of high social rank who have had wide territorial coverage and wide connexions for a long time with Brahmins, Chattris, Artisans, and other Hindu castes as well as with Muslims in more recent times. In physical appearance also they show much the same kind of resemblance with all these groups. Results based on the 'generalized distance' thus supply quite a reasonable picture.

7. THE MAIN SEQUENCE

207. The account given so far shows that there are three distinct clusters. The Brahmins (B-cluster) are most sharply distinguished in physical appearance from all other groups and occupy the highest social position. Chattris and Muslims, are very close in physical features; and together with Agharias form a second layer which comes between the Brahmins (B-cluster) and the Artisans (A-cluster) in physical measurements. The Artisans themselves occupy a medium social position, and also an intermediate position in physical appearance between the Brahmins and the Tribal groups. Chamars are of still lower social rank than the Artisans, and in physical appearance come between the Artisans and the Tribal groups.

208. In a broad general way, the Brahmins (forming the B-cluster), Chattris and Muslims (as a sub-cluster) and Agharias (forming a rather loose group), the Artisans, (Ahirs, Kurmis, other Artisans, and Kahars constituting the A-cluster) with Chamars on the outer fringe, and finally the Tribal groups are thus arranged in a main sequence in both physical appearance and social status. The higher the social status of a cluster in this main sequence, the greater is usually the physical resemblance to the Brahmins. It is interesting to note that this is true not only of the Hindu groups but also of the higher class Muslims who are completely outside the Hindu hierarchy.

8. THE CRIMINAL TRIBES

209. Bhatus (C_1) and Habrus (C_2), the so-called criminal tribes, are usually lumped together but have a D^2 -value of 1.41 (12 characters) which is definitely significant showing that they are clearly differentiated. D. N. Majumdar is of opinion (as quoted in the Ethnological supplement) that the Bhatus and Habrus belong to the same ethnic stock; but his own measurements conclusively show that they cannot possibly be lumped together.

210. Habrus show some resemblance to other Brahmins ($D^2_{12}=1.73$), but have an appreciably smaller build. Compared to Muslims ($D^2_{12}=4.17$) and Chattris ($D^2_{12}=5.31$), Habrus are taller and have an appreciably bigger sitting height but are otherwise generally of a smaller build. Compared to the Agharias ($D^2_8=2.60$), they have larger sitting height, larger nasal depth, larger nasal length, and larger bigonial breadth but smaller stature, smaller head length and head breadth, and smaller

facial breadth. Habrus are differentiated from Ahirs ($D^2_{12}=1.54$) by having stature, sitting height, nasal length, upper facial length and bigonial breadth of a larger size but with a definitely smaller facial breadth. Compared to Other Artisan group (with whom they show some moderate resemblance with ($D^2_{12}=1.91$), Habrus generally are of a larger build but have a characteristically small facial breadth and narrow nasal breadth. This is generally true in comparison with the Tribal groups, that is, Habrus generally have a larger build in all characters except facial breadth and nasal breadth. We thus find that Habrus are clearly differentiated from all other groups and also from Bhatu. Their most characteristic features are a comparatively tall stature, a very high sitting height, and a narrow nose (approaching the Brahmins) but a very small facial breadth.

211. Bhatu, as already noted, are clearly distinguished from other Brahmins ($D^2_{12}=3.67$), Chattris ($D^2_{12}=5.65$) Muslims ($D^2_{12}=4.70$). and Agharias ($D^2_8=3.50$) as well as from Tribal groups. They have a moderate stature, a large nasal length, a high nasal depth, and a small or narrow nasal breadth which are features resembling those of Brahmins. On the other hand they have an exceptionally small sitting height, a small head length (somewhat like the Tribal groups, and an exceptionally small facial breadth (in which they resemble the Habrus and the Tharus).

212. D. N. Majumdar notes that Bhatu and Habrus are both nomadic vagrants and criminal tribes and are scattered all over India, and though large sections have "settled in permanent homes there are still others who wander in groups of families in search of livelihood." This suggests that both are the remnants of old inhabitants of the country. Crooke⁵ notes that Habrus are in the intermediate stage between burial and cremation, and that in their funeral oration emphasis is laid on the fact that the "Habras are the only really free people in the country, as they are subject to none", and that they are much superior than the Brahmins and Rajputs⁶. From their peculiar customs and practices, it is generally agreed that the Habrus did not and even now do not belong to the regular Hindu hierarchy. From their comparatively fine physique (which, as D. N. Majumdar observes, enables them to move about freely in the guise of high caste Hindus), it is also clear that they do not belong to the people who are now represented by the Tribal groups. Do they represent still older groups who were however distinct from the prototypes of the existing tribal groups belonging linguistically to the Austric family?

213. D. N. Majumdar states that the Bhatu themselves admit their mixed origin. The social history is not clear. But in physical features, as already mentioned, they must be distinguished from the Habrus. They have moderate stature, large

⁵ Crooke : *Castes and Tribes of North Western Provinces and Oudh*, Vol. 2, p. 476.

⁶ Majumdar however notes that the Habrus claim Rajput descent. This is not in accordance with the above statement made by Crooke that they consider themselves superior to even Brahmins and Rajputs. Crooke's observations refer to the 1890's, while Majumdar's possibly to 1941. A lapse of about 50 years might of course have brought about a change.

nasal depth, large nasal length and small or narrow nasal breadth (like Brahmins) but an exceptionally small sitting height and small facial breadth (like Tribes).

214. Bhatus and Habrus occupy a very low social position. Their peculiar customs and practices as well as their physical appearance distinguish them clearly from each other, and also from the regular Hindu castes and Tribal groups. They have much finer features than the Tribal groups, in a way, closest to the Brahmins and yet are practically outside the Hindu caste society. Social history as well as physical appearance thus point to the Bhatus and Habrus as having come from two distinct and independent groups of people who probably inhabited India in pre-Vedic times. Do they represent, in a degraded form, some of the peoples of the pre-Vedic civilization who had originally occupied a ruling or high position but were conquered by later immigrants, possibly the Vedic people, and were expelled from orthodox society and gradually forced to become nomadic vagrants and criminal tribes? Further investigations are clearly necessary.

9. DOMS AND BHILS

215. Doms and Bhils have a D^2 -value of 2.24 (12 characters) and are clearly differentiated. Doms are of a bigger build in every character except head breadth in which they are of about the same size as Bhils. Doms are quite different from Brahmins (B-cluster), Artisans (A-cluster), and Tribes (T-cluster). Compared to the Other Brahmins ($D^2_{12}=3.78$), for example, Doms have much smaller sitting height; smaller head length and head breadth; but higher total facial length and a much wider nasal breadth. Compared to Chattris ($D^2_{12}=5.26$) and Muslims ($D^2_{12}=3.47$), Doms are taller and have much larger sitting height, larger upper and total facial length, and generally larger build but much smaller nasal and head length, and of course much wider nasal breadth. Compared to Agharias ($D^2_8=3.21$), Doms have much bigger nasal depth, wider nose and bigger upper and total facial length but much smaller head length. Doms are generally of a larger build than Bhatus ($D^2_{12}=5.30$), except in nasal length and head breadth; and have generally a larger build than Habrus ($D^2_{12}=3.30$) except in sitting height; and also have a larger build than the Artisan and the Tribal groups in practically all characters. Doms are thus clearly differentiated from all other groups and are of a generally large build being fairly tall with moderate sitting height and large nasal depth and large upper and total facial length (in which they somewhat resemble the Brahmins and to some extent Chattris, Muslims and Agharias) but have a very small head length and a wide nasal breadth (in which they resemble to some extent the Tribal groups).

216. Bhils are also clearly differentiated from the Doms ($D^2_{12}=2.24$), and have an appreciably smaller size; in practically all characters. They are far off from Brahmins and have a smaller build in every character except in nasal breadth which is moderately wide. They have a somewhat bigger nasal depth and, of course, wider nasal breadth than Agharias ($D^2_8=3.46$) but have smaller values in all other characters. Compared to Chattris ($D^2_{12}=5.23$) and Muslims ($D^2_{12}=3.35$), Bhils

have somewhat bigger sitting height and wider nose but are otherwise generally of a smaller build. Compared to Bhatu (D²=5.30) they have an appreciably larger sitting height, bigger facial breadth, and much wider nasal breadth but are otherwise generally of a smaller build. Compared to Habrus (D²₁₂=2.66), they have an appreciably wider facial and nasal breadth but otherwise are of a smaller size. Compared to Ahirs (D²₁₂=2.54), they have a somewhat bigger stature and facial breadth and, of course a much wider nose. Compared to the other Artisan groups (D²₁₂=1.92), Bhils are somewhat taller and have a somewhat bigger nasal depth and bigger facial breadth but have much smaller head length and smaller upper and total facial length. Compared to Chamars (D²₁₂=2.29), Bhils have smaller head length and smaller upper and total facial length but are of larger build. Compared to the Tribal groups, Bhils are taller and have an appreciably large sitting height, bigger nasal depth and usually bigger facial breadth but have a smaller head length and facial length, and usually less wide nasal breadth.

217. *Doms (D)*: The Doms occupy the lowest rank in the Hindu society and are required to live outside towns. Adult marriage, divorce and widow remarriage with levirate distinguishes them from orthodox Hindu groups. They are not controlled by Brahmins and they have their own divinities. Crooke notes that they have no settled usage regarding the disposal of dead bodies and have recourse to both cremation and burial. They cannot possibly be identified with the people who form the higher or middle layer of Hindu society. On the other hand, it is not possible to include them in the Tribal groups. D. N. Majumdar observes that the nomadic Dom "roams in the jungle but has not learnt the ways of the fowler or bird-catcher, and is an indifferent fisherman and ill-equipped hunter". In physical appearance also they are clearly distinguished from Tribal groups in having a moderately large stature, large sitting height, large nasal depth, large upper and total facial length, and moderately large facial breadth. Crooke states that in the Himalayan districts the Dom is recognized as a descendant of the Dasyus of the Vedas who are supposed to have held upper India before the advent of the Nagas and Khasas. He also mentions that there is some evidence to connect the Doms with the gipsy tribes of Europe. He thinks that the Doms may represent a more or less mixed body of menials who have been for ages in a state of utmost degradation.

218. Hutton thinks that though serfs and outcastes for centuries or millenia, Doms possibly represent a once respectable tribe and refers to the attempted identification with Odumbara, a legendary tribe of shepherds of the Punjab. In any case the Doms cannot be fitted into the higher (Brahmins, Chattris, Agharias) or the medium Artisan groups of Hindu society nor with the Tribal groups and are clearly distinguished in both physical appearance and many social practices from all the other groups. What is then their origin? Do they represent a group of original inhabitants of India who were entirely different from the more primitive tribes? Or are they a degraded form of one more of the Indus Valley people?

219. *Bhils (Bh)*: Bhils are a numerous and vigorous forest people and great

experts in the use of the bow. A Bhil girl is often unmarried up to the age of twenty or twenty-five, and their women have much freedom and used to accompany their menfolk into battle. Widow remarriage is permitted. They eat the flesh of all deceased animals. Although many of them are now settling down as peaceful cultivators, they are only partially Hinduized and retain their tribal organization. They worship Sitala, the small-pox goddess, and Mahadeva from whom they claim descent and who was probably a pre-Vedic deity.

220. Although they are sometimes considered to be akin to Cheros, Majhis, Kharwars or Gonds, this view is not tenable as they are clearly distinguished from the Tribal groups in physical appearance. D. N. Majumdar has pointed out that blood group results differentiate the Bhils from the Oraons and the Maria Gonds. Bhils now speak a language belonging to the Indo-Aryan family, but it is generally agreed that this had replaced a Dravidian and possibly a Kolarian (or Austric) language of earlier times.

221. According to one view the Bhils can be identified with the Pulinda which, however, is only a general term for aboriginal races. B. S. Guha thinks there are similarities in physical appearance between the Bhils and Chenchus, a South Indian tribe. According to another view the Bhils represent one section of the Mundas which occupied pre-Dravidian India. It is clear that in physical appearance the Bhils are differentiated from the Tribal groups, and yet there is little doubt that they are very old inhabitants of India. It would be of great interest to study their affiliations to the South Indian tribes.

10. THE TRIBAL GROUPS

222. *Chero* (T_1), *Majhi* (T_2), *Panika* (T_3), and *Kharwar* (T_4): The generalized distance (D^2 -value) not only separates the Tribal groups very clearly from all other groups but also reveals interesting differences among the Tribal groups themselves. *Chero* (T_1), *Majhi* (T_2), *Panika* (T_3) and *Kharwar* (T_4) have values of D^2 less than one among themselves and thus form a well demarcated sub-cluster which is characterized by appreciably a small sitting height, and smaller head length but larger nasal depth than the other tribal groups Oraon, Rajwar, Korwa, and Tharu. Within this sub-cluster itself, Cheros have the shortest facial and bizygomatic breadth; Majhis the smallest nasal length, small upper and total facial length, and the widest nasal breadth; Panika the shortest stature, shortest sitting height, and smallest head and bigonial breadth; and Kharwar the smallest nasal depth and smallest head length. Differences are, however, not large; and, on the whole the four tribes in the sub-cluster have a generally similar physical appearance.

223. It is interesting to note that all four tribes (*Chero*, *Majhi*, *Panika*, *Kharwar*) are in the process of gradual Hinduization. The Cheros and Kharwars are usually recognized to be the most advanced of the Tribal groups, but all four tribes are in a state of transition. Cheros have close connexions with the Kols; and Kharwars are connected with the Cheros. Among all four groups divorce and widow remarriage are

permitted. Monogamy is the general rule among Cheros and Majhis; polygamy is permitted among Panikas, but rare, and is more prevalent among Kharwars.

224. Usual occupations of Cheros are cultivation, cutting wood, collecting lac and other jungle produce. Majhis are not yet good cultivators. Panikas work as weavers and village menials. Kharwars have a variety of occupation from cultivation and holding land to menial work and cutting wood; and in certain regions, some of them have attained an economic status akin to some of the lower groups within orthodox society

225. They all have their own deities but also worship Hindu gods. The influence of the Brahmin is increasing; and among Cheros and Kharwars, child marriage is the usual rule, but adult marriage still continues among Majhis and Panikas. Cheros cremate their dead and perform the Hindu *shraddha* ceremony. Kharwars also cremate the dead but have their own funeral ceremonies. Majhis and Panikas are in the transition stage between cremation and burial.

226. The four tribes, Cheros, Majhis, Panikas and Kharwars thus resemble one another not only in physical appearance but also in their social customs and economic position in a general way. Along with Hinduization these four groups also show somewhat greater similarity in physical appearance with the non-tribal groups as indicated by their higher position in the table of D^2 -values. It is of some interest to note that as judged by such position in the D^2 -tables, Kharwars and Cheros are somewhat nearer the more orthodox castes while Panika and Majhis are somewhat further off. The larger extent of Hinduization of Kharwars and Cheros is thus accompanied by a somewhat closer resemblance in physical appearance with the higher castes.

227. *Oraons* (T_3), *Rajwars* (T_6) and *Korwas* (T_7): They differ a great deal from the above sub-cluster, and have values of D^2 (based on 8 characters) ranging between 2.41 to 4.47. Oraons and Rajwars are closest, but even then $D^2_8=1.20$, showing that they are clearly differentiated in physical appearance. These two tribes have a somewhat bigger sitting height but the two smallest nasal depths among all tribes. They also differ from the other tribes in the width of the nose. Rajwars have an outstanding feature of a small nasal breadth, in fact more narrow than any other caste or tribe.

228. Oraons speak a Dravidian language, and have much in the way a common culture with the Mundas, but according to S. C. Roy⁷ Oraons can be easily distinguished from them in physical appearance. The generalized distance also separates out the Oraons as a tribe having its own characteristics.

229. The Rajwars are a Dravidian speaking cultivating group which has been Hinduized to a considerable extent. They employ Brahmin priests and claim Kshatriya origin. In the Report on the 1901 Census they were placed with Chamars

in class V (unclean castes). With their higher degree of Hinduization they also show a somewhat greater resemblance with the Brahmin and the higher castes than the other tribes. Their exceptionally narrow nose is a most intriguing feature.⁸

230. The Korwas occupy usually the lowest position in the D^2 -table, that is, are farthest apart from the Brahmins and other groups in physical appearance. They have the shortest stature, the smallest head breadth, and the widest nasal breadth among all castes and tribes. In physical appearance they represent the most primitive type of people.

231. Socially also they stand entirely apart. They do not even pretend to be Hindus; have no connexion with the Brahmins; and worship their own tribal gods. Divorce and widow remarriage are permitted, and adult marriage is prevalent on the whole. Some of them are now taking to cultivation but they are not good cultivators and still continue to use bows and arrows. They have a simple material economy, and have an extraordinary tribal solidarity. Large values of the generalized distance place them farthest apart from the Brahmins and other castes in physical appearance. They also happen to be the most primitive of all groups, and the classification based on the generalized distance is in broad agreement with their known social and cultural status.

11. THARUS

232. Finally, the Tharus are far off from non-tribal groups with D^2_{12} varying from 3.54 in the case of other Artisans, to 7.69 in the case of Chattris. They are quite close to the Tribals and yet have a number of peculiarities of their own which make them stand distinctly apart from the other Tribal groups. They are taller than the other Tribals, and have moderately large sitting height; large nasal length; moderately large upper facial length and fairly large bizygomatic breadth and bigonial breadth thus resembling the Brahmins to some extent. On the other hand, they have a small nasal depth and a large nasal breadth; a small total facial length; and a small head breadth in which they resemble the Tribal groups. It is quite clear that in physical features the Tharus stand out of the main sequence and cannot be fitted in quite well with the Tribal groups.

233. The social and ethnic history of Tharus also clearly point to their being a group outside the orthodox Hindu society on the one hand and outside the Tribal groups on the other. They claim a high social status which, however, is not conceded by the Brahmins. Divorce and widow marriage with the levirate are permissible; adult marriage is the rule and polygamy is also allowed. Earth burial seems to have been the usual way of disposing of the dead but cremation is now taking its place.

⁸ This feature looked so suspicious that the records of measurements as received by us were again examined but no clue was found. The result is unexpected and surprising, and I have suggested to Dr. D. N. Majumdar that some fresh measurements should be taken on Rajwars.—*P.C.M.*

The Tharus have their own deities, the chief of whom is Kalika and another great deity is Bhairaba or Siva. Both are well-known gods in the mixed Nepalese and Tibetan religions.

234. The Tharus live by hunting and fishing, gathering forest fruits and vegetables and also by practising a rude form of agriculture. This points to their primitive origin. The Tharus at present inhabit mostly the foothills of the Himalayas, and there are traditions of their having descended from the hills. They show a mixture of partly Indian and partly Nepalese customs. For example, the women occupy a dominating position in society and have definite rights of inheritance which shows their affiliation to some of the Mongoloid groups. D. N. Majumdar notes that emphasis must be given to the matriarchal foundations of Tharu culture which link them to other groups in the cis-Himalayan region. Both physical appearance and cultural history suggest that the Tharus do not belong to the main sequence of orthodox Hindu society, nor to the Austric-speaking tribes of the plains. The Tharus probably represent a tribal people of the Himalayan region with Mongoloid affiliations who have become mixed in comparatively recent years with some of the people of the plains, and who are at present becoming gradually Hinduized.

12. FURTHER OBSERVATIONS ON PHYSICAL CHARACTERS

235. An over-all examination of the physical measurements show some further features which are worth noting. The occurrence of a "main sequence" has been already mentioned. This is apparently connected broadly with a size factor and the narrowness of nasal breadth. The normalized mean values of each physical character for each tribe and caste are shown in Table 8.1. A cursory glance at values in this table shows that the Brahmins usually have positive mean-values, that is, physical characters of a size larger than the average (the general average having been treated as the base or zero in each case) with a small or narrow nasal breadth. The Artisans have very small mean values, some positive, some negative. The Tribal groups, on the other hand, have negative mean-values (smaller than the average) with, however, large positive (that is, wide) nasal breadth.

236. The general picture can be appreciated by considering the average of the mean-values for each caste and tribe with the convention of reversing the sign of the mean-value for nasal breadth in Table (8.1). These averages are easily obtained by adding the twelve mean-values for each group (with reversal of the sign for 'nb', the nasal breadth), and then dividing the sum by 12. The figures given in the Table 8(a) were obtained in this way.

237. In Table 8(a), in the main sequence, the groups are arranged in serial order of the over-all size of the physical characters taking into consideration the narrowness (and not the width) of the nasal breadth. It will be seen that the Brahmins stand at the top showing that they have the largest size, and the Tribal groups at the bottom with the smallest size. The Artisans with medium size come in between the two. In fact, in the main sequence, the serial order in point of physical size as shown in Table

8(a) practically reproduces the serial order in point of social status. For example, after the two Brahmins (+0.595, +0.456) come in order, Chattri (+0.389), Agharia (+0.290), and Muslims (+0.221). Then the Artisans, broadly in order of social

TABLE 8(a): SIZE-FACTOR (WITH NARROWNESS OF NASAL BREADTH)

'main sequence'			'other groups'		
Basti Brahmin	(B ₁)	+ 0.595	Bhatu	(C ₁)	+ 0.334
Other Brahmin	(B ₂)	+ 0.456	Habru	(C ₂)	+ 0.198
Chattri	(Ch)	+ 0.389	Dom	(D)	+ 0.365
Agharia	(Ag)	+ 0.290	Bhil	(Bh)	- 0.135
Muslim	(M)	+ 0.221	Tharu	(Th)	- 0.124
Ahir	(A ₁)	+ 0.140			
Kurmi	(A ₂)	+ 0.119			
Other Artisan	(A ₃)	+ 0.014			
Kahar	(A ₄)	- 0.093	'clusters'		
Chamar	(Cm)	- 0.186	Two Brahmins (B-cluster)		+ 0.534
Kharwar	(T ₁)	- 0.244	Chattri-Muslim		+ 0.331
Chero	(T ₂)	- 0.309	Chattri-Muslim-Agharia		+ 0.292
Majhi	(T ₃)	- 0.359	Four Artisans (A-cluster)		+ 0.037
Panika	(T ₄)	- 0.442	Seven Tribal groups (T-cluster)		- 0.361
Oraon	(T ₅)	- 0.386	Chero, Majhi, Panika, Kharwar		- 0.347
Rajwar	(T ₆)	- 0.299	Bhatu-Habru		+ 0.286
Korwa	(T ₇)	- 0.603			

ranking: Ahir (+0.140), Kurmi (+0.119), Other Artisans (+0.014), and Kahar (-0.093) followed by Chamar (-0.186). These are followed by Kharwar (-0.244), Majhi (-0.359) and Panika (-0.442) practically in the order of the extent of Hinduization. Oraon (-0.386) is also roughly in its appropriate place while Korwa (-0.603), the most primitive of all tribes, occupies the bottom place. Rajwar (-0.299) has a somewhat higher size index than appropriate to its serial position in the list due clearly to their narrow nasal breadth, a very puzzling feature to which attention has been already drawn.

238. It is interesting to note the position of the groups standing out of the main sequence. The two so-called criminal tribes Bhatu (+0.334), Habru (+0.198) and still more prominently the Doms (+0.365) are of a large size roughly of the same order as Chattris, Agharias, and Muslims. This distinguishes all three groups, Bhatu, Habru, and Doms from the Tribal people; and indicates that originally these three castes probably had a status similar to the people from whom are derived the present upper and middle castes of Hindu society. The fact that all three castes (Bhatu, Habru, and Doms) now occupy a very low social position thus suggests that these castes were possibly expelled from (or not allowed to come within) the more orthodox circle, and became degraded in social status.

239. Finally, both Bhils and Tharus are of smaller build, but not quite so small as the groups within the Tribal cluster. In fact in point of size Bhils and Tharus

are somewhat like Chamars or lower Artisans rather than the regular tribes. The size factor thus points to both Bhils and Tharus belonging to primitive groups which were quite distinct from each other and also from the Tribal groups.

240. The correspondence between the size factor (with narrowness of the nasal breadth) in physical appearance and social status is quite close in the main sequence. The five exceptions are fully accounted for by known ethnological and cultural history, and thus corroborate the general result. In India, in a general way, the change from more primitive to more civilized conditions appears to have been accompanied by a shift from smaller to larger physical size (with narrow nose) among the different castes and tribes.

13. GENERAL SUMMARY

241. The over-all picture is shown in a schematic manner in the accompanying Chart 8(b). The Brahmins (B-cluster) occupy the highest social position in Hindu society at the top of the picture, and have the largest build of face and body with tall stature, large facial breadth, and comparatively large nasal length and biggest nasal depth but narrow nasal breadth. As one goes down from the top to the bottom of the picture there is a steady decrease in both social status and physical size (except in the case of the degraded castes, Bhatu, Habru, and Dom shown on the left).

242. Chattris (Ch), Muslims (M), (although not within the fold of Hindu society), and Agharia (Ag) have a high social position below the Brahmins. They resemble the Brahmins to some extent in physical appearance, and have a generally large physical build next to the Brahmins. They are tall, but have a smaller sitting height and a smaller facial breadth than the Brahmins. The Brahmins, Chattris, Agharias, and Muslims are all of large build and belong to the upper strata of society in the United Provinces. Chattris and Muslims are close in physical appearance, and have had considerable contacts for a long time in administrative work and in trade and commerce.

243. Then come the Artisans (the A-cluster) consisting of the Ahirs (A_1), Kurmis (A_2), Other Artisans (A_3), and Kahars (A_4) who all belong to the very numerous and widely scattered middle layers of Hindu society. They are of medium physical size, and have medium or moderate values of all characters under review. In fact, with the single exception of nasal breadth, they have features which are smaller in size than those of the Brahmins but larger than those of the Tribal groups. They have a somewhat narrow nasal breadth (resembling the upper castes) which differentiates them distinctly from the tribes.

244. Within the A-cluster itself there is a definite patterning among the four groups with the Ahirs (A_1) nearest to the Brahmins in physical appearance, followed in order by Kurmis (A_2), Other Artisans (A_3), and Kahars (A_4), the latter being farthest away from the Brahmins and showing the greatest resemblance to the tribal groups.

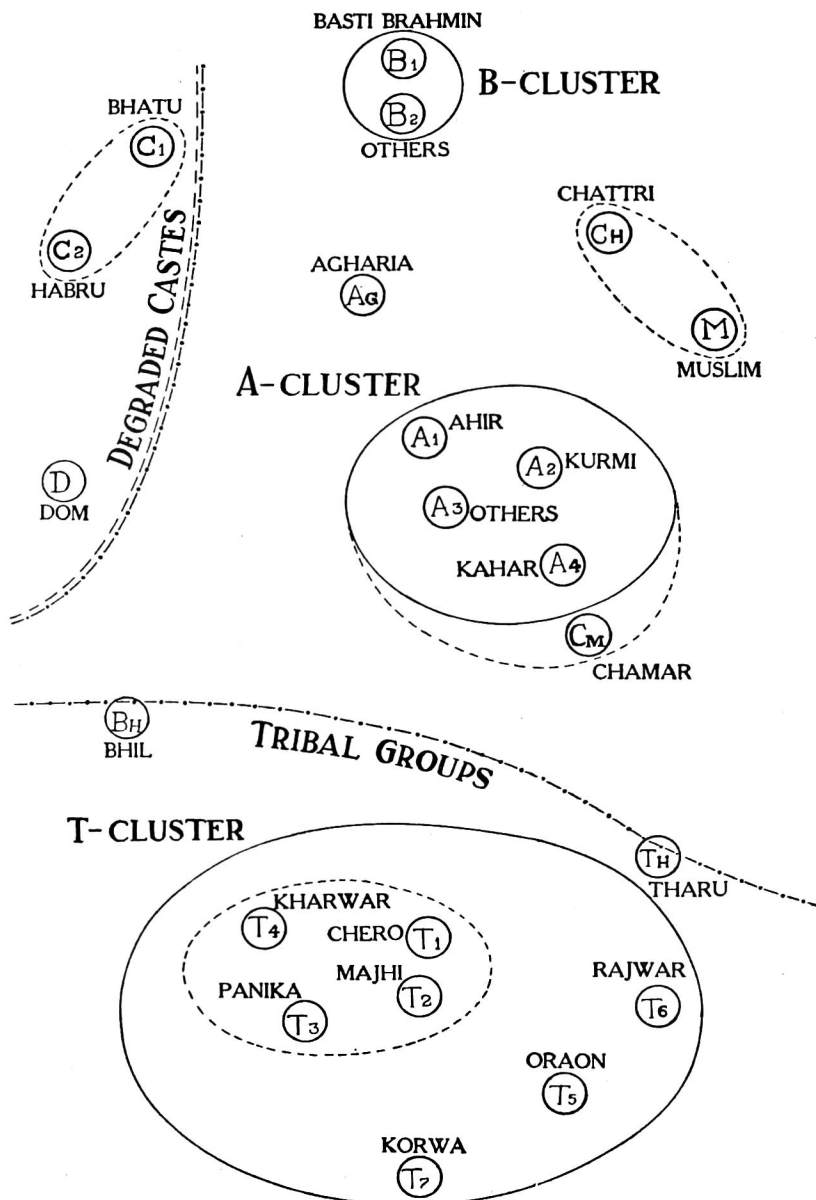


Chart 8(b). Distribution of castes and tribes indicating physical differences in relation to the ethnological classification

Ahirs (A_1), Kurmis (A_2) and Other Artisans (A_3) have features much nearer to the Brahmins than to the Tribal groups. For example, they are of medium stature somewhat taller than the tribes; they have moderate or large sitting height, moderate or medium build of head and face, and narrow nasal breadth. Kahars (A_4) are shorter in stature, and have a smaller sitting height, and a smaller build of head, face, and nose with medium nasal breadth.

245. The Chamars (Cm), traditionally leather-workers, are an extremely numerous and wide-spread caste at the bottom of the orthodox Hindu society. They resemble the Kahars to a considerable extent, and also show some resemblance to the Tribal groups but are clearly differentiated from them. They may possibly be included on the fringe of the A-cluster, but in many ways are a good deal separated in social status and customs.

246. At the bottom of the picture, and also at the lowest end of the social scale comes the T-cluster consisting of the modern representatives of the aboriginal tribes. They all have a short stature and are of small physical build with the shortest sitting height, small or smallest head length and head breadth, small or smallest nasal length and smallest nasal depth but the widest nasal breadth. Within the T-cluster itself, the four tribes Chero (T_1), Majhi (T_2), Panika (T_3) and Kharwar (T_4) form a distinct sub-cluster in both physical appearance, and, are also distinguished by the fact that they are Hinduized to a larger extent than the other tribes. It is interesting to note that Cheros and Kharwars, the two tribes which are most highly Hinduized, are also nearer the Brahmins and upper castes in physical appearance.

247. Oraons (T_5), Rajwars (T_6), and Korwas (T_7) differ from the above sub-cluster in having a somewhat bigger sitting height but much smaller nasal depth, that is, with a more flat nose. Korwas (T_7) have the smallest physical build and the widest nose, and are also recognized to be the most primitive of all the tribes under review and the one scarcely affected by Hindu customs and traditions. Rajwars show a most surprising deviation, namely, a very narrow nasal breadth which requires further investigation.

248. The groups considered so far form a kind of main sequence in which there is close association between social status and resemblance to the Brahmins in physical appearance. Such physical appearance is also in a general way closely connected with physical size but narrow nasal breadth. On the whole, in the main sequence the larger the physical build (with, however, narrow nasal breadth) the greater is the resemblance to the Brahmins and the higher the social status. Even Muslims (who are definitely outside the pale of Hindu society) conform to this general rule as shown in the Chart 8(b).

249. There are, however, a number of most significant exceptions. The two so-called criminal tribes, Bhatu (C_1) and Habru (C_2), and the Doms (D) all have quite a large build, smaller than that of the Brahmins but of the same order as the other upper castes Chattris (Ch), Agharias (Ag), and Muslims (M). Bhatu (C_1) and Habrus

(C₂) show a good deal of resemblance to the Brahmins. Habrus are of tall stature, and have a very large sitting height, a narrow nose but a characteristically small facial breadth. Bhatus have moderate stature ; large, deep and narrow nose (like the Brahmins) but an exceptionally small sitting height and small facial breadth (like the Habrus). Doms are tall, and have moderately large sitting height, large facial build (like the Brahmins and upper castes) but a very small head length and a wide nasal breadth (somewhat like the Tribal groups).

250. All three castes, Bhatus (C₁), Habrus (C₂) and Doms (D) occupy the lowest strata of Hindu society, and have many customs and practices looked upon with great disfavour by orthodox people, but they do not show any affinities with the Tribal groups in their ways of life. It looks plausible that these three castes originally belonged to much higher strata of society but were probably conquered by later immigrants and thrown out of the new orthodox circle and forced to occupy a very degraded position.

251. Bhils (Bh) and Tharus (Th) have their own peculiar features. They are of a comparatively small physical build broadly of the same type as the Tribal groups but quite clearly differentiated from them. They occupy a low position in society, but are becoming gradually influenced by Hindu customs and traditions.

252. Bhils are taller than the tribal people, and have an appreciably larger sitting height, bigger nasal depth but smaller head length, and usually less wide nasal breadth. They cannot, therefore, be classified with the other Tribal groups, and yet from their ways of life there cannot be any doubt that they belong to a primitive people of the forest. It is likely that they represent an aboriginal group but one which was quite distinct from the groups which are represented by those included in the T-cluster.

253. Tharus (Th) also represent a tribal people, but again one which is evidently quite different from the Bhils and the other Tribal groups. Tharus show definite evidence of affiliations in their social customs and practices (for example, in traces of a basic matriarchal culture) to the Mongoloid people of the cis-Himalayan region. Physical appearance as well as ethnological evidence thus point to their belonging to a people with Mongoloid affiliations admixed with people living in the foot hills of the Himalayas in India.

254. The conclusions reached from physical measurements (and the use of the generalized distance') are thus in broad agreement with available ethnological evidence but some of the results indicate new clues and some are contrary to accepted views and require further study.

SUPPLEMENT : ETHNOLOGICAL NOTES

By P. C. MAHALANOBIS

INTRODUCTION

In order to judge the reasonableness or otherwise of the results obtained by the use of the D^2 values (between pairs of castes and tribes) it is necessary to compare these results with ethnological knowledge about the different groups. With this object in view, ethnological notes on the different castes and tribes are given in this supplement. No attempt has been made to give any extensive bibliography. J. H. Hutton in his recent book on *Caste in India* (Cambridge University Press, 1946) mentions that "a recent Indologist in America claims to have compiled a list of over five thousand published works on this subject (Indian castes and tribes); and no useful purpose would be served by trying to prepare a short list" Hutton's own book is a compact one of moderate size which gives a useful outline and a select bibliography.

Fortunately, a detailed account of the castes and tribes of the United Provinces is available in the great work in four volumes of Sir William Crooke : *Tribes and Castes of the North-Western Provinces and Oudh** (Calcutta, 1846) from which extensive extracts have been taken. Use has also been made of H. H. Risley's *Tribes and Castes of Bengal, Ethnographic Glossary* (Calcutta, 1891) cited as Tribes and Castes. S. C. Roy's *The Oraons of Chota-Nagpur* (Calcutta, 1915) ; and D. N. Majumdar's *The Fortunes of Primitive Tribes* (Lucknow, 1944) ; various reports on the Census of India ; and a few other publications. Finally, extracts have been reproduced from mss. notes which D. N. Majumdar was kind enough to send me.

GENERAL NOTE

A general note on certain aspects of the caste system is given below as a brief introduction to the more detailed ethnological notes on the different castes and tribes. Castes are of many different types: functional, racial, sectarian, or castes having their origin in miscegenation or by expulsion from other castes. Every caste is an endogamous group, that is, no member of any particular caste can normally marry a person not belonging to the same caste. Usually each caste is divided into a number of endogamous sub-castes. Within each endogamous group there are usually a number of exogamous sections (such as *gotras*) within which marriage is prohibited. There are also prohibited degrees differing very widely from group to group. Sometimes there is the practice of hypergamy which means that a girl may marry a man belonging to a section of higher social status. Traditionally *anuloma* marriages (in which a man of a higher caste marries a woman of a lower one) were permitted at one time. There is also mention of *pratiloma* marriages (in which a woman of a higher caste marries a person of a lower one) which were, however, not looked upon with favour. There are many traditions of inter-caste marriages which were usually considered to have given rise to new castes or sub-castes.

The permissibility (or otherwise) of drinking water or eating food from the hands of people of other castes is sometimes a criterion of social status. *Kachha* is food cooked with water, and *pakka* or *pakki* is food cooked with clarified butter. Brahmins, for example, would not usually take either *kachha* or *pakka* food from non-Brahmins although there are some exceptions. Certain castes would take *pakka* from Brahmins (or from confectioners

*The old name of the present United Provinces.

or certain sub-castes) but not from other castes. The next broad division would be groups who take *kachha* food from Brahmins and *pakka* food from castes of certain medium status (for example, Ahirs can take *kachha* from Brahmins and *pakka* from castes not lower than Vaishyas). Finally, certain castes would take *kachha* from a caste lower than Brahmins; and in those cases the lowest caste from which *kachha* can be taken determines in a general way the social status. There are however many exceptions; and restrictions on food do not supply a clear-cut or consistent scheme of social precedence.

As regards marriage customs, widows usually do not re-marry in the higher castes and in most castes of middle rank. (Until recently widow re-marriage among higher or middle castes was considered to be definitely illegal; and a special Act 'Hindu widows remarriage act of 1856' had to be passed to make such marriages legally valid). Among the lower castes and tribal groups, widow re-marriage is normally permitted and is often connected with the levirate (which makes it obligatory or preferable for the widow to marry her deceased husband's younger brother) although marrying an outsider is also usually possible. Permissibility to widow re-marriage is usually regarded as a case of a comparatively low social status.

Adult marriage is usually prevalent among some of the tribal groups. It is known to have been prevalent among the higher castes in ancient times, but for several centuries the practice of child marriage has been generally prevalent among the higher castes. Castes of medium or low position began gradually to favour child marriage in imitation of the higher castes: but groups which are recently becoming Hinduized have not adopted the system of child marriage as a rule. The Sarda Act of 1930 definitely established a minimum age of 14 years for marriage of girls and of 18 years for boys.

The practice about the disposal of dead bodies varies a great deal. Cremation is the general rule among the higher castes, and the increasing tendency is for all castes and tribes to adopt this practice. In the middle and lower groups both cremation and burial are prevalent. The older tribes and groups used to practice burial at one time but are increasingly adopting cremation in imitation of the higher castes.

E. A. H. Blunt (*Caste in the U.P., Census of India, 1911*, Vol. XV, Part 1) mentions that in the United Provinces there were altogether 667 different caste entries among Hindus which were reduced to 245 consisting of 116 major castes, 100 minor castes, and 29 foreign castes (pp. 320-322).

In the Census Report of 1901 an attempt was made to classify the different castes by social precedence. This however gave rise to considerable difficulties. It is in fact not possible to arrange all castes and sub-castes in a strictly linear hierarchy of social precedence. There are broad divisions about which there can be no dispute. For example, Brahmins are usually accorded the highest status.

In 1901, in the Punjab, Ajmer Merwara and Rajputana, the Brahmins were placed in class I; Khatri and Rajput (Agharia and Chattri) in class II (Kshatriyas and castes allied to Kshatriyas considered to be of higher social standing); Ahirs in class IV (castes from whom members of the higher castes can take water and *pakki*); Bhil and Chamar in class VII (untouchable castes). Pathans and Sayeds were included in class I (better class Mohamadans) among Muslims.

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In the United Provinces and Bihar, Brahmins were placed in class I; Khatri and Rajput (Agharia and Chattri) in class III; Ahir, Kahar and Kurmi in class VIII (castes from whom some of the higher castes can take water and *pakki*); Chamar and Dom in class XII (lowest castes eating beef and vermin).

In Bihar, Brahmins were placed in class I; Rajput (Chattri, Agharia) in class II; Ahir, Kahar, Kurmi in class III, sub-class (a); Chamar and Rajawar in class V (unclean caste); Doms in class VI (scavengers and filth-eaters). Pathans and Sayeds were placed in class I among Musli-

BRAHMINS (1 & 2)*

Brahmins are traditionally the priest class of Hindu society and have the highest social status. According to Vedic traditions, the caste may have been in some measure occupational in origin. On the whole, the Brahmins are supposed to represent or to have close connexions with the Vedic people speaking languages of the Aryan or Indo-European family. There are however many legends of intermixture with other castes and also of the creation of certain classes of Brahmins in comparatively modern times. Traditionally *anuloma* marriages (which means the marriage of a bridegroom of a caste of higher social status with a bride of a lower one; that is, in the case of Brahmin bridegrooms, marriage with a bride of any other caste) were permissible at one time.

The Brahmins are divided into a number of great orders which vary from region to region. They are supposed to follow the Hindu scriptures in their social ceremonies. An important rite is that of initiation or *upanayana* usually at the age of 8; after initiation Brahmins begin to wear the sacred thread. The religious functions of the Brahmins are various, and in the orthodox community they are held in great veneration. Although religious priesthood is the traditional function, the great majority of Brahmins, of course, now follow other occupations but still enjoy the highest social status.

Basti-Brahmins : Measurements for Brahmins belonging to Basti (a district in the U.P.) have been pooled together. D. N. Majumdar notes (mss. p.1) that "the Basti Brahmins belong to the Sarjupari sub-group who are normally residents of the land lying on the river Sarju or Ghogra and who originally belonged to the great Kanojia division of Brahmins. The Sarjupari strictly follow exogamous restrictions. They are chiefly cultivators though many profess not to touch the plough themselves."

Other Brahmins : All other Brahmins (*i.e.* belonging to districts other than Basti) have been pooled together to form the group 'Other Brahmins'.

According to D. N. Majumdar these Brahmins from other districts belong to the Kanojia group of Brahmins. He says (mss. p. 3), "There are many sub-castes of Kanojia Brahmins. There are *Dikshit*, *Avasti*, *Bajpai* and *Agnihotri* who are said to have acquired these titles on account of their religious functions of performing *Yoga* or sacrifice. Those who are distinguished by their erudite scholarship are *Trivedi* (who have read and assimilated the three Vedas); *Pathak* (those who do a lot of reading of the sacred literature); *Upadhyaya* (teachers and gurus); *Dube* or *Dwivedi* (who have read and assimilated two Vedas); *Chaturvedi* (who have mastered the four Vedas); *Pande* (well versed in religious rites); *Misra* (proficient in astronomy and astrology); and *Shukla* (those who diffuse learning or light)" etc.

* The group numbers are given in brackets for convenience of reference.

AGHARIA (3)

D. N. Majumdar states that the Agharias measured by him are a sub-group of Khatriis who were associated with or belonged mostly to Agra.

Crooke (Vol. 3, pp.264-277) gives a general account of Khatriis, and describes them as "A mercantile caste which has its origin in the Punjab, but is found in considerable numbers throughout these (United) Provinces" (p. 264). He quotes Sir G. Campbell: "Trade is their main occupation, but in fact they have broader and more distinguishing features. Besides monopolising the trade of the Punjab and the greater part of Afghanistan and doing a good deal beyond these limits, they are in the Punjab the chief civil administrators, and have almost all literate work in their hands. So far as the Sikhs have a priesthood, they are moreover, the priests or Gurus of the Sikhs. Both Nanak and Govind were, and the Sodhis and Bedis of the present day are, Khatriis... They are not usually military in their character, but quite capable of using the sword when necessary." Ibbotson gave examples of high administrative posts held by Khatriis and states "Altogether there can be no doubt that these Khatriis are one of the most acute, energetic, and remarkable races in India, though, in fact, except locally in the Punjab, they are not much known to Europeans" (p. 265).

Crooke continues: "I do not know the exact limits of Khatri occupation to the West, but certainly in all Eastern Afghanistan they seem to be just as much a part of the established community as they are in the Panjab. They find their way far into Central Asia, but the further they get the more depressed and humiliating is their position. ... In the Panjab they are so numerous that they cannot all be rich and mercantile, and many of them hold land, cultivate, take service, and follow various avocations... Khatri traders are numerous in Delhi" (p. 266).

"The tribal tradition runs that when Parasu Rama, the sixth Avatara of Vishnu, was engaged in subduing the Kshatriyas in the interest of the Brahmans, of which caste he was a member, he violently caused the miscarriage of every pregnant woman he could find. Through fear some women who were pregnant took refuge with certain Brahmans, and saved their lives by declaring that they were Brahmans... The children of those women were the progenitors of the present Khatriis. It is said that these Brahmans were of the Saraswat tribe, and as a proof of their assertion the Khatriis point to the fact of the Saraswat Brahmans still accepting food cooked by them" (p. 267).

Crooke quotes (p. 268) Mr. Nesfield who was of opinion: "There is much reason to believe that Brahmans as well as Khatriyas have contributed to form the new caste of Khatri" Risley also was of opinion that "their features and complexion entitle them to be ranked as Aryans of comparatively pure lineage", but emphasized that "the section names of Khatriis belong to quite a different type, and rather resemble those in vogue among the Oswals and Agarwalas". Risley is of opinion: "If then, it is at all necessary to connect the Khatriis with the ancient four-fold system of castes the only group to which we can affiliate them is the Vaisyas".

Crooke notes (p.269): "As Khatriis mostly inhabit the Muhammadan capitals, Lahore, Delhi, Agra, Lucknow, etc., many Muslim customs, as wearing the sari on marriage, the use of shoes by females, etc., have crept into their society as well as among Kayasthas, Agarwalas, Oswals, and other similar tribes, and Khatriis and Kayasthas for the same reason use a greater

number of Persian words in familiar language than other Hindus. Another suggestion is that their peculiar customs and modern immigration into these provinces indicate them to be one of the Hindu tribes which occupied the trans-Indus region at the time of Alexander's invasion and an attempt has been made to identify them with the Xathri who were recorded by the Greek historians to have been on the Chinab when Alexander invaded Panjab. On the whole, it seems quite clear from their physique and general appearance that the Khattris are of Aryan descent, and if we admit, which is probably the case, that the aggregate of tribes now known under the name of Rajput and Brahman is of mixed origin, it is not difficult to imagine that the Khattris may have been an offshoot from one or the other".

Crooke notes (p.270) : "The internal structure of the Khattris is very intricate", and mentions that in the 1891 Census "The complete returns show 761 sub-divisions in which the endogamous sub-castes and exogamous sections are inextricably mixed together".

Polygamy is allowed, but there seems to be an increasing prejudice against it. Widow marriage is forbidden.

Khattris are generally Vaishnavas or Nanakpanthis and their family priests are Saraswat Brahmans. Their domestic ceremonies are of the standard orthodox type. Khattris rank high among Hindus. Saraswat Brahmans eat *pakki* and *kachhi* with them; Bahyas eat *pakki*; and Kahars and similar castes eat *kachhi* cooked by them. They themselves eat *pakki* and *kachhi* cooked only by members of the caste or Saraswat Brahmans.

Of the Khattris, Majumdar notes (mss. p. 8): "The Khattris are an ethnological problem. The name being similar to the Kshatriyas very often they are taken to be identical. Today the Kshatriyas are a vaguely defined social group. Social ambition makes it necessary for many Hindu castes to claim 'twice-born' status by affiliating themselves to the second order of the Hindu castes system. The Rajputs do not represent any particular racial strain though most claim to be Kshatriyas. If the Khattris are Kshatriyas, they are much purer than the latter, for their features are sometimes indistinguishable from the Brahmans. The Khattris are a wandering lot and they are found all over India. Though they are concentrated in the Panjab and the United Provinces they are scattered in other parts as well including Afghanistan and as far as Central Asia. They have been discovered in Turkestan and further west. Many are found to trade in the Mediterranean ports. The Khattris are a trading caste today and their distribution over wide areas has not affected their racial purity to any appreciable extent.

"The Khattris perform all the ceremonies that are detailed for the Kshatriyas in the Institutes of Manu. The Khattris are followers of Shakt cult and they worship Chandika, the goddess of destruction, of war and conquest. They sacrifice goats before their goddess and most eat meat. Some have adopted Vaishnavism which finds expression in many of their rites and usages. During the Dashera, for example, the Khattris are known to worship their sword and other weapons of offence, at marriage the Khattri bridegroom rides on a mare or pony and with sword in hand proceeds to the house of the bride, followed by his relations and caste fellows in palanquins (mss. p. 9).

"The Khattris have a number of territorial divisions. The Khattris of the Panjab are known as Pachnahiya, those living in Lahore are Lahoria, those of Delhi, Delwale, of Agra, Agrewale, those living in the eastern districts Purbiya (mss. p. 9).

"The Agrewalas also have sections among them. Adhaighar, Oharghar, Baraghar

and Bamanghar, while the Purbias are subdivided into Adhaighar, Charghar and Baraghar. Besides these territorial groups there are others who may be grouped as miscellaneous. The latter are divided into Sahindi, Sarin, Sikar, Bahri, Bhatia, Arora and Brahma-Khatrī. The rules restricting intermarriage among the Khattris are many and rigid also. A girl of Adhaighar, for example, cannot marry a boy of Charghar or Baraghar, for all the other groups are socially inferior to her!" (ms. p. 9).

CHATTRI (4)

D. N. Majumdar in his letter of 10 February, 1949 informed me that the Chattris "are the same as Rajputs and Thakurs or Kshatriyas". Crooke notes (Vol. 4, p.217): "The warrior and land-owning race of Northern India, who are also known as Thakur, 'lord' (Sanskrit *thakkura*) or Chhatrī, the modern representative of the ancient Kshatriya. All or most of the Rajput tribes in these Provinces have legendary accounts of their origin from the country known as Rajwara, Rajasthan or Rajputana".

"It was on the death of Harsu Vardhana, the famous king of Kanauj, who reigned from 607 to 650 A.D., that most of the Rajput families would seem to have risen to power. As far as the eastern part of the Province is concerned Sir C. Elliott suggests that the amount of pressure from the Muhammadan invaders determined the character of the Rajput colonisation (p. 218). ... The Oudh septs which claim an extra-provincial origin, trace their descent to single Chhatrī leaders and not to troops of Rajput invaders (p. 219). ... Rajputs are endogamous and the septs are exogamous (p. 220). ... The country legends abound with instances of the conflict between the Rajput and the Brahman in pre-historic times (p. 221)."

H. H. Risley (*Census of India* 1901, Vol.1) included Khatri and Rajput both in class II ("Kshatriya and caste allied to Kshatriya who are considered to be of high social standing") in Ajmer-Merwara, Rajputana, the Punjab, and Kashmir. In the United Provinces and Bihar, Khatri and Rajput are placed under class III.

Risley notes (*Census of India* 1901, Vol. 1, p. 81): "Kshatriya, Chhatrī, Chhettrī, the fighting and land-holding caste of Northern India, who claim to be the modern representatives of Kshatriyas of classical tradition, and who are in many cases entitled to appeal to their markedly Aryan cast of feature in support of their claim. Besides these Aryan Rajputs, the large group designated indifferently by the name Rajput or Chhatrī includes many families of doubtful or non-Aryan descent, whose pretensions to membership of the twice-born warrior caste rest solely upon the circumstances that they have, or are supposed to have, some sort of proprietary dominion over land".

MUSLIM (5)

D. N. Majumdar in his letter of 11 February 1949 informed me that the subjects measured by him were from "the Muslim population of Bareilly (District), they are Syeds or Pathans. This is a localized group in the U.P." All the Muslims have been lumped together in a single group which is thus somewhat mixed in character.

Although Muslims are not supposed to have any caste distinctions, in practice they are divided into four chief divisions, namely, Sheikhs, Saiyeds, Mughals, and Pathans, and further sub-divided into a number of sub-groups which are more or less endogamous and often have differing habits and customs, and usually also separate panchayats or group councils,

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The term Sheikh, for example, should properly be applied to tribes of pure Arab descent, but it has been now adopted by converts both from high and low caste Hindus to Islam.

Saiyeds are supposed to be descendants of the famous martyrs Hassan and Hussain, sons of Ali the fourth Khalifa and Fatima, the daughter of the Prophet. It is, however, impossible to say how many are true Saiyeds. Majumdar comments (mss. p. 11): "They are more orthodox than other Muslims. As regards education and high social qualities they compare with high class Sheikhs."

Crooke (Vol. 4, pp. 155-171) gives a general account of Pathans, and as regards the meaning of this word quotes Dr. Bellew: "The origin of the name Pathan, and the nationalities originally represented by it, carries us back to very early times. The term Pathan is not a native word at all. It is the Hindustani form of the native word Pukhtana, which is the plural of Pukhtun tribes, the Afridi notably, Pukhtun, Pukhtu, etc. are pronounced Pakhtun or Pakhtu etc., and this brings the words nearer to the Pakhtues of Herodotus."

Mughuls (or Mughals), one of the four great sub-divisions, are supposed to have descended from the Turks. Crooke (Vol. 4, p. 3) quotes Ibbetson to remark that "In the Delhi territory, the villagers accustomed to describe Mughuls of the Empire as Turks, used the word as synonymous with 'official,' and I have heard my Hindu clerks of Kayasth class described as Turks, merely because they were in Government employ. On the Biloch frontier the word Turk is commonly used as synonymous with Mughul."

The names of sub-groups which occur in Majumdar's records are Pathan, Mollah, Fakir, Jat, Dhumia besides the general term Mahomedan. Risley (*Census* 1901, Vol. 1, p. 57) placed Pathan, Saiyed, Sheikh in class I (better class Muhammadans) but included Dhumia and Fakir in class III (degraded class) among Muslims in the U.P. and Bihar.

CRIMINAL TRIBES : BHATU AND HABRU (6 & 7)

D. N. Majumdar in *The Fortunes of Primitive Tribes* has a separate chapter on the criminal tribes (pp. 185-208) from which extracts are given below:

"That crime is hereditary no one would seriously believe, but that men are born to crime is known to all. There are over 1,400,000 men, women and children in the United Provinces alone who are tied to crime from birth and by profession. These belong to all religions, particularly Hindus and Muslims. The Hindu castes contribute the major proportion of the criminal tribes in northern India. There are no less than 50 tribes who live a life of crime and are under police surveillance as required by the Criminal Tribes Act. These are scattered all over the land and though large sections of these tribes have settled down in permanent homes and have taken to ostensible means of livelihood, there are still others who wander in groups of families in search of livelihood, and where they fail to make honest means, they take to petty theft and pilfering and even to serious forms of crime with or without violence (p. 185). ... From anthropometric measurements it appears that the various criminal tribes do not belong to the same race but certain tribes can be affiliated to one racial type, others to a second, and inter-group differences are often large. ... In blood groups, however, the various criminal tribes or sections of them do not show much significant differences. (p. 187).

"The power behind the solidarity of the criminal gangs is the efficient panchayat system which often is a central organization for the whole tribe and which controls the social

as well as the political activities of the members of the tribe. It is not only an organization for maintaining discipline and watch over recalcitrant members, but it has positive functions to fulfil such as organising crime, recruiting members, apportioning duties and maintaining individual families and groups whose members suffer injuries in action or are killed in such enterprise" (p. 199).

D. N. Majumdar in his mss. notes (p. 12) writes: "The Haburas, the Bhatu, the Karwals, the Sansis all appear to belong to the same ethnic stock. They are some of the nomadic, vagrant and criminal tribes of the U.P.

"Most of these tribes wander about with their females, children and their petty effects from village to village and district to district and sometimes they move long distances to get to centres where their trade or operations are expected to bring their good luck. The increasing menace of these vagrant tribes to the peaceful villagers or to urban centres have led the authorities to take various steps to settle them on land or to provide some stable occupation for them and though many tribes like the Moghiyas, the Bariyas, the Bauris have taken to settled life, there are many to whom the prospects of a settled life or a definite occupation have no appeal and the vagabond strain in their make up cause them to move from place to place. Police vigilance has no doubt put much restraint on the criminal tendencies of these tribes but oftener than not they manage to evade the police and work their designs on the unsuspecting people.

"Most of these tribes have similar racial origins. The Bariyas, the Bhatu, the Haburas, the Karwals and the Sansis are often indistinguishable from one another, though Sansis and the Bhatu are fairer in complexion and possess finer and more leptorhine noses than the other tribes."

Bhatu: D. N. Majumdar notes (mss. p. 13): "The Bhatu today are Hindus, Christians and Muslims. The Bhatu themselves admit of their mixed origin. The name Bhatu has been variously derived from Bhanti, meaning broken or mixed, from 'Bhat' or genealogists, and from 'Bahu-tor' or arm breakers. The latter explanation has been given by Dr. B. S. Bhargava in his thesis on the criminal tribes (approved for the doctorate degree in Anthropology at Lucknow) though I must admit that I was not happy with this interpretation. Dr. Bhargava explains this use of the term by referring to their favourite device used against their opponents."

Habru: Crooke gives a general account of Haburas (Vol. 2, pp. 473-481) from which extracts are given below. He describes them as "a vagrant thieving tribe found chiefly in the Central Ganges-Jumna Duab. ... Ethnologically the Haburas are no doubt very closely connected with the regular gypsy tribes of Sansiya and Bhatu; in fact there seems reason to believe that these have only become quite recently endogamous groups, and even now it is asserted that they occasionally marry" (p. 473).

Crooke mentions four exogamous septs which are all named after well-known Rajput tribes and also mentions endogamous sub-divisions (p. 474). He states, "It is quite certain that up to modern times they were in the habit of recruiting the clan by kidnapping girls of other castes; since they have been placed under more careful supervision this has, it is believed, in a great measure ceased, but there seems good reason to believe, though Haburas themselves are very reticent on the subject, that they still introduce and marry in the tribe outcast women of other castes" (p. 475). Divorce and widow marriage are permissible,

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He notes "the Haburas are in the intermediate stage between burial and cremation... When the bones of an old and respected member of the tribe are being buried, the senior man of the tribe who is present makes a sort of funeral oration in which he dwells on the fact that the Haburas are the only really free people in the country, as they are subject to none; and he thus shows in detail how much superior they are even to Brahmins and Rajputs (p. 476).

"All the Haburas in these Provinces call themselves Hindus; but, as we have seen, they accept little or no service from Brahmans. They have local deities to whom buffaloes or goats are sometimes sacrificed (p. 477). ... They appear to be in a transitional stage as regards food. ... The fact is that there are two classes of Haburas: those who have settled down to agriculture and become fairly responsible members of society, and those who still preserve their vagrant mode of life." The vagrant branch of the tribes supplies some of the most audacious criminals in the Province (p. 477).

Crooke is of opinion that "it is preposterous to connect them with the Tharus, a particularly harmless, inoffensive race, inhabiting the Himalayan Tarai" (p. 479).

D. N. Majumdar notes (mss. p. 13): "The Haburas claim Rajput descent and affiliate themselves to one of the four Rajput clans, viz. Chauhan, Solanki, Panwar or Rathore. The Haburas claim more than a dozen exogamous septs. Some include the Dom, Pasi, Nat, Gheedia Bahelia, Chirimamar as septs of the Haburas, and the total number of septs vary from 12 to 20. From the criminal record of the Haburas it appears that they are the most violent of the criminal tribes, their methods of crime as told in the traditional account of their origin are dangerous and cruel. Some authorities claim that the Haburas use lethal weapons and have no pity for their victims. Their fine physique and handsome features help them to move about in the guise of respectable citizens, Brahmins and Chattris, and they freely mix with the crowd, and practise their nefarious trade on unsuspecting pilgrims or travellers. They often pose as Sannasis and mendicants and they keep large number of broad necklaces to help in their impersonation."

E. A. H. Blunt (Census of India 1911, Vol. XV, Part I) writes: "The Habura is chosen as an instance of a 'gipsy' criminal tribe, and perhaps the most Hinduized of them. They use Brahmans as astrologers and usually cremate their dead: they will not eat beef, and worship Kali. Other such tribes, the Kanjar and Sansiya, are much more backward" (p. 123).

БНП (8)

Crooke writes (Vol. 2, p. 47): "Professor Lassen identifies them (Bhils) with the Phyllitae of Ptolemy, whom Colonel Yule classes with the Pulinda, a general term for various aboriginal races. ... There can be little doubt that they are a branch of the great Dravidian race which is found along the mountains of Central India, and are akin to the Gonds, Kharwars, Manjhis, Cheros, and Santals, who live further to the eastward. ... They worship Sitala, the small-pox goddess, and Mahadeva from whom they claim descent" (p. 48).

Crooke quotes from the Rajputana Gazetteer: "All Bhils go about armed with the tribal weapons, bows and arrows; except the headmen and others of consequence, who carry swords. ... The men wear their hair long and hanging in uncombed masses from their shoulders

(p. 48). ... Bhil children are not betrothed by their parents in their childhood. A Bhil girl is often unmarried up to the age of twenty or twenty-five" (p. 49). Widow marriage is permitted. Dead bodies are cremated, and stone tablets are erected in memory of their male dead but never of deceased women. "Bhils will eat the flesh of all deceased animals, even that of a dead camel. Bhils and Mainas, having no order of priesthood, resort to the Guru of the Chamars" (p. 54).

D. N. Majumdar writes (mss. pp. 32-34): "The Bhils have been identified with the primitive pre-Dravidian people of India, an early race that once occupied the whole of India before the Indo-Aryans penetrated into and colonised India. The racial features of the Bhils have been identified with those of the pre-Dravidian tribal groups like the 'Kadars', 'Uralis', 'Chenchus' and others, and linguistic affiliations have also been sought with the latter on what appears to be very slender evidence. Dr. B. S. Guha found racial similarities between the Bhils and the Chenchus on the basis of the coefficient of racial likeness, worked out from his own unpublished anthropometric data; otherwise also the Chenchus are popularly known as the closest relations of Bhils. E. W. E. Macfarlane finds relationship between the Bhils, the Oraons, and the Maria Gonds in the anthropometric characters though the blood group results show a difference which admittedly could not be explained properly. C. S. Venkatachar thinks that the Bhils are possibly a proto-mediterranean race which spread far and wide when a climatic crisis occurred in the grand steppes of Sahara and it is the race which is responsible for the industry associated with the final Caspian culture in the Vindhya's. He thinks further that the Bhils are one section of the Munda race which occupied pre-Dravidian India and had for its home the central regions across the Vindhya's, and it is perhaps in contact with the Dravidians on the outside in Gujrat, they acquired their present affiliation. Linguistically the Bhils cannot be affiliated either with the Oraons or with the Mundas though popular belief exists about an identity with the latter. Grierson describes Bhili as a language of the Central group of the inner Indo-Aryan brand which has about twenty dialects. With Bhils and Bhilodi, the number of persons speaking the language was estimated by Grierson to be about 4 millions inhabiting Gujrat, Rajputana, Central India, Khandesh, Berar and Western United Provinces. According to P. G. Shah the Bhil dialects form a continuous change between Rajasthani through Gujrati and Khandeshi and Marathi. According to Rev. C. Thompson, the Bhils form a completed arch resting upon two distinct pillars, one representing the aborigines of India and the other Aryan. Thompson calculated that about 84% of Bhili words were derived from Sanskrit and corresponded to those used in the Gujrati, and 10% were of Persian origin; the remaining could not be deciphered. Shah and Dave also agree about the Aryan affiliation of the Bhil language.

"There are not many Bhils in the United Provinces, only a sprinkling in the south-western portion. The Bhils own two endogamous groups among them, the *Ujala* and *Mele*, the one pure the other mixed; there is a third group who have a very low status and play music and are singers by profession. Each Bhil group is sub-divided into number of *sects* which are exogamous, and marriage is prohibited among the members of the same sect. Besides these restrictions, the village Bhils do not marry in towns. (For a detailed description see the article on "The Bhils of Gujrat", *Journal of the Gujrat Research Society*, Special Science Number Vol. IV, No. 4).

