

## The Regional Balance of Racial Evolution.<sup>1</sup>

By Prof. H. J. FLEURE.

THE Oxford meeting of the British Association naturally recalls to one's mind the famous controversy about evolution, the fact of which is now universally accepted despite little outbursts where old modes of thought survive on the fringes of civilisation. The application of the idea of evolution to the study of mankind has been carried very far, and we have especially Elliot Smith's recent summary with its emphasis on correlated improvements of eyes, brain, and hands. I shall not venture upon the ground so well covered by one of our greatest leaders, but shall merely add a few points necessary for my main purpose, which is an attempt to outline the field of research into the distribution of the characteristics of modern living men.

First may be mentioned the very probable, not to say certain, lengthening of pre-natal life from about 220 to 280 days, with consequent continuance of growth of brain and delay of hardening of frontal and facial elements and the passing of the stage at which hair was previously developed now under new conditions conducive to the maintenance of embryonic, downy hair (lanugo), rather than to the growth of the definitive hair. Thus the lengthening of pre-natal life seems to have been an important factor in that reduction of hairiness which is a feature of mankind. It has also contributed to the increase of skull volume and of consequent difficulty in head support, so that infancy and opportunities for lengthened maternal care have been prolonged. The postponement of fixation of characters, the maintenance of more or less embryonic conditions with resulting unfolding of new features in response to opening up of new possibilities, has thus become a cardinal fact for the human race.

The prolongation of infancy has also contributed to differentiate women's work from men's work, and it may well have accompanied the growth of the hunting habit in man; woman remained more a gatherer. This differentiation increased personal relations and gave two mutually supplementary types of food, doubtless a valuable step forward at that stage of evolution. The consequent enrichment of social life is an obvious fact, but in mentioning this one must emphasise that human society does not so much result from the coming together of individuals as that human individuality results from the liberation, bit by bit, of individual initiative within groups.

The stone implements of early Pleistocene man are generally of a few types only, though they may be wonderfully executed. The heavy hand of tradition has often limited initiative, but also often allowed the compensation of the craftsman's joy. Mid-Pleistocene man, at least, seems to have made ceremonial burials and thus, perhaps, to have begun to dream of a future life. It is with the Aurignacian phase, or the beginning of the late Pleistocene, or, to use another name, the beginning of the neanthropic period, that we note a great liberation of initiative, and it is from this phase that we have the earliest assured evidence of modern

types of man, so far all or almost all from the north-western quadrant of the Old World.

Efforts have been made to estimate the climates at which men's bodies and minds function best and to argue thence to the home under the conditions of which they became men of modern type. The best conditions for bodily efficiency are not very different from those of our present British climate, for mental efficiency they are like those of our cooler (but not too bitterly cold) spells. Olbricht has ventured the suggestion that there was probably a big mental advance during a cold period such as a late phase of the ice age; but at such a time a climate like our present one favoured the south Mediterranean and the belt from the Sahara to Mesopotamia, perhaps only this belt. This belt seems to give abundant evidence of inhabitants of, possibly, mid-Pleistocene date.

We may venture provisionally to place the early modern men in the zone from the Atlantic edge of the Sahara to Persia, and should think of a fairly large population not all exactly alike. What sorts of men were they?

They may have been more or less brown-skinned with blackish hair and brown eyes, with jaws and brow ridges much reduced from the conditions known in many of the earlier forms of man, with heads almost balancing on the vertebral column, but the erect posture not yet attained in all cases.

The well-known youth and old woman from the lower layers at the Grotte des Enfants, currently known as the Grimaldi type, were short, with broad noses and strongly projecting mouths, but without brow ridges. Their heads were long, narrow, and high. They have often been said to be negroid, but it would be wiser to say that both in them and in many living Africans we find some of the same characters.

