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CURRENT NOTES ON ANTHROPOLOGY. — III.

[Edited by D. G. Brinton, M.D., LL.D.]

An International Anthropometric Scheme.

DR. R. COLLIGNON of the French Army is well known as one of the most active students of anthropology in France. His researches on the tribes of North Africa are classical. He has just issued a "Projet d'Entente Internationale pour arrêter un Programme commun de Recherches Anthropologiques," which should attract the earnest attention and co-operation of followers of this science the world over.

Without entering into the other details of his plan, those relating to the actual measurements desired may be here stated. In all cases there should be noted the height, the color of the eyes, as either light, dark, or intermediary; color of the hair, as either red, blond, intermediate, brown, or black; line of the nose, as either convex, straight, or concave. In addition to these, on forty subjects, the two factors of the nasal index should be carefully noted; finally, on twenty of these the following head measurements: maximum antero-posterior diameter, maximum transverse diameter, maximum bizygomatic diameter, total height of head.

Of course, the value of such statistics for comparison will depend a good deal on the operative methods employed. Dr. Collignon explains these with great care; and I would urge all who would like to aid in this admirable project for international scientific work to address him for particulars, as follows, Dr. Collignon, 42 Rue de la Paix, Cherbourg (manche), France.

Embryonic Causes of Variations in Vertebrates.

The fundamental question in anthropology is that of the causes which have led to the differences in the races of men. Hitherto most writers have been content with surface generalizations about "environment" and "heredity." The disciples of Spencer have rung the changes on these with little positive profit. We have no knowledge what heredity really

is, and "environment" has borne more than its share of causality.

A real step in advance has been taken by Dr. Dareste, in his work on "Teratogeny," or the artificial production of monsters. He shows conclusively that monsters or monstrosities are not the result of pathological changes in the embryo, as has hitherto been supposed, but are modifications of the processes of organic evolution, precisely analogous to those which bring about the differences which distinguish individuals and races in mankind. This can be proved experimentally in oviparous animals, the domestic fowl, for instance. By developing the chick in an artificial incubator and subjecting the egg to unusual conditions, such as shaking it from time to time, varnishing it, exposing it to rapid changes of temperature, etc., we can produce monstrosities in all points analogous to those in man.

The changes take place in the earliest epochs of embryonic life and are in two directions: 1, arrest of development; 2, union of homologous parts. The former assures the permanence of an embryonic condition, the latter produces the phenomenon of double monsters. By tracing the conditions which yield these exaggerations, we may distinctly perceive the causes of many of the physical peculiarities of man.

Application of Psychological Research to Anthropology.

Experimental psychology is a comparatively new realm of research, and we may confidently expect from it most valuable aid in defining the differences between the races of men. Its main object may be said to be the measurement of the relative rapidity, intensity, and persistence of mental actions. This means that it endeavors to discover material gauges and mathematical formulas for the sensory, motor, and intellectual processes. Think what this involves! Nothing less than that we shall be able to measure the mental abilities of a man as we do his height and girth!

Though this goal is probably theoretical, as the individual generally eludes averages, these are true for the mass, and we may be sure that a series of observations on, say twenty, pure adult types of the several races would yield results markedly different and highly significant. The points to be examined are such as these: the rate of muscular movement, rapidity of nervous impulse, transmission of motor and sensory stimuli, race-differences in reaction-times, sensation-areas, differences in estimating weights, judgment of the passage of time, sensibility to pain, the rate of forgetting, etc. With the excellent psychological laboratories now in operation at several of our leading universities, these comparative observations could readily be made, and they certainly promise most important results.

Curious Testimony to the Value of the Nasal Index.

In 1882 the British Government began an ethnographic and anthropometric inquiry into the native races of India. The results, which are now nearly ready for publication, will fill four bulky volumes, and will contain a mass of most valuable material for the study of these interesting peoples. A glimpse of some of them is presented in an article in the last volume of the *Journal of the Anthropological Institute*, by Mr. H. H. Risley of the Bengal Civil Service. One of the most noteworthy is the conclusion that there are really no physical differences between the Kols and the Dravidian tribes, in spite of the radical diversity of their languages. Neither of them discloses any Mongoloid affinities, though a number of tribes in northern and eastern Bengal are clearly akin to that great Asian race.

But the most curious statistics are those relating to the nasal indices of the tribes examined. They corroborate the high value of this physical element in racial anatomy. The nasal index is found in India in two widely distinct types; the one platyrhine to a degree closely approaching the negro (88-95), the other leptorhine about in the same proportion as in western Europe (67-72). These indices bear a constant relation to the order of social precedence, to the distinctions of caste, and to the organization of the family. "It may be laid down as a working hypothesis, if not as an absolute law, that the social position of a caste varies inversely as its nasal index." Everywhere the narrow-nosed Brahmin is at the top, the broad-nosed Pariah at the bottom. Wherever there is a high index, — above 80, — we find a low social position and the totemic sub-division of the tribe; wherever the index is low, — below 75, — we are equally sure to meet high rank and an eponymous family system.