Hutton (*Caste in India*, 1946, pp. 18-19) observes: "One famous tribe of Western India is still numerous and vigorous, and that is the Bhil tribe. ... Bhili, the tribal language,

is an Indo-Aryan tongue but it probably replaces an older Dravidian tongue, and perhaps a Kolarian language before that. The tribesmen, partially Hinduized now in most districts, but in some professing a rather unorthodox form of Muslim faith, still retain their tribal organization and tribal consciousness. Most of them are now peaceful cultivators, but in the past they have been renowned for brigandage and lawlessness. They are a smallish, swarthy race, very expert in the use of the bow. ... They venerate the horse above other animals, but their chief festivals are those in honour of the dead. They are inveterate believers in witchcraft, and their women who have much freedom and influence, used in former times to accompany their menfolk into battle, using slings with great effect."

Hutton (p. 210) also quotes Col. Cole (*Report on the Census of the Rajputana Agency, 1931*, p. 125) as stating that Bhils used to bring back the heads of their enemies and hang them up in trees. Hutton (p. 134) refers to Bhils as having proto-Australoid affinities.

DOM (9)

According to Crooke (Vol. 2, p. 312) Doms are a "menial caste found scattered throughout the province, regarding whose origin and ethnological affinities there has been much speculation. To the east of the Province they are usually known as Dom, but are sometimes called *Jallad*, 'executioner,' *Hatyara*, 'murderous, blood-thirsty.' ... He is required to live outside towns like the *Chandala*, to eat his food in broken vessels, to wear the clothes of the dead, and to be excluded from all intercourse with other tribes; he can possess no other property than asses and dogs, and his only office is to act as public executioner or to carry out the bodies of those who die without kindred."

Crooke also quotes (p. 313) Risley as referring to "a general consensus of opinion that the Doms belong to one of the races whom, for convenience of expression, we may call the aborigines of India. Their personal appearance bears out as 'small and dark, with long tresses of unkempt hair, and the peculiar glassy eye of the non-Aryan autochthon', and Mr. Sherring remarks that 'dark-complexioned, low of stature, and somewhat repulsive in appearance, they are readily distinguished from all the better castes of Hindus.' 'The type, however,' Mr. Risley adds, 'as is the case with most widely-diffused castes, seems to display appreciable variations. In Eastern Bengal, according to Dr. Wise, the Dom's hair is long, black, and coarse, while his complexion is oftener of a brown than a black hue; and among the Magahiya Doms, whom I have seen in Bihar, only a small portion struck me as showing any marked resemblance to the aborigines of Chota Nagpur, who are, I suppose, among the purest specimens of the non-Aryan races of India. On the whole, however, the prevalent type of physique and complexion seems to mark the caste as not of Aryan descent, although evidence is wanting to connect it with any compact aboriginal tribe of the present day.'"

Crooke notes: "The tribes of scavengers, such as the Bhangi and Dom, have for many generations formed a sort of Cave of Adullam for the outcaste of the higher races, and the notorious immoral character of the women of these tribes must have had a powerful effect in modifying the physique and appearance of castes such as these. On the whole it may perhaps be safer to regard the Doms, not as a single, individual aggregate, but as a more or less mixed body of menials, who have been for ages in a state of the utmost degradation, and whose appearance and physique have been largely modified by the rigour of their occupation and environment" (p. 314).

Crooke writes: "their internal structure is most intricate. Under the general term Dom there are in these Provinces at least three distinct classes of people. They are, first, the wandering race of houseless thieves and vagrants who infest Bihar and the eastern districts of the North Western Provinces. Some of these have gradually raised themselves above the degraded status of their vagabond brethren. Some of them have settled down on the outskirts of towns and villages, and have taken to scavenging or industries connected with cane-work and basket-making. ... Next come the Doms of the Himalayan districts, who deny all connection with the eastern branch of the tribe, and have gained a fairly respectable position as husbandmen and artisans. Lastly come the Dom or Dum Mirasi, who are singers and musicians, and are treated of under the head Mirasi" (p. 316).

The tribal councils or panchayats are well developed. Crooke mentions seven endogamous sub-castes, and writes: "Among the Doms of Mirzapur the endogamous sub-castes have exogamous sections, some of which are territorial or titular, and some apparently totemistic; but no Dom can give even an approximately correct list of his sections (p. 321). ... Polygamy is prohibited except the first wife be barren. But there seems no restriction in regard to concubinage. They practice adult marriage, the usual age for the marriage of a girl being eleven or twelve. Divorce is allowed. Divorced women can marry again by the lower or *Sagai* form. Widows can marry by the *Sagai* form, and are generally married to widowers. The levirate under the usual restrictions is admitted. Adoption is of course unusual (p. 322).

"According to Dr. Wise it is universally believed in Bengal that Doms do not burn or bury their dead, but dismember the corpse at night, like the inhabitants of Tibet, placing the pieces in a pot and sinking them in the nearest river or reservoir (p. 325)." In the U.P., Crooke notes (p. 325) "the Doms appear to have no settled usage as regards the disposal of the corpse. Those who are fairly well off cremate the corpse, but unlike Hindus, take with them from the house the fire which is applied to the pyre. The poorer and vagrant Doms either bury, or sometimes cremate in a very rude and perfunctory way, or, when it is more convenient, throw the corpse into running water."

Crooke says the religious practices of the tribe vary with the social status of the sub-castes, and there is no standard type of worship because they are not controlled by Brahmans. Crooke also mentions that there are two special divinities of their own; the chief is Gandak (male) and Samaiya (female) to whom the Magahiya Doms sacrifice young pigs and wine with sugar and spices. ... They naturally believe in ghosts and spirits (p. 326).

"In Mirzapur Doms of the better class worship Bhawani, to whom at the Nauratra of Chait they make an offering of hogs, cakes, gruel, and wreaths of flowers (p. 327). ... Their demonology is much of the usual type common to the lower castes by whom they are surrounded (p. 328). ... The occupation and social position of the Eastern Doms differ much according to the sub-castes. One duty of the ordinary Dom is to supply fire for cremation. ... From his business and environment the Dom is, of course, regarded by all respectable Hindus with contempt, fear, and abhorrence. No one will touch food or water from his hands. The Magahiya Dom of Gorakpur will eat anything except the flesh of the monkey, serpent, and lizard. ... Doms who have adopted more cleanly occupations than their vagrant and scavenger brethren, such as basket-making, are naturally becoming more Hinduised and more careful in matters of diet" (p. 329).

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Crooke writes of the Kumaun Doms : "They are supposed to be the relics of the original inhabitants of the country, corresponding to the Dhiyar or ore-smelters of Jammu, the Batal of the Kashmir Valley, the Bem of Ladakh, the Newer of Nepal. In the Himalayan Districts of these Provinces the Dom has been recognized as a descendant of the Dasyus of the Veda, who are supposed to have held Upper India before the advent of the Naga or Khasa race (p. 331).

"There seems reason to believe that some at least of the Gypsy tribes of Europe are akin to the Magahiya Doms; and a connection has been traced between their languages" (p. 339).

E. A. H. Blunt (*Census of India 1911*, Vol. XV, Part I) observes : "The Bansphor, Dharkar and Dom can be treated together : the two first are settled sub-castes of the last named. The Eastern or plain Doms have no connection whatever with Brahmans, except that occasionally they get a Brahman to recite a *katha* for them. Their deities are their own. They will eat beef, though some of them will not kill a cow : and this, with a certain reverence for the snake and certain rivers, is the whole extent of their Hinduization. Their burial customs are very unsettled : some cremate, some bury, some expose the body" (p. 123).

D. N. Majumdar in *The Fortunes of Primitive Tribes*, (1944) states : "Individuals with flat nose, very dark complexion and short stature are frequently met with among the Doms, but their general features have undergone great change due perhaps to free mixing they had through centuries of contacts with higher racial groups. While fine or even aquiline nose is found in plenty among the Bhatu and the Sansiyas, the Doms do not show such incidence; on the other hand the general feature of the Doms affiliate them more to the Munda, Santhal and cognate tribes of Chota-Nagpur and adjacent areas than to the Kanjars, Karwals, Sansiyas and Bhatu (p. 187).

"The Doms are scattered all over India. The U.P. Doms are divided into two branches, one settled, the other vagrant. Those who live in the cities or in their vicinity belong to the former section, while the nomadic Doms infest the eastern districts of the U.P. and Bihar. The nomadic Dom has not shown his skill in any work. He roams in the jungle but has not learnt the ways of the fowler or the bird catcher. He is an indifferent fisherman, and an ill-equipped hunter (p. 192).

"The Doms, however despised and detested they may be and even if they are the lowest of all the social groups as Crooke calls them ("the true survival of the loathsome chandala"), may have an ancestry which their tradition has carefully preserved and which today forms the basis of their claim to a higher social status. The Punjab tradition claims for them a Brahmin parentage while another popular tradition traces them from Raja Ben or Vena and one of their sub-clans is still known as Ben Bansi" (p. 193).

Regarding their racial origins, opinions are far from unanimous. Risley traces them to the aboriginal stock. Dr. Caldwell (*Grammar of the Dravidian Languages*, p. 546, quoted by Risley in *Tribes and Castes of Bengal*, p. 240) thinks that they are the surviving representatives of an older, ruder, and blacker race who preceded the Dravidians in India.

Risley, however, recognises the appreciable varieties of the Dom physical type and traces them to their being widely diffused all over. Dr. Wise could not find much similarity between the eastern Doms and the Munda-speaking tribes of Chota-Nagpur plateau, but he could neither affiliate them to the Aryan stock. "The fact", writes Risley, "that for centuries

they have been condemned to the most menial duties and have served as the helots of the entire village community, would of itself be sufficient to break down whatever tribal spirit they may once have possessed and to obliterate all structural traces of their true origin" (pp. 193-194).

J. H. Hutton (*Caste in India*, p. 30) writes : "The Doms, though serfs and outcasts for centuries if not millenia, possibly represent a once respectable tribe. Przylusky would identify them with the Odumbara, a more or less legendary tribe of shepherds in the Punjab. They are hereditary executioners, and their assistance is necessary at funerals to hand the wisp of lighted straw with which the chief mourner ignites the pyre; but they perform any menial work, and are often nomadic and are most unorthodox in their willingness to take food of any kind (including beef) on which account the Dom is very offensive to the orthodox Hindu, though he acts on occasions as a musician. The Dom in the Himalayan foothills, in Kumaon and Garhwal, has retained a considerably higher status and something of his tribal organization, and is subdivided into various artisan groups practising different crafts." Hutton observes (p.101) that Doms in the U.P. have become a caste "apparently within comparatively recent times."

AHIR (10)

Crooke gives a separate section to Ahirs (Vol. 1, pp. 49-71) and describes them as : "An important and widely-distributed caste of herdsmen and agriculturists, found in large numbers throughout the Province. According to the Brahmanical tradition, as given by Manu, they are descended by a Brahman from a woman of the Ambastha, or tribes of physicians" (p. 49).

H. M. Elliot (quoted by Crooke, p.50) notes : "In the Brahma Purana it is said that they are descended from a Kshatriya father and a woman of the Vaisya caste. This pastoral tribe of the Yadubansi stock was formerly of much greater consideration in India than it is at present."

Risley (*Tribes and Castes*, Vol. I, quoted by Crooke p. 50) notes : "The traditions of the caste bear a highly imaginative character, and profess to trace their descent from the god Krishna, whose relations with the milk-maids of Brindaban play an important part in Hindu mythology. Krishna himself is supposed to have belonged to the tribe of Yadavas, or descendants of Yadu, a nomadic race, who graze cattle and make butter, and are believed to have made an early settlement in the neighbourhood of Mathura. ... The large functional group known by the name Gualas seems to have been recruited not merely by the diffusion along the Ganges valley of the semi-Aryan Gualas of the North-western Provinces, but also by the inclusion in the caste of pastoral tribes who were not Aryans at all" (p. 51).

Crooke further notes (p. 51) : "Another account represents them to be the descendants of the Abars, one of the Scythian tribes who in the second or first century before Christ entered India from the northwest, or, and this is perhaps more probable, they are regarded as an old Indian or half-Indian race who were driven south before the Scythian invasion. That they were very early settlers in these Provinces and the neighbourhood is certain." Crooke (p. 52) refers to General Cunningham (*Archaeological Reports*, II, 81) who "assumes from the reference to them in Manu that they must certainly have been in India before the time of Alexander, and that as they are very numerous in the eastern districts of Mirzapur,

Benares, and Shahabad, they cannot possibly, like the Jats and Gujars, be indentified with the Indo-Scythians, whose dominions did not extend beyond the Upper Ganges."

Ahirs belong broadly to middle layers of Hindu society. Some of their traditions however indicate a tendency to aspire to a higher origin. For example, some of the sub-groups claim to be Rajputs; others call themselves Jats; and still others Kshatriyas.

J. A. Baines writes (*Census of India 1891: General Report* p.193): "The Ahir is chiefly found in North Western India, where he has, in his time, given more than one dynasty to local thrones. To him is attributed a Scythian origin, and there is no doubt that the Ahir once prevailed a little way south of the Vindhya range, and was in the Indus Valley at a very early period in the history of India."

Ahirs are divided into a large number of endogamous sub-castes which have many variations in social customs and practices in different regions. Crooke notes: "The internal affairs of the castes are managed by a panchayat or tribal council (p. 57). ... To the west of the Province polygamy is allowed but it is discouraged. In Mirzapur it is said to be prohibited without the express sanction of the council, which is given in exceptional cases. Marriage, except among the very poorest members of the caste, takes place in infancy. Widow marriage is permitted as well as the levirate (p. 58). They follow, as a rule, the Hindu law of succession (p. 59) ... The married dead are cremated; children and those who die of epidemic disease are buried (p. 62). ... Ahirs are all Hindus, but are seldom initiated into any of the regular sects. They are served by Brahmans of all the ordinary priestly classes (p. 63). ...The Ahirs observe the usual Hindu festivals, particularly the Holi" (p. 64).

Crooke also notes (p. 65): "In Bihar, according to Mr. Risley, they rank with Kurmis and similar castes, from whose hands a Brahman can drink water. Towards Delhi, Sir H. M. Elliot states, that they eat, drink, and smoke in common not only with Jats and Gujars, but also under a few restrictions with Rajputs. In other places Rajputs would indignantly repudiate all connection with Ahirs."

D. N. Majumdar notes (mss. pp. 16-18): "The Ahirs of Etwa claim to be Kshatriyas and put on the sacred thread. They have 'jado' as their surname a corruption evidently of Jadava. They are still a group of shepherds and breeders of cattle though many have settled on land. The land between the Jumna and Doab had extensive pasture lands and they scattered themselves where food and fodder for the cattle were abundant. They do not live in big valleys. They form small groups of families and live in small hamlets and even in single huts. ... The Ahir women used to sell curd in the Bazars but they have been forbidden by the caste to do so." He also writes that "During the first Great War, the Ahirs were enlisted for active service and recruited as sepoy; since then they are practising Hindu rites and customs and wear the sacred thread. The educated Ahirs are mostly Arya Samajists."

KURMI (11)

Crooke (Vol. 3, p. 346) describes the Kurmi as "A very important cultivating caste widely distributed throughout the Province. ... Regarding the origin of the tribe there has been considerable discussion. At least in these Provinces they have no tangible traditions which are of any service in ascertaining the origin of the caste. Dr. Buchanan asserts a connection between the Gorakhpur Tharus and the Kurmis, but this rests on no satisfactory evidence. Colonel Dalton regards the Kurmis of Bihar as some of the earliest of the Aryan

colonists of Bengal, a brown tawny-coloured people, of average height, well-proportioned, rather lightly framed, and a fair amount of good looks. They show well-shaped heads and high features, less refined than Brahmans, less martial than Rajputs, of humbler mien even than the Goalas; but, except when they have obviously intermixed with aborigines, they are unquestionably Aryan in looks. Grey eyes and brownish hair are sometimes met with among them. The women have usually small and well-formed hands and feet."

Crooke quotes Risley : "The foregoing description clearly refers only to the Kurmis of Bihar, who are on the whole a fine-looking race, though perhaps hardly so Aryan in appearance as Colonel Dalton seeks to make out. The caste bearing the same name in Chota Nagpur and Orissa belongs to an entirely different type. Short, sturdy, and of very dark complexion, these Kurmis closely resemble in feature the Dravidian tribes around them. In Manbhum and the north of Orissa it is difficult to distinguish a Kurmi from a Bhumij or a Santal, and the latter tribe who are more particular about food than is commonly supposed will eat boiled rice prepared by Kurmis, and, according to one tradition, regard them as half brethren of their own, sprung from the same father, who begot Kurmis on the elder and the Santals on the younger of two sisters. The question then arises—Are these Kurmis a degraded branch of the Kurmis of Bihar and Upper India, or should they be treated as a separate caste formed out of Dravidian elements and owing their name to the accident of their having devoted themselves exclusively to cultivation ? Colonel Dalton does not distinctly commit himself to either view; but it is clear from his account of the caste that he was conscious of the difficulty, and was on the whole inclined to dispose of it by the hypothesis of degradation. This theory, however, fails entirely to account for either the remarkably uniform type of the Chota Nagpur Kurmis or for their totemistic usages. The latter point, however, appears to have been unknown to Colonel Dalton, and might possibly have induced him to change his opinion. Three hypotheses seem to be more or less tenable : (1) that the class Kurmi is made up of two distinct stocks, the one Aryan and the other Dravidian; (2) that the entire group comes of an Aryan stock, the type of which has been modified to a varying extent by mixture of blood and vicissitudes of occupation; (3) that the entire group was originally Dravidian, but that those portions of it which lay in the way of the Aryan invasion were refined by intercourse with the immigrants, while those settled in remote parts of the country preserved their primitive type (pp. 317, 348)." Crooke comments as follows.

"The question can be settled only by the evidence of anthropometry, which has hardly advanced sufficiently to enable the matter to be settled. Most observers in these Provinces will be inclined to believe with Mr. Risley that the signs of so-called Aryan origin in the Kurmis are not so clear as Colonel Dalton found to be the case in Bihar. But with a tribe so widely spread, and so exposed to varied influence, as the Kurmi, such a divergence in physical type is only to be expected. On the whole, perhaps it is safest for the present to regard them as an occupational caste from which has, at various times, diverged a series of kindred castes, such as the Keori, Kachhi, Saini, Mali, and others connected with the higher forms of husbandry" (p. 348).

Crooke mentions 11 main endogamous sub-castes, while the complete Census list gives 1488 sub-divisions.

Crooke writes (p.350): "In Bihar, according to Mr. Risley, 'the section names are titular, and the tendency is to discard the primitive rule of exogamy in favour of the more modern system of reckoning prohibited degrees by the formula of certain prohibited sections...These

facts tell in favour of the theory that all Kurmis are derived from a Dravidian stock; for if the Bihar Kurmis had been originally Aryans, they could have had no motive for discarding their original section-names; whereas a Dravidian tribe, intimately associated with Aryans and subjected to Aryan influences, would certainly be anxious to cast off totemistic designations, which would serve only as a badge of social inferiority. It should be observed moreover, that even in Bihar the Kurmis have not risen high enough to establish a claim to use the Brahmanical gotras, and have had to content themselves with a titular series of names; while in Bengal they are excluded, on the ground of their Dravidian descent, from the group of castes from whose hands a Brahman can take water'. To the east of these Provinces the Kurmis practice a law of exogamy under which marriage is prohibited with the family of the maternal uncle for five generations; with the family of the father's sister for the same number of generations; in their own family (*Kul*) for as long as they can remember relationship.

"Polygamy is allowed, and practically a man may have as many wives as he can afford to keep; but there seems to be an increasing prejudice against the practice, and among some of the sub-castes there appears to be an advancing tendency to the adoption of the rule that a man should not marry again while his first wife is alive unless she is barren or incurably diseased (p.351). In religion they follow the rule of other Hindu castes of similar social standing. To the East their ceremonies are performed by Brahmans of the Sarwariya tribe; further West by the Kanujiyas. Their social status is respectable. They will not eat *kachhi* even if cooked by a Brahman who is not their Guru. The same rule applies to *pakki*. Some local Brahmans will eat *pakki* from their hands, and the same is the case with respectable Kshatriyas. All other castes eat *pakki* from their hands without hesitation. ... In Oudh they have traditions of having been land-owners before the Rajput conquest, and Mr. Butts remarks that the same is the case in Lucknow, where they do not seem to have been a low-caste tribe. They worshipped Mahadeva. They are about the most industrious and hard-working agricultural tribe in the Province" (p. 354).

D. N. Majumdar (mss p.18) writes : "Several origins of the word Kurmi are given by Kurmis. Some say it is derived from Sanskrit word Kutumbi, family, others say it comes from Sanskrit word "Krishi" (cultivation) or Kurmi the tortoise. Some say that they descended from Raja Kur of Ajodhya, others say that they are descendants of Kauravas. They assert that they are Kshatriyas and many of the members of this sub-caste have insisted upon their being recorded as such.

"The Kurmis practise farming as well as trade and today many of them are big contractors and merchants. In Lucknow there is a settlement of Kurmis which contains more than a dozen millionaires, all Kurmis. They run schools, dispensaries and own large properties in land and buildings. Some have received education."

OTHER ARTISANS (12)

This group consists of 22 subgroups of Artisans following a variety of occupations. They are Teli (oil presser), Kumahr, Dhakar, Kewat, Bhar, Dhobi (washerman), Lonja, Bania (tradesman), Hajam (barber), Barai, Lohar, Lodh, Kasera, Khatik, Belder, Chandihar, Bargan, Gaderia, Mali, Vaish, Goala.

KAHAR (13)

Crooke (Vol. 3, p. 92) derives the word from Sanskrit, *Skandha-kara*, "a tribe who engaged in cultivation, particularly in connexion with growing water nuts, etc. in tanks, fishing, palanquin carrying, and domestic service. This variety of occupations renders a complete analysis of the tribe and its sub-castes very difficult. ... According to the Brahmanical genealogists the Kahar is one of the mixed castes, descended from a Brahman father and Nishada or Chandala mother. Their appearance suggests a considerable admixture of what is called non-Aryan blood. ... The Bihar Kahars claim descent from Jarasandha, King of Magadha" (p. 93).

Crooke notes that Kahars do not take Brahmans as their spiritual guides: "The Kahars say that they are the Gurus of Brahmans and will not take Brahmans as their Gurus, but accept the services of Jogis instead" (p. 94).

Crooke mentions fifteen sub-castes with a number of smaller groups (p. 95).

Panchayats or tribal councils are functioning quite vigorously. Polygamy is recognized with certain restrictions. Thus in Jhansi before a man can marry again he must obtain the permission of his first wife. If she refuses to give her consent, he can bring the case before the Council. Girls are, as a rule, unless they are orphans or their parents are very poor, married about the age of eight, before puberty; boys are usually married before fifteen. Widow marriage is recognized, as also levirate.

Crooke says (p. 98): "The dead are cremated when adult; buried when unmarried or the victims of epidemic disease or snake-bite. The ordinary *shraddha* is done in their honour. ... Kahars are orthodox Hindus and worship most of the ordinary gods."

Crooke quotes Ibbotson (p. 100): "He is the carrier, waterman, fisherman, and basket maker of the East of the Punjab; he carries palanquins and all such burdens as are borne by a yoke on the shoulders; and he is specially concerned with water, insomuch that the cultivation of water-nuts and the netting of water-fowl are for the most part in his hands, and he is the well-sinker of the Province. He is a true village menial, receiving customary dues and performing customary service. In this capacity he supplies all the baskets needed by the cultivator, and brings water to the men in the fields at harvest time, to the houses where the women are secluded, and at weddings and other similar occasions. His social standing is in one respect high; for all will drink at his hands, but he is still a servant, though the highest of the class." As one correspondent remarks, "This caste is so low that they clean the vessels of almost all castes except menials like the Chamar and Dhobi, and at the same time so high that, except Kanaujiya Brahmins, all other castes eat *pakki* and drink water from their hands."

D. N. Majumdar writes (ms. pp. 20-21): "They are a menial caste, domestic servants as they call themselves, and are widely scattered. The Kahars vary in their physical features and some families approach the high castes while others can definitely be identified with the aboriginal elements in the country. They are according to some writers, true 'Aryo-Dravidian' peoples, the 'Dravidian' strain is found to increase as one proceeds from the north to the south or the south-east. The statement may bear scrutiny when we substitute 'Australoid' for 'Dravidian'."

"The Kahars have never been agriculturists and the fact that in every village there

are a few families of Kahars and that they do not have any other trade or art except domestic service indicates that they must have been always living as menials or domestic servants.

"The Kahars are probably derived from *pratiloma* or hypogamous marriages between the high caste women and low caste men or are the off-shoots of concubinage, the latter particularly true of Bengal Kahars who are labelled as 'Sudras' and in Bihar as 'Shagird-pesh.'

"In recent years the Kahars of the U.P. have been found to take to a variety of occupations probably due to the fact that domestic service today is not paying as before, so that they are forced to seek new occupations. In Bengal, the Kahars have given up domestic service and claim to be Kayasthas though their claims are in this direction have not been conceded by the latter. The latitude allowed by the Bengal Kayasthas to aspiring members of other castes to be absorbed in the Kayastha community, will ultimately decide in favour of a general mix up.

"The Kahars are a mobile community and settle down wherever they need to in the interest of work. In the Kheri district the Kahars are a numerous caste and possess a strong Panchayat organization."

THARU (14)

Crooke devotes a large section on Tharus (vol. 4, pp. 380-406) from which extracts are given below. He describes the Tharu as "a tribe which has its head-quarters in the Himalayan Tarai and colonies in the Gorakhpur Division and Northern Oudh. Mr. Nesfield* in giving an elaborate account of these people, says 'To the east they extend about as far as the river Kusi, where they come in contact with the Mechas, a tribe similar to themselves in habits and features, and inhabiting that portion of the Tarai which separates the plains of Bengal from the hills of Sikkim. To the west they extend as far as the river Sarda which flows between Kumaun and Nepal. At this point they dovetail with another forest tribe similar to themselves in appearance and culture, the Bhukasas'.

"The origin of the Tharus has formed the subject of much controversy. One account is thus given by Dr. Buchanan (*Eastern India*, II, 341): 'The Gurkhas seem to have been expelled from Magadha by a people called Tharu, who are said to have descended from the hills and extended themselves over every part north of the Ghaghra at least. Of this people very numerous monuments are shown, and from these they would appear to have been an industrious, powerful race, as the number of great buildings in brick which they have left is very considerable. The Tharus, in fact, pretend to be the proper descendants of the Sun, and their having expelled the Gurkhas from their usurped estates, and their having descended for that purpose from the hills, are not incompatible with that pretension. Their claims to rank are, however, treated with the utmost contempt because they are an abomination to the Brahmans, and indulge in all the impurities of eating and drinking'. He goes on to say that they retain in their features strong marks of a Chinese or Tartar origin, although it must be confessed that these marks are somewhat softened, and that the faces of the men especially do not differ so much from those of the Hindus as those of pure Chinese do. Still, however, a difference is observable even in the men, and in the women and children is very closely marked (pp. 381-382).

*J. C. Nesfield, *Calcutta Review*, (XXX-I).

"The tradition in East Oudh is that after the fall of the Buddhist dynasty of Kanauj, the Tharus descended from the hills and occupied Ajudhya. On the other hand they asserted to Mr. Knowles that they were immigrants from the Dakkin or the south country. In Bijnor they claim Chithor as their place of origin and refer to Jaymal and Patta. They never claim a Gurkha or hill origin. Interspersed with them are other tribes, generally called Tharu, but quite distinct, such as Gaharwar, who also claim to be Rajputs. Regarding the Chithor story, Mr. Nesfield says 'Some Tharus know nothing about this tradition, and those who do are not able to tell you whether it was the sack by Allauddin (A.D. 1303) or that by Bahadur Shah (A.D. 1533), or that by Akbar (A.D. 1567). The story is absurd on the face of it; not the slightest allusion to Tharus in connection with any of these events is made by the Muhammadan historians' (pp. 382-383).

"Dr. Oldham believes that the Tharus are Indian aborigines and certainly very different from the Tartar Highland races. That the tribe has suffered much admixture is quite certain. Mr. Nesfield writes 'Owing to the intermarriages which have taken place within the last two or three centuries between Tharu men and Nepalese women the physiognomy of the Tharu tribe has acquired, in some instances, a slightly Mongolian cast, which shows itself chiefly, but not to a striking degree, in slanting eyes and high cheek bones. In other respects their physical characteristics are of the strictly Indian type. They have long, wavy hair, a dark almost a black, complexion, and as much hair on the face and body as is usual with other natives of India. In stature, build, and gait they are distinctly Indian and not Mongolian; nor have they any traditions which connect their origin with Nepal.' One of Mr. Risley's correspondents remarks on the scantiness of their beards, but this peculiarity may be due to crossing with Nepalese or Mech. Mr. Knowles says that 'some of the women are very fair, and are good looking both in face and figure; though they generally partake of the Mongolian style features' (p. 384).

"The most probable explanation based on the available evidence seems to be that the Tharus are originally a Dravidian* race who, by alliances with Nepalese and other hill races, have acquired some degree of Mongolian physiognomy (p. 385).

"As might have been expected from the wandering habits of the Tharus and the varying influences to which they have been exposed, they tend to break up into a number of sub-tribes which are very intricate and not easily analysed (p. 385).

"The usual age for marriage on the women's part is about seventeen or eighteen, and a man usually makes his first marriage at about that age (p. 389). Polygamy, divorce in the form of the expulsion from the house of the faithless wife with the approval of the council, widow marriage, and the levirate under the usual restrictions are all allowed. Divorced women can marry again like widows. Adoption is permitted (p. 392).

"Earth burial seems to have been the usual way in which the Tharus formerly disposed of their dead; but cremation is now taking its place; except in the case of those who die of cholera or small-pox; these are always interred (p. 393).

"The goddess who presides over life and death, and whom the Tharus believe to be the supreme power in the universe, is Kalika, one of the numerous forms of Devi, Durga or Kali, at whose name all India trembles, especially the low tribes and the casteless among

*The word Dravidian is used in the sense of Pre-Vedic or Pre-Aryan or Pre-Indo-European.

whom she originally sprung. Another deity revered by Tharus, and like Kalika of indigenous or non-Aryan origin, is her consort Siva, known chiefly among Tharus by the name of *Bhairava*, 'The Terrible', *Thakur* 'The Lord', and amongst Hindus by that of *Mahadeva*, 'The Great God'. He, like his spouse, is a god of destruction and thirsts for blood. But he is chiefly worshipped by the Tharus as the author of reproduction, of which a stone lingam, as among Hindus, is made the symbol (pp. 398, 399).

"Tharus hold three animals sacred above all others, and these they would deem it a sacrilege to destroy—the cow, the serpent, and the monkey—of which the cow and monkey are probably adored through the example of their Hindu neighbours. The snake has a special service at the Nagpanchami (p. 400).

"Mr. Nesfield has given an elaborate account of the social life of the Tharu. They live by hunting and fishing, gathering forest fruits and vegetables, grazing cows and buffaloes making ghi, keeping pigs, fowls, and goats, and practising a rude form of agriculture (p.401).

"In Gonda they eat pork, and the flesh of deer and those cloven-footed animals which ordinary Hindus eat, fowls, fish, both scaled and scaleless, tortoises, rats and hares. They will not eat beef, or the flesh of the monkey, crocodile, snake, lizard, jackal, and other vermin" (pp.401-402).

The Tharu is a submontane tribe of Dravidian origin with a strong admixture of Mongolian blood. Fifteen years ago the majority were still very primitive: save that they did not eat beef, they fulfilled none of the tests suggested of Hinduism. Their beliefs were purely animistic, they had no connection with Brahmans, and buried their dead. A minority were becoming Hinduized. Though they occasionally employed Brahmans as priests, the instances were still sufficiently rare to be separately noticed. By the latest information available it does not appear that they have made as yet any very great progress towards Hinduism.

Majumdar (*The Fortunes of Primitive Tribes*, pp. 65-109) notes that there are many traditions connecting the Tharu with Rajputs of Northern India. There is also a tradition of Maharastra origin of the Tharus. "The Tharus themselves deny their Nepali origin. Even if the Tharus have not come from Nepal, their intermixture with the Nepalese cannot be denied (p. 68).

"The Tharu women have a dominant position in their society. ...The Tharu tribal code definitely lays down the share of each sex in the property and belongings of the tribe. Women are the sole proprietors of domestic pets, poultry, cattle and the produce of the kitchen garden" (p. 69).

Majumdar writes: "That the Tharus have Mongoloid features there is hardly any doubt. Their eyes are more or less oblique, their complexion mostly brown or yellow-brown, the hair on the body and face very scanty and straight, their nose thin and of medium size while other features affiliate them more with the Nepalese than with Australoid or Pre-Dravidian tribes or castes. The Tharus therefore appear to be a Mongoloid people who have succeeded in assimilating non-Mongoloid features" (p.71).

Majumdar from his own observations believes that "Tharus develop an immunity against malaria." He discusses blood group evidence and notes that "Tharus show a very high incidence of AB which I should think is larger than that obtained for any Indian caste

or tribe except the Tibetans who live in the north-east India. Even the Tibetans do not show as high a percentage of (B+AB) as the Tharus" (p.75).

"The principal festival of the Tharu is *Holi* which is observed for more than a week and during the festival a sort of *saturnalia* is indulged in by the women" (p.109).

Majumdar further notes : "Overwhelming emphasis must now be given to the matriarchal matrix of Tharu culture which appears to be amply borne out by similar social status enjoyed by the women in the cis-Himalayan region"(p.77).

D. N. Majumdar mentions in his mss. notes (p. 21) : "The total Tharu population as recorded in the 1931 Census was 77,021 of which 40,288 were males and 36,733 females (*Census of India*, Vol. I, Pt. II, p.523). In one district in the U.P. namely Nainital, there were about 36,000 Tharus of which the Bhoskas, a cognate tribe numbered 6000. According to the 1941 Census, the total strength of the Tharus in the U.P. was 22,381 and in Bihar 38,982. There has been a lot of defection among the Tharus due to conversion into Hindu castes.

"The Tharu women are dominant in social and economic spheres and the Tharu men are literally subservient to their womenfolk. ...The voice of tribal elders does not seem to have any effect on Tharu women and their social life is jealously guarded against male interference. The Tharu women live an outdoor life hardly allowed by other tribes and the men have to work under the control of women, a kind of slavery against which Tharu men have raised their voice though still ineffective for want of any sanction from woman.

"The Tharus live by agriculture supplemented by fishing and occasional hunting in the forests. There are 73 sections among the Tharus which are normally exogamous. Many of these sections are local units and marriage within the village or within the same settlement is not allowed. Every local group has a *panchayat* consisting of elders of any consequence but the decision of the *panchayat* must receive the assent of the women of the village who often exercise their veto in no uncertain way. The reformist section among the Tharus are finding it extremely difficult to put their reforms into operation as without the tacit approval of the women nothing can be done. In Chandan Chowki, Dudhwa, Bonbassa, in Nankmata and Khatima the Tharu women are regarded as versed in witchcraft and sorcery and they are dreaded by their neighbours. The charm and beauty of Tharu women often attract men of other castes and it is said that hundreds of homes are broken by the Tharu women by their girls and mischievous pretensions."

CHAMAR (15)

Crooke writes (Vol. 2, p.169) that the Chamars are "the caste of curriers, tanners, and day-labourers found throughout Upper India. Their name is derived from the Sanskrit *charma-kara*, a 'worker in leather'. Traditionally the Chamar is the offspring of a chandala woman by a man of the fisherman caste."

Crooke notes that most observers will agree that Mr. Risley is right in his opinion that the average Chamar is hardly distinguishable in point of features, stature, or complexion from the members of those non-Aryan races from whose ranks we should *prima facie* expect the profession of leather dressers to be recruited. Mr. Nesfield believes the Chamar to have sprung out of several different tribes, like Dom, Kanjar, Habura, Chero, etc. the last remains of which are still outside the pale of Hindu society. 'Originally he seems to have been an impressed labourer (*begar*) who was made to hold the plough for his master, and received

in return space to build his mud hut near the village, a fixed allowance of grain for every working day, the free use of wood and grass on the village lands, and the skins and bodies of the animals that died' (p. 169). Crooke also refers to a curious legend of the origin of the tribe in connexion with Agarwala Banyas.

Chamars are divided into a very large number of practically endogamous sub-castes. Crooke notes, "but there seems reason for believing that this fissure into endogamous groups may be comparatively recent" (p. 174), and mentions that some of the sub-castes intermarry. Crooke also notes "Chamars have a particularly well organized and influential tribal council or panchayat (p. 175). ... Chamars show an increasing tendency to the adoption of infant marriage. It is very seldom that a girl remains unmarried after the age of eight (p. 176) ... Widow marriage is fully recognized; but among Chamars, who have like those at Cawnpur, risen in the world, there seems a tendency to prohibit it. The levirate is recognized, but the widow can live with the younger brother of her late husband" (177). Adoption is permitted.

Crooke notes "Those who have been initiated into the Siva Narayani or Sri Naranani Kabirpanthi or Ramanandi sects are buried, unless before death they have expressed a wish to be cremated. Ordinary Chamars are burnt in the usual way (p. 183) ... Chamars in the main conform to the popular type of village Hinduism. To the east of the Province all, except the higher and more advanced members of the caste, dispense with the services of Brahmans, except in so far as they usually consult them about the marriage auspices. To the west their marriage ceremonies are performed under the guidance of the low Gurra or Chamarwa Brahmans. To the east, as they become rich and influential, they employ Sarwariya or Kanauiya Brahmans of a degraded type" (p. 184).

Crooke refers to the extensive demonology and observes: "The Chamar from his occupation and origin ranks even below the non-Aryan tribes who have been quite recently adopted into Hinduism. He is considered impure because he eats beef, pork, and fowls, all abomination to the orthodox Hindu. He will eat cattle which die a natural death, and numerous cases have occurred where Chamars have poisoned cattle for the sake of the hides and flesh. He keeps herds of pigs, and the Chamrauti or Chamar quarter in a Hindu village is generally a synonym for a place abounding in all kinds of abominable filth, where a clean living Hindu seldom, unless for urgent necessity, cares to intrude" (p. 189).

Crooke further notes "The Chamar practices a variety of occupations. His primary business is curing skins and shoemaking, and the latter business has developed what is really a separate caste, that of the Mochi; in a village he provides all leathern articles used in husbandry, such as whips, thongs, well buckets, and the like. His wife has similarly a certain number of families to whom she acts as midwife and performs various menial services at marriages and festivals. ... Large numbers of Chamars take to field labour, act as ploughmen, carters, grooms or emigrate to towns, where they do various kinds of unskilled work. ... Many of them have become wealthy and aim at a standard of social respectability much higher than their rural brethren and some have begun even to seclude their women which every native does as soon as he commences to rise in the world" (p. 190).

D. N. Majumdar notes (ms. p. 22) "they are an important caste in the United Provinces and are widely distributed. The Chamars do not all follow their traditional occupation of tanners and leather workers. The Chamars, particularly those of them who do not ply their

native occupation, claim higher social status. The Chamars are endogamous both with respect to the caste as well as with its subsections. ... Every section has its own *panchayat* very efficiently run ... Although divorce is allowed, widow remarriage is not banned by the caste panchayat ... Their religious life does not differ much from the lower castes of the Hindu social order, but they prefer burial to cremation."

CHERO (16)

Crooke (Vol. 2, p. 214) describes them as "labourers and cultivators found in the hill country of Mirzapur. The word may be possibly of non-Aryan origin. Sir G. Campbell's theory that Chero, Khero, Kharwar is not probable. The ethnology of the Cheros has been to some extent obscured by the fact that they are in Bengal perhaps the most advanced of the Dravidian races. They are said in Shahabad to have been rulers of the country extending from Charanadri, the modern Chunar, to Gridhayakot (Giridih), and from the Ganges to the hills which now form the boundary of South Bihar, including the entire extent of the country in the Patna division south of the Ganges. The names of the Kol Raj and the Chero Raj are now indiscriminately applied to the natives of the South Bihar to the Kingdom of the aborigines. ... Even as late as the time of Akbar, a Chero chief is said to have kept possession of Chayanpur, one of the chief towns in the district of Sahabad. General Cunningham thinks their power must have ceased before the accession of the Pala dynasty. One ancient chief or ruling family among them appears to have been known as Chero Chai. ... Colonel Dalton remarks that in Chota Nagpur their physical traits have been considerably softened by their alliances with pure Hindu families. They vary in colour, but are usually of a light brown. They have, as a rule, high cheek bones, small eyes obliquely set, and eyebrows to correspond; low, broad noses, and large mouths with protuberant lips; in other words, they are not appreciably different from the other Dravidian tribes, like the Kols, Majhwars, etc. This is further shown by the fact that in Mirzapur they are popularly known as Baiga, the devil priest, which is the special business of the non-Aryan races" (p. 216).

They are divided into a number of exogamous sections. But Crooke notes: "Their custom of exogamy even is uncertain. ... There can be very little doubt that until comparatively recently they used to intermarry with Bhuiyas, as is proved by numerous local traditions. The Bhuiyas, on the other hand, say that they have given up intermarrying with Cheros since the Cheros have taken to intermarry with Kols, and the Cheros at any rate give Kol as one of their sections. South of the Son it is generally asserted that Bhuiyas and Cheros are the same. From all which it would appear that Kols, Cheros and Bhuiyas are of one parent-stock, and have separated by a process of abscission in comparatively recent times (p. 217).

"There is no trace of polyandry among them ... Monogamy appears to be the rule. Like those in Chota Nagpur the Mirzapur Cheros profess to marry their children between the age of five and ten. The customs regarding divorce, widow-marriage, the levirate, and succession, are the same as among the Kols" (p. 218).

Cremation is customary, and as Crooke notes: "They are beginning to employ Brahmans and to do the regular *Sraddha* while they still retain some of the non-Aryan practices noticed in the case of the allied Dravidian races" (p. 219).

They have a number of deities of their own to whom fowls, goats and pigs are sacrificed. Crooke notes "Ancestor worship is fairly well established, but not universal" (p. 220).

Crooke notes : "The only meat from which Cheros habitually abstain is that of the cow, and the prohibition of its use is based on religious motives. Their usual occupations are cultivating, ploughing for others, cutting wood, collecting lac and other jungle produce. They have an elementary communal organization in which the residents of three or four villages join for general business" (p. 222).

D. N. Majumdar writes (ms. pp. 23-24): "This tribe is mainly found in Mirzapur district and in its chief characteristics it shows Australoid affinities. According to Colonel Dalton they are a 'Kolarian' tribe. Traditions of their origin are various and often inconsistent and as is usual among many tribes nothing precise is known as to their origin. The kinship nomenclature or terminology akin to those of the Cheros are very much of the Kol relationship.

"They worship a collection of local gods, goddesses and godlings in addition to the ordinary members of the Hindu Pantheon. Their birth ceremonies are very much similar to the Kolarian ceremonies. In fact so close and so significant are some of the resemblances between the Cheros and the Kols that the former have often been classified as a sept or division of the latter.

"The Cheros have very nearly absorbed Hindu culture, so much so that the influence of the Brahmin pandit is now felt in every walk of life and is fast becoming paramount. They cremate their dead and have the regular *Sraddha* unlike many other primitive tribes. But still belief in witchcraft, omens and demons is widespread so much so that many an old woman is still feared as a witch. Beef is forbidden to the Cheros and the other food taboos are the same as those of other tribes in the area. The importance of the Chero as sorcerer, diviner, witch-finder is still conceded by the other tribes.

"They cultivate the soil, but here they are seriously handicapped for occupying as they do the hilly tracts, where the soil is poor, their yield is as a result low. They also gather fruits and vegetables from nearby forests. Some of them also go out and serve as labourers in fields of other cultivators, or find an occupation in some other walk of life."

MAJHI OR MAJHWAR (17)

Crooke (Vol. 3, p. 413) describes the Majhi or Majhwars as 'an aboriginal tribe of Dravidian origin found in the hill country of South Mirzapur. Their appearance is of the ordinary Gond type. They answer to the description given by Captain Forsyth of the aborigines of the Central Indian Highlands which may be summarized in the following way: low stature; colour, generally, a very dark brown, almost black in many individuals, (though never reaching the sooty blackness of the Negro) flat face; low forehead, nose flat on the bridge, with open protuberant nostrils; lips heavy and large, but the jaw usually well formed and not prominent like Negro, the hair on the face generally very scanty, but made up for by a bushy shock of straight black hair. In form they are generally well made, muscular about the shoulders and thighs, with lean, sinewy forearm and lower leg.

Crooke mentions that the Mirzapur Majhis have broader heads and coarser-made noses than the Kols or Panikas. Among the Majhis, the nose is particularly wide at the base and narrows to a pointed tip.

Crooke mentions: "The Majhis of South Mirzapur are divided into five exogamous sub-divisions, each of which includes a number of totemistic septs. Each of these endogamous sub-divisions is named from the leading sept." (p. 414).

Crooke refers to legends of their migration from Central India and Western Vindhyan and Kaimur ranges: "They fix the date of their emigration into the Mirzapur Parganas of Dhubi and Singrauli, and the native states of Sarguja, at about ten generations ago. ... The Gond connection is again kept up by the common worship of the national deities." (p. 417).

Crooke notes (p. 418): "They have a tribal council (panchayat) at which every householder has a seat. ... As with the regular Gonds, monogamy is the general rule; and, among ordinary people, only one wife is taken, unless she happens to be barren, when, as is usual among savage races, a second woman is taken in marriage. ... Polyandry is absolutely forbidden, and even the idea is considered most repulsive. ... It is characteristic of the Majhis, like all Gonds, that infant marriage is not the rule. Like all savages, maturity comes at an early age. The usual age is sixteen for males and twelve for girls. It is characteristic of all Gonds that the bride is purchased, and the price consists of such things as are necessary for feeding the guests invited to the marriage. ... Widow marriage by the form known as sagai is freely allowed. The levirate is practised under the usual restriction that the younger brother has the first claim to the widow of his elder brother, but the elder brother cannot take the widow of his younger brother." Divorce is permissible under restrictions. Adoption is permitted.

Crooke (p. 432): "Like many other savage races the Majhis take the dying person into the open air so that there may be nothing to stop the egress of the departing soul. Like the Korkus, they are in the transition stage between burial and cremation. People who die of small-pox and are supposed to be thus directly under the influence of the goddess Sitala are buried."

Crooke gives a description of tribal deities and notes (p. 435): "Some of the more advanced Majhis worship Mahadeva who is admittedly the representative of the Gond deity Bara Deo like him has an ox for his vehicle." He also refers to extensive ghost worship.

D. N. Majumdar gives the following information in his mss. notes (pp. 24-26). "The Majhwars are known by different names in different areas. In some places they are recorded as Manjhis and in others as Gond Majhwar. They are an aboriginal tribe showing marked Dravidian affinities and are found especially in the hill country of south Mirzapur. In appearance they resemble the Gonds. But they are generally better clad and possess better clothes than do the Gonds of central India.

"Exogamy is the cardinal feature; and status, rank or locality do not matter when the question of marriage between two parties arises. Marriage by capture is nowhere found, though it is practised among the regular Gonds.

"Primogeniture prevails in as much as the eldest son gets something in excess of an equal share. This is usually 10% more in cattle or household goods though there is no fixed rule. Girls have no share in their father's property but unmarried girls have to be maintained and married from the income of the family. The office of village headman is hereditary.

Adoption is allowed and rules have been codified to regulate it but in this case the influence of Hinduism is doubtful. Beef, flesh of domestic pigs, snakes, lizards, crocodiles or rats are not taken. Doms, Chamars, and Dhobi are untouchables to him. They have certain taboos against allowing women to join in certain tribal functions; the idea of impurity attaching to a woman in her menses is widespread.

"The Majhwars are cultivators, but poor cultivators using crude implements only to scratch the ground and then sow the seeds. *Dahiya* cultivation is still practised by some. They are very slow in learning the technique of a higher form of agriculture."

PANIKA (18)

Crooke (Vol. 4, p.113) describes the Panika as: "A low weaving and watchman tribe in South Mirzapur. They are the same people who are known in Bengal as Pan, Panwa, Paur, Pab, Panika, Chik, Chik Baraik, Ganda, Mahato, Sawasi or Tanti. ... Colonel Dalton was disposed from their appearance to believe them of Aryan or Hindu, rather than Dravidian origin, and describes them as 'in all probability remnants of the Aryan colonies that the Hos subjugated'. This was disputed by Risley, who notes 'the most cursory examination of the exogamous divisions of the Pans affords convincing evidence of their Dravidian origin'. Though they have lost in Mirzapur their totemistic septs, still their appearance clearly indicates their connection with the Dravidian races like the Majhwars.

They have a tribal council known as kutumayat or kabildari. There is no permanent president, but at each meeting the most respectable person present takes the chair" (pp. 114-115).

Polygamy is permitted, but they can seldom afford more than one wife. If there are more wives than one, the head wife alone is mistress of the household and shares in the family worship. Divorce, and widow marriage (with the levirate on the usual conditions) are permitted. Rules regarding succession, adoption and relationship correspond in every way to those of the Majhwars. Adoption is permitted.

Crooke: "Unmarried children and people who die of epidemic disease are buried; others are cremated. ... They profess a sort of bastard Hinduism. They are much afraid of evil spirits which commonly reside in mahua, pipal or banyan trees. These are periodically propitiated by offering of goats and fowls performed by the Baiga. They do not employ Brahmans in any of their religious ceremonies. Their two great festivals are the Holi and Dasami (Dasahra); but they in no way follow Hindu usage on these festivals, and offer a burnt offering to the marriage god Dulha Deva, who is represented by a piece of rudely cut stone on a mud platform. His worship is performed by the Baiga. They have an extensive demonology and ancestor worship" (pp.116-117).

"They work as weavers and village watchmen. They often work up cotton into cloth for their customers, and for weaving a dhoti receive three sers of *kodo* or *sanwan* millet. As may be anticipated from their customs, they are regarded as pure village menials and their social status is very low" (p.118).

D. N. Majumdar writes (mss p.27): "Another tribe which is found chiefly in South Mirzapore though a few of them have spread to the neighbouring areas. In U.P. their original totemistic divisions do not exist. They forbid marriage between close relations as well as

between those who live in contiguous villages. Thus they may be said to observe the rules of exogamy. All are supposed to be equal of status within the tribe irrespective of wealth.

"Gradually they are being absorbed in the Hindu fold and the influence of the Brahmin is here keenly felt in all their ceremonies. But a belief in demons, omens and witchcraft is not inconsistent with a belief in Hinduism. The cow is venerated. The flesh of the buffalo, horse ass, camel, jackal, lizard or crocodile is also forbidden. Liquor and tobacco are taken freely."

KHARWAR (19)

Crooke (Vol. 3, p. 237) described them as "a Dravidian land-holding and cultivating tribe found in South Mirzapur. The difference in social position between various branches of the tribe renders an analysis of it difficult. Some have attained a good position as land-holders and claim a high social rank, while others are menials, hewers of wood and drawers of water for the superior tribes. That they are of Dravidian origin is clearly proved by their totemistic sept system. One account connects them closely with the Cheros. ... Again, we are told that the tribe now calling themselves Santhal were formerly called Kharwar. What the real origin of the name Kharwar may be is not easily determined. ... Their tribal shrine is at a place called Kota in the Singrauli Pargana of Mirzapur, where there is a shrine of Jualamukhi Devi, where most of them assemble for worship at the Ramnaumi festival in the month of Chait. They bring their Brahmans from Singrauli and Palamau."

"The internal organization of the tribe varies in different parts of Mirzapur. Throughout they seem to have shed off the elaborate organization of totem 'septs' which prevails in Bengal. ... In appearance the more advanced members of the tribe are in strong contrast to the more primitive families. Some of the former have received some admixture of Hindu blood. The real Kharwars Colonel Dalton compares with the Santhals: 'They are very dark with pyramidal shaped low noses, thick protuberant lips and cheek bones or zygomatica, which project so as to make the temple hollow'. A writer in the *Calcutta Review* says of the tribe in Shahabad, 'the hair of the Kharwar is black and straight. The form of the face is more oval, and the nose and lips are thinner than is the case with the other hillmen the Chero, who has more regular features, alone excepted. There is nothing peculiar in the skull, but a slight depression from the extremities to the eyes and downwards gives a height to the cheeks and protrusion but closeness to the lips, imparting an expression of shyness, for which the Kharwar is too well noted. The chest is rather narrow, the abdomen large, the limbs long and flat, the gait erect, but both fingers and toes disproportionately heavy'. At the same time, in South Mirzapur even people who have lived all their lives among these Dravidian races fail to identify them easily. All they can say with certainty is that the Majhwars and Kharwars are known by the breadth and coarseness of their noses, while the Bhuiyas are known because they speak through their noses in a very marked way" (p. 238).

The tribe is divided into many sub-divisions most of which are exogamous. "Difference in geographical position, wealth or social position are not a bar to intermarriage; but marriages with families who carry on degrading occupations are prohibited. A man may marry as many wives as he can afford to purchase and maintain. Concubinage is not allowed, and there is no trace of polyandry. ... The marriage age is from five to ten. Adult marriage is considered disgraceful. A woman can be divorced for habitual infidelity, and a woman can leave her husband for the same reason, which must in both cases be proved to the satisfaction of the council. ... A divorced wife may marry again in the *sagai* form" (p. 241).

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"The tribe is at present in a state of transition as regards widow marriage and the levirate. The more Hinduised Kharwars, particularly those who aspire to Rajput rank, prohibit both. But those of the more primitive type permit these arrangements. ... The more Hinduised branches of the tribe are beginning to recognise the ordinary rules of Hindu adoption. ... The corpse is cremated in the usual way (p. 242).

"They call themselves Hindus, but they do not worship any of the usual Hindu gods, except the Sun, to whom, as in Bengal, they appeal in times of trouble, and to whom the householder bows when he leaves his house in the morning. Their tribal deities are Juala-mukhi Devi of Kota and Raja Lakhan" (p. 247).

They also have a good deal of demonology. "Their great festival is in the middle of Bhadon, when a leafy branch of the *karam* tree is cut, daubed with red-lead and butter, and fixed up in the court-yard. This marks as among the Oraons, the time for the transplanting of the rice" (p. 247).

"They will not eat the meat of the cow, buffalo, monkey, horse, elephant, camel, donkey, alligator, lizard, or rat. ... They use liquor freely, and chew tobacco (*surti*). The use of liquor they consider wards off disease, but drunkenness is discreditable" (p. 253).

E. A. H. Blunt (*Census 1911*, Vol. XV, U. P., Part I, p. 122) : "Kharwars can be taken as Hinduized. One branch, the Benbansi, has been recognized as of Rajput origin ; this branch has permanent Hindu priests, other branches are served by Brahmans of a somewhat inferior class. They do not eat beef, and cremate their dead ; but they also possess other funeral ceremonies, some of which are purely aboriginal, and others are an obvious Brahmanical invention. They worship no great gods save the Sun and Mahadeo, but him only as a local godling. They are an excellent instance of an aboriginal caste which itself desired incorporation in Hinduism and was assisted into it by the Brahmans, whilst being allowed to maintain many of its old customs. They are much better off than the Kols and Majhwars, which suggests a reason why they have been able to progress so much faster."

D. N. Majumdar (mss. p. 28) writes : "The Kharwar is an aboriginal tribe displaying marked similarities with the Korwas. They themselves hold that the name of their tribe is derived from their occupation of makers of catechu or *Khair* or else from the place from which they have migrated namely Khairagarh. Thus the terms Kharwas, Khairas or Khairwas as they are recorded in different parts of India seem to be the names by which the same tribe is designated in different parts of India i.e., in the areas where it is found. The main centre of Kharwar settlement was Chota Nagpur and Bihar and it is from here that they have come into the U.P.

"The various exogamous groups of the tribe are named after some plant or animal and each of them has a separate body of ceremonies as well as code of ethics which are rigorously adhered to. Both infant and adult marriage are allowed, but if the girl is an adult her consent is necessary before the marriage can take place. There is a system of bride-price prevalent, widowers having to pay double the ordinary bride-price if they want to marry virgins."

Crooke (p.450) : "They work as cultivators and ploughmen and cultivate at lower rates than their Hindu neighbours. Their special form of cultivation used to be the *dahiya*, by which a patch of jungle was periodically burnt down and seeds scattered in the ashes. This is now being gradually abandoned."

E. A. H. Blunt (*loc. cit.*) compares them with the Majhwars. "The Kharwar, Majhwar, and Kol can be treated together. They are all Dravidian tribes of South Mirzapur, though the Kol is found also in Bundelkhand and Allahabad, and are at various stages of Hinduization. The Majhwar is much the least advanced. Fifteen years ago there was nothing that was Hindu about the Majhwar, save that he did not eat beef; and that was then a new restriction. He was in the transitional stage between burial and cremation; he employed Brahmans only as astrologers, and even that but very occasionally: his priests were purely tribal—the Patari, the Baiga, and Ojha. He had his own gods, mostly ghosts and demons. This caste had only so much respect for Brahmans that they would eat *pakki* food if cooked by them but otherwise would touch food cooked by nobody else. They still possess their old priests and though they are probably more advanced than in 1896, yet their advance is not likely to have been great."

ORAON (20)

Sarat Chandra Roy (*The Oraons of Chota Nagpur*, 1915) wrote: "Among the purely aboriginal tribes of the plateau (Chota Nagpur), the Oraons appear to occupy the first rank in intelligence and social progress as they stand foremost in the numerical strength. Before they had entered the country they appear to have passed beyond the savage or hunter state and the nomadic or herdsman state and reached the settled agricultural state of social culture (p.1).

"For the racial and linguistic affinities as well as for the origin of the Oraons, the student has to look to Southern India" (p. 17). Other purely aboriginal tribes (such as the Mundas, Kharias, the Korwas and the Asurs) live side by side with Oraons. The Mundas and the Kharias stand on the same level of culture as the Oraons; the Korwas and the Asur represent a still primitive culture (p. 68).

"They are a short statured, narrow-headed (dolico-cephalic) and broad nosed (platyrrhine) people. The colour of the skin is dark brown often approaching black. Their hair is black and coarse; and although woolly hair, it is not uncommon. We have come across one or two Oraons whose hair is distinctly so. Although the hair is plentiful on the Oraon skull, it is usually less plentiful on his cheeks and lips, and still less so on the chest, back and legs. Such beard and moustache as he has generally begin to appear rather late, ordinarily not before a lad is out of his teens. The chest is well developed and so are the calves of his legs. The eyes are medium sized and occasionally small. The colour of the iris is dark. His jaws are somewhat projecting, lips rather thick and the nose is depressed at the very root" (p.80).

Although racially connected, S. C. Roy notes that it is possible in most cases to distinguish a genuine Oraon from a genuine Munda: "Thus recently in a batch of about 50 aboriginal boys, all dressed in the same fashion, we could at once single out the only Munda boy from the rest of his companions who were all Oraons; and in the Ranchi Law Courts where people of both the tribes come daily as litigants and witnesses, we tried several days in the experiment of distinguishing by sight from Oraons and Mundas and over three-fourth of the cases were successful" (p.82).

D. N. Majumdar comments (mss. 34-35): "The Oraons are an aboriginal tribe speaking the Dravidian dialect inhabiting mainly the Chota Nagpur plateau, and also on either side of the Kaimur range of hills. They entered Chota Nagpur from West India as a wedge among the Mundas. Even to-day the Mundas are the priests of the Oraons, which shows that the Oraons are probably immigrants who had to accept the original settlers namely

the Mundas as their priest for their traditional knowledge of the demonology of the land. A few of them are found in the Mirzapur District in United Provinces and many in Sarguja and other Central Indian States. The Oraons are not culturally distinct from the Munda even if they speak a different language, there is a lot of racial similarity with the Munda. The Oraons possess an institution locally known as 'Dhumkuria' or bachelors' dormitory, an interesting description of which is given by S. C. Roy in his *Oraon Religion and Customs*.

RAJWAR (21)

D. N. Majumdar sent the following particulars (ms. p. 35) : "The Rajwars are a Dravidian speaking cultivating caste mostly found in Bihar, Western Bengal, Palamau division of Chota Nagpur, Sarguja and Mirzapur Districts (of United Provinces.). The Rajwars of Bihar claim themselves to be Bhuiyas, but the Rajwars of Sarguja and adjoining areas claim Kshatriya origin. Some of the Rajwars claim to have come from Nagpur. They are Hindus and are Vaishnavas by sect. They employ Brahmin priests in their ceremonies and festivals, though the Brahmins who serve them are considered degraded."

Crooke does not mention Rajwar. Risley (*Census 1901*, Vol. I, pp. 50-57) includes Rajwar with Ahir and Kurmi in class III sub-class (a); and Chamar and Rajwar in class V (unclean castes) in the U.P.; and in class V (unclean castes) in Bihar.

KORWA (22)

Crooke (Vol. 3, p. 322) describes them as "a Dravidian tribe found in the part of Mirzapur south of the river Son and along the frontier of Sarguja. They appear to be the aborigines of Sarguja, Jashpur, and Palamau, and this claim is in some measure borne out by the fact that the priests who propitiate the local spirits are always selected from this tribe' (Risley, *Tribes and Castes*, I, 511). ... There seems little doubt that they are in name and origin closely connected with the Kurs, whose name Mr. Hislop connects with Kol, and describes as 'found on the Mahadeva hills and westward in the forest on the Tapti and Narbada until they come in contact with the Bhils'. ... The word Korwa seems to be another form of Kol. Herr Jellinghause interprets the word Kol to mean 'pig killer,' but the better opinion seems to be that it is a variant for *horo*, the Mundari for 'man'.

"The Mirzapur tribe say that there are two sub-tribes, Korwa and Koraku, both of whom are mentioned by Colonel Dalton. The former live in Pargana Dudhi, the flat country north of the Sarguja plateau, and the latter in the Sarguja hills. The former have almost abandoned the use of the bow and arrow, which is said to be habitually used by the latter. Among themselves the Mirzapur Korwas call the males Koraku and the women Koriku. ... Colonel Dalton's description applies very well to the Mirzapur tribe. He describes them as 'short of stature and dark-brown in complexion, strongly built and active with good muscular development'; but, as appeared to me, disproportionately short-legged. ... In feature the characteristic types are not very prominent: a breadth of face from the lateral projection of the zygomatic arches and narrowness of forehead are the most remarkable traits; the nose, chin, and mouth are better formed than we generally find them among the rude tribes of the Dravidian stock; and, notwithstanding the scarecrow tradition, the Korwas are, as a rule, better looking than Gond and Oraons. The males, I noticed, were more hirsute than the generality of their cognates, many of them cultivating beards or rather not interfering with their spontaneous growth, for in truth in their toilettes there is nothing like cultivation (pp. 323-324).

"They have a tribal council (*bhaiyari*). ... It is presided over by a permanent hereditary president. ... Every adult male has a right to sit on the council. ... There are in Mirzapur no exogamous sub-divisions. ... As a rule they have only one wife and do not indulge in concubinage or polyandry. The marriage age is twelve for males and ten for girls." Divorce is allowed but a divorced woman cannot remarry.* Widows may be married again by the *sagai* form (p. 324).

"The dying person is taken into the open air before death. The tribe is in a transitional stage between burial and cremation. ... Those that bury the dead have regular tribal, or family, burial-ground. Even among those who cremate the dead, young children and those who die of epidemic diseases are buried (p. 332).

"They do not even pretend to be Hindus, and have no connection with the Brahmans. They worship as their tribal god Raja Chandol in the month of February (*Phalgun*) with an offering of a cock, some red lead (*sendur*), and flowers (p. 332).

"They will not eat the flesh of the snake, tiger, hyaena, jackal, iguana, tortoise, house lizard, and similar animals. Among birds they do not eat the vulture. ... They will eat the flesh of the bear, monkey, pig, ox, buffalo, and all kinds of deer. ... A few have now taken to working as ploughmen, but as a rule they pick up their living as best as they can in the jungle and practically do no cultivation. ... They are expert in the use of the axe, and some can shoot fairly well at short distances with the bow and arrow. They are also expert in making fire by the friction of two pieces of dry bamboos. ... The Korwas, on the whole, are much the most primitive and miserable tribe to be found in these Provinces" (p. 333).