The name of Cro Magnon has often been used as a label for nearly all the types of the late Palæolithic except the Grimaldi skeletons just mentioned. Giuffrida Ruggeri urged a more restricted use of the term, but his views were held back from general acceptance for a while owing to exaggerations due to Klaatsch, exaggerations which Klaatsch retracted before he died. Using the term more carefully and more strictly, it applies fully to about four skeletons and partially to two or more of presumed Aurignacian date as well as to other later ones. In the Cro Magnon type the head is long absolutely, but only moderately long relatively, the cephalic index being about 74, 75, or 76. The height of the skull is much less than its breadth, the nose and chin are strong and narrow, the brow ridges do not stand out separately in front of the forehead, the stature is great, the cheek bones are large and project laterally, and the face is short and broad.

It is difficult to accept either the Brunn or the Brûx calotte as suitable objects from which to name a race, and there are difficulties about naming it from the Combe Capelle skull. We await anxiously the full description of skulls found at Predmost. The general characters here are extreme length and narrowness of the head, so that the cranial index is rarely so high as

<sup>1</sup> From the presidential address to Section H (Anthropology) of the British Association, delivered at Oxford on August 9.

73 on the skull; the height of the skull is usually greater than the breadth, the brow ridges are well marked and in this connexion the rather exaggerated term 'Neanderthaloid' has often been used. There are a few skulls otherwise belonging to this type which are low in the vault.

Skulls from Solutré show high heads without strong brow ridges, but heads which are so much shorter as to make the usual index 78-83. We await confirmation of the date and detailed descriptions of the Solutré skulls.

Reviewing these early skulls comparatively, we notice that great length of head is a very general feature. This is combined with a very narrow and rather high-ridged form in some cases, and a less narrow and less high-ridged form in some others.

The great majority of the apes and the extinct types of man do not seem to have been relatively long-headed, if we are careful not to include the enormous brow ridges of some of them in measuring the head length. Comparing the skulls of Aurignacian men with these others, we note a marked growth in length, especially in front of the ear. This implies special additions along the coronal suture. Now the temporal muscles were of very great importance to the flesh hunters of the late Palæolithic age, who doubtless had to tug at flesh food. They had been important, no doubt, in earlier times as well, so they may be looked upon as an ancient feature persisting for a while and exerting an influence on the new growth. The early closing of the sagittal suture gave a firm anchorage to the temporal muscles and limited growth in breadth anteriorly at least; increase of anterior space must thus be secured mainly by increase in length. It is therefore permissible to suppose that a great lengthening, extreme in some cases, was a feature of skull growth among most, but not necessarily among all, early representatives of modern types of man.

In several cases the two sides of the skull roof seem to have been pulled down, or in other words the sagittal line was ridged up, and this is found frequently associated with a deep temporal hollow, so that the brow ridges are left outstanding. In other cases the temporal muscles seem to have pulled the sides down to a lesser extent, and the head is less narrow and the brow ridges less outstanding. Lest too much importance be attached to the pull of the temporal muscles, it is well to remember that the face was still heavily developed in most early examples of modern man, and that to balance this the head tended to grow so as to project backwards, *i.e.* to grow in length.

It is thus possible to think that in the evolution of modern men we may have:

(a) Types with little of the additional growth just mentioned. These would be sub-brachycephalic and small.

(b) Types with considerable growth, almost entirely growth in length, and with the sides of the skull sloping steeply from the sagittal ridge. These would be hyperdolichocephalic and usually high-headed, often with strong brow ridges.

(c) Types with considerable growth in length but without the sharp down slope of the sides. These would be more moderately dolichocephalic than (b), less high-headed and usually with less strong brow ridges.

(d) Types with considerable growth more generally distributed along the various sutures. These would be mesaticephalic or sub-brachycephalic with parietal rather than frontal breadth as a distinguishing feature.

I think it useful to figure the great lengthening as a feature in the main groups of early modern men in the early home zone, and then to think that there were fringing groups who remained without this lengthening. These fringing groups on the hot south side, probably subject to unfavourable conditions, would have relatively small growth and would remain as small mesaticephals. On the cooler north side they, then or later, were able to accomplish longer continued growth and so gave better grown, larger headed mesaticephalic and sub-brachycephals.

