specialized for protective purposes, and short, soft hairs, which form the fur and keep in the warmth. Sometimes these long hairs are greatly enlarged and hardened to form protective spines as in the porcupine, hedgehog, spiny mouse and spiny ant-eater (Echidna).

*Horns.—*Horns are of three kinds: (1) antlers, (2) hollow horns and (3) hairy horns of the rhinoceros.

Antlers are growths of true bone and, except for their very vascular covering of skin (velvet), are not exoskeletal structures. They grow with great rapidity, and in the deer family are renewed each year. As soon as their growth is finished the skin covering dries up and strips off. The small horns of giraffes are also bony structures though permanent.

The hollow horns of the ruminants (Bovidae) are cases of hardened epidermis which fit over a bony core and are permanent. They are found in both sexes, and in this differ from the antlers of the deer, which, except in the reindeer, are confined to the male. In the prongbuck (Antilocapra) the hollow horns are shed periodically.

The hairy horns of the rhinoceros are a mass of hairs cemented together by cells. The hairs grow from dermal papillae, but differ from true hairs in not being sunk into hair follicles.

*Claws and Hoofs.—*These are modifications of nails, but whereas in nails and claws the structures are confined to the dorsal aspect of the digits, in hoofs they spread to the plantar surface as well. It has been shown in the embryological section of. this article that the nail appears at the very tip of the digit, and in this position it remains in many amphibians, *e.g.* giant salamander, while in hoofed mammals it develops both ventrally and dorsally. In the Felidae the claws are retractile, but the real movement occurs between the middle and terminal phalanges of the digits.

*Spurs.—*Spurs are quite distinct from nails and claws; they are very common in birds as horny epidermal sheaths covering bony outgrowths of the radial side of the carpus, metacarpus or meta­tarsus. The spur-winged goose has a carpal spur; in the screamers (Palamedea and Chauna) the spur or spurs are metacarpal, while in many gallinaceous birds *{e.g.* common fowls and pheasants) metatarsal spurs are found. In the mammals the male monotremes (Echidna and Ornithorhynchus) have spurs attached to an extra (? sesamoid) bone in the hind leg, perforated for the duct of the already mentioned poison gland.

*Beaks.—*Certain fishes belonging to the family Mormyridae have a fleshy prolongation of the lower lip, and are hence termed beaked fishes. In the Amphibia Siren and the tadpoles of most Anura (frogs and toads) have small horny beaks. In the Reptilia horny beaks are found in the Chelonia, while in birds beaks are constant and replace the teeth in modern species. In mammals a horny beak is found in Ornithorhynchus, though it coexists with true teeth in the young and with horny pads in adult specimens. In all these cases the beaks are formed from cornified epidermal scales.

*Baleen.—*The baleen which is found in the mouths of the Balae- nidae or whalebone whales is a series of flattened triangular horny plates arranged on either side of the palate. The inner edges and apices of these are frayed out into long fibres which act as strainers. In *Balaena mysticetus,* the Greenland whale, there are nearly four hundred of these plates, the longest of which often exceed 10 ft. In its development baleen resembles rhinoceros horn in that it consists of a number of epidermal hair-like fibres cemented together and growing from dermal papillae, though not from true hair follicles.

For further details and literature see R. Wiedersheim, *Com­parative Anatomy of Vertebrates,* translated by W. N. Parker (London, 1907) ; S. H. Reynolds, *The Vertebrate Skeleton* (Cambridge, 1897).

(F. G. P.)