E. A. H. Blunt (*Census of India 1911*, Vol. XV, Part 1) speaks of them "as possibly the most primitive and miserable tribe in this province. They occasionally cremate the dead, but have no connection with Brahmans, worship gods and fetishes peculiarly their own, eat beef and scarcely even pretend to be Hindus. In every respect they are of the most aboriginal description" (p. 123).

D. N. Majumdar gives a full account of the Korwas in *The Fortunes of Primitive Tribes* 1944 (pp. 1-64) from which extracts are given below. "The Kols, the Bhuiyas, the Korwas, the Majhwars, the Cheros, the Aghariyas and the Kharwars are some of the primitive tribes living in the Mirzapur district. ... The Brahmins are getting well established as priests of the advanced sections of the tribal population though their influence is felt more among the Kharwars and the Majhis; the latter owe their finer features to a mixture with the caste people in the locality. The influence of Hinduism on the tribal cultures has certainly been great and many of the tribes like the Korwas could preserve their cultural heritage only at the expense of their tribal vitality, and today, like many other primitive tribes, they are faced with extinction" (p. 1).

Majumdar quotes Col. Dalton, who described the Korwas as follows: "Short of stature and dark brown in complexion, strongly built and active with good muscular development" but, Crooke found them disproportionately short legged. Majumdar notes: "In physical features the Korwas are easily distinguished from the neighbouring tribes such as the Majhwars, the Kharwars, the Bhuiyas, the Cheros and the Oraons. Most of the latter tribal groups are of a less robust constitution, a shade lighter in complexion and possess finer

*Majumdar (mss. pp. 30, 31) writes that divorced remarry,

traits. When I met the Korwas for the first time in Dudhi in 1931, I could not find any racial traits among them. The Korwas of Dudhi and of Palamau do not show any connection with the Negritoes as such, but a few Korwa families of Sarguja were found to possess characteristics suggesting negroid affiliation. The Korwas have a very dark complexion; some are even soot black. They have a well-developed chest and their figure gives an impression of great physical strength. Their eyes are small and the lids are swollen, though there is no mongoloid fold or obliqueness. The lips are thick but not interveed. The jaws are heavy and prognathism is not uncommon. The hair is coarse, thick and very dark. Woolly hair is not found among them. Genuine Korwas have a well-developed physique but look undernourished, even famished. They are scantily clad and sometimes go even nude particularly in the interior of the forests. There is apparently a lack of proportion between the upper and lower parts of their body, that is, they appear to be short-legged with the trunk fairly long for their stature" (p. 2).

Majumdar also gives the results of blood group data for 147 individuals collected by him and notes that Korwas have the highest A and the lowest B value of all the tribes and castes of these Provinces. The criminal tribes and the Tharus all show high B incidence (p. 3).

Majumdar notes: "The Korwas of the U.P. are the most primitive element in the population of the Province and the hill Korwas still live in a wild state in Sarguja forests and in Udaypur and Jashpur. ... Korwas in the wildest parts of Sarguja and Jashpur where they seem to have retained a most elementary social stage, using bow and arrows and content with a simple material economy, ... and even today the true Korwa neither sows nor reaps. He lives a wild life and with his sharp spud digs up edible roots which with the fruit of jungle trees, constitute his food." (p. 4). The Korwas in the United Provinces are confined to Dudhi in Mirzapur district.

"The Korwas do not allow any inter-tribal intercourse. No inter-tribal marriage is possible and they seldom observe prohibited degrees in marriage. Father-daughter and brother-sister marriages are not allowed but they can marry all other relations and they do so with the full knowledge and approval of the tribal society (p. 21). ... The Korwas have their tribal society. Instead of constituting the *punch* with only the elders, as is common among all tribal societies, the Korwa elders share their powers with the rest of the tribe and even women and children are found to take part in the deliberations of the Korwa council. (p. 22).

"Death from infectious diseases such as small-pox, cholera or plague is seldom followed by cremation. The Korwas throw the bodies into the caves of distant hills or into big rivers with strong currents. Unmarried persons of both sexes are also buried by the Korwas (p. 31).

"Among the Korwas there is a highly developed sense of solidarity and comradeship. The family is the unit of social organization, yet it is completely overshadowed by the closed territorial group (p. 34). ... The tribal solidarity of the Korwas is phenomenal and whenever any opportunity for joint effort and enterprise presents itself, the tribal society is sure to make the best of it summoning workers to satisfy individual needs (p. 40).

"As a rule, all marriages are arranged by the parties concerned and the elders seldom interfere in the choice of the young people. Where the parents take an active part in arrang-

ing marriages, the final choice remains with the young people concerned and any refusal on the part of the bride or the bridegroom leads to the dissolution of the proposed union. There has been of late a tendency to child marriage which the Korwas have learnt from their Hinduised neighbours, but the number of cases of child marriage are few and there is no indication that it is likely to gain in popularity (p. 53). ... The average marriage age for the boys is seldom below 20 while girls are not married before 15 (p. 54). ... Divorce is allowed as is also widow re-marriage (p. 56).

"Tribes like the Korwas who are on evil days still claim allegiance to their great clan god *Raja Chandol*, but their interest is more concentrated on propitiating the evil spirits they know by the legion, or those whom their shrewd neighbours force on them in order to exploit them with their help" (p. 60).

D. N. Majumdar furnished the following particulars (mss. pp. 30-31): "The Korwas are a tribe with proto-Australoid affinities who are concentrated in Sarguja and Mirzapur. They are to be found in the part of Mirzapur which is south of the river Son and along the frontier of Sarguja. The Korwas are thought to represent the very few survivors in the U.P. of a Munda speaking stock found on the borders of Sarguja state in the south east of Mirzapur. In Mizapur the Korwas are divided into no endogamous sub-divisions, though there are three sub-tribes of the Korwas, these are the Dib Korwas, the Dand Korwas, and the Parhaiya Korwas. The Korwas have a tribal council called among them as the *Bhaiyari* which is summoned by invitation when it is thought necessary. It is the usual custom for Korwa men to have only one wife, a second wife being accepted only if the first proves barren. Divorce is allowed and divorced women can remarry* by the *sagai* form and widows also can remarry by the same rite as in the past. The junior levirate is found to exist among them and so the younger brother can claim his deceased elder brother's widow. Disobedience to the orders of the *Bhaiyari* results in excommunication and hence its orders are implicitly obeyed. The Korwas of Sarguja now claim to be Hindus and in justification of their claim they urge that they worship the Hindu Gods. Though this is true in most cases yet they also retain their tribal beliefs to include their primitive beliefs. Once, it is held that they had a language of their own but today due to contact with their Hindu neighbours their language has been absorbed in Hindusthani.

"Their original occupation appears to have been hunting with the bow and arrow and though most of them still use their bow and arrow yet those who have settled on the plateau have ceased to use these weapons. However today they are chiefly cultivators and field labourers though their methods of cultivation are indeed very curde. They are not in the habit of using heavy ploughs instead of which they employ a crude digging stick by which they scratch the soil and then sow their seeds. Their cultivation and its success depends much on chance. Hence arises the need for subsidiary means of earning a livelihood and to-day hunting with the bow and arrow is their second line to fall back upon in order to improve the subsistence level rather than to act as the mainstay."

* Refer the footnote on page 234. According to Crooke divorced women can not remarry.

APPENDIX 1. HISTORICAL NOTE ON THE D^2 -STATISTIC.

By P. C. MAHALANOBIS

Karl Pearson had devised the Coefficient of Racial Likeness (C.R.L.) for comparing the resemblance of racial groups and this coefficient was first used in 1921 by Miss M.L. Tildesley in her paper on "A First Study of the Burmese Skull" (*Biom.* Vol. 13, 1921 247-251). At about the same time I had started the statistical analysis of anthropological measurements of Anglo-Indians taken by the late Dr. N. Annandale, and had been considering the problem of classification. I soon realised that Karl Pearson's C^2 was properly a test of divergence between two samples rather than a measure of the actual magnitude of the divergence. I, however, wanted an actual measure of the group distance, and adopting the notion of a generalized distance I formulated an early expression and used it in my paper on the "Analysis of Race Mixture in Bengal" in 1925.

The point to be emphasized is that the Pearsonian C.R.L. is, properly speaking, a test and not a measure of group divergence. The magnitude of C^2 determines the degree of certainty with which differentiation between the samples under consideration can be asserted, but does not supply any information regarding the magnitude or extent of such divergence. So long as samples are drawn from the same population, C^2 would be approximately equal to 0 (within the margin of errors of sampling), whatever the size of the samples. When the two samples are however drawn from two different populations, the magnitude of C^2 would depend on the size of the samples. The value of D^2 , however, would remain sensibly constant (within the margin of errors of sampling) when samples are drawn from the same two different populations, whatever might be the size of the respective samples. In other words, D^2 supplies a *measure* of the actual magnitude of divergence between the two groups under comparison. This was my chief reason for using D^2 in preference to C^2 .

In June 1927, when I was working in the University College, London, during a period of leave abroad, I showed my work on D^2 to Karl Pearson and discussed with him on several occasions the difficulties in using C.R.L. arising from the fluctuating size of samples. Karl Pearson was unable to accept my views, and pointed out that I had obtained only an approximate expression for the standard error of D^2 as I had not retained deviations of an order higher than the second. A second line of argument used by him was that the C.R.L. had actually proved to be of great value in the classification of races (based on skull measurements), a subject which he had discussed a short time ago in considerable detail in a paper "On the Coefficient of Racial Likeness."

After my return to India in 1927, I made further calculations retaining statistical deviations up to much higher orders, and succeeded in getting the exact distribution of D^2 for the null-hypothesis, that is, for the case when the two samples were drawn from the same population. I also obtained expressions for moment-coefficients up to the fourth order (which later on turned out to be exact) of the D^2 -statistic in the non-null case when the samples were drawn from different populations. These results were communicated to the Indian Science Congress towards the end of 1928.

As already stated, Pearson had shown in a review of about 750 computed values of C^2 that in actual practice the C.R.L. had been found to be an extremely useful tool in craniometric researches (*Biom.* 1926, 105-177). For purposes of comparison, I obtained by

direct calculation values of C^2 reviewed by Pearson. I found that a very large number of C^2 -coefficients (reviewed by Pearson) referred to closely associated groups for which both C^2 and D^2 would have low values. Further, owing to paucity of material, the number of skulls in each sample was also usually small, so that the size of samples did not fluctuate very widely from sample to sample. In other words, in craniometric work reviewed by Pearson, values of C^2 and D^2 gave more or less concordant results in a large number of cases. I, however, came across a certain number of comparisons for which C^2 and D^2 gave widely different results. In most of these critical cases, values of D^2 (rather than of C^2) were more in accordance with known anthropological facts showing the superiority of D^2 for purposes of classifications.

I also used the D^2 -statistic for the analysis of extensive measurements given by H. Lundborg and F. J. Linders in their great publication on "Racial Characters of the Swedish Nation" (Swedish Institute for Race Biology, Upsala, 1926). I prepared a memoir containing (a) theoretical work on D^2 -statistics, (b) its application to the Swedish material, and (c) the comparison of about 750 values of C^2 and D^2 to which I have already referred, and sent it to Karl Pearson in 1929 for *Biometrika*, but the paper was not accepted for publication. I, therefore, sent a second copy to R. A. Fisher requesting that he might communicate to some other journal for publication. In the mean time Karl Pearson, without sending any information to me, had published the anthropological portion of the work on the Swedish material under my name in a paper on "A Statistical Study of Certain Anthropometric measurements from Sweden" (*Biometrika*, Vol. 22, 1930, 94-108). This naturally prevented the publication of the full paper in England. The theoretical portion of the work was subsequently published in the form of a paper "On Tests and Measures of Group Divergence", in the *Journal of the Asiatic Society of Bengal*, New Series Vol. 26, 1930, No. 4. The second portion on the Swedish material, as already noted, was published in *Biometrika*. I had sent to the Asiatic Society of Bengal the third portion of the original memoir (which dealt with the comparison of about 750 values of C^2 and D^2). It appeared, however, that papers dealing only with Asiatic matters could be published in the Journal of the Asiatic Society of Bengal; and as the C^2 and D^2 coefficients related mostly to non-Asiatic races it was held that this portion of the paper could not be published in this journal. The work on the comparison of C^2 and D^2 values was thus never published.

This brings the researches in the problem up to 1930. Since then a good deal of further work has been done. In a brilliant piece of investigation, Rajchandra Bose succeeded in 1936 in obtaining the exact distribution of the D^2 -statistic in the classical form (that is, when the population values of the dispersion matrix were known). A little later, in 1938, the distribution of the D^2 -statistic in the studentised form was given by Rajchandra Bose and Samarendra Nath Roy. Suitable tests to judge the significance of differences in the dispersion matrices of two multivariate populations have been developed by Samarendra Nath Roy in a series of theoretical papers from 1939. The appropriate generalizations of the D^2 -statistic in the case of more than two populations and suitable statistics to test the equality of means of each character for a given number of populations were given by Fisher in 1939. The distribution of the ratio of D^2 's calculated on p and $(p+r)$ characters has been found by C. R. Rao in 1946. The test based on this is useful to decide whether the inclusion of r more characters to p basic characters results in an increase in the divergence measure between the populations.

H. Hotelling, working from an entirely different point of view, had also given in 1931, a generalized test (T) which was closely related to the D^2 -statistic. R. A. Fisher developed the use of the discriminant function in the problem of classification with multiple measurements in 1936, and later in 1939 obtained suitable generalizations of the analysis of variance to multiple measurements. He also gave a general review of the whole subject in his 1938 paper.

An account of some of the methods that were developed in the course of the analysis of the present material has been given in later appendices.

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APPENDIX 2. A NOTE ON THE USE OF INDICES

BY P. C. MAHALANOBIS AND C. RADHAKRISHNA RAO

Anthropologists make extensive use of certain percentage ratios such as Cephalic Index (100 Head Breadth/Head Length), Nasal Index (100 Nasal Breadth/Nasal Length) etc., for the purpose of classification. At the request of Dr. Majumdar, mean values and standard deviations of 5 indices (i) 100 HB/HL (Cephalic Index), (ii) 100 NB/NL (Nasal Index), (iii) 100 ND/NB (Nasal Elevation), (iv) 100 TFL/BzB (Facial Index), and (v) 100 BgB/BzB (Bizygomatic Index) were calculated and supplied to him.

The mean values, standard deviations, and coefficients of variation with standard errors for these five indices are given in Table 2A.

In calculating Karl Pearson's C^2 (Coefficient of Racial Likeness) it has been sometimes the practice to use indices as separate characters in combination with the measurements themselves, for example, Cephalic Index in addition to both Head Length and Head Breadth. This appears to have no theoretical justification as the following discussion will show.

Consider two characters x and y with mean values M_x and M_y , variances σ_x^2 , σ_y^2 and the coefficient of correlation ρ . The frequency constants for the Index (y/x) formed by the ratio of y to x are (when coefficients of variation of x and y are small) given by

$$\begin{aligned} V\left(\frac{y}{x}\right) &= \frac{M_y^2}{M_x^2} \left(\frac{\sigma_x^2}{M_x^2} - 2\rho \frac{\sigma_x \sigma_y}{M_x M_y} + \frac{\sigma_y^2}{M_y^2} \right) \\ C\left(x, \frac{y}{x}\right) &= \rho \frac{\sigma_x \sigma_y}{M_x} - \frac{M_y \sigma_x^2}{M_x^2} \\ C\left(y, \frac{y}{x}\right) &= \frac{\sigma_y^2}{M_x} - \rho \frac{M_y \sigma_x \sigma_y}{M_x^2} \end{aligned}$$

where V denotes the variance and C the covariance. The dispersion matrix for x and y and the index (y/x) used as an additional third character is given by

$$\begin{vmatrix} \sigma_y^2 & \rho \sigma_y \sigma_x & C\left(y, \frac{y}{x}\right) \\ \rho \sigma_y \sigma_x & \sigma_x^2 & C\left(x, \frac{y}{x}\right) \\ C\left(y, \frac{y}{x}\right) & C\left(x, \frac{y}{x}\right) & V\left(\frac{y}{x}\right) \end{vmatrix}$$

TALBE 2A. VALUES OF MEANS, STANDARD DEVIATIONS AND COEFFICIENTS OF VARIATION
WITH STANDARD ERRORS FOR FIVE INDICES BY GROUPS

Name of group	Head Breadth/Head Length							Nasal Breadth/Nasal Length						
	N	mean $\pm$	s.e.	s.d. $\pm$	s.e.	c.v. $\pm$	s.e.	N	mean $\pm$	s.e.	s.d. $\pm$	s.e.	c.v. $\pm$	s.e.
	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(1.6)	(1.7)	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)
1 Brahmin (Basti B ₁)	86	72.92 $\pm$ 0.341		3.16 $\pm$ 0.241		4.33 $\pm$ 0.305		85	71.74 $\pm$ 0.714		6.58 $\pm$ 0.505		9.17 $\pm$ 0.696	
2 Brahmin (Others B ₂)	92	72.89 $\pm$ 0.341		3.27 $\pm$ 0.241		4.49 $\pm$ 0.295		91	72.16 $\pm$ 0.683		6.52 $\pm$ 0.483		9.04 $\pm$ 0.673	
3 Agharia (Ag)	107	73.31 $\pm$ 0.325		3.36 $\pm$ 0.230		4.58 $\pm$ 0.343		107	72.81 $\pm$ 0.628		6.50 $\pm$ 0.444		8.93 $\pm$ 0.620	
4 Chattri (Ch)	139	72.12 $\pm$ 0.260		3.06 $\pm$ 0.184		4.24 $\pm$ 0.240		137	68.08 $\pm$ 0.576		6.74 $\pm$ 0.407		9.90 $\pm$ 0.610	
5 Muslim (M)	167	72.16 $\pm$ 0.212		2.74 $\pm$ 0.150		3.80 $\pm$ 0.219		168	71.23 $\pm$ 0.584		7.57 $\pm$ 0.413		10.62 $\pm$ 0.607	
6 Bhatu (C ₁)	148	74.46 $\pm$ 0.282		3.42 $\pm$ 0.199		4.59 $\pm$ 0.291		150	68.86 $\pm$ 0.592		7.25 $\pm$ 0.419		10.53 $\pm$ 0.643	
7 Habru (C ₂)	123	73.52 $\pm$ 0.253		2.81 $\pm$ 0.179		3.82 $\pm$ 0.255		124	71.51 $\pm$ 0.615		6.85 $\pm$ 0.435		9.58 $\pm$ 0.641	
8 Bhil (Bh)	186	75.62 $\pm$ 0.206		2.82 $\pm$ 0.146		3.73 $\pm$ 0.208		187	77.54 $\pm$ 0.543		7.43 $\pm$ 0.384		9.58 $\pm$ 0.522	
9 Dom (D)	113	73.69 $\pm$ 0.283		3.01 $\pm$ 0.200		4.08 $\pm$ 0.267		113	75.98 $\pm$ 0.794		8.44 $\pm$ 0.561		11.10 $\pm$ 0.741	
10 Ahir (A ₁)	67	73.76 $\pm$ 0.384		3.15 $\pm$ 0.272		4.27 $\pm$ 0.346		68	73.35 $\pm$ 0.952		7.85 $\pm$ 0.673		10.70 $\pm$ 0.955	
11 Kurmi (A ₂)	94	72.97 $\pm$ 0.318		3.08 $\pm$ 0.224		4.22 $\pm$ 0.292		94	73.90 $\pm$ 0.790		7.66 $\pm$ 0.559		10.36 $\pm$ 0.737	
12 Other Artisan (A ₃)	173	72.98 $\pm$ 0.243		3.20 $\pm$ 0.172		4.38 $\pm$ 0.215		173	74.48 $\pm$ 0.546		7.18 $\pm$ 0.386		9.60 $\pm$ 0.543	
13 Kahar (A ₄)	57	72.17 $\pm$ 0.511		3.86 $\pm$ 0.362		5.35 $\pm$ 0.469		57	75.88 $\pm$ 0.985		7.44 $\pm$ 0.697		9.80 $\pm$ 0.946	
14 Tharu (male) (Th)	191	72.33 $\pm$ 0.213		2.95 $\pm$ 0.151		4.08 $\pm$ 0.205		191	76.22 $\pm$ 0.476		6.58 $\pm$ 0.337		8.63 $\pm$ 0.464	
15 Chamar (Cm)	159	72.92 $\pm$ 0.259		3.26 $\pm$ 0.183		4.47 $\pm$ 0.225		159	75.41 $\pm$ 0.478		6.03 $\pm$ 0.338		8.00 $\pm$ 0.451	
16 Chero (T ₁)	100	72.36 $\pm$ 0.329		3.29 $\pm$ 0.233		4.55 $\pm$ 0.354		100	81.42 $\pm$ 0.698		6.98 $\pm$ 0.394		8.57 $\pm$ 0.642	
17 Majhi (T ₂)	155	72.67 $\pm$ 0.243		3.03 $\pm$ 0.172		4.17 $\pm$ 0.228		156	84.28 $\pm$ 0.608		7.60 $\pm$ 0.430		9.11 $\pm$ 0.514	
18 Panika (T ₃)	158	72.54 $\pm$ 0.226		2.84 $\pm$ 0.160		3.92 $\pm$ 0.225		157	81.06 $\pm$ 0.587		7.35 $\pm$ 0.415		9.07 $\pm$ 0.512	
19 Kharwar (T ₄)	196	73.60 $\pm$ 0.266		3.73 $\pm$ 0.188		5.07 $\pm$ 0.253		197	79.97 $\pm$ 0.548		7.69 $\pm$ 0.387		9.61 $\pm$ 0.509	
20 Oraon (T ₁)	100	72.30 $\pm$ 0.284		2.84 $\pm$ 0.201		3.93 $\pm$ 0.283		100	79.52 $\pm$ 0.847		8.47 $\pm$ 0.599		10.65 $\pm$ 0.787	
21 Rajwar (T ₂)	105	73.46 $\pm$ 0.273		2.80 $\pm$ 0.193		3.81 $\pm$ 0.276		105	73.79 $\pm$ 0.720		7.38 $\pm$ 0.509		10.00 $\pm$ 0.697	
22 Korwa (T ₃)	101	71.90 $\pm$ 0.252		2.53 $\pm$ 0.178		3.52 $\pm$ 0.282		101	85.54 $\pm$ 0.859		8.63 $\pm$ 0.607		10.09 $\pm$ 0.711	
23 Tharu (female)	182	72.64 $\pm$ 0.207		2.79 $\pm$ 0.146		3.84 $\pm$ 0.210		182	77.71 $\pm$ 0.472		6.37 $\pm$ 0.334		8.20 $\pm$ 0.422	

TABLE 2A. VALUES OF MEANS, STANDARD DEVIATIONS AND COEFFICIENTS OF VARIATION
WITH STANDARD ERRORS FOR FIVE INDICES BY GROUPS (Contd.)

Name of group	Nasal Depth/Nasal Breadth					Bigonial Breadth/Bizygomatic Breadth				
	N	mean $\pm$ s.e	s.d $\pm$ s.e	c.v $\pm$ s.e		N	mean $\pm$ s.e	s.d $\pm$ s.e	c.v $\pm$ s.e	
	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)
1 Brahmin (Basti B ₁)	85	69.92 $\pm$ 0.747	6.89 $\pm$ 0.530	9.85 $\pm$ 0.775		86	75.59 $\pm$ 0.471	4.37 $\pm$ 0.333	5.78 $\pm$ 0.459	
2 Brahmin (Others B ₂)	91	68.64 $\pm$ 0.709	6.76 $\pm$ 0.501	9.85 $\pm$ 0.749		92	75.65 $\pm$ 0.354	3.40 $\pm$ 0.251	4.49 $\pm$ 0.295	
3 Agharia (Ag)	107	66.15 $\pm$ 0.648	6.70 $\pm$ 0.458	10.13 $\pm$ 0.690		107	74.53 $\pm$ 0.370	3.83 $\pm$ 0.262	5.14 $\pm$ 0.343	
4 Chattri (Ch)	137	70.16 $\pm$ 0.695	8.14 $\pm$ 0.492	11.60 $\pm$ 0.735		138	75.28 $\pm$ 0.397	4.66 $\pm$ 0.280	6.19 $\pm$ 0.363	
5 Muslim (M)	168	67.74 $\pm$ 0.568	7.36 $\pm$ 0.402	10.87 $\pm$ 0.607		168	76.26 $\pm$ 0.277	3.59 $\pm$ 0.196	4.70 $\pm$ 0.273	
6 Bhatu (C ₁)	150	70.71 $\pm$ 0.598	7.32 $\pm$ 0.423	10.35 $\pm$ 0.583		150	75.29 $\pm$ 0.255	3.12 $\pm$ 0.180	4.14 $\pm$ 0.231	
7 Habru (C ₂)	124	67.64 $\pm$ 0.607	6.76 $\pm$ 0.429	10.00 $\pm$ 0.641		124	76.96 $\pm$ 0.305	3.40 $\pm$ 0.216	4.42 $\pm$ 0.254	
8 Bhil (Bh)	187	64.43 $\pm$ 0.429	5.87 $\pm$ 0.304	9.11 $\pm$ 0.469		186	75.26 $\pm$ 0.280	3.82 $\pm$ 0.198	5.08 $\pm$ 0.250	
9 Dom (D)	112	66.94 $\pm$ 0.703	7.44 $\pm$ 0.497	11.11 $\pm$ 0.744		113	75.45 $\pm$ 0.341	3.62 $\pm$ 0.241	4.80 $\pm$ 0.333	
10 Ahir (A ₁)	68	68.65 $\pm$ 0.840	6.93 $\pm$ 0.594	10.09 $\pm$ 0.866		68	75.41 $\pm$ 0.472	3.89 $\pm$ 0.334	5.16 $\pm$ 0.430	
11 Kurmi (A ₂)	94	66.61 $\pm$ 0.623	6.04 $\pm$ 0.441	9.07 $\pm$ 0.662		94	75.70 $\pm$ 0.372	3.61 $\pm$ 0.263	4.81 $\pm$ 0.366	
12 Other Artisan (A ₃)	171	65.86 $\pm$ 0.541	7.08 $\pm$ 0.383	10.75 $\pm$ 0.602		173	75.67 $\pm$ 0.332	4.37 $\pm$ 0.235	5.78 $\pm$ 0.324	
13 Kahar (A ₄)	57	65.36 $\pm$ 0.873	6.59 $\pm$ 0.617	10.08 $\pm$ 0.946		57	76.20 $\pm$ 0.587	4.43 $\pm$ 0.415	5.81 $\pm$ 0.564	
14 Tharu (male) (Th)	191	57.46 $\pm$ 0.400	5.53 $\pm$ 0.280	9.62 $\pm$ 0.517		191	76.07 $\pm$ 0.247	3.42 $\pm$ 0.175	4.49 $\pm$ 0.205	
15 Chamar (Cm)	159	64.30 $\pm$ 0.416	5.25 $\pm$ 0.294	8.16 $\pm$ 0.451		159	74.83 $\pm$ 0.297	3.74 $\pm$ 0.210	5.00 $\pm$ 0.281	
16 Chero (T ₁)	100	58.48 $\pm$ 0.554	5.54 $\pm$ 0.392	9.47 $\pm$ 0.642		100	74.96 $\pm$ 0.356	3.56 $\pm$ 0.252	4.63 $\pm$ 0.354	
17 Majhi (T ₂)	156	57.15 $\pm$ 0.420	5.24 $\pm$ 0.307	9.16 $\pm$ 0.514		155	75.71 $\pm$ 0.329	4.10 $\pm$ 0.233	5.42 $\pm$ 0.285	
18 Panika (T ₃)	157	59.03 $\pm$ 0.457	5.74 $\pm$ 0.323	9.72 $\pm$ 0.568		158	74.90 $\pm$ 0.279	3.49 $\pm$ 0.196	4.66 $\pm$ 0.282	
19 Kharwar (T ₄)	197	57.93 $\pm$ 0.363	5.10 $\pm$ 0.257	8.81 $\pm$ 0.457		197	75.30 $\pm$ 0.253	3.55 $\pm$ 0.179	4.72 $\pm$ 0.253	
20 Oraon (T ₅)	100	54.90 $\pm$ 0.557	5.57 $\pm$ 0.394	10.15 $\pm$ 0.714		100	75.14 $\pm$ 0.339	3.39 $\pm$ 0.240	4.51 $\pm$ 0.354	
21 Rajwar (T ₆)	105	60.01 $\pm$ 0.648	6.64 $\pm$ 0.458	11.07 $\pm$ 0.768		105	74.91 $\pm$ 0.332	3.40 $\pm$ 0.235	4.53 $\pm$ 0.345	
22 Korwa (T ₇)	101	54.19 $\pm$ 0.522	5.25 $\pm$ 0.369	9.68 $\pm$ 0.711		101	74.88 $\pm$ 0.350	3.52 $\pm$ 0.248	4.70 $\pm$ 0.353	
23 Tharu (female)	182	54.57 $\pm$ 0.380	5.13 $\pm$ 0.269	9.40 $\pm$ 0.476		181	74.21 $\pm$ 0.256	3.44 $\pm$ 0.181	4.64 $\pm$ 0.264	

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TABLE 2A. VALUES OF MEANS, STANDARD DEVIATIONS AND COEFFICIENTS OF VARIATION WITH STANDARD ERRORS FOR FIVE INDICES BY GROUPS (*Concl'd.*)

Name of group		Total Face Length/Bizygomatic Breadth						
		N (5.1)	mean (5.2)	± s.e (5.3)	s.d (5.4)	± s.e (5.5)	c.v (5.6)	± s.e (5.7)
1	Brahmin (Basti B ₁)	86	88.83	± 0.590	5.48	± 0.418	6.17	± 0.459
2	Brahmin (Others B ₂)	92	87.74	± 0.488	4.68	± 0.345	5.33	± 0.370
3	Agharia (Ag)	107	87.89	± 0.444	4.59	± 0.314	5.22	± 0.343
4	Chattri (Ch)	139	89.72	± 0.507	5.98	± 0.359	5.67	± 0.422
5	Muslim (M)	167	88.97	± 0.376	4.86	± 0.266	5.46	± 0.274
6	Bhatu (C ₁)	149	88.08	± 0.382	4.65	± 0.269	5.28	± 0.290
7	Habru (C ₂)	123	88.06	± 0.478	5.30	± 0.338	6.02	± 0.384
8	Bhils (Bh)	186	85.62	± 0.362	4.94	± 0.256	5.77	± 0.312
9	Dom (D)	112	90.76	± 0.468	4.95	± 0.331	5.45	± 0.335
10	Ahir (A ₁)	68	86.88	± 0.642	5.29	± 0.454	6.09	± 0.516
11	Kurmi (A ₂)	94	87.99	± 0.462	4.48	± 0.327	5.09	± 0.336
12	Other Artisan (A ₃)	173	87.84	± 0.376	4.95	± 0.266	5.64	± 0.324
13	Kahar (A ₄)	57	87.82	± 0.649	4.90	± 0.459	5.58	± 0.564
14	Tharu (male) (Th)	191	86.43	± 0.349	4.82	± 0.247	5.57	± 0.308
15	Chamar (Cm)	158	86.80	± 0.379	4.77	± 0.268	5.50	± 0.339
16	Chero (T ₁)	100	88.30	± 0.516	5.16	± 0.361	5.84	± 0.426
17	Majhi (T ₂)	155	86.02	± 0.405	5.04	± 0.286	5.86	± 0.342
18	Panika (T ₃)	157	86.70	± 0.405	5.07	± 0.286	5.85	± 0.340
19	Kharwar (T ₄)	197	87.13	± 0.316	4.44	± 0.224	5.10	± 0.253
20	Oraon (T ₅)	100	87.42	± 0.547	5.47	± 0.387	6.25	± 0.426
21	Rajwar (T ₆)	105	88.43	± 0.472	4.84	± 0.334	5.47	± 0.346
22	Korwa (T ₇)	101	85.61	± 0.438	4.40	± 0.310	5.14	± 0.353
23	Tharu (female)	182	84.13	± 0.381	5.14	± 0.269	6.10	± 0.316

It will be noticed that the determinant of this dispersion matrix vanishes as the third row can be obtained by adding $1/M_x$ times the first row and subtracting M_y/M_x times the second row.

Since the dispersion matrix is singular, the use of such variates in D^2 is not possible when correlations are taken into account. The vanishing of the above determinant indicates an approximate linear relationship between x , y and (y/x) so that the C. R. L. calculated with these three variables ignoring correlations reduces to a quadratic form in mean differences of x and y with weights (coefficients) which do not have a simple interpretation.

Also the dispersion matrix based on the original characters and indices would not remain sensibly the same for different groups of castes or tribes so that the theoretical assumptions on which the D^2 -statistic (or C. R. L.) is calculated would not hold good. In such cases a different approach would be necessary. In the present material, coefficients of variation are small and the use of index numbers as separate characters for calculating D^2 -statistic would not serve any useful purpose.

In view of the importance of the subject it has been considered advisable to work out numerical examples. As already stated, Dr. Majumdar had specially asked for 5 indices to be calculated. Mean values of these 5 indices expressed as deviates from the general mean in terms of corresponding standard deviations are given in Table 2B for each caste separately.

Calculations have also been made by transforming the three Nasal measurements (nasal length, nasal breadth and nasal depth) into 3 canonical variates as explained in Appendix 4. The equation giving the canonical variances is

$$\lambda^3 - 1.0523\lambda^2 + .2114\lambda - .0101 = 0$$

with $\lambda_1 = .796$, $\lambda_2 = .181$ and $\lambda_3 = .075$ as roots.

The three canonical variates corresponding to λ_1 , λ_2 , λ_3 are

	Nasal		
	length	breadth	depth
λ_1	-.222	.507	-.832
λ_2	.651	.569	.280
λ_3	-.877	-.521	.186

The mean deviations (from the general mean) expressed in terms of standard deviations for these three canonical variates are also given in the Table 2B. The total variance

TABLE 2B. NORMALISED VALUES OF INDICES AND THE THREE CANONICAL VARIATES
FOR THE THREE NASAL CHARACTERS

	hb/hl	b _e b/b _s b	tl/b _s l	nd/nb	nb/nl	canonical variates		
	(1)	(2)	(3)	(4)	(5)	λ_1 (6)	λ_2 (7)	λ_3 (8)
1 Brahmin (BastiB ₁)	-.05	.01	.36	.97	-.53	-1.20	.60	-.19
2 Brahmin (OthersB ₂)	-.06	.02	.14	.77	-.48	-.87	.23	-.02
3 Agharia (Ag)	.06	-.25	.17	.37	-.39	-.33	-.16	.18
4 Chattri (Ch)	-.28	-.03	.54	1.01	-1.03	-1.11	.55	-.45
5 Muslim (M)	-.19	.17	.37	.62	-.60	-.77	.42	-.29
6 Bhatu (C ₁)	.58	-.06	.24	1.09	-.93	-1.23	.49	-.25
7 Habru (C ₂)	.19	.31	.17	.61	-.56	-.66	.06	-.05
8 Dom (D)	.18	-.02	.75	.50	.04	-.75	.75	-.29
9 Bhil (Bh)	.72	-.07	-.29	.10	.25	-.16	.09	.12
10 Ahir (A ₁)	.31	-.03	-.03	.77	-.31	-.67	-.21	.43
11 Kurmi (A ₂)	-.03	.04	.19	.45	-.24	-.44	-.07	.22
12 Other Artisan (A ₃)	-.03	.03	.16	.33	-.16	-.25	-.20	.30
13 Kahar (A ₄)	-.27	.16	.16	.25	.02	-.23	-.13	.27
14 Tharu (male) (Th)	-.12	.13	-.12	-.98	.07	.94	.06	-.54
15 Chamar (Cm)	-.05	-.17	-.04	.08	-.03	-.01	-.30	.29
16 Chero (T ₁)	-.21	.34	.25	-.82	.78	.82	.04	.12
17 Majhi (T ₂)	-.07	.12	-.15	-1.03	1.17	1.10	-.14	-.06
18 Panika (T ₃)	-.16	-.03	-.04	.74	.73	.82	-.30	.18
19 Kharwar (T ₄)	.14	-.06	.02	-.91	.58	.93	-.03	-.20
20 Oraon (T ₅)	-.23	-.10	.08	-1.39	.52	1.57	-.61	-.02
21 Rajwar (T ₆)	.11	-.15	.28	-.58	-.25	.86	-1.04	.35
22 Korwa (T ₇)	-.35	-.16	-.28	-2.95	1.35	1.64	-.16	-.14
Variance	.068	.022	.032	.669	.392	.796	.181	.075

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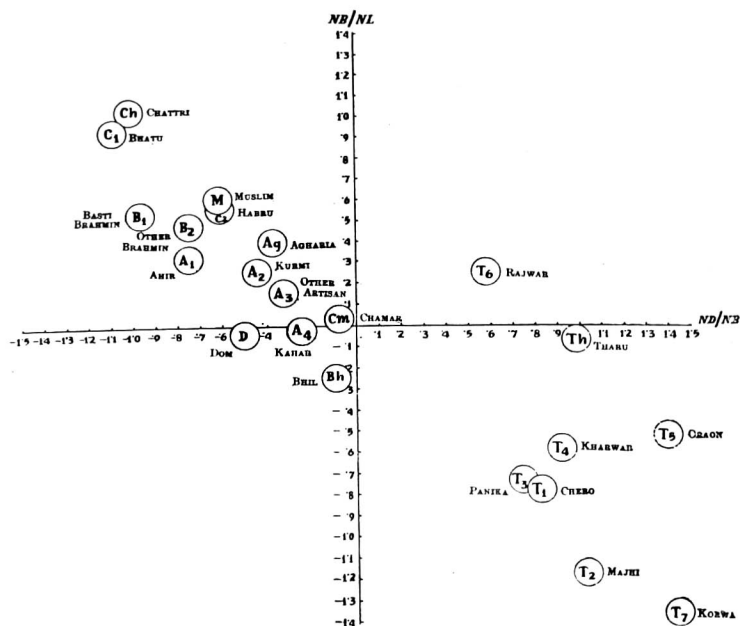


Chart 2C. The distribution of the groups with respect to nasal index and elevation

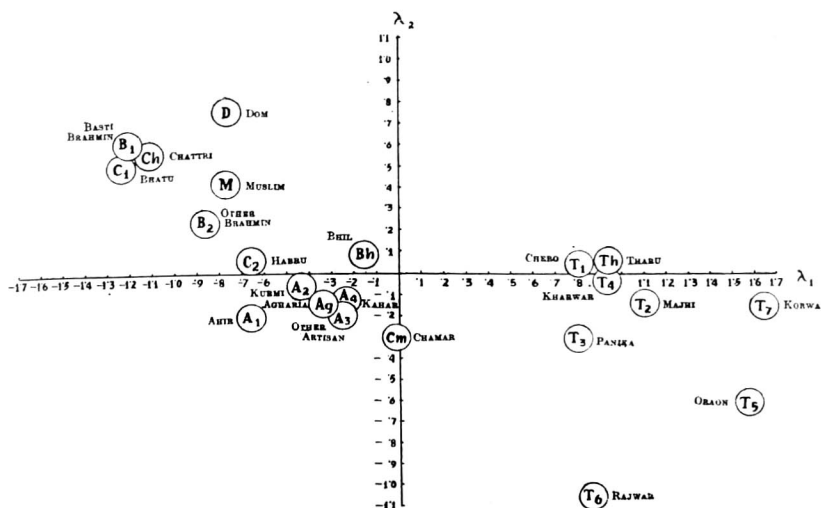


Chart 2D. The distribution of the groups with respect to first two canonical variates of the nasal characters

between castes and tribes is given at the bottom of the table. It will be noticed that λ_1 has the largest discriminating power with a value of 0.796 with the corresponding values of 0.181 and 0.075 for λ_2 and λ_3 respectively. The measures of discrimination due to Cephalic, Facial and Bigonial indices are .068, .032 and .022 which are comparatively very small and hence of no use for classification purpose. The two other indices, Nasal Elevation (0.669) and Nasal Index (0.392) show larger discriminating power than either λ_2 and λ_3 , but are still much less useful than λ_1 .

The two-dimensional picture, using the Nasal Index and Nasal Elevation index, is shown in Chart 2C. The corresponding diagram using the two canonical variates λ_1 and λ_2 is given in Chart 2D. It will be seen that the (λ_1, λ_2) chart discriminates the present material better than the other one. In fact λ_1 alone will distinguish between the different castes and tribes more effectively than the two indices. The Tribal groups are well separated and also the Artisans which are rather confused in the Nasal Index Chart.

This analysis brings out that no additional information is obtained in the problem of classification by the inclusion of indices together with the original characters. The best discriminating functions are certain linear functions of the characters and they may be profitably used instead of the indices for purposes of classification.

APPENDIX 3. ON THE DISTANCE BETWEEN TWO POPULATIONS

By C. RADHAKRISHNA RAO

Let the distribution of a certain number of characters in a population be defined by the probability differential

$$\phi(x, \theta_1, \dots, \theta_q) dx$$

The quantities $\theta_1, \dots, \theta_q$ are called population parameters. Given the functional form, of x 's which are the variables, specifying the type of the distribution, we can generate different populations by varying the parameters $\theta_1, \dots, \theta_q$. These quantities may be represented by a point in a space of q -dimensions, so that a population of a given type will be identified with a point of this space. This may be called the population space (P.S).

Let $\theta_1, \dots, \theta_q$ and $\theta_1 + d\theta_1, \dots, \theta_q + d\theta_q$ be two contiguous points in (P.S). At any assigned values of the characters of the populations, the differences in the probability densities corresponding to these contiguous points is

$$d\phi(\theta_1, \theta_2, \dots, \theta_q)$$

retaining only the first order of differentials. It is a matter of importance to consider the relative discrepancy $d\phi/\phi$ rather than the actual discrepancy. The distribution of $d\phi/\phi$ over the x 's summarises the consequences of replacing θ_i by $\theta_i + d\theta_i$ ($i=1, 2, \dots, q$). The variance of this distribution or the expectation of the square of the relative discrepancy comes out as the positive definite quadratic differential form

$$ds^2 = \sum \sum g_{ij} d\theta_i d\theta_j$$

where

$$g_{ij} = E \left(\frac{1}{\phi} \frac{\partial \phi}{\partial \theta_i} \right) \left(\frac{1}{\phi} \frac{\partial \phi}{\partial \theta_j} \right)$$

Since the quadratic form is invariant for transformations in (P.S.) it follows that g_{ij} 's form the components of a covariant tensor of the second order and is also symmetric for

$g_{ij} = g_{ji}$, by definition. This quadratic differential form with its *fundamental tensor* as the elements of the *Information matrix* may be used as a suitable measure of divergence between two populations defined by two contiguous points. The properties of (P.S.) may be studied with this as the *quadratic differential metric defining the element of length*. The space based on such a metric is called the Riemannian space and the geometry associated with it is the Riemannian geometry with its definitions of distances and angles.

If two populations are represented by two points A and B in (P.S.) then we can find this distance between A and B by integrating along a geodesic using the element of length

$$ds^2 = \sum g_{ij} d\theta_i d\theta_j$$

If the equations to the geodesic are

$$\theta_i = f_i(t) \quad (i = 1, 2, \dots, g)$$

where t is a variable, then the functions are derivable from the set of differential equations

$$\sum_{j=1}^g g_{ik} \frac{d^2 \theta_j}{dt^2} + \sum_{j,l=1}^g [jl, k] \frac{d\theta_j}{dt} \frac{d\theta_l}{dt} = 0$$

where $[jl, k]$ is the Christoffel symbol defined by

$$[jl, k] = \frac{1}{2} \left[\frac{\partial g_{jk}}{\partial \theta_i} + \frac{\partial g_{ik}}{\partial \theta_j} - \frac{\partial g_{ij}}{\partial \theta_k} \right]$$

The estimation of distance, however, presents some difficulty. If the two samples from the two populations are large then the maximum likelihood estimate of distance can be found. With small samples we can determine the fiducial limits only in some limited cases.

The necessity for the introduction of a suitable measure of distance between two populations arises when the position of a population with respect to a number of populations has to be studied. The concept of distance between two statistical populations was first developed by P. C. Mahalanobis, and the generalized distance defined by him (Mahalanobis : 1936) has become a powerful tool in biological and anthropological research.

If (P.S.) defines a system of p -variate normal populations differing only in the mean values the quadratic differential metric giving the element of length in this space is given by

$$ds^2 = \sum \alpha^{ij} dm_i dm_j$$

where α^{ij} are the elements of the matrix reciprocal to the common dispersion matrix. Integrating along the geodesic between the points defined by $m_1, m_2, \dots, m_p$ and $m'_1, m'_2, \dots, m'_p$ we get the expression for distance as

$$\sum \sum \alpha^{ij} (m_i - m'_i)(m_j - m'_j)$$

which is Mahalanobis' generalized distance.

Some of the logical aspects of Mahalanobis' G.D. have been discussed by the author in 1947. It has been shown that this distance is an explicit function of the proportion of overlapping individuals in the two populations.

A perfectly general measure has been developed by Bhattacharyya (1942) who defines the distance between two populations as the angular distance between points represent-

ing the populations on a unit sphere. If $\pi_1, \pi_2, \dots, \pi_k$ are the proportions in a population consisting of k classes then the population is represented by a point with co-ordinates $\sqrt{\pi_1}, \sqrt{\pi_2}, \dots, \sqrt{\pi_k}$ on a unit sphere of k dimensions. If two populations have the proportions $\pi_1, \pi_2, \dots, \pi_k$ and $\pi'_1, \pi'_2, \dots, \pi'_k$ then the points representing them have co-ordinates $\sqrt{\pi_1}, \sqrt{\pi_2}, \dots, \sqrt{\pi_k}$ and $\sqrt{\pi'_1}, \dots, \sqrt{\pi'_k}$. The distance between them is given by

$$\cos^{-1}(\sqrt{\pi_1\pi'_1} + \dots + \sqrt{\pi_k\pi'_k})$$

If the population are continuous with probability densities $\phi(x)$ and $\psi(x)$ the distance is given by

$$\cos^{-1} \int \sqrt{\phi(x)\psi(x)} dx$$

The representation of a population as a point on a unit sphere, as given by Bhattacharyya (1946) throws the quadratic differential metric in an interesting form. By changing $\theta_1, \dots, \theta_q$ the parameters occurring in the probability density, the points representing the corresponding populations describe a surface on the unit sphere. It is easy to verify that the element of length connecting two points corresponding to $\theta_1, \dots, \theta_q$ and $\theta_1 + d\theta_1, \dots, \theta_q + d\theta_q$ on this is given by

$$ds^2 = \Sigma (d\phi)^2 / \phi = \Sigma \Sigma g_{ij} d\theta_i d\theta_j$$

where g_{ij} are the elements of the quadratic differential metric defined above.

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APPENDIX 4. REPRESENTATION OF 'p' DIMENSIONAL DATA IN LOWER DIMENSIONS

BY C. RADHAKRISHNA RAO

If there are k sets of p ordered elements each, they can be represented by k points in a space of p -dimensions. The problem is one of getting the best representation of the k points in a space of lower dimensions, and is the same as 'fitting' a space of given dimensions to data in higher dimensions. Two methods suitable for uncorrelated and correlated sets of variables are given below.

Uncorrelated variables: Let $M = ((m_{ij}))$ ($i = 1, 2, \dots, k; j = 1, 2, \dots, p$) be the matrix representing k points in a p -dimensional space. It may be supposed, without loss of generality, that the origin is at the centroid of these points. Let $L = (l_1, l_2, \dots, l_p)$ represent the direction cosines of a line passing through the origin so that $LL' = 1$ where L' represents the transpose of L . The projections of these k points on this line are given by the elements of the vector LM' . Then L is chosen in such a way that the sum of the squares of these pro-

jections, $LM' ML'$ which gives the scatter of the projected points on the line, is a maximum. Introducing the Lagrangian multiplier λ and differentiating $LM' ML' - \lambda(LL' - 1)$ one gets

$$LM'M - \lambda L = 0, LL' = 1$$

Eliminating L , λ is obtained as the root of the determinantal equation $|M'M - \lambda I| = 0$. The equation has all real and positive roots if the rank of M is equal to p , and has b real and positive roots and a zero root of multiplicity $(p-b)$ if the rank of M is b .

If $\lambda_1, \lambda_2, \dots, \lambda_p$ are distinct and positive roots in descending order of magnitude with $L_1, L_2, \dots, L_p$ as the corresponding derived vectors then the following relationships exist. Since $L_i M' M L_i' = \lambda_i$, the vector giving the maximum scatter corresponds to the maximum root. If λ_i and λ_j are any two different roots then

$$L_i M' M L_j' = \lambda_i L_i L_j' \text{ and } L_j M' M L_i' = \lambda_j L_j L_i'$$

which, on subtraction, gives $L_i L_j' = 0$ showing thereby that L_i and L_j are orthogonal. If one requires the best representation of the points given by the matrix M in t ($t < p$) dimensions, it is only necessary to replace M by $L^{(t)} M'$ where $L^{(t)}$ represents the matrix obtained by writing $L_1, L_2, \dots, L_t$ in order one after the other. This is the best fitting t -space to the points in p -space.

If there is a zero root of multiplicity $(p-b)$, then the points lie entirely in a b -space and it is possible, by the above method, to replace the b -space by best fitting spaces of lower dimensions by considering the non-zero roots $\lambda_1, \lambda_2, \dots, \lambda_b$.

If the root λ_1 is of multiplicity r , then the rank of matrix $M'M - \lambda_1 I$ is $(n-r)$ so that the system of linear equations $LM'M - \lambda_1 L$ has an r -fold infinity of solutions. These solutions are generated by r independent sets of solutions which may be replaced by r orthogonal sets of solutions subject to the condition that the sum of the squares of elements in each set is unity. These may be called $L_1, L_{1+1}, \dots, L_{1+r-1}$, in any order one likes. It is thus possible to get the vectors $L_1, L_2, \dots, L_b$ in all cases with the help of which the original p -space can be transformed to another orthogonal p -space by the transformation $M \rightarrow L^{(p)} M'$ such that the sub-spaces formed by the first axis, first two axes, etc. form the best fitting 1-space, 2-space etc. for the system of points represented by M in the original space or $L^{(p)} M'$ in the transformed space.

Maximising the scatter in a t -space is same as minimising the sum of squares of perpendicular distances from points to the t -space. This method is quite general and can be used to represent any data in p -dimensions in a lower number of dimensions.

An early use of this has been made in a paper by Kendall (1939) to distinguish geographical regions according to crop productivity. He used only the first transformed variate.

Correlated variables: This is particularly useful in the case of representation of a set of populations defined with respect to p correlated characters. If $X = (x_1, x_2, \dots, x_p)$ represents the vector of p -variates with the dispersion matrix defined by Λ , then the p variates are replaced by a linear function LX' with unit variance so that $L\Lambda L' = 1$ where $L = (l_1, l_2, \dots, l_p)$. The mean values of LX' for k populations, with identical dispersion matrices, may be represented by LM' . It may be assumed, without loss of generality, that the origin is at the centroid of the mean values of the k populations. If one is maximising the scatter $LM' ML'$

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
MUSLIM												
N	72	108	168	168	108	131	168	168	168	168	168	168
Frontal Breadth (FB)	—	0.5202	-0.0117	0.1341	0.1212	—	0.3781	0.0537	0.4275	0.2284	0.0510	0.0094
Bizygomatic Breadth (BzB)	0.5202	—	0.0781	0.2973	0.1405	0.2509	0.2448	0.4524	0.6203	0.2119	0.0351	0.2296
Nasal Length (NL)	-0.0117	0.0781	—	0.2183	0.0749	-0.0436	0.1904	0.0005	0.1396	-0.1008	0.3478	0.5719
Head Length (HL)	0.1341	0.2973	0.2183	—	0.2572	0.1498	0.2797	0.2014	0.3021	0.1046	0.1941	0.3426
Upper Face Length (UFL)	0.1212	0.1405	0.0749	0.2572	—	0.2261	0.2782	-0.0393	0.0906	0.0356	0.3858	0.6990
Sitting Height (SH)	—	0.2509	-0.0436	0.1498	0.2261	—	0.6971	0.2353	0.1700	0.0132	0.1867	0.1706
Stature (St)	0.3781	0.2448	0.1904	0.2797	0.2782	0.6971	—	0.2148	0.2025	0.0537	0.2508	0.2731
Bigonial Breadth (BgB)	0.0537	0.4524	0.0005	0.2014	-0.0393	0.2353	0.2148	—	0.1779	0.1322	0.0684	0.1071
Head Breadth (HB)	0.4275	0.6203	0.1396	0.3021	0.0906	0.1700	0.2025	0.1779	—	0.0804	0.0934	0.2059
Nasal Breadth (NB)	0.2284	0.2119	-0.1008	0.1046	0.0356	0.0132	0.0537	0.1322	0.0804	—	-0.0397	-0.0020
Nasal Depth (ND)	0.0510	0.0351	0.3478	0.1941	0.3858	0.1867	0.2508	0.0684	0.0934	-0.0397	—	0.2703
Total Face Length (UFL)	0.0094	0.2296	0.5719	0.3426	0.6990	0.1706	0.2731	0.1071	0.2059	-0.0020	0.2703	—
BRATU												
N	150	150	150	150	150	57	150	150	150	150	150	150
Frontal Breadth (FB)	—	0.7019	-0.0425	0.0610	0.0769	0.4746	0.1894	0.2770	0.3671	0.1658	0.1111	-0.0297
Bizygomatic Breadth (BzB)	0.7019	—	0.2377	0.1985	0.2627	0.2888	0.1603	0.4541	0.5549	0.2259	0.2855	0.2372
Nasal Length (NL)	-0.0425	0.2377	—	0.1945	0.0753	0.0759	0.0247	0.0068	0.1178	-0.0451	0.2750	0.4133
Head Length (HL)	0.0610	0.1985	0.1945	—	0.1052	0.3181	0.1037	0.2495	0.0594	0.0120	0.1321	0.0841
Upper Face Length (UFL)	0.0769	0.2627	0.0753	0.1052	—	0.1890	0.1593	0.0683	0.1165	-0.0346	0.1693	0.6306
Sitting Height (SH)	0.4746	0.2888	0.0759	0.3181	0.1890	—	0.7716	0.2716	0.3915	0.1566	0.1245	0.2192
Stature (St)	0.1894	0.1603	0.0247	0.1037	0.1593	0.7716	—	0.5357	0.1773	0.2660	0.0773	0.2340
Bigonial Breadth (BgB)	0.2770	0.4541	0.0068	0.2495	0.0683	0.2716	0.5357	—	0.4198	0.1079	0.0544	0.1284
Head Breadth (HB)	0.3671	0.5549	0.1178	0.0594	0.1165	0.3915	0.1773	0.4198	—	0.0170	0.1794	0.1527
Nasal Breadth (NB)	0.1658	0.2259	-0.0451	0.0120	-0.0346	0.1566	0.2660	0.1079	0.0170	—	0.1441	-0.0369
Nasal Depth (ND)	0.1111	0.2855	0.2750	0.1321	0.1693	0.1245	0.0773	0.0544	0.1794	0.1441	—	0.0279
Total Face Length (TFL)	-0.0297	0.2372	0.4133	0.0841	0.6306	0.2192	0.2340	0.1284	0.1527	-0.0369	0.0279	—

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second canonical variance. Hence the vector N is the same as the second canonical vector. Either the canonical variates or any linear combinations of them serve the same purpose.

The result can be generalized, so that the best t linear functions satisfying the requirements of the above problem are supplied by the first t canonical variates.

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APPENDIX 5. ON A TRANSFORMATION USEFUL IN MULTIVARIATE COMPUTATIONS

BY C. RADHAKRISHNA RAO

In multivariate analysis one is often confronted with the task of inverting a covariance matrix which is laborious when the number of variates exceeds four or five. This and the further use of the elements of the inverse matrix in the computation of statistical constants and test criteria can be considerably simplified by working with a set of transformed variates derivable from the original variates. The method of construction of these transformed variates and the mechanization it introduces on the computational side are given in this appendix with special reference to the statistical methods used in the main article.

Let $x_1, \dots, x_p$ be the original variates all reduced to unit standard deviation and r_{ij} the correlation between the i -th and j -th variates. The new system of variates $Y_1, \dots, Y_p$ is defined by

$$\begin{aligned} Y_1 &= x_1 \\ Y_2 &= x_2 - a_{21} Y_1 \\ Y_3 &= x_3 - a_{32} Y_2 - a_{31} Y_1 \\ &\dots\dots\dots \\ Y_p &= x_p - a_{pp-1} Y_{p-1} - \dots - a_{p1} Y_1 \end{aligned}$$

The constants a_{ij} are chosen such that the Y 's are independent. The actual evaluation of these coefficients is carried out in successive stages so that knowing the coefficients in $Y_1, \dots, Y_i$ any coefficient in Y_{i+1} can be calculated in a simple manner.

To find a_{21} , the covariance of Y_1, Y_2 denoted by $\text{cov}(Y_1, Y_2)$ has to be equated to zero.

$$\begin{aligned} \text{cov}(Y_1, Y_2) &= \text{cov}(x_1, x_2) - a_{21} V(Y_1) = 0 \\ &= r_{21} - a_{21} = 0 \\ a_{21} &= r_{21} \\ V(Y_2) &= 1 - r_{21}^2 \end{aligned}$$

where V denotes variance. For Y_3, a_{32} and a_{31} are to be calculated in order. Introducing

the constants b_{ij} as defined below merely to facilitate computation the steps may be given as follows :

$$\begin{aligned} b_{31} &= r_{31} & a_{31} &= b_{31} \\ b_{32} &= r_{32} - a_{21} b_{31}, & a_{32} &= b_{32}/V(Y_2) \\ V(Y_3) &= 1 - b_{31} a_{31} - b_{32} a_{32} \end{aligned}$$

To find Y_4 , the steps are

$$\begin{aligned} b_{41} &= r_{41}, & a_{41} &= b_{41} \\ b_{42} &= r_{42} - a_{21} b_{41}, & a_{42} &= b_{42}/V(Y_2) \\ b_{43} &= r_{43} - a_{32} b_{42} - a_{31} b_{41}, & a_{43} &= b_{43}/V(Y_3) \\ V(Y_4) &= 1 - b_{41} a_{41} - b_{42} a_{42} - b_{43} a_{43} \end{aligned}$$

Knowing $Y_1, \dots, Y_{i-1}$ the steps for the evaluation of Y_i are

$$\begin{aligned} b_{i1} &= r_{i1} & a_{i1} &= b_{i1} \\ b_{i2} &= r_{i2} - a_{21} b_{i1}, & a_{i2} &= b_{i2}/V(Y_2) \\ b_{i3} &= r_{i3} - a_{32} b_{i2} - a_{31} b_{i1}, & a_{i3} &= b_{i3}/V(Y_3) \\ b_{ij} &= r_{ij} - \sum_{i=1}^{i-1} a_{ij} b_{i1}, & a_{ij} &= b_{ij}/V(Y_j), j \leq i-1 \end{aligned}$$

$$V(Y_i) = 1 - \sum_{j=1}^{i-1} a_{ij} b_{ij}$$

The method needs checking at each stage since the constants derived at any stage depend on those previously calculated. Errors may accumulate due to rounding off in earlier calculations but the accuracy can be maintained by retaining a sufficient number of decimal places at each stage.

Ultimately the variates $Y_1, \dots, Y_p$ can be reduced to unit standard deviation by dividing each variate by its standard deviation. If these are represented by $y_1, \dots, y_p$ then they satisfy the relations

$$y_i = Y_i / \sqrt{V(Y_i)}$$

D² analysis : From the mean values of the original characters reduced to standard deviation units the mean values of the transformed characters can be calculated by the use of the formulae listed above. If $d_1, \dots, d_p$ are the differences in transformed characters for two groups then D^2 , the generalized distance between them, is

$$D^2 = d_1^2 + \dots + d_p^2$$

This formula has two advantages, (a) this saves a good amount of labour and mechanizes the computation of D^2 which as defined with respect to the original characters contains as many as $p(p+1)/2$ terms with the elements of the inverse of a p -th order matrix as the compounding coefficients, and (b) the distance contributed by the addition of a new variable can be separately calculated and added on to the previous value without going through the process of inverting a $(p+1)$ -th order matrix.

Discriminant function analysis : If $d_1, \dots, d_p$ denote the differences in mean values as defined above, then the discriminant function in terms of the transformed variates $y_1, \dots, y_p$ is

$$d_1 y_1 + \dots + d_p y_p$$

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with its variance

$$d_1^2 + \dots + d_p^2 = D^2$$

The discriminant function which utilizes the first i variates only is

$$d_1 y_1 + \dots + d_i y_i$$

with its variance

$$d_1^2 + \dots + d_i^2$$

The increase in efficiency of the classification by the addition of more variables can be immediately assessed in any situation by using the above variances and the proportion of intermixture.

Mahalanobis axiom on dimensional convergence: Mahalanobis (1937) stated, that if D_p^2 denotes the generalized distance based on p characters between two groups then the sequence

$$D_p^2, D_{p+1}^2, D_{p+2}^2, \dots$$

tends to a definite limit in whatever order the characters may be chosen. This can be empirically examined by the evaluation of the successive differences $D_{p+1}^2 - D_p^2, D_{p+2}^2 - D_{p+1}^2$ which give the contributions to D^2 with the addition of each character. If the transformed characters are being used the above differences are supplied by $d_{p+1}^2, d_{p+2}^2, \dots$ Methods for judging the significance of these additional contributions have been discussed by the author in 1948.

