

## Recent Advances in Anthropology, Ethnology and Ethnography in India.

By Dr. B. S. Guha,

*Anthropologist, Indian Museum, Calcutta.*

IN his otherwise well-informed account of the "Recent Advances in Anthropology, Ethnology and Ethnography in India" published in the January issue of the *Current Science*, it is regretted that Rao Bahadur L. K. Ananthakrishna Iyer should have made no reference to the works of several important investigators. I have no doubt that this omission was unintentional but if such accounts are to be considered as authoritative it is essential that due mention be made of all important contributions. I give below a summary of some of the anthropological works that have not been included in the above account.

Lt.-Col. Alberto C. Germano da Silva Correia has been carrying on investigations in the Ecole de Medicine de Nova Goa, on the somatic characters of the inhabitants of Portuguese India and has published several memoirs, such as (1) *Les Ranes de Satary* (1928), (2) *Les Lusos-Descendants de l'Inde Portugaise* (1928), and (3) *Les enfants et des adolescents luso-descendants de l'Inde Portugaise* (1931). Dr. da Silva Correia's work has been regarded by European anthropologists as of very great importance and he has been the recipient of many honours in recognition of the valuable researches carried on by him in this country. He has further been instrumental in training several students, one of whom Dr. Voicunte Camotin has published an important anthropometric study of the Saraswat Brahmins, viz., *Os Bramanes Sarasvatas de Goa, 1929*.

Mr. K. P. Chattopadhyaya, Education Officer of the Calcutta Corporation, has published two papers of great merit on Social Anthropology, namely, "The Social Organisation of the Satakarris and Sungas" (1929) and "Contact of Peoples as Affecting Marriage Rules" (1931). In the latter paper Mr. Chattopadhyaya has been able to offer a more comprehensive theory of Social Organization than was advocated by Rivers in the light of the

recent discoveries of the Pentecost and Ambrym marriage rules.

Dr. Provash Ch. Bose, of the Department of Racial Biology recently opened in the Bose Institute of Calcutta, has within the last few years published a number of papers on physical anthropology and has received commendation from European scientists. At present he is engaged in carrying on an anthropometric survey of the aboriginal tribes of Chotanagpur and a preliminary account of it was recently published in the *Transactions of the Bose Institute*.

Mr. B. K. Chatterjee of the Anthropological Laboratory of the Zoological Survey of India has carried out an elaborate study of the somatic affinities of the Behari Brahmins; this is soon appearing as No. 2 *Anthropological Bulletin* of the Zoological Survey of India.

Dr. Irawati Karve, a pupil of Dr. Ghuriye, has recently returned after taking the Doctorate degree in Anthropology from the Berlin University where she worked under Prof. Eugen Fischer. The results of her investigations on the eye colour of the Chitpavan Brahmins published in the *Zeitschrift für Morphologie und Anthropologie* (Band XXIX, 1931) has greatly added to our knowledge of the significant distribution of this trait among the Konknanasth Brahmins of Western India.

Lastly, Mr. P. O. Bodding's work on the Santali language and folklore and Prof. P. C. Mahalanobis' statistical study of Indian anthropometric data require mention. The former has devoted his entire life to this work and the Norwegian Institute of Human Culture has recently published a sumptuous volume from his pen. A great portion of Prof. Mahalanobis' statistical analysis of the anthropometric data taken by the late Dr. N. Annandale has been published in the *Records of the Indian Museum* and the rest is expected to be completed soon.