The first group seems illustrated by the Andamanese, Semang, Aeta, Tapiro and other pigmies of south-eastern Asia, and the Akka and other small peoples of equatorial Africa, the last being much less strongly pigmented than the others. All have flat, broad noses, the Tapiro less than the others. It seems almost necessary to think that some of these types have left their mark on the population of various parts of India, and some of their characters seem to survive also among various African peoples other than the equatorial pigmies. The Bushmen, on the view here sketched out, would be types showing some measure of head lengthening, and the Tasmanians also.

I have not mentioned hair. The downy hair has fairly straight roots even in Bushmen, and the spirally curved hairs so characteristic for Africa develop that curve with a sharp angle between it and the root. As ape hair also has fairly straight roots, it thus seems likely that spirally curved hair is a specialisation among some early types of modern man, chiefly, I think, types on the south side of the early home zone under hot conditions, where hair reduction and the pressing of the roots up toward the surface would allow the freer giving off of heat.

Next we may think of cases in which head lengthening had taken place fully. Broom's Hottentots and Koranas fall here, and so do most of the African peoples. Among some the pressing of the hair roots up to the surface has made possible a large growth of blood vessels in the skin, and the reduction of hair has gone very far in certain cases. The thin supple epidermis without many dry non-conducting layers, the everted lips, as well as the development of skin blood vessels and the reduction of hair, all promote cooling.

It was mainly types with broad, flat noses, prominent mouths, feeble brow ridges, and spirally curved hair that drifted southwards in Africa, from the south flank of the early home zone, but a brow-ridged type also went that way.

The south-eastward drift was a drift rather from the end than from the flank of the early home zone, and for this reason it was more varied. Pigmies with spiral hair and medium broad heads; dark Tasmanians with spiral hair and partly lengthened heads; south-east Australians with lengthened but often low heads, dark colour, and wavy hair; North Australians with lengthened and high heads, dark colour and wavy hair; Papuans and Melanesians with long high heads, dark colour, and spirally curved hair and so on—an interesting series of drifts through a long and relatively narrow

belt. This contrasts with the African drift through a wide belt lying on the south flank of the early home.

Let us turn now to the northern flank of the early home zone and think of migrants across from Tunisia to Sicily and Italy, migrants mostly with very long heads, the bearers of Capsian culture to Europe. In addition to these we have to think of people drifting northward between Elburz and Hindu Kush as the ice diminished. Once north of this barrier the human drifts could spread either north-eastwards in the lowlands or north-westward to the European loess. These early drifts have been pressed upon by subsequent streams and their survivors are now found in peripheral situations and in a few refuges on the way. Survivals of these early characters are shown in types found at Plynlymon. The new work on blood constituents is interesting in that it is tending to show that the blood of the peripheral, longheaded peoples is inherited with little alteration from a phase before certain specialisations occurred in the composition of the blood of many human stocks.

When the belt of the westerly winds from the Atlantic shifted northward as the ice sheets diminished and the land sank in north-west Europe, inner Asia lost its rain to a large extent, but melting ice seems to have kept it moist for some millennia. Mesopotamia remained moist for the same reason for a good while. The change of climate in north-west Europe produced a human crisis; the spread of the forest broke the old schemes of life, especially as the first phase was that of a pine forest, very unfriendly therefore to man. In south-west Asia, wild barley and possibly wild relatives of wheat have been found. Somewhere then, probably on the northern fringe of the early home zone, there arose sooner or later a culture complex, including cultivation of wheat and barley, the art of stone grinding perhaps developed through the use of stone for digging, the consequent invention of the stone wedge, and so the rise of new power over wood to haft tools, to make palisades that kept animals under man's command for milk, etc., the making of pots, the dawn of metallurgy and so on. I think of this complex, provisionally, as spreading among hill folk rather than plains-men, for the latter might more easily keep up their old habits of following herds of animals, and it seems that it spread through Anatolia to Hungary and so, after a long history, ultimately to western Europe probably about the end of the fourth millennium B.C. There is, however, no need to picture the awakening west as copying exactly from old and distant cultures.