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APPENDIX 6

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS

Character	BRAHMIN (BASTI)											
	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
N	86	86	86	86	86	85	85	86	86	86	86	86
Frontal Breadth (FB)	—	0.3973	0.2376	0.3172	0.2311	0.1993	0.1119	0.3036	0.4515	0.1733	0.1564	0.3215
Bryzomatic Breadth (BzB)	0.3973	—	0.1494	0.2494	0.1221	0.2669	0.2958	0.1868	0.7458	0.1936	-0.2740	0.2893
Nasal Length (NL)	0.2376	0.1494	—	0.1805	0.6997	0.2143	0.3496	0.3274	0.3408	0.0008	0.2339	0.4976
Head Length (HL)	0.3172	0.2494	0.1805	—	0.2107	0.3994	0.2908	0.1821	0.3244	0.1068	0.1294	0.4877
Upper Face Length (UFL)	0.2311	0.1221	0.6997	0.2107	—	0.1947	0.2352	0.2868	0.4146	0.1353	0.0972	0.5797
Sitting Height (SH)	0.1993	0.2669	0.2143	0.3994	0.1947	—	0.7137	0.2741	0.2495	0.2010	0.1233	0.4152
Stature (St)	0.1119	0.2958	0.3496	0.2908	0.2352	0.7137	—	0.2984	0.3117	-0.0207	0.2352	0.4015
Bigonial Breadth (BgB)	0.3036	0.1868	0.3274	0.1821	0.2868	0.2741	0.2684	—	0.1928	-0.0330	0.2949	0.2015
Head Breadth (HB)	0.4515	0.7458	0.3408	0.3244	0.4146	0.2495	0.3117	0.1928	—	0.0864	0.2101	0.4069
Nasal Breadth (NB)	0.1733	0.1936	0.0068	0.1068	0.1353	0.2010	-0.0207	-0.0330	0.0864	—	0.1257	0.0100
Nasal Depth (ND)	0.1564	-0.2740	0.2339	0.1294	0.0972	0.1233	0.2352	0.2949	0.2101	0.1257	—	0.0907
Total Face Length (TFL)	0.3215	0.2893	0.4876	0.4877	0.5767	0.4152	0.4015	0.2015	0.4069	0.0100	0.0907	—
BRAHMIN (Others)												
N	92	92	91	92	92	92	92	92	92	91	91	92
Frontal Breadth (FB)	—	0.5546	0.2060	0.4112	0.2235	0.4146	0.4277	0.4437	0.4478	0.2040	0.2226	0.2361
Bryzomatic Breadth (BzB)	0.5546	—	0.2394	0.4977	0.3349	0.4473	0.3794	0.5138	0.5872	0.2473	0.2080	0.4751
Nasal Length (NL)	0.2060	0.2394	—	0.2241	0.8216	0.2594	0.3327	0.2376	0.0562	0.0036	0.3878	0.7017
Head Length (HL)	0.4112	0.4977	0.2241	—	0.3000	0.3513	0.4179	0.5053	0.2271	0.2953	0.1658	0.4472
Upper Face Length (UFL)	0.2235	0.3349	0.8216	0.3000	—	0.2946	0.3448	0.2750	0.1146	0.0640	0.3137	0.7588
Sitting Height (SH)	0.4146	0.4473	0.2594	0.3513	0.2946	—	0.6340	0.3586	0.3217	0.0740	0.2041	0.2883
Stature (St)	0.4277	0.3794	0.3327	0.4179	0.3448	0.6340	—	0.4705	0.2124	0.0613	0.3039	0.3713
Bigonial Breadth (BgB)	0.4437	0.5138	0.2376	0.5053	0.2750	0.3586	0.4705	—	0.2861	0.2507	0.1069	0.3583
Head Breadth (HB)	0.4478	0.5872	0.0562	0.2271	0.1146	0.3217	0.2124	0.2861	—	0.1416	0.1183	0.1876
Nasal Breadth (NB)	0.2040	0.2473	-0.0036	0.2953	0.0640	0.0740	0.0613	0.2507	0.1416	—	-0.0307	0.0515
Nasal Depth (ND)	0.2226	0.2080	0.3878	0.1658	0.3137	0.2041	0.3039	0.1069	0.1183	-0.0307	—	0.1878
Total Face Length (TFL)	0.2361	0.4751	0.7017	0.4472	0.7588	0.2883	0.3713	0.3583	0.1876	0.0515	0.1878	—

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TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	AGHARIA											
	FB	BzB	NL	HL	UFL	SH	St	BzB	HB	NB	ND	TFL
N	107	107	107	107	107	107	107	107	107	107	107	107
Frontal Breadth (FB)	—	—	—	—	—	—	—	—	—	—	—	—
Bizygomatic Breadth (BzB)	—	—	0.2588	0.3587	0.3249	0.4527	0.4454	0.4815	0.5411	0.2722	0.2935	0.3782
Nasal Length (NL)	—	0.2588	—	0.2404	0.7283	0.1702	0.1964	0.1771	0.4761	0.0547	0.3958	0.6012
Head Length (HL)	—	0.3587	0.2404	—	0.2424	0.2122	0.2579	0.2719	0.3127	0.1704	0.2544	0.3177
Upper Face Length (UFL)	—	0.3249	0.7283	0.2424	—	0.2193	0.2094	0.2094	0.2361	0.0576	0.2541	0.6289
Sitting Height (SH)	—	0.4527	0.1702	0.2122	0.2424	—	0.1871	0.2612	0.4157	0.1920	0.3382	0.3059
Stature (St)	—	0.4454	0.1964	0.2579	0.2193	0.7346	—	0.3624	0.3533	0.2829	0.3170	0.4084
Bizygomatic Breadth (BzB)	—	0.4815	0.1771	0.2719	0.2094	0.2612	0.3624	—	0.3390	0.0729	0.2594	0.3541
Head Breadth (HB)	—	0.5411	0.4761	0.3127	0.2361	0.4157	0.3533	0.3390	—	0.2715	0.3551	0.3090
Nasal Breadth (NB)	—	0.2722	0.0547	0.1704	0.0576	0.1290	0.2829	0.0729	0.2715	—	0.2115	0.1133
Nasal Depth (ND)	—	0.2935	0.3958	0.2544	0.2541	0.3352	0.3170	0.2594	0.3551	0.2115	—	0.2814
Total Face Length (TFL)	—	0.3782	0.6012	0.3177	0.6289	0.3059	0.4084	0.3541	0.3090	0.1133	0.2814	—
CHATTI												
N	41	139	139	139	139	139	139	139	139	139	139	139
Frontal Breadth (FB)	—	0.2643	0.1049	0.2655	0.3055	0.0024	0.1082	0.1912	0.3908	0.0440	0.2114	0.3756
Bizygomatic Breadth (BzB)	0.2643	—	0.0243	0.0853	0.1180	0.3137	0.3728	0.5104	0.6640	0.2110	0.0730	0.1965
Nasal Length (NL)	0.1049	0.0243	—	0.0972	0.6006	0.1218	0.1258	0.0527	0.0472	0.0903	0.1597	0.4173
Head Length (HL)	0.2655	0.0853	0.0972	—	0.3775	0.1318	0.2250	0.3358	0.2779	0.2006	0.0965	0.3372
Upper Face Length (UFL)	0.3055	0.1180	0.5006	0.3775	—	0.2508	0.2827	0.1135	0.1307	0.1798	0.3295	0.6355
Sitting Height (SH)	0.0024	0.3137	0.1218	0.1318	0.2508	—	0.7043	0.4012	0.2824	0.2317	0.2392	0.3228
Stature (St)	0.1082	0.3728	0.1258	0.2250	0.2827	0.7043	—	0.3862	0.2528	0.1369	0.1583	0.3131
Bizygomatic Breadth (BzB)	0.1912	0.5104	0.0527	0.3358	0.1135	0.4012	0.3862	—	0.2431	0.2133	0.1472	0.0801
Head Breadth (HB)	0.3908	0.6640	0.0472	0.2779	0.1307	0.2824	0.2317	0.2431	—	0.1460	0.1352	0.3096
Nasal Breadth (NB)	0.0440	0.2110	0.0903	0.2006	0.1798	0.2317	0.1369	0.2133	0.1460	—	0.1621	0.0330
Nasal Depth (ND)	0.2114	0.0730	0.1597	0.0965	0.3295	0.2392	0.1583	0.1472	0.1352	0.1621	—	0.1581
Total Face Length (TFL)	0.3756	0.1965	0.4173	0.3372	0.6355	0.2228	0.3131	0.0801	0.2096	0.0320	0.1581	—

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
MUSLIM												
N	72	168	168	168	168	131	168	168	168	168	168	168
Frontal Breadth (FB)	—	0.5202	-0.0117	0.1341	0.1212	—	0.3781	0.0537	0.4275	0.2284	0.0510	0.0094
Bizygomatic Breadth (BzB)	0.5202	—	0.0781	0.2973	0.1405	0.2509	0.2448	0.4524	0.6203	0.2119	0.0351	0.2296
Nasal Length (NL)	-0.0117	0.0781	—	0.2183	0.0749	-0.0436	0.1904	0.0005	0.1396	-0.1008	0.3478	0.5719
Head Length (HL)	0.1341	0.2973	0.2183	—	0.2572	0.1498	0.2797	0.2014	0.3021	0.1046	0.1941	0.3426
Upper Face Length (UFL)	0.1212	0.0749	0.0749	0.2572	—	0.2261	0.2782	-0.0393	0.0906	0.0358	0.6390	0.1706
Sitting Height (SH)	—	0.2509	-0.0436	0.1498	0.2261	—	0.6971	0.2353	0.1700	0.0132	0.1867	0.1706
Stature (St)	0.3781	0.2448	0.1904	0.2797	0.2782	0.6971	—	0.2148	0.2025	0.0537	0.2508	0.2731
Bigonial Breadth (BgB)	0.0537	0.4524	0.0005	0.2014	-0.0393	0.2353	0.2148	—	0.1779	0.1322	0.0684	0.1071
Head Breadth (HB)	0.4275	0.6203	0.1396	0.3021	0.0906	0.1700	0.2025	0.1779	—	0.0804	0.0934	0.2059
Nasal Breadth (NB)	0.2284	0.2119	-0.1008	0.1046	0.0358	0.0132	0.0537	0.1322	0.0804	—	-0.0397	-0.0020
Nasal Depth (ND)	0.0510	0.0351	0.3478	0.1941	0.3858	0.1867	0.2508	0.0084	0.0934	-0.0397	—	0.2703
Total Face Length (TFL)	0.0094	0.2296	0.5719	0.3426	0.6990	0.1706	0.2731	0.1071	0.2059	-0.0020	0.2703	—
BHARV												
N	150	150	150	150	150	57	150	150	150	150	150	150
Frontal Breadth (FB)	—	0.7019	-0.0425	0.0610	0.0769	0.4746	0.1894	0.2770	0.3671	0.1658	0.1111	-0.0297
Bizygomatic Breadth (BzB)	0.7019	—	0.2377	0.1985	0.2627	0.2888	0.1603	0.4541	0.5549	0.2259	0.2855	0.2372
Nasal Length (NL)	-0.0425	0.2377	—	0.1945	0.0753	0.0759	0.0247	0.0068	0.1178	-0.0451	0.2750	0.4133
Head Length (HL)	0.0610	0.1985	0.1945	—	0.1052	0.3181	0.1037	0.2495	0.0594	-0.0120	0.1321	0.0841
Upper Face Length (UFL)	0.0769	0.2627	0.0753	0.1052	—	0.1890	0.1593	0.0683	0.1165	-0.0346	0.1693	0.6306
Sitting Height (SH)	0.4746	0.2888	0.0759	0.3181	0.1890	—	0.7716	0.2716	0.3915	0.1566	0.2192	0.2340
Stature (St)	0.1894	0.1603	0.0247	0.1037	0.1593	0.7716	—	0.5357	0.1773	0.2660	0.0773	0.2340
Bigonial Breadth (BgB)	0.2770	0.4541	0.0068	0.2495	0.0683	0.2716	0.5357	—	0.4198	0.1079	0.0544	0.1284
Head Breadth (HB)	0.3671	0.5549	0.1178	0.0594	0.1165	0.3915	0.1773	0.4198	—	0.0170	0.1794	0.1827
Nasal Breadth (NB)	0.1658	0.2259	-0.0451	0.0120	-0.0346	0.1566	0.2660	0.1079	0.0170	—	0.1441	-0.0369
Nasal Depth (ND)	0.1111	0.2855	0.2750	0.1321	0.1693	0.1245	0.0773	0.0544	0.1794	0.1441	—	0.0279
Total Face Length (TFL)	-0.0297	0.2372	0.4133	0.0841	0.6306	0.2192	0.2340	0.1527	-0.0369	0.0279	0.0279	—

TABLE 3-1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
HABRU												
N	124	124	124	124	124	71	124	124	124	124	124	124
Frontal Breadth (FB)	—	0.3199	0.1386	0.1695	0.1862	0.2599	0.2679	0.1819	0.2339	0.2038	0.1244	0.1140
Bizygomatic Breadth (BzB)	0.3199	—	0.2882	0.3967	0.2183	0.2121	0.1807	0.4190	0.5961	0.3463	0.2162	0.3006
Nasal Length (NL)	0.1386	0.2882	—	0.1274	0.7408	0.2261	0.2342	0.0374	0.1131	-0.0385	0.2880	0.6016
Head Length (HL)	0.1695	0.3967	0.1274	—	0.0777	0.4005	0.3290	0.2008	0.3811	0.2709	0.1017	0.2810
Upper Face Length (UFL)	0.1862	0.2183	0.7408	0.0777	—	0.3445	0.3370	0.0789	0.0700	-0.0689	0.1245	0.6407
Sitting Height (SH)	0.2599	0.2121	0.2261	0.4005	0.3445	—	0.8641	-0.0341	0.2500	0.2481	0.1360	0.3952
Stature (St)	0.2679	0.1807	0.2342	0.3290	0.3370	0.8641	—	0.0386	0.2541	0.2772	0.1564	0.3339
Bigonial Breadth (BgB)	0.1819	0.4190	0.0374	0.2008	0.0789	-0.0341	0.0386	—	0.3035	0.2206	0.0619	0.0699
Head Breadth (HB)	0.2339	0.5961	0.1131	0.3811	0.0700	0.2500	0.2541	0.3035	—	0.3776	0.0620	0.1836
Nasal Breadth (NB)	0.2038	0.3463	-0.0385	0.2709	-0.0689	0.2481	0.2772	0.2206	0.3776	—	0.0979	-0.0004
Nasal Depth (ND)	0.1244	0.2162	0.2880	0.1017	0.1245	0.1360	0.1564	0.0619	0.0620	0.0979	—	0.2428
Total Face Length (TFL)	0.1140	0.3006	0.6016	0.2810	0.6407	0.3952	0.3339	0.0699	0.1836	-0.0004	0.2428	—
BHIL												
N	187	187	187	187	187		187	187	187	187	187	187
Frontal Breadth (FB)	—	0.5358	0.0443	0.3081	0.1926	—	0.0806	0.1534	0.5413	0.2178	0.0720	0.1846
Bizygomatic Breadth (BzB)	0.5358	—	0.2513	0.3721	0.3510	—	0.3156	0.3521	0.6179	0.3472	0.2200	0.3593
Nasal Length (NL)	0.0443	0.2513	—	0.2217	0.7450	—	0.1458	0.1314	0.0628	-0.0199	0.3571	0.5982
Head Length (HL)	0.3081	0.3721	0.2217	—	0.3035	—	0.2351	0.2752	0.3236	0.1765	0.0972	0.3947
Upper Face Length (UFL)	0.1926	0.3510	0.7450	0.3035	—	—	0.0639	0.1653	0.1392	0.1063	0.3624	0.7148
Sitting Height (SH)	—	—	—	—	—	—	—	—	—	—	—	—
Stature (St)	0.0806	0.3156	0.1458	0.2351	0.0639	—	—	0.1645	0.1972	0.1489	0.0213	0.2217
Bigonial Breadth (BgB)	0.1534	0.3521	0.1314	0.2752	0.1653	—	0.1645	—	0.2501	0.1256	0.0862	0.1850
Head Breadth (HB)	0.5413	0.6179	0.0628	0.3236	0.1392	—	0.1972	0.2501	—	0.2245	0.0684	0.1767
Nasal Breadth (NB)	0.2178	0.3472	-0.0199	0.1765	0.1063	—	0.1489	0.1256	0.2245	—	0.1467	-0.0171
Nasal Depth (ND)	0.0720	0.2200	0.3571	0.0972	0.3624	—	0.0213	0.0862	0.0684	0.1467	—	0.2622
Total Face Length (TFL)	0.1846	0.3593	0.5982	0.3947	0.7148	—	0.2217	0.1850	0.1767	-0.0171	0.2622	—

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
Dom												
N	113	113	113	113	113	102	113	113	113	113	113	113
Frontal Breadth (FB)	—	0.5178	0.1146	0.2983	0.0407	0.3068	0.3612	0.2159	0.3773	0.2277	0.0535	0.1167
Bizygomatic Breadth (BzB)	0.5178	—	0.2021	0.3794	0.1227	0.4385	0.8107	0.3938	0.4333	0.4106	0.1518	0.2049
Nasal Length (NL)	0.1146	0.2021	—	0.1086	0.7292	0.1873	0.3012	0.1645	0.0678	-0.1516	0.2709	0.5337
Head Length (HL)	0.2983	0.3794	0.1086	—	0.1718	0.3178	0.3947	0.3671	0.1986	0.3124	0.2619	0.2194
Upper Face Length (UFL)	0.0407	0.1227	0.7292	0.1718	—	0.1206	0.2167	0.1898	-0.1114	0.0143	0.2290	0.6590
Sitting Height (SH)	0.3068	0.4385	0.1873	0.3178	0.1206	—	0.6730	0.1266	0.2934	0.0923	0.1331	-0.1858
Stature (St)	0.3612	0.8107	0.3012	0.3947	0.2167	0.6730	—	0.0460	0.2684	0.0951	0.1560	0.2745
Bigonial Breadth (BgB)	0.2159	0.3938	0.1645	0.3671	0.1898	0.1266	0.0460	—	0.2449	0.2016	-0.0095	0.1719
Head Breadth (HB)	0.3773	0.4333	0.0678	0.1986	-0.1114	0.2934	0.2684	0.2449	—	0.0922	0.0847	0.0357
Nasal Breadth (NB)	0.2277	0.4106	-0.1516	0.3124	0.0143	0.0923	0.0951	0.2016	0.0922	—	0.1467	0.0294
Nasal Depth (ND)	0.0535	0.1518	0.2709	0.2619	0.2290	0.1331	0.1560	-0.0095	0.0847	0.1467	—	0.0796
Total Face Length (TFL)	0.1167	0.2049	0.5337	0.2194	0.6590	-0.1858	0.2745	0.1719	0.0357	0.0294	0.0796	—
AHIR (ARTISAN)												
N	68	68	68	68	68	68	67	68	68	68	68	68
Frontal Breadth (FB)	—	0.2971	0.1367	0.1361	0.1680	0.2230	0.1871	-0.0498	0.3921	0.1553	0.0948	0.0452
Bizygomatic Breadth (BzB)	0.2971	—	0.1134	0.1892	0.0709	0.3089	0.2099	0.2044	0.3370	0.2633	-0.0736	0.1659
Nasal Length (NL)	0.1367	0.1134	—	0.0967	0.6157	0.2367	0.2405	0.1769	-0.0092	-0.1118	0.3253	0.5781
Head Length (HL)	0.1361	0.1892	0.0967	—	0.3085	0.3304	0.3493	0.1734	0.1544	0.2466	0.1516	0.2093
Upper Face Length (UFL)	0.1680	0.0709	0.6157	0.3085	—	0.2688	0.2804	0.2559	-0.1008	0.1161	0.3792	0.6348
Sitting Height (SH)	0.2230	0.3089	0.2367	0.3304	0.2688	—	0.7125	0.2074	0.2058	0.0773	0.4231	0.2076
Stature (St)	0.1871	0.2099	0.2405	0.3493	0.2804	0.7125	—	0.2265	0.0894	0.0952	0.4159	0.2392
Bigonial Breadth (BgB)	-0.0498	0.2044	0.1769	0.1734	0.2559	0.2074	0.2265	—	0.0838	0.0826	0.1027	0.3111
Head Breadth (HB)	0.3921	0.3370	-0.0092	0.1544	-0.1008	0.2058	0.0894	0.0838	—	0.1495	-0.0631	-0.1099
Nasal Breadth (NB)	0.1553	0.2633	-0.1118	0.2466	0.1161	0.0773	0.0952	0.0826	0.1495	—	0.0562	-0.2314
Nasal Depth (ND)	0.0948	-0.0736	0.3253	0.1516	0.3792	0.4231	0.4159	0.1027	-0.0831	0.0562	—	0.1167
Total Face Length (TFL)	0.0452	0.1659	0.5781	0.2093	0.6348	0.2076	0.2392	0.3111	-0.1099	-0.2314	0.1167	—

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
KURMI (ARTISAN)												
N	94	94	94	94	94	94	94	94	94	94	94	94
Frontal Breadth (FB)	—	0.3798	0.1460	0.3201	0.1513	0.2918	0.2337	0.2507	0.3581	0.1201	0.2302	0.1703
Bizygomatic Breadth (BzB)	0.3798	—	0.2733	0.4502	0.3960	0.4421	0.2562	0.5343	0.3652	0.2448	0.3437	0.4130
Nasal Length (NL)	0.1460	0.2733	—	0.1480	0.7725	0.3029	0.3753	0.0162	0.0957	-0.1188	0.4655	0.7293
Head Length (HL)	0.3201	0.4502	0.1480	—	0.1405	0.1437	0.0367	0.2278	0.2232	0.1928	0.1887	0.2797
Upper Face Length (UFL)	0.1513	0.3960	0.7725	0.1405	—	0.3558	0.2542	0.1177	0.1568	0.0579	0.4053	0.7587
Sitting Height (SH)	0.2918	0.4421	0.3029	0.1437	0.3558	—	0.4651	0.3062	0.2147	0.0736	0.1088	0.3504
Stature (St)	0.2337	0.2562	0.3753	0.0367	0.2542	0.4651	—	0.2030	0.1090	0.0492	0.0076	0.3580
Bigonial Breadth (BgB)	0.2507	0.5343	0.0162	0.2278	0.1177	0.3062	0.2030	—	0.2352	0.1117	0.0029	0.0576
Head Breadth (HB)	0.3581	0.3652	0.0957	0.2232	0.1568	0.2147	0.1090	0.2352	—	-0.0497	0.2615	0.0964
Nasal Breadth (NB)	0.1201	0.2448	-0.1188	0.1928	0.0579	0.0736	0.0492	0.1117	-0.0497	—	0.1072	-0.0142
Nasal Depth (ND)	0.2302	0.3437	0.4655	0.1887	0.4053	0.1088	0.0076	0.0029	0.2615	0.1072	—	0.3891
Total Face Length (TFL)	0.1703	0.4130	0.7293	0.2797	0.7587	0.3504	0.3580	0.0576	0.0964	-0.0142	0.3891	—
OTHER ARTISAN												
N	173	173	173	173	173	172	173	173	173	173	173	173
Frontal Breadth (FB)	—	0.5625	0.2355	0.3579	0.3021	0.2181	0.2621	0.1191	0.5262	0.2202	0.1477	0.2516
Bizygomatic Breadth (BzB)	0.5625	—	0.3503	0.3307	0.3416	0.3332	0.2856	0.2911	0.5415	0.2704	0.1869	0.3246
Nasal Length (NL)	0.2355	0.3503	—	0.3117	0.8198	0.1368	0.2801	0.2137	0.2845	0.1860	0.4592	0.6711
Head Length (HL)	0.3579	0.3307	0.3117	—	0.2969	0.3616	0.3414	0.1801	0.2003	0.1935	0.1620	0.3698
Upper Face Length (UFL)	0.3021	0.3416	0.8198	0.2969	—	0.1014	0.1536	0.1975	0.2888	0.2112	0.4298	0.7774
Sitting Height (SH)	0.2181	0.3332	0.1368	0.3616	0.1014	—	0.5385	0.2602	0.2674	0.3828	0.1716	0.5292
Stature (St)	0.2621	0.2856	0.2801	0.3414	0.1536	0.5385	—	0.1074	0.2037	0.1688	0.2145	0.2881
Bigonial Breadth (BgB)	0.1191	0.2911	0.2137	0.1801	0.1975	0.2602	0.1074	—	0.1209	0.0041	0.2111	0.0989
Head Breadth (HB)	0.5262	0.5415	0.2845	0.2003	0.2888	0.2674	0.2037	0.1209	—	0.1115	0.1694	0.1677
Nasal Breadth (NB)	0.2202	0.2704	0.1860	0.1935	0.2112	0.3828	0.1688	0.0041	0.1115	—	0.0783	0.2747
Nasal Depth (ND)	0.1477	0.1869	0.4592	0.1620	0.4298	0.1716	0.2145	0.2111	0.1694	0.0783	—	0.3410
Total Face Length (TFL)	0.2516	0.3246	0.6711	0.3698	0.7774	0.5292	0.2881	0.0989	0.1677	0.2747	0.3410	—

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	KAHAR (ARTISAN)									
	N	57	57	57	57	57	57	57	57	57
Frontal Breadth (FB)	—	0.6044	0.0924	0.2269	0.0328	0.3087	0.4259	0.3401	0.4776	0.1584
Bizygomatic Breadth (BzB)	0.6044	—	0.0930	0.1822	0.0775	0.2000	0.3935	0.2609	0.6206	0.2799
Nasal Length (NL)	0.0924	0.0930	—	0.1845	0.0780	0.0436	0.2848	0.1208	0.0254	0.4506
Head Length (HL)	0.2269	0.1822	0.1845	—	0.0220	0.2356	0.0064	0.0483	0.0030	0.2233
Upper Face Length (UFL)	0.0328	0.0775	0.0780	0.0220	—	0.0064	0.0601	0.0540	0.0396	0.4858
Sitting Height (SH)	0.3087	0.2000	0.0436	0.2356	0.0064	—	0.4265	0.2172	0.1367	0.1280
Stature (St)	0.4259	0.3935	0.2848	0.2440	0.0601	0.4265	—	0.0850	0.0904	0.2499
Bigonial Breadth (BgB)	0.3401	0.2609	0.1208	0.0483	0.0540	0.2172	0.0850	—	0.3036	0.0654
Head Breadth (HB)	0.4776	0.6206	0.0254	0.0030	0.0396	0.1367	0.0964	0.3036	—	0.1279
Nasal Breadth (NB)	0.2617	0.0673	0.0457	0.2565	0.1136	0.1305	0.0247	0.0604	0.2287	0.0128
Nasal Depth (ND)	0.1584	0.0968	0.4506	0.2233	0.4858	0.1280	0.2499	0.0654	0.1279	0.0128
Total Face Length (TFL)	0.1078	0.2799	0.5844	0.1142	0.7246	0.0460	0.2112	0.1906	0.0926	0.4757
THARU (male)										
N	191	191	191	191	191	191	191	191	191	191
Frontal Breadth (FB)	—	0.4924	0.1046	0.2674	0.1760	0.1015	0.1936	0.2229	0.4849	0.0666
Bizygomatic Breadth (BzB)	0.4924	—	0.2331	0.1943	0.2115	0.1421	0.2025	0.3919	0.5704	0.1285
Nasal Length (NL)	0.1046	0.2331	—	0.2422	0.7519	0.1337	0.0911	0.2163	0.1176	0.3776
Head Length (HL)	0.2674	0.1943	0.2422	—	0.2482	0.2634	0.2221	0.1376	0.2659	0.2353
Upper Face Length (UFL)	0.1760	0.2115	0.7519	0.2482	—	0.2363	0.1906	0.2005	0.0900	0.1291
Sitting Height (SH)	0.1015	0.1421	0.1337	0.2634	0.2363	—	0.1369	0.0922	0.1568	0.2248
Stature (St)	0.1936	0.2025	0.0911	0.2221	0.1906	0.1369	—	0.1531	0.1512	0.1171
Bigonial Breadth (BgB)	0.2229	0.3919	0.1633	0.1376	0.2005	0.0922	0.1531	—	0.1932	0.1794
Head Breadth (HB)	0.4849	0.5704	0.1176	0.2659	0.0900	0.1568	0.1512	0.1932	—	0.0433
Nasal Breadth (NB)	0.1659	0.1793	0.1508	0.2300	0.1226	0.1046	0.0292	0.2557	0.1677	0.0354
Nasal Depth (ND)	0.0666	0.1285	0.3776	0.2353	0.1291	0.2248	0.1171	0.1794	0.0433	—
Total Face Length (TFL)	0.1515	0.1814	0.5775	0.3172	0.6963	0.3069	0.2395	0.1806	0.1837	0.2472

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	CHAMAR												CHERO													
	N	FB	BzB	NL	HL	UFI.	SH	St	BgB	HB	NB	ND	TFL	N	FB	BzB	NL	HL	UFI.	SH	St	BgB	HB	NB	ND	TFL
Frontal Breadth (FB)	159	—	0.5138	0.0868	0.4005	0.1446	0.2648	0.1808	0.3147	0.5226	0.1660	0.1338	0.2141	100	100	100	99	100	100	100	100	100	100	100	100	100
Bizygomatic Breadth (BzB)	—	0.5138	—	0.2201	0.3003	0.3007	0.4564	0.3038	0.4287	0.5794	0.2830	0.3569	0.2691	—	0.5469	—	0.2654	0.1749	0.2101	0.2692	0.3020	0.3477	0.4904	0.4536	0.1441	0.1843
Nasal Length (NL)	0.0868	0.2201	—	—	0.1695	0.7231	0.0362	0.2389	0.1414	0.1946	0.1525	0.3019	0.5196	0.2654	—	0.2654	—	0.3521	0.7773	0.2916	0.4503	0.1347	0.1907	0.2260	0.3459	0.6033
Head Length (HL)	0.4005	0.3003	0.1695	—	—	0.2099	0.2833	0.2566	0.2083	0.1598	0.2226	0.1072	0.2742	0.3521	0.3521	0.1749	0.3521	—	0.3912	0.2377	0.2211	0.0568	0.2384	0.0869	0.4819	0.4819
Upper Face Length (UFL)	0.1446	0.3007	0.7231	0.2099	—	—	0.2608	0.3273	0.2751	0.1967	0.1830	0.3418	0.7241	0.2099	0.2101	0.1072	0.3628	0.3126	0.3155	0.2552	0.2010	0.2384	0.2015	0.3418	0.7241	0.7241
Sitting Height (SH)	0.2648	0.4564	0.0362	0.2833	0.2099	0.2833	—	0.5209	0.4171	0.2152	0.1479	0.3126	0.7241	0.2322	0.2322	0.2742	0.3169	0.3169	0.3212	0.1584	0.1267	0.0209	0.3227	—	—	—
Stature (St)	0.1808	0.3038	0.2389	0.2566	0.2099	0.3273	0.4509	—	0.2623	0.1862	0.1768	0.3155	0.3212	0.2384	0.2384	0.1525	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Bigonial Breadth (BgB)	0.3147	0.4287	0.1414	0.2083	0.2083	0.2751	0.4171	0.2623	—	0.2321	0.1930	0.2552	0.1584	—	0.5469	0.3477	0.2654	0.1749	0.2101	0.2692	0.3020	0.3477	0.4904	0.4536	0.1441	0.1843
Head Breadth (HB)	0.5226	0.5794	0.1946	0.1598	0.1598	0.1967	0.2152	0.1862	0.2321	—	0.2099	0.3010	0.1267	0.2099	0.2099	0.1525	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Nasal Breadth (NB)	0.1650	0.2830	0.1525	0.2226	0.2226	0.1830	0.1479	0.1768	0.1930	0.2099	—	0.2384	0.0209	0.2099	0.2099	0.1525	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Nasal Depth (ND)	0.1338	0.3569	0.3019	0.1072	0.1072	0.3628	0.3126	0.3155	0.2552	0.2010	0.2384	—	0.3227	0.2099	0.2099	0.1525	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Total Face Length (TFL)	0.2141	0.2691	0.5196	0.2742	0.2742	0.6815	0.3169	0.3212	0.1584	0.1267	0.0209	0.3227	—	0.2099	0.2099	0.1525	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Frontal Breadth (FB)	100	—	0.5469	0.0280	0.1086	0.0108	0.2993	0.1573	0.0770	0.6293	0.2134	0.1324	0.0653	100	100	100	99	100	100	100	100	100	100	100	100	100
Bizygomatic Breadth (BzB)	—	0.5469	—	0.2654	0.1749	0.2101	0.2692	0.3020	0.3477	0.4904	0.4536	0.1441	0.1843	100	100	100	99	100	100	100	100	100	100	100	100	100
Nasal Length (NL)	0.0280	0.2654	—	—	0.3521	0.7773	0.2916	0.4503	0.1347	0.1907	0.2260	0.3459	0.6033	0.2654	—	0.2654	—	0.3521	0.7773	0.2916	0.4503	0.1347	0.1907	0.2260	0.3459	0.6033
Head Length (HL)	0.1086	0.1749	0.3521	—	—	0.3912	0.2377	0.2211	0.0941	0.0568	0.2384	0.0869	0.4819	0.3477	0.3477	0.4904	0.1907	0.0568	0.0978	0.2215	0.2005	0.1942	0.0230	0.2914	0.1135	0.1135
Upper Face Length (UFL)	0.2101	0.2101	0.7773	0.3912	0.3912	—	0.2322	0.4417	0.1021	0.0978	0.2015	0.3418	0.7241	0.2322	0.2322	0.2742	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Sitting Height (SH)	0.2993	0.2692	0.2916	0.2377	0.2377	0.2322	—	0.7251	0.2450	0.2346	0.3097	0.3403	0.3403	0.2322	0.2322	0.2742	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Stature (St)	0.1573	0.3020	0.4503	0.2211	0.2211	0.4417	0.7251	—	0.3029	0.2005	0.1942	0.0230	0.2914	0.2322	0.2322	0.2742	0.3169	0.3169	0.3169	0.3169	0.2099	0.2099	0.3097	0.3403	0.3403	0.3403
Bigonial Breadth (BgB)	0.0770	0.3477	0.1347	0.0941	0.0941	0.1021	0.2450	0.3029	—	0.1942	0.0230	0.2914	0.1135	0.3029	0.3029	0.1347	0.0941	0.0978	0.2215	0.2005	0.1942	0.0230	0.2914	0.1135	0.1135	0.1135
Head Breadth (HB)	0.5293	0.4904	0.1907	0.0568	0.0568	0.0978	0.2215	0.2005	0.1942	—	0.0230	0.2914	0.1135	0.5293	0.5293	0.4904	0.1907	0.0568	0.0978	0.2215	0.2005	0.1942	0.0230	0.2914	0.1135	0.1135
Nasal Breadth (NB)	0.2134	0.4536	0.2260	0.2384	0.2384	0.2015	0.3446	0.2267	0.2209	0.0230	—	0.0008	0.1626	0.2134	0.2134	0.2260	0.2384	0.2015	0.3446	0.2267	0.2209	0.0230	0.2914	0.1135	0.1135	0.1135
Nasal Depth (ND)	0.1324	0.1441	0.3459	0.0869	0.0869	0.3418	0.3097	0.2683	0.1863	0.2914	0.0008	—	0.2582	0.1324	0.1324	0.0869	0.0869	0.3418	0.3097	0.2683	0.1863	0.2914	0.0008	0.2582	0.2582	0.2582
Total Face Length (TFL)	0.0653	0.1843	0.6033	0.4819	0.4819	0.7241	0.3403	0.4326	0.1198	0.1135	0.1626	0.2582	—	0.0653	0.0653	0.1843	0.6033	0.4819	0.4819	0.7241	0.3403	0.4326	0.1198	0.1135	0.1626	0.2582

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	MAJHI										PANTEA														
N	FB	BzB	NL	HL	UFL	SH	St	EgB	HB	NB	ND	TFL	N	FB	BzB	NL	HL	UFL	SH	St	EgB	HB	NB	ND	TFL
Frontal Breadth (FB)	156	156	156	156	156	156	155	156	156	156	156	156	157	158	158	157	158	157	157	157	158	156	156	156	156
Bizygomatic Breadth (BzB)	—	0.5336	0.0725	0.1039	0.0192	0.2129	0.1043	0.2726	0.5707	0.1858	0.2368	0.0492	—	0.5408	0.0563	0.0563	0.2647	0.1161	0.2120	0.1222	0.1822	0.4765	0.2080	0.1817	0.2291
Nasal Length (NL)	0.0725	—	0.1532	0.2916	0.1822	0.3112	0.0832	0.4559	0.5553	0.3534	0.1298	0.2868	0.0725	—	0.1374	—	0.2886	0.2767	0.1358	0.1820	0.4683	0.5348	0.3258	0.2596	0.2419
Head Length (HL)	0.1039	0.2916	—	—	0.7898	0.0381	0.3184	0.2454	0.0868	0.2292	0.1721	0.3432	0.3241	0.1384	0.1374	0.1384	—	0.3072	0.2270	0.2396	0.0732	0.1817	0.1297	0.1943	0.4820
Upper Face Length (UFL)	0.0192	0.1822	0.7898	0.1513	—	—	0.0373	0.1601	0.1393	0.1522	0.0082	0.6905	0.3241	0.1384	0.1374	0.1384	0.3072	—	0.2343	0.2101	0.1599	0.1329	0.2291	0.2787	0.0861
Sitting Height (SH)	0.2129	0.3112	0.0381	0.3819	—	—	0.7102	0.2418	0.2372	0.1212	0.2351	0.1565	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	—	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843
Stature (St)	0.1043	0.1627	0.0832	0.3184	0.0373	0.7102	—	0.2387	0.1507	0.0707	0.1370	0.2102	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	0.8055	—	0.1742	0.1680	0.2648	0.3258	0.2843
Bigonial Breadth (BgB)	0.2726	0.4559	0.1650	0.2454	0.1601	0.2418	0.2387	—	0.1901	0.3724	0.1041	0.1657	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2843
Head Breadth (HB)	0.5707	0.5553	0.1810	0.0868	0.1393	0.2372	0.1507	0.1901	—	0.2492	0.2034	0.0866	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2843
Nasal Breadth (NB)	0.1858	0.3534	0.0671	0.2292	0.1522	0.1212	0.0707	0.3724	0.2492	—	—	0.0165	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2843
Nasal Depth (ND)	0.2368	0.1298	0.2065	0.1721	0.0982	0.2351	0.1870	0.1041	0.2034	0.1419	—	0.0866	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2843
Total Face Length (TFL)	0.0492	0.2866	0.6377	0.3432	0.6905	0.1565	0.2102	0.1657	0.2543	0.0165	0.0866	—	0.3241	0.1384	0.1374	0.1384	0.3072	0.2343	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2843
N	158	158	157	168	157	157	157	168	167	167	167	167	167	168	168	167	168	167	167	167	168	167	167	167	167
Frontal Breadth (FB)	—	0.5408	0.0563	0.2647	0.1161	0.2120	0.1222	0.1822	0.4765	0.2080	0.1817	0.2291	—	0.5408	0.0563	0.0563	0.2647	0.1161	0.2120	0.1222	0.1822	0.4765	0.2080	0.1817	0.2291
Bizygomatic Breadth (BzB)	0.5408	—	0.1374	0.2886	0.2767	0.1358	0.1820	0.4683	0.5348	0.3258	0.2596	0.2419	0.5408	—	0.1374	—	0.2886	0.2767	0.1358	0.1820	0.4683	0.5348	0.3258	0.2596	0.2419
Nasal Length (NL)	0.0563	0.1374	—	0.1384	0.5337	0.2270	0.2396	0.0732	0.1817	0.1297	0.1943	0.4820	0.0563	0.1374	—	0.1384	0.5337	0.2270	0.2396	0.0732	0.1817	0.1297	0.1943	0.4820	0.0563
Head Length (HL)	0.2647	0.2886	0.1384	—	0.3072	0.2886	0.1384	—	0.3072	0.2886	0.1384	—	0.2647	0.2886	0.1384	—	0.3072	0.2886	0.1384	0.3241	0.1973	0.2511	0.1612	0.3054	0.4211
Upper Face Length (UFL)	0.1161	0.2767	0.5337	0.3072	—	0.2343	0.2101	0.1599	0.1329	0.2291	0.2787	0.0861	0.1161	0.2767	0.5337	0.3072	—	0.2343	0.2101	0.1599	0.1329	0.2291	0.2787	0.0861	0.1161
Sitting Height (SH)	0.2120	0.1358	0.2270	0.3358	0.2343	—	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2120	0.1358	0.2270	0.3358	0.2343	—	0.8055	0.1296	0.1070	0.3318	0.3250	0.2843	0.2843
Stature (St)	0.1222	0.1820	0.2396	0.3241	0.2101	0.8055	—	0.1742	0.1680	0.2648	0.3258	0.2843	0.1222	0.1820	0.2396	0.3241	0.2101	0.8055	—	0.1742	0.1680	0.2648	0.3258	0.2843	0.2843
Bigonial Breadth (BgB)	0.1822	0.4683	0.0732	0.1973	0.1599	0.1296	0.1742	—	0.2635	0.3335	0.1184	0.0449	0.1822	0.4683	0.0732	0.1973	0.1599	0.1296	0.1742	—	0.2635	0.3335	0.1184	0.0449	0.0449
Head Breadth (HB)	0.4765	0.5348	0.1817	0.2511	0.1329	0.1070	0.1660	0.2635	—	0.2331	0.2576	0.1740	0.4765	0.5348	0.1817	0.2511	0.1329	0.1070	0.1660	0.2635	—	0.2331	0.2576	0.1740	0.1740
Nasal Breadth (NB)	0.2080	0.3258	0.1297	0.1612	0.2291	0.2194	0.2648	0.3335	0.3331	—	0.1552	0.1987	0.2080	0.3258	0.1297	0.1612	0.2291	0.2194	0.2648	0.3335	0.3331	—	0.1552	0.1987	0.1987
Nasal Depth (ND)	0.1817	0.2596	0.1943	0.3054	0.2787	0.3318	0.3258	0.1184	0.2576	0.1552	—	—	0.1817	0.2596	0.1943	0.3054	0.2787	0.3318	0.3258	0.1184	0.2576	0.1552	—	—	—
Total Face Length (TFL)	0.2291	0.2410	0.4820	0.4211	0.0861	0.3250	0.2843	0.0449	0.1987	0.2604	0.2604	—	0.2291	0.2410	0.4820	0.4211	0.0861	0.3250	0.2843	0.0449	0.1987	0.2604	0.2604	—	—

U. P. ANTHROPOMETRIC SURVEY, 1941

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL
N	197	197	197	197	197	188	197	197	197	197	197	197
Kharwar												
Frontal Breadth (FB)	—	0.4287	0.1975	0.1323	0.2404	0.1834	0.2120	0.4288	0.5420	0.2227	0.0293	0.3727
Bizygomatic Breadth (BzB)	0.4287	—	0.2927	0.1793	0.3231	0.2240	0.2027	0.4339	0.4835	0.2918	0.1809	0.3677
Nasal Length (NL)	0.1975	0.2927	—	0.1456	0.8053	0.1590	0.1624	0.0354	0.3219	0.0501	0.1754	0.5943
Head Length (HL)	0.1323	0.1793	0.1456	—	0.1084	0.2321	0.2140	0.2489	0.0323	0.1188	0.1279	0.2410
Upper Face Length (UFL)	0.2404	0.3231	0.8053	0.1084	—	0.0940	0.0818	0.1664	0.3306	0.1772	0.2420	0.7108
Sitting Height (SH)	0.1834	0.2940	0.1590	0.2321	0.0940	—	0.6696	0.1733	0.0371	0.1364	0.2334	0.2204
Stature (St)	0.2120	0.2027	0.1624	0.2140	0.0818	0.6696	—	0.2082	0.0081	0.1349	0.1945	0.2252
Bigonial Breadth (BgB)	0.4288	0.4339	0.0354	0.2489	0.1664	0.1733	0.2082	—	0.1776	0.3362	0.0921	0.2526
Head Breadth (HB)	0.5420	0.4835	0.3219	0.0323	0.3306	0.0371	0.0081	0.1776	—	0.1206	-0.0294	0.3128
Nasal Breadth (NB)	0.2227	0.2918	0.0501	0.1188	0.1772	0.1364	0.1349	0.3862	0.1206	—	0.2461	0.1888
Nasal Depth (ND)	0.0293	0.1809	0.1754	0.1279	0.2420	0.2334	0.1945	0.0921	-0.0294	0.2461	—	0.1139
Total Face Length (TFL)	0.3727	0.3677	0.5943	0.2410	0.7108	0.2204	0.2252	0.2526	0.3128	0.1888	0.1139	—
Oran												
N	100	100	100	100	100	99	99	100	100	100	100	100
Frontal Breadth (FB)	—	—	—	—	—	—	—	—	—	—	—	—
Bizygomatic Breadth (BzB)	—	0.0491	0.4084	0.1038	0.3140	0.3325	0.4629	0.4902	0.2472	0.0712	0.2104	—
Nasal Length (NL)	0.0491	—	0.1703	0.7130	0.1423	0.1648	0.1891	0.0139	-0.1350	0.3727	0.6201	—
Head Length (HL)	0.4084	0.1703	—	0.2839	0.3271	0.3449	0.1983	0.2680	0.4040	0.1499	0.2382	—
Upper Face Length (UFL)	0.1038	0.7130	0.2839	—	0.2275	0.1666	0.2129	-0.0397	0.0208	0.3097	0.7430	—
Sitting Height (SH)	0.3140	0.1423	0.3271	0.2275	—	0.7486	0.2162	0.2246	0.1340	0.1840	0.2138	—
Stature (St)	0.3325	0.1648	0.3449	0.1066	0.7486	—	0.2179	0.2344	0.1902	0.1621	0.1977	—
Bigonial Breadth (BgB)	0.4629	0.1891	0.1983	0.2129	0.2162	0.2179	—	0.2234	0.2551	0.1459	0.1647	—
Head Breadth (HB)	0.4902	0.0139	0.2680	-0.0397	0.2246	0.2344	0.2234	—	0.0719	0.1167	0.0881	—
Nasal Breadth (NB)	0.2472	-0.1350	0.4040	0.0208	0.1340	0.1902	0.0719	0.0719	—	0.0640	0.0035	—
Nasal Depth (ND)	0.0712	0.3727	0.1499	0.3097	0.1840	0.1521	0.1459	0.1167	0.0640	—	0.3052	—
Total Face Length (TFL)	0.2104	0.6201	0.2382	0.7430	0.2138	0.1977	0.1647	0.0881	0.0035	0.3052	—	—

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Contd.)

Character	RAJWAR												KORWA												
	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL	FB	BzB	NL	HL	UFL	SH	St	BgB	HB	NB	ND	TFL	
N		105	105	105	105	105	105	105	105	105	105	105		101	101	101	101	99	101	101	101	101	101	101	101
Frontal Breadth (FB)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bizygomatic Breadth (BzB)	—	—	0.1319	0.3975	0.0885	0.0401	0.3281	0.4794	0.4718	0.2617	0.0734	0.1740	—	—	—	—	—	0.1699	0.2807	0.3549	0.6611	0.2758	0.0424	0.1767	
Nasal Length (NL)	—	0.1319	—	0.1983	0.7928	0.2423	0.1426	0.1467	0.1277	0.0562	0.2122	0.8908	—	—	—	—	—	0.0737	0.1690	0.1792	0.1695	0.1675	0.3086	0.5787	
Head Length (HL)	—	0.3975	0.1983	—	0.3210	0.3883	0.4339	0.2604	0.2523	0.3260	0.0634	0.3955	—	—	—	—	—	0.1750	0.3124	0.1086	0.2630	0.2877	0.0774	0.2971	
Upper Face Length (UFL)	—	0.0885	0.7928	0.3210	—	0.3442	0.2965	0.1704	0.0962	0.0896	0.1472	0.7615	—	—	—	—	—	0.0395	0.1376	0.1966	0.2778	0.3677	0.6682	0.2462	
Sitting Height (SH)	—	0.0401	0.2423	0.3883	0.3442	—	0.7035	0.3697	0.1515	0.2584	0.0138	0.2251	—	—	—	—	—	—	0.4880	0.1163	0.0573	0.1107	0.0648	0.1443	
Stature (St)	—	0.3281	0.1426	0.4339	0.2965	0.7035	—	0.2618	0.2083	0.2779	0.1006	0.3183	—	—	—	—	—	—	—	0.3193	0.1645	0.1347	0.1396	0.2960	
Bigonial Breadth (BgB)	—	0.4794	0.1467	0.2604	0.1704	0.3697	0.2618	—	0.2591	0.3136	0.1224	0.1381	—	—	—	—	—	0.1704	0.0355	0.0475	—	—	—	0.2251	
Head Breadth (HB)	—	0.4718	0.1277	0.2523	0.0962	0.1515	0.2083	0.2591	—	0.0159	0.0138	0.1704	—	—	—	—	—	—	0.1006	0.1224	0.0138	0.0475	—	—	
Nasal Breadth (NB)	—	0.2617	0.0562	0.3260	0.0896	0.2584	0.2779	0.3136	0.0159	—	0.0475	0.0355	—	—	—	—	—	—	0.1006	0.1224	0.0138	0.0475	—	—	
Nasal Depth (ND)	—	0.0734	0.2122	0.0634	0.1472	0.0832	0.1006	0.1224	0.0138	0.0475	—	0.2251	—	—	—	—	—	—	0.3183	0.1381	0.1704	0.0355	0.2251	—	
Total Face Length (TFL)	—	0.1740	0.6908	0.3955	0.7615	0.3199	0.3183	0.1381	0.1704	0.0355	0.2251	—	—	—	—	—	—	—	—	—	—	—	—	—	
N		101	101	101	101	99	101	101	101	101	101	101		101	101	101	101	101	101	101	101	101	101	101	
Frontal Breadth (FB)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Bizygomatic Breadth (BzB)	—	—	0.0723	0.3758	0.1228	0.1699	0.2807	0.3549	0.6611	0.2758	0.0424	0.1767	—	—	—	—	—	0.1699	0.2807	0.3549	0.6611	0.2758	0.0424	0.1767	
Nasal Length (NL)	—	0.0723	—	0.1877	0.7714	0.0737	0.1690	0.1792	0.1695	0.1675	0.3086	0.5787	—	—	—	—	—	0.0737	0.1690	0.1792	0.1695	0.1675	0.3086	0.5787	
Head Length (HL)	—	0.3758	0.1877	—	0.1094	0.1750	0.3124	0.1086	0.2630	0.2877	0.0774	0.2971	—	—	—	—	—	0.0395	0.1376	0.1966	0.2778	0.3677	0.6682	0.2462	
Upper Face Length (UFL)	—	0.1228	0.7714	0.1094	—	0.0395	0.1376	0.3128	0.1966	0.2778	0.3677	0.6682	—	—	—	—	—	—	0.4880	0.1163	0.0573	0.1107	0.0648	0.1443	
Sitting Height (SH)	—	0.1699	0.0737	0.1750	0.0395	—	0.4880	0.1163	0.0573	0.1107	0.0648	0.1443	—	—	—	—	—	—	—	0.3193	0.1645	0.1347	0.1396	0.2960	
Stature (St)	—	0.2807	0.1690	0.3124	0.1376	0.4880	—	0.3193	0.1645	0.1347	0.1396	0.2960	—	—	—	—	—	—	—	—	—	—	—	—	
Bigonial Breadth (BgB)	—	0.3549	0.1792	0.1086	0.3128	0.1163	0.3193	—	0.0980	0.1605	0.2058	0.7499	—	—	—	—	—	—	0.3193	0.1645	0.1347	0.1396	0.2960	0.2462	
Head Breadth (HB)	—	0.6611	0.1695	0.2630	0.1966	0.0573	0.1645	0.0980	—	0.0723	0.0761	0.2462	—	—	—	—	—	—	—	0.0980	—	—	0.2083	0.2733	
Nasal Breadth (NB)	—	0.2758	0.1675	0.2877	0.2778	0.1107	0.1347	0.1605	0.0723	—	0.2083	0.2462	—	—	—	—	—	—	0.1347	0.1605	0.1347	0.1396	0.2960	0.2462	
Nasal Depth (ND)	—	0.0424	0.3086	0.0774	0.3677	0.0648	0.1396	0.2058	0.0761	0.2083	—	0.0931	—	—	—	—	—	—	0.1396	0.2058	0.0761	0.2083	0.2462	0.0931	
Total Face Length (TFL)	—	0.1767	0.5787	0.2971	0.6682	0.1443	0.2960	0.7499	0.2462	0.2733	0.0931	—	—	—	—	—	—	—	—	—	—	—	—	—	

U. P. ANTHROPOMETRIC SURVEY, 1941

TABLE 3.1 VALUES OF CORRELATION COEFFICIENTS BY GROUPS FOR ALL PAIRS OF CHARACTERS (Concl'd.)

Character	T _{HARU} (female)											
	N	182	182	182	182	182	181	182	182	182	182	182
FB.												
BzB		182	182	182	182	182	181	182	182	182	182	182
NL												
HL												
UFL												
SH												
St												
BgB												
HB												
NB												
TFL												
Frontal Breadth (FB)	—	0.6032	0.4484	0.1941	0.0326	—	0.2955	0.2657	0.4394	0.1909	0.0898	0.0927
Bizygomatic Breadth (BzB)	0.6032	—	-0.0415	0.2559	0.1005	—	0.3312	0.4326	0.6491	0.2011	0.1691	0.1792
Nasal Length (NL)	0.4484	-0.0415	—	0.0870	0.7168	—	0.2220	0.0698	0.6249	0.1720	0.2316	0.5636
Head Length (HL)	0.1941	0.2559	0.0870	—	0.1838	—	0.3737	0.2072	0.2948	0.1803	0.1332	0.3159
Upper Face Length (UFL)	0.0326	0.1005	0.7168	0.1838	—	—	0.2746	0.1071	0.0748	0.2263	0.2735	0.4733
Sitting Height (SH)	—	—	—	—	—	—	—	—	—	—	—	—
Stature (St)	0.2955	0.3312	0.2220	0.3737	0.2746	—	—	0.2969	0.3160	0.0347	0.2837	0.4173
Bigonial Breadth (BgB)	0.2657	0.4326	0.0698	0.2072	0.1071	—	0.2969	—	0.2798	0.1450	-0.0237	0.1357
Head Breadth (HB)	0.4394	0.6491	0.6249	0.2948	0.0748	—	0.3160	0.2798	—	0.1304	0.1164	0.1507
Nasal Breadth (NB)	0.1909	0.2011	0.1720	0.1893	0.2263	—	0.0347	0.1450	0.1304	—	0.1367	0.0911
Nasal Depth (ND)	0.0898	0.1691	0.2316	0.1332	0.2735	—	0.2837	-0.0237	0.1164	0.1367	—	0.2590
Total Face Length (TFL)	0.0927	0.1792	0.5636	0.3159	0.4733	—	0.4173	0.1357	0.1507	0.0911	0.2590	—

APPENDIX 7. U. P. ANTHROPOMETRIC DATA, 1941 : ORIGINAL MEASUREMENTS

The measurements in mm. of the individuals in all the groups (including Tharu females) are given in the accompanying tables. The serial number refers to the order in which the individuals in any group are measured.

The order in which the original measurements are recorded is (1) Head Length (Head L.),* (2) Head Breadth (Head Br.), (3) Frontal Breadth, (4) Bizygomatic Breadth (Bizygo. Breadth), (5) Bigonial Breadth, (6) Nasal Length (Nasal L.), (7) Nasal Breadth (Nasal Br.), (8) Nasal Depth (Nasal D.), (9) Total Facial Length (Total Face L.), (10) Upper Facial Length (Upper Face L.), (11) Orbito-Nasal Breadth (Orbito Nas. Br.), (12) Orbito-Nasal Arc (Orbito Nas. Arc), (13) Stature and (14) Sitting Height. This was changed in the accompanying tables to maintain the order followed in the text for listing the constants.

The districts, villages and the sub groups to which the individuals belong are given wherever possible.

The measurements for Orbito-Nasal Breadth and Arc are available for the groups, Agharia, Oraon, Rajwar and Korwa only. The measurements for span are available only for the Chattris.

The groups are indicated by their names and arranged in the order followed in the text. The contents are as given below.

group	name	page	group	name	page
1	Brahmin (Basti)	267	13	Artisan (Kahar)	296
2	„ (Others)	268	14	Tharu (male)	297
3	Agharia	271	15	Chamar	301
4	Chattri	273	16	Chero	304
5	Muslim	275	17	Majhi	306
6	Bhatu	278	18	Panika	309
7	Habru	281	19	Kharwar	312
8	Bhil	283	20	Oraon	315
9	Dom	287	21	Rajwar	317
10	Artisan (Ahir)	289	22	Korwa	319
11	„ (Kurmi)	291	23	Tharu (female)	321
12	„ (Others)	292			

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*These abbreviations are used in the tabular headings.