Ethnology

The colour of the human skin has always held an important place among physical criteria of race. Physiology explains colour as a consequence of climate and even diet. The pigment or colour­ing matter under the epidermis, or rather under the second or Malpighian skin, is not peculiar to the Negroid and other coloured races, but is common to all human beings. It is simply more abundant in certain peoples, and this abundance is attributed to the stimulating action of the solar heat, combined with moisture and an excess of vegetable food, yielding more carbon than can be assimilated, the character being then fixed by heredity. Theodor Waitz quotes examples proving “that hot and damp countries favour the darkening of the skin,” and that the same race inclines to be darker in low marshy districts than on the hills. C. R. Lepsius asserts that the hotter the climate the darker the negro, pointing out that if you follow the line of greatest heat from Africa into Asia, it is in those regions of the latter continent that the darkest Asiatics are found. Many apparent exceptions to this general law occur, but they may be explainable as due to local causes. Thus Schweinfurth (*Heart of Africa)* believes that the reddish tint of the Bongos and other of the peoples inhabiting the hot, moist White Nile district is due to the ferruginous nature of the laterite soil: the hue of the A-Zandeh (Niam-Niam) of the Welle valley being possibly explicable in the same way. In South America all shades of complexion intermingle. Thus in Bolivia the coppery Maropas, the dark brown Aymaras, the yellowish Moxos, and the light Mosetenos, Siriones, and Guarayos are, so to speak, neighbours. In Austral­asia there is the contrast between the yellow-brown Malays and the sooty-black Tasmanians. Such deviations from the colour-law may be attributed to descent (dark peoples migrating to cold, light to tropical countries), or to such varied causes as dryness, moisture, food and the vegetable peculiarities of the land, by all of which the complexion may be affected, and the influence of temperature mitigated.

The colour of the human skin cannot, then, be regarded as an entirely trustworthy racial test, even blackness not being an exclusively negro characteristic. It serves, however, to divide Man into three fundamental types corresponding to the three great ethnic groups, viz. the White, the Yellow and the Black man. The first predominate in Europe, the second in Asia, while the third have their chief centres in Africa and Melanesia. Inter­breeding and, in a lesser degree, the influence of environment have caused the occurrence within the three main groups of almost every shade and tint of complexion. Thus the colour of the skin affords a faulty basis of ethnological classification, since in the same ethnic group it varies so widely and races of one group resemble in this particular races of another. The so-called Red Indians are usually classified as a fourth group, but they are not really red-skinned. The name has come about through their custom of smearing their faces with red ochre. But among the American aborigines, side by side with the yellow, olive brown or even black (*e.g.* the Charruas of Uruguay), there are tribes of reddish-yellow or coppery hue. This tint is found also in certain African tribes. The palms of the hands and the soles of the feet of negroes are never black, but always yellowish, and in all coloured races the back of the body is a shade darker than the front.

It is noteworthy that the skin of the coloured races is always of a lighter tint in the newly-born than in the adult; the negro baby is born a light grey colour, and the dark pigment is absent in the negro foetus. On the eighth day, sometimes as early as the third, the negro infant changes its colour to a hue nearly as dark as that of its parents. It would seem as if the blackness is associated with the general thickening of the skin and is an accompaniment of the general organic adaptation of the negro to his hot malarious climate. The effects of sunburn vary with different races. It is with the races having intermediate pigmentation, such as the dark Europeans and the yellow peoples, that the effect is most noticeable. With the former the sun burns the skin uniformly, making them of the tint of mulattoes. The colour so acquired is merely temporary. It diminishes in winter, and disappears entirely on their return to a cold temperate climate. With the Asiatics the sun causes different tints. The skins of the Indo-Chinese and the Malays become dark olive. The Fuegians and Galibis turn brick-colour or dull red. The Chinese skin turns darker in winter and paler in summer. Among certain peoples whose skins are naturally dark the parts of the body exposed to the light and air are often lighter than those covered by their clothes. This is the case with the Fuegians and the Sandwich Islanders. The fair European skin reddens under the sun, passing from pale red to brick red or to patches of deep red.

**SKIN DISEASES.** The diseases of the skin do not essentially differ from those of the other organs of the body. Like these, the skin is composed of cells resting on a connective tissue framework, in which run the vessels which nourish it and the nerves which keep up its communications with the rest of the body. But it has certain differences from other organs, some dependent on its structure and some on its exposed position. Thus, instead of, like the kidney, to which it may best be com­pared, having its epithelium faced by epithelium, all lies open, and the various processes are all “ one-sided.” There are no depths to be attacked, and any diseases, if they spread, must do so superficially; spreading as they often do equally in all directions, the diseases of the skin have a tendency to assume a circular form, independently of any parasitic cause, though when such cause is present the patches are of a more perfectly circular shape. Further, from the extent of its superficial area and its exposed position, the skin is liable to be attacked by more forms