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VARIATION IN MAN*

by G. M. KURULKAR

Bombay

HEGEL analysed progress into three stages, which he called Thesis, Antithesis, and Synthesis. Applying this idea to educational theory, A. N. Whitehead adopted the terms, Stage of Romance, Stage of Precision, and Stage of Generalization. Thinking in these terms of stages of progress, one is likely to get an impression that such stages are discrete and separate, one following the other. But this may not be so. It may be possible that each stage of progress may have the seeds of the other two inherent in it. This method of analysis of progress can be applied to the growth and progress of science.

Science of Anthropology deals with all mankind in its environment. It tries to understand ourselves, here, now, so that it may help to improve our present, and possibly influence the future. It concerns itself with men's physiques, their societies, with communications and products—the languages and cultures—of these societies. It has so far specialized on the primitives, because no other science will deal seriously with them.

If one were to apply Whitehead's idea of stages of progress,

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then it looks that Anthropology of today is in the stage of Precision. Some few generalizations are in sight. The strategy of Physical Anthropology—as Washburn describes—is fast changing. Anthropologists have not yet finalized their new method. This is so, because purpose and theory are also undergoing a radical change. The emerging new Anthropology is gradually tending to be a coordinating science. Concept of "Culture", around which various disciplines like Psychology, Biochemistry, Primatology, Genetics, Anatomy, etc., are closing round, is the centre. Clearer definitions of Culture are being attempted at. One such, by Jules Henry is comprehensive and clear, having been expressed on physiological basis. This is dealt with later.

The research activity in Anthropology must become a collective and integrated activity of scientists drawn from different disciplines. So far, we are accustomed to seeing a lone Anthropologist doing some research. This is going to be a thing of the past.

With this background, I now make an attempt to present you in this address the following three topics.

1. The nature of the methodic exposition of "Variation in Man" by ancient Indians (600 500 B. C.) as hypothesized by them. It is significant to note that these exponents were mainly the pioneers in Ayurveda—Science of life—and practised medicine in India of ancient times.

2. Tendency of anthropologists towards the progressive utilization of important newly developed biological and other sciences in an anthropological investigation.

3. Realization of the positive usefulness of New Anthropology to reorient the health organizations and concepts of disease, somewhat on the lines of what Ancient Indians attempted.

1. Exposition of Variation in Man by Ancient Indians.

The following information regarding variation in man, as expounded by ancient Indians, is collected from Carakasaṁhitā,

Suśrutasaṁhitā, Aṣṭāṅgasaṅgraha, etc., which are considered authorities in this regard.

The study of normal man used by Ancients,

1. 1. to differentiate Ātura (a patient) from a person of normal health,
1. 2. to know suitability of man and woman to each other in mating,
1. 3. to know the past and future of man.

1. 1. For examination of a patient, Caraka lays down a rule that Ātura should be examined, with a view to find out his—

1. 1. 1. Prakṛti—Normalcy (there is no correct English word equivalent to the idea underlying the Sanskrit word Prakṛti),
1. 1. 2. Vikṛti—Disturbance of normalcy,
1. 1. 3. Sāra—Essences (dominances ?),
1. 1. 4. Saṁhanana—Body build,
1. 1. 5. Pramāṇa—(body) proportions,
1. 1. 6. Sātmya—Likes and dislikes,
1. 1. 7. Satvaśakti—Power of mind,
1. 1. 8. Vyāyāmaśakti—Capacity for physical work,
1. 1. 9. Āhāraśakti—Eating and digesting capacity,
1. 1. 10. Vayas—Age.

1. 1. 1. Prakṛti (normalcy) is determined in its following four aspects :

1. 1. 1. 1. Prakṛti of a person may be of three types according to which of the three body humors (Vāta, Pitta, Kapha) is dominating in him.
1. 1. 1. 2. Normalcy is influenced by the following factors.
1. 1. 1. 2. 1. Jātiprasaktā—attached to caste.
1. 1. 1. 2. 2. Kulaprasaktā—attached to lineage of family.
1. 1. 1. 2. 3. Deśanupātini—consequent to the region (of land).
1. 1. 1. 2. 4. Vayonupātini—consequent to age.
1. 1. 1. 2. 5. Kalānupātini—consequent to weather.
1. 1. 1. 2. 6. Pratyātmaniyatā—restrained by one's own self.
1. 1. 1. 3. Varṇa—complexion. Kṛṣṇa (dark), Śyāma (brown), Avadāta (spotless fair), Śyāmāvadāta (spotless brown),

1. 1. 1. 4. Swara—Voice resembling any of the following : Hansa (swan), Krauñca (heron), Nemi (ring of wheel), Dundubhi (large kettle drum), Kalaviṅka (sparrow), Kāka (crow), Kapota (dove), Jarjara (dull hollow broken brass vessel).

1. 1. 2. Vikṛti—Malconditions. These are dealt with, in Indian Medicine.

1. 1. 3. Sāra—Essences, or dominant peculiarities of a person, consisting of eight types.

1. 1. 3. 1. Tvaksāra—Skin essence or dominance. Skin is juicy, smooth, soft, and pleasant. Hair is soft, long, delicate, and lustrous.

1. 1. 3. 2. Raktasāra—Blood essence or dominance. Ears, eyes, mouth, tongue, nose, lips, palms, soles, nails, forehead and penis are red and lustrous.

1. 1. 3. 3. Māṃsasāra—Flesh essence or dominance. Temples, forehead, upper part of neck, orbits, cheek, jaws, shoulders, belly, chest, joints of hands and feet are bigger and full of flesh. These persons are strong, courageous, happy and straightforward, and have push and forgiving temperament.

1. 1. 3. 4. Medahsāra—Fat essence or dominance. Skin, hair, nails, lips, teeth, urine, and stools are oily. These persons have endearing eyes, and affectionate voice. They are delicate and need sympathic treatment.

1. 1. 3. 5. Asthisāra—Bone essence or dominance. Heels, ankles, knees, wrists, sternum, cheeks, head, joints, nails, teeth, and bones in general are big. These persons are strong, active, and have great capacity for bearing pain. They are energetic.

1. 1. 3. 6. Majjāsāra—Marrow essence or dominance. These persons are strong, have soft body and big joints. They beget many issues.

1. 1. 3. 7. Śukrasāra—Semen essence or dominance. These are mild persons with mild eyes and look. They have evenly set teeth, pleasant skin, and

an attractive voice full of affection. They have big loins and are jolly, healthy, and fond of women. They love popularity and beget many issues.

1. 1. 3. 8. Satvasāra—Mind essence or dominance. These persons are devoted, grateful and learned. They are alert, bold, and great fighters. They have great energy, strong memory, and like serious intellectual pursuits for the good of the people. They have clean habits, and their gait is sound. They do not mourn losses.

A person may belong to one or more essences. Persons not coming under any of the above categories are Asāra (without essence).

1. 1. 4. Saṁhanana Body build. There are three types :

1. 1. 4. 1. Susaṁhata (well built). Body symmetrically disposed, bones strong, joints secure, flesh well placed, and full blood are the characteristics of this type. These are Balavanta (powerful).

1. 1. 4. 2. Visaṁhata (weakly built). Type opposite to susaṁhata. These persons are Alpabala (not much powerful).

1. 1. 4. 3. Madhyamasaṁhata (medium built). Medium type between Susaṁhata and Visaṁhata, with medium power, Madhyamabala.

1. 1. 5. Pramāṇās (proportions) of human body. These are quoted from (a) Carakasaṁhitā—Vimānasthāna, Adhyāya 8, (b) Suśrutasaṁhita—Sūtrasthāna, Adhyāya 35, (c) Aṣṭāṅgasaṅgraha—Śarirsthāna, Marmabhediya Adhyāya 8.

These are normals.

The method of taking measurements for pramāṇās is given below :—

"Measured by fingers of the body to be measured, if the body of a male or a female has the proportions as described, then he or she should be considered, as having a correct proportionate body." (Suśrutassaṁhita, Sūtrasthāna, Adhyāya 35, Śloka 14).

It need not be mentioned that measurements by fingers, are really phalango-corporal indices, and not absolute measurements.

	Body Parts	Fingers Suśruta	Caraka	A.Sangraha
1.	Length, big toe	2	—	2
2.	,, 2nd toe	2	—	2
3.	,, 3rd toe	8/5	—	8/5
4.	,, 4th toe	32/25	—	32/25
5.	,, 5th toe	1	—	1
6.	,, total foot	14	14	14
7.	,, leg	18	18	18
8.	,, from knee to waist	32	—	—
9.	,, total lower limb	50	—	—
10.	,, thigh, knee to hip joint	18	18	18
11.	,, knee	—	4	4
12.	,, calf belly	—	10	10
13.	,, forefoot	4	—	4
14.	,, foot central part	4	—	4
15.	,, heel	5	—	4
16.	,, Breadth, forefoot	5	—	6
17.	,, foot central part	5	—	5
18.	,, heel	4	—	4
19.	Circumference, foot central part	14	—	14
20.	,, ankle	14	—	14
21.	,, leg central part	14	—	14
22.	,, knee	14	16	—
23.	,, calf belly	16	16	—
24.	,, thigh	32	32	32
25.	Height, arch of the foot	—	4	4
26.	Length, testis	2	—	—
27.	,, non-erect penis	4	6	—
28	,, vagina	12	—	—
29	,, Scrotum	—	6	6
30.	Circumference, vulva	—	12	—
31.	,, scrotum	—	8	8
32.	,, penis	—	5	—
33.	Width, chin	2	—	—
34.	,, chin and lip together	—	4	4
35.	,, side of the nose	2	—	—
36.	Length, tooth	2	—	—
37.	,, nose	4	4	4
38.	,, ear	4	4	4
39.	,, eye	—	—	2

			Fingers		
			Suśruta	*Caraka*	*Sangraha*
40.	,,	nasal opening each	1½	—	—
41.	,,	face	12	12	12
42.	Breadth,	forehead	4	4	4
43.	,,	open eye	—	—	breadth thumb
44.	Distance,	between eyes	2	—	—
45.	,,	,, ear and outer canthus	5	—	—
46.	,,	,, hinder border of the left auricle and that of the right ear across face	24	24	24
47.	Distance	between pupils	4	4	4
48.	Mouth	fully open	4	5	—
49.	Corneal	surface proportion of eye	1/3	—	1/3
50.	Pupil,	proportion of cornea	1/9	—	1/9
51.	Distance,	from hair line to vertex	11	—	—
52.	,,	,, vertex to back hair line	10	—	—
53.	,,	between ear to ear on head back	14	—	—
54.	,,	between upper end of neck to vertex	—	16	16
55.	Circumference,	head	—	32	32
56.	,,	neck	24	24	22
57.	Nape	of neck	4	4	4
58.	Heart	beat area to neck in front	12	—	—
59.	Distance	between nipples	12	12	—
60.	Length,	chest surface	—	12	—
61.	Breadth,	,, ,,	—	24	—
62.	Areola,	breast	—	2	—
63.	Heartbeat	area	—	2	2
64.	Length,	whole arm excluding axillary region	32	—	—
65.	,,	upper end of humerus to elbow	16	16	16
66.	,,	shoulder joint	—	6	6
67.	,,	axilla	—	8	8
68.	,,	hand	—	12	12
69.	,,	middle finger	5	—	5
70.	,,	index and ring finger	4½	—	4½
71.	,,	thumb and little finger each	3½	—	3½
72.	Distance	root of thumb to index finger	5	—	—
73.	,,	elbow tip to middle finger tip	24	—	—
74.	,,	between palm and elbow	16	15	15
75.	Circumference	uniform between root of hand and a point four fingers above it	12	—	—
76.	Hollow	of the palm	6 by 4	—	—
77.	Distance	between umbilicus and root of penis	12	—	—
78.	Length,	udar (belly) surfacial	—	12	12
79.	Width,	,, ,, ,,	—	12	12

		Fingers		
		Suśruta	*Caraka*	*Sangraha*
80.	Length, waist	—	16	16
81.	Circumference, waist	—	—	50
82.	Expanse of shoulder	—	8	8
83.	Sides, chest up to axilla, length	—	12	12
84.	„ „ „ „ „ width	—	10	10
85.	Height, pelvis while sitting	—	12	12
86.	Distance from upper border of pelvis to beginning of neck on the back.	—	18	—
87.	Stature	120	84	84
88.	Arm stretch	—	84	—
	SEX DIFFERENCES			
89.	Female hip region as broad as male chest	24	—	—
90.	Female chest as broad as male waist	18	—	—

Suśruta further says that these proportions can only be applied to the males above 25 and females above 16 years.

Stature is described as 120 fingers by Suśruta, and 84 fingers by Caraka and A. Saṅgraha. This disparity is due to the reason, as mentioned by Dalhana, the commentator of Suśrutasaṁhita, that Suśruta's stature is taken with the arms raised above the head.

1. 1. 6. Sātmya—Likes and dislikes.

1. 1. 6. 1. Ghṛta-kṣhīra-taila-māṅsarasa Sātmya—persons who are fond of ghee, milk preparations, oils, and meat juices. These are strong, bear pain, and have long life.

1. 1. 6. 2. Ruksha Sātmya—are persons who like rough food. These cannot bear pain, are weak, and have short life.

1. 1. 6. 3. Vyāmiśra Sātmya—persons with mixed likes, get mixed consequences.

1. 1. 7. Satvaśakti—power of mind. (1. 1. 3. 8. is further analysed here).

1. 1. 7. 1. Pravara-satva are persons who can bear any pain lightly.

1. 1. 7. 2. Hīna-satva are persons who cannot bear pain, and cannot be consoled also. Very little physical pain upsets them. Sights of ugly

things, terrifying experiences, sight of blood, flesh, etc., completely upset them. They may collapse, faint, become demented, and may even die in the above mentioned circumstances.

1. 1. 7. 3. Madhya-satva persons are of intermediate type and can bear pain by thinking, can control themselves by effort, and can be consoled.

1. 1. 8. Vyāyāma-śakti—capacity for physical work, judged by making a person do graded physical work.

1. 1. 9. Āhara-śakti—capacity for quantity of food and digesting it. Four types—

1. 1. 9. 1. Samāhār-śakti—capacity for eating and digesting moderate amount of good food always.

1. 1. 9. 2. Visamāhār-śakti—sometimes eat and digest and sometimes cannot.

1. 1. 9. 3. Atibhukta—can digest huge quantities of food.

1. 1. 9. 4. Alpa-pacanśakti—cannot eat much and have poor digestion.