U. P. ANTHROPOMETRIC SURVEY, 1941

GROUP (1) : BRAHMIN (BASTI)

DISTRICT : BASTI

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L	Head L	Upper Face L	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
1	B. Gosai	27	111	131	51	200	71	870	1564	99	140	35	21	129
2	Sital Pd.	28	106	139	55	195	72	917	1710	112	139	30	29	127
3	Sankar Naik	28	103	129	50	181	67	842	1639	95	148	36	26	116
4	Laxmi Naik	33	99	133	52	198	67	846	1602	105	136	35	25	120
5	R. Lal Pandey	30	112	147	54	193	68	847	1668	108	144	36	31	128
6	Gholar Tewari	36	109	136	55	192	77	861	1717	98	146	35	24	130
7	R. L. Pandey	34	104	136	53	202	72	872	1642	109	141	39	27	129
8	P. R. Upadia	24	101	129	54	192	65	869	1675	100	138	33	27	113
9	C. L. Misra	35	100	135	55	186	68	858	1642	99	145	35	25	129
10	R. Pandey	27	104	131	47	189	66	878	1679	96	137	40	25	123
11	R. N. Upadia	26	109	130	49	182	62	813	1598	103	137	32	25	117
12	Rajan Chonbey	30	109	133	48	208	55	933	1672	99	137	39	25	127
13	J. Gosai	45	105	131	55	187	73	845	1655	100	144	42	26	123
14	R. N. Sukhl	27	99	130	48	186	62	856	1620	100	137	35	28	106
15	K. P. Sukhla	40	107	139	58	192	71	838	1622	102	147	40	25	117
16	B. Naik	26	95	128	55	188	71	881	1674	110	139	33	28	125
17	P. Dubey	30	103	144	49	195	67	849	1652	99	142	39	25	120
18	B. Pandey	27	107	135	49	196	63	843	1620	100	141	38	28	115
19	R. Pandey	22	107	145	49	187	63	845	1639	101	141	35	25	108
20	P. Nand	45	104	132	52	190	68	869	1689	102	138	35	25	111
21	H. Tewari	29	105	136	46	200	60	878	1610	95	143	36	25	116
22	B. Lal Tewari	30	108	132	52	208	66	842	1675	100	140	35	26	127
23	K. Pandey	30	102	126	47	189	62	853	1604	101	137	35	25	111
24	R. Ojha	24	104	137	53	193	69	893	1717	101	139	36	28	120
25	R. N. Tewari	37	103	125	49	190	67	845	1584	97	132	36	23	118
26	B. Pandey	24	102	124	49	184	62	873	1713	99	134	37	25	111
27	T. Pd. Sukhla	34	109	135	54	198	73	899	1670	102	147	37	26	130
28	G. S. Pandey	28	103	133	56	194	69	901	1703	99	139	34	25	118
29	J. R. Dubey	27	104	138	54	194	69	851	1605	102	135	36	24	120
30	J. Tewari	38	103	127	49	186	67	857	1575	99	134	37	24	111
31	P. Datey	32	108	126	51	200	64	849	1625	95	142	38	28	111
32	R. Ram	29	103	132	49	192	65	855	1637	97	139	37	26	119
33	R. K. Tewari	40	109	135	51	194	72	896	1695	99	141	40	27	125
34	Kedar Naik	48	104	133	51	184	67	866	1670	103	141	37	25	118
35	Lakhpatt	33	112	141	51	197	65	887	1716	105	139	37	24	120
36	D. S. Pandey	30	101	135	50	185	66	831	1525	92	142	32	24	115
37	S. K. Pandey	30	106	135	55	189	66	849	1609	101	140	42	27	114
38	R. N. Upadhaya	24	101	128	45	186	61	837	1576	102	127	32	24	112
39	K. S. Pathak	37	99	128	49	188	63	845	1631	96	132	47	26	109
40	T. Sukhla	29	103	132	49	186	63	841	1630	101	135	34	23	117
41	K. N. Upadhaya	30	107	131	48	189	61	807	1456	98	144	35	23	114
42	R. A. Pandey	27	103	128	49	192	67	864	1617	92	139	34	24	117
43	I. Jit Pandey	38	107	137	51	195	66	818	1565	95	139	35	28	114
44	R. B. Pandey	49	96	122	50	185	68	850	1618	93	129	39	25	117
45	T. D. Tiwari	20	99	120	52	181	63	804	1542	87	125	35	25	113
46	D. Tiwari	25	100	127	47	185	58	805	1589	94	138	36	25	105
47	M. Pandey	48	106	137	55	192	69	849	1597	105	144	40	29	116
48	C. B. Sukhla	35	105	135	49	190	67	815	1650	105	141	36	23	120
49	M. B. Tewari	50	101	135	55	189	58	879	1667	102	134	34	25	121
50	S. P. Bhat	31	99	134	49	188	65	841	1645	87	149	38	24	120
51	B. Pandey	26	101	122	49	189	55	870	1699	99	135	35	25	117
52	R. P. Tewari	34	108	142	47	183	65	841	1718	112	150	38	25	109
53	R. D. Tewari	30	105	129	51	183	65	822	1599	92	137	32	24	112
54	J. Tewari	39	104	133	52	189	65	878	1667	105	138	35	26	117
55	D. N. Pandey	30	104	141	52	194	65	913	1690	95	144	39	26	123

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
87	H. B. Pandey	33	104	137	51	197	67	848	1622	101	145	35	26	117
88	R. N. Upadiya	25	103	135	53	192	69	905	1694	99	141	38	26	117
89	R. N. Pandey	39	106	139	53	187	68	899	1700	102	145	40	25	117
90	R. S. Tewari	32	106	135	50	185	64	871	1666	98	137	35	25	119
91	R. L. Pandey	34	101	130	52	199	68	833	1605	102	133	40	24	116
93	R. N. Pathak	38	100	130	47	187	62	895	1688	98	135	39	25	108
96	R. T. Pandey	29	106	138	53	200	69	884	1640	110	137	40	24	117
126	S. L. Sukhla	23	107	138	54	189	65	878	1678	102	139	35	25	116
127	Ram Dubey	40	105	135	51	195	68	889	1674	97	141	41	28	127
128	Jeonand Pathak	45	109	136	53	198	70	873	1678	106	143	36	28	130
129	D. N. Misra	28	106	134	49	201	63	884	1682	102	139	34	26	111
130	B. Tewari	38	105	141	52	194	67	919	1728	114	144	36	25	119
134	J. Pandey	48	109	139	52	189	67	882	1668	103	145	39	25	114
135	Gopinathji Naik	80	109	145	54	205	78	—	—	103	147	43	26	135
136	R. D. Naik	50	106	135	45	199	61	863	1635	100	135	41	27	112
137	Kedar Tewari	24	109	137	55	189	70	850	1593	104	139	39	26	120
138	R. D. Lall	37	107	128	52	197	67	901	1690	99	144	41	23	120
139	R. S. Misra	38	106	129	53	199	68	885	1653	106	139	38	24	120
140	S. N. Dubey	44	116	134	52	179	66	843	1580	100	136	40	26	118
141	Janvi Pd.	24	102	137	54	194	68	883	1695	105	140	31	27	120
142	Dayaram	22	111	139	56	192	70	874	1692	105	141	36	24	122
143	Monorama	38	107	142	46	198	63	884	1680	100	147	36	27	125
144	Ramsarwar Misra	30	105	132	52	199	68	885	1677	96	137	34	22	130
159	R. R. Tewari	30	106	136	54	203	69	881	1681	107	145	38	27	121
162	B. P. Sukhla	26	111	134	49	199	60	882	1644	103	145	38	26	115
163	Basdeo Pandey	45	99	125	46	174	62	862	1652	106	128	37	25	111
168	R. B. Upadhaya	26	107	141	56	188	69	870	1700	109	144	34	25	121
169	Sita Ram Gosai	32	98	125	46	189	57	836	1614	90	134	35	23	106
173	R. K. Dubey	25	107	128	50	185	64	840	1605	103	135	39	28	108
175	Sri Niwas	27	113	138	53	192	68	886	1732	96	152	36	27	126
177	R. L. Pandey	45	103	137	54	199	67	854	1742	105	147	32	25	122

GROUP (2) : BRAHMIN (OTHERS)

DISTRICT : GORAKHPUR

37	A. Dubey	29	107	136	51	198	62	863	1606	100	140	34	23	120
38	S. Misra	32	108	137	48	196	64	865	1680	102	138	33	25	118
39	C. Pd. Pandey	34	101	132	45	184	59	843	1559	93	135	35	22	105
40	S. N. Pandey	45	102	127	45	195	62	856	1620	95	142	38	25	110
41	S. Tewari	21	100	125	48	193	60	853	1614	98	135	36	27	108
42	T. N. Tewari	28	117	137	50	193	66	870	1652	105	146	40	24	117
43	B. Pd. Tewari	40	109	138	—	189	61	853	1635	99	142	—	—	115
44	B. Pandey	39	103	131	51	190	65	849	1704	98	141	36	23	114
45	R. S. Misra	30	105	130	53	189	68	842	1590	99	138	30	25	118
46	R. S. Pandey	32	103	128	49	184	63	818	1581	97	132	35	25	111
47	B. R. Dubey	24	102	128	54	187	69	838	1631	99	137	35	25	117
48	R. L. Tewari	25	99	131	43	180	56	864	1689	98	138	35	23	106
49	H. Sukhla	28	116	137	53	198	67	893	1663	102	133	38	26	117
50	S. P. Naik	41	110	134	49	200	65	856	1645	103	140	38	22	119
51	S. Upadhaya	48	95	130	55	189	72	837	1621	99	128	38	24	126
52	M. Pathak	27	105	129	54	184	68	855	1615	95	138	32	25	116
53	R. N. Sukhla	23	99	131	48	185	66	873	1626	104	139	35	22	117
54	M. B. Pandey	30	107	135	54	180	72	836	1667	102	144	35	24	128
55	R. A. Upadhaya	30	103	125	52	190	66	855	1667	102	133	36	22	113
56	J. Tewari	28	107	134	49	198	63	873	1713	102	141	35	24	117

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Biconia Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
57	R. S. Pathak	31	98	126	49	182	59	843	1635	98	138	34	24	120
58	R. C. Pandey	25	110	138	55	197	72	870	1764	107	142	38	28	120
59	G. Dubey	37	107	139	52	188	66	856	1609	99	137	37	25	117
60	L. M. Pandey	29	105	127	53	188	67	869	1642	103	136	36	25	111
61	R. P. Tewari	24	105	125	44	185	57	806	1610	103	137	33	22	102
62	K. Tewari	44	99	131	50	184	68	860	1610	89	142	36	25	119
63	R. S. Pathak	24	107	138	49	200	63	869	1614	97	141	40	23	117
64	Ichha	30	101	131	48	189	63	848	1654	101	134	36	22	113
65	Jamuna	37	101	129	48	188	63	807	1600	97	135	36	28	111
66	R. D. Dubey	23	102	129	47	193	62	849	1569	99	142	38	22	113
67	R. N. Pandey	49	107	133	54	193	68	870	1729	100	139	33	27	119
97	S. R. Ojha	33	99	124	50	185	63	869	1632	95	129	38	25	108
98	R. A. Upadiya	50	107	120	47	188	63	830	1560	96	143	38	22	108
99	R. Ujhagar	24	104	125	55	197	69	899	1720	97	137	39	25	125
148	Mahadeo Pandey	29	100	125	50	180	62	782	1526	88	135	34	23	114
149	Ramnaresh Tewari	26	102	125	48	178	62	833	1576	86	137	33	24	103
150	Biswanath Dubey	22	108	134	48	185	62	882	1690	103	145	36	25	116
151	G. Tewari	40	104	132	49	192	65	870	1702	103	138	31	24	116
160	D. R. Tewari	30	109	135	54	208	73	879	1677	101	137	36	25	127
165	Dhanrai	33	99	131	48	190	60	849	1592	102	145	36	24	116

DISTRICT : AGRA

92	O. N. Sukhla	37	111	136	53	192	69	933	1820	99	142	38	26	120
95	B. Pandey	46	100	131	46	189	64	809	1585	101	131	38	22	108
119	R. H. Dubey	42	112	138	58	196	73	933	1835	105	144	35	26	136
120	R. N. Dubey	30	97	129	49	188	65	865	1635	97	135	35	26	116

DISTRICT : FYZABAD

94	B. Raj Dubey	45	108	137	48	198	66	925	1701	111	141	36	25	112
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DISTRICT : KHERI

100	S. Tewari	50	109	134	55	203	72	884	1680	99	139	35	26	122
101	D. W. Dubey	34	105	134	53	184	67	852	1608	100	136	35	25	118
102	P. Dubey	50	108	135	51	197	66	880	1680	105	141	38	25	117
103	R. P. Sukhla	44	101	128	44	181	58	818	1560	95	142	36	22	106
104	S. K. Tripathi	34	108	139	52	187	67	931	1693	102	142	35	28	117
105	R. Tewari	45	101	128	56	198	69	856	1584	103	133	33	26	125
106	Komal Tewari	46	107	133	49	189	66	865	1714	104	137	36	25	116
107	Adya Pd.	30	103	135	50	199	63	849	1595	97	138	36	23	115
108	J. N. Tewari	31	105	139	55	183	67	829	1627	98	144	36	27	115
109	S. S. Tewari	45	103	129	52	184	66	895	1665	94	143	32	24	115
110	S. N. Misra	26	109	136	54	188	68	888	1649	105	149	38	25	118
111	R. M. Sarma	28	104	137	53	200	68	849	1673	99	139	35	25	129
112	R. B. Chanbey	28	99	134	49	189	59	855	1595	95	140	40	25	113
113	R. L. Misra	38	98	129	49	189	66	865	1652	94	135	35	23	116
114	D. R. Pandey	36	102	133	52	194	66	851	1608	102	145	38	23	109
115	H. L. Pathak	30	108	132	47	189	59	894	1671	101	142	36	24	114
116	K. N. Tewari	26	104	129	51	189	69	849	1613	97	142	35	26	120
131	R. K. Shukla	30	97	127	52	187	66	885	1701	97	131	34	27	118
132	B. Pandey	34	112	149	51	197	70	853	1587	107	150	43	26	128

DISTRICT : BARRAH

117	J. N. Misra	27	101	128	49	187	62	856	1670	95	138	41	23	105
118	Mahadeo	48	98	124	54	182	66	830	1575	91	132	36	28	108

serial no.	name	age	Frontal Breadth	Bizyg. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
DISTRICT : ALLAHABAD														
121	R. P. Pandey	29	114	137	54	189	69	888	1615	106	147	36	26	117
122	K. P. Sharma	41	99	139	54	198	73	903	1658	99	145	38	23	128
DISTRICT : KANPUR														
123	M. Dubey	39	101	135	42	194	59	845	1596	101	137	35	22	108
124	Rampat Dubey	39	107	139	50	198	67	858	1603	105	147	40	29	119
125	Duber Pandey	30	107	134	49	198	62	893	1677	101	135	38	27	111
145	R. C. Tewari	30	99	127	50	175	66	845	1574	100	136	38	21	112
DISTRICT : BAREILLY														
133	R. A. Sukhla	34	107	127	48	189	66	853	1649	90	131	39	25	116
DISTRICT : MEERAT														
146	Kanjan Tewari	50	98	136	52	192	70	892	1683	99	142	38	25	120
147	Jokhan Pandey	40	104	135	50	192	69	867	1640	92	142	33	25	129
DISTRICT : BENARAS														
152	R. N. Pandey	30	108	139	49	201	63	876	1725	105	151	35	26	121
153	R. M. Pandey	45	102	134	49	199	65	866	1711	103	140	35	25	115
154	Teju Pandey	23	99	137	52	192	65	894	1682	105	146	35	25	114
155	B. Pandey	40	108	137	55	212	72	901	1726	116	139	40	26	128
DISTRICT : JAUNPUR														
156	N. K. Upadiya	27	105	135	57	179	73	844	1693	100	144	31	27	125
157	R. N. Tewari	30	102	132	55	205	72	811	1717	114	134	40	23	135
DISTRICT : GONDA														
158	Ram Pyare	33	101	134	49	185	65	871	1637	104	143	38	25	118
161	R. I. Pandey	30	97	126	48	193	59	812	1623	99	138	36	29	107
164	Mata. Pd. Misra	31	111	136	50	188	64	882	1719	110	137	40	25	116
166	P. D. Misra	40	109	143	51	204	68	870	1697	109	147	37	24	129
167	R. C. Tewari	20	108	134	46	189	57	856	1701	99	139	35	25	110
170	S. P. Misra	28	104	129	49	189	66	886	1664	102	137	35	26	115
171	J. N. Misra	29	114	134	47	190	61	896	1681	102	141	38	25	108
172	L. N. Misra	30	111	142	54	204	65	889	1687	106	143	37	26	115
DISTRICT : MANIPUR														
174	R. S. Dubey	31	104	137	49	194	64	884	1654	100	142	34	24	117
DISTRICT : NOELGHAR														
176	S. L. Dadheech	36	113	139	48	204	66	874	1784	105	147	38	26	110
DISTRICT : JAIPUR														
178	Thakur Pd. Brahmin	30	104	126	49	191	61	852	1625	97	142	34	26	111

U. P. ANTHROPOMETRIC SURVEY, 1941

GROUP (3) : AGHARIA

DISTRICT : AGRA

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
1	Chamdel Singh	32	135	50	185	88	843	1666	99	146	35	23	118	122	105	104
2	Dinanath	22	132	56	196	89	873	1683	105	137	36	28	121	119	104	105
3	Chakradhar	45	137	50	187	65	905	1675	96	144	36	25	120	120	105	107
4	Dhukhu	38	135	50	198	66	840	1632	100	150	40	26	122	126	107	105
5	Shyam Sunder	18	125	43	186	59	815	1674	95	134	38	23	105	112	107	101
6	Ganesh Ram	44	127	46	194	61	862	1683	97	136	38	20	109	117	105	105
7	Kursiahu Ram	34	140	51	176	65	863	1733	99	144	41	25	114	118	107	105
8	Tula Ram	27	129	52	198	66	875	1663	99	142	33	30	125	122	104	104
9	Badhi Ram	25	135	51	192	68	900	1802	103	139	35	24	128	119	107	100
10	Sheonandan	32	124	46	188	59	825	1738	99	137	37	21	116	112	107	107
11	Tikaram	40	132	50	197	63	870	1712	97	145	41	23	120	126	109	109
12	Jhan Singh	36	131	45	192	60	800	1664	98	132	33	19	114	119	106	106
13	Jikaram	32	136	54	194	66	863	1690	102	145	36	23	123	128	105	105
14	Parmanand	28	137	45	183	61	905	1765	95	145	36	27	114	119	99	99
15	Bhalmukund	40	130	45	186	60	853	1673	103	144	37	24	106	109	103	103
16	Goohar Ram	50	135	51	200	74	880	1684	108	150	34	25	128	122	106	106
17	Ghutu	55	134	49	182	68	835	1624	99	135	37	22	105	112	100	100
18	Dasaram	20	128	50	184	60	820	1606	95	135	35	21	116	119	102	102
19	Antaram	55	132	49	197	66	845	1655	105	149	40	25	111	120	104	104
20	Deo Lal	35	136	48	202	64	862	1743	98	145	38	24	116	122	104	104
21	Nandram	45	133	53	185	73	845	1694	99	139	34	23	115	121	104	104
22	Nahar Singh	35	132	49	182	64	857	1637	99	139	33	22	118	128	105	105
23	Ghasiram	20	129	50	195	65	859	1709	98	140	36	23	117	114	100	100
24	Ram Prasad	40	141	48	194	63	852	1745	108	144	39	24	123	119	106	106
25	Mohan Lal	32	137	55	194	69	862	1699	98	154	32	25	116	117	101	101
26	Aiodha Prosad	—	125	47	195	54	822	1673	95	137	35	26	112	117	97	97
27	Narothan	48	143	49	186	67	822	1646	110	139	35	27	118	125	107	107
28	Lambodora	32	132	51	185	63	862	1683	95	139	36	22	118	117	104	104
29	Lakhman Pd.	43	130	45	188	60	762	1558	98	139	34	21	110	119	101	101
30	Meghnath	45	128	50	178	67	792	1560	90	134	36	20	118	117	100	100
31	Lakhman Pd.	35	135	52	203	63	832	1705	106	144	38	28	119	128	108	108
32	Shukilal	30	133	46	192	61	847	1678	106	142	34	24	115	118	103	103
33	Hoialal	38	137	49	188	62	852	1675	87	144	39	26	111	120	107	107
34	Krishna Ram	40	134	51	193	69	842	1674	95	145	32	19	125	120	106	106
35	Surja Kumar	28	130	55	192	69	822	1647	90	137	34	27	118	118	102	102
36	Gorakhnath	28	131	50	195	66	812	1643	98	137	36	24	116	119	102	102
37	Hari Pd.	27	138	47	199	62	857	1754	102	145	36	25	116	126	109	109
38	Daya Ram	18	135	51	197	66	852	1625	101	140	38	24	120	115	104	104
39	Sita Ram	18	126	46	192	58	822	1590	92	142	32	25	109	116	101	101
40	Chitta	50	134	49	191	63	852	1689	100	145	34	22	126	121	104	104
41	Manshar	40	129	47	186	62	827	1650	95	133	30	23	110	111	95	95
42	Raghnunath	38	131	51	178	65	867	1680	102	138	37	24	117	115	101	101
43	Arjun	70	128	48	182	58	792	1650	101	135	35	24	118	118	101	101
44	Hiraram	70	130	55	179	68	858	1687	97	149	35	29	118	115	104	104
45	Ganesh Ram	25	126	49	183	60	823	1630	96	135	36	24	116	115	96	96
46	Umed Singh	35	130	50	192	66	843	1652	100	135	32	21	118	126	108	108
47	Dhani Ram	40	135	47	185	62	878	1808	108	139	35	23	119	120	106	106
48	Chaitram	50	130	47	192	62	793	1622	85	142	40	22	102	112	100	100
49	Suvenath	45	134	46	191	67	838	1636	105	135	36	24	118	112	98	98
50	Harish	50	130	49	192	65	828	1653	96	138	37	23	117	120	102	102
51	Ushadram	50	128	52	192	74	793	1689	94	139	35	22	128	115	99	99
52	Buddhu	42	129	47	185	63	843	1671	90	133	36	20	113	112	101	101
53	K mahi Singh	50	127	51	172	69	848	1732	95	135	35	22	118	115	103	103
54	Harihar	45	129	52	185	71	808	1645	97	136	35	21	122	116	102	102
55	Jairam	38	140	46	202	65	858	1684	112	144	36	21	115	126	105	105

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bicondylar Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
56	Manareodh	35	129	50	175	62	813	1599	95	145	34	23	108	115	100	
57	Mukutram	30	126	52	196	65	828	1676	95	139	37	23	113	122	100	
58	Balakram	40	130	43	179	52	833	1698	95	137	38	20	101	110	99	
59	Mani Ram	42	128	47	183	65	778	1539	88	137	32	22	110	112	98	
60	Ram Saran	48	131	48	192	66	823	1620	86	135	36	23	120	118	102	
61	Rabiram	25	130	47	190	63	828	1620	90	137	36	22	113	116	98	
62	Chintamani	40	136	50	196	69	848	1713	107	143	37	26	118	127	106	
63	Bhagaban	45	138	50	208	62	893	1800	100	147	40	25	122	120	105	
64	Parmanand	48	133	57	192	73	828	1770	102	145	42	25	136	126	107	
65	Daktar	32	138	45	187	61	888	1768	99	143	36	23	114	120	105	
66	Shanker	45	126	47	187	64	803	1585	92	137	36	25	112	118	102	
67	Chanden Singh	38	129	48	195	61	858	1661	100	138	35	26	117	116	100	
68	Anyor Singh	38	141	46	192	58	868	1735	104	148	37	22	116	120	105	
69	Bhigurai	37	127	46	189	62	863	1689	90	137	32	22	110	114	99	
70	Mohan Lal	30	135	48	187	58	843	1655	99	138	38	25	107	118	100	
71	Bindan Singh	27	126	45	191	57	824	1609	91	132	33	21	108	116	99	
72	Chaitram	37	132	49	199	66	798	1587	96	137	34	23	117	115	101	
73	Khageshwar	36	129	53	197	66	858	1707	95	137	37	24	117	125	106	
74	Sita Sahai	50	131	51	194	67	836	1687	89	137	35	25	116	119	103	
75	Beni Madhab	38	127	47	201	60	823	1647	95	138	34	22	106	116	96	
76	Busam	48	123	48	182	61	768	1546	90	131	36	21	106	108	96	
77	Bir Singh	48	135	52	205	69	863	1730	102	141	37	23	119	121	107	
78	Ram Pd.	38	132	54	195	63	873	1725	96	137	35	24	116	121	105	
79	Behari	40	120	45	175	56	833	1674	89	136	34	25	109	106	94	
80	Durga Pd.	26	129	49	191	57	828	1645	104	138	33	25	114	117	101	
81	Mohay Singh	40	133	52	203	71	888	1718	110	145	35	25	118	124	102	
82	Maian Mohan	45	137	48	192	64	878	1748	109	139	36	28	109	121	105	
83	Khemraja	46	131	49	205	62	898	1715	95	139	36	22	116	122	105	
84	Hari Krishna	40	129	51	191	69	773	1607	105	138	38	23	113	119	104	
85	Mohan Singh	40	126	46	195	59	838	1624	90	137	37	23	110	113	99	
86	Motiram	55	134	56	203	77	903	1814	99	136	38	29	122	127	105	
87	Ram Ratan	38	130	48	193	60	821	1585	103	139	35	22	111	115	100	
88	Parikhit	45	138	56	208	68	828	1680	97	147	37	26	110	117	105	
89	Dharam Singh	25	136	47	190	65	872	1746	94	139	38	25	111	120	105	
90	Rajan	32	142	52	202	66	858	1748	102	142	37	25	124	127	110	
91	Chinta Ram	44	134	52	187	66	822	1677	100	138	36	25	118	117	102	
92	Lakh Pati	45	138	55	211	68	844	1750	104	149	35	24	120	125	105	
93	Ratiram	30	131	47	188	60	848	1690	96	136	34	23	113	113	101	
94	Bajjnath	52	129	51	180	67	833	1637	99	145	33	23	111	105	98	
95	Mainram	45	135	48	194	66	838	1715	93	145	42	25	123	121	105	
96	Brahma	28	135	52	192	62	843	1662	102	142	34	24	121	121	103	
97	Bubhaneswar	25	131	50	180	56	808	1613	96	136	34	21	106	113	98	
98	Kalspram	48	134	49	197	63	788	1602	98	147	38	24	116	112	105	
99	Ram Pd.	32	129	44	186	62	833	1698	96	137	31	19	108	113	97	
100	Gobindhar	35	128	51	187	65	808	1659	104	137	37	22	118	110	100	
101	Minu	36	132	47	195	59	728	1530	94	125	35	22	110	108	99	
102	Hari Har Singh	20	124	51	185	64	818	1738	103	137	35	26	120	104	96	
103	Shebokeum	20	131	51	186	63	868	1730	98	135	37	23	119	121	105	
104	Lekhan	30	130	48	187	52	823	1667	99	145	40	23	108	116	98	
105	Rupman	28	135	57	192	70	838	1674	109	139	34	24	123	117	103	
106	Nawal Sai	21	132	52	190	65	838	1662	93	138	35	24	115	118	103	
107	Nandalal	48	140	59	206	76	843	1679	98	144	38	25	130	126	104	

U. P. ANTHROPOMETRIC SURVEY, 1941

GROUP (4) : CHATTRI

EASTERN AND NORTHERN DISTRICTS

serial no.	name	age	Frontal Breadth	Buzgo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonal Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Span
1	G. Singh	32	98	131	56	183	69	844	1666	99	132	32	24	113	
2	S. Singh	28	96	122	46	188	61	849	1562	100	132	37	25	115	
3	P. Pal Singh	26	101	132	50	189	61	848	1585	101	142	35	22	115	
4	S. Singh	40	103	135	39	193	56	860	1616	98	147	39	23	103	
5	S. S. Singh	40	99	129	46	185	67	855	1584	97	137	38	26	112	
6	D. Singh	23	104	141	52	193	64	900	1709	99	148	38	25	120	
7	Baldeo Singh	25	104	133	49	181	59	816	1611	92	152	32	25	118	
8	R. R. Roy	36	96	139	52	184	57	863	1656	104	150	37	25	115	
9	Padstri	25	105	131	53	188	64	855	1640	100	141	39	24	111	
10	L. B. Singh	36	103	124	48	184	61	828	1577	102	132	34	26	110	
11	B. Singh	40	108	130	49	193	63	889	1690	109	136	36	23	120	
12	K. Pal	29	108	132	48	199	63	839	1674	102	142	33	23	109	
13	B. Singh	40	108	129	54	188	68	868	1712	96	143	34	25	123	
14	M. Singh	36	107	135	47	189	64	869	1652	102	139	35	25	113	
15	J. Singh	28	102	131	52	198	67	888	1643	97	138	35	23	116	
16	M. Singh	49	105	133	53	191	68	820	1567	102	140	34	25	118	
17	G. P. Singh	48	107	133	55	199	71	941	1797	108	147	40	27	128	
18	B. Singh	30	99	128	51	184	70	866	1585	95	138	38	23	118	
19	F. Singh	48	104	130	47	197	62	883	1661	107	138	33	24	121	
20	M. Singh	32	111	138	53	189	69	795	1574	104	148	33	25	128	
21	S. Singh	50	106	129	49	197	66	849	1622	95	135	36	23	119	
22	K. B. Pal	45	107	135	54	193	66	910	1726	115	137	38	27	112	
23	B. Singh	48	110	133	55	189	71	879	1610	100	148	35	25	126	
24	B. B. Singh	30	107	134	51	207	70	867	1613	103	137	40	28	121	
25	T. Singh	26	109	135	49	187	64	873	1674	102	137	36	26	115	
26	H. Singh	40	111	137	49	189	68	909	1711	103	141	41	28	118	
27	R. N. Singh	30	105	132	52	188	69	843	1670	101	139	35	25	127	
28	S. Ram Singh	35	105	145	50	194	68	890	1661	102	141	38	25	120	
29	Gajhadhar Singh	30	104	142	55	194	66	870	1673	108	145	32	26	124	
30	M. P. Singh	30	104	129	50	194	67	814	1594	97	138	36	25	118	
31	S. Singh	22	96	129	49	189	62	804	1588	101	134	33	25	112	
32	K. P. Singh	32	101	129	52	179	65	882	1714	98	138	37	27	117	
33	S. D. Singh	36	108	147	54	192	66	893	1712	114	149	36	27	113	
34	Patesar Singh	40	100	131	54	195	68	861	1676	98	141	34	27	127	
35	S. P. Singh	27	101	131	46	192	59	859	1599	98	135	35	25	112	
36	H. Singh	22	106	129	54	187	69	839	1612	95	139	39	24	125	
37	S. N. Singh	26	104	134	51	188	62	839	1668	98	138	37	23	117	
38	J. S. Bhal	40	102	132	52	187	67	814	1584	100	142	38	25	106	
39	Bhart. N. Singh	33	101	132	51	207	69	854	1669	105	133	38	25	125	
40	Rana Singh	45	—	131	56	186	63	820	1659	107	128	35	25	117	1752
41	Srichand	50	—	128	51	196	65	774	1607	99	137	36	26	106	1665
42	Beer Singh	40	—	128	57	193	72	884	1640	102	140	34	26	126	1685
43	Kashi Ram	38	—	132	59	199	65	850	1667	105	135	42	26	122	1745
44	Poor Chan	35	—	133	52	187	63	886	1678	105	145	41	28	107	1750
45	Sastri	41	—	136	51	193	64	885	1649	102	144	36	26	127	1710
46	Rajmal	37	—	149	58	208	71	875	1690	108	152	41	24	133	1780
47	Devisingh	41	—	129	48	196	61	820	1602	104	133	37	26	105	1645
48	Beer Singh	36	—	126	53	190	63	810	1577	88	143	36	27	107	1620
49	Musha	45	—	135	57	195	67	804	1628	98	142	43	27	121	1580
50	Munghi	55	109	130	40	195	61	750	1499	91	143	32	29	117	1590
51	Barfia	37	109	136	48	192	67	878	1667	99	143	36	25	124	1703
52	Ghen Gutha	27	—	129	47	185	59	800	1571	95	133	37	25	110	1630
53	Kadri	25	—	139	64	204	77	840	1729	100	149	37	28	132	1850
54	Boan Singh	35	—	134	49	197	65	825	1671	106	136	37	26	117	1710

serial no	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Span
55	Jum Chan l	45	127	55	188	86	748	1530	87	131	36	24	123	1633	
56	Raj Manji	38	131	60	195	72	860	1675	96	135	37	27	126	1710	
57	Madho	48	134	54	190	67	785	1624	97	138	33	23	120	1690	
58	Kanan Chan l	30	128	49	190	59	838	1610	95	136	33	26	109	1685	
59	Iswro	48	138	52	206	64	880	1670	109	147	33	25	117	1750	
60	Baplua	45	127	47	182	57	750	1480	93	135	36	23	106	1510	
62	Beni	41	139	49	203	61	850	1642	103	145	35	23	114	1740	
63	Antram	34	133	50	193	59	800	1550	129	130	36	25	107	1660	
64	Baru	35	128	58	197	69	830	1648	92	136	37	25	125	1690	
65	Rupran	45	127	57	192	62	809	1588	101	132	36	24	109	1638	
66	Keol	40	129	55	197	64	815	1626	96	136	37	26	124	1686	
67	Dilip Singh	32	135	61	195	71	790	1562	96	139	32	26	126	1637	
68	Shivaran	40	125	61	179	75	810	1609	89	131	34	27	119	1666	
69	Khusroo	35	136	49	192	61	799	1622	96	139	35	24	119	1685	
70	Chanre	36	132	56	203	68	810	1655	104	140	36	28	123	1736	
71	Supa	28	129	53	187	61	845	1655	95	134	31	23	113	1690	
72	Kambu	32	125	51	199	65	799	1649	92	138	33	27	119	1730	
73	Nageband	38	127	51	195	62	742	1495	95	139	32	24	124	1605	
74	Supa	25	129	55	199	65	765	1543	94	138	37	26	123	1633	
75	Gopi	35	136	51	183	58	743	1547	95	141	34	19	111	1607	
76	Bhowan	30	135	54	195	64	765	1556	104	137	37	23	119	1625	
77	Bhupal Singh	38	127	46	187	59	782	1564	92	136	33	23	111	1610	
78	Bhup Singh	25	141	53	193	65	845	1703	105	142	37	25	122	1780	
79	Ram Singh	28	131	50	206	64	860	1644	111	138	33	25	120	1705	
80	Bhawan Singh	38	137	51	196	61	870	1712	105	149	38	26	115	1760	
81	Nag Singh	25	127	58	185	61	830	1636	90	134	31	26	113	1680	
82	Sairam	25	126	54	205	67	850	1705	96	132	37	24	125	1760	
83	Kalsu	45	140	56	196	67	750	1585	98	152	35	24	119	1640	
84	Sher Singh	30	129	57	192	69	850	1691	96	138	32	25	130	1730	
85	Supa	26	131	49	199	61	820	1628	101	137	35	23	113	1704	
86	Bhowan Singh	28	133	51	183	60	830	1673	100	139	30	22	117	1720	
87	Srichand	35	135	50	187	62	790	1616	101	136	35	27	114	1670	
88	Naran Singh	32	141	52	196	65	830	1686	103	145	37	24	121	1780	
89	Antaram	35	129	53	188	59	833	1705	102	138	38	23	116	1780	
90	Hari	20	135	48	194	62	842	1673	99	141	34	23	120	1730	
91	Ram Singh	38	132	56	186	66	811	1665	99	139	37	25	124	1725	
92	Nag Chand	30	132	54	193	65	799	1600	95	136	38	25	117	1645	
93	Mor Singh	35	127	53	185	64	745	1529	97	136	36	24	119	1585	
94	Jhenqutra	28	129	55	198	65	850	1706	103	135	33	23	119	1780	
95	Sri Chand	40	131	51	187	64	817	1663	102	136	33	25	121	1680	
96	Bej Chand	50	129	55	184	67	758	1561	95	135	35	26	109	1580	
97	Dayaram	28	134	52	191	70	855	1708	109	135	36	24	125	1740	
98	Muni Ram	26	131	54	185	60	760	1512	97	138	32	24	112	1550	
99	Bonshi	34	125	52	177	59	775	1535	98	129	32	22	107	1610	
100	Nagchand	40	129	59	203	74	825	1662	110	136	34	26	125	1710	
101	Sheir Ram	27	127	54	191	67	818	1614	104	135	34	24	122	1680	
102	Sita Ram	33	127	52	196	67	795	1623	96	136	33	26	121	1670	
103	Komalu	32	134	49	196	61	804	1634	104	137	35	25	115	1674	
104	Hari Ram	28	131	51	192	67	793	1595	100	142	35	23	124	1647	
105	Brij Raj	32	136	49	192	63	815	1665	104	138	38	25	115	1710	
106	Raj Singh	38	135	52	199	67	825	1617	105	142	38	24	120	1660	
107	Bhapt Ram	34	128	52	198	65	775	1608	102	138	35	23	122	1680	
108	Nag Chand	38	128	47	197	61	838	1669	96	138	35	24	114	1703	
109	Hari	36	131	52	192	61	814	1673	96	136	35	25	113	1689	
110	T lu	25	135	51	190	63	853	1713	98	137	35	24	111	1742	
111	Joya	38	135	50	196	64	824	1624	103	143	39	23	113	1697	
112	Chetu	24	135	49	202	61	769	1566	103	142	35	22	112	1643	

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Span
113	Nanda	40		127	56	185	65	760	1636	98	132	36	24	114	1693
114	Hari Ram	37		128	57	192	63	851	1716	95	134	38	23	116	1732
115	Nanayan	35		131	55	189	60	803	1678	94	138	32	25	116	1699
116	Kousia	34		135	49	202	61	863	1749	99	137	32	24	119	1770
117	Hari	35		133	52	198	64	797	1657	103	142	36	23	122	1713
118	Ganga	40		128	55	207	63	743	1549	98	138	37	22	115	1601
119	Sriram	30		135	57	202	67	747	1579	103	147	38	24	116	1627
120	Jiran	38		136	52	193	69	858	1752	105	145	34	25	116	1763
121	Madan	28		130	53	205	71	831	1635	98	141	35	24	121	1683
122	Rupran	23		129	51	195	67	803	1615	97	137	36	23	116	1662
123	Ram	27		126	53	191	63	796	1615	97	135	38	24	119	1647
124	Kadu	30		131	56	197	65	801	1675	99	134	40	23	121	1701
125	Barpa	29		132	55	190	63	786	1624	101	136	37	24	117	1690
126	Kashi	31		137	51	188	64	817	1653	106	139	36	27	120	1697
127	Bhowani	31		135	52	189	66	796	1653	99	137	32	26	121	1691
128	Narayan	31		131	55	191	63	759	1617	97	135	34	24	123	1663
129	Barai	28		129	53	188	61	788	1637	96	133	36	23	118	1674
130	Madhoo	24		134	54	167	63	767	1628	101	138	36	25	116	1654
131	Munjo	26		135	53	188	66	824	1687	104	138	34	25	124	1715
132	Balaram	35		133	55	203	65	840	1680	101	146	36	26	127	1720
133	Khema	37		129	58	195	60	793	1642	98	143	37	25	114	1661
134	Bhupal	40		132	48	188	64	793	1617	99	138	31	21	120	1673
135	Sree Chand	32		127	58	196	59	759	1600	96	142	32	26	111	1654
136	Shiva	32		125	60	179	61	743	1572	88	128	35	23	114	1619
137	Dayaram	40		132	56	185	63	759	1589	99	136	34	26	117	1643
138	Toli	31		135	54	192	65	760	1634	102	138	39	24	110	1674
139	Rupa	35		131	56	192	64	804	1627	99	139	39	24	124	1670
140	Chunnu	40		129	57	198	63	799	1615	98	136	36	27	118	1669

GROUP (5) : MUSLIM

DISTRICTS : BAREILLY AND MORADABAD

SUBGROUP : MOLLAH

1	Banha	29	99	125	52	185	63	796	1554	98	135	31	25	113
2	Ferni	26	110	139	50	194	63	846	1680	105	135	38	24	123
6	R. Lakhan	24	103	131	42	192	57	833	1575	94	137	37	25	113
7	Rikhai	27	96	128	45	188	61	816	1562	98	136	36	23	107
8	Tidi	26	104	133	46	187	58	867	1649	104	139	36	24	110
10	S. Ram	32	102	129	47	184	64	848	1601	108	137	33	24	115
15	Algu	48	101	139	49	191	64	875	1690	105	142	36	21	119
16	R. Raj	49	104	139	49	193	63	833	1624	110	138	41	25	120
20	Jogeshar	45	104	135	52	190	69	855	1681	96	137	40	25	119
22	Jhinan	36	101	125	49	185	62	843	1555	100	136	38	25	115
23	Ratan	48	109	137	46	188	59	821	1602	105	137	40	24	108
24	Harkhoo	24	98	125	52	189	66	867	1642	94	133	37	26	118
25	Baiju	33	102	126	49	187	62	827	1587	97	133	38	26	109
26	Gokal	37	102	130	54	174	67	901	1647	95	142	33	26	116

SUBGROUP : MOHAMADAN

3	Lakhraj Dhumia	40	104	137	49	186	66	850	1594	100	140	35	25	115
4	A. S. Seikh	28	101	135	53	188	71	803	1581	98	135	39	25	123
5	Katwaru	30	104	136	50	192	69	863	1621	98	142	36	26	117
9	S. Mohmd	28	101	125	52	189	65	878	1674	103	135	35	26	117
11	A. Dhumia	24	104	132	46	189	64	827	1534	93	135	36	22	112
12	S. Dhumia	48	104	137	55	191	68	853	1620	115	140	34	25	123
13	N. Hasan	30	94	130	49	194	65	806	1544	95	138	35	24	118
14	Asrafi Dhumia	29	101	125	54	193	69	815	1577	95	134	34	24	123

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
17	S. Seikh	23	104	133	49	192	62	889	1767	95	137	36	24	107
18	H. Dhar	28	111	139	48	177	66	816	1595	103	143	35	24	113
19	M. Bux	30	105	127	50	181	69	853	1622	95	132	35	24	120
21	Imamali	30	105	129	49	191	63	845	1626	94	138	32	26	111
27	Ali Sheikh	32	101	127	52	188	67	849	1621	104	135	36	24	125
28	Roshan Sheikh	48	101	133	55	198	67	858	1660	104	140	38	26	113
29	Nure Sheikh	38	102	129	47	190	61	827	1571	93	137	36	21	117
30	Sardar	34	109	135	50	193	67	820	1620	98	139	41	25	117
31	Jumman	30	99	124	49	182	66	795	1490	96	128	35	24	120
32	Aliraje	49	110	137	48	198	63	843	1686	98	146	35	25	113
33	Joghan	35	110	139	51	187	68	873	1638	98	132	35	24	123
34	Hasmul	44	104	136	48	185	63	826	1567	100	144	34	23	113
35	Abbas Ali	29	101	135	51	192	66	857	1611	99	138	34	23	119
37	Akbar Khan	25	103	126	48	187	60	—	1634	104	134	41	23	113
38	Reazali	21	107	136	50	186	68	—	1696	96	139	38	26	121

SUBGROUP : PATHAN

36	Nanda Mia	—	101	131	45	187	59	—	1584	99	138	38	24	112		
39	Abdul Majeed	23	102	136	46	195	61	—	1535	107	139	38	24	117		
41	Baslin	18	106	127	50	187	65	—	1663	91	135	36	26	117		
49	Dannali Khan	50	107	132	53	187	68	—	1671	96	144	35	26	131		
50	Ali Ahmed	18	106	129	49	182	58	—	1588	94	139	37	24	111		
51	Abdul Rashid Khan	40	106	130	56	190	72	—	1743	99	134	34	25	121		
52	Lal Khan	45	104	133	54	199	71	—	1685	106	134	42	26	123		
53	Taj Khan	40	104	132	55	186	67	—	1636	103	135	34	24	127		
61	Walidyar Khan	27	101	123	48	179	62	—	1636	93	134	36	23	108		
64	Alayar Khan	35	99	122	43	182	59	—	1602	97	138	36	22	109		
66	Risayatulla	30	104	127	51	187	66	—	1680	101	138	36	28	115		
71	Nurney Khan	26	105	128	49	189	60	—	1630	102	135	34	24	112		

SUBGROUP : DHUMA

40	Muin Bux	60	104	133	51	185	67	—	1570	102	140	40	21	117		
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SUBGROUP : FAKIR

48	Sper Ali	55	100	129	52	188	69	—	1595	94	131	36	29	117		
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SUBGROUP : JAT

54	Baldai	22	107	129	52	200	64	—	1659	100	142	38	20	107		
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SUBGROUP : SOCIAL STATUS UNKNOWN

42	Ghasit	25	100	132	48	199	62	—	1727	102	138	35	25	117		
43	Rahim Bux	40	99	133	54	187	68	—	1626	108	137	34	27	123		
44	Inaat Khan	45	99	131	50	181	60	—	1550	108	134	30	22	113		
45	Sardar Khan	—	99	132	50	199	70	—	1630	99	131	41	28	120		
46	Khuda Bux	45	99	133	49	183	61	—	1657	104	135	32	26	115		
47	Inamulla	25	105	134	54	195	71	—	1675	97	142	38	26	128		
55	Seetaldeen	20	111	136	46	195	63	—	1620	106	138	41	24	110		
56	Shali Mahmodad	30	104	128	51	185	67	—	1604	95	133	40	24	120		
57	Abdul Majeed	25	111	142	51	189	61	—	1828	109	145	40	28	114		
58	Tara Chand	25	101	134	52	192	67	—	1684	105	137	39	26	121		
59	Wazir	25	107	135	53	198	64	—	1649	94	137	35	27	117		
60	Ashraf	45	97	127	44	188	51	—	1611	111	133	36	25	116		
62	Pazandali	24	101	134	48	185	60	—	1597	102	141	37	25	113		
63	Saleemullaha	40	107	129	54	187	67	—	1647	105	137	37	28	122		
65	Qasem	35	103	138	52	189	64	—	1608	110	138	42	23	123		

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Biygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
67	Junam Khan	45	103	124	48	186	63	—	1642	103	135	37	26	120	—	—
68	Tunduin	40	106	132	51	189	64	—	1690	95	145	39	23	116	—	—
69	Ghous Mohamd	50	100	131	51	192	71	—	1685	101	131	38	24	120	—	—
70	Jhaboo Khan	30	107	134	51	189	60	—	1725	104	144	33	26	113	—	—
72	Irfanali	28	104	134	52	185	61	—	1665	114	137	37	21	115	—	—
73*		45		131	56	186	63	820	1659	107	128	35	25	117	101	97
74		50		128	51	196	65	774	1607	99	137	36	26	109	107	100
75		44		128	57	193	72	840	1640	102	140	34	26	126	117	105
76		38		132	59	199	65	851	1667	105	135	42	26	122	117	100
77		35		133	52	187	63	886	1678	105	145	41	28	107	112	101
78		38		132	56	186	66	841	1665	99	139	37	25	124	119	105
79		41		136	51	193	64	825	1649	102	144	36	26	127	118	104
80		37		149	58	208	71	875	1690	108	152	41	24	133	124	110
81		41		129	48	196	61	820	1602	104	133	37	26	115	110	100
82		28		129	47	187	64	837	1621	102	128	36	23	107	116	101
83		26		136	52	196	63	846	1671	97	140	38	23	116	116	105
84		36		126	53	190	63	810	1577	88	143	36	27	107	112	99
85		45		130	49	195	64	850	1678	103	138	36	23	115	107	96
86		30		126	46	185	61	825	1595	95	128	39	22	110	112	100
87		38		132	44	195	58	830	1634	94	132	38	22	105	109	105
88		22		129	50	189	61	796	1592	106	135	40	23	110	117	103
89		45		135	57	195	67	804	1628	98	142	43	27	121	125	110
90		51		134	51	195	61	750	1479	100	143	40	22	117	115	111
91		37		139	49	192	67	878	1667	106	143	40	26	124	124	106
92		28		127	55	191	64	790	1662	96	135	34	26	110	110	96
93		38		134	55	188	63	815	1602	105	138	37	25	113	116	106
94		35		129	58	190	65	851	1721	100	139	38	29	117	112	100
95		30		131	49	192	57	832	1622	102	136	40	20	107	118	102
96		27		129	47	185	59	800	1571	95	133	37	25	110	113	101
97		25		139	64	204	77	842	1729	100	149	37	28	132	132	111
98		35		134	49	197	65	812	1671	106	136	37	26	117	115	100
99		45		127	55	188	66	748	1530	97	131	36	24	123	112	100
100		38		131	60	195	72	861	1675	96	135	37	27	126	113	99
101		48		134	54	190	67	785	1624	97	138	33	23	120	115	103
102		30		128	49	190	59	838	1610	95	136	33	26	109	115	100
103		48		138	52	206	64	880	1670	109	147	34	25	117	125	105
104		45		127	47	182	57	755	1480	93	135	36	23	106	112	97
105		34		139	49	203	61	850	1642	103	145	35	23	114	119	102
106		34		133	50	193	59	803	1550	109	130	36	25	107	108	98
107		35		128	58	197	69	830	1648	92	136	37	25	125	116	102
108		45		127	51	192	62	809	1588	101	132	36	24	109	115	101
109		40		129	55	197	64	815	1626	99	136	37	26	124	114	100
110		32		135	61	195	71	790	1562	98	139	32	26	126	116	98
111		40		125	61	179	75	803	1609	89	131	34	27	119	113	100
112		35		136	49	192	61	799	1622	96	139	35	24	119	117	102
113		36		132	56	203	68	810	1655	104	140	36	28	123	119	101
114		28		129	53	187	61	845	1655	99	134	31	23	113	110	99
115		32		125	51	201	65	799	1649	92	138	33	27	119	117	100
116		38		127	51	195	62	742	1495	95	139	32	24	124	114	100
117		25		129	55	199	65	765	1543	94	138	37	26	123	118	105
118		24		126	55	187	65	768	1589	98	130	32	27	116	109	96
119		28		122	48	195	63	805	1613	96	134	38	26	115	112	97
120		40		134	54	195	67	790	1611	103	135	37	27	122	119	105

*After taking about 72 measurements, there was an agitation led by a few Jats who suspected my motives. Arguments and persuasion having failed, it was decided to take the measurements without writing down names. The measurements of the people given are of Jats, Pathans and Fakirs of Barielly and Moradabad. The ages could be indicated.—D. N. M.

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
121		30	132	54	193	65	791	1600	99	136	38	25	117	118	103	
122		32	129	52	195	64	770	1528	98	142	37	26	119	114	100	
123		35	127	53	185	63	745	1529	97	136	36	24	119	117	100	
124		30	136	52	191	60	765	1525	101	140	35	27	114	116	104	
125		48	130	57	193	65	800	1587	100	139	40	24	118	117	105	
126		35	136	51	183	58	743	1547	98	141	34	19	111	110	96	
127		32	132	50	188	63	785	1633	103	137	41	23	114	117	103	
128		30	135	54	195	64	760	1556	104	137	37	23	119	128	107	
129		38	127	46	187	59	782	1564	92	136	33	23	111	112	101	
130		25	141	53	193	66	845	1703	108	142	37	25	122	116	101	
131		28	131	50	206	64	860	1644	111	138	33	25	120	122	103	
132		28	129	55	198	65	857	1706	103	135	33	23	119	116	99	
133		40	131	51	187	64	817	1663	102	136	33	25	121	115	104	
134		31	129	55	184	67	758	1561	98	135	35	26	109	120	102	
135		28	134	52	191	70	855	1708	109	135	36	24	125	122	105	
136		26	131	54	185	60	760	1512	97	138	32	24	112	114	102	
137		34	125	52	177	59	775	1535	98	129	32	22	107	114	99	
138		38	137	51	196	61	870	1712	105	149	38	26	115	122	116	
139		25	127	58	185	61	830	1636	98	134	31	26	113	113	96	
140		40	129	59	203	74	825	1662	110	136	34	26	125	119	102	
141		27	127	54	191	66	818	1612	104	135	35	24	121	114	96	
142		28	129	56	181	65	761	1602	92	139	39	22	119	119	103	
143		25	126	54	205	67	851	1705	96	132	37	24	125	122	104	
144		45	140	56	196	67	752	1585	98	152	35	24	119	114	100	
145		30	129	57	192	69	853	1691	96	138	32	25	130	118	99	
146		26	131	49	199	61	821	1628	101	137	35	23	113	117	107	
147		33	134	49	196	61	804	1634	104	136	35	25	115	126	103	
148		32	127	5	196	67	793	1515	96	137	36	23	124	118	100	
149		28	131	51	192	66	789	1647	100	142	35	23	119	117	100	
150		32	136	49	192	63	815	1685	104	138	38	25	115	116	102	
151		38	135	52	199	67	825	1612	105	142	38	24	120	119	102	
152		28	133	51	183	60	830	1673	100	139	30	22	117	110	100	
153		20	125	48	186	57	783	1570	97	132	37	22	106	112	101	
154		35	135	50	187	62	790	1616	101	136	35	27	114	123	105	
155		32	141	52	196	65	837	1686	103	145	37	24	121	125	103	
156		35	135	48	194	62	842	1672	99	141	34	23	120	125	105	
157		20	129	53	188	59	833	1705	102	138	38	23	116	119	102	
158		30	126	48	193	62	825	1673	92	134	38	20	115	112	98	
159		25	126	52	190	62	808	1660	93	131	41	22	123	114	100	
160		26	135	47	185	59	758	1536	97	141	40	23	113	111	101	
161		35	129	51	188	64	770	1596	92	138	38	21	111	111	103	
162		26	136	54	192	65	833	1600	102	146	33	24	125	115	101	
163		37	133	49	196	59	807	1611	101	137	37	24	110	119	105	
164		46	126	51	187	68	840	1682	97	134	33	23	121	114	100	
165		35	128	48	194	59	790	1522	103	137	38	24	111	114	101	
166		46	132	55	189	65	775	1559	102	137	38	19	115	113	100	
167		34	127	51	198	65	775	1608	102	138	35	25	122	114	99	
168		35	134	51	191	60	765	1603	101	133	44	23	106	116	101	

GROUP (6) : BHATU

DISTRICT : MORADABAD

1 Bhoop	45	101	136	58	181	72	895	1719	97	138	35	27	129
2 Ram Ratan	30	104	137	52	187	64	826	1625	106	144	37	23	114
3 Udhani Pal	45	105	132	50	184	62	826	1585	100	135	31	26	119
4 Bhagun	32	101	127	53	187	67	818	1606	90	135	32	25	117
5 Pritam	52	99	135	49	198	61	807	1572	95	138	38	24	109

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breath	Bizygo. Breath	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breath	Head Br.	Nasal Br.	Nasal D.	Total Face L.
6	Ram Dayal	42	98	130	51	182	66	825	1630	97	136	92	23	118
7	Bansi	35	107	134	57	193	70	894	1693	96	139	37	27	116
8	Bhidda	60	109	139	54	192	66	870	1714	99	140	37	27	118
9	Trilok Singh	28	100	133	52	186	68	842	1625	105	135	35	23	120
10	Ram Bharan	30	99	127	50	189	66	806	1598	96	135	32	24	118
11	Bhidda S/o. Kallu	55	102	127	55	182	70	812	1547	95	139	33	23	120
12	Pitambar	65	99	132	55	187	69	830	1639	98	143	34	29	114
13	Rambharan	55	103	132	49	150	68	838	1605	91	138	36	24	118
14	Girdhari	60	107	141	55	164	71	847	1680	102	136	42	32	118
15	Jagan Singh	30	107	132	49	190	64	823	1569	98	134	32	24	118
16	Madho	42	107	132	54	187	66	822	1655	102	134	43	24	118
17	Swarup	48	104	131	49	179	62	857	1633	103	147	34	24	113
18	Ram Pd.	34	100	126	46	181	62	845	1577	100	135	31	24	113
19	Mangal	24	109	129	48	199	65	864	1687	102	135	39	26	116
20	Har Bayal	32	107	138	49	192	65	837	1649	100	139	35	24	118
21	Nathua	45	105	127	52	194	66	857	1616	99	143	32	24	113
22	Bansi Bhar	30	97	135	57	187	72	845	1620	103	136	35	25	127
23	Ram Swarup	40	105	137	51	190	68	876	1670	106	139	37	26	120
24	Hooh Singh	34	104	139	46	198	65	873	1678	107	145	35	26	120
25	Jodha	65	97	131	52	177	64	780	1572	98	133	35	26	117
26	Babasa	50	107	136	50	178	67	836	1598	109	139	36	28	116
27	Dhekolia	35	104	138	54	198	69	870	1662	103	137	36	24	122
28	Radhey	35	105	136	49	178	66	825	1606	99	143	38	23	122
29	Janak Singh	35	109	136	43	192	59	841	1548	103	141	40	22	105
30	Harilal	25	101	132	50	183	61	863	1612	100	143	34	23	108
31	Nawal Singh	26	103	132	55	180	67	812	1579	97	142	35	27	118
32	Bishan Singh	18	103	129	52	183	65	865	1656	100	135	36	27	113
33	Sooraj	22	105	133	53	179	67	845	1638	96	138	32	25	120
34	Hari Singh	22	109	133	47	193	66	840	1604	102	143	35	25	118
35	Sopua	38	107	137	49	198	63	846	1652	105	139	35	21	117
36	Parjab Singh	43	101	135	55	182	71	815	1555	99	139	34	22	120
37	Bulaki	45	101	133	45	186	62	880	1737	99	136	39	23	110
38	Wazira	50	100	137	54	179	69	820	1597	103	137	35	27	118
39	Kanhai	42	97	123	50	173	65	845	1637	97	134	30	26	108
40	Peerjey	34	107	138	53	181	65	832	1633	94	141	35	24	115
41	Dansi	32	103	130	55	178	72	846	1651	103	137	32	26	118
42	Pitam Singh	28	113	134	52	195	63	860	1695	103	138	32	26	116
43	Balwan	68	105	139	57	192	72	845	1650	117	149	35	26	128
44	Swaroop	22	110	136	57	187	64	880	1685	104	141	38	24	123
45	Tirbeni	27	102	128	49	185	61	832	1624	103	133	36	25	112
46	Ranbir	22	105	129	51	184	62	841	1624	104	136	35	21	112
47	Babulal	26	112	141	52	189	68	922	1755	113	149	35	25	120
48	Lal Chand Singh	28	98	131	44	177	54	797	1562	106	136	35	25	103
49	Patras	26	105	137	49	186	67	850	1651	103	146	34	24	120
50	Shaji	28	102	131	45	188	70	856	1668	110	142	35	27	125
51	Ganga Ram	28	104	134	51	193	62	852	1620	105	135	35	25	116
52	Rambharasa	18	109	135	50	190	66	883	1658	100	145	35	26	120
53	Rambharan	50	105	131	52	185	66	872	1658	100	141	37	25	128
54	Ram Swarup	37	95	127	52	185	66	846	1611	92	135	30	26	112
55	Shyam Lal	30	101	132	53	175	66	836	1595	110	139	36	25	120
56	Hari Singh	20	101	128	49	194	62	852	1581	98	135	35	24	118
57	Nihal Singh	32	104	141	53	184	66	860	1647	101	135	39	27	116
58	Tehlu	35	98	135	47	188	64	—	1669	96	134	38	28	109
59	Mangta	26	92	131	50	187	61	—	1563	100	142	37	24	115
60	Wazira	50	106	140	51	187	70	—	1567	101	147	33	26	114
61	Balwant	45	95	130	54	181	63	—	1584	93	131	36	23	114
62	Sukhe	25	93	132	50	177	64	—	1513	96	131	39	22	115

serial no.	name	age	Frontal Breadth	Bi-zygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
63	Musa I	20	83	127	58	183	69		1658	98	133	33	25	126
64	Jagmohon	28	97	136	53	187	67		1617	96	137	35	26	118
65	Ganeshi	50	103	139	55	181	70		1628	100	145	31	25	122
66	Chunkan	35	104	141	53	194	68		1657	102	150	36	25	117
67	Jhandoo	32	102	142	49	183	66		1666	104	141	34	26	124
68	Jhangā	30	102	135	54	182	74		1630	104	137	36	23	126
69	Chhatter Pal	30	93	136	55	187	68		1658	103	143	37	22	121
70	Attar Singh	40	93	138	48	188	65		1677	100	140	40	25	125
71	Nathara	45	100	131	55	190	66		—	103	143	36	23	119
72	Lachman	26	92	135	54	191	70		1662	97	132	38	24	124
73	Putwa	28	92	136	54	178	69		1712	99	139	33	25	124
74	Hiralal	20	87	129	50	180	62		1644	95	135	32	23	117
75	Kalul	18	105	141	53	195	68		1726	105	143	37	23	119
76	Sarnam Singh	22	104	138	51	191	67		1696	98	142	38	25	114
77	Kanhanja I	19	91	135	50	187	61		1466	103	137	30	22	113
78	Kanhanja II.	38	91	138	50	182	63		1547	106	138	33	21	114
79	Amichand	32	96	135	51	191	68		1608	107	142	36	21	118
80	Bhagawandin	20	105	131	54	187	74		1676	97	133	37	22	117
81	Bhikari	18	100	128	52	182	66		1585	97	136	36	24	115
82	Narsingh	39	104	128	54	185	70		1584	97	137	35	24	115
83	Anar	42	100	133	50	184	62		1674	99	141	35	25	119
84	Railal	37	99	131	52	183	64		1630	96	141	37	25	121
85	Ram Pd.	34	95	129	52	183	68		1602	105	135	31	21	112
86	Bhutta	30	100	137	56	195	70		1611	103	139	34	26	126
87	Harduani Lal	25	92	127	53	189	67		1613	94	137	34	22	115
88	Gouri Sankar	26	100	131	55	191	69		1680	99	134	40	24	127
89	Jaharaj	50	96	131	55	181	66		1565	97	137	34	27	112
90	Nako	60	104	139	50	192	63		1615	105	146	40	28	109
91	Baldewar	55	96	133	55	181	66		1600	98	137	38	29	115
92	Mula	45	90	137	55	195	71		1676	101	141	36	27	121
93	Ajah Singh	75	105	137	54	197	67		1679	101	140	37	28	118
94	Nanak	65	97	129	48	177	63		1625	92	133	35	25	106
95	Piyari	38	97	135	57	188	69		1677	98	140	36	29	120
96	Musa III	28	90	128	49	183	64		1691	97	132	32	26	117
97	Fattah	40	89	127	54	188	76		1702	98	131	38	26	124
98	Budhuwa	40	96	131	45	193	58		1597	103	134	37	24	113
99	Phullo	25	95	129	50	189	65		1588	97	132	35	25	119
100	Kallu	40	93	130	51	185	72		1689	98	134	41	22	124
101	Swipal	34	101	132	50	180	63		1608	89	134	35	23	112
102	Chhidido	19	88	127	44	181	57		1607	96	131	39	25	108
103	Sanda	60	104	138	52	187	70		1614	99	139	38	27	119
104	Ragbhar	65	100	139	53	197	63		1690	102	138	43	31	113
105	Net Ram	60	105	140	50	178	63		1674	103	150	40	26	111
106	Ram Lal	60	100	132	60	180	74		1634	98	141	36	27	118
107	Dammo	58	105	133	51	195	67		1610	103	140	35	23	121
108	Mahipal	28	100	141	55	183	65		1685	100	142	37	28	119
109	Devi	60	99	128	53	188	66		1690	96	138	34	25	125
110	Itwari	27	97	130	52	182	68		1662	98	131	35	23	122
111	Kalwa	60	99	133	48	188	63		1578	101	138	37	25	115
112	Tutu	30	92	127	46	171	59		1532	100	136	34	23	111
113	Ketu	57	98	131	56	185	69		1665	106	133	40	24	113
114	Munni	67	96	140	55	185	72		1580	105	140	34	28	130
115	Damber	55	92	130	50	183	61		1533	100	141	35	28	112
116	Maindak	68	92	137	58	186	72		1620	100	136	35	25	132
117	Juhri	59	97	135	52	177	64		1604	96	135	35	25	113
118	Pitto	35	103	135	49	184	65		1580	105	141	38	26	111
119	Kallu	40	94	138	52	186	65		1694	109	135	38	24	121

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
120	Chiman	31	106	137	50	188	68		1570	105	141	40	28	112
121	Behari	68	98	125	51	181	60		1585	97	132	35	22	108
122	Ram Dass	30	101	130	48	181	56		1600	101	139	40	25	109
123	Bansi	65	98	137	63	192	78		1777	105	140	36	28	134
124	Sardar	65	98	132	53	195	60		1637	99	138	38	27	109
125	Jagoo	58	93	138	57	183	65		1598	97	137	33	29	118
126	Arju	40	90	124	53	183	68		1559	94	137	35	25	125
127	Sipi	50	90	138	55	187	66		1680	104	139	35	24	125
128	Kalwa	58	99	131	50	191	59		1699	101	141	40	31	107
129	Bhagawandin	55	99	139	51	174	66		1605	102	146	33	25	127
130	Dhu Kallan	66	92	125	51	179	62		1478	94	134	31	24	107
131	Sobha	60	88	140	55	191	68		1613	102	139	32	25	122
132	Ram Charan	65	99	133	56	187	71		—	97	145	38	23	118
133	Umrao	65	99	142	59	185	77		1600	110	142	37	26	132
134	Parsa	38	100	137	50	187	61		1690	105	147	37	28	122
136	Sampat Singh	26	95	123	53	192	64		1623	97	133	38	24	118
137	Balram	26	95	136	55	194	62		1646	99	135	33	25	113
138	Hira Chand	21	88	131	46	185	59		1580	95	137	40	22	111
139	Chanda	50	90	132	51	191	60		1585	103	139	35	26	116
141	Dalip	27	99	139	54	182	67		1705	104	139	33	30	120
143	Ishara	40	102	132	55	190	72		1585	98	138	33	26	123
144	Badnoo	62	91	131	53	185	59		1603	99	139	36	27	105
145	Bachchu	45	96	128	51	195	65		1664	102	137	35	26	118
146	Bijai	45	91	129	53	181	65		1670	98	137	35	24	113
147	Chhotuja	40	92	131	54	189	73		1713	97	135	32	27	131
148	Dhurya	36	101	134	47	194	61		1610	104	134	37	24	114
149	Chanda	32	93	141	53	197	64		1675	105	145	33	24	111
150	Phuse	60	98	141	55	197	72		1690	103	150	37	29	125
151	Mohan	58	102	138	53	195	71		1620	99	136	37	26	122
152	Cheranji	40	92	133	52	181	69		1653	95	139	35	24	123
153	Ganeshi	34	100	134	51	189	67		1717	102	138	41	23	120

GROUP (7) : HABRU

DISTRICT : KANPUR

1	Kishna	36	107	136	48	182	67	867	1694	109	141	37	25	118
2	Shiva Mohan	18	107	135	45	191	56	822	1570	110	146	40	21	105
3	Mangua	30	99	129	52	187	67	807	1563	107	135	35	23	117
4	Protua	45	109	137	57	197	77	890	1755	106	143	37	25	134
5	Tota	40	100	129	50	184	66	838	1650	99	128	40	25	118
6	Ronmilia.	50	101	129	54	179	66	850	1657	108	135	35	28	113
7	Ratia	35	101	129	49	178	67	817	1585	98	131	34	25	117
8	Suva	26	107	134	53	159	68	820	1524	101	137	36	26	122
9	Bhata	25	109	131	53	196	65	823	1677	102	136	34	26	117
10	Nanda	45	97	129	48	182	62	843	1649	102	138	35	25	113
11	Patram	35	107	135	48	192	63	912	1700	106	138	37	25	120
12	Natha	50	104	131	57	189	74	962	1622	97	139	34	23	136
13	Kormchand	35	101	135	50	198	66	915	1770	109	141	39	26	121
14	Lakshmana	54	95	121	48	186	64	873	1686	97	131	38	24	106
15	Bhiranji I	32	101	130	53	190	66	890	1692	102	133	35	23	118
16	Jangalia	28	95	120	54	180	70	803	1571	101	127	30	22	118
17	Nanlahia	20	96	124	50	187	62	843	1617	101	131	32	26	110
18	Shakmalia	35	103	127	51	182	66	840	1614	105	143	37	23	118
19	Shakar Lal	25	107	135	55	190	70	911	1762	102	143	36	23	128
20	Dela	30	95	126	47	186	64	814	1585	105	130	35	25	108
21	Hazari	40	103	133	55	183	70	930	1741	90	131	36	27	121
22	Rambhandra	27	107	129	47	189	59	867	1698	93	137	41	22	113
23	Mantua	25	104	127	47	185	59	844	1632	98	136	40	22	109
24	Phoola	30	105	133	50	182	65	850	1640	103	136	36	23	110
25	Sadhna	28	106	122	50	180	64	—	—	95	135	34	23	101

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
26	Kishan Lal	50	102	135	50	194	65	859	1657	107	144	37	25	113
27	Ram Dayal	30	101	134	51	187	63	873	1636	103	132	34	25	119
28	Darbari	28	99	113	45	187	60	878	1695	97	135	35	21	111
29	Parshadi	55	98	134	47	185	66	842	1615	105	138	35	21	111
30	Mohana	35	98	126	45	184	62	872	1635	106	129	37	24	112
31	Chiranjib	37	99	126	52	183	58	809	1576	93	132	34	24	119
32	Sukh Ram	35	99	141	54	187	70	863	1666	95	139	38	23	114
33	Mangla	32	102	129	52	186	70	873	1660	94	142	35	23	112
34	Bahadura	30	102	129	53	190	72	881	1722	102	134	34	23	129
35	Budhdha	34	103	133	48	184	60	807	1565	106	135	34	24	108
36	Hanna	28	104	125	47	189	64	841	1569	97	133	35	22	112
37	Hirrai	38	102	132	50	177	66	—	—	97	139	33	23	119
38	Hira	30	99	125	48	187	62	859	1673	100	132	34	22	115
39	Bhutia	47	100	132	49	189	64	817	1610	103	142	37	23	111
40	Bhendha	40	99	129	59	189	72	899	1689	96	136	36	26	117
41	Banjia	35	102	136	52	188	67	873	1647	105	138	35	22	120
42	Ram Pd.	24	102	131	49	179	64	863	1628	100	135	36	25	111
43	Dibia	58	109	140	55	188	72	889	1757	109	142	40	28	128
44	Bhanda	44	101	132	50	187	68	853	1680	104	142	35	24	117
45	Nanbata	50	102	135	48	189	62	918	1726	99	139	38	26	117
46	Khachera	38	105	130	48	184	62	794	1549	99	137	36	22	115
47	Ram Swarup	27	106	132	52	195	67	896	1728	94	136	36	25	120
48	Hari Singh	30	104	135	50	192	64	899	1752	107	138	35	24	112
49	Lochua	22	107	130	50	189	66	873	1726	97	137	37	25	108
50	Murli	35	102	126	49	185	64	857	1654	99	133	42	22	111
51	Bala	35	101	129	50	188	64	841	1625	96	135	36	23	116
52	Budha	40	103	132	50	188	66	895	1696	102	138	36	24	116
53	Sadhua	60	94	128	52	176	70	823	1600	95	128	36	23	121
54	Besha	30	106	131	42	187	55	832	1567	97	142	36	24	100
55	Purna	35	105	138	52	194	65	860	1617	98	145	36	22	118
56	Nahar Singh	40	100	127	47	181	62	879	1650	99	134	33	23	102
57	Gaija	42	97	126	47	180	63	860	1620	103	134	32	22	113
58	Bhikari	38	99	125	54	187	72	878	1712	99	134	28	25	129
59	Har Pd.	22	99	134	51	184	64	794	1561	100	129	35	22	110
60	Govinda	50	96	131	47	187	63	773	1550	102	133	32	26	111
61	Shankara	52	103	133	52	185	66	876	1714	109	137	40	26	113
62	Jiva	19	101	119	49	184	64	842	1591	88	133	33	23	113
63	Shankar Lal	23	97	120	47	189	61	880	1672	91	128	32	25	112
64	Bhoty Lal	25	100	129	53	187	68	864	1653	107	141	35	24	112
65	Sardari	18	104	126	48	181	63	829	1463	100	138	35	24	104
66	Batlisa	40	101	129	47	198	66	885	1692	95	138	36	22	123
67	Likkha	52	101	132	56	189	71	834	1625	99	132	38	26	108
68	Bharua	20	101	132	51	184	63	832	1604	104	138	35	22	112
69	Mehtab	34	101	129	55	185	66	828	1640	108	137	34	25	111
70	Gobinna	38	100	128	56	186	70	901	1732	98	139	40	24	119
71	Lakhana	50	99	129	50	189	62	819	1554	99	134	35	23	112
72	Phoola	27	104	129	48	183	64	848	1625	94	137	35	23	109
73	Naththa	48	101	135	52	192	75	898	1755	103	138	36	25	126
74	Tunda	35	97	124	47	179	61	—	1550	95	125	34	25	109
75	Salagwa	22	91	128	50	179	67	—	1550	99	138	36	22	119
76	Sultana	38	98	138	48	188	60	—	1662	102	141	36	30	111
77	Itwari	40	98	131	49	193	64	—	1595	102	138	39	25	113
78	Mirchuja	50	102	127	53	186	67	—	1685	99	136	35	26	113
79	Bhikari	32	105	138	51	182	63	—	1605	99	143	33	25	113
80	Jeesukh	20	103	139	52	189	61	—	1546	105	139	37	26	112
81	Govardhan	20	97	127	53	182	66	—	1730	99	131	36	25	123
82	Ram Charan	50	100	134	51	187	62	—	1605	101	137	39	25	115