## Research Notes.

## Phase Boundary Potentials.

It has frequently been suggested that surface reactions and surface equilibria are to a large extent controlled by the potential differences (P.D.) which exist at the phase boundaries. In Monograph No. 83 of *Actualities Scientifiques et Industrielles* (Hermann et cie Paris, 1934), E. K. Rideal has critically surveyed the present state of our knowledge on the subject of phase boundary potentials. The earliest type of phase boundary potential known is that recognised by Volta in 1808 at metal to metal interfaces. This Volta P. D. ( $\bar{v}$ ) is modified by the presence of a film on either metal such that if  $\Delta v$  be the potential across

the film, the new volta potential  $\bar{v}_1$  will be  $\bar{v}_1 = \bar{v} + \Delta v$ . E. K. Rideal and his colleagues have developed a technique to measure with precision the P. D. between two metals suspended in a gas after ionising the gap between the two surfaces by means of short range  $\alpha$ -particles from polonium. With this apparatus they have been able to study the effect of surface films on the volta potential and thereby obtain interesting data on the adsorption isotherm of a polarisable vapour such as ethyl alcohol on gold, and on the rates of evaporation of unimolecular films from metallic surfaces both pure and contaminated. The results indicate that the effect of poisons on the

volta potential of catalytic surfaces may alter considerably the critical energy increment for the surface reactions.

Similar measurements of the effect of film forming materials on the phase boundary potentials at air-liquid interfaces have yielded a number of important generalisations. The different phases in which films can exist show different characteristic molecular contributions to the phase boundary P.D. defined by  $\mu = \Delta \bar{v} / 4 \pi n$  where  $\Delta \bar{v}$  is the change in the phase boundary P.D. caused by the presence of  $n$  molecules per sq. cm. The values of  $\mu$  which are determined mainly by the polar groups in the molecule, are further influenced by the presence and position of double and triple bonds in the hydrocarbon chain. The measurements also yield information regarding the molecular arrangement of high molecular weight complex bodies such as the long chain polypeptide units of gliadin, at an air liquid interface. Further the course of chemical reactions actually taking place in the phase boundary could be followed by observations of the rate of change in the phase boundary P.D. Such reactions at liquid interfaces are of special importance because of the many biological implications.

Not much is known about the phase boundary potential at liquid-liquid and liquid-solid interfaces. As is well known, the P.D. between a metal and a solution containing its ions involves the volta potential as well as the difference in free energies between an adsorbed ion and one in solution. If the electrolyte is insoluble in one phase but readily adsorbed at an interface a true phase boundary potential should result. This is probably the case for the glass electrode of Haber when placed in a solution containing metallic ions, *e.g.*,  $\text{Ag}^+$  which are strongly adsorbed although the electrode is reversible for  $\text{H}^+$  ions which are distributed in both aqueous and non-aqueous phases, the thermodynamic concentration remaining constant in the glass.

It is hoped that more investigators will be attracted to this interesting field.

M. A. G.

#### Heavy Water and Tumour Growth.

THE production of heavy water in quantities easily available for experimental purposes, has stimulated work on its biological properties. Taylor, Swingle,

Eyring and Frost reported that in concentrations ranging from 85–100 per cent., heavy water possessed marked toxic effects on fresh water organisms. Lewis found that 99 per cent. heavy water completely inhibited the germination of tobacco seeds. With the accumulation of larger supplies of water at Princeton, arrangements are now being made to ascertain its effect on the growth of cancer cells.

The work of Sagura and Chesley on the effect of heavy water on the viability of mouse sarcoma and melanoma is of great interest (*Proc. Soc. Exp. Biol. and Med.* **31**, 659–660). These authors have shown that at concentrations of 14.8 and 40 per cent. heavy water, the proliferating capacities of the tumours, mouse sarcoma 180, and the Passey mouse melanoma are unaffected. The tumour fragments which had been immersed in Locke-Ringer solution made up in ordinary and in 40 per cent. heavy water grow normally when transplanted into animals. Histological examination of a number of tumour tissues after immersion in heavy water and ordinary distilled water were essentially similar in swelling, jelly-like appearance, and the hydropic degeneration of the cytoplasm with nuclear degeneration.

#### Petalody in *Thespesia populnea* Cav.

WHILE giving specimens of *Thespesia populnea* for class work, a flower was observed in which two of the stamens were transformed into petaloid structures. The rest of the stamens of the staminal column were quite normal both in their number and their size. Nor were any transitional stages from normal stamens to petaloid structures to be found. A search was made of the rest of the flowers but no case of petalody could be seen. About a hundred and fifty flowers from the tree from which these were got, were also scrutinised, but with the same result.