1. 1. 10. Vayas—age. This is considered at length, but its description is left out.

* * * * * *

1. 2. Suitability of man and woman in mating.

In Kāmaśāstra (science of love) man and woman each has been described in two different ways. Their individual characters are described at length. A very brief account is given here.

1. 2. 1. Types are determined by comparison with animals. Esthetic grouping is based upon general form, shape and beauty.

	Type Man		Type Woman
1.	Mṛga (deer)	Vs	Padmini (lotus)
2.	Śaśa (hare)	Vs	Citrini (talented, artistic)
3.	Vṛsa (bull)	Vs	Hastini (she-elephant)
4.	Aśva (horse)	Vs	Śankhini (conch)

1. 2. 2. Mating groups are based on physical suitability.

Type Man	Mate of	Type Woman
Śaśa (hare) penis length 6 fingers	—	Mṛgī (doe) vagina length 6 fingers
Vṛṣa (bull) penis length 9 fingers	—	Aśvī (mare) vagina length 9 fingers
Aśva (horse) penis length 12 fingers	—	Kariṇī (she elephant) vagina length 12 fingers.

* * * * * *

1. 3. Sāmudrika-śāstra is supposed to be the science of knowing the past and future of man, from observations made on him.

Individual variations of each observation are attributed predicting values. Observations are done on : (1) variation in shape, form, and comparison with animals, (2) some visible functional features, (3) Ayurvedic considerations, and (4) lustre.

(1) Body parts observed are feet, legs, knees, penis, scrotum, glans penis, buttocks, waist, abdominal outline, sides of abdomen, sides of chest, umbilicus, skin, skin folds on abdomen, nipples, back, heart area, front of the chest, sternoclavicular junctions, neck, ribs, sternum, shoulders, hands, fingers, wrists, palms, nails, patterns of ridges on fingers, the same on palms, lower jaw, lips, teeth, tongue, palate, face contours, Adam's apple, moustache and beard, cheeks, ears, nose, eyes, eyebrows, temples, forehead, lines on forehead, head, and hair on head.

(2) Some visible functional and other features are observed.
   (a) Urine, nature of urine flow, semen.
   (b) Voice, nature is noted.
   (c) Peculiarities about laughing, weeping, and sneezing are considered.

(3) Variations based on Ayurvedic considerations are noted (1. 1).

(4) Lustre of a person is considered,

A sample of Sāmudrika observations is reproduced here :

"With Parimaṇḍala (spherical) heads be rich possessors of cows, with Chatrākāra (umbrella-shaped) heads be lords of earth, with Cipita (flat nosed) heads be killers of father and

mother, with Karoti (oval long bowl shaped) heads have long life, with Ghata (pitcher shaped) heads be fond of meditation, with Dvimastaka (bifid) heads be sinner and forsaken by riches, with Nimna (apically narrowing) heads be great, and Bahunimna (extremely apically narrowing) head is the source of disasters." (Sāmudrika-śāstra, by Vedavyās, 114, 115.)

Further, five types of Mahāpuruṣa (big men), and five types of deformed men are described.

Mahāpuruṣa :
1. Malavya are residents of Cutch, Saurastra, Gujrāt, Sind, Mālwā, Mārwar.
2. Bhadra are residents of Central India.
3. Rucaka are residents of Vindhya, Sahya, Ujjain.
4. Śaśa are resident of Mlechha (non-Hindu) country.
5. Haṇsa are residents of Khasa, Sūrsena, Gandhāra, Duab.

Deformed :
1. Jaghanya (big buttocked) is dull, bold, cruel, humorous.
2. Vāmanaka (pygmy) broken-backed, God-fearing.
3. Mandālaka (white leucoderma spots) fond of learning and black art.
4. Sāmi (very ugly) unlucky, charitable.
5. Kubjaka (hunch-backed) bold, dies suddenly.

Lastly, amongst Hindus there is a belief that an ideal human body has the following 32 Lakshaṇās (signs) :

1. Umbilicus deep and whorling to the right. 2. Voice deep. 3, 4, 5, 6, 7, 8, 9, nails, eye-corners, lips, palate, feet, tongue, palms red. 10, 11, 12, forehead, face, heart broad. 13, nose long. 14, 15, 16, 17, distance between nipples, eyes, jaws, arms long. 18, 19, 20, 21, 22, joints, teeth, skin, nails, hair, delicate and thin. 23, 24, 25, 26, back, penis, legs, neck short, 27, 28, 29, 30, 31, 32, head, neck, mouth, chest, axilla, nose, held up.

All these descriptions, which we have just gone through, display the critical attitudes of observational capacity and

ingenuity of thought of ancient Indian scientists. It is worth noting that various angles concerning variation in man, which in the present era of psychosomatic medicine are the objects of study, seem reflected in the minds of Caraka and Suśruta.

Body measurements and observations (1. 1. 1. 3) (1. 1. 5.), heredity (1. 1. 1. 2. 1.) (1. 1. 1. 2. 2.), body build (1. 1. 4.), psychological factors (1. 1. 7.), personality (1. 1. 6.) (1. 1. 7.) (1. 1. 1. 2. 6.), eugenics (1. 2.), attitudes and mental traits correlated to physical variations (1. 3.), ecology (1. 1. 1. 2. 3. & 5) have received their attention. Lastly, essences or dominances of tissues—a novel consideration—may not be so unintelligible to our mind, if we ponder and think.

Let me now briefly review the account of newly developing sciences, which are progressively being utilized in Anthropology.

2. *Utilization of newly developed Biological Science in Anthropological investigations.*

During the last century and a half, physical variation in man was attempted to be studied and understood by physical measurements. Out of all the measurements utilized for the purpose, "Cephalic Index" held sway over other mensural estimations. This period can aptly be called as "Cephalic Index Era." Traditional methods of this era was speculation. This era is passing. There had been enough speculations and classifications. New methods of investigation are being developed to prove which of the speculations are on the right track. It is true, however, that in studies of growth and applied anthropology, measuring rod and calipers will be necessary, as the direct knowledge of dimensions is, what is aimed at. But in the evolutionary investigations, the change of methods and theoretical approach are of greatest importance. Washburn says that "much of the old anthropological work on race and constitution is eliminated by rejection of the old concept of type. However, one of the main implications of the new point of view is that there is a far more intimate interrelationship between the different aspects of anthropolgy than under the old strategy. For example, a dynamic analysis of the form of jaw

will illuminate problems of evolution, fossil man, race, growth, constitution, and medical application. An unravelling of the process of evolution and variation will enrich the understanding of other mammalian groups, whereas the detailed description of a fossil has a more limited utility. By its very nature, the investigation of process and behaviour has a generality which is lacking in purely descriptive studies. The problems of human evolution are but the special cases of the problems of mammalian evolution, and their solution will enrich palaeontology, genetics, and parts of clinical medicine."

We know that genes have their basic characteristics. A gene has either a dominance over its allele, or is recessive. It mutates. Mutation is a chemical or physical change potentially capable of being transmitted. Mutation in a germinal gene only is what counts for transmission. Most mutations are recessive, and more or less harmful to the organism. Mutation rate in most of the genes is very low. Comparatively, genes are stable. Mutation may take place one in thousands of years in a gene. Mutations do not take place in more than one gene at a time. Attempts at producing mutations experimentally by food, humidity, temperature and other environmental factors were unsuccessful. Use of X-rays and other types of irradiation may greatly increase the mutation rate. Genes may get lost by chromosomal deletion or breaking away. Recessive mutations are usually lost.

A second consideration is that, with all these hazards a gene must get a chance of being transmitted, then alone the offspring will be influenced by that gene. And to influence a population, effectively, permanently, gene must get successive similar chances so that its frequency in a population should increase. Such chances would depend on :

1. Tendencies of populations in selecting mates,
2. Rate of fertility in an individual,
3. Size of a population,
4. Stable or migrating nature of the population,
5. Facilities of mixing up of different populations,
6. Isolation of a population.

Thus, genetic study is almost entirely dependent on the

studies of populations. Six major points should be taken into account about the studies of genetics :

1. Unit of study must be the population and not the individual. Because it is the breeding population in which genetics is interested, breeding habits of the group under study must be known. To define population limits, one must look for help to both the ecologist and the demographer.
2. Populations cannot be defined by a survey of single characters. Several attributes of population are important subjects for study :

(a) Breeding enclaves.
(b) Increase of contact of populations by means of rapid communications and rapid transportation.
(c) Increase of population.
(d) Factors affecting population pressures.

3. Animal experimentation for ecological studies.
4. There is no use in following a combination of traits. Each trait must be traced by itself.
5. Since different approaches yield different racial types, many of the older typological groups will have to be abandoned as the basic unit becomes the population. There should be a shift in emphasis from classification towards that of understanding the processes of race formation. With the genetic method many races could be ruled out as genetically undemonstrable.
6. Genetic classifications of human groups will have to be set up.

Determining a genetic trait

To claim that a particular trait is genetic in origin is a difficult matter. Spuhler began his studies by laying down certain assumptions about the rules for changes of genetic characteristics.

a. Neither selection nor mutation has much to do with these changes.
b. No two genes are known to occupy the same locus on

the chromosome, so that isolation and identification of genes should not be impossible.

c. To make a satisfactory genetic study the population must neither be too small nor too large.

d. The frequency of the trait must neither be too rare nor too common.

Important genes so far demonstrated

The account of the genetic traits rendered here, is besides the pathological traits which are left out.

Blood groups

1. Blood groups, O, A, B, AB, are well known. Later the following subgroups of A were found. A_1 five or six times as common as A_2, A_3 one in 60,000, and A_4 one in 2,000 persons.
2. Later investigations brought forth two other agglutinogens M, N, a Mendelian pair of genes not carried on the same chromosome which carries O, A, B genes. Recently discovered Anti-Sera enable the M, N, groups to be subdivided. The S, s, gene pair might be another pair of alleles linked to the M, N, locus, but it is also possible that the new pair simply enables, instead of the M, N, pair, four alleles MS, Ms, NS, Ns, to be distinguished.
3. P blood group was discovered nearly along with M and N. The antigen P is inherited as a dominant. Gradation in the strength of P is observed.
4. The ability to secrete blood group substances A, B, and H (Q) into saliva and other body fluids in water soluble form, inherited as a Mendelian pair ; S (secretor) being dominant over s. The highest frequency for secretor is found among American Negro ; the lowest in Amerinds.
5. Lewis blood groups : L, is recessive in adults and dominant in children. L, blood groups are found intimately associated with the secreting factor. All adult individuals reacting with anti-Le^a, and therefore

by hypothesis, Le^a/Le^a genetically, are non-secretors of A, B, and H. Most Le^a negatives are secretors, but about 1% secrete neither A, B, H, Le^a, nor Le^b. It is thought that they probably secrete an antigen Le^c, not yet identified. Thus the genes Le^a, Le^b, Le^c, and S, s would form two series of alleles contiguous to each other.

6. Rh factor : According to Fisher's hypothesis, three closely linked adjacent loci, C, D, E, are involved. According to Weiner's hypothesis a series of allelic genes, r, R′, R″, R_1, R_2, R_o, r^y, R^z, is involved. The two theories lead to identical genetic predictions. Other Rh antigens have been found from time to time, so that the following genes are available for the C, D, and E, loci, respectively ; C, c, C^w, c^v, C^u ; D, d, d^u ; E, e, E^u. No particular dominance relations are observed among these genes.

   The Rh gene of human blood is turning out to have so many ramifications astounding in nature, that it is difficult to keep pace with them.

7. Lutherian blood groups : This dominant gene is called Lu^a and the still hypothetical recessive gene as Lu^b.

8. Kell blood groups : This antibody is symbolized as K, and its allele as k.

9. Duffy blood groups named after the patient "Duffy" who was suffering from hemophilia and who had several blood transfusions over the preceding 20 years. The gene is named as Fy^a, and the hypothetical allelic gene as Fy^b. An agglutinin for Fy^b was found in the blood of a mother in Berlin after the birth of her second child. The child appeared normal, and the antibody, which had a titer of 16,000 was discovered in the course of routine examination of the sera of all the mothers in the hospital.

10. A blood factor called "Kidd" has also been found. Gene symbol "Jk^a" is given to it. Its hypothetical allele is called "Jk^b".

Human Hemoglobin

Hemoglobin, the coloring pigment of human red blood cells, is found to be of many types. Pauling and his associates described sickle-cell hemoglobin and introduced into Medicine the concept of molecular disease. Different types of hemoglobin can be identified by their biochemical properties, reactions in electrophoretic process, and other special methods. Though the genetic study of different types of hemoglobin is not complete, still there is a strong evidence that the variations in hemoglobin are genetic traits.

Nomenclature—Types of hemoglobin

Hgb A	Normal adult hemoglobin
Hgb F	Fetal hemoglobin
Hgb S	Sickle cell hemoglobin
Hgb C	——
Hgb D	——
Hgb E	——
Hgb G	——
Hgb H	——

From the evidence available, the human hemoglobin types, with exception of Hgb F, are controlled by a single set of allelic genes. Hgb F, in contrast to the other hemoglobins, appears to be under the control of an independent set of allelic genes. There are no data to suggest that the concept of dominance or recessiveness may be applied to the genetics of the human hemoglobins, although the expressivity of genes must vary. All the hemoglobin types appear to inhibit the expressivity of Hgb F in varying degrees—Hgb A to the greatest degree. Increased expressivity of hemoglobins S, C, E and F, may in turn inhibit normal adult human hemoglobin formation.

Other Genetic Traits

1. Subjective taste traits : Taste reaction to P. T. C. (phenylthiocarbamide) indicates that Amerinds are low in non-tasters, Negroes and Caucasians being higher than Mongoloids in this regard. In connection with the evolutionary significance in taste reactions to such substances as phenylthiourea, Boyd notes that these are

pharmacologically anti-thyroid, and heterozygosity may be of adaptive advantage. Barnicot demonstrates, that non-tasters are much rarer among Chinese and Africans than among English.