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bzypo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bicondylar Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
83	Ram Sarup	27	102	130	50	180	66		1700	103	141	35	21	108
84	Chhuttan	19	95	131	50	192	58		1465	98	138	35	24	120
85	Pita	30	91	121	46	181	58		1465	97	135	35	23	108
86	Jagia	35	107	137	50	187	65		1610	107	142	40	25	115
87	Niranjan	42	103	127	51	190	68		1667	98	139	37	27	123
88	Hari Chand	22	103	137	53	186	69		1606	102	136	33	21	120
89	Jhadoo	20	102	127	51	183	68		1627	102	143	33	27	117
90	Lachman	30	96	123	46	175	63		1537	97	132	32	23	108
91	Chhotuja	21	106	131	50	190	62		1632	101	141	34	27	109
92	Ishara	45	99	133	55	188	74		1644	97	146	33	27	127
93	Musa	22	94	120	48	181	62		1665	94	137	35	26	111
94	Dalwa	45	100	137	53	199	68		1775	107	146	36	25	119
95	Attar Sing	30	97	127	49	182	61		1565	99	132	35	23	113
96	Bhola	35	87	133	53	185	62		1702	101	142	33	24	117
97	Jagondhiya	65	100	137	49	193	61		1596	101	146	37	23	107
98	Shyam Lal	3	106	139	48	199	60		1582	107	139	35	24	118
99	Pahari	35	94	125	44	188	58		1664	99	140	39	23	108
100	Hati Lal	35	99	138	56	192	69		1721	101	139	37	28	123
101	Totaram	26	102	140	57	204	68		1702	107	150	41	25	129
102	Lakhma	39	95	135	50	187	64		1597	102	144	36	21	114
103	Chhatteer	30	100	134	47	184	61		1633	105	146	43	27	115
104	Gokal	32	95	135	46	191	64		1641	102	149	39	22	118
105	Puran	26	97	133	49	191	63		1683	99	135	33	24	116
106	Chhatu	33	97	132	51	186	63		1715	103	143	38	21	104
107	Nairama	35	98	139	47	196	61		1690	105	144	36	23	113
108	Nanbatiya	40	99	139	55	183	67		1720	99	139	35	27	123
109	Behari	45	104	135	52	187	65		1650	102	132	35	23	110
110	Pitambar	29	109	140	51	195	67		1776	103	142	41	27	120
111	Raghunath	20	98	129	49	184	62		1564	95	140	32	20	109
112	Tota	26	99	128	48	177	64		1525	98	132	33	23	113
113	Roohna	25	87	128	48	189	61		1587	108	138	36	22	114
114	Baldewa	27	98	137	51	196	67		1686	99	145	36	25	126
115	Girwar	35	91	131	47	185	63		1550	99	133	36	24	108
116	Hoshna	27	100	129	52	192	67		1676	102	135	32	26	126
117	Durgwa	35	90	133	52	188	67		1616	98	136	37	24	118
118	Raghbira	60	101	129	49	184	59		690	99	135	35	26	100
119	Tagura	19	95	128	50	189	67		662	101	137	37	21	114
120	Mahpal	40	103	136	48	194	61		1530	97	144	39	26	113
121	Jagwa	30	92	133	51	182	63		1670	102	137	36	25	111
122	Madari	25	101	141	49	195	61		1631	102	138	38	26	113
123	Chhotiya	18	90	123	51	187	61		1646	96	142	37	25	113
124	Gajraj	18	95	129	49	195	62		1720	103	136	37	27	118

GROUP (8) : BHIL

DISTRICT : PANCHMAHALS (BOMBAY PRESIDENCY)

VILLAGE : CHARCHERA

1	Rai Singh Goomb	40	108	141	53	184	69		1707	107	147	38	26	126
2	Nagji Gula	60	106	137	47	184	66		1690	100	136	41	25	110
3	Maria Deva	35	102	136	49	186	68		1654	94	141	37	23	126
4	Kachua Keora	75	99	125	55	181	70		1615	94	135	34	25	117
5	Jokula Vesta	—	109	134	51	179	66		1664	100	141	37	23	112
6	Motia Revla	—	106	140	53	187	66		1700	102	146	39	25	121
7	Burji Mogyi	45	107	132	47	181	62		1540	104	139	36	23	109
8	Kulji Mogia	35	107	137	54	187	70		1654	96	142	35	25	131
9	Pajia Phulji	50	104	133	50	187	67		1590	104	137	40	26	108
10	Mania Buria	55	98	129	52	181	63		1605	99	133	41	24	110

serial no.	name	age	Frontal Breadth	Biszygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L
11	Rangji Nathia	65	104	132	50	182	69		1584	90	141	40	26	116
12	Mala Kalia	30	106	130	49	179	62		1668	99	135	38	25	109
13	Nathua Vichia	35	104	137	48	171	61		1565	103	145	37	24	110
14	Sana Punia	65	106	130	49	182	67		1575	93	132	38	24	102
15	Bhima Balur	30	109	133	49	186	68		1597	106	142	35	22	115
16	Madia Roomla	48	107	135	49	181	62		1760	100	139	39	21	107
17	Jokhla Phulji	35	114	142	52	196	66		1670	99	147	41	24	120
18	Gawa Nathia	50	102	125	45	174	60		1570	91	134	36	22	102
19	Bulia Buria	42	107	138	49	177	60		1562	104	139	39	23	101
20	Balji Burji	40	114	135	48	185	59		1523	90	152	37	22	108
21	Saiji Vesta	40	103	127	45	179	61		1591	98	137	38	23	111
22	Kalia Andra	75	101	135	55	181	73		1663	101	136	42	21	120
VILLAGE : NANDEBA														
23	Soor Singh Lakhia	40	107	129	47	175	62		1618	99	139	37	26	109
24	Soor Singh Jokhla	75	105	132	50	180	67		1566	102	138	43	26	106
25	Jokhla Loonala	48	106	131	52	184	65		1580	104	143	37	24	116
26	Malia Swala	50	102	131	52	185	70		1600	98	134	41	23	120
27	Maria Dhuru	40	102	130	49	182	61		1632	99	135	39	23	109
28	Langji Bhura	35	106	135	47	185	62		1592	97	141	37	24	112
29	Teria Goomla	28	105	135	47	194	61		1729	108	143	36	23	115
30	Maria Chokla	40	101	132	48	186	63		1700	103	135	39	24	115
31	Ranaji Roopla	20	101	128	46	183	56		1606	102	135	38	24	105
32	Phoolji Mana	28	96	125	49	173	61		1713	101	135	35	22	112
33	Kalia Kesta	47	99	131	50	176	67		1622	99	139	40	23	111
34	Tukhla Jokhla	21	101	129	48	190	58		1686	100	135	37	25	121
35	Ranaji Mario	35	109	127	50	184	62		1631	100	134	39	25	105
36	Byia Bhalia	48	107	134	52	180	65		1651	92	139	38	27	115
37	Muria Maria	15	101	122	52	188	64		1607	89	132	40	22	112
38	Soor Singh Loonjua	19	97	129	43	165	55		1522	91	132	37	21	101
39	Bapria Damla	60	99	136	48	179	63		1510	103	139	39	26	109
40	Rangji Damla	40	105	135	45	184	60		1776	96	142	37	22	107
41	Narsingh Jokhla	20	108	132	47	185	57		1674	104	142	39	24	110
42	Hira Rangji	21	104	126	45	173	55		1610	95	137	33	20	101
43	Galji Nanji	68	101	133	59	193	68		1588	106	139	39	27	130
44	Man Singh Lungi	28	105	129	53	179	63		1706	106	139	35	25	115
45	Rangia Punjia	35	105	130	52	180	61		1638	98	139	34	25	109
46	Nathia Vinja	20	101	127	45	179	56		1608	85	139	34	24	101
47	Mala Mangla	30	104	129	47	185	66		1664	98	139	35	22	124
48	Hunia Dhumria	35	100	132	45	192	64		1560	107	137	35	23	109
VILLAGE : ANLIKHAJOORIA														
49	Karia Laloo	32	104	127	50	182	64		1575	96	134	35	25	118
50	Malia Dewla	22	102	129	50	179	61		1567	98	135	39	24	115
51	Hirji Bhagwan	60	98	129	50	176	66		1624	94	137	37	27	112
52	Lirtan Hira	40	107	131	52	195	68		1663	105	138	38	27	118
53	Punia Dhomoia	35	96	129	50	188	63		1541	96	132	38	26	112
54	Vir Singh Rewla	35	102	127	52	184	69		1605	105	132	35	23	123
55	Vir Singh Newla	25	104	132	47	183	59		1590	98	133	35	23	109
VILLAGE : KHAJOORIA														
56	Par Singh Soorji	40	107	129	53	189	67		1699	95	141	40	26	118
57	Kanji Matha	25	111	142	49	187	60		1711	97	145	36	21	113
58	Kanji Devlo	40	107	133	53	183	70		1616	104	132	34	25	125
59	Ahji Jogda	55	106	129	49	178	61		1579	102	139	37	25	106
60	Mekua Badia	27	101	131	50	182	60		1643	96	134	36	23	113

U. P. ANTHROPOMETRIC SURVEY, 1941

ser. al. no.	name	age	Frontal Breadth	Biaygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
61	Dilia Maroo	70	97	129	44	183	57		1546	102	138	39	22	105
62	Kalia Punjia	40	107	133	54	192	73		1587	100	142	37	26	120
63	Lalia Bijia	35	114	139	51	189	70		1600	96	137	38	24	124
64	Goman Amra	55	97	125	50	184	61		1628	98	134	38	26	110
65	Choonia Darji	32	105	137	51	185	67		1636	111	139	34	24	124
66	Vinja Khooman	28	104	128	51	187	61		1603	100	132	37	23	111
67	Somji Kalia	55	108	136	48	184	62		1607	96	139	35	25	114
68	Khoonji Sowla	35	104	129	45	187	58		1645	109	139	42	23	112
69	Dalia Khorman	23	97	120	45	172	52		1558	98	129	35	20	104
70	Kalia Salia	45	101	126	49	187	64		1607	96	139	38	22	102

VILLAGE : CHANDAWARA

71	Walchand Khanji	45	106	127	47	185	63		1642	102	139	36	23	105
72	Rup Singhji Lalji	50	104	131	43	182	59		1662	104	134	39	21	108
73	Seva Fulji	45	100	129	46	176	65		1574	98	136	35	25	109
74	Nar Singh Katra	—	101	132	50	182	63		1687	101	130	40	24	113
75	Wala Senya	25	106	139	49	193	59		1755	107	147	39	25	115
76	Chagan Walchand	25	104	128	49	179	64		1625	97	136	37	24	108
77	Burji Seva	20	100	126	43	173	54		1675	94	137	34	25	102
78	Narsingh Kalji	45	98	130	49	178	61		1686	98	135	35	25	101
79	Bhura Walchand	18	99	124	45	175	57		1634	90	134	35	20	102
80	Dita Sakra	50	107	129	47	184	63		1695	99	135	35	25	107
81	Dhula Dala	45	101	131	54	174	67		1735	99	137	38	25	115

VILLAGE : BEJATAO

82	Mahan	48	106	132	50	184	66		1608	98	137	38	27	109
83	Bassu Ganla	35	105	135	46	182	60		1668	98	137	38	26	110
84	Nanyo	50	104	128	50	169	63		1540	95	138	36	23	116
85	Lalji Vinja	—	107	135	47	177	60		1665	102	142	42	24	115

VILLAGE : JERWATA

86	Man Singh	35	100	128	41	179	59		1662	96	136	39	22	109
87	Birjia Nathum	42	96	127	47	186	62		1644	105	134	36	21	115
88	Kanji	35	108	135	53	197	67		1740	98	147	38	22	122
89	Somda Rupta	25	102	129	48	179	60		1668	98	135	38	25	109
90	Punya Vesta	—	104	131	44	178	53		1590	95	139	40	21	108
91	Manji Chunia	40	107	137	50	184	62		1739	100	142	39	25	117
92	Kali Lalji	20	99	127	49	187	63		1570	98	134	39	25	109
93	Nath Mogha	25	110	129	46	181	59		1563	98	139	37	25	111
94	Gala Kalu	45	110	137	52	194	69		1660	108	141	38	26	126
95	Mahia Walji	40	102	127	51	175	64		1616	103	135	39	25	117
96	Veer Singh Vesta	28	103	128	42	188	53		1678	94	135	41	22	105
97	Rupla Nathu	60	102	135	49	178	57		1716	94	139	36	26	102
98	Nathia Jumla	25	104	129	42	194	54		1706	104	139	37	22	99
99	Kathra Bora	30	103	132	50	182	62		1620	110	139	35	23	112
100	Dalia Rania	—	104	135	50	189	63		1622	107	142	43	26	113

VILLAGE : WADWUA

101	Kadu Vesta	65	108	137	52	185	70		1644	100	139	41	27	118
102	Kalu Nathu	45	102	142	46	184	60		1614	104	144	40	22	107
103	Dulia Kala	60	99	122	45	181	60		1575	104	138	35	25	119
104	Punjia Mehia	35	105	134	51	178	63		1664	98	143	38	27	113
105	Rai Singh Malji	—	104	132	43	177	57		1605	103	137	35	24	101
106	Nanji Ratna	50	104	134	50	182	64		1595	95	139	39	24	108

VILLAGE : AHLOO

107	Babar Bai Gala Bai	60	107	142	54	184	68		1631	103	143	41	26	118
108	Vir Singh Goman	45	104	134	53	184	67		1585	95	143	37	25	117

serial no.	name	age	Frontal Breadth	Bizyo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
109	Bhar Singh Doodu	50	101	132	49	185	61		1682	102	142	40	27	108
110	Seneo Nar Singh	50	101	132	50	187	66		1653	98	134	39	25	117
111	Nartha Bhura	55	101	127	45	178	60		1656	95	132	38	24	113
112	Malji Vinja	60	105	133	44	188	61		1570	97	139	38	26	108
113	Far Singh Bahar	28	109	137	48	179	60		1656	100	139	41	25	109
114	Nagji Kala	58	101	139	50	185	63		1708	105	144	39	25	114
115	Bhurji Mangla	35	99	127	45	184	59		1647	95	134	37	24	110
116	Sonji Nagla	35	108	138	48	189	61		1624	99	149	40	25	115
117	Hari Bhai Phata Bhai	30	97	132	49	182	61		1760	97	138	40	25	114

VILLAGE : CHAKALIA

118	Narsingh Vista Bhai	35	98	128	51	178	64		1656	92	134	34	25	115
119	Joti Bhai Raoji Bhai	23	102	134	45	187	59		1697	105	140	41	28	108
120	Bhalji Mogji	40	96	129	51	185	60		1621	97	135	37	23	116
121	Jora Bhima	30	111	135	50	180	68		1637	94	142	37	25	128
122	Hinji Mata	30	101	133	48	181	63		1628	94	137	40	26	115
123	Babu Mata	28	100	125	47	182	59		1563	91	136	35	24	110
124	Ramji Hira	24	104	137	50	187	59		1653	94	133	36	26	115
125	Deta Hima	28	98	131	49	188	55		1616	89	135	40	22	103
126	Ter Singh Vesta	40	99	129	52	181	62		1626	96	131	35	26	116
127	Vira Khumna	35	108	135	49	186	61		1605	94	140	39	25	109
128	Raoji Bagla	48	109	136	48	192	64		1605	99	139	38	24	122
129	Haria Hakma	27	107	131	47	176	63		1657	90	142	36	24	118
130	Vichiah Joka	50	107	130	50	187	65		1654	104	135	36	23	122
131	Rajai Dhira	26	105	136	37	178	60		1642	96	146	40	24	113
132	Deva Poona	50	105	134	50	187	68		1713	98	136	37	24	126
133	Chemice Hira	25	108	129	50	182	60		1656	98	134	42	27	118
134	Hiro Deva	18	107	127	46	180	61		1557	99	134	37	25	108
135	Hima Natha	23	97	123	51	169	60		1707	90	128	33	26	117
136	Bhora Sovji	20	109	132	48	185	63		1630	95	139	38	23	113
137	Tehiah Ranji	38	104	128	46	178	59		1578	94	133	34	27	113
138	Kala Kika	22	104	129	48	185	62		1619	92	139	37	25	112
139	Ter Singh Phata	20	101	129	47	178	60		1652	87	136	40	25	108
140	Khata Hima	18	102	132	46	181	57		1628	96	134	41	25	104
141	Rupla Ranji	22	104	126	47	174	61		1621	95	135	34	23	112

VILLAGE : MIRAKHEDI

142	Dhanji Bhai Jaga Bhai													
	Damor	30	103	124	45	178	55		1541	102	138	35	22	101
143	Kichia Bhai Amahur	24	102	125	44	179	54		1626	84	137	35	22	106
144	Monji Koya Dongi	45	103	124	54	182	70		1635	97	132	40	24	118
145	Sonji Keshari	45	100	134	50	186	69		1715	94	138	41	20	123
146	Gala Lima Maida	25	101	128	49	186	65		1555	96	137	33	26	121
147	Pajula Raj Singh Maida	20	100	128	44	173	56		1558	96	141	37	22	104
48	Kidia Maida	22	95	129	50	176	66		1611	98	132	37	24	120
149	Jeta Damar	18	107	129	45	179	56		1640	102	136	40	24	105
150	Kalia Keswari	25	106	133	46	158	61		1604	102	138	42	25	110
151	Jokha Keswari	25	102	122	41	169	54		1543	89	128	39	22	97
166	Dola	21	102	135	44	181	56		1708	103	139	38	24	109

VILLAGE : DAGERIA

152	Roach Bhai Dangi	55	101	133	45	180	61		1608	101	132	37	26	113
153	Lala Dangi	35	99	128	51	184	61		1681	102	139	34	24	113
154	Mala Dangi	38	106	132	52	182	65		1590	104	139	36	24	110
155	Sartan Katara	39	100	129	45	178	57		1617	97	139	37	23	109

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Rizyo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
VILLAGE : VASTI														
156	Nagaji Bhalhor	59	106	132	50	186	68		1644	88	138	42	25	118
157	Vesta Baria	40	100	130	49	172	60		1632	95	134	38	24	107
158	Gajia Devla Damor	35	103	132	49	189	70		1693	103	137	36	24	125
159	Khalra Katara	30	101	128	43	179	57		1552	103	137	37	23	105
165	Gana Sangadu	21	107	133	44	189	54		1634	94	137	37	20	108
VILLAGE : DANGARA														
167	Vesta	48	114	144	50	190	67		1762	105	142	41	23	123
168	Jokha Damor	45	104	128	49	185	62		1651	94	139	36	22	114
169	Dita Jokhna Vasuma	30	101	127	52	182	66		1687	94	129	30	23	121
170	Valji Damor	35	105	126	46	172	57		1619	102	137	42	23	101
171	Vichhia Vasunia	35	100	128	49	181	60		1594	88	132	33	23	115
VILLAGE : NAIN HANDI														
160	Surtan Ninama	45	101	133	53	184	65		1634	99	142	40	26	117
161	Methia Devada	42	102	138	52	175	66		1665	99	138	33	26	118
162	Titia Ninama	36	97	125	46	179	62		1613	93	134	34	25	113
163	Valka Katara	25	109	129	41	184	52		1608	105	138	38	24	101
164	Vesta	60	100	129	49	178	62		1592	98	139	38	26	109
VILLAGE : KALIGAM														
172	Vesta Dangi	40	109	140	50	187	63		1646	104	145	40	27	111
173	Vichhia Badia Dangi	35	98	132	51	179	61		1698	101	134	38	24	115
174	Rava Teha	39	105	132	51	181	65		1592	104	138	38	25	118
175	Kodar Bijia Barja	25	101	129	48	183	60		1673	102	133	35	22	107
176	Velji Thawara Halita	25	103	138	48	179	57		1662	103	144	37	21	107
177	Revla Kala Parmar	60	106	130	45	178	53		1480	89	134	38	23	105
178	Chichka Bhoola Baria	20	104	128	47	183	63		1511	96	135	35	24	109
179	Raj Singh Vesta	16	105	131	41	185	54		1676	95	139	38	19	106
181	Bhoja Nanji Singhada	36	97	129	48	189	61		1672	103	135	38	25	108
182	Deula Nagji Buria	40	100	133	49	185	61		1587	94	137	36	24	110
183	Kalu Dilia Kisori	30	98	127	49	179	61		1598	103	134	33	22	115
184	Kidia Salia Baria	40	99	124	47	174	54		1615	104	129	31	23	103
185	Hira Dala Bilwal	60	107	139	55	182	71		1568	105	143	36	24	118
186	Gangaji Dangi	35	97	131	58	175	70		1580	92	128	37	27	120
187	Vaga Saka Dhobi	32	104	129	51	177	65		1696	95	135	37	24	118
VILLAGE : PAROO														
180	Velji Falji Hathela	35	99	124	49	182	60		1586	90	139	36	24	108
GROUP (9) : DOM														
DISTRICT : GORAKHPUR														
1	Phelsu	102	129	51	189	64	833	1622	99	142	38	26	121	
2	Ram Lagan	103	132	52	187	67	850	1674	93	132	36	28	120	
3	Jagan	102	137	47	189	63	803	1684	110	145	43	26	119	
4	Mahadeo	104	139	52	187	64	818	1640	112	145	37	27	110	
5	Jadwa	105	132	56	183	74	808	1668	100	137	33	25	132	
6	Lallan	105	137	47	178	62	846	1720	95	149	38	23	114	
7	Bhagwan Das	104	134	49	184	64	864	1724	98	140	38	24	117	
8	Haramzad	104	131	51	192	71	833	1690	105	133	35	27	123	
9	Dwarika	105	132	49	189	69	868	1691	99	137	37	24	123	
10	Chulhul	102	139	50	182	66	845	1665	108	139	47	26	128	
11	Lochan	109	135	47	181	66	855	1730	97	142	38	23	125	
12	Jhagroo	105	136	55	189	69	846	1712	104	142	36	26	120	
13	Ramhali	112	136	53	194	69	919	1825	95	150	38	30	117	
14	Kheladi	108	139	54	187	68	821	1630	101	136	44	28	126	
15	Kishun	99	132	55	189	71	843	1725	96	135	40	28	124	

serial no.	name	age	Frontal Breadth	Bizyg. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
16	Shyan Lal S/ Parameswar		110	140	54	190	74	866	1752	107	144	38	26	127
17	Sahubar		104	135	53	177	68	838	1695	97	135	35	26	123
18	Ramial		101	135	51	189	82	840	1656	93	137	34	26	117
19	Birju		101	132	55	178	71	793	1624	98	135	35	27	125
20	Phulchand		107	133	49	193	69	870	1728	99	134	38	27	122
21	Neje Sar		106	132	53	192	69	863	1660	111	140	39	30	124
22	Bihari		105	142	57	198	73	878	1760	99	141	41	25	139
23	Chilli		107	142	55	193	72	853	1737	114	133	44	22	127
24	Kanchan		101	135	54	184	68	876	1638	105	138	39	26	132
25	Surajhali		106	132	52	185	66	818	1631	103	141	38	26	115
26	Rajhali		101	125	49	175	63	828	1643	94	129	36	26	118
27	Sohdwa		106	135	51	185	66	845	1628	97	137	40	24	120
28	Lal Chand		103	139	50	188	65	835	1591	102	139	37	26	115
29	Hiralal		107	142	47	185	60	903	1744	99	140	39	26	111
30	Faujdar		105	134	50	189	63	811	1625	99	138	39	24	115
31	Hum man		106	134	46	189	60	826	1664	112	147	39	24	114
32	Shambar		106	134	54	194	63	878	1750	102	135	36	27	117
33	Harham		109	135	52	185	67	863	1730	104	137	43	20	119
34	Amrud		98	126	54	182	73	803	1670	94	129	35	28	128
35	Maharaj S/ Khelmon		105	129	50	186	69	813	1654	102	129	38	25	118
36	Dhobia		105	137	50	191	69	833	1660	105	130	42	26	117
37	Chandrabali		109	134	46	185	59	825	1615	99	139	39	23	112
38	Panchu		109	129	47	185	62	819	1705	92	137	45	29	110
39	Dhaman		104	134	54	185	69	938	1690	99	135	39	27	122
40	Sundar S/ Ramcharan		107	135	50	197	72	855	1716	98	137	40	25	128
41	Panchu S/ Lhali		99	129	54	186	72	824	1644	102	137	42	26	123
42	Ganda Lal		109	132	52	189	66	866	1724	104	137	34	25	120
43	Mesri Lal		104	124	54	180	70	837	1602	96	135	33	25	120
44	Gajadhar		104	135	52	184	70	807	1625	105	140	38	23	123
45	Chechva		97	132	48	189	67	853	1672	100	139	37	25	120
46	Lochan S/ Pratadh		107	137	54	189	71	807	1607	100	132	38	27	118
47	Chela		104	134	51	191	67	825	1644	105	139	41	23	119
48	Puddi		109	137	58	188	70	847	1763	101	141	36	26	125
49	Phulhahadua		101	132	49	189	61	834	1635	105	139	38	23	112
50	Amed		106	129	51	189	70	826	1696	95	137	41	28	125
51	Harhanji		107	135	54	175	71	841	1711	99	141	36	25	132
52	Sahgada		99	129	45	178	60	854	1685	91	134	36	22	115
53	Badmesh		107	135	45	181	66	845	1704	98	134	38	23	122
54	Tapeswar		104	134	50	185	69	841	1648	102	144	38	27	128
55	Sayanhihari		104	128	55	189	75	834	1670	100	132	34	25	129
56	Sayan Lal S/ Beni		101	132	47	197	67	901	1764	102	137	39	24	124
57	Moti Lal		106	123	44	182	59	805	1564	97	131	33	25	111
58	Jadwa S/ Hasna		96	122	54	168	70	815	1591	90	127	32	25	117
59	Patras		101	125	47	174	59	784	1594	94	134	37	24	111
60	Gulab Lal		106	125	49	187	65	845	1620	102	134	35	25	112
61	Ram Saran		107	129	52	181	66	771	1618	98	137	38	25	122
62	Mithai		110	138	53	199	66	867	1756	97	147	35	28	119
63	Ram Kishan		100	132	52	181	66	856	1725	103	140	35	26	113
64	Jhumel		108	142	52	182	71	875	1759	96	135	35	26	130
65	Khumbhun		103	136	50	184	67	853	1668	102	139	32	26	128
66	Kanbsar		107	139	56	184	66	871	1632	99	135	38	28	111
67	Parmesar		108	137	47	195	68	877	1785	102	137	42	25	125
68	Chunni		107	135	48	184	62	879	1752	106	139	38	28	118
69	Phul Chand		101	128	51	188	70	841	1640	97	142	30	26	122
70	Gopilal S/ Lochan		99	125	43	187	59	821	1642	88	137	38	22	110
71	Chand		103	125	48	192	66	824	1682	94	134	38	25	120
72	Lalbehari S/ Mahalin		107	135	51	194	64	847	1723	104	137	39	25	122

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
73	Jangli		99	121	50	172	65	807	1660	98	130	35	23	118
74	Jagisair		102	126	49	184	62	824	1619	94	137	36	25	115
75	Gunda		104	134	50	188	68	888	1697	95	132	44	26	123
76	Mahabir		101	132	52	182	71	843	1600	98	139	35	27	127
77	Chunni S/ Jaisari		100	132	52	189	66	834	1660	98	137	38	28	119
78	Kanta		109	135	55	185	72	903	1730	106	145	38	26	127
79	Chotetal S/ Gunda		101	131	49	182	65	844	1665	99	140	38	25	117
80	Rozan		106	131	49	187	71	795	1614	109	134	38	26	128
81	Buddhre		105	131	52	194	68	844	1695	105	144	38	26	117
82	Nebua		99	120	48	187	67	783	1560	98	134	35	26	123
83	Lutra		103	129	44	187	57	814	1537	96	135	41	24	113
84	Mahalal		96	137	47	192	63	844	1667	101	137	45	33	109
85	Ram Lal S/ Gunda		104	129	45	175	62	808	1620	95	139	40	26	115
86	Gharla Das		109	135	47	201	63	858	1718	104	139	41	28	125
87	Dhouda		99	132	49	187	68	824	1598	102	137	40	27	120
88	Samial		109	136	50	192	66	865	1698	102	144	35	24	127
89	Jhopeta		109	135	46	195	57	868	1692	99	139	43	27	108
90	Rumal		112	139	50	190	64	849	1570	96	144	41	26	121
91	Chatra Dhari		107	136	48	191	64	828	1628	106	135	40	21	119
92	Timal		107	135	49	193	69	789	1594	97	138	39	28	127
93	Dalsingar		101	131	49	185	66	824	1755	105	134	40	25	120
94	Shikari		105	137	54	192	73	886	1738	113	137	38	27	129
95	Bickran alias Victor		109	134	50	189	54	866	1724	99	142	33	26	126
96	Gopital S/ Kalicharan		101	132	45	185	59	824	1673	104	134	35	23	115
97	Iswar Dass		100	128	52	172	63	806	1555	95	143	34	22	118
98	Barkat Singh		109	134	48	189	62	847	1708	106	137	40	25	112
99	Lochan S/ Surat		103	129	49	186	64	825	1689	92	132	35	25	117
100	Jang Bahadur		110	132	48	178	62	824	1560	98	137	39	24	117
101	Chotey Lal S/ Maharaj		102	125	50	187	66	797	1628	98	137	41	25	125
102	Swarup		97	125	45	178	58	799	1548	96	135	38	26	115
103	Kunj Behari		102	138	49	191	67	—	1630	105	137	36	25	121

DISTRICT : MORADABAD

104	Darbari	40	101	131	53	192	71	—	1644	97	134	40	26	130
105	Bans Raj	27	102	130	51	188	65	—	1640	101	136	35	26	130
106	Sarjoo	30	98	129	46	178	62	—	1515	95	130	37	23	110
107	Panjabuja	35	107	137	52	196	67	—	1697	106	135	44	23	120
108	Kalbal	—	103	132	48	177	63	—	1537	100	138	41	22	113
109	Khunkhun	27	109	137	47	187	64	—	1685	95	139	44	23	124
110	Magra	39	101	125	53	190	68	—	1662	107	135	36	22	125
111	Jitwa	43	111	134	54	188	71	—	1647	99	140	45	25	118
112	Swarajbali	52	101	130	50	187	65	—	1622	95	135	38	25	117
113	Rambali	19	103	127	52	178	67	—	1645	94	137	37	22	116

GROUP (10) : ARTISAN (AHIR)

ARTISAN CASTES FROM EASTERN AND WESTERN DISTRICTS

19	Haman	40	105	135	51	183	64	794	1555	99	131	36	21	117
67	Jhinkoo	22	101	126	36	185	61	814	1619	100	136	35	25	111
68	Bansraj	36	97	128	53	188	67	820	1604	98	135	35	24	118
69	Tirbeni	30	107	137	52	195	64	866	1697	98	139	36	24	123
73	Udit	30	105	135	46	173	57	836	1653	92	135	35	24	115
86	Awtar	30	105	134	45	195	60	803	1571	90	146	36	22	111
87	Bindsari	22	109	131	49	187	61	827	1592	98	137	35	22	113
88	Timal	26	99	130	51	183	65	798	1562	95	136	38	25	113
89	R. Jiwan	32	105	129	49	192	66	874	1643	104	142	36	24	119
90	Bansi	31	102	132	54	184	66	893	1677	97	139	31	25	119

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonal Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
97	Jatan	27	104	137	49	183	60	847	1602	102	140	36	21	110
98	Kamal	32	108	130	50	184	65	853	1656	98	137	37	27	108
99	Mohan	32	101	121	50	184	60	831	1640	98	135	34	29	108
100	R. Ujagar	21	103	127	42	190	61	834	1624	105	138	35	24	113
102	R. Bali	28	102	136	46	175	57	830	1575	97	140	35	24	105
105	R. Achal	28	101	125	43	177	54	825	1581	92	137	32	22	109
106	Khudur	25	104	135	51	192	64	883	1720	101	137	34	24	116
109	Somai	40	98	138	47	197	61	828	1574	108	142	38	24	113
112	Baldeo	30	106	129	51	191	67	818	1610	105	136	34	24	112
114	Bidesi	28	103	129	49	171	63	799	1516	98	140	30	21	114
115	Kanhi	24	105	133	49	191	62	840	1614	101	139	38	25	118
116	Nirmal	30	98	126	49	190	60	856	—	94	129	32	23	111
123	P. Nath	41	104	136	48	192	60	849	1624	97	147	37	22	110
124	Bansi	37	105	129	54	190	68	801	1544	97	137	36	24	113
128	P. Ram	30	97	129	55	187	72	858	1683	101	139	34	26	128
34	Nirhoo	29	109	135	51	184	63	859	1661	99	141	40	27	112
136	Arjun	34	106	129	49	193	68	846	1612	95	143	36	24	117
137	Jaipal	44	96	132	50	195	73	883	1649	107	135	38	24	125
138	R. Butel	30	105	133	47	193	62	871	1696	107	144	41	25	104
142	Bisun	37	108	129	52	193	67	858	1701	98	136	31	26	118
144	Chotak	40	99	128	52	184	58	828	1572	107	135	30	22	129
146	J. Siri	38	110	137	52	187	64	841	1551	103	143	35	24	123
150	Hari	28	101	124	47	183	59	805	1566	95	141	35	22	109
154	Hemu	33	102	127	50	194	63	823	1537	99	137	33	27	102
155	R. Hit	23	103	129	47	175	59	826	1557	90	139	36	21	107
159	R. Das	30	105	132	53	195	71	868	1645	107	137	37	24	126
162	M. Din	39	98	129	49	188	59	874	1676	96	134	36	28	108
163	Tameshar	44	105	133	59	184	71	890	1690	102	135	37	26	122
165	R. Jatan	28	104	126	50	186	64	869	1632	96	132	37	27	110
167	S. Raj	30	102	134	45	183	59	838	1555	92	146	36	21	110
169	Bunel	44	100	131	44	192	60	838	1567	103	134	37	22	109
170	T. Narain	38	105	137	50	195	67	858	1644	102	138	40	28	119
174	R. Baran	40	106	135	45	197	62	888	1723	96	141	37	25	117
175	S. Din	38	103	129	55	192	69	843	1594	94	137	34	25	123
176	M. Raj	36	101	125	45	184	57	802	1609	104	133	34	24	107
180	Gholar	32	101	132	47	187	64	864	1630	96	133	35	26	117
181	J. Siri	48	104	135	50	184	64	859	1591	105	146	38	25	108
191	Chirkat	50	103	137	51	201	67	849	1661	99	140	35	25	126
198	Ram Swaraj	29	102	132	41	185	55	821	1546	95	138	35	23	106
201	R. Hit	30	98	134	53	180	55	823	1570	99	135	32	26	120
203	R. Naresh	32	97	143	45	185	61	868	1661	104	133	33	23	113
205	Santer	33	106	132	47	191	61	885	1655	98	139	34	25	114
211	Nohar	29	109	135	55	184	71	873	1603	101	139	35	28	125
218	Surjoo	37	104	135	47	185	66	838	1606	102	136	36	24	118
219	Bhukal	38	106	137	52	189	60	868	1602	103	149	35	25	114
223	Dhunman	33	104	134	45	182	61	855	1615	99	136	41	23	105
226	R. Lakhnan	23	104	133	50	188	68	868	1612	95	142	35	28	117
228	R. Lal	43	100	129	47	185	63	863	1607	97	139	33	27	113
229	Sarjoo	42	102	127	48	189	66	823	1592	95	128	37	23	117
235	Mira	30	98	129	48	182	60	823	1593	103	141	37	24	112
236	Sumeswar	29	101	137	51	189	63	823	1625	105	135	35	26	115
242	Chungur	35	103	127	49	186	61	839	1647	95	139	36	24	112
243	Balo	32	98	129	51	182	63	856	1606	108	136	38	24	118
247	Chotelal	30	101	128	45	190	57	830	1580	96	139	37	25	105
248	Ram Somehai	48	101	136	45	197	59	822	1554	88	134	38	23	105
251	Bhawani Phair	30	105	135	45	194	57	858	1649	102	144	37	21	108
252	Mahabir	36	100	130	50	182	65	794	1486	96	131	37	22	120
253	Jhapsi	25	100	129	47	189	57	849	1609	96	138	37	24	109

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GROUP (11) : ARTISAN (KURMI)

serial no.	name	age	Frontal Breadth.	Bizygo. Breadth.	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
4	Sukhan	35	101	133	49	195	64	772	1645	92	133	36	24	121
5	Tilak	38	101	122	53	183	68	812	1700	92	135	36	25	120
6	Sheshman	35	104	132	53	186	66	832	1698	95	135	35	26	122
7	Chahirgun	28	103	128	53	190	63	801	1646	93	133	33	23	118
11	Manbot	18	102	126	46	187	57	814	1629	96	140	33	22	114
12	Jagesher	40	98	129	50	188	63	802	1621	87	139	38	25	113
13	Rechak	37	95	124	49	179	61	782	1565	90	131	35	21	113
14	Ram Dhan	22	101	124	45	174	57	767	1622	94	137	33	21	108
70	Basdeo	30	104	137	53	189	68	822	1603	96	141	32	25	124
71	Mahabal	36	101	131	50	185	65	846	1656	97	128	33	23	119
72	Ramlakhan	36	102	128	48	187	63	822	1608	90	139	32	23	116
75	Sarjoo	45	100	135	50	190	69	800	1557	97	139	37	25	118
76	Sriram	38	102	131	51	189	70	807	1557	99	138	38	28	120
77	Ramtahal	33	107	138	49	205	68	844	1609	103	144	35	25	118
78	Raghunanan	40	99	137	46	192	60	790	1532	106	139	37	25	111
79	Ram Milan	35	102	132	46	188	61	849	1633	99	137	37	23	110
80	Anandi	31	106	135	50	185	63	830	1613	105	147	35	28	115
81	Ramharakh	29	105	132	50	198	62	836	1668	103	142	33	24	113
82	Ramehit	32	101	130	51	185	63	826	1595	101	139	36	24	110
83	Sohrat	30	102	131	56	190	70	867	1739	107	139	35	25	124
84	Dhonde	42	101	129	41	185	58	803	1567	99	131	38	23	104
85	Bipat	44	102	129	50	186	65	850	1589	94	140	32	23	112
96	Ranraj	41	101	137	54	193	75	802	1549	104	139	38	26	129
101	Sukha	32	105	128	50	175	65	804	1555	101	139	33	23	108
103	Salig	29	101	128	57	185	72	825	1609	88	129	34	25	126
117	Manorath	36	101	131	47	191	65	828	1607	100	147	38	22	119
111	Raghunath	28	112	135	50	184	67	835	1637	107	137	37	25	125
113	Bhamu	31	102	125	42	185	55	831	1612	100	134	36	22	105
117	R. Surat	26	105	131	55	201	70	835	1666	99	141	39	24	125
118	R. Siri	41	98	130	47	191	65	849	1570	100	137	35	25	118
120	Gauri	34	99	125	50	179	66	780	1524	99	136	33	24	118
122	Sunir	32	101	134	47	187	63	816	1542	103	137	37	24	106
125	Durga	28	103	134	52	188	67	878	1642	96	142	37	27	118
126	Manshar	36	106	134	53	201	66	811	1556	98	141	34	30	119
127	Nirhoo	39	97	127	50	179	66	816	1590	103	128	36	22	112
129	R. Sahai	45	103	145	50	196	67	868	1711	119	139	40	23	117
130	Gajai	47	105	139	52	184	70	869	1642	109	139	39	23	123
131	Pratap	34	105	131	53	194	70	823	1590	95	148	39	24	120
133	Jagallal	30	107	133	45	198	60	848	1574	98	137	40	24	110
135	Lalman	25	103	137	49	195	66	833	1650	103	142	35	22	118
140	R. Achal	30	103	134	48	198	61	808	1522	105	135	36	22	116
143	Badri	34	104	134	54	193	71	821	1596	89	135	40	28	125
147	Muneshar	38	109	131	50	201	69	889	1688	103	135	38	22	126
149	Bineshar	38	104	135	48	185	64	815	1470	91	138	38	23	121
151	S. Saran	27	107	130	49	186	63	825	1625	94	137	37	27	112
152	Basdeo	28	104	131	44	192	59	799	1525	96	141	36	22	107
157	Ludur	32	102	126	45	189	59	812	1537	103	134	35	23	113
158	R. Tahal	34	110	135	52	193	67	868	1702	100	144	40	23	117
164	C. B. Choudhury	36	98	135	54	185	72	843	1584	91	147	37	27	126
171	R. Pyre	30	101	132	46	188	60	819	1605	102	138	40	23	109
172	Surjoo	34	105	135	49	192	64	897	1707	101	141	35	23	120
173	Kisun	27	99	133	52	192	64	839	1570	92	126	33	25	115
179	Ragunandan	47	100	132	55	184	71	848	1622	106	137	36	25	123
183	Achaybar	32	103	132	48	182	62	853	1609	105	143	33	23	110

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
184	R. Samiyh	50	100	133	50	192	66	837	1580	99	134	36	22	106
185	R. Nand	33	104	130	46	185	57	843	1610	104	136	39	25	105
186	Saraljit	38	98	132	47	189	64	855	1607	93	132	36	23	117
187	Jageshar	38	101	126	46	188	59	828	1611	94	131	35	24	113
188	Hardwar	34	101	132	48	179	66	870	1650	95	139	37	23	121
190	S. Pat	20	99	126	50	181	66	853	1608	96	134	33	23	118
192	B. Das	32	101	135	47	184	62	823	1607	104	138	40	24	112
193	R. Bahal	25	102	133	42	184	67	863	1630	96	133	36	22	109
195	Lachoo	42	105	136	44	198	61	835	1617	97	142	36	24	119
196	Gujari	22	102	128	49	197	57	850	1556	99	139	35	22	109
199	M. P. Choudhury	40	112	144	51	185	63	907	1786	106	146	34	25	120
200	Jamuna	38	107	132	49	190	67	848	1617	99	135	35	23	120
206	Durga	24	101	130	43	185	58	833	1564	98	134	40	23	102
208	Algu	27	106	138	49	198	64	859	1604	105	142	37	25	121
209	Brigial	37	104	127	49	188	63	860	1695	91	136	37	22	111
210	Badri	28	101	135	53	193	66	885	1659	99	143	36	25	117
212	J. Siri	34	105	134	46	195	62	798	1538	103	139	40	22	112
213	Muneswar	48	103	127	47	195	63	820	1571	100	136	36	24	116
214	Baldeo	27	107	135	52	190	67	850	1619	91	142	38	25	117
215	S. Murat	26	97	126	46	174	64	846	1629	97	143	33	24	107
217	R. Din	36	102	137	49	191	65	841	1654	109	139	35	25	114
220	Bahadur	37	104	135	54	194	69	853	1615	99	138	37	27	126
221	R. Chartra	29	102	128	46	187	57	790	1556	95	144	35	25	106
222	R. Kumar	28	103	129	46	193	59	843	1616	102	141	40	25	109
224	R. Lakhan	34	101	135	54	189	63	853	1646	102	129	33	25	129
225	Budhai	29	105	134	59	188	75	905	1702	103	136	35	24	128
231	Patan	31	102	137	49	193	62	848	1639	104	138	39	25	111
232	Phagu	34	101	133	52	196	65	879	1684	99	135	40	24	119
233	Rambhit	44	107	133	49	188	65	816	1567	96	137	40	28	113
238	Nagesar	55	100	132	51	184	67	848	1623	98	139	40	24	119
239	Kalap	45	99	126	47	186	61	822	1616	94	137	35	23	115
240	Kalapnath	30	98	139	50	189	69	875	1670	108	138	38	25	125
241	Dubar	36	100	130	48	185	56	806	1660	95	133	35	23	111
244	Rambaran	35	110	137	52	197	69	862	1606	108	143	35	26	120
245	Puran	30	109	129	51	178	65	840	1621	96	136	38	24	118
246	Ramjiwan	30	100	129	44	188	56	860	1604	95	138	37	23	111
249	Gomti Pd.	35	101	129	50	197	65	834	1615	97	138	35	23	118
250	Udai Raj	30	104	135	52	192	66	819	1630	106	139	31	24	114
255	Ramdulare	25	104	127	45	181	59	796	1567	99	133	35	22	104
256	Ulloo	26	103	121	44	188	60	776	1536	95	136	39	22	106

GROUP (12) : ARTISAN (OTHERS)

SUBGROUP : OIL PRESSER

20	Tepesar	38	105	139	50	189	66	853	1680	94	138	41	26	128
21	Kolitar	35	99	128	46	188	58	818	1633	96	128	34	22	114
22	Lakesar	40	102	134	56	192	66	826	1682	102	135	35	27	120
23	Mahadeo	44	103	132	51	184	66	786	1664	100	133	40	26	128
24	Sukraj	25	98	126	48	181	57	788	1563	103	134	36	25	106
25	Churkai	28	101	126	44	179	58	802	1625	95	128	36	23	113
26	Sampat	30	107	129	51	182	63	798	1640	94	141	38	25	105
27	Ghorat	22	102	131	52	183	65	800	1648	99	142	32	24	127
28	Gopal Das	38	99	129	50	180	60	832	1750	101	135	39	23	111
29	Rup Narain	30	95	129	45	193	55	790	1623	93	126	35	21	119
30	Sita Ram	19	101	127	43	183	55	793	1640	91	129	34	23	107
31	Kashi	35	104	132	51	187	68	816	1688	97	144	35	26	128
32	Raj Narain	32	102	128	49	185	63	812	1655	105	129	38	25	120

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
33	Har Keshan	29	108	128	45	181	62	788	1551	99	132	36	22	113
34	Rangu	38	105	135	55	189	65	836	1682	100	134	38	26	113
35	Narman	25	101	139	54	190	65	838	1715	102	139	35	27	128
36	Ramdhar	40	97	127	50	187	62	818	1655	105	138	38	24	118
37	Sukhraj	48	103	126	53	187	69	773	1613	98	135	36	23	116
38	Bucho	35	99	135	46	191	62	803	1560	96	134	40	22	118
40	Kamelal	38	103	125	49	189	61	798	1656	94	137	36	22	111
42	Durai	36	108	135	48	176	62	843	1674	108	135	40	22	115
43	Kishun	38	109	137	52	198	67	828	1671	100	146	36	26	124
44	Matu Dhai	38	102	133	59	193	74	853	1745	104	137	40	25	134
45	Ram Sunder	30	99	128	51	185	62	758	1567	99	136	35	23	114
46	Jamai	50	102	126	40	198	55	856	1717	95	134	33	24	100
51	Samu	40	101	127	54	187	69	763	1550	95	135	37	21	122
95	R. Dhan	34	106	132	52	190	67	850	1723	100	139	36	27	118
139	Girdhari	37	105	139	57	190	69	853	1653	102	144	39	26	122
197	Ramo	36	99	125	51	189	62	847	1612	93	133	36	24	118
SUBGROUP : KUMAHR														
15	Mukhram	35	100	127	48	182	61	782	1600	103	132	38	23	115
SUBGROUP : DHAKAR														
17	Kalasar	50	104	133	50	196	65	798	1597	109	129	42	23	118
18	Gbahku	35	104	131	47	183	59	783	1604	104	135	39	33	111
48	Dhairam	35	101	128	49	184	65	777	1619	97	134	38	23	113
49	Kali Charan	26	104	135	54	186	67	799	1587	98	139	34	24	119
SUBGROUP : GOALA														
50	Kula	28	99	125	43	177	61	718	1530	87	132	37	22	108
SUBGROUP : KEWAT														
74	Chandraka	32	99	136	49	180	66	837	1552	107	140	31	25	114
92	Dhurai	30	98	127	49	183	61	813	1591	105	129	36	23	113
93	Lujhi	30	103	133	44	190	57	846	1675	89	136	36	23	107
94	Bhagwati	21	104	131	45	179	58	817	1509	88	142	34	23	108
104	Sukhan	29	99	126	45	179	61	798	1559	90	139	38	23	110
110	Balraj	30	108	137	51	193	67	834	1597	96	146	34	25	112
119	Dashrath	22	106	133	46	190	59	839	1617	95	139	36	24	110
121	R. Adahere	25	100	126	49	185	62	821	1622	82	132	37	25	114
132	R. Barooh	36	96	121	50	191	69	829	1567	95	130	36	26	119
141	Nidhu	33	104	134	51	193	65	819	1562	109	136	36	24	115
145	Bihari	34	99	136	49	189	62	833	1568	101	141	35	21	119
148	Bali	29	104	131	45	189	59	835	1635	97	137	37	21	110
153	Paraj	48	99	134	48	195	63	839	1645	109	138	40	25	111
156	Algu	21	106	132	49	188	62	813	1547	90	144	37	24	112
160	Sawal	27	101	128	50	189	66	821	1635	89	134	36	24	126
161	Mohon	40	100	140	50	185	64	839	1645	104	146	39	28	112
166	Bhagwat	30	102	131	49	187	62	860	1596	105	135	35	26	114
168	Chotak	50	105	139	54	193	71	837	1605	97	143	38	28	121
177	Guridin	38	101	133	52	188	66	821	1595	105	135	33	24	124
182	Narile	32	101	127	42	182	57	809	1566	97	133	35	23	108
189	Mussee	48	101	130	54	184	71	826	1594	92	135	41	26	124
194	Jhinka	30	103	139	49	196	66	849	1631	103	141	38	23	117
202	Mangru	24	99	132	47	188	61	847	1604	98	132	37	22	115
207	Bhaghu	29	107	137	46	179	65	857	1573	106	139	35	24	113
216	Belbhadar	46	102	137	53	181	68	827	1587	98	134	37	25	118

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
227	Mohan	45	110	136	46	198	65	853	1633	106	139	34	22	117
234	Medhai	26	100	128	48	183	61	827	1591	106	142	33	23	110
237	Barsati	28	107	135	50	184	68	869	1638	98	142	35	26	123
254	Muneshar	28	104	130	43	189	58	849	1559	104	137	38	19	112
277	R. Adhere	28	101	126	50	186	64	883	1667	105	132	32	25	113
SUBGROUP : BHAR														
257	Narain	32	97	125	43	188	58	822	1626	95	134	39	20	109
267	Chandara Kundu	35	99	130	49	186	64	780	1466	99	133	30	21	112
266	Lutawan	29	105	131	54	195	70	870	1698	95	136	37	23	123
273	R. Adhare	24	96	122	45	183	59	836	1543	105	136	34	26	105
280	S. Charan	34	99	132	44	187	62	838	1608	101	143	31	23	108
296	Chotu	—	108	136	52	196	66	849	1586	104	139	40	25	122
300	Jageshar	38	98	121	47	176	63	804	1547	99	130	30	21	114
308	Kanhi	32	102	137	45	190	62	852	1644	98	138	36	24	110
312	Mahabir	38	104	139	49	187	64	849	1674	100	148	37	22	115
321	Sukhraj	28	103	134	47	187	62	849	1615	99	139	36	25	117
332	Chilar	40	101	135	50	187	64	841	1641	102	135	37	22	113
338	Sukhlu	32	101	135	49	179	64	878	1611	106	142	36	23	112
342	Dhadur	38	100	133	43	197	57	846	1577	102	134	35	24	106
351	R. Bali	28	109	134	45	180	62	849	1581	98	139	39	24	110
353	Dharma	29	100	130	46	185	60	828	1572	108	135	37	24	107
360	Sampat	24	100	124	44	189	60	813	1555	84	130	39	20	110
387	Mihar	34	97	134	52	185	68	826	1620	99	137	39	23	128
SUBGROUP : LODH														
258	Somai	22	105	134	47	184	62	808	1575	106	139	31	23	113
263	Manju	28	106	139	49	192	63	831	1594	98	137	35	23	116
294	Ganeshi	34	100	129	41	175	57	803	1543	99	132	36	23	106
SUBGROUP : DHONI														
265	Budhai	48	101	136	49	183	63	842	1620	100	136	36	24	119
276	Rupai	39	100	127	52	187	65	824	1604	100	136	30	25	109
290	Bijay	27	103	137	51	181	64	864	1676	112	129	35	24	109
322	Lalsa	40	101	134	46	183	65	823	1527	94	134	37	21	116
323	Badal.	37	98	129	48	164	59	804	1557	102	137	34	22	105
324	Bekaru	37	98	134	53	189	67	826	1585	99	136	42	22	119
325	Panchoo	34	101	125	45	179	58	826	1636	92	135	35	22	110
329	Barkat	39	103	135	43	198	58	870	1674	108	141	31	24	107
333	J. Siri	31	111	143	47	193	65	858	1719	98	145	37	25	119
355	Bipat	48	104	133	48	185	66	808	1512	91	138	40	24	113
372	Hansraj	35	100	133	45	184	60	840	1600	98	134	37	22	109
373	R. Lall	35	102	131	45	184	50	842	1602	100	136	39	26	109
374	R. Lakhan	32	104	135	51	189	65	843	1645	106	136	36	23	116
392	Ram Lall	30	104	134	46	194	59	828	1596	90	137	37	22	111
SUBGROUP : MALI														
278	B. Nath	24	102	125	50	183	64	849	1669	95	132	29	24	110
SUBGROUP : LONIA														
279	Bhagelu	42	106	135	51	196	63	836	1640	100	139	37	26	109
291	Dhuki	30	109	133	50	197	67	828	1637	95	136	36	22	128
327	Baldeo	34	105	129	46	190	62	851	1582	96	138	36	21	111
361	S. Ram	46	101	128	46	194	62	834	1570	103	138	36	24	116
389	Sita Ram	25	107	132	53	208	70	826	1614	102	130	38	24	125
SUBGROUP : BANAI														
275	Laxmi	38	104	128	53	192	72	829	1620	102	135	34	27	127

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bitygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
281	G. Pd	33	104	133	43	189	58	844	1628	102	136	37	21	116
286	H. Raj	22	103	126	49	191	66	835	1630	100	136	36	25	118
337	H. Lal	32	95	126	47	190	62	782	1500	91	129	35	25	111
376	Sarjudin	50	104	135	58	183	75	875	1605	99	138	35	27	131
380	Ram Sawrup	48	108	135	52	189	67	824	1580	96	140	41	25	118
SUBGROUP : BARAI														
282	R. Ratan	36	110	129	44	189	62	826	1612	102	135	34	25	120
285	Dwarka	28	101	123	43	184	58	786	1456	94	133	35	22	106
297	Binda	24	104	131	49	186	66	887	1655	100	135	33	22	111
299	S. Swarup	45	103	128	51	198	67	828	1581	98	139	39	24	124
301	Thinkoo	32	102	132	50	187	62	856	1612	104	141	34	22	108
302	R. Jas	42	100	132	49	185	66	810	1571	101	140	40	21	116
328	Bhaguti	27	107	133	49	195	65	839	1587	99	138	39	27	117
334	R. Dulare	28	99	133	51	197	68	894	1658	105	135	31	25	121
335	R. Pal	29	102	132	51	197	66	865	1639	98	135	35	25	119
346	R. Garib	30	98	130	50	195	66	864	1673	96	137	35	22	118
360	R. Sarup	28	104	138	49	191	66	863	1623	105	147	37	26	118
362	R. Bali	34	98	128	51	189	68	857	1585	100	135	37	27	119
371	R. Bali	31	107	128	48	189	67	873	1662	107	139	31	23	118
388	Bansati	35	101	131	54	197	69	810	1653	112	137	33	25	120
SUBGROUP : HAJAM														
272	R. Dubrey	27	100	127	48	184	63	868	1664	105	137	36	23	114
283	Banarsi	25	105	127	47	183	60	793	1564	92	129	31	24	112
292	Jhingur	27	98	126	51	184	65	813	1623	91	144	35	23	113
319	Jiyawan	28	99	130	50	178	61	865	1595	99	131	36	28	114
331	Bipat	37	103	133	44	186	60	835	1607	98	141	38	22	111
336	Massee	34	101	131	47	178	59	781	1486	99	136	32	25	108
343	Jagan	34	104	131	50	183	67	813	1552	104	136	37	24	120
350	Sahadeo	27	103	132	46	190	58	845	1710	104	125	36	22	114
SUBGROUP : VAISH														
269	Drayalulall	26	97	117	36	172	47	—	1538	91	132	30	21	97
379	G. D. Gupta	22	101	126	48	188	61	850	1602	99	135	25	21	113
382	G. D. Gupta	32	101	128	48	187	62	879	1638	105	136	37	25	114
384	S. R. Gupta	25	104	127	51	192	63	839	1698	102	138	34	25	120
SUBGROUP : LOHAR														
299	S. Mangal	30	106	136	54	199	70	850	1685	109	139	40	26	129
308	Barni Chand	36	99	127	49	189	64	828	1582	105	134	36	27	116
303	S. Nath	27	100	125	50	185	62	883	1637	92	140	40	24	114
305	R. Adhara	34	105	138	47	193	60	876	1687	101	137	38	22	110
306	R. N. Lohar	24	92	124	45	183	58	813	1526	97	130	31	22	105
310	C. Bali	42	108	134	45	195	63	838	1576	104	135	40	26	112
311	Pardeesi	40	105	135	49	184	63	870	1683	103	135	38	25	110
314	R. Sohrat	33	105	129	46	188	64	803	1544	105	134	41	27	118
315	Bhagwan	39	100	133	44	186	62	810	1650	95	132	33	24	116
316	R. Lagan	35	107	135	48	192	60	840	1570	107	143	35	21	112
317	Dhanjir	28	105	131	54	199	67	863	1662	101	139	38	25	119
318	R. Lakhan	42	111	132	57	182	73	838	1552	93	149	37	23	126
359	S. Nath	37	104	131	44	183	58	834	1608	85	141	38	21	108
378	Phatingan	38	105	135	50	187	68	845	1674	103	143	39	22	125
SUBGROUP : KASERA														
304	Purnawasi	38	105	130	47	179	59	780	1633	95	145	33	25	104
308	Aigu	31	98	128	45	180	58	823	1571	90	132	34	21	114

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
SUBGROUP : BADAI														
274	B. Loll	29	101	126	44	197	60	858	1693	106	135	39	22	111
288	Dhatal	29	97	123	48	181	66	786	1573	109	133	34	24	109
309	Balraj	45	104	133	48	187	62	841	1628	96	142	36	21	115
SUBGROUP : KHATAK														
320	Kesar	24	102	129	46	182	60	833	1617	95	135	43	20	112
SUBGROUP : BELDER														
330	Sukhai	32	97	131	47	185	65	806	1592	96	132	38	25	119
344	Bhagelu	34	103	135	50	181	67	820	1574	105	139	37	25	117
345	Binesha-	44	105	133	46	183	64	791	1468	96	142	40	21	112
357	Lala	32	99	129	50	189	66	876	1670	98	138	37	24	120
364	Manju	30	107	138	53	191	72	899	1677	99	139	41	26	125
SUBGROUP : CHANDIKAR														
339	Bahadur	36	91	124	44	164	64	711	1547	95	127	33	21	114
SUBGROUP : BARGAN														
341	K. Pd	30	116	143	50	192	62	885	1720	101	151	39	25	114
SUBGROUP : BIND														
354	Mahabir	24	96	131	47	187	62	855	1606	97	136	32	24	113
SUBGROUP : GADERIA														
365	Mahadeo	48	104	131	50	189	69	827	1625	95	140	38	27	131
SUBGROUP : CHAI														
377	Badal	28	104	137	54	198	63	795	1567	104	139	39	24	109
SUBGROUP : AGARWALA														
380	S. L. Surehha	32	101	128	52	189	64	879	1702	104	139	38	26	113
381	Nagarmal	55	114	140	58	204	69	839	1681	105	146	39	25	129
390	Madanlall Saraf	27	104	128	49	198	66	866	1631	96	143	38	27	123
391	B. jranj Lall	30	107	134	49	198	61	880	1642	97	138	38	23	112
SUBGROUP : SONAR														
383	Ganesh	40	107	133	54	194	70	800	1529	95	141	30	25	121
385	R. Polai	42	106	137	52	193	68	844	1681	102	139	35	22	118
GROUP (13) : ARTISAN (KAHAR)														
1	Shakar	40	104	135	57	190	70	788	1660	99	139	34	23	126
2	Sobaran	33	102	135	53	202	60	802	1627	99	143	39	24	114
3	Jeebud	32	107	135	45	193	59	754	1632	97	139	39	22	115
8	Sukhdeo	42	102	132	53	184	67	834	1647	98	136	35	25	124
9	Raghbir	38	106	137	51	197	67	814	1704	95	142	33	28	122
10	Kanya Ram	48	104	139	57	196	71	840	1753	97	139	37	28	123
16	Bishmahir	38	107	134	45	197	60	842	1641	94	140	42	27	116
39	Kalav	45	105	136	53	197	66	843	1752	108	131	37	24	120
41	Lulai	35	91	125	50	188	62	798	1582	92	127	37	25	115
47	Nank	35	101	125	51	186	67	774	1612	94	127	34	25	118

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bi-zygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
52	Chambil	27	97	131	47	192	59	783	1624	87	137	35	22	105
53	Ram Jagat	39	101	129	57	189	68	768	1585	109	136	37	25	120
54	Niranjan	36	101	127	44	175	63	738	1533	99	139	35	26	116
55	Jagadew	45	98	127	51	185	62	808	1664	100	132	33	22	107
56	Henda	38	104	136	45	170	59	793	1678	105	141	36	22	114
57	Ramdhar	35	101	125	45	192	56	768	1640	95	131	39	22	104
58	Bajnath	43	101	132	52	197	60	833	1662	104	138	41	25	115
59	Dipan	38	101	129	48	179	56	818	1587	101	139	35	22	111
60	Bechu	39	107	128	50	185	64	773	1562	99	138	40	24	117
61	Jagasar	38	105	124	48	198	68	815	1657	96	125	35	25	124
62	Began	40	103	136	52	193	67	808	1632	95	139	39	26	120
63	Rambaran	38	99	128	52	195	66	800	1620	102	132	38	25	122
64	Soha	38	99	126	45	182	59	765	1581	99	135	36	22	109
65	Dhopat	36	99	134	48	201	62	785	1560	109	135	36	23	115
66	Lakraj	45	99	132	44	183	60	765	1531	101	138	39	23	108
91	Bihari	25	105	134	46	184	60	850	1640	102	136	33	24	112
108	Gopi	—	97	124	46	185	62	823	1550	94	134	35	23	108
178	R. Ugrah	30	106	134	45	196	62	806	1553	107	137	36	26	114
204	Sitaram	34	107	130	55	194	68	897	1672	106	140	39	26	118
230	Shiv Tahal	44	101	134	50	192	68	845	1569	103	139	34	26	128
260	Binde Shri	45	99	135	42	192	56	817	1582	100	139	37	20	107
261	Abhiraj	28	97	126	49	186	65	826	1602	96	136	36	25	113
262	S. Charan	40	98	131	49	189	68	831	1599	105	142	33	23	119
264	Bisheshar	48	93	121	54	188	68	762	1490	98	122	34	23	120
267	Kodai	37	101	122	48	186	59	835	1590	97	133	35	24	103
269	Bipat	28	96	132	49	186	60	798	1520	90	135	36	25	113
270	Jagat	32	97	133	50	180	67	851	1684	96	135	33	26	125
271	Chohara	24	104	128	45	194	58	858	1658	109	135	37	23	114
284	R. Murti	24	102	129	45	186	60	868	1704	98	134	39	25	113
287	Siri	24	102	127	48	185	64	823	1547	94	133	36	23	110
293	Kalap	34	101	133	46	200	56	853	1610	100	129	37	23	106
295	S. Ram	32	104	137	52	183	66	816	1577	110	144	35	25	124
307	H. R. Kahar	30	102	136	47	182	62	815	1580	107	146	38	24	111
313	Ujagir	42	104	125	48	188	62	839	1593	109	141	38	25	109
326	Sahdeo	38	107	133	45	192	53	863	1663	107	139	36	21	117
340	Girga	30	104	131	49	191	63	839	1560	104	138	37	20	111
347	R. Deo	39	107	135	45	194	58	853	1659	102	140	37	21	108
348	Bhagelu	28	102	128	46	189	60	801	1565	94	132	38	21	111
349	R. Oudh	36	108	134	48	192	62	848	1643	91	140	38	25	110
352	Bhuswal	40	97	122	48	185	63	804	1512	88	131	37	23	110
356	R. Das	25	102	133	49	180	64	833	1585	104	138	38	24	117
358	Sidu	44	93	131	42	187	58	811	1515	95	135	35	23	113
363	Rangi	42	102	129	51	195	67	820	1496	97	143	43	24	121
366	Dhanraj	45	104	131	49	186	67	819	1556	103	138	37	24	116
367	Bahar	48	99	133	43	172	66	811	1577	101	132	38	20	118
370	P. Dhanan	39	101	128	52	189	64	839	1575	102	136	36	25	116
375	Muneshar	37	104	131	45	187	57	804	1568	96	136	35	24	104