Petalody which is the transformation of the primordia of the stamens into petals, is a terratological phenomenon brought about by pathological (De Bary) or physiological (Goebel) causes. The sporadic transformation of a few stamens into petaloid structures in this case would appear to be due to some pathological cause by which certain localised portions, *i.e.*, a couple of stamens, assume a petaloid expansion—a form which first indicated the foliar nature of the stamen.

Recently a case of petalody of the entire androecium of the cotton was recorded by Sankaran (*Madras Agricultural Journal*, 19, No. 3), and I learn from the author that it has subsequently proved to be a case of floral mutation.

T. S. R.

#### Gametogenesis of *Senophylax stellatus*.

R. A. R. GRESSON (*Proc. Roy. Soc. Edin.*, LIII, Part IV, R.P. 322-346) describes the oogenesis in this Trichopterid insect, especially the behaviour of the cytoplasmic inclusions. He has determined that the nucleolar activity is very great and that fragments of the nucleolus which are found in the cytoplasm probably give rise to albuminous yolk. But the nucleoli do not contain chromatin as revealed by Feulgen's technique. The Golgi bodies which are in the form of rings or granules are, in the young oocytes, situated at one pole of the nucleus but increase in size and number as the oocyte grows and become distributed in the cytoplasm. They give rise to fatty yolk as in the majority of insects. It is suggested that the material derived from the ooplasm is added on to these globules of fatty yolk formed by Golgi. The rôle of mitochondria is not clear. In fact they are seen with great difficulty on account of their small size and the large number of yolk globules that fill the cytoplasm. Probably they add to the formation of protein yolk. The chromosome number is sixty and while in the younger stages of the oocytes, the chromosomes are clearly seen, later, they become obscure and are replaced by granules of chromatin.

#### On Bone Marrow in Hookworm Disease.

WALTER OSWALDO CRUZ (*Men. Inst. Oswaldo Cruz.*, Tome XXVII, Fasc. 4, 1933) has described the appearance of bone marrow in cases of infection by *Ancylostoma duodenale* and *Nicator americanus*. The macroscopical appearance of bone marrow from femur diaphysis presented a uniform red colouration as contrasted with the pale tone of other organs of the body due to anæmia and subsequent fatty degeneration. The microscopic structure presented an intense regeneration of parenchyma and a great decrease in fatty cells. The red colouration was due to the great number of erythroblasts laden with hæmoglobin. The author believes that the

etiologial agent of the hookworm disease does not act directly upon blood causing a destruction through any process whatever, nor upon bone marrow producing an arrest of its regenerative capacity, nor to any paralysing toxic action.

He thinks that the parasite acts upon the iron metabolism causing a quantitative decrease of this element in the organism resulting in an abnormality in the evolution of the normoblast, which is clearly seen in the microscopic preparations of marrow.

#### Bionomics of Two Estuarine Crabs.

VERY little information is available about the habits and natural history of Indian crabs and Dr. Sunder Lal Hora's note on the Bionomics of two Estuarine Crabs (*Proc. Zool. Soc. London* for 1934, pp. 881-884, pls. i, ii) is, therefore, especially welcome. The note is based on observations of the author made in the field and on simple experiments carried out in the laboratory. The species dealt with, *Varuna litterata* (Fab.) and *Sesarma tetragonum* (Fab.), belong to the family Grapsidæ, several members of which are known to live in estuaries—some have almost established themselves in fresh waters also—under conditions more or less similar to those described by Hora, and are, therefore, accustomed to live for considerable periods out of water. The area from which the author collected his material is also tidal and it would be interesting to know if the crabs are ever left under conditions of complete drought for long periods at any time.