The mastery of a wood technique, food production, and the potter's art all helped home-making and the provision of soft food for infants, delaying the hardening of the skull or, in other words, prolonging infancy. In this connexion one pictures diminution of jaws and brow ridges and freer growth of the skull along many sutures leading to a maintenance of the mesati- and sub-brachycephalic skull form. This form and the brachycephalic form, which I believe is derived from it, are mainly characteristic of the great mountain belt of the Old World.

Another factor that enters into the story here is the probable increase of chewing at the expense of tugging, and Prof. Thomson and others have associated with

this an increased width of the malar bones to which the masseter muscles are largely attached. Increased width of face and jaws is likely to have encouraged increased width of head as well. It is important to note that there has been no suggestion that some functional change in the jaws led to a transformation of dolichocephaly into brachycephaly. The suggestion is rather that the brachycephals have originated from fringing mesaticephals or sub-brachycephals. I appreciate and accept Prof. Thomson's observations and views on the lower jaws of the typical broadheads. These thoughts make me incline to criticise our present use of terms for skull forms.

Brachycephals give one the impression of evolution and drift from Anatolia and surrounding regions. It is noteworthy that Pamir broadheads are much like Alpo-Carpathian and Cevenole. For the present, I look upon the extreme broadheads of the high plateaux of east central Asia as showing in some cases a flattening of the nasal bones and an insinking of the nasal chambers, but others have the profile prominent enough. The broadheads of the high plateaux have yellow-brown skin, the early brown being retained and the yellowness being increased by the insinking of blood vessels, and the thickening of the dry superficial layers—both protective devices in a region of intense winter cold. The very variable extra fold of the upper eyelid may have begun as a consequence of the facial flattening, and once developed would be a valuable protection against glare.

The well-known diagram of Ripley shows the distribution of broadheads in Europe as known in his day, and its relation to the mountain zone is very marked. A preliminary attempt has also been made to design a map of types in Europe. Around the mountain zone the broadheads have spread and the longheads are mostly peripheral in the north-west and in the south-west. In the north-west, climate encouraged long continuation of growth and diminution of pigment, and I look upon the tall fair Nordic as to a large extent a regional specialisation. In the south-west the Mediterranean type links on to the Hamitic type of North Africa and the longheads of the Arabian wastes, all having among them an element surviving with little change from the early days of modern man, but many showing somewhat more general growth along the various sutures, and therefore less extreme length of heads. The fundamental element of the British population I look upon as drifting from the continent in late Palæolithic times, with a southern element fairly well represented but, nevertheless, on the whole neither fully Mediterranean nor fully Nordic, but, as I think Sir Arthur Keith would say, just British.

I have tried to suggest that development of the individual depends on hereditary factors of a conservative nature, and on environmental influences which have changed with climate, food, and equipment. Thus they have affected plastic infancy, and in the end have moulded race types blending hereditary characters sometimes brought from afar with other features in which the changes of environment have had more power. A doubt persists in my mind as to the assignment of more than a somewhat limited value to taxonomic treatment of the question. It seems

worth while to think rather of regional gatherings together of physical characters.

Changes of environmental influence are usually cumulative, for natural processes are essentially irreversible even if, as in climate, there is something of a cyclic scheme of change. The cumulative change may be said to draw out the course of development more and more from its original path, thus creating a state of internal strain. No two embryos are exactly alike, and in some the hereditary units may vary towards, in others away from, a condition which would diminish that internal strain. Those varying so as to diminish the strain would probably grow best. So we have a theoretical possibility of variation of the germ limping after variation of the soma. In the case of man, whose development is so closely linked with varying balances of the influence of endocrine glands, the adjustment of the variation of the germ to the variation of the soma may not be very slow.

A special attempt has been made to suggest the part played by the development of social life in the evolution of human physique, and the importance of parental care. These factors seem in particular to have led in certain circumstances to a vast liberation of individual

initiative within our human societies, especially after the development of intercourse between groups.