GROUP (14) : THARU (male)

DISTRICT : LAKHIMPUR - KHERI

VILLAGE : MOSAMKAM

1	Sukai	45	98	137	52	190	64	852	1640	95	143	37	22	119
2	Kesari	48	105	134	55	193	72	836	1633	101	137	35	26	128
3	Dhabba	38	101	135	46	181	60	798	1600	94	135	36	22	110
4	Bhudai	40	101	135	48	186	64	822	1585	100	140	32	22	108
5	Birchha	46	96	129	49	188	62	846	1694	102	130	39	21	111

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
6	Kali Charan	32	95	133	52	187	61	836	1640	102	137	35	23	114
7	Paltoo	28	95	130	53	189	67	852	1652	96	137	35	23	121
8	Babooram	18	97	124	51	194	68	806	1595	106	132	39	21	122
9	Mulha	37	100	129	51	184	65	880	1684	102	137	35	23	118
10	Sukkha	22	99	141	49	190	61	776	1555	103	139	37	20	114
11	Ram Singh	32	100	136	49	187	65	856	1628	99	137	33	23	113
12	Bansi	40	102	137	49	192	66	886	1670	105	137	36	25	117
13	Bikaram	26	100	137	51	190	63	826	1634	100	145	37	22	116
14	Bhangi	37	104	137	52	181	71	886	1701	105	147	36	20	123
15	Punna	47	96	135	48	175	66	862	1606	96	134	40	20	118
16	Mihilal	24	108	140	49	191	62	836	1667	104	147	39	20	120
17	Gangram	27	100	135	46	182	61	852	1645	99	137	37	20	109
18	Sankar	29	104	139	57	184	71	792	1522	99	139	36	24	116
19	Hira	50	99	129	48	189	64	842	1591	96	134	40	21	114
20	Bonha	35	100	129	47	193	63	846	1679	92	135	40	20	112

VILLAGE : DHAYANPUR

21	Bandha	36	96	128	54	185	67	841	1605	103	132	36	23	118
22	Nannu	27	104	131	51	183	61	904	1709	95	137	37	24	110
23	Biru	20	99	125	55	188	70	839	1648	100	125	36	23	116
24	Mihilal	32	95	120	45	179	58	815	1674	95	132	34	20	115
25	Bachchoo	40	100	131	49	189	69	852	1613	112	137	41	21	124
26	Tandla	25	94	125	47	187	61	831	1585	98	124	38	21	112
27	Lal Singh	27	97	134	50	185	69	876	1655	104	128	35	22	116
28	Parladh	18	98	125	46	174	60	832	1617	103	131	34	23	117
29	Bhajan	47	97	126	43	177	62	822	1581	90	133	37	21	115
30	Dhani	48	107	137	48	195	68	832	1665	101	142	38	24	114

VILLAGE : SONAHA

31	Saidoo	50	102	136	48	188	61	866	1712	106	141	38	22	115
32	Sagoo	52	105	138	53	184	69	826	1562	104	135	37	22	117
33	Birchha	40	99	125	52	192	71	858	1655	94	133	38	22	118
34	Thikaram	32	105	135	46	193	63	896	1684	104	138	41	22	115
35	Kalooa	28	98	136	48	179	60	832	1600	99	135	37	21	109
36	Birchha	29	100	134	49	188	60	886	1780	104	131	38	22	116

VILLAGE : BHARARI

37	Hirduse	45	105	139	51	184	66	843	1631	105	142	35	23	117
38	Mahabir	28	98	125	50	184	63	826	1598	94	128	35	21	109
39	Goonhan	50	97	120	50	184	67	811	1561	94	125	38	22	122
40	Durfa	31	98	131	53	194	64	818	1561	103	137	42	23	112
41	Bika Ram	40	95	128	42	178	55	832	1607	104	129	39	24	100
42	Fattoo	20	100	128	50	190	61	852	1600	95	135	38	21	114
43	Deepa	55	98	131	59	184	75	806	1594	98	137	40	24	124
44	Phagoo	35	98	132	47	191	61	866	1619	95	133	39	21	117

VILLAGE : DEORAH

45	Gaindam	44	100	134	54	185	68	806	1558	96	143	38	21	116
46	Dulli	35	100	129	51	194	64	816	1594	98	137	36	21	116
47	Badri	42	102	130	51	182	66	842	1610	100	141	41	20	115
48	Kaddu	32	101	129	48	187	60	891	1715	102	139	35	21	110
49	Amtoo	40	103	137	48	196	61	862	1661	100	139	43	22	110
50	Bhojori	30	102	131	47	189	64	831	1643	99	131	38	21	117
51	Pattoo	24	100	128	44	186	55	848	1627	95	136	38	18	100
52	Bircha	40	101	127	48	194	68	876	1672	99	134	39	22	115
53	Nandi	52	107	135	56	194	74	856	1665	109	144	44	24	124
54	Palta	40	98	135	48	183	62	852	1687	105	129	38	22	113

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Birgo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
55	Darbhu	27	98	129	49	188	61	836	1671	105	134	35	21	115
56	Guljari	45	97	128	46	187	63	891	1689	99	133	37	20	113
57	Kali	40	104	133	41	194	58	806	1613	96	139	36	22	107
58	Mauri	18	99	130	52	190	65	861	1671	96	133	40	23	110
59	Kalicharan	19	96	126	48	184	60	796	1631	105	128	35	23	108
60	Molaha	31	98	130	49	181	66	772	1533	95	133	37	20	117
61	Bhandha	38	98	132	52	191	64	880	1606	102	139	40	21	120
62	Sakri	—	97	125	49	194	64	870	1582	106	129	41	23	116

VILLAGE : NAIHOTA

63	Junna	55	99	126	54	183	68	856	1685	91	126	36	22	110
64	Nattha	50	103	135	54	199	67	884	1704	107	138	40	24	111
65	Gendhi	32	97	134	51	192	66	836	1613	100	144	39	23	108
66	Kunnar	33	97	125	52	185	66	826	1533	101	127	36	20	116
67	Rangi	27	99	131	54	190	68	820	1588	104	139	38	22	121
68	Autram	25	98	123	44	184	58	802	1604	92	132	37	22	111
69	Chotta	48	100	130	52	187	64	834	1650	96	131	38	21	110
70	Lachmin	29	99	128	44	175	56	788	1601	105	132	40	18	105
71	Kaidoo	28	99	130	47	185	62	818	1606	99	130	35	21	110
72	Bahora	50	103	139	49	186	65	819	1610	99	139	39	22	120
73	Kesari	18	102	129	49	193	59	818	1547	99	138	39	20	110
74	Magroo	40	100	131	52	189	64	816	1626	95	134	36	21	112
75	Sohan	35	99	128	46	179	60	826	1667	95	135	38	20	111
76	Autaram	—	106	132	50	190	67	856	1638	100	135	37	22	122
77	Mathura	32	99	123	52	188	64	844	1630	95	128	42	22	112
78	Bhikha	35	92	125	47	186	62	857	1742	94	135	37	21	117
79	Ram Sahai	36	104	131	47	193	61	818	1622	105	136	39	21	115
80	Tikka	30	102	124	44	194	56	812	1605	101	134	37	19	105
81	Bhajan	30	105	131	49	181	64	857	1724	101	139	38	21	114
82	Sandha	60	104	136	55	179	68	846	1681	105	136	41	24	106

VILLAGE : BANKATTI

83	Chetram	55	94	132	50	188	56	801	1608	103	135	38	24	111
84	Natha	25	103	134	54	189	72	850	1687	104	134	32	20	111
85	Rupa	50	97	130	50	184	66	839	1566	98	132	36	22	106
86	Dhani	32	97	124	50	176	60	816	1650	99	128	33	21	107
87	Seba	35	99	137	57	195	70	859	1657	108	143	43	23	121
88	Manna Paddha	35	94	135	53	195	70	899	1704	104	137	41	22	123
89	Gehoo	20	106	137	44	182	58	827	1541	99	137	38	19	108
90	Somal	18	98	129	42	187	54	797	1555	95	139	35	21	98
91	Asai	37	94	127	49	185	65	867	1621	97	135	36	23	120
92	Labra	26	103	134	56	194	68	872	1677	99	142	39	23	119
93	Ram Sarup	18	101	129	45	191	55	816	1548	95	132	36	19	101
94	Mangroo	29	102	136	54	183	68	854	1670	108	129	36	19	116
95	Gangaram	33	108	132	48	187	64	856	1685	99	143	37	21	111
96	Chaita	24	99	130	49	187	64	852	1601	94	136	36	22	116
97	Bhagi	55	101	131	49	192	58	832	1612	103	142	44	22	103
98	Bulaki	43	101	133	50	195	63	889	1702	105	134	42	22	115
99	Rammoo	22	97	134	45	184	56	801	1536	101	141	37	20	106
100	Budhai	54	102	136	53	186	71	886	1685	104	139	39	21	116
101	Soolhi	25	96	134	50	184	62	861	1608	99	138	36	18	116
102	Ramcharan	47	105	131	52	193	69	853	1665	101	135	43	23	116
103	Meghnath	25	96	136	48	191	60	828	1602	96	144	40	21	110
104	Koidoo	27	96	131	51	194	62	839	1666	99	139	35	23	114
105	Gehoo	38	103	139	46	185	59	819	1629	105	135	39	22	108
106	Marraha	35	105	137	52	198	65	868	1738	109	143	40	20	115

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
107	Bamman	50	99	139	51	198	67	876	1667	101	140	38	22	115
108	Sacha	42	102	137	54	194	69	893	1758	99	140	35	23	118
VILLAGE : SOONDA														
109	Raghnath Paddan	34	106	138	54	194	68	874	1645	102	135	34	26	118
VILLAGE : SARIAPARA														
110	Seba	25	98	129	50	182	62	818	1593	104	139	35	23	114
111	Pakhara	45	94	125	46	188	56	862	1598	98	138	37	22	100
112	Bhora	55	98	130	56	196	72	902	1687	104	137	44	24	125
113	Thagi	40	99	133	51	178	64	828	1611	94	133	38	23	114
114	Bhagga	48	105	135	51	186	65	876	1627	95	146	41	21	114
115	Bhadooa	45	100	127	49	196	66	859	1575	95	134	35	21	115
116	Charrha.	56	94	128	51	189	69	898	1726	104	131	40	21	118
VILLAGE : CHADIA														
117	Sonu	25	100	130	49	193	66	805	1607	94	139	36	21	121
118	Bhaggi	27	99	137	53	189	70	830	1624	106	141	35	22	115
119	Thaggi	45	99	128	54	194	71	797	1586	93	136	39	24	125
120	Chattan	35	99	125	43	183	59	880	1707	95	135	35	21	108
121	Palta	35	99	135	46	175	61	838	1667	96	135	38	19	109
122	Saligram	25	102	129	52	192	69	876	1707	106	138	37	20	124
123	Jogi	45	95	132	48	182	63	785	1552	94	132	38	23	105
124	Fakira	60	107	135	51	185	68	760	1525	106	135	43	21	114
125	Paure	50	100	135	43	191	58	852	1709	105	136	39	24	109
126	Sarkat	30	107	138	58	188	67	885	1711	104	140	40	22	121
127	Panta	40	102	127	48	189	62	804	1547	99	135	37	24	114
128	Natha	40	99	130	54	185	67	837	1671	99	127	38	23	114
129	Madhai	37	96	127	53	184	65	860	1607	95	135	40	19	114
130	Malha	48	99	136	52	191	64	880	1604	101	138	41	23	116
131	Bhudhai	45	102	133	51	186	67	836	1650	96	141	38	22	115
132	Fakhar	45	95	125	47	191	59	816	1595	98	127	37	22	111
133	Kablu	45	103	133	51	190	60	856	1666	101	138	36	21	108
134	Tewani	40	100	136	47	181	58	835	1624	101	135	38	20	109
135	Bavana	50	97	136	55	192	74	851	1672	105	137	38	24	122
136	Kaidu (1)	35	103	134	48	185	61	822	1712	105	137	39	22	108
VILLAGE : BRURO														
137	Ranjan	43	100	133	45	182	60	814	1685	100	136	38	19	109
138	Kaidu (2)	40	96	131	56	185	66	836	1621	97	135	34	22	114
139	Yogi	43	105	142	55	198	66	827	1622	111	139	43	23	116
140	Sankar	40	98	125	45	182	60	826	1649	95	134	35	23	105
141	Charla	45	95	124	53	186	58	788	1594	96	128	37	23	109
142	Jukhai	30	99	128	47	189	61	824	1616	102	129	37	19	115
143	Bairagi	25	102	136	52	191	67	787	1642	103	139	36	23	117
144	Kaidu (3)	28	95	132	50	186	60	826	1646	102	137	35	23	107
145	Palta	30	103	129	47	197	60	856	1667	95	138	35	20	105
146	Chajji	35	104	135	48	191	63	846	1634	106	140	37	22	111
147	Pallu	40	99	125	48	189	54	845	1634	86	133	38	18	105
148	Bandha	35	101	130	52	188	65	822	1590	99	129	37	23	113
149	Mango	48	96	127	47	182	62	802	1604	97	127	38	22	103
150	Lallu Singh	20	106	134	55	192	68	825	1604	106	141	35	24	114
151	Ramlal	25	99	133	48	185	67	848	1674	108	136	40	20	114
VILLAGE : BAJAI														
152	Bal Kishan	50	99	129	54	192	72	812	1672	95	135	38	23	125
153	Paraylal	25	103	129	45	185	51	800	1529	96	137	36	19	106
154	Palta	40	102	137	49	188	61	842	1676	103	144	40	21	113
155	Bhura	50	99	130	58	185	72	812	1609	99	134	36	22	115

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
156	Ragunath	32	99	133	49	188	66	820	1608	95	139	35	21	119
157	Jyogiram	28	105	138	50	185	60	850	1630	109	142	40	21	116
158	Hardari	32	102	130	54	191	67	808	1587	100	136	42	22	114
159	Jangi	40	102	135	54	194	69	846	1604	102	139	40	19	120
160	Puran	33	99	135	44	194	54	828	1653	105	135	35	18	105
161	Karai	45	102	134	53	210	66	864	1722	97	137	40	24	120
162	Bahadur Singh	34	103	132	51	197	68	782	1547	104	135	40	20	120
163	Marua	36	104	136	47	184	65	846	1686	101	144	37	23	113
164	Jyogi	48	102	134	48	185	60	819	1616	95	138	43	19	108
165	Somar	52	102	135	65	190	70	807	1641	104	134	40	23	118
166	Dhubari	47	96	129	48	178	63	794	1616	106	137	38	22	110
167	Bhajji	27	97	129	53	189	66	834	1630	95	139	37	20	120
168	Salhchoo	48	99	132	51	185	66	796	1543	106	134	40	21	122
169	Bhandha	50	96	134	54	179	60	818	1571	112	138	41	24	109
170	Cheddi	31	99	132	50	192	59	827	1637	104	137	40	23	110
171	Mulha	35	101	135	53	194	65	844	1720	99	139	40	23	121
172	Behari	45	100	132	50	179	63	796	1629	96	135	40	24	108
173	Mulaha	36	105	132	52	182	63	779	1522	103	138	40	20	107
174	Kalgan	38	101	134	50	195	62	800	1629	97	140	37	24	109
175	Thagan	40	105	134	52	194	64	824	1671	94	138	37	20	116
176	Jahawa	50	97	132	51	179	71	827	1639	100	133	36	22	118

VILLAGE : PIPOOLA

177	Surja	44	104	139	54	189	68	828	1619	95	138	37	23	117
178	Kaidoo	40	105	131	49	197	65	848	1674	97	136	40	24	120

VILLAGE : DHAKIA

179	Bhedi	45	100	139	51	197	68	828	1672	103	135	40	22	114
180	Somal	50	99	127	46	188	65	817	1624	98	139	39	21	107
181	Sovana	53	100	129	50	184	66	792	1600	105	129	38	24	110
182	Bhakkoo	55	95	129	52	185	66	802	1594	104	124	37	23	110
183	Parasadi	54	103	137	52	197	68	822	1685	100	139	41	24	124
184	Sikharisa	52	105	124	52	195	63	782	1530	101	138	38	23	112
185	Dhatoo	45	96	132	46	197	62	802	1545	102	135	37	23	107
186	Subba	46	105	129	45	194	65	852	1682	97	135	41	23	115
187	Bhadai	58	97	131	44	179	56	764	1524	99	137	41	19	99
188	Kadda	48	102	128	48	194	66	846	1698	98	136	36	22	119
189	Lachka	47	90	123	53	185	67	828	1618	93	125	38	21	112
190	Niramama	48	99	137	55	187	65	834	1645	100	135	38	20	117
191	Budhai	35	97	128	51	188	63	818	1611	97	128	37	20	114

GROUP (15) : CHAMAR

DISTRICT : MIRZAPUR

1	Mohon	40	102	126	51	190	64	772	1560	98	136	35	23	113
2	Bhagnat	40	102	129	47	197	62	810	1630	96	135	35	21	119
3	Sobhnath	35	97	123	48	188	62	788	1619	88	128	36	25	117
4	Brijlal	45	110	134	51	189	64	757	1560	99	145	38	21	113
5	Ram Khelan	30	103	130	51	192	63	802	1695	107	133	38	23	118
6	Janki	35	109	132	49	198	64	802	1637	93	137	39	25	120
7	Ram Autar	38	104	135	52	183	68	797	1665	102	142	36	26	121
8	Nanhan	22	103	130	48	185	61	786	1621	95	137	31	22	120
9	Sundar	20	105	132	51	186	60	798	1658	89	130	36	22	110
10	Ram Das	28	97	128	50	186	70	812	1640	96	132	33	23	118

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
11	Brijhan	32	105	136	48	196	65	827	1670	98	141	35	24	119
12	Mohon	30	109	129	52	192	67	807	1693	99	133	33	23	121
13	Mohon	32	101	127	47	186	61	754	1587	89	136	37	22	113
14	Jagannath	30	102	125	52	195	57	780	1670	97	133	35	23	106
15	Gopal	42	94	128	51	175	62	757	1585	85	141	35	22	112
16	Buddhu	26	103	131	47	192	62	766	1600	96	135	35	21	112
17	Jodhi	38	100	132	51	188	65	802	1663	105	135	38	25	111
18	Shewa	38	103	132	50	185	61	800	1633	104	136	34	21	112
19	Mahgan	27	105	132	55	192	68	792	1637	94	137	33	23	125
20	Nanuh	38	101	129	50	187	61	758	1571	96	135	33	25	109
21	Jagun	38	100	119	50	189	61	766	1603	89	135	32	20	110
22	Manu	45	108	135	47	193	59	794	1616	105	139	42	22	102
23	Dhansa	35	98	130	43	185	64	828	1650	97	135	36	23	119
24	Gobindh	25	101	129	48	188	62	792	1653	103	140	36	28	115
25	Dhasrat	38	98	128	49	179	64	789	1580	95	136	38	24	112
26	Deolal	29	101	131	47	179	60	807	1686	99	135	36	22	108
27	Chatur	40	104	130	54	189	69	808	1663	99	142	39	24	121
28	Jageshar	32	107	132	45	186	62	778	1614	100	139	32	24	110
29	Dasrat	39	101	124	49	182	64	773	1522	94	132	32	22	115
30	Dhukhan	35	108	127	50	193	66	828	1637	96	135	35	25	119
31	Harka Chanmer	40	107	129	52	200	67	798	1622	94	132	40	22	119
32	Sarju	30	104	128	47	181	60	770	1632	95	139	37	23	116
33	Pewaro	30	101	132	49	183	62	751	1594	87	137	32	22	108
34	Jhorai	35	102	133	51	194	65	823	1653	96	141	40	24	120
35	Ran Khelan	28	101	128	51	180	66	813	1698	90	133	33	24	114
36	Rechai	24	107	130	49	201	64	775	1610	95	137	37	21	117
37	Kalu	38	101	129	49	187	64	760	1682	94	135	35	22	108
38	Jhagru	35	104	137	46	188	56	784	1669	96	138	37	24	110
39	Hari	30	107	132	48	184	59	823	1627	95	139	36	21	105
40	Janki	20	97	122	43	180	57	803	1652	94	134	35	20	105
41	Ramdas	19	98	127	42	185	52	778	1597	91	136	37	20	102
42	Bershar	45	104	128	49	192	68	770	1564	104	133	39	23	118
43	Peharu	35	99	129	47	188	62	775	1642	92	134	39	25	117
44	Charku	40	101	136	51	191	63	768	1577	99	136	40	24	111
45	Seoman	38	98	129	48	187	62	798	1630	95	137	38	24	116
46	Buddun	40	106	135	46	188	59	803	1650	100	138	39	26	110
47	Bishunath	35	101	128	49	181	61	758	1570	92	132	39	24	111
48	Banafer	45	101	126	47	182	62	758	1584	86	129	36	23	114
49	Rajal	40	107	130	48	182	64	798	1599	90	144	35	22	112
50	Mohan	35	105	127	51	194	62	853	1690	95	135	40	24	113
51	Ramdhan	28	101	128	46	179	58	848	1687	96	135	35	21	110
52	Dhunuk	22	104	130	49	189	64	851	1731	89	137	35	24	117
53	Gopi	35	102	137	51	197	69	851	1693	97	138	36	23	120
54	Charku	32	97	129	47	185	61	760	1515	90	136	35	22	109
55	Jagnath	22	105	125	48	182	61	821	1617	100	136	36	25	108
56	Abbi	45	101	129	50	199	62	810	1657	95	136	39	23	120
57	Bundeo	42	101	129	52	188	67	773	1629	97	142	32	24	120
58	Ram Charan	32	113	133	52	196	67	840	1728	102	139	35	22	125
59	Jagdeo	40	101	125	48	185	65	755	1542	88	133	35	22	112
60	Tribeni	28	103	132	48	187	59	803	1562	91	139	36	24	108
61	Ram Khelan	22	102	126	47	163	60	778	1657	95	145	35	23	108
62	Sewa	25	102	127	43	191	59	798	1593	94	135	39	23	103
63	Lachman	25	99	124	44	187	53	768	1536	95	137	33	21	98
64	Chapuran	28	104	132	48	182	60	773	1588	96	139	31	22	111
65	Banshi Dhar	35	107	126	41	184	55	818	1649	95	139	36	22	102
66	Sahdew	30	99	131	46	187	55	781	1552	92	132	33	22	105
67	Jadan	40	98	125	45	181	61	788	1593	100	135	37	23	103
68	Ramnath	40	102	129	48	180	62	798	1597	98	142	35	25	112

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth.	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
69	Bharati	38	97	122	53	189	67	812	1711	93	132	37	22	118
70	Lochon	45	100	135	55	192	71	793	1645	100	139	39	26	122
71	Tulsi	38	102	127	51	172	62	712	1450	99	137	35	23	106
72	Hari charan	21	103	122	45	184	59	753	1544	99	135	34	22	103
73	Bikan	18	104	127	49	186	63	778	1579	93	134	36	24	111
74	Mali	20	102	128	47	184	62	758	1629	91	138	39	24	113
75	Sibdhar	31	102	127	45	183	56	752	1547	101	135	38	21	104
76	Nitan	37	107	129	49	192	60	774	1648	96	139	41	24	106
77	Mohan	38	99	128	49	182	64	772	1614	90	137	38	24	113
78	Dhian	19	99	123	49	182	59	763	1585	95	129	35	22	113
79	Jagdev	42	101	129	49	185	65	828	1667	107	129	32	22	120
80	Ram Ratan	35	104	134	54	182	69	773	1623	98	142	35	25	118
81	Payal	36	105	122	47	185	61	748	1620	99	133	36	24	113
82	Sampat	45	98	134	52	188	62	748	1560	98	130	37	23	115
83	Mathura	36	101	125	49	189	63	758	1614	94	131	36	23	117
84	Baji	45	109	130	47	193	62	810	1557	96	136	36	25	107
85	Jogasher	45	105	127	46	193	61	834	1667	95	133	38	24	106
86	Mahdew	38	102	127	45	182	60	784	1555	96	129	36	24	110
87	Mahadew	30	102	132	48	189	60	839	1655	105	136	38	24	114
88	Gopi	30	104	133	46	183	60	780	1678	100	135	35	23	111
89	Sapuran	38	107	131	46	192	57	787	1660	96	135	36	22	109
90	Chorku	45	101	128	51	184	63	769	1691	99	136	37	24	108
91	Gardan	40	94	124	47	178	63	814	1625	101	122	36	24	111
92	Jenandan	42	97	119	52	185	66	774	1520	95	130	37	23	118
93	Sukal	36	108	135	49	186	66	864	1740	101	137	35	23	120
94	Deoki	40	107	130	47	180	63	834	1646	105	137	35	25	112
95	Bahan	38	109	135	48	189	67	774	1573	93	137	37	25	120
96	Dipal	45	97	128	48	190	67	750	1547	99	129	35	24	109
97	Ghulchan	46	110	133	49	191	67	814	1650	107	138	37	22	118
98	Nanhu	38	102	126	47	180	63	824	1605	96	135	38	25	107
99	Harban	45	106	145	47	192	65	870	1743	105	145	37	24	107
100	Pacchu	38	94	121	48	183	64	834	1634	101	129	37	20	110
101	Ternal	40	109	140	44	197	60	804	1677	100	145	40	24	103
102	Ram Rattan	42	105	132	52	187	66	779	1650	97	142	38	24	118
103	Jagan	40	101	118	48	182	60	729	1595	98	130	36	21	105
104	Charku	38	107	133	45	187	58	827	1617	103	136	37	24	115
105	Rupan	40	104	139	46	184	59	786	1613	103	141	37	26	110
106	Jatan	44	107	139	56	200	78	874	1769	109	142	45	25	110
107	Jagu	39	107	136	55	185	66	769	1549	99	146	35	22	114
108	Bhora	25	101	136	49	179	58	794	1638	97	136	37	24	108
109	Mahar	38	99	135	57	185	71	854	1789	98	139	41	26	119
110	Basant	35	98	126	45	191	56	754	1627	99	135	38	22	100
111	Sukhari	25	101	126	49	181	63	799	1671	95	135	35	23	110
112	Namoa	33	97	123	50	185	67	770	1636	100	131	36	23	118
113	Joki	27	101	129	49	187	61	806	1699	100	139	35	22	112
114	Bhoda	42	101	125	45	187	57	760	1538	95	135	36	20	106
DISTRICT : GORAKHPUR														
115	Tirbeni	40	100	129	50	182	67	831	1636	100	134	35	23	116
116	Sukhal	38	97	124	45	180	62	821	1597	99	130	34	25	108
117	Awtar	30	105	135	45	185	58	822	1535	93	139	37	20	102
118	Mangru	28	105	134	46	193	65	884	1713	108	136	33	23	112
119	Sukhoo	40	107	134	45	203	62	850	1687	106	137	38	23	107
120	R. Nand	30	104	135	45	196	58	875	1652	93	135	35	24	106
121	Sumer	30	103	135	45	182	61	835	1571	103	134	33	24	114
122	Bhajan	38	102	132	45	184	62	822	1558	101	135	36	21	112
123	Suraj Bal	30	104	131	49	178	65	797	1559	106	134	40	24	112

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
124 Bhikari		34	104	132	49	192	63	823	1598	99	135	37	23	119
125 Soman		28	103	127	45	182	60	815	1541	99	133	34	23	113
126 S. Bali		27	115	138	47	198	65	840	1575	105	147	38	21	119
127 Nanku		40	100	131	52	182	63	825	1561	95	135	38	24	109
128 Bilar		36	97	125	45	186	63	793	1573	90	130	32	22	119
129 Ganeshi		29	101	134	49	189	65	859	1623	98	139	38	23	114
130 Soman		38	100	127	48	181	65	801	1555	99	139	33	21	112
131 Balwant		33	103	128	49	185	65	826	1563	91	139	37	22	115
132 Pahlad		35	105	135	49	188	65	826	1589	100	135	36	25	117
133 R. Sainitya		46	106	135	55	191	69	838	1640	104	139	36	25	117
134 Awtar		34	107	133	45	190	61	807	1575	102	136	40	21	113
135 Bideshi		36	104	139	49	178	71	802	1617	92	138	38	25	124
136 J. Mohon		54	103	134	50	185	65	819	1582	97	143	41	23	119
137 Murali		36	103	133	49	197	67	860	1611	96	141	38	25	121
138 Badri		28	99	128	46	188	58	790	1525	98	130	35	22	117
139 Jabbar		27	104	131	47	182	63	827	1552	95	138	39	23	120
140 Sapuran		39	100	139	55	187	69	890	1687	106	139	36	26	118
141 Hirawan		40	105	138	54	203	70	871	1667	104	149	39	27	128
142 Thingur		29	95	119	41	188	54	824	1607	88	127	35	23	102
143 Dhanai		38	103	131	50	197	66	853	1674	97	132	35	25	113
144 Ghisyawan		34	104	134	49	186	62	864	1612	103	146	37	25	112
145 Bishambhar		30	100	132	48	178	64	830	1645	103	141	37	25	116
146 Basu		32	105	138	50	178	67	879	1734	103	135	37	25	120
147 Gava		28	105	136	49	185	63	848	1635	100	137	38	24	115
148 Bhadai		29	99	130	45	188	63	858	1652	98	133	36	23	117
149 J. Lal		32	104	125	43	182	57	795	1587	88	131	35	22	110
150 Girdhari		45	107	132	47	184	62	853	1638	98	139	36	25	114
151 Bharose		32	104	132	47	189	63	861	1619	100	138	38	24	116
152 Tirath		38	109	139	49	195	66	885	1637	107	139	35	25	129

DISTRICT : GONDA

153 Jagai	35	106	130	49	195	62	861	1687	103	137	36	25	119
155 Garjan	26	101	139	46	174	60	834	1654	96	139	40	24	109
158 Nohar	37	101	136	47	184	62	788	1535	105	135	38	20	112
159 Ramsamugh	—	104	128	48	182	60	856	1620	94	135	38	24	108

DISTRICT : JAIPUR

154 Phulna	30	102	134	49	184	62	825	1620	98	136	33	22	108
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DISTRICT : BASTI

156 Bal Kesar	28	104	134	51	191	66	820	1634	102	137	35	26	124
157 Gopal	30	105	139	48	205	60	845	1608	105	142	36	26	112

GROUP (16) : CHERO

DISTRICT : MIRZAPUR

1 Paltan	32	97	126	46	182	59	794	1622	99	129	37	23	112
2 Manraj	50	94	122	52	185	67	777	1624	99	125	38	25	110
3 Modi	40	101	129	52	190	75	817	1645	104	131	41	22	130
4 Lalman	25	98	130	52	179	62	798	1677	100	139	37	23	116
5 Jagdeo	27	94	123	47	189	61	732	1534	91	134	35	17	118
6 Jagdeo	32	98	125	47	197	60	762	1552	95	133	40	22	121
7 Seoprasad	22	102	122	45	184	59	747	1569	94	132	35	21	114
8 Amerit	45	108	132	44	188	61	762	1568	95	135	41	22	108
9 Brijan	35	100	127	51	179	62	812	1666	100	136	36	22	113
10 Sampat	38	103	130	46	181	63	712	1493	92	132	40	24	113

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizyg. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
11	Charko	36	102	131	55	192	71	847	1707	108	134	38	25	131
12	Nanku	38	101	131	50	183	63	819	1713	102	143	41	25	110
13	Ramu	45	104	137	53	181	67	782	1640	107	142	42	23	116
14	Ram Sahai	28	99	127	52	189	66	815	1656	99	138	37	24	119
15	Nanku	43	102	135	52	192	67	814	1639	100	141	40	23	117
16	Buddhu	40	102	131	48	192	64	802	1651	101	133	43	23	113
17	Mangru	45	107	137	46	186	58	807	1610	99	139	41	23	108
18	Prem	35	101	135	47	194	60	804	1647	99	128	41	21	119
19	Birbal	38	99	128	46	182	62	812	1614	95	132	37	25	119
20	Ban Sup	40	106	141	55	195	71	794	1679	99	142	43	22	126
21	Dew Saha	45	100	129	50	189	69	790	1590	94	134	39	24	115
22	Mat Raj	38	104	129	53	180	65	840	1632	104	139	44	22	117
23	Jhubbo	36	105	136	52	191	68	812	1688	104	138	37	24	115
24	Ramu	35	104	129	46	191	60	808	1575	95	135	40	21	110
25	Bhaija	28	105	126	47	192	60	816	1614	95	133	41	22	111
26	Rapai	25	105	128	46	193	59	803	1555	102	141	36	22	116
27	Basaut	35	102	132	43	187	59	803	1710	110	139	41	23	115
28	Basant	30	104	125	48	179	61	793	1597	97	139	37	24	110
29	Bulai	23	106	131	44	187	60	833	1645	97	139	38	24	115
30	Ranj	45	95	125	45	170	58	762	1597	99	129	39	19	109
31	Samol	45	97	129	50	183	64	758	1522	99	132	38	21	111
32	Gajhadhar	42	104	132	47	183	60	842	1671	107	136	40	25	115
33	Ram Khan	25	101	130	46	177	57	794	1568	98	137	36	24	109
34	Mahipad	40	98	125	47	188	62	788	1568	102	132	40	23	118
35	Sukdew	38	100	128	47	188	57	788	1570	105	135	44	23	109
36	Basdew	38	109	136	48	189	66	815	1635	99	145	41	24	120
37	Baldew	42	101	126	46	187	57	805	1617	99	135	34	23	111
38	Sakhan	45	99	129	46	185	63	779	1574	99	138	37	23	118
39	Sarhagan	40	97	130	49	194	66	800	1653	110	135	42	22	122
40	Manbhai	36	104	139	51	182	62	837	1703	107	145	37	22	113
41	Bansurap	38	99	127	53	189	69	848	1725	99	135	41	26	123
42	Athal	38	100	127	44	185	66	821	1675	94	135	35	21	111
43	Kisan	39	107	137	49	194	65	839	1717	98	149	37	23	118
44	Karmet	45	105	130	50	187	70	794	1586	90	135	37	24	122
45	Chaku	26	103	129	47	189	62	746	1549	95	132	38	21	113
46	Dokhu	38	105	133	51	195	65	764	1596	97	136	39	24	115
47	Kalasham	45	100	129	47	187	65	804	1631	107	132	41	23	113
48	Bechu	47	102	137	48	195	63	818	1613	109	135	39	23	110
49	Nanku	48	95	129	52	186	66	741	1540	100	133	39	24	110
50	Jawhu	39	101	127	53	203	72	794	1705	99	134	37	24	130
51	Miram	38	102	127	47	191	62	786	1598	94	137	37	21	113
52	Laza	46	102	129	45	185	58	804	1631	100	134	40	23	114
53	Dipal	45	100	127	51	197	68	858	1727	100	129	42	22	117
54	Raman	45	99	131	51	195	69	821	1685	96	137	45	22	118
55	Dalga	45	102	129	49	198	68	849	1645	96	139	38	25	124
56	Srihalak	40	102	132	50	198	68	816	1604	103	140	37	25	128
57	Sagan	42	99	130	47	194	66	809	1634	105	132	40	20	119
58	Bhogali	40	107	133	46	185	67	817	1685	105	137	37	23	126
59	Gambhira	35	104	129	53	202	66	814	1704	95	139	40	23	115
60	Sukhan	35	101	125	42	194	57	787	1614	93	133	38	23	110
61	Saruam	40	101	128	42	175	59	808	1620	107	133	36	22	106
62	Mahadew	20	99	125	43	180	55	769	1547	102	128	37	19	102
63	Dilbud	29	105	133	45	185	59	792	1576	99	135	40	24	112
64	Maghan	40	101	130	50	193	65	786	1635	102	131	38	22	115
65	Ram Rachan	41	101	129	48	182	65	764	1594	102	136	37	23	113
66	Dargahi	44	101	132	52	181	68	774	1644	105	136	40	22	123
67	Cherku	38	101	131	49	193	61	734	1536	98	136	37	22	108

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
68	Jarji	47	94	120	50	186	64	764	1552	93	135	32	23	114
69	Suka	40	101	125	45	173	61	784	1571	98	132	36	22	107
70	Baran	38	101	135	53	185	68	814	1622	102	133	42	25	119
71	Chahu	42	101	130	47	182	66	798	1661	102	139	44	21	111
72	Juri	40	96	124	46	190	59	804	1612	93	136	35	23	107
73	Bharat	39	99	125	45	188	57	796	1619	96	134	34	20	111
74	Rupan	43	99	129	48	181	62	817	1708	106	129	38	23	112
75	Hira	35	104	129	42	177	58	739	1552	102	143	39	23	108
76	Janki	38	104	132	53	190	69	799	1648	98	137	40	22	129
77	Jageshur	46	97	125	48	183	64	784	1617	103	135	39	25	116
78	Bigan	38	101	131	48	182	62	809	1608	100	131	43	22	110
79	Hooi	38	103	138	47	191	60	830	1645	100	137	42	22	115
80	Sudi	39	101	135	45	188	60	777	1595	108	139	39	23	107
81	Ram Narain	45	99	126	41	185	56	734	1470	100	135	38	22	108
82	Charku	35	104	133	47	177	62	794	1593	98	137	38	21	109
83	Began	35	98	129	48	181	62	791	1655	101	131	36	22	117
84	Ramadhan	45	103	134	47	189	63	809	1650	113	143	39	24	116
85	Banhu	48	102	121	43	188	57	770	1581	99	128	38	20	102
86	Jagmohon	42	97	126	48	182	63	770	1641	99	128	38	23	113
87	Dasrat	42	97	123	48	189	67	819	1631	98	132	37	23	124
88	Kuar	40	107	131	49	198	66	834	1657	108	136	41	23	128
89	Deo Dhan	23	104	128	44	185	55	782	1585	100	140	39	21	113
90	Bahan	40	97	135	45	195	62	782	1648	99	127	43	22	114
91	Rangali	35	106	132	40	182	55	812	1633	96	132	40	19	107
92	Sita Ram	35	103	126	44	194	60	827	1617	96	130	40	22	113
93	Punru	50	102	136	46	193	62	788	1593	94	131	44	20	111
94	Becho	36	103	137	52	189	64	843	1648	97	139	43	23	121
95	Nanka	25	105	135	48	178	59	794	1634	99	141	37	23	105
96	Bisa	20	102	134	46	187	61	771	1626	102	134	38	22	115
97	Bhagawan.	31	102	130	46	179	60	815	1569	103	136	37	24	110
98	Parmesh	24	109	134	50	181	62	830	1654	101	140	38	26	112
99	Shuklal	27	101	128	49	191	61	787	1627	98	140	36	24	109
100	Lalmohon	35	103	135	47	186	61	767	1525	104	138	39	22	114

GROUP (17) : MAJHI

DISTRICT : MIRZAPUR

1	Sheo Nandan	25	104	121	50	192	65	732	1561	99	139	42	25	115
2	Nakchede Ran	40	107	132	51	194	66	808	1621	107	134	37	21	118
3	Sukh Deo	25	101	126	45	177	60	768	1570	91	140	39	20	111
4	Mohar	38	98	123	49	192	65	802	1646	97	131	39	21	116
5	Skusaran	34	107	135	49	196	64	837	1689	103	144	41	22	119
6	Bechan	33	101	132	41	196	55	822	1717	99	141	44	25	110
7	Lachan	35	104	132	49	185	63	792	1700	87	141	31	22	123
8	Budhan	40	102	132	49	185	63	767	1567	97	140	45	23	110
9	Moti	45	102	136	47	182	64	827	1733	95	137	36	20	118
10	Ratu	50	97	128	49	180	63	752	1571	89	132	38	21	112
11	Nahar	42	108	135	50	189	61	797	1656	102	139	38	22	113
12	Dasmal	40	102	128	44	185	56	692	1490	95	137	40	22	108
13	Anup	28	104	129	47	194	60	836	1735	95	141	38	22	115
14	Lachman	28	101	127	48	179	61	742	1605	101	137	41	21	108
15	Rattu	35	94	127	49	179	64	738	1545	94	129	37	19	119
16	Began	50	107	134	48	184	60	766	1542	106	135	41	21	108
17	Nanku	38	105	128	45	189	57	782	1623	99	143	36	22	108
18	Sohar	45	102	133	49	198	61	727	1522	102	141	42	23	111
19	Bisnath	34	103	120	42	190	56	797	1645	94	131	36	22	108
20	Hira Lal	34	97	123	43	190	58	782	1608	102	128	37	21	110

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bi-zygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
21	Rajadhar	25	98	127	45	170	57	760	1553	95	132	33	23	106
22	Lachman	42	98	132	43	176	57	767	1576	91	135	40	20	106
23	Jhangeal	40	102	135	50	201	68	794	1638	99	143	39	26	127
24	Mangal	43	101	134	53	189	67	810	1677	101	139	40	24	125
25	Daloi	44	110	137	48	197	62	867	1752	112	139	40	23	119
26	Debi	46	107	139	45	201	63	817	1626	101	142	43	23	117
27	Birsa	48	98	134	48	183	62	797	1590	106	136	37	23	110
28	Manohar	28	102	129	48	180	63	777	1500	94	133	39	21	114
29	Nandlal	50	101	137	49	181	62	745	1579	102	141	43	21	121
30	Phago	39	101	120	40	179	55	732	—	93	128	35	19	103
31	Nanku	26	97	128	46	185	58	842	1712	99	130	35	21	111
32	Kash	35	101	129	45	191	61	806	1612	100	137	39	24	110
33	Jaddu	28	104	134	44	196	60	787	1610	104	138	41	22	113
34	Marsa	38	102	132	49	175	60	777	1566	91	139	37	23	115
35	Dirshan	40	105	138	44	192	60	793	1458	97	137	42	22	115
36	Ramjeri	35	105	134	45	189	58	849	1738	104	141	40	25	110
37	Najhir	50	105	141	48	197	66	787	1650	110	138	45	24	117
38	Puran	45	108	135	52	183	67	847	1671	102	143	38	25	123
39	Ram Charan	38	105	144	44	189	57	842	1600	105	141	41	22	105
40	Gritwa	34	102	127	42	183	56	792	1615	102	137	35	20	109
41	Dallu	20	99	130	45	185	56	777	1587	87	135	40	22	105
42	Ram Charan	40	99	129	50	194	63	782	1668	109	135	35	23	115
43	Nanhu	45	104	132	44	196	56	808	1582	96	140	36	24	105
44	Budhu	26	104	135	42	190	51	808	1640	103	133	43	20	99
45	Mahipat	22	101	124	45	179	61	758	1540	87	128	35	23	115
46	Gulat	40	101	127	44	184	58	792	1634	103	130	37	20	113
47	Tebhali	45	104	133	52	182	67	837	1683	101	137	43	25	112
48	Gurdi	40	101	129	46	186	63	819	1656	101	137	43	22	113
49	Saluwar	50	105	136	50	185	60	817	1696	109	135	44	26	108
50	Sukh Deo	45	101	126	46	180	61	822	1608	97	135	38	22	112
51	Barman	40	111	142	49	185	68	798	1705	112	151	42	20	127
52	Ramdas	25	101	128	48	181	59	824	1653	95	129	37	23	111
53	Moti	19	97	126	51	192	61	797	1562	105	119	35	23	113
54	Bhola	45	105	129	46	185	59	818	1620	95	131	40	22	108
55	Sahdeo	40	101	125	46	182	60	837	1644	88	133	37	25	115
56	Aganyan	25	101	128	44	185	57	810	1655	96	133	37	22	113
57	Gobin	26	101	126	50	185	61	797	1599	97	131	38	24	121
58	Lagan	28	101	138	43	195	57	846	1721	101	135	40	23	117
59	Began	18	107	127	42	175	54	777	1590	95	130	40	24	99
60	Paley	48	114	139	50	191	64	826	1463	107	144	42	24	119
61	Ram Bakas	50	99	130	47	192	66	787	1585	97	129	41	23	127
62	Man Raj	50	104	129	45	179	57	777	1565	98	136	44	21	109
63	Mahabir	48	106	135	44	189	59	787	1567	105	135	40	23	108
64	Jai Mangal	42	104	129	45	189	60	797	1577	102	136	42	24	110
65	Sukhlal	38	98	131	44	185	59	796	1555	99	132	37	21	110
66	Deo Narain	40	101	129	47	184	61	792	1602	97	135	36	23	106
67	Ranjit	45	103	137	48	181	60	782	1591	99	137	39	24	112
68	Dharma	46	107	137	47	186	62	802	1649	101	140	39	22	115
69	Hulas	30	105	137	40	182	55	792	1557	99	139	38	20	105
70	Suddhi	35	104	138	52	186	68	822	1702	105	136	43	23	124
71	Lakhpati	40	101	142	49	196	66	759	1562	108	133	39	22	123
72	Datla Mohar	25	104	134	45	198	58	822	1669	103	132	38	22	116
73	Jagmanik	28	105	131	45	176	58	842	1716	104	133	37	22	112
74	Ahar	29	106	128	45	182	55	808	1585	99	133	36	22	108
75	Sohram	35	98	136	43	191	49	842	1601	100	135	41	21	115
76	Sukhlal	30	108	137	50	196	62	804	1681	92	143	38	24	116
77	Raja Ram	50	102	129	47	180	61	762	1565	93	130	41	20	112

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
78	Rup Sahai	26	100	127	45	177	56	792	1588	98	126	40	23	103
79	Gahar	35	103	131	48	179	62	818	1649	96	139	39	22	112
80	Thanki	32	106	134	48	189	60	798	1597	101	142	38	25	111
81	Nadhir	40	104	142	48	191	64	768	1559	110	144	37	20	120
82	Dhanseer	35	105	138	52	183	68	801	1617	108	138	40	22	120
83	Ram Satai	38	101	125	50	190	62	783	1619	97	139	40	23	115
84	Buddhan	30	100	128	50	182	62	758	1630	97	137	39	22	115
85	Sohan Saha	38	99	130	51	195	66	828	1734	105	139	40	23	121
86	Kalwari	42	101	130	42	187	55	868	1722	105	133	42	24	102
87	Dehal	45	111	137	50	189	62	824	1662	100	139	42	22	119
88	Hirasa	38	108	139	42	188	56	769	1572	104	143	40	22	103
89	Rupsahai	45	104	137	47	196	60	794	1606	96	136	42	22	116
90	Pran	35	108	135	45	181	59	764	1604	106	141	40	23	109
91	Mahadeo	35	102	133	40	187	54	818	1669	96	137	42	20	106
92	Magan	40	106	133	46	172	60	809	1588	104	134	39	24	102
93	Sita Ram	45	101	134	47	184	62	828	1722	106	135	41	20	120
94	Suddhi	35	101	127	46	188	58	793	1667	102	135	37	22	120
95	Sonsa	35	101	131	48	190	62	824	1633	100	134	42	24	118
96	Sheo Raj	45	101	129	49	198	64	812	1650	95	133	42	22	114
97	Kalan	46	102	128	49	191	63	788	1640	97	132	40	25	110
98	Mah Raj	40	99	132	48	195	63	878	1751	106	134	43	21	110
99	Dalai	26	103	135	48	194	66	844	1754	107	137	43	23	121
100	Panchnar	40	104	134	52	194	66	848	1697	113	139	43	23	124
101	Sonu	50	108	134	53	194	68	848	1690	99	145	37	22	120
102	Psaidhan	32	101	132	49	206	58	868	1715	100	135	37	23	115
103	Jagu	18	105	127	50	183	65	768	1657	95	135	37	21	110
104	Jodhbar	45	101	136	50	193	62	913	1641	99	142	40	22	115
105	Mondhar	39	100	132	50	195	66	838	1710	99	135	38	23	118
106	Lolan	35	104	135	44	193	59	858	1722	99	134	39	21	111
107	Anant	30	102	128	47	182	59	788	1600	100	133	40	22	112
108	Jagasher	40	101	129	45	185	59	783	1642	101	133	41	23	100
109	Lal Sahai	42	102	125	44	187	58	783	1592	96	136	35	20	113
110	Jagannath	48	98	126	46	179	62	756	1565	91	127	35	20	107
111	Prem	30	104	131	46	186	58	798	1565	98	129	40	21	109
112	Ram Prasad	30	101	129	45	185	62	803	1636	94	130	40	24	116
113	Jan Sal	35	103	133	45	196	55	846	1650	94	141	40	23	109
114	Babulal	38	102	128	46	183	57	818	1627	93	134	35	23	112
115	Dodhi	30	98	129	46	195	59	788	1632	103	136	43	24	110
116	Mahabir	35	102	133	43	185	55	805	1583	103	135	36	22	100
117	Manraj	38	101	126	48	190	63	780	1525	93	137	40	20	110
118	Rambehari	20	101	132	50	193	58	828	1672	98	136	36	23	119
119	Atwara	40	97	128	49	182	65	758	1558	100	129	35	21	118
120	Raghubir	44	101	137	48	191	64	816	1595	100	135	41	22	119
121	Sebanyain	38	97	126	50	184	67	795	1642	100	130	39	22	122
122	Bhola	40	98	127	44	183	57	811	1660	89	135	40	22	108
123	Somari	45	103	132	47	192	62	795	1570	96	139	39	23	118
124	Hamat	42	108	137	45	185	62	813	1648	104	145	44	22	117
125	Agabel	48	103	128	47	184	59	828	1735	100	135	39	21	118
126	Parsolam	30	105	135	46	187	57	798	1737	109	131	38	24	110
127	Sobhnath	20	103	133	45	187	58	828	1640	96	143	37	26	110
128	Ranglal	19	104	131	46	186	59	832	1685	101	135	36	23	111
129	Sobran	44	104	130	51	187	66	783	1539	95	137	40	20	109
130	Bilar	20	98	126	46	182	63	780	1607	99	133	37	23	118
131	Sheolal	35	99	129	43	184	54	788	1662	110	135	40	21	108
132	Basro	22	104	129	44	184	62	793	1637	99	135	37	23	112
133	Raghubir	35	109	131	42	182	49	828	1724	96	139	40	23	100
134	Bahan	35	103	141	50	192	64	796	1667	96	134	35	23	124

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Biryo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
135	Bandew	40	105	132	46	194	62	813	1657	105	136	39	25	112
136	Amarsa	22	100	132	46	183	61	758	1618	79	138	35	23	117
137	Dew Saran	35	104	131	45	184	58	768	1611	103	137	42	24	108
138	Amrit	48	106	134	51	191	67	808	1684	101	139	44	26	118
139	Ramgher	38	101	132	49	194	67	808	1647	99	135	42	23	113
140	Mani	22	104	132	46	176	63	775	1558	102	129	37	24	115
141	Mahabir	24	101	124	45	189	56	804	1640	83	132	37	24	107
142	Bagul	21	104	131	44	189	56	783	1577	97	139	37	22	111
143	Bholar	35	104	134	49	177	63	762	1594	107	139	42	24	111
144	Balak.	—	102	132	52	189	68	743	1632	97	136	39	20	120
145	Rameswar	24	101	129	41	198	58	818	1691	99	134	40	19	105
146	Baldeo	39	105	129	47	190	62	782	1604	100	135	40	24	113
147	Ujagir	30	99	129	42	202	58	814	1689	99	132	42	20	113
148	Manyar	—	109	189	47	186	65	848	1754	97	145	40	24	120
149	Kushal	38	101	132	45	176	68	755	1542	92	128	40	20	106
150	Maharsa	38	97	129	48	188	64	748	1572	103	127	41	21	112
151	Mahara	21	103	131	45	180	55	743	1550	97	135	38	19	105
152	Gobind	38	99	126	52	188	66	748	1545	97	132	40	21	118
153	Lal Bhajan	28	105	133	49	190	62	794	1670	97	138	37	24	111
154	Mohan	38	105	131	45	182	62	783	1637	102	133	42	22	114
155	Kusher	39	99	126	42	174	54	753	1614	99	132	40	24	100
156	Baddhar	35	104	135	47	197	58	788	1686	107	137	40	23	115

GROUP (18) : PANIKA

DISTRICT : MIRZAPUR

1	Hari Mangal	28	99	126	49	186	60	814	1603	87	126	33	22	114
2	Jeeter	45	105	140	45	199	60	792	1659	107	135	43	22	116
3	Ranantar	30	100	127	44	193	63	785	1587	98	135	33	20	117
4	Kreeman	30	97	121	42	179	55	762	1500	95	124	36	21	102
5	Jhagar	48	105	133	51	185	63	742	1595	96	137	39	23	120
6	Gopi	32	104	133	47	185	62	819	1587	98	131	41	19	109
7	Mahadeo	38	94	128	47	180	62	702	1525	88	126	37	22	113
8	Hindal	35	104	135	49	186	64	802	1669	97	147	39	23	119.
9	Bramdhar	25	100	132	45	176	55	712	1466	97	135	31	18	104
10	Sudhu	35	101	134	49	196	65	778	1575	107	141	41	23	115
11	Sahdew	27	103	135	44	186	61	757	1577	103	139	42	22	105
12	Lal Saher	32	101	132	46	188	61	770	1667	94	138	35	23	108
13	Sohan Gohai	35	101	132	51	188	64	819	1651	96	137	37	23	117
14	Sirgohin	26	110	129	44	183	58	837	1616	97	137	37	22	113
15	Ram Gulan	40	106	131	48	190	63	838	1578	97	139	43	27	122
16	Bhindi	40	104	130	50	191	62	813	1638	98	132	38	22	120
17	Bisheshwar	40	101	130	49	188	61	773	1572	95	132	40	22	118
18	Jhangri	45	101	129	49	194	65	788	1584	90	128	41	22	125
19	Prem	38	99	129	54	185	69	808	1664	97	133	37	22	120
20	Jai Karan	36	101	125	48	183	64	824	1633	99	136	39	23	116
21	Ganu	40	103	131	45	188	63	770	1594	86	134	35	22	111
22	Ghora	46	102	133	45	188	60	762	1564	98	143	38	24	111
23	Ram Neran	20	101	131	48	185	60	824	1702	95	135	39	25	116
24	Rattu	—	111	139	46	198	62	818	1595	99	141	35	21	120
25	Santu	38	99	132	49	182	67	800	1618	105	134	41	21	116
26	Kalo	31	98	132	47	180	61	813	1634	103	134	40	19	109
27	Jagat	32	105	131	55	189	62	814	1630	100	134	37	22	120
28	Girdhari	30	98	128	50	176	62	768	1602	86	136	34	20	115
29	Jadunath	28	105	135	45	185	59	763	1627	102	138	40	25	114
30	Sarup	43	102	135	43	189	63	800	1573	101	138	40	23	119

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
31	Sardar	45	105	135	41	182	55	728	1490	97	139	34	22	103
32	Narihai	30	105	127	48	184	64	784	1573	95	135	37	22	117
33	Jagdeo	46	104	137	52	197	65	826	1665	102	139	41	26	123
34	Sew Rattan	35	101	128	48	186	61	825	1665	99	133	42	23	110
35	Mohan	41	100	133	46	182	59	788	1636	99	134	37	25	113
36	Sobha	43	107	132	52	195	71	793	1660	99	138	39	22	126
37	Bajnath	36	102	125	46	179	58	768	1587	104	135	34	25	101
38	Bui Sari	—	104	129	49	189	60	803	1649	103	130	35	23	110
39	Lachman	38	104	129	52	183	63	848	1666	91	135	35	26	118
40	Sampat	40	97	132	45	194	65	771	1576	96	135	35	25	121
41	Sobran	43	99	129	48	185	62	790	1662	89	129	37	21	116
42	Jagmohan	41	101	129	51	195	67	755	1653	96	139	38	24	125
43	Sankar	35	99	120	47	193	57	770	1601	97	134	39	23	114
44	Hublal	46	101	132	56	183	71	790	1598	105	138	40	23	126
45	Jagasar	39	101	127	47	192	65	800	1603	102	135	46	24	115
46	Manu	44	99	131	47	191	61	819	1668	101	137	38	24	108
47	Dipral	38	105	133	47	193	62	834	1682	98	137	39	22	117
48	Jewahir	39	104	136	49	184	64	824	1707	107	138	39	25	117
49	Kalwari	35	95	129	—	192	—	—	—	97	133	—	—	—
50	Jansa	23	103	129	47	180	63	826	1630	88	135	39	24	115
51	Chamru	39	98	124	49	188	62	792	1577	91	132	38	25	115
52	Hoiasa	30	101	125	51	180	64	826	1615	97	135	40	26	113
53	Judha	19	102	129	50	186	63	809	1636	91	136	42	22	118
54	Jhagru	48	105	138	53	195	70	771	1581	97	149	40	24	125
55	Sadew	38	105	130	45	203	62	781	1562	97	132	36	22	111
56	Abhitak	42	107	137	46	179	60	801	1632	100	144	41	20	102
57	Sajiman	45	101	127	47	179	60	814	1582	97	131	39	21	110
58	Domani	32	101	126	49	178	66	729	1513	89	132	35	22	114
59	Sobhi	40	104	133	48	180	63	806	1598	98	136	38	23	119
60	Padar	35	106	137	46	177	59	784	1572	107	145	40	22	106
61	Kapaldew	42	109	135	50	195	67	809	1618	103	136	41	24	118
62	Jagdeo	40	107	138	45	197	58	816	1663	103	136	42	26	108
63	Bhona	39	102	132	50	188	67	820	1629	101	139	42	21	122
64	Gambhura	46	101	133	51	189	71	794	1625	105	136	38	24	118
65	Hotelal	46	99	129	47	192	62	794	1594	105	136	40	21	108
66	Kesu	20	107	132	49	185	65	750	1641	97	132	39	24	115
67	Girbai	38	102	139	45	194	60	852	1745	107	143	40	24	110
68	Sankar	35	101	134	49	194	66	817	1637	103	132	39	22	115
69	Sewdat	35	98	129	48	182	62	744	1530	99	134	37	23	113
70	Deepchand	34	97	134	46	189	61	780	1574	105	134	36	22	107
71	Charat	38	105	134	54	188	64	820	1638	101	135	38	22	120
72	Ram Kishan	40	108	133	48	187	61	838	1658	95	139	39	30	112
73	Mangru	21	104	128	50	185	62	806	1581	99	133	32	23	112
74	Sarju	38	101	134	48	188	62	787	1576	96	137	31	21	116
75	Samaru	30	101	133	49	178	64	801	1559	97	132	38	21	110
76	Gadu	25	107	131	48	201	64	801	1619	97	136	40	24	118
77	Saramar	28	108	137	44	178	58	769	1560	98	136	40	22	106
78	Ruplal	45	102	129	46	198	62	790	1647	102	133	38	22	106
79	Bramdar	26	100	130	46	176	53	714	1466	98	135	35	22	100
80	Pamantar	35	100	125	49	193	63	798	1589	90	133	35	23	114
81	Hiralal	40	98	125	41	189	52	778	1586	97	128	35	21	107
82	Jagannath	48	103	131	52	191	67	807	1627	93	136	40	22	122
83	Jeodhan	40	109	130	46	186	63	799	1650	96	141	37	23	115
84	Ramsundar	21	102	129	49	178	67	764	1512	96	124	37	22	117
85	Mahabir	36	109	135	47	192	62	797	1601	99	137	38	24	116
86	Manfod	34	102	129	49	182	62	799	1602	98	136	38	25	112
87	Jhagan	38	98	128	49	178	62	774	1560	95	130	39	22	112

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
88	Rameshar	25	97	128	44	183	59	806	1645	97	132	35	23	108
89	Jangi	45	102	129	49	193	67	784	1597	88	128	38	22	124
90	Beshashar	45	101	132	47	188	62	790	1585	95	133	39	23	112
91	Jaikaran	38	101	124	48	183	63	822	1652	96	136	37	24	114
92	Prem	40	98	129	54	184	70	821	1677	98	134	37	23	122
93	Nanak	35	102	135	49	188	62	777	1575	99	137	39	24	118
94	Bhagat	38	97	133	49	182	67	752	1637	105	134	39	19	118
95	Sukhdeo	35	95	124	42	177	54	772	1627	87	129	40	21	104
96	Bhaji	40	102	131	56	183	68	807	1604	109	132	43	19	127
97	Sah Deo	45	100	139	52	185	64	766	1589	100	141	44	23	118
98	Deo Chand	35	106	134	49	188	63	757	1541	104	139	39	20	114
99	Karimal	25	104	133	46	185	60	797	1689	96	140	36	25	115
100	Rangi	32	101	134	48	190	62	778	1563	96	127	36	21	118
101	Raghunandan	38	104	134	46	189	60	835	1716	95	143	44	22	111
102	Bhagai	28	102	126	45	187	60	826	1671	96	130	38	22	111
103	Bodhi	42	104	134	49	197	62	806	1630	95	136	39	24	116
104	Bhijhat	19	98	125	48	184	59	773	1540	94	132	35	21	113
105	Bharat	22	102	131	45	183	58	784	1550	95	135	39	21	107
106	Samar	35	103	129	42	178	56	774	1529	91	131	42	19	108
107	Sakhar	45	104	135	44	196	57	764	1523	96	143	36	22	113
108	Kishun	25	104	135	45	186	56	718	1625	102	139	37	22	108
109	Dolat	48	104	137	43	178	58	753	1600	103	136	37	22	103
110	Serta	35	101	123	42	183	57	751	1496	92	131	35	18	103
111	Panna	40	95	123	48	181	64	782	1552	94	128	37	22	110
112	Sukhari	21	97	126	46	181	62	763	1566	99	133	36	21	103
113	Lakhraj	45	99	131	50	188	66	783	1633	107	131	39	24	118
114	Hari	45	99	127	49	182	63	741	1510	93	135	36	21	116
115	Deoman	40	102	132	49	185	67	780	1619	98	135	37	23	117
116	Jilor	50	101	133	45	182	62	733	1560	99	136	39	23	109
117	Janki	45	105	134	45	178	62	768	1562	94	131	41	22	111
118	Jaga	35	104	135	54	197	67	768	1577	103	139	41	25	119
119	Dokhar	45	101	125	49	191	65	733	1515	99	132	36	21	116
120	Sukhroo	21	107	132	49	190	62	798	1602	99	138	39	25	116
121	Sobhi	25	101	128	46	192	59	786	1628	98	137	40	21	115
122	Jundhan	40	98	127	47	183	58	780	1623	103	129	41	23	101
123	Sukhan	32	103	133	41	185	55	758	1504	91	135	38	22	107
124	Depuk	39	109	131	48	188	60	803	1635	102	135	38	21	110
125	Buddhan	36	101	130	49	184	63	798	1650	93	135	36	23	117
126	Samar	40	101	129	49	185	61	788	1610	99	137	44	21	112
127	Behai	46	97	127	42	183	57	764	1500	105	129	35	22	98
128	Kiruman	45	107	135	50	187	68	810	1606	102	137	37	22	126
129	Dasani	37	101	121	42	177	57	681	1580	95	139	38	19	105
130	Lachman	36	101	128	43	178	56	739	1476	97	142	40	21	101
131	Ram Ratan	40	404	131	48	189	65	824	1618	95	135	41	22	119
132	Mushi	24	99	131	43	186	58	794	1582	100	135	35	24	107
133	Samaru	34	97	122	49	181	60	799	1605	97	137	38	22	113
134	Ratan	45	102	124	41	182	54	768	1542	97	133	35	20	102
135	Darshan	29	100	122	47	186	59	780	1562	95	132	34	24	105
136	Pacho	45	102	132	45	188	61	756	1542	92	136	37	23	115
137	Khagora	18	95	118	42	172	55	744	1545	88	125	36	19	104
138	Biddo	40	103	130	51	185	65	759	1532	105	131	38	23	119
139	Chahuri	45	105	128	41	178	59	759	1583	94	135	40	22	105
140	Lalu	35	103	120	43	183	57	767	1545	90	130	35	21	113
141	Bana	28	101	121	45	190	60	799	1607	95	135	37	20	111
142	Ruplal	38	105	130	42	181	60	799	1555	100	132	39	22	106
143	Jangi	35	110	133	44	184	58	784	1543	95	143	36	21	110
144	Bishnu	40	106	135	44	184	62	727	1468	101	133	39	21	105