As pointed out by the author, *Sesarma tetragonum* leads an active life, probably with somewhat restricted metabolism, during the "resting period," but it is difficult to say, without further evidence being adduced, if the habits of *Varuna* ever "closely resemble those of an aestivating animal". The crabs found "lying quietly" under dried slabs "with the legs folded beneath the body or spread out wide apart" may have been shamming death, as is commonly done by a large number of animals under similar circumstances; the behaviour of active crabs when placed on dry slabs seems to point to this view.

Dr. Hora's remarks on the burrowing habits of *Sesarma tetragonum* are of interest. Some other species of *Sesarma* and of a few other genera of the Grapsidæ are also

known to burrow deep holes in the somewhat marshy ground on which they live. It is, however, interesting to note at Uttarbhag *Sesarma* burrows in dry ground.

Dr. Hora's observations as also his photographic reproductions are both interesting and instructive and it is to be hoped that he will be able to continue the work he has so well started.

B. N. C.

#### Studies on the Spermatocyte divisions in *Ascaris*.

H. P. STURDIVANT makes a significant contribution to the study of the Spermatogenesis of *Ascaris megalocephala* (*Journal of Morphology*, 55, No. 2, March 5, 1934) in his recent paper on the "Studies of the

Spermatogenesis of *A. megalocephala* with special reference to the central bodies, Golgi complex and mitochondria. He describes the centriole of the spermatocytes as a definite entity and its behaviour during the progress of the mitotic phase is observed. The disappearance of the centriole in the spermatid and its absence in the later stages are also noticed, and he draws the conclusion that the centrioles of the spermatocytes are not to be regarded as different from the centrioles in the other types of mitoses.

The behaviour of the Golgi complex from the early spermatocyte stage to that of sperm formation is inferred to represent the process similar to that of acrosome formation. Mitochondria which undergo very little change are interpreted as forming the prenebenkern.

#### Geological Aspects of the North Bihar Earthquake of the 15th January, 1934.†

EARTHQUAKES are due to the fact that the earth is not a dead body, but is subject to continuous, though gradual, change in the shape of its surface due to the uplift and denudation of mountain ranges and the filling up of valleys by silt derived from the higher portions of the globe, and also because of periodic volcanic eruptions relieving the internal heat of the earth. The changes due to mountain building and to deposition are not uniformly distributed over the earth's surface, but tend to be restricted to definite belts known as geosynclinal belts, within which accumulated sediments suffer folding and uplift. One of the principal belts of such folding traverses the Indian Empire in three festoons—the first in the hills of Baluchistan and the North-West Frontier Province, the second along the arc of the Himalayas, and the third along the Assam-Burma arc lying to the west of the Shan plateau. In the Indian Empire it is the tracts contained in, or adjoining these arcs that are particularly liable to earthquakes. The Peninsula towards which these mountain festoons appear to have been pressed by earth forces, is geologically much older and is relatively stable and but little subject to earthquakes.

A statistical study of earthquakes in India was made some years ago, and is contained

in a memoir on the "Seismic Phenomena in British India and their connection with its Geology" by Count F. de Montessus de Ballore, published in Vol. XXXV of the *Memoirs of the Geological Survey of India*. To this memoir is attached a map in which the author divides India into seismic regions according to their relationship to the geology of the country. Since this memoir was published, there have been the following important earthquakes in the Indian Empire:—

* Kangra	4th April, 1905.
* Baluchistan	21st October, 1909.
Maymyo	21st May, 1912.
* Srimangal & E. Bengal	8th July, 1918.
Rangoon	17th December, 1927.
Swa, Burma	8th August, 1929.
* Pegu, Burma	5th May, 1930.
Dhubri, Assam	3rd July, 1930.
Pyu, Burma	3rd-4th December, 1930.
Baluchistan	27th August, 1931.
* Upper Bihar	15th January, 1934.

All these, with the exception of the Maymyo earthquake, belong to the three festoons mentioned, or to adjoining tracts. From this list it will be seen that the Himalayan region had passed through quite a long period of seismic inactivity, the last earthquake associated with the Himalayas

† Sent by Dr. L. L. Fermor, Director, Geological Survey of India, for publication.—*Ed.*

(\* denotes very destructive earthquakes.)