Incidentally it may be added that these investigations bear out the ancient Indian traditions that the Aryan nations of India entered the peninsula from the north-west, and destroyed or subjugated the ancestors of the dark, flat-nosed Kols, the "snub-nosed blacks," often referred to in the ancient Vedic war-songs.

OSTEOLOGICAL NOTES.

In previous papers (*Science*, Vol. xvi., p. 332, Vol. xvii., p. 117, Vol. xviii., p. 53) we have assumed that the modifications presented by the jugal arch in the Mammalia are due to the various influences derived from use or disuse, correlated necessarily with the habits and environment of the animal. In no order is the specialization of the arch, under the influences of natural selection, more clearly exhibited than in the Insectivora.

Adopting the classification of the highest authorities, and notably that of Dr. Dobson, this order may be divided into two sub-orders, first, Dermoptera, embracing only one species — *Galeopithecus volans* — and, second, Insectivora Vera, which comprehends all the remaining families. This second sub-order may be divided in turn into two groups. In the first, — including the families Tupaidæ, Macroscelidæ, Erinaceidæ, Talpidæ, and Soricidæ, — the true molars have W-shaped crowns. In the second group, including the Centetidæ, Solenodontidæ, Potamogalidæ, and Chrysochloridæ, these same teeth have V-shaped crowns.

Accepting the above classification, the Insectivora, so far as concerns the jugal arch, may be brought into three groups.

1. Those in which the arch is complete and well developed, comprising the Tupaidæ, Macroscelidæ, Rhynchocyonidæ, Galeopithecidæ.

2. Those in which the arch is complete but more or less feebly developed, comprising the Erinaceidæ, Talpidæ, Chrysochloridæ.

3. Those in which the arch is partially or wholly deficient, comprising the Centetidæ, Potamogalidæ, Solenodontidæ, Soricidæ.

The *Tupaia* (Squirrel-shrew) may be taken as a typical form of the first group. The jugal arch is well developed, a post-orbital process from the frontal meeting a corresponding one from the malar, thus forming a complete bony orbital ring. The malar has a large longitudinal oval vacuity, which, although unique in this case, when taken with similar vacuities in the palate of this genus, as also in some of the other Insectivora, points unmistakably to the Marsupialia.

The horizontal curvature of the arch is sufficient to counteract any inherent weakness due to the vertical curvature with its convexity downwards. The temporal fossa is moderately extended, while the coronoid surface of the mandible presents a large backward projecting surface rising high above the transversely produced condyle.

In the second group, where the arch although complete is for the most part weak, the cranium presents marked modifications. In *Erinaceus* and *Gymnura* the arch is formed mostly by the processes of the Squamosal and maxilla which join, while the molar is very small and occupies in a splint-like form the outer and under sides of the centre of the arch. There are no traces of any post-orbital processes. The temporal fossa is deep and extended, while additional surface is afforded for the temporal muscle by the prominence of the sagittal and occipital crests. The ascending ramus of the mandible with its broad concave coronoid surface and the development of the pterygoid fossæ denote increased masticatory powers, in spite of the apparent weakness of the buttress.

In the Talpidæ, certainly in all of the truly fossorial of the family, the jugal arch is slender and exhibits no distinct malar bone, no occipital or sagittal crests, and no post-orbital processes. The mandible is long and the vertical portion presenting a moderately extended coronoid surface with a small transverse condyle. The infra-orbital foramen is of great size, being a very slender osseous arch which serves for the transmission of the large infra-orbital branch of the trifacial, which affords the necessary supply of sensory nerves to the muzzle.

In the Chrysochloridæ (Golden moles), which in the general shape of the skull present modifications different from all other Insectivora, the jugal arch is in some species so expanded vertically, that, as Dr. Dobson remarks, "their upper margins rise above the level of the cranium giving additional origin to the large temporal muscles." There is no post-orbital process given off either by the frontal or zygomatic arch. As regards the mandible, the coronoid process is little elevated and in some species is nearly level with the transversely extended condyle.

In the third group the arch is incomplete, and in one instance, at least, may be described as entirely absent. In the Centetidæ, the skull is long and narrow, and marked by largely developed occipital and sagittal crests which serve as attachments for the muscles of temporal origin. The zygomatic processes of the maxilla and squamosal are very short and rudimentary, while the malar is entirely absent. The temporal fossæ are very large, and the skull retains nearly the same width at their anterior and posterior regions. There is not a trace of a post-orbital process. The infra-orbital foramen is circular, and capacious. There are no pterygoid fossæ. The coronoid process of the mandible is largely developed, its inner surface being concave, and its outer surface flattened. The condyle is small and circular, while the glenoid surface is transversely concave.

The other families of this group with the exception of the Soricidæ agree with the Centetidæ in the modifications of the skull that have been described. In the Soricidæ the cranium is broadest just behind the glenoid surfaces. There is no jugal arch and no trace of a post-orbital process. Frequently there is present a strongly marked lambdoidal ridge as well as a sagittal crest. There is no pterygoid fossa, but very large vacuities exist on each side of the basis cranii.

The mandible resembles that of the Talpidæ, although the horizontal ramus is shorter, while the ascending one "pre-