2. Linguistic studies of isoglosses of "th" in Europe. In respect of this trait about peculiarities of pronounciation of the same alphabet, there is a great field for research in India.
3. Capacity of tongue rolling and tongue folding. The presence of folding depends on rolling. Work is done among Chinese.
4. Longitudinal and transverse patterns of superficial veins as manifested in infra-red photographs (anterior thorax).
5. Presence or absence of palmaris longus muscle in forearm and peronius tertius muscle in leg.
6. Color blindness : Probably several alleles are concerned. The frequency of red-green color blindness is lower among Amerinds than among Chinese, Japanese or European populations. There are two types of color blindness (red-green). 4·97% males and 0·71% females from a total of 11,000 Chinese, were color blind.
7. Number and form of circumvallate papillae (found just in front of anterior sulcus of tongue) : Number varies from three to eleven, and the pattern of their arrangement may take the form of either a "V", "Y", "W", or "T". It appears that there are five alleles with dominance of large over small number of papillae.
8. Hair whorls : Occipital hair whorl is controlled by a single allele with the clockwise whorl dominant.
9. Five allelic genes have been suggested to explain the occurrence of mid-digital hair : There is an apparent preponderance of ring finger mid-digital hair among Nordics and Iranians, middle finger among Alpines, index finger among Slavic countries, and the little finger in Ireland.
10. Dematoglyphics : Three pairs of single alleles are identified.

11. Is there any correlation (genetic) between pigmentation and blood groups O and A ?
12. Polydactyly, syndactyly and clinodactyly.
13. Deafness.
14. Absence of teeth.
15. Visceral asymmetry.
16. Somatometric relations between relatives of the first degree.
17. Twin study : Frequency of dizygous twin confinements appears to increase with the age of the mother. In assessing the role of environmental factors in man, studies of identical twins provide one method of controlling genetic factors. Sterility, left-handedness, height, weight, hair and dermatoglyphics, etc. can give useful information by studies on identical twins. Rearing of identical twins in different environments and studies undertaken on them will throw much light on influences of environment. Price suggests that the results of many twin studies may have been interpreted wrongly because of failure to distinguish monochorial from dichorial types of monozygous pairs.

Human Ecology

In studying the relation of the individual to his environment, the individual should be studied in totality, and his environment be conceived of as the universe around him. In studying ecological factors, some of the problems of approach have to be tackled. Genetic study has to be tackled through population studies, and population studies, in turn, are closely associated with environmental studies. Some problems of Human Ecology* can be considered here.

1. Whether, in the study of human ecology, the distinction commonly made between population and community is valid.

*The word Ecology used by Haeckel for the environmental studies, carries an idea, which is expressed in Sanskrit literature by words like "divaukas", "jalaukas," meaning residents of heaven and residents of water. The root in these sanskrit words "okas-house" is nearly the same as the root in ecology which is "oikos-house (Greek)".

2. It would be necessary to study the effect of each of the several elements on selection and adaptation of the human organism. The particular elements to be taken into consideration would be climate, altitude, nutrition, migration, density of settlement, and the use of the natural resources made by man, as fertile fields for coordinated investigation.
3. The influence of social organization on biological make-up of a population might be approached with an ecological slant. Mating patterns are obviously amenable to investigation, but other social factors can also have biological effects, as for example, life under a surplus or subsistence economy. Different phenotypic end-products may result from a differential development of the organism during child rearing,—the factors such as differences in degree and kind of physical activity at an early age—*i.e.*, ability to swim—as opposed to cultural emphasis on mental activities.

   In regard to nutrition and disease, the social organization also has an effect on the biological end-product.
4. Human ecology serves to keep in focus two of physical anthropology's most fruitful concepts : those of function and of population. It can serve, therefore, as a framework for the study of such problems as the relation between size and structure of a population on the one hand and biological change on the other, as well as the nature and relation of genetic and nongenetic factors in man's adaptation to his environment.

Thus physical anthropology, which studies variation in man, would in future rest on :—

I. Judicious physical measurements and observations
II. Study of genetics
III. Population studies or Demography
IV. Environmental studies or Human Ecology.

Three types of research in physical anthropology can be distinguished :

1. Studies whose goal is addition to the general body of knowledge.
2. Next, comes the intermediate area, where studies border on, and are related to the practice of medicine.
3. Studies primarily meant for practical purposes like trade, etc.

Researches in the intermediate area are more intimate to the man himself. During the past few years, and as a result of having gained unusual experiences in world wars, medical world is busy changing its old concepts, and reorienting its approaches to man's health. It is seriously thinking that anthropology is its need of the hour. Let us see as to how anthropology will help medicine.

3. Positive usefulness of new Anthropology to reorient the health organizations and concepts of disease.

It has been observed that anthropological knowledge, if used knowingly and with planning, would be useful in two directions.

3.1. First direction would be toward the improvement of organizations in medicine.

3.2. Second direction would be toward understanding disease itself.

3.1. Organizations in medicine would improve and be more efficient, if social aspects about these are correctly understood. The various considerations, required to be done, would be as follows :—

3.1.1. The place of medicine in the structure of society.

3.1.2 Cultural knowledge necessary for running the health centres efficiently.

3.1.3. Social relationship between a patient and a physician.

3.1.4. Social sanctions for sickness.

3.1.5. Medical treatment as a social control.

3.1.6. Adoption of modern medical care has to be done carefully, and thoughtfully, if good results are are desired.

3.1.7. Medicine as a social group.

3.1.8. Hospitals as social systems.

3.1.9. Wards as social groups of patients.

3.1.1. The place of medicine in the structure of society has long occupied medical historians and has increasingly become a conscious problem for medicine. Stimulated by this interest, social scientists in U. S. A. have recognised :

1. Medicine as a part of the social system.
2. Community attitudes towards health, illness, and medical practice.
3. The professional roles associated with medicine.
4. Social structure of the hospitals.
5. The interaction of patients on various kinds of wards and its effects on their progress in treatment.

3.1.2. Foster points to the types of cultural knowledge, that a technical aid administrator should have in order to plan the work of health centres effectively :

1. Knowledge of folk medicine.
2. Extent of literacy.
3. Family social organization.
4. Value systems.
5. Local costs of living.
6. Local political organizations.

Further, it is essential to know :

7. Local theories of disease and its treatment.
8. Relationship of the local people to the modern-trained medical people in that area.
9. Food production and consumption.
10. Controlled culture changes, before and after health programmes at intervals.

3.1.3. In any health or medical care programme, much depends on patient-physician (Social) relationship. Waterson says, "the relationship between the doctor and his patient does not exist in vacuum..... We have not yet given sufficient attention to the sciences that deal with this aspect of human relations". Both the sick and the physician have a distinct social role, one of the sick sanctioned by the society, and that

of the physician developed by his training. Both the sick and the physician have their privileges.

Social role (sick)	Social role (physician)
1. Exempted from doing some of his normal social obligations.	1. Place the welfare of the patient foremost and grant his essential unconditional support.
2. Not held normally responsible for being ill.	2. Assume explicit or implicit control of the sanctions in many areas of the patient's life.
3. Defined as being in need of help.	3. Have access to physical and mental intimacies of the patient not ordinarily revealed in normal relationships.
4. Obligated, by the contingent legitimation of the sick role, to try to get well as quickly as possible.	4. Be barred from taking advantage of, or reciprocally participating in such intimacies.

3. 1. 4. Social sanction for sickness : Social sanction for a sick role varies according to the societies. In individual families, an arbitrary decision for sanctioning the sick role may be taken, or may be denied in some circumstances. Even the notion of disease itself depends on the decisions of the society, primitive or cultured, rather than on objective facts. It is then possible, nay sometimes is observed, in a society's history, to die of a disease, without ever being sanctioned as sick by the society itself.

3. 1. 5. Medical treatment as a social control : It is true that all medical care, and particularly Psychotherapy is a process which helps an individual in treatment, but it can also be considered, in a wider sense, a form of social control.

3. 1. 6. Adoption of modern medical care has to be done carefully, and thoughtfully, if good results are desired. If it is true that cultural changes occur with least conflict and confusion, along lines of established community patterns, then

research in each commuity should centre around the investigation of the social processes which occur when health programmes are started. With the national health schemes undertaken by different Indian States, this aspect of investigation should not be lost sight of, if good results are desired. It would not be useful to depend on propaganda, that the modern health programmes are the best, and sorcery, magic spells, prayers, manual rites, ritual dances, etc. are all nonsense.

The tendency of doctors and nurses to ignore, if not to ridicule, folk concepts of illness, probably strengthens the popular belief that certain categories of illness are not understood and cannot be treated by modern medical men.

3. 1. 7. Medicine as a social group : Medicine is not only a professional but a social group, in which work is carried on within the framework of an elaborate social machinery rather than in a freely competitive milieu. There are cultural and social aspects of gaining admission to a medical or ayurvedic college (both being separate social groups), getting housemanship jobs, acquiring practice, and developing informal relations with colleagues.

In our country, the nursing profession has not reached the level reached in Europe or U. S. A., still the nurse in India has all the defects of her sister in Western countries. She is caught between writing notes, swabbing throats, and injecting patients. She has neither the time nor the opportunity, to dispense the emotional gratification to the patients. Moreover, such emotional support as she is able to give, is all too often viewed by the nurse herself and by the hospital system as ancillary to her profession and almost unprofessional. Authoritarianism is nearly a rule in nursing schools, and one smells of convent from which nursing has come. Much of the dissatisfaction expressed by nurses may stem from the lack of an opportunity to replenish and satisfy their own emotional needs.

3. 1. 8. Hospitals as social systems : The ratio of modern hospitals to the population in India is very low in comparison with other progressive countries. But those which we have and are having, are developing with the defects also inherent

in the type of organization. Smith found that the hospitals show, to a far greater degree than industrial concerns, high interpersonal tensions, bitter conflicts between departments, and an amorphous structure which lacked defined roles and areas of authority and responsibility.

All the basic substructure of a hospital (medical staff, nurses, patients, special services such as pathological laboratory X-ray, pharmacy, etc.) are subject to a dual control—one is the acknowledged formal administrative line of authority, the other is the more informal but very potent power of the doctor. Tensions existing between members of these authority systems are often chronic and extreme. The pathologist complains ; "My girls in the laboratory have one trouble, every doctor in the hospital is their boss."

A significant difference is pointed out between industries and hospitals. In the industries the actual production work is done by workers at the bottom of authoritative hierarchy ; in hospitals the production workers (doctors) have high prestige.

A hospital is a system of discrete and mobility-blocked levels within which the consciousness of the status is at a maximum. Unlike almost any other organization in the society, a hospital permits of little upward movement, no service worker can become a technician, no technician can become a nurse, and no nurse can become a doctor. If any individual wishes to change his occupational class, he must leave the system for a long period of outside training before returning at a higher level. Such a structure makes different value system on various levels, and interpersonal relationships between levels are highly formalised. All this has an important effect on the nature and flow of communications through the system. Such a rigid hierarchial structure is neither administratively nor therapeutically the most efficient setting for patients in getting along with their fellowmen. The need for collaborative research between medicine and the environmental settings conducive to the successful treatment of physical and mental illnesses has to be realized.

3. 1. 9. Wards as social groups of patients : Patients in

a ward are not the aggregate of individuals but a social group, and hence their therapeutic progress may be directly influenced by :

1. The nature and the extent of their interpersonal relations with other patients and with staff members ;
2. Moreover their observable behaviour, which is a datum of significance for any illness in any hospital, is related, not only to factors in their illness but also to the influence of the situation upon their action.

3. 2. Anthropology in understanding disease itself, is becoming of prime importance. The recent interest shown by physicians in the psychological and social concomitants of disease seems to be the resultant of the broad trends,

1. the apparent great increase in the incidence of chronic physical and mental illness in the civilized world,
2. reawakened interest in the multiple stress and multicasual aspects of all types of disease.

If the collaboration between anthropology and medicine is to prove truly fruitful, it will be probably in this rich unworked area.

Parrot has pointed out that in U. S. A. 25 millions have some chronic disease and 1 million deaths, and 1000 million days of disability can be attributed to chronic disease. The leading diseases are rheumatism, heart disease, diseases of the circulatory system, and allergic diseases. The increasing control of communicable disease, the progressive reduction in infant mortality, and all round increase in life expectancy have probably brought about a shift in the distribution of age and illness within the population. It looks that mortality would be replaced by morbidity. Increased chronic and mental illness may constitue a diversion of tendencies to deviation from other channels of expression, into the role of illness.

Boas observes that 'consideration of man as a domesticated animal is also of great importance—if some hunting tribes are excepted—for a clear understanding of his mental processes.

We might perhaps say that the range of mentality of the domesticated forms seems to be, on the whole, wider, and this condition increases with increasing degrees of domestication."

In relation to anthropology, the problem of psychosomatics falls within the special field "personalily and culture," which is the study of relation between cultural environment and personality formation. Personality and culture, however, is a new area of study, and in any country a negligible number of anthropologists are engaged in it. Anthropologists should expand their horizons and undertake the cross-cultural studies of psychosomatics. Such studies might be undertaken for the purpose of investigation of the relationship between the cultural factors and psychosomatic illness.

1. Incidence of behaviour disorder and psychosomatic illness, among neighbouring tribes differing in culture and in type, and frequency of disorder might be studied and compared.
2. Where parts of tribe are undergoing acculturation by tribal centres of welfare in India, while other parts of the tribes are relatively untouched, the accultured could be compared with non-accultured.
3. In the culture of India there are many subcultures, influenced by religion, caste, profession, etc. Though some of these have been the objects of study, these studies were purely social, or physical, or sociophysical. With the new angle of personality and culture, new reoriented studies will have to be planned by a group of scientists belonging to different disciplines.

New Definition of Culture.

Jules Henry has stressed the need of reviewing the traditional concepts. If the group of scientists of different disciplines have to work together, with a common aim, it is necessary to make the exchange of ideas easier. Outstanding among the concepts, is the concept of "Culture", around which the future research is to revolve. Concept of culture must be understandable to sociologists, cultural anthropologists, morphologists, biochemists, physicians and others,—to name

the scientists of different disciplines who will have to work in close harmony together. Jules Henry defines "Culture" as "the individual's or group's acquired response systems." It makes clear in simple definition, that when we study the organism and its patterns of physiologic functions, we have to take into consideration response systems that are determined not only by hereditary processes, but also by events in the external world, since it is the event in the external world that determines the acquired response system. The definition of culture in terms of acquired characteristics, leads us back to Boas' original conception of changes in mental function under the influence of domestication. It is the domestication of *Homo sapiens* that brings it about, that man has an enormous number of response systems that are not genetically determined.

