Anthropology. — *On the Origin of human Races.* By Prof. L. BOLK.

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In the anthropological literature many systematic divisions of mankind into races may be found. Now it strikes us that so little has been done concerning a systematic study of the origin of the human races. Leaving out of consideration the memoirs in which problems of general biology are treated, e.g. whether the origin of the races was a monogenetic or a polygenetic one, or whether they are not rather to be considered as subspecies, and suchlike questions, there is until a few years back scarcely any indication of a trial to explain the origin of races from a fundamental point of view. Of course, there are plenty of vague generalities, which can invariably be reduced to the little satisfactory standpoint occupied by DARWIN, when he summed up his opinion about the origin of species about as follows: "We may conclude that the variations giving origin to the human races, have been brought about either directly by exposure to various conditions of life, or indirectly by some form or other of selection". At the close of the chapter treating on the origin of races, in his "Descent of Man" he also admits the possibility that races may have evolved from spontaneous variations.

It is easy to understand that such generalities cannot furnish a basis for a methodical interpretation of even the most conspicuous somatic properties of the different races. DARWIN himself tries to do so with respect to the black skin of the negroes (to which I shall revert) but finally he declares that not one interpretation satisfies him.

In recent years, however, the problem of the origin of races has been studied on more sharply defined biological principles than those produced by DARWIN's theory. Starting from the consideration that the morphogenesis of the individual is regulated by the hormones of the endocrine system, now one is trying to retrace the somatic differences between the groups of individuals forming together one race, to a different agency of these substances. This reasoning is quite logical, and KEITH has been the first, who, in 1919, viewed the typical physical characters of the various races from that standpoint. After him several German authors have advocated the same opinion. The different hormones are supposed to be in a certain condition of equilibrium, a change in this equilibrium revealing itself in a more or less strong development of a somatic character. So every race would as PFUHL puts it, have its own type of hormonic equilibrium.

This idea, first unfolded by KEITH [1]), as stated above, has already induced other investigators to study the degree of development of the endocrine glands in different races; and as yet some positive results have been obtained.

In their speculations on the origin of the human races I side with these authors the more readily as they are quite within the sphere of my own conceptions as to the origin of man. But, I'll go a step further, and not confine myself to the pronouncement that the racial qualities are indicative of a difference in, what I would term "the hormonistic index" of the individuals, but endeavour to show in what way certain racial characters result from these differences.

On the face of it this looks like a difficult task, yet it will appear that along this path it will be possible to comprehend the origin of racial qualities and consequently the origin of the races.

In my exposition I start from the hypothesis (in my opinion irrefutable), that the same cause from which arose the specific physical characters of mankind as a whole, also brought about the specific properties of the races, into which the genus differentiated. This, then, points to a common prime cause for the genus and for the races.

Some time ago I published a résumé of the principles of my theory of Anthropogenesis [2]). The leading thought of it was that man resulted from a retardation in the developmental tempo, and the course of life of the organism. Human life proceeds, to put if figuratively, like a retarded film. Now that retardation was, as regards the somatic development, not a regular one: certain physical characters were restrained more intensely in their evolution than the whole, of some the development was even completely arrested, i.e. suppressed. The consequence of this was that the form became characterized by the possession of properties of a fetal nature. This is what I termed the fetalisation-theory of our morphogenesis.

Now the study of racial features confirms the correctness of this theory, as it appears that just as the specific physical qualities of man are in general persisting fetal conditions, so also the specific racial features bear completely this character. In some sense, therefore, a race of men may be defined as a group of individuals in whom a definite somatic property or condition terminates its evolution at a certain stage, whereas in all other individuals its evolution is still proceeding till the very end. In other words: the specific racial features are fetalisation phenomena. The connection between this conclusion and the conception, just now alluded to, of the racial characteristics as manifestations of a different equilibrium of the hormones, is not far to seek. For, already in my discourse, just now referred to, I pointed out that the fetalisation

[1]) The differentation of mankind into racial types. The Lancet 1919, Vol. 2.

[2]) On the Problem of Anthropogenesis. Proceedings Kon. Akad. v. Wetensch., Vol. 29, 1926.

of the human body, as a whole, results from a checking agency emanating from the hormones. Racial characteristics, then, are merely manifestations of specific checks at work in the evolution of definite groups of men.