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
145	Bukhali	24	102	127	49	189	60	770	1531	89	145	35	22	109		
146	Mangher	19	101	120	39	179	58	757	1533	95	127	35	21	105		
147	Sahadew	40	98	123	45	183	61	802	1607	96	133	39	23	112		
148	Ramdhan	40	107	139	49	201	67	826	1642	105	140	37	24	121		
149	Jokhan	38	106	134	53	187	67	804	1595	100	142	39	24	119		
150	Jai Ram	38	102	131	48	185	63	784	1595	95	131	35	22	116		
151	Parsadi	35	101	128	40	187	54	814	1582	99	127	37	21	112		
152	Rangu	45	98	129	49	192	60	801	1603	103	135	37	21	106		
153	Gharparan	45	114	136	51	192	70	763	1594	97	140	40	24	118		
154	Sukhi	45	105	138	44	178	57	789	1611	105	135	41	23	99		
155	Ram	35	101	127	38	189	52	794	1626	99	136	37	21	101		
156	Kishan	20	105	126	40	189	52	820	1627	91	136	39	20	113		
157	Deo Sara	35	101	133	48	191	66	837	1655	99	138	36	23	111		
158	Soharai	40	100	125	45	185	61	850	1612	98	136	37	23	109		

GROUP (19) : KHARWAR

DISTRICT : MIZAPUR

1	Lakshu	30	125	48	177	59	—	1601	96	132	36	21	110	109	98	
2	Ghunra Rai	35	134	47	182	59	—	1624	91	135	37	21	110	109	99	
3	Sirdar	50	129	53	186	67	—	1567	85	138	35	21	110	114	103	
4	Balaram	35	129	49	177	67	—	1574	96	137	36	20	119	117	103	
5	Sulhan	25	125	41	180	53	—	1656	95	136	37	21	109	117	100	
6	Gowro	30	128	45	180	56	—	1565	99	137	37	23	113	115	105	
7	Bhakal	30	133	46	184	57	—	1631	100	144	37	20	115	116	105	
8	Sukhdeo	35	120	44	181	58	—	1626	94	135	35	20	110	110	97	
9	Gai Singh	45	134	50	184	66	—	1535	101	137	39	22	114	115	105	
10	Ghorghora	20	137	52	178	69	770	1542	104	141	40	22	119	125	107	
11	Munni Ram	23	127	46	184	58	814	1624	99	135	36	19	112	116	100	
12	Narayan	30	131	46	185	58	864	1668	104	132	38	20	110	114	106	
13	Raghubar	40	135	51	187	65	874	1672	107	139	35	22	117	117	105	
14	Kanti	35	138	50	187	60	829	1640	97	144	38	21	121	121	105	
15	Bajinath	50	126	51	187	67	834	1590	93	129	35	22	120	117	102	
16	Ganddhar	45	137	49	187	64	854	1653	104	141	41	23	113	125	110	
17	Ghatoo	30	135	50	184	61	814	1575	96	136	40	23	111	116	105	
18	Dukhiram	48	137	47	184	60	849	1577	105	139	38	24	113	120	102	
19	Muttu	38	129	50	187	64	859	1602	99	134	35	24	113	118	102	
20	Bhurna	38	129	45	177	62	764	1546	97	139	36	22	110	112	98	
21	Mani	28	126	46	177	64	804	1581	96	135	40	23	116	117	104	
22	Mothoram	38	127	51	187	64	799	1604	103	132	40	21	123	115	100	
23	Budha	22	125	45	179	59	814	1647	92	129	37	20	108	112	100	
24	Sunnu	40	129	43	179	60	784	1672	104	134	38	22	108	113	100	
25	Ghaurarai	20	129	46	189	57	819	1631	91	143	37	22	115	108	99	
26	Kuttoo	35	139	52	197	65	834	1667	107	137	40	24	116	122	105	
27	Bhitaugue	22	129	49	187	59	814	1473	95	134	37	21	110	115	110	
28	Rati	50	130	52	177	68	778	1600	96	138	34	20	111	110	99	
29	Sobharam	45	126	50	191	66	794	1685	98	132	41	22	112	117	100	
30	Nauki	46	129	51	176	65	809	1577	101	135	37	22	123	110	100	
31	Bhrat	48	126	49	185	60	769	1588	87	134	34	22	111	115	100	
32	Ghadi	35	128	42	186	54	820	1610	92	129	36	23	98	118	100	
33	Rajao	30	135	52	189	65	834	1622	98	140	38	23	114	119	103	
34	Kurba	30	128	46	188	62	854	1690	92	143	37	21	113	116	101	
35	Kirti	—	126	50	191	65	819	1613	95	137	36	21	122	122	107	

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizyg. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
36	Majila	50	128	52	178	63	794	1573	99	137	40	23	103	112	100	
37	Beta	28	125	53	182	68	770	1544	90	137	36	23	118	113	96	
38	Raghu	38	133	47	181	62	814	1577	97	136	37	22	115	110	104	
39	Rang kishore	30	135	43	181	57	834	1580	91	131	37	22	105	115	100	
40	Buddhu	32	137	46	187	62	864	1701	107	137	44	21	118	118	105	
41	Chandan	22	129	46	184	60	799	1580	98	136	39	20	110	117	100	
42	Baijin	30	138	50	188	63	844	1720	101	138	36	21	121	117	107	
43	Bishambar	38	132	40	187	60	814	1670	98	148	36	22	108	115	101	
44	Burhwa	40	129	46	192	57	804	1586	97	135	40	21	109	114	98	
45	Dharam Singh	30	128	52	191	69	849	1630	102	139	39	22	119	116	98	
46	Thathoo	23	123	47	181	59	784	1555	92	131	37	22	111	107	95	
47	Chamroo	28	125	50	187	66	784	1550	96	139	35	23	120	115	98	
48	Tilu	40	129	52	180	69	814	1562	89	134	41	22	116	116	101	
49	Dokri	40	129	51	187	65	804	1545	95	130	40	23	115	111	98	
50	Dhirsai	35	132	54	185	72	804	1620	99	142	32	22	127	118	106	
51	Duknath	55	135	52	176	70	789	1630	97	145	35	22	118	126	108	
52	Buddho	50	132	46	182	62	790	1625	93	143	41	22	111	121	101	
53	Late	28	129	47	188	62	864	1594	92	137	38	23	111	121	104	
54	Ghasiram	50	128	50	175	66	794	1570	96	146	38	22	108	120	105	
55	Anandram	55	135	46	179	67	824	1623	100	142	41	24	118	117	107	
56	Manbodh	55	133	52	188	68	734	1480	97	142	37	22	115	116	105	
57	Hati Singh	45	130	50	182	63	754	1575	93	133	42	23	110	115	105	
58	Narayan	—	125	52	187	72	784	1512	99	137	33	23	124	121	100	
59	Ghanda	50	135	57	191	67	784	1624	100	141	38	23	114	117	103	
60	Rangu	30	131	50	172	65	759	1623	98	139	37	22	113	116	103	
61	Dokoria	42	132	48	180	63	770	1552	95	135	37	22	106	110	99	
62	Gandara	—	125	46	181	55	770	1595	88	131	34	21	106	106	95	
63	Bharati	18	125	42	184	56	774	1532	88	137	41	22	110	111	99	
64	Mangroo	48	127	47	179	62	789	1572	92	132	33	22	108	112	102	
65	Thakurram	19	122	45	168	56	794	1583	87	133	36	19	104	109	95	
66	Buraha	55	130	49	178	65	769	1533	97	135	35	21	103	107	97	
67	Butti	45	136	47	182	67	819	1560	95	140	45	21	113	110	101	
68	Pitaromrath	45	130	54	182	70	784	1595	99	138	38	22	120	120	105	
69	Amar Singh	46	132	52	188	69	784	1657	100	138	39	23	119	118	100	
70	Ghandani	48	138	50	192	68	838	1684	98	137	41	23	119	124	111	
71	Shukul	50	128	50	196	64	858	1654	96	132	35	20	104	112	102	
72	Anandram	45	133	53	182	71	803	1586	95	148	34	22	121	112	100	
73	Asuram	40	127	47	186	66	808	1685	94	130	34	25	119	117	101	
74	Manbhur	25	136	49	185	65	819	1655	106	140	42	22	114	118	107	
75	Samara	30	132	59	185	70	843	1716	91	138	39	21	128	111	102	
76	Sakharam	40	134	47	184	61	813	1600	101	136	37	22	111	112	101	
77	Kathari	48	132	52	192	70	830	1658	101	141	40	21	131	116	104	
78	Chamroo	48	135	52	198	68	773	1598	98	143	41	23	120	123	105	
79	Sadha	45	136	52	185	74	787	1627	103	144	38	22	127	118	103	
80	Jheetman	50	129	44	191	61	823	1592	97	139	39	20	113	112	99	
81	Jhaiman	45	131	49	183	69	763	1490	95	157	35	21	118	114	101	
82	Sukul	47	129	48	182	66	818	1633	100	137	38	19	104	116	101	
83	Buri	45	125	52	189	70	833	1643	100	139	41	21	127	110	97	
84	Budhi	45	138	55	187	67	823	1650	94	145	41	24	119	126	110	
85	Jaiudeo	48	135	55	197	70	823	1656	93	139	40	23	120	116	100	
86	Ganesh	48	131	50	187	69	843	1730	95	142	47	24	120	116	101	
87	Barri	48	135	55	195	70	798	1694	100	141	36	22	115	112	101	
88	Thakur	35	135	51	197	71	813	1635	102	140	34	21	117	117	103	
89	Mainram	38	132	50	193	62	813	1672	96	141	34	20	115	111	100	
90	Prithi Singh	35	127	51	189	67	823	1653	95	137	43	22	121	112	99	
91	Heraram	35	138	52	191	68	798	1624	95	141	36	25	124	127	108	
92	Pithurgam	30	132	52	182	72	828	1667	105	135	43	25	118	116	105	

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
93	Adhiram	45		130	56	195	67	823	1712	95	142	35	24	113	120	107
94	Buraha	25		137	50	189	62	853	1705	105	142	40	25	114	117	106
95	Raja Ram	38		131	52	188	69	823	1658	105	139	40	22	125	111	100
96	Jade	40		131	47	187	54	829	1685	95	140	38	20	111	118	106
97	Gangaram	40		135	52	178	66	773	1568	92	141	39	21	112	114	98
98	Ramdhan	35		134	48	172	67	809	1658	106	141	42	21	120	112	105
99	Pinkham	45		134	49	187	65	798	1664	98	138	41	22	113	120	105
100	Samuru	48		135	54	191	72	783	1527	103	139	46	23	115	117	107
101	Bodhan	45		141	49	191	65	831	1642	104	147	44	21	120	115	105
102	Bindia	44		138	51	189	69	796	1571	99	146	40	24	114	123	108
103	Dhansar	35		135	50	182	62	803	1577	96	141	37	21	118	116	103
104	Tilakram	30		130	45	187	60	818	1662	96	141	41	22	113	116	103
105	Phiroo	25		134	51	184	67	848	1698	99	135	33	22	119	116	105
106	Ram Bhoro	38	105	135	47	199	62	802	1675	106	135	40	21	115		
107	Tainan	19	99	132	43	195	52	748	1557	94	136	36	21	106		
108	Moti	30	102	128	45	188	59	763	1510	95	135	37	28	111		
109	Mirit	40	101	129	45	197	62	825	1559	100	137	43	24	105		
110	Agcher	38	98	129	49	187	62	813	1641	89	135	37	23	115		
111	Sankar	40	106	135	50	190	66	868	1736	103	136	46	28	119		
112	Lalu	38	99	135	50	182	64	796	1706	101	137	41	23	117		
113	Mahdew	30	98	131	49	170	62	748	1561	102	142	35	22	110		
114	Sander	36	104	131	42	187	55	828	1654	103	128	40	22	110		
115	Yokhan Lal	30	109	135	50	181	61	840	1742	101	140	38	25	112		
116	Param Shokh	32	103	129	56	193	71	810	1652	98	135	41	22	126		
117	Sakha	40	104	129	53	197	67	784	1655	97	128	40	24	123		
118	Bikram	35	101	131	46	187	59	784	1631	99	134	37	23	116		
119	Kirwa	20	104	129	46	180	57	772	1626	95	141	36	23	106		
120	Rurajil	32	101	128	51	188	58	748	1505	97	135	36	21	114		
121	Chaila	18	107	129	45	184	57	778	1621	99	138	37	20	108		
122	Malipit	21	101	129	46	185	61	778	1597	99	132	35	23	113		
123	Hugla	20	99	128	47	187	64	758	1545	100	135	39	22	112		
124	Ram nath	22	101	129	45	179	57	813	1640	104	136	41	23	110		
125	Bhagwan	38	105	133	45	197	59	805	1582	105	136	39	21	111		
126	Narand	39	104	134	52	191	63	814	1611	105	145	41	21	111		
127	Manboor	18	99	121	41	183	51	770	1611	95	132	38	20	101		
128	Manj	40	107	135	49	192	68	768	1621	106	137	38	22	123		
129	Hardew	26	105	135	47	185	63	798	1625	104	134	34	20	115		
130	Dilu	40	101	137	48	192	64	838	1676	99	137	38	23	116		
131	Hari Kishan	30	105	131	50	193	63	778	1536	100	139	42	21	118		
132	Parulam	23	101	132	42	175	55	758	1556	99	134	39	21	108		
133	San Raj	33	104	129	46	187	62	738	1520	95	134	37	20	112		
134	Julai	40	105	125	52	189	73	778	1571	102	129	43	19	123		
135	Murari	44	97	127	50	183	66	784	1606	95	132	35	23	115		
136	Durga	40	103	135	49	195	62	801	1610	102	137	43	25	116		
137	Bajrangi	35	103	135	46	184	60	764	1525	102	139	39	21	114		
138	Lalu	35	101	132	45	185	63	789	1617	99	137	36	23	109		
139	Lukwan	44	108	135	51	180	66	802	1609	106	141	44	22	122		
140	Gageswar	46	101	128	48	188	67	766	1535	105	134	43	23	116		
141	Isri	48	107	137	51	176	63	800	1525	103	149	40	22	115		
142	Pachhu	39	101	130	48	189	62	779	1569	97	135	37	21	116		
143	Durgahi	20	101	139	45	196	59	824	1666	99	134	36	23	113		
144	Ganesh	27	98	130	45	190	57	844	1661	87	127	40	26	109		
145	Bhai Ram	30	104	138	49	185	61	824	1622	108	139	40	23	118		
146	Gagadhar	35	102	127	46	196	60	816	1645	101	135	35	22	115		
147	Paru	44	103	127	50	191	68	814	1684	108	131	39	23	116		
148	Surit	46	99	133	46	187	64	806	1621	96	132	39	22	118		
149	Babulal	47	101	139	52	192	67	769	1657	101	137	41	21	121		

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serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
150	Sahdew	41	97	129	46	197	58	819	1680	105	128	36	22	114		
151	Jakun	45	98	126	40	175	58	734	1512	95	129	38	22	100		
152	Ranantar	22	101	128	50	192	62	804	1635	92	131	37	23	112		
153	Ranjan	38	104	133	48	198	57	838	1633	107	135	42	23	109		
154	Dehidial	46	100	127	45	194	64	807	1615	100	129	37	23	113		
155	Mathur	40	99	131	52	182	70	819	1620	99	135	40	24	120		
156	Akher	46	109	137	51	185	67	818	1660	103	140	38	24	120		
157	Dew Chand	36	97	128	47	177	62	820	1640	96	129	39	25	109		
158	Joti	50	101	135	46	191	67	808	1620	98	135	45	22	116		
159	Akber	50	99	133	49	175	65	804	1579	97	133	41	24	117		
160	Raju	38	105	132	48	183	62	784	1635	97	135	40	24	108		
161	Barami	41	97	129	46	188	62	824	1598	106	137	37	22	105		
162	Pachhu	40	104	136	49	201	66	789	1617	104	139	41	23	118		
163	Jawahir	42	101	136	45	186	61	804	1580	101	134	40	23	117		
164	Mahip	22	107	129	44	175	60	794	1612	99	137	36	23	107		
165	Nukhan	40	101	135	45	184	62	768	1550	99	136	39	21	113		
166	Nanhu	24	102	127	48	192	58	822	1632	99	133	39	22	118		
167	Jailal	39	98	130	49	182	63	770	1555	98	133	39	21	118		
168	Parmeshar	38	106	140	50	196	67	804	1640	112	143	41	23	119		
169	Ram Kishan	38	108	131	46	178	59	787	1536	102	148	41	22	116		
170	Gajraj	40	104	129	48	188	60	804	1537	103	135	38	22	112		
171	Rupnarain	26	102	126	45	184	57	801	1611	104	136	40	23	108		
172	Sukhali	48	97	128	45	187	62	754	1496	99	129	37	22	105		
173	Odu	50	103	125	45	187	60	791	1605	104	131	39	21	105		
174	Bhukan	25	102	127	44	187	57	789	1604	99	137	37	22	108		
175	Mukat	25	103	128	46	188	60	781	1548	95	131	37	22	110		
176	Chetamber	40	94	129	45	184	57	734	1470	88	125	37	21	108		
177	Bhegan	32	97	120	48	187	63	758	1574	97	128	37	21	113		
178	Sumaru	30	104	132	40	186	56	799	1515	105	140	37	21	109		
179	Ram Karan	38	109	135	47	194	65	814	1634	100	138	39	24	118		
180	Gopi	26	102	124	49	184	62	814	1655	99	129	40	25	103		
181	Deadat	39	105	132	45	191	61	767	1548	106	137	45	22	114		
182	Buddhu	38	104	138	51	185	67	809	1625	97	135	37	21	119		
183	Jokhan	38	105	134	49	191	64	827	1622	102	135	41	23	117		
184	Katal	26	109	135	47	187	60	820	1653	101	139	38	23	112		
185	Sukhan	26	103	130	46	170	61	834	1668	97	138	40	22	107		
186	Propad	45	110	137	49	190	70	767	1559	99	143	43	22	124		
187	Bhaqawan	38	112	131	48	186	64	799	1630	102	135	35	23	117		
188	Shyam Lal	40	107	136	47	192	68	770	1580	99	144	40	23	123		
189	Dhloo	28	98	127	46	185	56	767	1535	102	135	40	24	108		
190	Kebal	50	99	127	46	182	59	784	1604	99	137	38	23	109		
191	Puran	25	102	126	44	182	59	807	1671	96	131	40	22	113		
192	Buisiri	38	103	130	48	188	62	830	1672	104	131	38	23	110		
193	Agar	45	101	133	52	186	65	820	1650	105	136	43	25	113		
194	Narayan	39	100	124	45	207	59	824	1620	100	131	33	21	108		
195	Brajan	40	107	131	47	201	68	804	1642	107	135	39	24	126		
196	Nadip	36	101	133	49	177	67	820	1640	97	129	37	24	119		
197	Sukhdew	28	105	137	43	187	60	781	1562	104	135	38	19	111		

GROUP (20) : ORAON

DISTRICT : MIRZAPUR

1	Buddhu Lal	32		125	50	191	63	858	1656	92	137	39	20	117	112	101
2	Gopal	45		125	47	184	63	771	1516	98	131	36	17	108	109	99
3	Bulchoo Nath	35		133	50	183	63	786	1565	102	136	35	20	110	109	99
4	Samchar	48		128	50	187	64	816	1627	99	136	36	21	112	110	101
5	Modar	45		134	44	194	56	829	1627	103	131	40	20	104	110	104

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
6	Chamroo	24	124	47	181	64	871	1655	96	132	37	21	123	102	97	97
7	Mahaprasad	38	129	50	187	60	825	1682	104	133	40	20	112	111	98	98
8	Bhira	42	126	44	189	60	816	1572	92	136	33	19	110	109	96	96
9	Jailal	35	124	46	184	63	786	1558	95	127	35	19	110	104	93	93
10	Bilku	34	125	49	183	67	791	1533	93	129	41	23	118	108	96	96
11	Suknath	26	121	52	185	68	803	1617	93	132	35	23	123	114	99	99
12	Dhanla	38	126	53	192	71	831	1694	97	127	39	21	125	119	103	103
13	Angroo	40	125	47	177	60	815	1611	94	128	34	22	108	110	98	98
14	Bandhar	28	127	42	191	57	801	1553	101	137	44	20	112	118	98	98
15	Macharia	34	130	47	173	61	764	1467	101	146	36	19	114	107	94	94
16	Haru	45	126	54	188	68	796	1591	103	140	37	22	117	108	99	99
17	Sanichar	26	134	50	196	63	811	1635	100	138	40	20	119	112	100	100
18	Challorani	30	133	41	191	53	811	1652	96	137	40	18	108	108	102	102
19	Kaharoo	40	130	48	195	64	854	1644	97	142	39	21	120	113	101	101
20	Sukhoo	40	132	46	192	59	836	1660	110	137	40	21	103	107	102	102
21	Mahadel	—	137	42	192	60	867	1637	102	140	40	19	114	116	105	105
22	Kachuara	36	131	50	196	68	823	1621	95	132	36	21	122	114	105	105
23	Bayer	40	123	49	189	68	826	1670	92	136	35	21	124	107	99	99
24	Khasoo	32	137	50	189	62	841	1630	99	139	36	22	116	111	100	100
25	Munroo	50	129	52	192	69	806	1623	100	137	35	22	109	119	103	103
26	Maniar	35	136	47	189	61	841	1644	106	135	38	19	113	113	101	101
27	Lakhoman	36	125	44	186	58	786	1562	87	140	33	18	105	110	98	98
28	Bhandari	32	126	56	183	67	801	1580	97	137	35	23	124	110	98	98
29	Mitroo	38	136	44	193	66	—	—	95	136	45	18	113	113	107	107
30	Bhadra	32	127	44	195	59	861	1737	93	135	40	21	108	112	99	99
31	Manni	32	128	49	183	65	834	1702	95	138	36	21	119	104	98	98
32	Pukra	34	127	46	192	62	842	1599	88	142	37	20	120	118	105	105
33	Thoru	40	134	43	173	58	809	1563	98	138	32	21	112	112	100	100
34	Lohra	45	125	50	191	61	769	1515	91	140	36	21	119	112	100	100
35	Murha	35	122	50	193	62	772	1532	96	132	34	22	111	109	100	100
36	Pacha	46	130	48	186	58	777	1577	101	139	37	17	116	111	101	101
37	Mahto	20	129	49	191	66	849	1694	100	137	39	22	123	111	102	102
38	Dhooloo	42	135	51	192	63	849	1700	106	137	38	19	119	112	102	102
39	Laundia	28	129	46	182	59	839	1688	101	133	40	19	109	111	98	98
40	Madina	24	135	46	189	55	813	1641	97	138	35	20	114	113	103	103
41	Ladhoo	35	144	51	195	68	839	1728	105	146	38	19	128	112	106	106
42	Jholoo	45	128	45	174	60	819	1640	97	139	38	23	110	108	99	99
43	Burga	32	135	50	192	62	795	1588	94	139	37	23	119	114	105	105
44	Bolahai	26	127	46	186	59	774	1520	95	136	37	22	108	110	96	96
45	Babdo	46	132	51	202	64	829	1666	97	134	42	21	110	120	106	106
46	Khundra	36	129	46	187	59	779	1592	95	136	38	21	112	111	100	100
47	Ghokna	25	126	45	181	56	807	1596	92	133	33	19	104	112	95	95
48	Bhudka	44	134	47	193	61	854	1700	104	147	39	21	108	108	100	100
49	Dilrani	30	131	50	187	63	779	1646	97	137	36	21	117	116	102	102
50	Mundra	28	126	46	187	57	815	1685	96	145	40	23	108	117	100	100
51	Chettoo	31	129	50	196	66	779	1560	100	138	37	22	120	111	101	101
52	Pagaisura	34	137	46	187	59	829	1644	99	140	40	21	105	109	98	98
53	Bhadeon	36	130	51	194	68	829	1608	99	141	33	20	124	107	101	101
54	Surian	30	121	48	183	57	779	1614	89	133	35	21	108	103	96	96
55	Narahari	40	136	47	179	60	769	1567	101	137	35	21	115	108	100	100
56	Santo	42	134	46	188	59	776	1635	97	138	38	20	112	110	101	101
57	Bula	35	122	46	183	59	779	1490	88	135	35	18	106	104	94	94
58	Rupsai	19	129	49	190	61	799	1617	94	137	35	21	115	108	101	101
59	Maji	36	135	45	192	60	824	1640	92	142	37	20	113	113	103	103
60	Laloo	20	130	43	190	46	794	1632	98	138	41	22	111	112	107	107

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth.	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
61	Sunao	38	133	44	195	61	817	1625	109	139	35	21	111	113	105	95
62	Rajroo	46	120	45	177	59	819	1630	94	136	37	19	109	112	95	97
63	Mahanaun	28	131	44	194	60	819	1600	94	141	40	24	104	109	97	97
64	Chungroo	35	139	51	206	68	849	1670	104	141	43	22	124	119	107	107
65	Ratto	46	129	51	184	64	826	1620	99	136	35	22	122	105	96	96
66	Nadia	36	131	42	187	60	821	1619	99	139	38	21	108	112	96	96
67	Jugia	30	127	48	189	66	789	1609	95	138	40	20	118	110	98	98
68	Laloo	25	127	45	192	57	819	1670	98	137	38	21	112	110	99	99
69	Ghera	38	135	46	196	64	799	1550	100	138	41	21	118	120	105	105
70	Jhusman	40	131	47	195	64	834	1657	109	140	41	21	113	114	101	101
71	Jhari	32	135	46	200	62	815	1692	93	140	35	22	120	113	105	105
72	Jamna	36	132	48	197	67	769	1557	101	136	37	21	125	114	102	102
73	Murra	45	133	46	194	64	799	1596	102	139	39	20	110	112	104	104
74	Jarrah	35	129	46	181	55	785	1540	100	134	36	21	103	112	100	100
75	Sandhia	28	127	45	194	58	839	1678	95	135	39	19	104	111	100	100
76	Ram	38	136	50	190	64	813	1620	107	138	38	23	116	117	103	103
77	Sundar	37	129	45	184	62	774	1590	96	134	39	17	106	105	98	98
78	Landu	40	127	45	190	62	805	1629	98	132	35	18	112	108	96	96
79	Sanswar	18	132	47	189	62	779	1536	95	137	38	21	113	107	98	98
80	Thasu	30	129	54	194	71	819	1681	108	137	42	24	128	113	103	103
81	Phugoo	38	125	45	185	60	792	1600	97	128	36	19	109	105	95	95
82	Sarjoo	35	130	49	186	55	809	1614	94	142	32	21	101	105	96	96
83	Latha	42	125	45	187	56	749	1480	100	136	40	20	112	106	95	95
84	Jutee	40	127	42	188	55	799	1572	97	139	38	21	104	112	98	98
85	Gumgra	40	127	49	189	59	719	1460	95	133	39	19	109	112	96	96
86	Gangalal	44	135	47	193	60	809	1628	93	137	41	22	114	114	105	105
87	Sakra	50	127	51	190	66	779	1552	95	128	42	21	120	114	100	100
88	Ladey	50	132	48	187	59	799	1583	98	137	38	21	107	110	99	99
89	Kanoo	40	134	50	183	65	819	1606	92	135	35	19	123	115	101	101
90	Cherha	50	135	50	187	57	796	1638	92	139	37	19	110	114	105	105
91	Beebhoo	38	129	49	184	61	789	1582	98	137	38	20	117	111	96	96
92	Chehenga	42	125	41	187	52	789	1566	95	133	41	18	102	106	96	96
93	Mungen	50	138	49	203	62	809	1667	97	147	41	19	113	117	101	101
94	Gopan	28	127	46	184	59	819	1647	93	132	37	19	108	109	98	98
95	Sukha	45	129	45	195	58	834	1689	94	135	39	23	110	107	100	100
96	Bhagloo	45	143	48	197	66	844	1616	102	140	39	23	120	119	105	105
97	Makloo	28	139	49	197	63	892	1778	105	143	37	20	117	113	103	103
98	Mathgir	48	137	57	198	72	869	1654	105	138	39	24	124	125	107	107
99	Suddhu	27	128	57	192	63	869	1666	97	139	36	22	114	112	100	100
100	Guba	45	125	46	195	62	839	1607	92	136	40	20	104	106	97	97

GROUP (21) : RAJWAR

DISTRICT : MIRZAPUR

1	Sukhanrajwar	44	136	50	189	63	771	1617	100	141	37	24	115	125	108
2	Ramdelhi	48	130	50	192	67	791	1596	101	136	40	20	118	115	100
3	Bhagubab	25	133	42	189	55	857	1608	103	139	40	21	102	122	105
4	Narayan	55	120	43	185	55	771	1590	95	132	40	24	100	110	97
5	Dhanrai	50	133	52	188	68	801	1630	98	137	32	23	126	116	102
6	Bahadur	40	130	48	183	62	841	1702	101	128	33	24	118	115	101
7	Budhram	35	124	50	187	63	771	1585	96	135	35	20	114	116	98
8	Pradham	50	125	51	184	69	821	1618	95	134	40	21	118	115	100
9	Mankeri	35	131	46	184	60	771	1574	97	138	32	20	112	117	101
10	Dudhiall	40	130	48	186	66	811	1619	101	139	37	20	115	113	100
11	Moharsan	38	127	45	185	64	821	1584	94	142	34	21	110	117	100
12	Bondhano	35	128	51	187	65	806	1604	97	139	34	19	122	115	99
13	Sajanrai	40	125	50	180	63	811	1577	94	138	35	20	120	109	99
14	Dharogi	36	125	54	199	72	881	1771	99	138	36	22	124	111	98
15	Deosai	35	129	49	188	61	837	1631	97	136	35	21	116	119	103

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
16	Nilbandoo	34	127	46	195	60	806	1611	92	139	37	21	118	110	97	97
17	Tharku	38	126	45	187	60	781	1587	95	136	35	21	109	116	100	109
18	Ramdhan	40	132	49	181	60	791	1552	105	136	37	20	110	116	103	103
19	Manlal	18	125	51	182	62	773	1536	93	131	34	18	112	112	100	100
20	Burhan	45	129	53	190	69	827	1597	97	139	34	20	113	109	98	98
21	Ram Pd.	30	132	48	190	62	800	1582	100	139	35	21	113	115	99	99
22	Raiwap	37	129	51	196	64	826	1611	96	136	39	23	117	113	97	97
23	Desbadhu Ram	45	128	51	181	65	821	1618	92	137	29	24	110	114	103	103
24	Baldeo Ram	38	136	51	188	63	836	1645	106	144	41	23	116	118	102	102
25	Sukta	40	133	48	187	62	811	1606	95	142	33	22	118	115	104	104
26	Hardeo	50	124	40	181	58	794	1496	89	131	31	19	103	113	96	96
27	Gaontoo	50	130	51	190	65	825	1656	107	138	35	21	115	114	103	103
28	Singarsai	40	134	50	195	66	811	1696	97	142	39	23	123	116	106	106
29	Buddhu	48	135	53	188	67	866	1604	103	135	37	22	114	116	107	107
30	Deosai	35	125	50	178	59	790	1544	88	132	35	19	112	110	97	97
31	Pawanram	36	130	52	192	67	816	1560	95	134	40	23	117	115	101	101
32	Achanbit	28	134	46	185	59	846	1660	97	138	33	22	106	115	102	102
33	Bhajan	35	141	53	195	68	861	1644	108	140	42	22	118	123	107	107
34	Lagna	38	131	45	197	61	831	1590	104	145	34	21	111	117	103	103
35	Jhidhan	40	126	49	183	66	781	1575	97	135	37	21	119	107	97	97
36	Manraj	28	129	53	174	64	806	1619	88	141	36	23	118	107	96	96
37	Bhajanwa	30	125	44	171	53	791	1558	96	137	34	19	97	107	98	98
38	Ganontoo	32	127	47	191	62	801	1650	89	132	34	21	114	115	98	98
39	Tikla	36	129	49	194	64	806	1524	90	136	35	22	119	117	97	97
40	Ghansi	48	129	57	188	72	831	1660	95	131	37	20	128	113	101	101
41	Manraj	40	129	47	182	64	851	1555	101	135	32	24	121	112	97	97
42	Pramsai	38	127	48	185	70	805	1596	96	135	31	19	123	115	100	100
43	Usith	50	126	45	186	62	831	1677	99	134	41	20	110	107	98	98
44	Malsai	38	131	46	189	63	825	1625	94	135	37	19	112	114	100	100
45	Dhansai	50	134	44	197	60	801	1650	95	135	39	19	113	121	104	104
46	Hukumsai	36	131	45	196	63	841	1706	100	138	36	21	117	116	105	105
47	Buhia	40	122	47	185	68	776	1573	88	136	35	21	116	112	97	97
48	Shanoo	35	133	50	195	67	821	1630	106	136	36	21	120	123	105	105
49	Bachan	30	130	43	184	58	811	1610	96	140	34	20	112	112	100	100
50	Jhansai	45	132	44	194	61	825	1647	101	139	37	21	113	115	99	99
51	Nanha	22	135	50	181	64	801	1596	95	141	34	21	120	117	103	103
52	Chanru	45	136	50	197	64	767	1568	94	139	35	21	116	122	109	109
53	Dadleu	35	133	54	189	72	805	1610	94	144	34	21	124	117	99	99
54	Burha	40	129	53	193	65	831	1570	92	139	36	20	117	114	101	101
55	Sunder	45	130	47	187	60	815	1594	101	138	32	21	110	109	98	98
56	Sukhdeo	46	132	54	184	69	821	1585	95	136	34	21	115	110	101	101
57	Kamra	35	130	52	196	66	839	1644	99	145	35	19	117	116	98	98
58	Gaddo	28	127	50	184	60	761	1475	93	129	34	20	111	109	96	96
59	Ghangzi	30	129	46	178	61	779	1580	97	145	33	20	108	112	101	101
60	Ghambhira	35	136	48	195	57	801	1663	99	140	36	24	108	122	107	107
61	Bigua	36	130	50	178	62	811	1573	97	140	37	23	111	119	102	102
62	Srimangal	35	128	51	195	66	816	1622	95	141	36	23	122	108	99	99
63	Manni	40	135	52	181	64	846	1585	107	136	40	22	120	124	103	103
64	Ram Khan	42	131	45	186	59	801	1585	97	136	32	24	113	115	100	100
65	Nanki	48	127	48	181	64	806	1636	100	137	33	21	114	110	99	99
66	Ghasiram	48	131	52	185	67	811	1637	106	137	40	22	117	114	101	101
67	Ghandi	30	129	47	192	60	811	1549	102	135	37	21	112	113	101	101
68	Bholwai	40	130	46	186	62	831	1664	94	139	34	21	118	114	102	102
69	Mukundh	25	126	44	188	58	791	1575	94	137	37	22	108	111	95	95
70	Jagarnath	30	128	51	188	66	817	1580	95	137	35	22	113	114	103	103
71	Diukariah	45	129	45	188	59	836	1644	96	138	35	22	116	112	103	103
72	Thakur	35	136	45	195	63	797	1537	97	135	36	20	109	115	101	101

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serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
73	Dhansai	36	132	45	185	52	811	1590	95	136	35	18	108	109	102	97
74	Sadhu	42	130	52	191	65	801	1559	103	141	32	24	121	109	97	108
75	Sansai	35	139	46	196	59	843	1610	104	142	37	19	118	124	108	100
76	Bandoo	44	129	42	184	56	791	1545	95	137	34	21	112	109	100	97
77	Budhoo	40	123	47	182	64	826	1695	95	132	35	24	118	110	97	108
78	Natraram	30	125	44	179	56	757	1480	96	136	33	21	105	108	96	101
79	Rameswar	38	135	40	184	54	821	1590	99	137	39	18	100	111	101	98
80	Charku	30	125	51	185	66	801	1555	96	131	34	22	118	111	103	94
81	Sreemangal	18	127	52	185	67	806	1570	94	137	33	21	119	112	107	94
82	Rupsai	38	124	42	174	56	757	1520	86	127	31	22	108	107	94	103
83	Dilram	38	126	47	182	63	821	1630	97	134	35	21	113	115	103	102
84	Daloo	35	129	49	200	66	811	1593	107	139	35	21	123	120	102	101
85	Sajan	45	119	47	179	64	751	1425	99	132	35	22	113	115	101	100
86	Pandoo	40	129	56	191	70	791	1600	96	139	31	23	128	120	100	94
87	Burratil	48	124	45	176	57	778	1520	95	132	34	18	106	103	94	104
88	Burriha	50	132	51	192	69	856	1651	96	137	39	19	120	114	104	101
89	Sivanath	45	125	48	182	64	781	1572	95	133	39	20	108	111	101	103
90	Ram P.d.	35	131	46	185	62	826	1654	104	135	36	22	114	112	103	101
91	Raghuuath	32	131	45	187	59	787	1546	95	135	36	21	110	117	101	103
92	Jainath	38	131	44	189	64	851	1711	99	135	39	21	111	113	103	97
93	Nanki Ram	35	126	49	184	62	815	1545	98	134	30	23	115	110	97	99
94	Dilsai	38	128	47	192	63	801	1545	95	138	36	21	113	110	99	97
95	Burah	40	125	44	180	59	764	1514	93	132	34	22	108	106	97	102
96	Mayaram	36	129	45	188	59	806	1567	93	138	37	22	108	112	102	99
97	Jithu	30	127	45	182	58	791	1530	97	139	34	19	110	114	99	102
98	Bagarsai	38	129	51	188	67	825	1583	103	135	36	19	113	112	102	99
99	Ugair	42	126	43	183	59	821	1678	96	142	35	19	114	111	99	104
100	Sarku	40	130	48	184	66	845	1677	96	139	36	20	118	112	104	95
101	Diram	40	131	50	188	60	801	1532	94	143	35	22	118	106	95	99
102	Bhajan	38	125	50	190	64	851	1685	92	138	33	20	118	112	99	107
103	Dhularsai	19	135	47	171	62	796	1601	99	146	34	22	109	118	107	98
104	Bhikari	26	135	48	193	64	825	1650	95	135	35	21	117	116	98	100
105	Roofsai	30	132	50	182	64	811	1535	100	137	35	21	116	109	100	

GROUP (22) : KORWA

DISTRICT : MIRZAPUR

1	Paltoo	32	129	44	186	56	787	1562	100	136	40	20	100	112	100
2	Chuta	55	133	52	193	62	809	1661	96	135	41	21	113	117	105
3	Dandoo	38	133	49	179	65	792	1571	98	139	38	22	111	117	104
4	Samarua	38	132	54	197	66	812	1620	97	135	44	23	109	123	109
5	Rahua	34	127	43	187	57	812	1610	97	132	37	22	110	116	100
6	Remlal	28	127	41	190	53	791	1557	96	134	39	22	104	116	100
7	Lumua	40	127	47	193	58	767	1576	97	133	47	22	111	119	104
8	Suddhu	35	130	55	203	72	837	1609	102	140	48	22	126	119	103
9	Sundra	32	130	40	177	54	807	1550	92	128	38	19	98	107	100
10	Thothi	38	131	43	198	63	842	1650	99	132	47	21	116	119	108
11	Dumarua	30	131	54	192	67	802	1632	98	137	38	23	118	126	111
12	Budhan	40	136	47	187	61	922	1609	103	137	40	23	110	112	104
13	Khuwari	36	130	47	189	64	832	1589	98	136	41	21	113	114	105
14	Choli	30	139	48	200	62	797	1550	105	137	43	22	110	114	105
15	Julia	42	137	47	187	63	822	1605	101	132	39	22	113	117	103
16	Sukhdeo	38	132	47	179	63	822	1617	97	137	38	22	117	110	99
17	Mangru	37	135	45	189	58	797	1567	99	134	43	21	108	126	105
18	Poraha	45	121	43	186	59	794	1483	93	130	40	23	116	114	95
19	Jatha	38	119	48	177	62	847	1624	94	132	42	22	116	113	95
20	Kuka	46	135	51	195	64	861	1669	106	138	41	22	115	119	110

serial no.	name	age	Frontal Breadth	Bi-zygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Fr.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
21	Bhukal	40	127	47	184	57	774	1520	100	133	33	20	112	109	102	
22	Lohra	28	129	45	180	59	782	1570	102	134	49	23	108	109	105	
23	Chunia	45	130	47	179	63	792	1587	104	132	41	23	111	115	104	
24	Rasia	36	135	44	178	58	800	1558	96	134	36	21	106	112	102	
25	Najhroo	38	126	46	187	63	775	1624	101	135	36	23	110	111	98	
26	Sandhane	28	130	45	185	57	822	1614	99	132	37	22	105	113	100	
27	Guja	35	130	49	177	66	841	1648	104	131	40	24	110	107	102	
28	Bilta	35	135	42	191	57	813	1607	104	136	40	23	115	113	99	
29	Barra	40	130	47	189	60	832	1584	97	135	43	23	106	110	101	
30	Pasloo	32	134	47	192	59	827	1573	101	136	40	21	108	118	107	
31	Bishan	18	125	49	187	64	837	1625	95	126	42	24	113	114	100	
32	Gutai	32	129	48	196	57	747	1536	97	132	40	21	111	109	98	
33	Sonha	30	132	47	189	61	747	1480	85	135	42	19	123	123	107	
34	Kandoo	45	125	47	187	61	817	1580	96	135	38	23	110	112	99	
35	Bhokthi	30	132	44	187	57	837	1632	99	129	41	24	108	122	101	
36	Sudhan	40	127	45	175	63	787	1475	97	135	44	23	110	107	107	
37	Nokhnath	35	129	45	184	58	763	1530	95	137	41	23	102	118	100	
38	Pahloo	46	129	45	183	59	787	1560	99	131	41	23	110	108	100	
39	Manbodh	35	127	52	184	64	787	1560	97	134	40	23	116	117	101	
40	Baisa	28	130	50	182	62	810	1550	97	137	40	22	112	112	107	
41	Dasarath	25	136	42	181	56	822	1588	97	134	40	21	105	122	105	
42	Sukhi	38	131	46	186	56	847	1622	90	134	42	19	105	111	99	
43	Pruthna	38	126	49	185	64	795	1519	97	131	42	19	115	109	100	
44	Ladoo	22	129	41	189	49	797	1594	96	136	35	19	109	109	106	
45	Kagra	18	128	41	189	54	842	1686	101	132	37	20	110	112	105	
46	Bahrja	35	131	48	180	61	823	1566	105	135	39	21	108	106	99	
47	Phagoo	40	131	52	189	67	822	1650	106	135	42	23	120	113	102	
48	Mithur	35	131	44	181	53	777	1538	99	137	39	20	106	114	106	
49	Sricharan	28	130	51	187	64	787	1480	90	132	41	21	115	114	104	
50	Bhegue	28	129	50	189	62	822	1669	102	130	40	22	114	111	101	
51	Birjhue	45	135	47	187	62	817	1570	104	137	42	20	119	111	102	
52	Pusna	24	128	52	182	63	802	1577	95	132	40	24	113	112	98	
53	Japta	18	120	42	171	58	803	1558	85	136	37	21	104	108	96	
54	Aghua	32	125	46	191	53	767	1515	95	130	38	22	101	109	93	
55	Sohrai	34	127	44	190	53	817	1520	95	135	36	22	103	108	102	
56	Mahra	35	125	46	184	57	832	1520	94	132	39	21	110	106	97	
57	Nadir	18	127	47	196	63	817	1552	95	134	38	21	108	116	101	
58	Mangal	19	121	47	187	57	797	1513	92	144	38	22	108	111	99	
59	Sain chara	29	123	44	182	62	837	1585	95	135	40	21	110	103	96	
60	Piloo	40	137	47	192	60	877	1600	90	135	44	22	118	112	109	
61	Lodoo	14	132	50	188	62	847	1552	86	138	33	21	110	114	102	
62	Akloo	36	133	45	194	59	762	1627	98	135	38	20	103	114	103	
63	Sukhug	32	133	45	187	64	827	1610	98	135	43	22	116	109	101	
64	Mewa	30	128	46	188	58	857	1600	97	130	34	20	112	106	98	
65	Dhumnea	19	128	49	189	60	841	1585	95	140	34	18	110	115	99	
66	Sajoo	20	130	48	181	62	797	1627	92	132	42	21	120	114	101	
67	Chamroo	36	134	42	192	57	812	1618	96	140	40	20	113	107	102	
68	Gaya	35	131	46	195	60	817	1690	102	137	40	21	116	119	105	
69	Jawahi	26	134	44	190	58	832	1597	95	136	41	22	108	114	104	
70	Pachloo	32	136	47	193	62	822	1679	100	143	40	25	116	119	104	
71	Bhual	24	125	48	184	63	807	1577	97	133	35	23	113	110	97	
72	Gorya	30	132	48	191	65	812	1612	105	137	38	19	116	116	105	
73	Jogia	28	133	45	183	56	820	1579	105	132	34	19	107	110	102	
74	Bhola	30	126	48	188	59	847	1588	95	130	41	21	109	111	99	
75	Ruita	48	135	48	192	67	792	1595	104	135	42	22	112	117	105	
76	Dholia	35	140	47	188	57	787	1555	97	135	41	21	108	116	107	
77	Batai	25	131	46	191	59	779	1476	95	131	37	22	108	111	98	

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.	Orbito Nas. Arc	Orbito Nas. Br.
78	Bandhoo,	36	130	52	183	66	821	1614	100	134	35	25	113	115	99	
79	Ruddi	38	134	50	185	65	807	1497	101	137	40	20	115	115	100	
80	Jutan	35	131	48	187	60	793	1583	97	132	41	22	107	115	99	
81	Jhirga	45	135	42	184	58	822	1580	100	139	39	20	109	115	103	
82	Sahadeo	28	131	48	189	57	787	1541	94	139	41	23	116	117	101	
83	Bhukla	50	132	48	183	67	777	1607	101	142	34	22	118	111	95	
84	Gerha	48	135	47	189	67	787	1606	102	133	45	24	112	116	104	
85	Sukhin	35	116	41	180	55	—	1480	93	124	35	22	103	103	93	
86	Mohon	45	131	55	183	68	827	1570	99	136	41	22	119	111	100	
87	Mathura	40	132	50	195	66	827	1587	103	135	43	22	119	115	103	
88	Lotha	32	134	47	194	63	837	1626	100	135	41	20	118	114	103	
89	Roopan	40	129	49	193	62	787	1580	96	128	37	20	116	115	102	
90	Jhiga II	36	132	54	188	65	827	1607	100	139	39	22	116	112	98	
91	Akloo	38	137	38	192	53	—	1530	98	140	43	17	106	112	104	
92	Nakoo	38	137	49	200	65	867	1682	94	145	46	21	123	110	107	
93	Pandoo	34	128	44	188	57	817	1614	94	129	37	20	111	114	101	
94	Ghansia	22	125	48	189	62	792	1594	89	137	38	18	115	105	96	
95	Sukhna I	30	131	48	191	60	837	1631	92	137	35	20	118	112	99	
96	Thakur	40	132	45	187	60	777	1550	101	135	39	21	112	112	102	
97	Sukhna II	32	132	45	194	57	797	1610	85	140	37	21	108	114	101	
98	Bhagloo	30	126	46	185	57	821	1590	102	135	39	18	107	108	98	
99	Jhoria	20	133	42	189	54	904	1573	94	138	41	22	108	111	103	
100	Sona	32	131	46	187	60	843	1583	97	130	44	21	114	114	105	
101	Dasrup	30	125	45	179	61	777	1540	94	131	38	21	110	110	95	

GROUP (23) : THARU (female)

DISTRICT : LAKHIMPUR-KHERI

VILLAGE : MASHANKHAN

1	45	94	120	50	178	68	1538	95	130	36	19	114
2	44	93	120	52	179	64	1546	92	125	33	20	110
3	52	95	123	47	180	58	1520	96	130	37	17	99
4	50	94	120	46	184	60	1437	103	128	37	18	106
5	46	100	128	45	172	64	1475	99	128	37	18	104
6	28	93	124	53	184	64	1513	97	136	34	20	116
7	24	98	124	44	172	64	1444	86	127	38	18	96
8	18	95	121	45	180	58	1486	85	131	35	19	99
9	30	95	125	45	179	61	1560	90	134	34	19	113
10	32	101	124	43	184	60	1615	86	124	35	21	104
11	22	95	125	44	179	57	1510	94	131	33	18	106
12	23	97	130	44	184	60	1558	94	136	35	22	103
13	25	100	126	44	179	55	1506	89	133	31	20	105
14	45	102	126	54	188	60	1552	95	133	35	20	117
15	26	94	126	48	188	64	1476	95	135	36	19	114
16	35	104	135	44	179	57	1564	97	142	36	19	99
17	42	100	129	45	189	63	1556	98	137	37	21	112
18	22	98	125	47	178	59	1568	89	129	36	20	105
19	40	105	129	44	185	58	1504	96	141	35	20	106
20	45	90	121	44	184	60	1523	89	131	35	20	97
21	24	98	126	45	186	64	1595	89	130	34	19	114
22	28	98	133	48	190	58	1658	100	137	38	21	107
23	26	97	125	47	176	61	1662	101	135	38	19	109
24	35	102	121	41	186	56	1480	87	130	36	20	102
25	35	98	125	50	186	66	1530	101	132	35	20	117

VILLAGE : DHAYANPUR

26	38	101	130	45	185	57	1571	95	140	38	21	107
27	25	105	131	43	190	61	1635	96	134	35	21	108
28	28	97	126	44	192	58	1596	98	132	35	18	102

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
29		30	98	118	45	173	56	—	—	89	128	30	20	107
30		35	98	121	45	177	64	1470	1470	94	126	34	20	108
31		18	90	121	44	182	58	1474	1474	92	132	32	20	98
32		40	104	135	41	181	52	1565	1565	98	137	34	18	107
33		45	96	125	48	179	60	1625	1625	95	135	37	23	107
34		20	98	120	44	176	55	1400	1400	82	125	36	19	100
35		25	95	127	42	182	59	1406	1406	92	131	33	20	104
36		22	97	129	49	187	60	1500	1500	90	138	38	22	108
37		21	92	124	44	185	58	1514	1514	96	125	36	20	109
38		46	102	124	45	184	62	1590	1590	90	126	34	22	106
39		50	90	115	42	178	54	1440	1440	87	120	38	21	98
40		20	95	124	48	188	62	1490	1490	95	132	35	22	108
41		20	95	123	44	174	61	1505	1505	92	126	36	19	105

VILLAGE : SONAHA

42	Sagina	35	96	129	47	187	58	1526	1526	91	131	38	21	110
43	Bhalasu	34	99	130	40	182	55	1486	1486	96	136	37	21	101
44	Chutaria	30	95	121	40	172	50	1416	1416	90	124	35	19	94
45	Jhingu	33	99	130	51	182	72	1527	1527	92	135	41	21	114
46	Kaddie	28	95	128	45	172	56	1420	1420	94	136	34	21	102
47	Dalia	31	97	128	47	181	60	1501	1501	91	132	37	22	107
48	Sattoo	30	95	124	47	178	58	1514	1514	96	128	36	21	102
49	Sandoka	45	97	126	45	180	65	1514	1514	93	135	35	21	109
50	Boso	26	95	120	48	181	61	1496	1496	93	124	32	21	107
51	Sohagiya	50	109	139	48	194	86	1646	1646	98	137	37	21	112
52	Laundi	30	94	125	41	177	52	1400	1400	95	128	36	18	100
53	Phullu	22	99	127	45	186	60	1508	1508	90	137	35	20	104
54	Motia	32	95	122	44	172	60	1533	1533	92	128	35	21	108
55	Toomka	38	98	122	46	188	56	1556	1556	91	135	37	19	108
56	Chotia	47	98	128	48	192	64	1562	1562	86	134	35	22	110
57	Pholooa	18	95	117	44	187	57	1522	1522	84	129	35	19	110
58	Roni	18	95	122	43	175	53	1488	1488	87	127	32	18	106
59	Jamkia	—	96	126	47	174	60	1552	1552	86	129	35	20	108
60	Jagania	22	96	120	46	177	55	1569	1569	109	129	35	19	104
61	Antora	30	102	127	45	179	58	1558	1558	100	131	34	18	102
62	Palti	38	104	135	42	186	55	1579	1579	104	134	37	21	109
63	Kalsia	18	101	127	43	190	58	1482	1482	92	136	33	17	104
64	Soonla	25	99	129	45	182	56	1554	1554	93	131	34	18	95
65	Dokhan	18	99	130	42	180	57	1452	1452	90	138	36	20	101
66	Motaria	27	105	135	50	175	62	1561	1561	103	142	37	20	105
67	Samalia	39	97	127	45	179	57	1457	1457	94	135	37	20	98
68	Bisuni	—	99	120	42	182	57	1494	1494	97	131	34	21	102

VILLAGE : BHARARI

69	Ghumi	50	97	121	45	182	62	1552	1552	94	129	34	18	105
70	Patli	45	94	121	44	177	59	1585	1585	92	132	34	21	105
71	Bhulia	25	95	126	49	185	58	1534	1534	99	129	36	21	109
72	Jogu	18	95	118	45	175	57	1400	1400	86	127	37	20	98

VILLAGE : DEORANI

73	Balasi	25	99	133	50	188	62	1566	1566	98	136	34	20	107
74	Sitthoo	23	95	125	52	187	63	1497	1497	86	135	40	21	112
75	Gorkia	22	96	125	51	175	61	1476	1476	92	128	39	21	100
76	Beilani	18	102	125	41	174	54	1407	1407	95	134	38	21	105
77	Jankia	18	95	117	51	168	62	1385	1385	80	131	35	17	104
78	Ketoki	18	94	122	49	175	63	1512	1512	93	125	34	18	108
79	Fariya	60	97	126	50	184	63	1550	1550	92	131	35	21	98

U. P. ANTHROPOMETRIC SURVEY, 1941

serial no.	name	age	Frontal Breadth	Bizygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonal Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
80	Anipu	18	102	136	45	175	54		1512	95	138	32	19	100
81	Samalia	40	91	122	45	182	59		1475	88	129	35	17	101
82	Birchi	42	97	125	42	177	52		1466	92	128	34	17	95
83	Palti	35	99	126	47	174	57		1477	90	135	35	18	104
84	Raddho	40	95	131	45	183	63		1473	95	128	36	21	114
85	Ghoomni	30	99	131	45	183	58		1446	92	134	36	20	104
86	Basmetia	28	98	132	42	180	57		1591	99	129	37	19	100
87	Sugartia	23	102	130	42	172	54		1422	99	135	38	19	98
88	Jharia	30	97	131	44	193	54		1547	102	137	35	17	102
89	Garbia	31	97	123	47	177	58		1610	91	126	36	18	108
90	Dulara	33	91	124	50	185	64		1428	90	128	34	17	108
91	Sangia	34	94	121	48	184	66		1605	96	128	34	22	109
92	Koria	30	97	124	48	189	60		1546	95	133	37	20	104
93	Chidda	25	93	120	44	180	57		1452	91	124	32	19	102
94	Thaggo	18	91	115	42	182	54		1412	88	124	35	16	98
95	Dhularia	30	96	125	49	184	64		1580	102	130	36	18	112
96	Bhokti	18	94	120	44	176	54		1432	93	121	37	20	100
97	Ghoomni	—	105	132	42	197	55		1557	104	139	35	18	107
98	Sona	28	88	122	38	179	51		1410	95	127	35	19	104
99	Koili	29	97	126	47	180	58		1546	95	128	41	17	102
100	Nathia	40	99	124	49	179	61		1536	88	129	35	18	106
101	Ghania	30	102	131	40	164	52		1420	95	130	35	17	86
102	Budhia	35	96	126	43	178	54		1442	87	131	35	16	91
103	Chaito	40	94	120	56	184	71		1524	92	125	39	19	121
104	Budia	35	94	124	49	179	62		1482	95	134	36	18	100
105	Mangri	30	97	127	48	182	60		1564	95	132	35	20	104
106	Basumatia	40	96	125	43	180	59		1533	98	134	35	17	104
107	Changa	24	96	127	40	185	48		1489	92	136	37	17	99
108	Toola	27	99	131	46	177	58		1543	97	129	35	19	111
VILLAGE : BANKATTI														
109	Goodnia	28	103	131	45	178	56		1486	99	130	33	18	103
114	Kanshila	26	88	121	46	178	58		1514	87	131	35	17	105
121	Jhablo	48	96	125	51	178	67		1547	92	130	37	20	112
122	Manghia	24	100	128	46	173	56		1466	87	131	37	20	101
123	Chota	35	98	122	45	178	56		1457	90	132	32	17	112
124	Ghomni	24	93	127	47	174	58		1510	89	129	32	20	105
125	Dulara	22	93	125	44	184	52		1464	94	134	36	21	107
126	Dyas	32	95	124	46	175	58		1442	90	129	35	17	102
127	Thaggo	21	100	125	47	183	54		1519	92	129	36	18	102
128	Phoola	20	96	126	47	174	58		1456	94	127	35	18	104
129	Lalia	24	99	128	44	187	57		1594	88	136	34	20	105
130	Dillo	18	95	116	39	177	48		1466	88	123	32	17	94
131	Dilando	22	99	121	49	177	60		1495	89	126	36	20	114
132	Soodha	23	95	126	45	183	59		1518	97	135	35	18	105
VILLAGE : SINGHA														
110	Karna	45	96	128	49	188	62		1486	95	137	36	17	104
111	Sathia	50	102	125	48	181	62		1544	91	135	35	19	108
112	Kalsia	47	94	123	50	178	67		1477	97	129	36	17	106
113	Jhania	53	103	126	46	184	61		1540	95	134	42	21	110
115	Balo	38	97	127	45	182	59		1551	101	135	35	18	104
116	Phoola	24	94	128	50	178	61		1547	103	135	38	21	107
117	Sundara	39	96	125	50	191	63		1512	98	127	35	21	110
118	Chanda	18	96	118	46	187	56		1505	87	128	36	17	108
119	Ilachi	17	96	126	46	185	58		1513	91	134	36	18	107
120	Bataso	45	95	127	45	186	61		1567	93	134	33	20	114

serial no.	name	age	Frontal Breadth	Bi-zygo. Breadth	Nasal L.	Head L.	Upper Face L.	Sitting Height	Stature	Bigonial Breadth	Head Br.	Nasal Br.	Nasal D.	Total Face L.
VILLAGE : SOONDA														
133	Ratia	48	99	128	46	183	58		1556	88	139	35	17	111
134	Andhia	52	97	128	46	182	58		1492	95	135	38	18	106
135	Bamnia	48	97	128	51	178	60		1503	92	130	37	21	102
136	Bhajoo	50	99	125	46	188	55		1547	97	129	40	19	104
137	Pakia	55	95	121	45	185	61		1472	87	127	38	20	111
138	Durga	42	102	125	45	185	60		1559	92	137	36	18	108
139	Datia	52	94	125	47	172	58		1512	94	128	35	20	105
140	Satani	55	102	129	49	181	64		1555	95	139	41	21	101
141	Bawagri	35	96	126	48	181	66		1688	98	132	36	21	119
142	Dhukia	36	98	124	52	179	69		1445	92	130	37	18	117
143	Bilando	42	94	123	50	185	64		1538	95	136	35	20	112
144	Kadia	43	96	121	49	175	64		1495	94	129	36	18	105
145	Budia	47	99	124	50	181	64		1519	96	129	35	17	111
146	Maguri	56	101	134	44	185	57		1541	102	135	38	18	95
147	Sukia	58	96	122	48	178	57		1450	104	131	32	18	108
VILLAGE : CHADIA														
148	Jkniga	50	102	127	49	191	61		1607	94	132	35	20	113
149	Dulari	50	102	127	49	186	62		1612	91	135	33	20	108
150	Main	16	91	118	46	176	56		1414	90	125	36	18	95
151	Mantora	16	95	122	38	176	56		1486	86	134	35	17	106
152	Jaraia	30	95	124	47	179	63		1527	94	128	35	20	107
153	Jhaani	20	100	133	45	184	63		1552	98	132	37	20	110
154	Manjan	18	100	137	49	184	62		1513	92	143	36	20	110
VILLAGE : BHURIA														
155	Phulbati	20	94	122	45	181	58		1555	87	126	34	23	102
156	Phnia	18	99	125	43	187	52		1558	89	132	35	18	99
157	Thagani	18	95	122	44	176	57		1447	93	122	37	18	104
158	Ramkali	18	98	122	45	189	55		1514	96	127	40	21	98
159	Jamuna	18	96	121	41	179	50		1522	94	132	34	17	96
160	Chuaa	18	98	125	44	173	55		1540	90	135	33	19	103
161	Phaguni	20	95	125	51	175	65		1484	89	127	34	22	109
162	Bilando	15	99	119	43	164	49		1435	86	129	33	19	97
163	Durla	18	97	129	47	186	61		1430	98	129	38	20	106
VILLAGE : BAJAI														
164	Bhunta	45	99	129	42	185	61		1465	95	128	34	17	105
165	Ghumni	45	105	127	45	191	58		1468	98	136	40	18	106
166	Jyogari	48	99	129	48	181	64		1482	93	135	37	21	109
167	Ghoomta	18	97	122	43	175	54		1513	84	128	35	17	103
168	Bhedo	46	107	133	53	185	69		1493	95	135	42	19	119
169	Khima	18	95	125	45	184	54		1490	93	132	31	20	100
170	Miroso	18	97	124	43	179	56		1482	87	128	37	20	103
171	Sadiya	50	97	123	49	188	66		1422	95	129	34	18	114
VILLAGE : PIPRAIA														
172	Sathia	48	97	123	43	189	60		1482	88	133	37	18	104
173	Mango	51	99	124	55	181	64		1562	85	137	34	23	111
VILLAGE : DHAKIA														
174	Sekhani	50	95	127	48	173	57		1525	96	135	33	21	102
175	Bhoodia	51	99	129	46	174	61		1514	90	134	35	21	103
176	Soonia	47	104	129	47	181	61		1550	101	132	37	19	108
177	Bhoonti	38	105	127	46	187	55		1512	95	128	37	19	98
178	Mithia	47	95	123	46	186	62		1415	80	129	39	19	108
179	Bhajjo	50	95	128	46	177	58		1407	91	133	33	20	104
180	Palti	55	93	128	44	185	58		1497	98	136	40	21	101
181	Jhiya	55	96	128	52	174	68		1482	94	128	36	20	117
182	Bamania	52	97	125	49	179	65		1556	95	134	36	19	110