Conception of culture as response systems acquired through the process of domestication places the so-called psychosomatic disorder within the general process of evolution of the species. These disorders then appear as part of the larger design of the "natural order" and take on a new meaning. One might as well hypothecate that what appears in the clinic as visible dysfunction might be just one of an enormous number of imperceptible changes which are taking place at the same time, but cause no discomfort. This means simply that culture, as an instrument for survival, generates new selective processes through the creation of new response systems. Who shall survive, will be determined in part by these selective processes. This argument is an answer, if an anthropologist was to deny psychology a place within the theoretical framework of cultural anthropology. The development of the science of Psychosomatics, the undeniable relationship between mental life and bodily function and survival, place social psychology within the general purview of anthropological research.

Since the human animal has become enormously dependent on acquired response systems, his psychic integration is subject to whatever conditions exist in the "domesticating environment". The more numerous, the more varied, and the

more conflicting the response systems the organism is forced to acquire, the more the organism is subject to psychic malfunction. This is how it is possible to produce neurosis in lower animals also : we force to acquire response systems that are too complicated or conflicting for their simple organization (domestication of wild animals). The need to develop response systems in excess of one's capacity to do so, also, produces behaviour disorder in man. The conception of the response systems acquired through domestication gives sense to the enormously taxing character of the complicated and contradictory "Western Culture".

Thus it can been seen that from the anthropological standpoint psychosomatics may be considered as an aspect of the study of response systems acquired by *Homo sapiens* during domestication. In contemporary anthropology, psychosomatics would fall in the field of "personality and culture", the new subject of anthropological research and investigation.

Anthropological, medical and biochemical research among primitive tribes would give additional and needed insight when carried in large populations and where other conditions make good experimental design possible. It is left to be seen whether Indian scientists would undertake such research in India, wherein lies such a rich field.

After consideration of the new definition of culture, it would not be out of place here, to give some thought to the changing concepts of disease.

Changing Concepts of Disease.

Modern medicine has developed on a structural basis, a concept originated by Virchow. The structural concept of disease led to the separation of illness from psyche, and disease came to be thought of, as only a disorder of organs and cells. The structural concept, being the basis of thought, naturally developed in thinking in terms of systemic diseases. With systemic diseases came the specialists to treat these diseases, and with the specialists came the introduction of instruments of precision and the mechanisation of medicine began. Medicine now contended itself with the study of

the organism as a group of different systems and as a physiological mechanism, and got impressed by blood chemistry, electrocardiography and other methods of investigation, but unimpressed by, and, indeed, often holding in contempt the psychological background of the patient, which was not considered so scientific as the results of the "laboratory studies". This period may, in truth, be referred to as the "Machine Age in Medicine". It is not to be denied, however, that remarkable developments have occurred during the "laboratory ascendency" but it must also be admitted that the emotional side of illness had been almost entirely neglected.

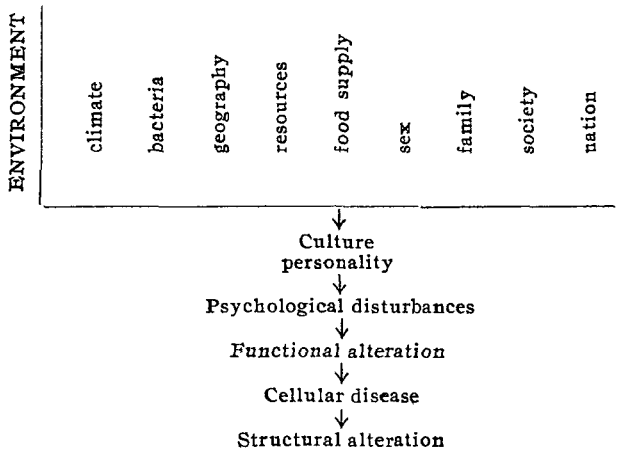
Nineteeth century concept of disease would be that, cellular disease was followed by structural alteration which led to physiological or functional disturbance. In the twentieth century this formula underwent a change. For example in essential hypertension and vascular disease, the formula was altered to read that functional disturbance was followed by cellular disease which led to structural alteration.

We are still in the dark as to what may precede the functional disturbances. It is quite likely that further investigation may permit us to say that psychological disturbances may precede the functional disturbances. Psychological disturbances in turn are the effects of environment on personality and culture (with its new definition in mind), which initiate the psychological disturbances.

The concepts of disease changing from time to time are represented thus :—

Virchow's 19th century structural concept		*20th century change essential hypertension, vascular disease*
Cellular disease	1	Functional disturbance
↓		↓
Structural alteration	2	Cellular disease
↓		↓
Physiological or functional disturbances	3	Structural alteration

Hypothetical further possibility of change in the concept of disease



In ancient medicine, the humoral theory prevailed claiming the fluids of the body to be the carriers of disease. In ancient Indian medicine, Caraka and Ṣusruta say, "Therefore a patient should be examined from the following points of view : prakrti (vāta, pitta, kafa), caste influences, lineage of family, regional influences, weather influences, subjective urges, complexion, voice, malconditions, essences or dominances, body build, body proportions, likes and dislikes, mind power, capacity for physical work, eating and digesting capacity, and age influences." (1. 1.). Nothing can beat, so far, the considerations about a picture of a patient in his totality as presented by Caraka and Susruta.

Political upheavals caused by frequent aggressions on India, hampered organized thought and scientific progress in India. Since the seventeenth century, impacts with streamlined Dutch Portuguese, French, and English, became urgent, and helped to demolish whatever was left of Caraka and Susruta, and to create an admiration for the medicine brought by these foreigners. In Europe, its ancient Medicine was demolished by different events. The Western thought in medicine underwent a great upheaval during the Renaissance. During this period, a method of investigating cause of disease in the body of a patient by dissecting it after his death, developed.

It required two great world wars to revive the interest of the physician in the totality of a patient. During these wars, practically all the population of nations turned into active fighters and/or defenders. Soldiers went to camp and fight, torn away from their homes and countries, in far distant lands. They suffered not only from the wounds caused by weapons, but by the effects of strange circumstances in which they were required to remain for very long periods under mental stresses and strains. Medical science had to investigate and strive hard to keep them fit, and to refit them, if maimed either in body or mind, because these wars required huge numbers of able-bodied men, and the supply of personnel was limited. The original concept of disease began to be looked upon with suspicion. The return to the ancient approach to disease and consideration of a patient in his totality, began, because hereditary effects influence not only the whole physical structure of the body, but also organism's function and behaviour. Function and behaviour of an individual form the basis on which the edifice of social science is built. Alan Gregg makes the following impressive statement :

"The totality, that is a human being, has been divided for study into parts and systems ; one cannot decry the method but one is not obliged to remain satisfied with its results alone. What brings and keeps our several organs and numerous functions in harmony and federation ? And what has medicine to say of the facile separation of "mind" from "body" ? What makes an **individual**, what the word implies—not divided ? The need for more knowledge here is of an excruciating obviousness. But more than mere need there is fore-shadowing of changes to come. Psychiatry is astir, neurophysiology is crescent, neurosurgery flourishes, and a star still hangs over the cradle of endocrinology.....Contributions from other fields are to seek from psychology, **cultural anthropology, sociology,** and philosophy as well as from chemistry and physics and internal medicine to resolve the dichotomy of the mind and body left us by Descartes."

Let us help in bringing out these prophetic changes by intergrating all aspects of Anthropology with Medicine. Let

us hope that the future man lives in happiness, by developing harmony with each other, with all his differences in body and mind.

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SISTER'S DAUGHTER MARRIAGE IN A MYSORE VILLAGE[1]

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Introduction

THE influence of preferential marriage rules in societies where relatives frequently marry has been a problem which has long held interest in the field of anthropology. E. B. Tylor coined the term 'cross-cousin' marriage for the most common form of marriage are between relatives, which is marriage between the children of a brother and his sister, and he concluded that these marriages are derived from a society organized into two exogamous, intermarrying corporations. Tylor's interest in the origins of single institutions, such as cross-cousin marriage, has been superseded by the modern interest in developing a comparative science of the structured behaviour that is involved in the social recognition and maintenance of human kinship ties. It was for this latter reason that the custom of marrying an elder sister's daughter was studied during seven month's research in a Mysore village. Here data on the villagers' use of kinship terminology, inheritance customs, and family alliances are presented in order to explore the implications of sister's daughter marriages for a society.

The general setting in which the research was conducted may briefly be considered. Morsralli is a farming community of 504 Kannaḍa-speakers situated near the border of Madras State in the Bangalore District of Mysore. Eight castes are

[1]A preliminary version of this paper was read before the Section of Anthropology and Archaeology, Indian Science Congress, 1957. The field-work was done in 1953-4 on a Ford Foundation Fellowship.

represented among the village's ninety-one families, but nearly three-fourths of Morsralli's members were born to the Vokkaliga, or cultivator, caste. The seven non-cultivator castes of the village comprise seven washermen, six cowherd, three shepherd and two beggar families, and one goldsmith, one trader, and one barber family. The major agricultural operation in Morsralli, the cutting of the millet (ragi) crop and the making of family threshing grounds provided an opportunity to observe cooperative and exchange labour among relatives and non-relatives both within and from outside the village group. These harvesting operations were performed by groups depending much more upon friendship ties between families than upon ties of common membership in patrilineages.

Marriage Statistics

A sample of 518 marriages was drawn from the genealogies collected in Morsralli and in Huillipahhalli, a smaller village of 252 residents situated one mile southeast of Morsralli. One's own village and neighbouring villages are heavily favoured in the selection of spouses, especially by the hereditary cultivators, but intermarriage has not occurred between Morsralli and Huillipanhalli because of the ritual custom of *agni muli*, which prohibits the taking of a wife from the southeast or northwest of one's own village. The marriage sample represents seven castes, which are listed here with the percentage of cases each contributed : cultivator or Vokkaliga (66·8%), cowherd or Golla (7·5%), leatherworkers or Madiga (7·5%), beggar-bards or Helawa (6·8%), washermen or Agasa (5·0%), shepherd or Kuruba (3·5%), basketmakers or Meda (3·3%).

In these two villages, 21% of the marriages were between cognatic relatives and 6·2% were with relatives who were connected by affinal ties before the marriage. We must note in anticipation of the following section on kinship terminology, however, that our classification, which is offered here for the purpose of a statistical summary, is artificial in so far as there are no separate terms in the kinship system for affinal relatives. The same referential term is used by men for all

relatives who are potential wives, and a woman applies the single term for relatives who are potential husbands both referentially and in address. If we follow the rule of translating these terms as they are applied to the nearest consanguineal relation, these relatives are 'sister's daughter' and 'mother's brother', respectively. In our category of cognatic matings, a man married his elder sister's daughter or his father's brother's daughter's (classificatory sister's) daughter in 9·8% of the cases, his mother's brother's daughter or his mother's father's brother's son's (classificatory mother's brother's) daughter in 6·5% of the cases, and his father's sister's daughter or his father's father's brother's daughter's (classificatory father's sister's) daughter in 4·8% of the cases. In the second category of affinal matings, 2·5% of the marriages were with a sister's husband's sister and 3·7% were marriages with wife's sister or brother's wife's sister. In our sample 60·4% of the marriages were between previously unrelated persons and 13·4% were 'doubtfuls', in which family members asserted that the bridal couple had been relatives but their genealogical connection was now traceable only through the marriage itself.

The statistics from the two villages demonstrate that the frequency of marriage with relatives is a function of the size, and so also the geographical dispersion, of the caste groups. Morsralli and Huillipanhalli are, like most villages in Mysore, segmented into one large cultivator caste and several small castes with different hereditary occupations. The data in Table I show that persons of the cultivator caste, with its large local population, contract more marriages with non-relatives, 68·5% as against the 44·2% figure for marriages between unrelated persons in the six small castes studied. When Table I is treated as a 'two by k' table of marriage patterns, the statistical comparison yields a chi square figure which is significant at a probability level of 0·001. Chance, therefore, does not account for the higher frequency of matings between non-relatives among the hereditary cultivators. The frequency differences are explained by the fact that the cultivator caste comprises a relatively large, locally-situated group

of potential spouses and its members are therefore freer to contract marriages with unrelated families. Hereditary cultivators may marry within their own village, whereas the local populations of the non-cultivator caste are nearly always exogamous due to their small size. The non-cultivators, who are faced with these greater difficulties in marital match-making, find their spouses in the families of close relatives, and often even these related families must be found at considerable distances from the home village.

TABLE I

Frequency Comparison Of Marriages With Relatives And Non-Relatives In Large and Small Castes

	Relatives	Non-relatives	Doubtfuls
Cultivators	84 (24·3%)	237 (68·5%)	25 (7·2%)
Non-cultivators	58 (33·7%)	76 (44·2%)	38 (22·0%)

The data on the frequency of different types of marriages between relatives may be considered with respect to a recent theory which postulates an influence of preferential marriage rules on social stratification. Lévi-Strauss has concluded that the forms of marriage with relatives which categorize local descent groups as either wife-giving or wife-receiving groups, vis-a'-vis other groups, tend, through an inevitable shortage of marriageable women, to produce caste-like stratifications wherein women mate upward in the direction of the pole of economic and political power.[2] Sister-exchange marriages, in which women are merely traded in the same or the following generation between two local descent groups, do not have this theoretical importance of causing differences in social status, according to Lévi-Strauss. It may be possible to argue that sister-exchange marriages have an opposite or egalitarian effect, since the marriage rule is a guarantee that the two intermarrying groups occupy the same relationship

[2] Le'vi-Strauss, 1949, p. 325. Leach, 1952, p. 39.

to each other as both wife-givers and wife-receivers. We may then assess our sample of marriages for what may constitute its hypergamous potential or its opposing egalitarian effectiveness. From this standpoint, sister's daughter, father's sister's daughter, and sister's husband's sister marriages are classified as sister-exchange marriages. Marriages in which the patrilineal descent group is stabilized either at the pole of wife-giver or wife-receiver but is never both wife-giver and wife-receiver with respect to the same group will include marriages with mother's brother's daughter, sororal polygyny, and marriages with brother's wife's sister. The figures are then 19% sister-exchange and 10% wife-giving marriages for our sample. These statistics suggest that if marriage rules do affect social stratification in the two villages, the force would be against the formation of a social hierarchy between wife-receiving and wife-giving groups.