It is out of place here to fully discuss this principle, I must confine myself to unfolding the biological principle of the origin of races, and am now going to illustrate this by three of the most striking racial properties, viz. the specific characteristic of the Mongolian race, the colour of the skin, and the shape of the skull.

The so-called mongol-fold or Epicanthus is no doubt the most characterising feature of the Mongolian race: a skin-fold that, starting from the upper eye-lid, runs downward, and bridges over the inner angle of the palpebral fissure. This, however, is but one characteristic of the Mongolian physiognomy. When comparing the structure of the upper half of the face of a Mongol with that of a European, it will appear that the real differences extend farther, and that e.g. the face of a Japanese is typified by what I will designate by the comprehensive name of "Mongol-complex". This complex presents three anatomical pecularities, viz. the above-named fold, the flattened nose-bridge, and the protrusion of the eye-balls. First let us dwell on the last two.

As ADACHI's investigations have borne out, the topography of the eye-ball of the adult Japanese, relative to the orbit, differs from that of the European. The deep-set eye, often met with among Europeans, does not occur with the Mongolian race. On the contrary, the eye-ball of the Mongol lies protruded to such a degree that nearly the half of it lies before the plane of entrance of the orbit, whereas with the European the eye-ball lies entirely within the orbit or at most for one third out of it. This fact, in conjunction with the flattened nosebridge, enables the Japanese and the Chinese to let a stick rest on both their eye-balls while it passes right across their nosebridge. This anatomical peculiarity is as typical of the Mongol as the occurrence of the epicanthus. Now, if we examine on this head the fetus of the European, it appears that at one stage of his evolution a transitory condition occurs like that which is characteristic of the adult Mongol. In the development of the European we also meet with a stage with flattened nosebridge and prominent eye-balls. But while with the Mongols this stage has become the terminal condition, it is for the European a transitional phase; for during further development the eyeball sinks deeper into the orbit, and the upper part of the nosebridge becomes prominent. Thus we see that with the Mongol these two components of the "mongol-complex" are persisting fetal conditions.

The same holds good for the third component of the complex, the epicanthus, or the mongolian fold. In order to demonstrate this, we have to make a short exposition of the development of the system of folds round the human palpebral fissure.

The different phases of this development after my personal investigations

are represented by figs. 1 to 7. When the eyelids have been formed and cover the considerably prominent eyeball, there exists a marginal groove compassing the eyeball medially and upwards, while the medial angle of the