We must speedily undertake more and more biological observation and measurement among ourselves, and we must exercise ever more care in the treatment of our measurements. Averages of cases which are not properly homologous should not be made lest we mask the biological truth in mathematical abstractions. If our anthropological work can but go on becoming more biological, gaining insight into physiology, especially of the brain and the endocrine organs and their correlations with growth, I venture to think that racial study will develop great practical value for education, for the fight against tuberculosis and other diseases, and for race-improvement. Evolutionary race biology seems to be a hopeful sphere of work that may bring about a much-needed enrichment of public opinion on social questions, a diminution of race-arrogance, and a check on schemes that do not sufficiently allow for the mutual adaptations between diverse human stocks and diverse environments. I would ask for faith in the future of such work to bring out its great possibilities for nobler races with freer personal initiative in societies both more stable and richer in the things that are not seen.

### The London School of Hygiene and Tropical Medicine.

HYGEIA, the goddess of health, daughter of Esculapius, was included among British *lares et penates* some fifty years ago, when the Public Health Act of 1875 was adopted. Since that time Great Britain has been a world pioneer in the achievements

Official evidence before and during the War relating to national physique and the statistics of diseases indicate the need for sustained effort in the health crusade. Even the layman can form some conception of the vast field for scientific research from the wonderful

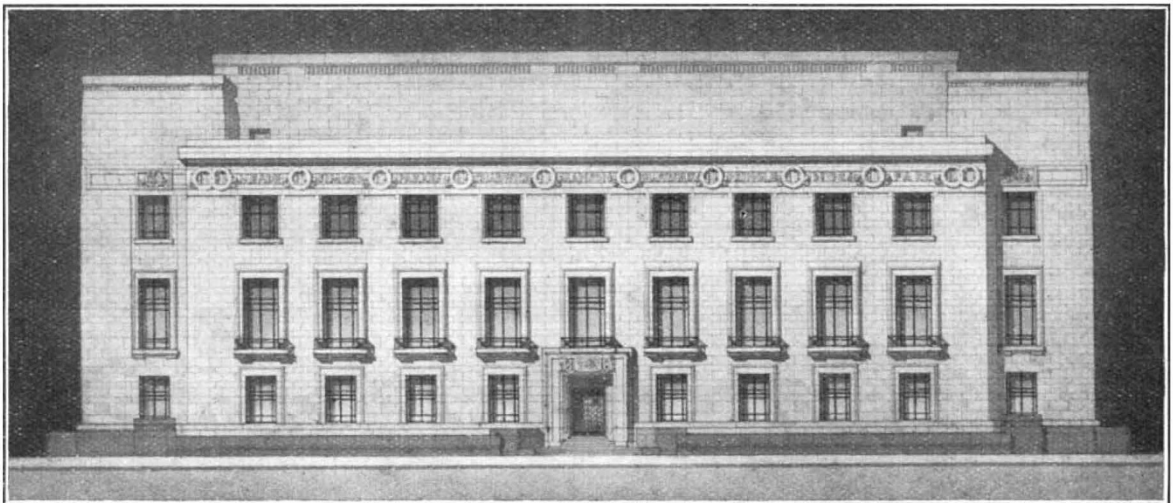


FIG. 1.—The London School of Hygiene and Tropical Medicine. Frontage to Keppel Street.

of its public health service. Attention was concentrated in the earlier years on drains and sanitation, but gradually the scope of the work of the public health authorities has widened. The results, as seen in the reduction of the death-rate to 12 per thousand and the consequent increase in the span of human life and in the health and happiness of the people, have undoubtedly had a bearing on industrial efficiency and national prosperity. But much remains to be done.

discoveries of which information is published from time to time, such as those relating to the curative power of natural and artificial sunlight and chemical methods of preventing goitre.

The Ministry of Health, as in duty bound, early recognised the need for extending facilities for instruction and research in preventive medicine. A committee appointed by the Ministry and presided over by the Earl of Athlone submitted a report in