Kinship Terminology

The basic pattern of the kinship terminology which the villagers use in Morsralli is found, except for the modifications due to sister's daughter marriage, in Coorg, where their nearest cultural relatives who prohibit sister's daughter marriages live. The Dakota-Iroquois kinship terminology that Emeneau recorded from the Coorgs is consistent with their practice of cross-cousin marriage. The Coorg preference for marrying both cross-cousins, father's sister's daughter and mother's brother's daughter, results in a symmetrical kinship system of Kariera type, in which affinal relatives are merged with the mother's patrilineal relatives. This terminological system is diagrammed in Figure I as two intermarrying patri-descent lines. The second diagram in Figure I shows that sister's daughter marriages also produce a symmetrical kinship system which is reducible to mirror-image patrilines. The principle of sister exchange, implicit in sister's daughter and reciprocal cross-cousin marriage, is realized in the extension of sibling terms to spouse's sibling's spouse in both the systems. In the Kannaḍa linguistic region this presumptive sibling relationship of sisters' spouses is called *saḍka*. Both the systems always

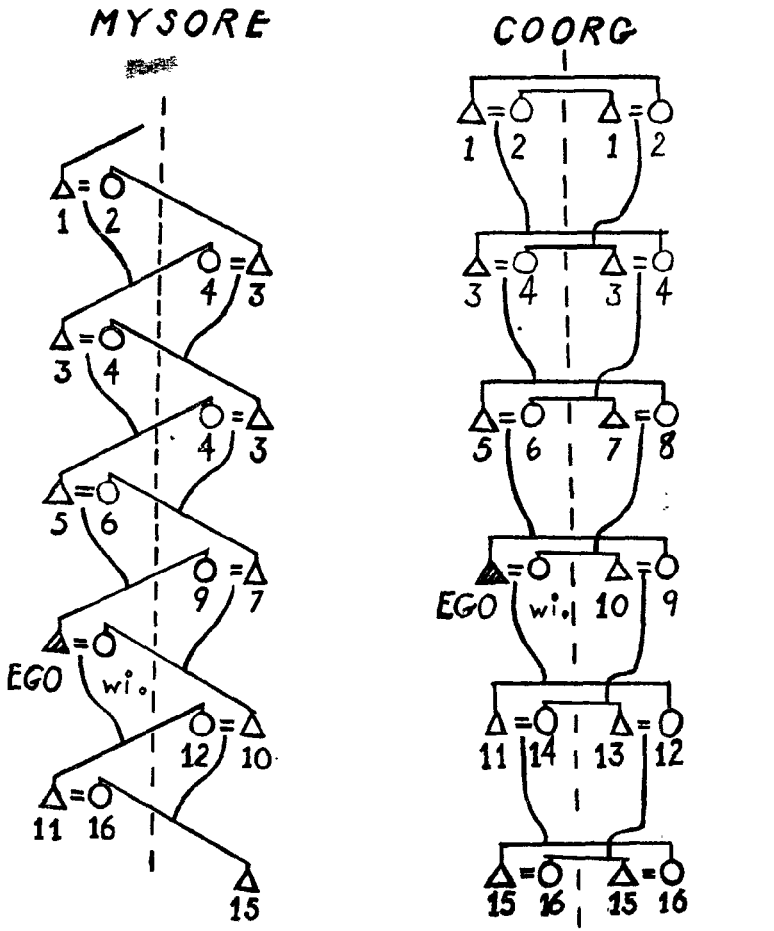
distinguish the sex of a relative, and terms do not differ by the speaker's sex, except when cross-cousins' and cross-sexed sibling's children are referred to. Younger relatives are usually addressed by name in the Mysore village and so also among the Coorgs. Both systems classify siblings by their age relative to the speaker, and parents' siblings who are of the same sex as the parent are bifurcated into 'big and little' fathers, 'big and little' mothers.

Morsralli's system of kinship terminology reflects sister's daughter marriage. Nearly 10% of the matings were between mother's brother and sister's daughter in this village, of which over two-thirds were with own sister's daughter and slightly less than one-third were with the daughter of a classificatory sister. One consequence of these matings is the equation of father's and mother's maternal grandparents with one's own grandparents, and it can be seen in Figure I how these mergings come about in a system of sister's daughter marriage. Since father has married his sister's daughter, ego's mother's mother's parents are father's parents, or grandparents, to ego. Father's father has also married his sister's daughter so that father's father's sister is the same person as father's mother's mother. Here the villager is consistent with the patrilineal emphasis of his society and chooses to recognize his grandfather's sibling tie rather than the relationship between father's mother and her mother, and so father's father's sister and her husband are called grandparents. The other equations which reflect sister's daughter marriages in Morsralli involve terms for affinal relatives, and their derivation from cross-generation mating is apparent without reference to the diagram. These include the following : sister's daughter's husband = brother, (man speaking) sister's son = wife's brother, and (man speaking) sister's daughter = wife's sister = brother's wife. Sister's daughter marriage is also reflected in the terms women use to address their mother-in-law, which include 'father's sister', 'grandmother' and a compounded term made up of both these elements.

In those 10% of marriages which are between a mother's brother and his sister's daughter certain adjustments of

FIGURE I

Preferential marriage patterns, mother's brother-sister's daughter marriage and cross-cousin marriage.



Key:

1 great grandfather
2 great grandmother
3 grandfather
4 grandmother
5 father
6 mother
7 mother's brother
8 father's sister
9 elder sister
10 male cross-cousin
11 son
12 daughter
13 sister's son (man speaking)
14 sister's daughter (man speaking)
15 grandson
16 granddaughter

terminology are inevitable. Then the wife addresses her parents-in-law as 'grandparents' and her children will call her mother and their father's sister 'grandmother'. It is helpful to refer to the diagram in Figure I in order to visualize how sister's daughter marriages bring about these adjustments in households where the marriages have taken place. A man who marries a daughter of sister continues to call his mother-in-law 'elder sister', and she refers to him reciprocally as 'younger brother' and not as 'son-in-law'.

The merging of kinship terms for mother's brother, cross-cousins, and affinal relatives in Morsralli reflect the co-occurrence of marriage with cross-cousins and with the daughter of a sister. There is no society which permits sister's daughter marriages which does not also favour cross-cousin matings, so that similar equations may be expected in other societies where sister's daughter marriages are sanctioned. The underlying principle in these equations is that one pair of reciprocal terms, mother's brother-sister's daughter, is used by all relatives who may marry. Since a potential husband is an elder relative, the term for him is applied both referentially and in address, whereas the custom of addressing younger relatives by their names permits the reciprocal term to be used only in referring to a potential wife. The following is the concerned equation for male relatives that results from preferential mating with sister's daughter and cross-cousins in the same society: mother's brother = mother's brother's son (elder than ego) = father's sister's husband = father's sister's son (elder than ego) = father-in-law = sister's husband (elder than ego) = spouse's elder brother. Kinship terms for relatives older than the speaker do not differ by sex in this terminological system, and so a brother follows his sister's classification of these relatives. A person may follow, according to the mirror-image symmetry of the system, his spouse's equation of these relatives and address them as 'elder brother' as circumstances permit, but it is obvious that spouse's father-in-law must always be 'father'. In the 11·3% of the marriages which were cross-cousin matings spouse's mother's brother or spouse's father's sister's husband is ego's father, and so only one of these relatives can be called

'brother'. In the 10% of the marriages in which a sister's daughter was married husband's mother's brother must be either ego's father or grandfather, husband's sister's husband is 'father,' and the terms for wife's father's sister's husband and wife's father's sister's son cannot be the same. When a sister's daughter marriage occurs wife's father's sister's husband may be ego's father, but if not, he is addressed as 'brother' because he is ego's sibling's spouse's sibling's spouse, and his son becomes son to ego. Some persons, who themselves have not married a cross-cousin or sister's daughter (mother's brother), do, however, apply the full equation brother = spouse's mother's brother = spouse's mother's brother's son = spouse's father's sister's husband = spouse's father's sister's son = spouse's sister's husband.

The relatives whom a man refers to as sister's daughter, potential wives, reflect the fact that both sister's daughters and cross-cousins are married. Thus, sister's daughter (man speaking) = father's sister's daughter = mother's brother's daugter = spouse's sister = brother's wife. Women do not apply this equation, since a woman's sister's child addresses her as mother.

The kinship terminologies of South American groups practising, or formerly practising, sister's daughter marriage also reveal the influence of this institution on the classification of relatives. Lévi-Strauss has reported that sister's daughter marriage among the Brazilian Nambikuara was accompanied by the terminological equations of grandfather = mother's brother = father-in-law and of grandmother = father's sister = mother-in-law.[3] The Tupi Mundurucu of Brazil were reported in 1867 to be marrying sister's daughters, and in 1932 a terminological reflection of the custom appeared in a vocabulary, from which it was seen that women equated brother and son-in-law.[4] The Guarani Cayua' of the southern Mato Grosso of Brazil practised neither sister's daughter nor cross-cousin marriage in 1943, but one terminological feature of the present

[3] Le'vi-Strauss, 1943, p. 398.

[4] Horton, 1948, p. 277.

Cayua' system suggests that their ancestors practised sister's daughter marriage. Cayua' women use a single term 'brother's child', which parallels the term for grandchild because the sex of the relative is not distinguished. Men, on the other hand, distinguish the sex of sister's children and have separate terms for sister's daughter and sister's son.[5] Gillin recorded only two cases of sister's daughter marriage for the Barama River Caribs in 1936, but their kinship terminology continued to reflect sister's daughter marriage and preferential cross-cousin marriage. Male Caribs equated female cross-cousin, sister's daughter, wife's sister, and brother's wife, while women equated mother's brother, male cross-cousin, husband's brother, and sister's husband.[6] Another Carib-speaking group, the Killinago of the Lesser Antilles islands, have been reported as marrying cross-cousins and sister's daughters. Here a man may marry his sister's daughter or she may be given to his son, and this is reflected in their equation wife = daughter-in-law = sister's daughter.[7]

Behaviour Patterns of Kin

The kinship terms which men and women use in Morsralli invariably specify the degree of seniority of the relative, and this fact is equally as well observed in the associated patterns of interaction within the small universe defined by the kinship system. The polarization which the principle of relative age brings to the universe of kindred is plain in the deference which a young man is expected to show toward his father and his elder brother. The younger relative addresses the elder by kinship term only and works under his direction. The following additional elements of etiquette are prescribed : tolerating verbal abuse of the elder, not interfering with the elder's work, standing and leaving the vicinity when the elder approaches, not initiating conversation nor sleeping before the elder, avoiding groups in which the elder is included unless directed by him to come, eating only after the elder has started, bathing

[5] Watson, 1952, p. 37.

[6] Gillin, 1936,pp. 95, 82 ff.

[7] Kirchhoff, 1932, p. 140.

after the elder has finished, surrendering personal earnings to the elder, and requesting of him the use of joint-family property. The period of maximal respect-giving to father and elder brother is usually between ages thirteen and thirty, since joint-family property is partitioned at the death of the father and the elder brother's supervisory role recedes after that. The average age-difference between a father and his eldest son was 31.2 years in Morsralli, with a standard deviation of 7.4 years. This sample was based on forty-six cases in which the son had attained age thirteen. As may be expected in a system where respect follows age and father is equated with his brothers, greater respect is prescribed for a man's father's elder brother than need be shown to his younger brother.

The sternness which the recognition of age gives to kindred relationships is, however, offset by differentiation of roles by sex. This factor of sex-differentiation, which is as well specified by kinship terminology as the principle of seniority, allows the development of cordial relationships along the axis of cross-sex linkages between relatives. Sex works against the differences in the ages of a father and his daughter. A close sentimental attachment is often shown by these relatives so that a father may carry his infant daughter when he visits friends and she may accompany him to adult male gatherings to the age of her puberty. The services of a girl in her father's household are rationalized as part of her training for work in her mother-in-law's household. Daughters assist their mother and elder brothers' wives, for example, in bathing the members of the family, which is properly the kinship duty of daughters-in law. Child-tending is done by a mother-in-law and her daughters, while the daughters-in-law do heavier field-work, water-transport, and the grinding of grain. After her puberty and removal to her mother-in-law's house, a daughter becomes an honoured guest in her father's house, and she bears her first child, at the least, there. When a woman gives her daughter in marriage to her own brother, her opportunity for interaction with her father's family is intensified and elaborated.

The bond between siblings, when qualified by the factor of sex-difference between them, functions as the axis for cordial

relationships among relatives. Brother-sister ties are maintained by festival visits, gifts and mutual assistance, and by marriages. Their children, cross-cousins, are expected to preserve this atmosphere of reciprocal friendship among themselves. A brother comes to his sister's house for festivals, and he plays a prominent role in the celebration of her children's marriages. Sisters and their children are honoured with gifts of clothing at the marriages of their brothers and of their brother's children. A brother and his sister participate in the choosing of spouses for each other's children, so that the event involves cooperation and reunion between themselves. The brother-sister relationship is more particularly renewed and intensified, if the brother is himself marrying his sister's daughter or if the marriage is between the children of the brother and sister. A surety exists in these cases that the ideal of mutual assistance between the children of brother and sister is realized in the obligations created by marriage. It would be difficult to over-emphasize the effect of these favoured marriages on preserving the bonds of friendship and cooperation which are founded on the affection of brother and sister, as it appears that herein lies one of the major functions served by sister's daughter and cross-cousin marriage.[8]

Morsralli's symmetrical marriage system appears to be in conflict with patriliny and the ideals of Sanskritic Hinduism, which require an asymmetrical relationship between spouses.[9] Cross-cousin and sister's daughter marriages unite relatives who are linked by equal and reciprocal ties, and the symmetry of their relationship is revealed in the use of a self-reciprocal kin term, mother's brother = sister's son = male cross-cousin = brother-in-law, when the relatives are of approximately equal age. The reciprocal nature of the relationship is further realized in mutual festival dining, aid in agricultural work, aid in choosing spouses, help in buying animals, loans, and by support in family or village disputes. A symmetry in the terminology of address for husband and wife has appeared in some Morsralli families with the self-reciprocal use of the

[8] Brown, 1934. pp 36-39, for an earlier development of this thesis.

[9] Gough, 1956, p. 844, for Tanjore Brahmans' solution of this conflict.

'respect' suffix, which was formerly applied only by wife for husband. This change comes by way of extension of the traditional self-reciprocal address of husband and wife's brother, when their ages do not greatly differ. The extension is through the principle of the social equivalence of siblings so that the wife has been equated and merged with her brother. We may speculate that the self-reciprocality in the husband-wife relationship was present, though suppresssd under the force of religious ideals and the economic emphasis of patrilineal descent, even before the terminological change took place.