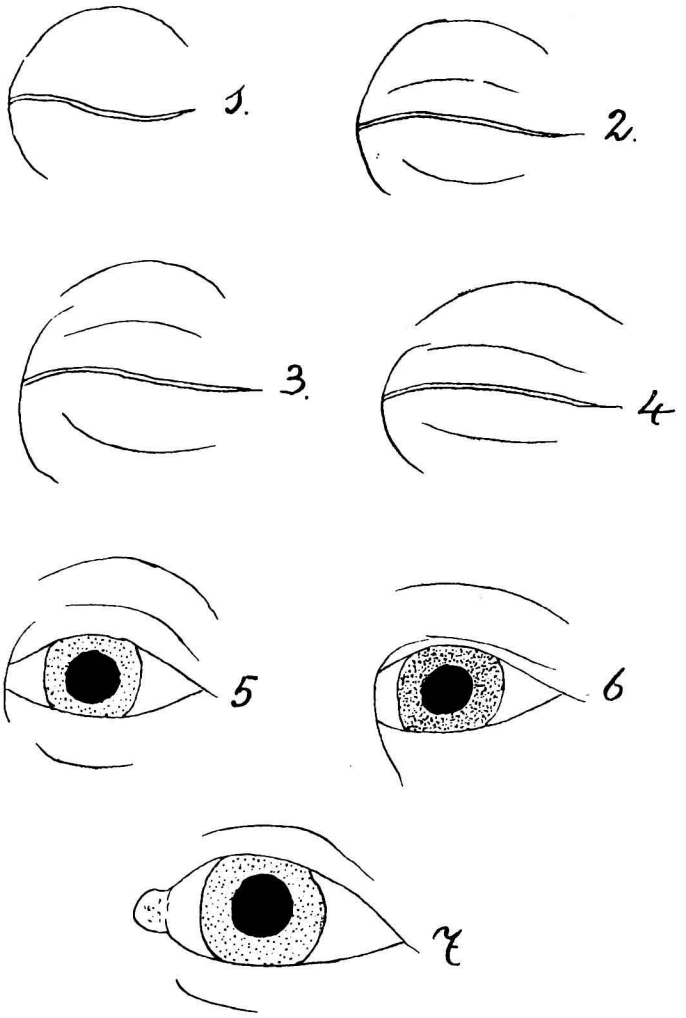

Fig. 1—7.

palpebral fissure extends to this groove (Fig. 1). After this a skinfold is evolved on the upper and the lower palpebra, which, however, does not reach the groove (Fig. 2). Subsequently the marginal fold splits up into two fragments, a superior and a medial one. Henceforth the latter forms a skinfold by itself, in the middle of which the medial end of the palpebral fissure terminates (Fig. 3). This medial fold slightly overlaps the nasal end of this fissure, so that in this phase the fetus has a true epicanthus (Fig. 4). Now, in case the eyes were to open in this stage of development, we should see a condition as illustrated in Fig. 5, in which the

medial canthus is overarched by the medial fold or epicanthus. It is commonly known that in neonati of the European this fold occurs occasionally, when the normal process of development, in which the epicanthus disappears, has been retarded. In normal cases this disappearance takes place in the European fetus during intrauterine life already, and the condition of fig. 7 is brought about. In the Mongolian race, however, the fetal epicanthus persists, and unites with the secondary skinfold on the upper eyelid (fig. 6). It is evident, therefore, that epicanthus and mongolian fold are not completely identical: the mongolian fold has originated from a combination of the fetal epicanthus with the secondary fold of the upper palpebra.

This brief description of the development of the skinfolds round the palpebral fissure goes to show that the epicanthus of the Mongols is a persisting fetal property.

The embryological investigation of the development of the system of folds round the palpebral fissure indicates that an epicanthus normally occurs during intrauterine life of Man. However, while as a rule this stage is transitory and the epicanthus disappears, the fetal condition persists in the Mongolian race. The "mongol-complex", as I termed it, which differentiates the Mongolian race so sharply from the other races, appears, indeed, to be a veritable fetalisation phenomenon. So with respect to this feature an interrelation exists between the races, corresponding to the relation of the general human characteristics to that of the other primates. Conditions, which in Primates are generally transitional, embryological stages, have become terminal stages in Man. It is just the same with the epicanthus: a condition, which in general is a transitional stage in the development of Man, has become a terminal stage with a definite race.

The fact that in every man the system of folds passes through an epicanthus-stage, elucidates two phenomena that I wish to accentuate here. Firstly the occurrence, already mentioned, of an epicanthus in neonati of the white race. In most cases this fold gradually disappears in the first years after birth. It is evident that the occurrence of such a fold is not at all due to some hereditary influence of a hypothetical Mongolian ancestor, as was formerly supposed; it is merely a pathological retardation of a normal evolutionary process. Occasionally this retardation gets so intense, that the fold persists also in Europeans, in this case the retardation has acquired a pathologial character. This is one of the instances pointing to the fact that stabilization of a fetal condition being physiological for one race, may be pathological for another.

The second instance I wish to call attention to, and which becomes quite comprehensible to us now, is the frequent occurrence of an epicanthus among tribes of the negro-population of Africa. Until recently this was known only for the Hottentots, about 70 % of them having a more

or less pronounced epicanthus. This led to the supposition of a hereditary relationship between Mongols and Hottentots, to which, however, objections have been raised. Another interpretation was brought forward, viz. that while racial characteristics may originate as spontaneous variations, the occurrence of an epicanthus in Mongols and Hottentots was evidence that such variations may arise independently among various groups of men. Subsequent reports stated that in Africa the epicanthus is not restricted to the Hottentots. It is especially among the negroes of Nigeria that it seems to occur frequently.[1]) And the first reporter, convinced that an epicanthus was typical of the Mongolian race, expressed his surprise at discovering Mongolian influence among the population of Central Africa.