Sister's daughter marriage represents one means for elevating the authoritarian status of the husband, because this form of marriage automatically prefers wives who will be significantly younger than their husbands. A wife is then required to respect her husband by the analogy of the deference generally accorded to elders. The ideal age of a husband is said to be ten years in advance of his wife, and this was the modal figure for the age difference between husband and wife in Morsralli. The mean difference in spouses' ages was eight years, with a standard deviation of 3.21 years. These age differences must indeed provide an important surety to the ideal pattern of husband dominance, if there is pressure in the kinship system for equality and self-reciprocality of the husband-wife relationship because of the symmetrical marriage rules.

Family Alliances and Inheritance

For sister's daughter marriages, the association between the families of spouses is an old one, and it therefore forms a more secure base for the exchange of services between the inter-marrying families than would exist if each were to contract a wholly new set of alliances in each generation. Exchanges are encouraged by the kinship system, in which the appropriate behaviour of co-fathers-in-law is said to be the same as the reciprocal assistance of mother's brother-sister's son and cross-cousins, *i.e.*, as if all marriages were sister's daughter or cross-cousin marriages. Old alliances replace new relationships with untried family groups in cross-cousin matings, too, and in marriages with sister's husband's sister or brother's wife's

sister we may discover the same advantage. The distinction is made in Morsralli between 'old' and 'new' relationships on these grounds, and a greater degree of informality is seen between members of families linked by an old marriage relationship. Among new relatives, on the other hand, care and formality is felt to be the necessary norm for conduct.

All the forms of marriage with relatives share the advantage of allowing family resources to be concentrated, distributed and exchanged within a limited circle of kin. We may speculate that within this smaller universe the ideal of exchange between allied families is more easily reached and that a poor family whose members did not marry relatives would incur more obligations than it could fulfil. A family with few alliance is more likely to return its obligations, and the chances of a conflict due to an omission are reduced.

One advantage of marrying a relative in Morsralli derives from the customary arrangements for the inheritance of property in families which lack sons. In these families the property is transferred to a son-in-law who elects to reside with his wife's family, and the arrangement has the sentimental advantage that the property remains with members of a man's own household, his son-in-law and his daughter's sons. Son-in-law succession allows the property to pass undivided to grandsons, rather than be divided among the different households of brothers' sons or father's brother's sons' sons. A son-in-law is the more reliable trustee in so far as his family background and character have been known up from his childhood, which happens if the son-in-law is a man's sister's son, wife's brother or wife's brother's son. When the son-in-law's marriage represents an old relationship, his family has had a chance to prove itself in the exchanges between marriage-linked families. The advantages of a son in-law who is an old relative are here so strong that if he is not favoured, he may be replaced by his wife's mother's brother, mother's brother's son, or father's sister's son. But if the girl has married one of the favoured relatives in the first instance, the problem of adjusting her marriage for son-in-law succession will have been happily forestalled.

Marriages between relatives in Morsralli present, in the last instance, a situation in which there is reciprocity with respect to son-in-law inheritance for the two families linked by the marriages. Sister's daughter marriages and sister's husband s sister marriges confer reciprocal chances on the two brothers-in-law to inherit each other's property. In this respect father's sister's daughter marriage is like a lien which is satisfied in the next generation. If a man chooses for himself or his brother his wife's sister for his household, he may thereby monopolize the succession rights for sons-in-law in his wife's family. The wife's family, for their part, gain by giving their second daughter to a son-in-law, or his brother, and so reserving the son-in-law succession privileges in the related family for their sons.

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GEOLOGICAL AND CULTURAL EVIDENCES OF THE STONE AGE IN MAYURBHANJ

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IN the report[1] on the excavations in Mayurbhanj where the characteristic features of the palaeolithic industry found in Kuliana (22°4′N, 86°39′E) and other sites in Mayurbhanj (Orissa) have been described by the first two authors of this paper, the importance of the study of the cliff sections of the river Burhabalang, specially those near Kamarpal (22°2′N, 86°38′E) within three miles of Kuliana, was emphasized in order to ascertain the age of the lithic industry on reliable geological evidence. Since 1950, the authors of the present paper have been engaged in such studies, but as the suitable time for this work is practically restricted to only three weeks in the year, between the third week of May and the first week of June, when most of the river section is exposed, the progress of the field-work has been rather slow. In some seasons when the rains started early, work had to be abandoned. Uptil now it was possible to carry out such work, only in four seasons of 1950, 1952, 1955 and 1957 and for about a week each year. However, valuable geological and archaeological data were collected and it is expected that such a line of work for a few more seasons would help in dating the palaeolithic culture of Mayurbhanj. This might throw some light on the same problem in peninsular India. The report of the first season's work has already been published[2]. In the present report the authors have reviewed their observations during the subsequent three

[1] Bose and Sen, 1948
[2] Bose, Sen and Ray, 1951

season's work incorporating the geological observations of Sri A. Chaudhuri of the Geology Department, Calcutta University, who accompanied the party during their work in June, 1955. The observations have here been dealt with under three sub-headings (namely, stratigraphical, palaeontological and typological evidences), including the re-examination of some of the tentative conclusions made on the published report of the first season's work.

Stratigraphical Evidences

In our report on the first season's work we discussed the stratigraphical sequence of the sections of the river Burhabalang within a mile upstream of Kamarpal Ghat. The main sequence of these sections is practically the same; which from the water level upwards is as follows: (i) a sticky somewhat greyish-white clay bed partly exposed in only one of the sections and in others just below the water level; (ii) above it, a bed of gravelly laterite somewhat compact in nature, the thickness being about 4 feet; (iii, iv and v) overlying this are two beds of boulder conglomerate separated by a narrow gravelly bed with ferruginous matrix or by pebbles embedded in a pellety laterite. According to the stratigraphic position, the two boulder conglomerate beds have been termed 'lower' and 'upper'. Lithologically the two beds are practically the same and show some concentration of ferruginous material. In thickness, the lower one varies between 3'6" and 4' and the upper one between 3' 8" and 5' 6"; (vi) the topmost bed in each section is a thick deposit of alluvium which has been called 'old alluvium' as the present day high floods do not reach the top of it. The maximum thickness of this bed at one place is 25' 6". On the whole, these beds are more or less in conformity with one another and a few palaeolithic implements were also recovered *in situ* from the boulder conglomerate beds.

On the basis of the above study and also of an earlier study on the thalweg of the Burhabalang river[8], it was tentatively suggested that the boulder conglomerate beds indicate

[8] Bose and Sen, 1948

a large carrying capacity of the stream which is possible during pluvial periods, while the lower compact laterite and the upper pellety laterite suggest two old land-surfaces indicating dry periods which helped the formation of laterite. Thus the whole series suggested a succession of pluvial and dry conditions rather than large-scale tectonic movements which can rejuvenate a river and augment the flow of the river to deposit boulders instead of sand or silt when the river becomes almost graded.

Let us now examine the above observations on the basis of the stratigraphical evidences recorded during the next three seasons' work. Our work in 1952 and 1955 yielded no additional data with regard to the stratigraphical sequence near Kamarpal, excepting that more implements, including some *in situ* specimens were found. In 1955 the work was more concentrated on different sections of the river Burhabalang further downstream at Mahulia, Mukramatia, and Satpautia where some fossils including one bovid tooth (a valuable index fossil) were recovered from the sections but no *in situ* tool was found there. The general stratigraphical sequence at the above mentioned places is as follows: (i) a limestone bed containing brachiopod, foraminifera and ostrea, underlain by (ii) a bluish-grey shale and overlain by (iii) a bluish-white shale, all in conformable sequence and earlier identified and grouped together by the late P. N. Bose[4] as Baripada beds. Eames[5], and other geologists dated Baripada beds as lower Miocene. At places over this shale bed there is a thin cap of secondary laterite. A few palaeolithic tools were found scattered over this laterite surface. The palaeontological implications of the fossils recovered from these sections have been discussed under a separate sub-heading.

But the stratigraphical evidence collected during 1957 near Kamarpal suggests that the sequence there is probably the result of some local phenomena and not the outcome of a widespread climatic cycle of successive dry and wet phases as we

[4] Bose, P. N. 1904

[5] Eames, 1936

tentatively suggested at first. The heavy flood which occurred in the river Burhabalang in 1956 practically washed off large parts of the river sections which we studied in earlier seasons and the drought in the field season of 1957 which exposed the sections further downwards enabled us to review the sections in the light of new evidences. These evidences revealed that the base of the greyish sticky clay (with a bluish tint) is hard and calcareous and that the compact laterite which we found above this clay bed (which was in part below the water level in previous seasons) does not seem continuous over a long distance and does not extend horizontally well into the section. Further observations are however required to establish its actual stratigraphical relationship with the lower beds. Secondly, the overlying boulder conglomerate beds cannot be divided any more into two by the intervening gravelly bed with ferruginous matrix or by gravel embedded in pellety laterite. The new sections opened by flood in the same area are practically devoid of this intervening band. This bed like the earlier compact laterite may be a purely local phenomenon. The boulder conglomerate is now observed as one vertically continuous bed. Its horizontal spread is not however very extensive. And the size of the boulders is not at all bigger than that of the boulders carried by the present day stream as exposed in the middle of the river-bed this season.

Thus the stratigraphy of the present day river section near Kamarpal becomes more or less as follows: (i) a greyish blue clay bed lying over a hard calcareous bed exposed at places in the water level, (ii) over this clay bed is a continuous bed of boulder conglomerate ; below this bed at places, there seem to occur deposits of compact laterite, whose continuity has not been well established, (iii) over the boulder conglomerate bed is a thick deposit of alluvium. Therefore, we cannot suggest a cycle of dry and wet phases to explain this stratigraphy. During this season also no fossils were recovered from these sections but more *in situ* tools were obtained from the boulder bed. Our work in Mukramatia and Mahulia this season yielded some fossils but no new stratigraphical feature was noted there.

Typological Evidences

On the basis of the tools collected during our first season's work in the river section at Kamarpal we pointed out in our earlier report that their workmanship is generally crude and primary in nature. The series include both core and pebble tools and a few flakes. The former comprise bifaces of early Abbevillian type and show crude form and workmanship. Regarding the tool sequence, it was said that Kuliana typology starts from crude bifaces and choppers and ends in fiuer bifaces, cleavers and a few flake tools. But the tool sequence in the sections on the Burhabalang, established by few *in situ* tools, was observed to be from crude pebble tools to bifaces of crude type. Thus we missed crude pebble tools in the Kuliana series and finer bifaces and cleavers in the Kamarpal sections. But we expected that further work would reveal the full sequence both at Kuliana and at Kamarpal.

In our subsequent field-season's work in the river sections near Kamarpal, the number of implements from this area including those found *in situ* have increased and now we are fairly in a position to say more definitely about the typological sequence in the river sections. Detailed study of these implements will be published in another paper. On the whole, we can say that our earlier assumption about this sequence and its comparison with Kuliana sequence is more or less corroborative of each other. The majority of the crude implements from the lower part of the boulder-conglomerate bed have been made simply by removing only a few flakes and keeping a large part of the original cortex in tact, from large river-rolled quartzite pebbles of somewhat elongated shape and not from small rounded pebbles. So on technological ground these are comparable with so-called pebble tools and may be said to belong to the same facies as the pebble tools from our river sections and those from Africa or elsewhere have been turned into tools simply by removing a few flakes only. These tools perhaps belong to an earlier facies of the evolved Abevellian-Acheulian type of the bifaces, the main difference being the size of the medium chosen. Future work will reveal the percentage

of each group of tools among themselves or whether we are justified to make such an assumption.

Palaeontological evidences

After our first season's work at Kamarpal, a few soil samples from the river sections were handed over to the Palaeo-Botany section of the Botany Department of Calcutta University for microbotanical analysis (for spores and pollens). A few such fossils were identified only in the clay bed below the boulder conglomerate bed by R. Majumdar, a research worker of that Department. Majumdar identified only three spore species from the clay bed but they could not be profitably used for dating purposes as their range in time is too wide to be of any use.

During our third season's work in Mayurbhanj in 1955 some fossils (molluscs, shark teeth, etc.) were collected from the shale band above the limestone band of the Baripada beds at Mahulia and Mukramatia as mentioned before. Among the fossils collected at Mukramatia, there occurs a bovid tooth as reported by A. Choudhuri.[6]

Later on K. C. Sarma[7] of the Calcutta University Geology Department followed up this work and 'the results obtained from his study of sections of the Baripada beds show that these beds are of much younger age than Miocene, so much younger that it may be placed even in the Lower Pleistocene.' Thus the lower limit of the tool-bearing deposits may be raised from Miocene to Lower Pleistocene.

Conclusion

In an earlier paper written before we undertook our study of the river sections on the banks of the river Burhabalang, N. K. Bose , one of the authors of this paper, pointed out that if the boulder-conglomerate bed lying below the tool-bearing gravel bed at Kuliana can be equated with the boulder conglomerate bed on the river sections nearby where the bed is underlain by an unfossiliferous clay bed and if this clay bed be of the same series as the Baripada beds further down

[6] Choudhuri, A, 1957

[7] Sarma, K. C., 1956 and 1957

stream, then it can be suggested that the lower limit of the artefacts is later than Lower Miocene based upon earlier dating of the Baripada beds. But in view of our recent studies and of those of the geologists on the river sections, our observations now are as follows :

(i) The extension of the Kuliana sequence of palaeolithic implements has been well established into the boulder conglomerate bed near about Kamarpal lying within 3 miles of Kuliana with an earlier crude tool phase at the base.

(ii) The age of the Baripada beds may be placed in the Lower Pleistocene instead of in the Lower Miocene.

On the basis of the above observations, it may be said that the lower limit of the Mayurbhanj palaeolithic industry is not earlier than Lower Pleistocene and that these observations have now much narrowed down our problem of dating in Mayurbhanj. Our future line of work should be directed (a) to correlate the lower limit of the tool-bearing deposits with the upper limit of the beds containing datable fossils and (b) to ascertain the age of the boulder conglomerate bed on the basis of fossil evidence.

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A NOTE ON JUANG ANTHROPOMETRY

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(*Received on 9th December, 1957*)

THE Juangs inhabit the central region of Orissa, formed by the districts of Dhenkanal and Keonjhar. They claim to be autochthones of Keonjhar and direct descendants of the first human beings created by God. They consider the village Gonasika in Keonjhar (21'-30" Lat and 85' 37" E. Long) as the place of their origin. They numbered 17,032 according to the Census of 1941. Anthropometric data were collected by the author during 1956-57. They were collected from the following villages: Bimballanatakota, Kathogora, Kapilas and Sangsal in Dhenkanal; Kantala, Rajamunda and Jamra in Pal-lahara; and Kantabahal, Tungrubahal in Keonjhar. The following anthropometric measurements were taken on 116 adult males :—

Stature, head length, head breadth, head height, bizygomatic breadth, bigonial breadth, nasal height, nasal breadth, nasal depth and total facial height.

The following indices have been worked out of the above measurements :—cephalic index, breadth-height-index, altitudinal index, nasal index and total facial index.

Measurements were taken according to the technique described by Wilder. For indices, Martin's classification has been followed.

TABLE 1

Classification of Stature. (in cm)

Class	Range	Abs. No.	Percent.
Very short	130·0–149·9	14	12·0
Short	150·0–159·9	65	56·0
Below medium	160·0–163·9	21	18·1
Medium	164·0–166·9	9	7·7
Above medium	167·0–169·9	6	5·1
Tall	170·0–179·9	1	0·8

The average stature of the Juangs is 157·57 ± ·64 cm., the maximum being 171·4 cm. and the minimum 143·5 cm. Short stature (56·0%) appears to be predominating. Next to it comes the below medium class (18·1%). The percentages of very short, medium and above medium are 12·0, 7·7 and 5·1 respectively. Only one tall-statured individual occurs in the group.

TABLE 2

Statistical Constants of 116 male measurements (*in cm.*)

Measurements	Max.	Min.	Mean	Standard Deviation	Co-efficient of Variation
Head Length	20·1	16·5	18·41 ± ·02	0·25 ± ·01	1·35 ± ·08
Head Breadth	15·1	12·7	13·82 ± ·04	0·48 ± ·03	3·53 ± ·23
Head Height	14·5	10·4	12·48 ± ·82	0·89 ± ·05	7·15 ± ·46
Nasal Height	5·3	3·8	4·40 ± ·03	0·37 ± ·02	8·51 ± ·55
Nasal Breadth	5·0	3·1	3·95 ± ·04	0·49 ± ·03	12 41 ± ·81
Nasal Depth	1·9	1·1	1·47 ± ·01	0·17 ± ·01	11·82 ± ·71
Total Facial Height	12·3	9·7	10·72 ± ·04	0·52 ± ·03	4·91 ± ·32
Bizygomatic Breadth	14·3	11·4	13·16 ± ·05	0·58 ± ·03	4·46 ± ·29
Bigonial Breadth	11·1	7·5	9·71 ± ·04	0·53 ± ·03	5·49 ± ·36
Stature	171·4	143·5	157·57 ± ·64	6·99 ± ·45	4·43 ± ·29

TABLE 3

Statistical Constants of Indices

Indices	Max.	Min.	Mean	Standard Deviation	Co-efficient of Variation
Cephalic Index	88·0	68·5	75·29 ± 0·36	3·94 ± 0·25	5·23 ± 0 33
Altitudinal Index	80·5	60·8	68·04 ± 0·32	3·53 ± 0·23	5·18 ± 0 34
Breadth-Height Index	106·0	70·3	90·46 ± 0·80	8·63 ± 0·56	9·58 ± 0·62
Nasal Index	116·3	62·0	89·96 ± 0·77	8·35 ± 0·54	9 28 ± 0·60
Total Facial Index	93·9	72·9	81·34 ± 0·46	5·02 ± 0·33	6·17 ± 0·40

TABLE 4

Classification of Cephalic Index

Class	Range	Abs. No.	Percent.
Hyper-dolichocephalic	× – 69·9	2	1·7
Dolichocephalic	70·0 – 75·9	76	65·5
Mesocephalic	76 0 – 80·9	28	24·1
Brachycephalic	81·0 – 85·4	8	6·8
Hyper-brachycephalic	85·5 +	2	1·7

The mean cephalic index is 75·29 ± ·36 with the maximum of 88·0 and minimum of 68·5. Dolichocephaly (65·5%) appears to be predominant among the Juangs. Mesocephaly occurs in the next highest percent of 24·1%. Brachycephaly occurs in 6·8 percentage while hyper-brachycephaly and hyper-dolichocephaly are seen in the equal percentage of 1·7. The mean head length and head breadth of the Juangs are 18·41 ± ·02 cm. and 13·82 ± ·04 cm. respectively. Head length varies between the maximum of 20·1 cm. and the minimum of 16·5 cm. while head breadth between those of 15·1 cm. and 12·7 cm.

TABLE 5

Classification of Length-Height Index

Class	Range	Abs. No.	Percent.
Orthocephalic	57·7 – 62·5	10	8·6
Hypsicephalic	62·6 – ×	106	91·3

The mean length-height index of the Juang head is 68·04 ± ·32; the range of variation being between 60·8 and 80·5. Hypsicephaly (91·3%) is seen in the highest concentration among the Juangs. The percentage of orthocephalic element is only 8·6 while no chamaecephly has been found in the present sample. The mean head height is 12·48 ± ·82 cm. the maximum being 14·5 cm and the minimum 10·4 cm.

TABLE 6

Classification of Breadth-Height Index

Class	Range	Abs. No.	Percent.
Tapeinocephalic	× – 78·9	2	1·7
Metriocephalic	79·0 – 84·9	18	15·5
Acrocephalic	85·0 – ×	96	82·7

The mean breadth-height index of the Juang head is 90·46 ± ·80 with the maximum of 106·0 and minimum of 70·3. Acrocephalic (82·7%) element is seen in majority among the Juangs. Metriocephaly occurs in 15·5% while tapeinocephaly is present in 1·7%.

TABLE 7

Classification of Nasal Index

Class	Range	Abs. No.	Percent.
Leptorrhine	55·0–69·9	2	1·7
Mesorrhine	70·0–84·9	24	20·6
Platyrrhine	85·0–99·9	78	67·2
Hyper-platyrrhine	100–×	12	10·3

The mean nasal index is 89·96±·77 with the maximum of 116·3 and the minimum of 62·0. Platyrrhiny occurs in the highest frequency of 67·2% while the percentage of mesorrhiny is 20·6%. Combined with 10·3% of hyper-platyrrhiny the Juang nose appears to be predominantly a platyrrhine one. Leptorrhiny occurs in 1·7% only. The mean nasal height and nasal breadth is 4·40±·03 cm and 3·95±·04 cm. respectively. The range of variation of the nasal height is between 3·8 and 5·3 cm. while that of nasal breadth between 3·1 and 5·0 cm.

TABLE 8

Classification of Total Facial Index

Class	Range	Abs. No.	Percent
Hyper euryprosopic	×–78·9	34	29·3
Euryprosopic	79·0–83·9	52	44·8
Mesoprosopic	84·0–87·9	25	21·5
Leptoprosopic	88·0–92·9	3	2·5
Hyper-leptoprosopic	93·0–×	2	1·7

The mean total facial index is 81·34±·46 ; the maximum being 93·9 and the minimum 72·9. In the total facial index it is observed that the euryprosopic element is predominant while both the hyper-euryprosopic and the mesoprosopic element are strongly present. The leptoprosopic element is low in percentage. The mean total facial height is 10·72±·04 cm. ; the maximum being 12·3 cm. and the minimum 9·7 cm. The mean bizygomatic breadth is 13·16±·05 cm. ; the maximum being 14·3 cm. and the minimum 11·4 cm.

THE TRIBAL POPULATION IN WEST BENGAL

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and

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Introduction

THE Census of 1951 shows eight scheduled tribes in the state of West Bengal with a total population of 1,165,476 of whom 588,233 are male and 577,243 female. The details of the tribal population are given in Table 1.

TABLE 1

Tribal Population in West Bengal

Tribes	Male	Female	Total	Sex Ratio (No. of females per 1000 males)
1. Bhutia	2,594	2,216	4,810	854
2. Lepcha	6,927	6,503	13,430	938
3. Mech	5,991	4,796	10,787	800
4. Munda	42,698	40,307	83,005	944
5. Oraon	108,249	95,077	203,326	878
6. Santal	420,204	425,218	845,422	1011
7. Mru	1,570	3,126	4,696	1991

The most striking feature of the above Table lies in the high ratio of the females among the Santals and the Mrus. It is expected of the Santals as the sex ratio approaches that of Santal Parganas in Bihar and is also supported by the population figures of six out of the 15 districts of the state.

The figures for the Mrus are somewhat peculiar; the number of females is nearly double than that of the males and the same has been found to be the case in six out of twelve districts.

The Mrus or The Mros ?

The figures for the Mrus given in the Census of 1951 is given in Table 2.

TABLE 2

Mru Population in the Districts of West Bengal

District	Male	Female	Total
Burdwan	14	88	102
Bankura	21	—	21
Midnapur	594	971	1565
Hooghly	14	1124	1138
Howrah	9	2	11
24-Parganas	356	247	603
Calcutta	6	4	10
Murshidabad	7	106	113
Malda	20	8	28
West Dinajpur	154	82	236
Jalpaiguri	302	372	674
Darjeeling	73	122	195
	1570	3126	4696

It will be seen from the above Table that excepting the districts of Bankura, Howrah, 24 Parganas, Calcutta, Malda and West Dinajpur all the other districts show a very high preponderance of females and the figures for Hooghly and Murshidabad appear to suffer from some sort of inaccuracy. It is an almost unexpected ratio for an immigrant population. The figures of Burdwan, Midnapur, Jalpaiguri and Darjeeling also raise considerable doubts, but the Hooghly figures are the climax of all — 14 males for 1124 females.

Besides these inaccurate figures there is one more vital question—Who are these Mrus ? Where are they found ? In course of a trip to Balagarh in the district of Hooghly, where the highest population has been reported, no Mrus

could be traced. The Balagarh Police station could not give us any information of any tribal population of the name of the Mrus, although 1088 souls have been reported from there in the 1951 Census. It appears that there has been a great confusion regarding this tribe. It is doubtful if the Mrus exist at all in West Bengal.

In a brochure published by the Cultural Research Institute for Tribal Welfare, Government of West Bengal, the so-called Mrus have been identified with the Mros, who were described by J. P. Mills in the Census of India, 1931, Vol. 1. Pt. III (p. 122). Mills described the Mros from the south of the Chittagong Hill Tracts from his personal enquiries and although he has been quoted verbatim in the above brochure, it is difficult to judge how far they agree with the so-called Mrus of West Bengal. It will be apparent from Mills' description that the Mros are a very shy people and it is difficult to believe that they immigrated from the southern portion of the Chittagong Hill Tracts to West Bengal. It appears highly improbable that the Mrus reported in the Census of 1951 are the same Mros described by Mills in 1931. There is also no justification to convert the term 'Mro' used by Mills into 'Mru'.

The Census of 1931 also made the mistake of calling the Mros as Mrus (Vol. 1, Pt. II). Their total population in 1931 was 7,404 (males : 3,934 ; females : 3,470) of whom 7,328 were reported from the Chittagong Hill Tracts alone ; but for this association of the latter region it would not have been possible to identify them with the Mros of Mills. Of the rest 76, eight, all females, were reported from Midnapur ; 16, all males, from Hooghly ; 22 (17 males, 5 females) from Darjeeling ; 25 (10 males, 15 females) from Rangpur and 5 males from Tippera. It may be noted that in Hooghly there were 16 males in 1931 which decreased by 2 in 1951 and there was an influx of 1124 females only. It appears to the present writers that even the above 76 individuals of 1931 Census are not probably the Mros of Mills but belong to some other tribal population.

It will be apparent from the Census figures of 1931 that

the Munda are known as Mura as well and some persons have been counted under the latter name. It is possible that the Mru has its origin in this word Mura and the peoples who have so far been counted are probably Mundas. This is a tentative suggestion, though the Cultural Research Institute may easily find out the real state of affairs. As a matter of fact, the Institute should have approached the problem before identifying the so-called Mrus with the Mros of Chittagong Hill Tracts, as our interests in tribes have far more increased since 1931.

The Mros migrating into West Bengal are possibly the solitary instance of a westward migration contrary to the eastward migration of the other tribes excepting the Mongoloid Lepcha and Bhutia, who yet confine themselves largely in the northern districts. The Mros speak an entirely different language and as such their indentification will not be a difficult problem. If the so-called Mrus are found to be actually the Mros of the Chittagong Hill Tracts, their migration into West Bengal will be of great ethnic interest. Mills has pointed out "the almost entire absence of Mongolian traits in their feature" and from the photograph of a Mro woman published by him in the "Nudes of all Nations" it appears that Mros represent a very old Veddid pocket in this corner of India.

The tendency to the high excess of females is also obvious in the population figures of the Santal, Oraon, Munda and Lepcha. The detailed sex-wise data for the above four tribes are given in Table 3.

The high female sex ratio of the Santals appear to be highly exaggerated for the districts of Midnapur, Hooghly and Howrah. In Howrah district the females have been found to be about 3·5 times the male population — 3392 females for 972 males. In Midnapur there is an excess of 10,632 females while in Hooghly the same is 9,619 females. Bankura shows an excess of 1,645 females only.

TABLE 3

Distribution of the two sexes among Santal, Oraon, Munda and Lepcha.

Districts	Santal		Oraon		Munda		Lepcha	
	Male	Female	Male	Female	Male	Female	Male	Female
Burdwan	67626	59815	2673	1882	1339	1108	—	—
Birbhum	38913	39527	57	745	76	99	—	—
Bankura	68007	69652	126	161	89	145	—	—
Midnapur	96125	106757	1357	1686	2491	2539	3	—
Hooghly	19683	29276	3217	2519	817	558	31	—
Howrah	972	3392	1059	514	324	137	1	—
24-Parganas	13357	9645	11188	9240	8006	9621	21	2
Calcutta	141	25	34	18	46	40	4	3
Nadia	3687	2547	1934	1447	761	610	—	—
Murshidabad	10867	10986	535	704	82	154	—	—
Malda	36705	36095	3934	3569	65	67	—	—
W. Dinajpur	48582	46328	10274	10400	4562	3812	—	—
Jalpaiguri	12863	9065	62299	53477	20806	18684	36	165
Darjeeling	1843	1638	9032	8185	3124	2628	6831	6333
Cooch Behar	833	469	530	530	110	105	—	—

In the case of the Oraons, Birbhum only shows a very high excess of females—there are said to be 745 females for 57 males only. As regards the Mundas, only the district of 24-Parganas shows an excess of 1,615 females while in the case of the Lepchas, the district of Jalpaiguri shows 165 females for 36 males.

It will be of interest to know how far these figures are correct. Lastly, the Lepchas and the Bhutias are Buddhists. Are we justified in classing them as scheduled tribes on a par with the Oraons, Mundas and such other aboriginal tribes ?