Now the fetalisation-theory throws quite a different light upon the occurrence of the epicanthus among the inhabitants of Africa. The persistence of a fetal condition in human ontogenesis, characteristic of the population of Eastern Asia, also takes place frequently among certain tribes of the negro-group, as it does in individuals of the white races.

This can the more easily be understood, as in this case, just as with any other somatic condition, we have not to do with an acquired property. All human individuals have had an epicanthus; with most of them it disappears, with a minority it persists and now becomes a distinctive property of races. The problem why this stabilization occurs in definite groups, we are unable to solve. The retardation, and the fetalisation as phenomena and as evolutionary factors, are easy to demonstrate, but the selection exercised by the retardation we do not understand: it remains a puzzle.

For (and now I am going to discuss the second racial character) why has the pigmentation of the skin, the eyes, and the hair been retarded, even suppressed in a group of men? Am I justified in asking this question? Yes, for the ancestors of Man were black-haired, and black-skinned, the fair type issued from the dark. I must adduce my argument for this assertion.

With regard to the colour of the skin DARWIN takes a somewhat peculiar standpoint. He does not ask: what caused the difference in the colour of the skin, the eye and the hair, but sets himself the question: how is it that negroes have become black? and considers several possibilities, none of which, however, satisfied him.

I am of a different opinion; our ancestor was black-haired and black-skinned, just as the Gorilla and the Chimpanzee. My reason for this assertion is obvious. The genus Homo, as a whole, is characterized by black hair and brown to black eyes. Only the Homo nordicus possesses fair hair and blue eyes, a property acquired only in a later phase of Anthropogenesis. If, then, black hair and black eyes are characteristic of

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[1]) SELIGMAN, A Pseudo-Mongolian Type in Negro-Africa. Man. Dec. 1924.

Man, we may conclude that also the skin was black, before it lost its hair. With some races this colour has persisted: Negroes, Papuans, Australians. The process of depigmentation was as follows: first the pigment in the skin was lessened: Mongolians, Malays; and afterwards the development was suppressed to such a degree that races with a fair skin were generated, but still in possession of black hair and dark eyes. Their representatives are the mediterranean, and the alpine races. In one race the depigmentation became complete, viz. the nordic race. In this race also the hair and the eyes lost their pigment, the eye became blue, the hair fair.

Now, if we consider the question: What is the nature of this process of depigmentation, causing a racial differentiation of Mankind to such a degree that it became the basis of the first classification, that of BLUMENTHAL? Evidently here also we have to do with different stages of a fetalisation-phenomenon. The faculty of producing pigment, so strong at the beginning that the neonatus was born with the intensely black colour of skin, hair, and eyes of his parents, was trigged in its development, and became less intense. This signified already an approach to the fetal condition, in which the skin is fair, the eyes blue, and the hair light. At first this retardation was limited to the pigmentation of the skin. The negroes show the first indication of it, the neonatus of this race being often of a considerably lighter colour than its parents, and acquiring its definitive colour some time after birth, at most after 6 months, according to records in the literature.

Now, the more the development of pigment in the skin is suppressed, the more the individual will approach the fetal condition: the colourless skin. In the Nordic race this condition persists most completely. In this race, furthermore, the depigmentation is progressive, iris and hair lose their dark colour as a manifestation of a fetalisation-phenomenon. This process of depigmentation is of just the same nature as that in the skin: the production of pigment is suppressed and retarded. Owing to the first circumstance the eyes and the hair become lighter, and as to the latter, we still observe its action in the well-known fact that with fair-haired children as a rule the hair gets darker after birth, a process varying individually considerably. This darkening of the hair and the eyes after birth seldom stays away in children of the fair race, which phenomenon is identical with the postnatal darkening of the skin in negro-children.

So, as to the colour of the skin, the eyes and the hair, the Homo nordicus appears to be more fetalized than any other race.

As the third racial character presenting itself as fetalisation-phenomenon, the form of the skull may be discussed. In this paper, in which only principal points can be discussed I shall confine myself for the sake of brevity to the two principal shapes of the skull; the brachycephalic and the dolichocephalic. There are brachycephalic and dolichocephalic races.