BOOK REVIEWS

Kalidasa : *The human meaning of his works. By Walter Ruben. Pp 105. Akademie—Verlag, Berlin. 1957.*

Professor Ruben has given us an account of the life and times of Kalidasa and then proceeded to present in summarized form the works of the poet Kalidasa. In a final chapter he also tries to assess the influence of Kalidasa upon another great Indian poet of later times, namely, Rabindranath Tagore.

The author presents Kalidasa's tales in an interesting and readable manner ; but what one feels all through the book is his intense prepossession with the economic interpretation of history. Nobody minds if a case is proved ; but when guesses are made and served in the form of history, the unwary are likely to be led astray. Who will say, for instance, that the following is not history, but reading a meaning into history unwarranted by available data ?

"The great kingdom of the Mauryas belonged to the Indian slave period, the Guptas ushered in the period of feudalism.....The changeover from slave society to feudalism occured so slowly and almost unnoticeably that only the most advanced indologists have of late attempted to describe it." (p. 14)

"In Kalidasa's time Buddhism had also set up the Mahayana ; a a new feudalist form alongside its old form, in which Buddha, like Siva or Vishnu, was honoured in temples." (p. 20)

With reference to Tagore, there are curious observations which could easily be contradicted by students of Bengali literature. But we need not multiply faults ; we should rather end with a due appreciation of the manner in which the author succeeded in presenting an alien culture one of its highest literary geniuses to a Western audience.

N. K. Bose

The Mahadev Kolis : *by G. S. Ghurye. Popular Book Depot, Bombay 1957—Price Rs. 14/-*

This book from the pen of an eminent sociologist shows that the fences between social anthropology and sociology have fallen down. The Mahadev Kolis, a scheduled tribe of Maharastra, have been

studied through anthropological method by sociologists under the guidance of Professor Ghurye. Though the Mahadev Kolis are a scheduled tribe, there is nothing primitive about them. They are settled agriculturists with breeding of cattle, trading in milk and milk products and poultry-keeping as subsidiary occupations. They live in tiled houses with walls made of sundried bricks. Not much income is derived from forests. These people have been reputed criminals in the past and in 1925 not less than one thousand Kolis were registered under the Criminal Tribes Act.

The account of the Kolis in the book is based on observations made at three centres, Nimgiri, Manik Ozar and Devargaon. Each centre represents a distinct economic level. Nimgiri is well-to-do, Manik Ozar is just above the subsistence level and Devargaon poor. Thus Dr. Ghurye is able to present a composite picture synthesising the vertical differences in their culture. The three villages might represent horizontal variation in culture also due to the fact that they belong to three districts of Poona, Ahmednagar and Nasik.

The Kolis have adopted the worship of Mahadeva, Rama and Krishna. Idols of these gods are kept in the temples generally dedicated to Maruti, the monkey god. The temple serves as a community centre. The Kolis are mortally afraid of their neighbours the 'Thakurs', another scheduled tribe because of the latter's influence over the realm of spirits. Among them we find shamans called 'Ghumara Bhagats' who go into trance. The author has described trance phenomena of men and women 'Ghumara'.

The Kolis cremate their dead, observe ceremonial pollution and employ priests for the purification ceremony. All these ceremonies are analogous to Hindu Sharadha ceremonies including *pindadana*. They believe in rebirth and hold that the next birth depends upon the merit or sin acquired during the present existence. It is thus apparent that their beliefs are not different from similar beliefs current among the lower Hindu castes.

During the past fifty years or so, the twenty-four sept names of the Mahadev Kolis have disappeared. People bearing a certain number of family names form an exogamous group known as '*gotribhaus*'. Each group consists of twelve family names. Marriage with a mother's sister's daughter is forbidden while it may be performed with the mother's brother's daughter. Bride price has risen due to a general rise in prices. Boys and girls were

married very young formerly but now adult marriage is generally the rule for the male. Majority of the girls are married before they are ten or twelve years of age. Among them there was no tradition for divorce, but it has come into vogue now as the law forbids bigamous unions.

In the Epilogue, the author gives us a number of case histories and through them he has tried to present the story of culture change. The Mahadev Kolis took part in the national struggle of 1935 when a number of them joined the forest satyagrah movement. Some of them went underground during the 1942 struggle. Their excitable spirit took them to Delhi to take part in a demonstration against the non-inclusion of Bombay City in United Maharastra. Education, urbanization and Community Projects are the main factors responsible for changing the pattern of their life. Hostels have been started for Koli students in remote areas by tribal welfare organisation. The life histories given are interesting human documents. They show how illiterate agriculturists face their troubles in urban situations. In the majority of cases they show remarkable capacity for adaptation and some of them are in a very flourishing state due to their thrift and perseverance. Many a case history reveals the change in outlook due to travel in distant areas and visits to places of pilgrimage. The Kolis have shown a capacity for speedily acquiring technical skills like carpentry. Due to association with Thakurs and Katkaris, they have learnt the art of charcoal making from jungle wood.

Dr. Ghurye tells the story of the Mahadev Kolis faithfully and sympathetically and the book is an example of a fine ethnographic study. One however feels, that the book coming as it does from Dr. Ghurye's pen, should have been more analytical than descriptive. The data instead of being put under age-old categories might have been given more scientific labels. The pictures as well the printing are good.

Sachchidanand

Human Types : *An Introduction in Social Anthropology, Raymond Firth, F. B. A. : Revised Edition, London, Thomas Nelson & Sons Ltd., Price 8s. 6d. net.*

This is an excellent text-book on Social Anthropology and six

re-prints of the book since its first publication in 1938 goes to show the popularity achieved by it.

The colonial system brought the primitive peoples into contact with the modern civilization and world War II has resulted in focussing a great deal of attention on them. Anthrpology has been helping Governments and bodies concerned with these primitives to solve the problems arising out of the impact and according to the learned author of the book it has an important role to play even perhaps in the study of our own civilised institutions though it has not yet been systemetically applied here.

The broadness and vigour of mind of the author strike the reader as he goes through the book. The author brushes aside the general idea of the western people that he is inherently superior to an Africander or Maori in intelligence. According to him it merely indicates the ignorance and prejudice of the speaker when he says that the Savge is inferior in mentality to the general westerner or that he has the mind of a child.

The author has dealt within a short compass with the primitives of Australia, New Zealand, Africa, America, Polynesia, Indonesia and their institutions and made a comparative study thereof. He has many interesting things to say about their beliefs and their social organizations. He points out the effect of environment on them. The economic Law prevails though in a simple form. Real family life underlines the wildest aberrations of sexual life. Though there is usually no specefic code of legislation and no formal judical body of the nature of a court, nevertheless, there are rules which are expected to be obeyed and which in fact are normally kept and there are means for ensuring some degree of obedience. Finally he deals with religion and magic in primitive societies and discusses the relationship between the two. The book is a masterpiece of compression but in our opinion it lacks in completeness. There is total absence of the comparative study of the primitive people of India and their organisations and practices though materials on the subject are available in books of such pre-eminent Indian Anthropologist as late Saratchandra Roy. We hope the learned author will make good this omission in the next edition of the book.

H. D. Ghosh

African Figurines : *Their Ceremonial Use in Puberty Rrites in Tanganyika, H. Cory, Faber and Faber, London, 1957, pp. 176, Price 63 Shillings Net.*

The author has written a very interesting book on the Representational Art, as found in Tanganyika. It bears stamp of great labour and genuine interest in the subject. Mr. Cory travelled far and wide and availed himself of the opportunities to get the informations needed from the Africans he came in contact with. He found that figurines were used in initiation ceremonies of boys and girls and that these were used for the purposes also. These were all kept secret by the tribes concerned but the author managed to collect more than 2000 pieces of them of which only about 850 exist. The figurines were used in the ceremonies with accompanying songs containiug instructions.

The rites performed by the different tribes along with the accompanying songs have been recorded in the book with photographs of the figurines used. The author has given free English translation of the songs from the vernacular. He has also given his own interpretation of the figurines and has pointed out the models which he considers to have the highest artistic value.

Due to the impact of modern civilisation the attitude of the Africans to their ancient customs and ceremonies is undergoing vast change. Moreover, they have not that enough leisure at their disposal now needed for the performance of the initiation ceremonies. So the use of the figurines for the purpose is falling into disuse. The author has rendered great service to African Art by the timely publication of this book.

H. D. Ghosh

New Lives For Old, Cultural Transformation—Manus, 1928-1953. *By Margaret Mead. Victor Gollancz Ltd., London, 1956. Pp. XXI 548. Price 25 shilling.*

It is a very interesting book on culture change. It shows how rapidly and how radically a change can be brought in a society. Mead's first visit in 1928 among Manus people of New Guinea produced "The Growing Up in New Guinea" and her second visit in 1953 in the same Peri village produced the present volume. Unbelieveable changes have occured during this short period of

twenty-five years in which the three thousand Manus people completely changed their culture. This book is the record of a people who have moved from darkest savagery of stone age to the most modern community of twentieth century. It is the story of men who have skipped over thousands of years of history in just the last twenty-five years. Their pile dwellings and water ways between houses filled with small canoes have changed into American-Style houses built on land. Metal coins have taken place of their dog's teeth and shell beads, the only form of money they knew. They no longer have day-to-day and hand-to-mouth subsistence economy. The credit of bringing all these changes goes to their native leader Paliau who understood and incorporated the values and institutions of the western world, and built on real modern culture of its own, complete with democratic government, schools, clinics, universal suffrage, money and individual and community responsibility. Under Paliau's leadership people had worked together with unprecedented and rapid co-operativeness to build up a modern way of life and culture. Their old ways have been destroyed and they have completely burnt their religions and political boats.

In the last chapter on 'Implications for the World' Mead suggests that this knowledge of rapid change can be used all over the world. It changes our ideas about how rapidly other peoples can learn and adapt themselves to the changing circumstances. Mead also suggests that rapid change is not only possible but may actually be very desirable, that instead of advocating slow and partial changes, we should advocate that people who choose to practice a new technology will do this more easily if they change completely by living in different houses, wearnig different clothes and eating differently cooked food. Partial change can be seen not as a bridge between old and new but rather as the condition within which discordant institutions and practices develop and multiply. So, Mead advocates that the whole cultural pattern should be transformed atonce, with as little reminder of the past as possible to slow down the new learning or make that learning incomplete and maladaptive. It is this way that the people of Peri all changed together as unit—parents, grand-parents and children. It is because Manus were a people most favourably inclined toward change.

The inclusion of a few figures and over a dozen photographs showing the constrast of the old and new way of life adds to the

quality of the book. One becomes surprised to see the photographs of the same individuals twenty-five years ago, in one thay are seen barely naked with uncombed frizzly hair and wearing shellbead armlets and in the other they are seen wearing modern three piece suit, bow-tie and smoking cigars.

A. B. Saran

The Featherd Serpent. *By Roland Robinson, with a foreword by T. G. R. Strchlow, M. A., Printed & Published by Edwards & Shaw of 171. Susses Street, Sydney, 1956, Pp. XVI-87, Price not mentioned.*

This is a collection of Australian aboriginal myths and tradiions. The author travelled over the continent to gather the materials and his informants were the old men who were the owners of the traditions. As Mr. Strchlow points out in his foreward the traditions relating to any given totemic ancestor were the private property of the person who was regarded as his reincarnation or of the heirs of the person. The aboriginal mythology has been handed down through centuries by means of great song cycles and rituals and by verbal explanations of ritual objects and the sources of the present collections were changed and narrated to the author, and he has successfully preserved the style of the original myths.

The stories narrated in the pages of the book are refreshingly simple. Many of the themes are to be found in Lores of other countries, Western and Eastern as well. These give the readers a new insight into the native mind and illustrate the eternal source and meaning of the spirit and of Life. Some of the stories centre round the rain-bow serpent of Northern Australia. It is a supernatural being and it takes a dominant place there as a culture hero to whom are attributed many of the most important creative feats.

There are some paintings in the book done by the old aboriginals and these have added to the attraction of the book.

H. D. Ghose

The Cultural Heritage of India, *Vol. IV, The Religions, Second Edition, The Ramkrishna Mission Institute of Culture, Calcutta, 1956, Pp. xix and 775. Price Rs. 35.*

The Cultural Heritage of India was first published in 3 volumes in 1937 and is now being republished in a series of independent and self-contained volumes. Vol. III dealing with the philosophies came

out in 1953 and was reviewed in this Journal, *Cf.* Vol. 34, No. 2, Pp. 164-6.

The volume under review is devoted to the religions of India, with the understanding that Jaina and Buddhist cultures will be treated in Vol. I and the religious, philosophical and ethical speculations of the Vedas and Upanisads will be dealt with in other volumes ; this leaves us with the religions which came to their full development after the Vedic period.

The book contains six unequal parts. Part I, the longest and most important, deals with Religious sects and cults and has 22 chapters. Chapter I brings us a masterly survey of the evolution of the religio-philosophic culture in India from the able pen of India's great historian, R. C. Majumdar. This is by far the most useful chapter of the book. The last chapter of this first part treats of cult-syncretism, so that there remain 20 chapters to give us a picture of the various cults that constitute the composite religious culture of India. Of these not less than 9 deal with the Tantras : Evolution of the Tantras, Tantra as a way of realization. The spirit and culture of the tantras, Sakti cult in South India, Tantrika culture among the Buddhists, the cult of the Buddhist Siddhacaryas, the Natha cult, some later Yogic schools, the doctrinal culture and tradition of the Siddhas ! And the second has another chapter on Sakti Worship and the Sakta saints. There is no chapter on later Vaisnavism in North India, with its two great ramifications : the Krisna-Radha cult of Vallabha and the Ramawat Sampradaya of Ramanand.

Part II, with 6 chapters, deals with the Saints and their teachings and Part III, with 8 chapters, shows us religion in practice, e.g. symbolism, ritual, hymnology, festivals and pilgrimages. Part IV, Religions from beyond the borders, includes Zoroastrianism, Christianity, Islam and Sufism and deals with these religions in a very catholic and tolerant spirit. Part V has three chapters on the Brahma Samaj. The Arya Samaj and Theosophy, which constitute the great modern reform movements. The last part has a long chapter of 76 pp. on Sri Ramkrishna and Spiritual Ranaissance. Although the contributions are of unequal value, the volume as a whole will be indispensable to all students of Indian Religions. We are looking forward to the other volumes of this extremely useful publication.

C. Bulcke

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