By some authors the cause of this difference is considered to be a telluric one, in such a sense namely that mountainous regions favour the evolution of a brachycephalic skull. However, the instances, at variance with this presumed correlation between environment and shape of the skull, are so many that this hypothesis may be repudiated as being faulty.

It was supposed by DARWIN that the increase of stature without a corresponding augmentation of the size of the brain, has provided some races with a dolichocephalic skull. I quite agree with DARWIN in supposing a correlation between increase of stature and dolichocephaly, but to my mind the additional factor, viz. the absence of a coinciding increase of the cerebrum, is superfluous.

However, the preliminary point we have to consider, is again: the shape of the skull of primitive man. This problem is rather difficult, because morphologically the term "primitive man" does not convey a distinct conception. There are no morphological criteria to refer a definite form still to the anthropoids, and to call another form Homo. This may be illustrated by the Pithecanthropus, which nobody will class as a primitive man. Yet, if of this form the calvarium were not known, and only the teeth had come into our possession, we should not hesitate in diagnosing them as the teeth of a primitive man.

When considering, however, that the skull of the Pithecanthropus, and likewise all skulls of the Homo neanderthalensis, known to us, and also the Talgay-skull, are dolichocephalic, while furthermore a brachycephalic skull appears only in a later period, it is within the bounds of probability that primitive man was dolichocephalic. Until recently one might have argued against this supposition that anthropoids are brachycephalic. This objection, however, has become invalid, since the existence of a dolichocephalic race of Gorilla was demonstrated [1]). The rule, however, that Anthropoids are brachycephalic, suggests the supposition, that the ancestor of Man also possessed a round skull, which during anthropogenesis was metamorphosed into a dolichocephalic one. When tracing the cause of this morphological change, it seems to me that a fair point of issue may be found in DARWIN's idea (just alluded to) that augmentation of body-length may be correlated with the development of dolichocephaly. Although no evidence can be adduced, it may still be assumed on the basis of several considerations, that anthropogenesis was attended with an increase of stature. This increase concerned particularly the trunk and the legs. The connection of this phenomenon with the development of dolichocephaly I imagine to be the following: The increase of the length of the trunk results from a prolonged persistence of the epiphyseal disks of the vertebrae, which is to be considered as a symptom of the

[1]) L. BOLK: "On the Existence of a Dolichocephalic Race of Gorilla. Proc. Kon. Akad. v. Wet., Amsterdam, Vol. 28, 1925.

H. A. HARRIS: Endocranial Forms of Gorilla skulls. American Journal of Physical Anthropology, Vol. 9, 1926.

retardation of the development in general. This prolonged function of the epiphyseal disks caused a vertical enlarging of the vertebrae, and brought about an increase in length of the trunk. But also the epiphyseal disk in the base of the skull persisted and functionated longer, so that the base of the skull was elongated. Add to this the rather considerable enlargement of the cerebellum by which the Os occipitale got protracted in sagittal direction, then we have two possible factors that render the transformation of brachycephaly into dolichocephaly, and the dolichocephalic skull of primitive man, comprehensible.

Now, how did in a later period the brachycephalic skull issue from this form? It would seem to me, that here we have to do again with a fetalisation phenomenon. It should be remembered that every man is brachycephalic during a rather long phase of his fetal life. According to the investigations by SCHULTZ (Fetal Growth of Man and other Primates. Quaternal Review of Biology, Vol. I) no dolichocephalic skulls are met with until the 6th month of the fetal growth, and only during the sixth or the seventh month the index cephalicus may be lowered so much that the skull has become dolichocephalic. Dolichocephaly, therefore, is a secondary form taking its origin during fetal growth. In brachycephalic individuals this transformation of the skull is suppressed, and the primary fetal form is retained. If we correlate this fact with brachycephaly as racial feature, we come to the conclusion that this characteristic is also due to the persistence of the cranium (now as a hereditary phenomenon) in the form that is typical of the first period of human fetal life. It follows, then, that brachycephaly is also a phenomenon of fetalisation.

It has thus been demonstrated, that there is one and the same cause for the origin of racial features and the genesis of the actual form of Man, as a whole.