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Anatomy and Politics.

By PROF. W. E. LE GROS CLARK, F.R.C.S.

The title of this lecture suggests an unnatural association of two quite incongruous subjects. Yet to-day, when human activities of every kind are becoming more and more involved in and directly dependent on political controversies and political creeds, there need be no surprise at a title which links up one of the most venerable of biological sciences with current world problems. There recently appeared in a reputable German scientific journal a paper entitled "Anatomie and Kultur," in which the attempt was made to emphasise the contribution which the study of human anatomy has to make towards the development of a system of political philosophy. This involved rather forced arguments to the effect that our attitude towards the Universe in general, *Macrocosmos*, must ultimately be determined by our knowledge of the *Microcosmos*, of which the human body represents the material aspect, and that the creative work and manual dexterity of the anatomist brings him into the category of the skilled labourer or craftsman whose social position in those countries which are so intent at the moment on building up their technical equipment is gaining in prestige. I do not propose, however, to deal with these highly problematic and philosophical interpretations of the rôle of anatomical science. Nor shall I pause to consider the historical aspect of anatomy in so far as the early anatomists, by their discoveries, became involved in political issues, though it is well known that the progress of anatomical research in the Middle Ages was deeply affected by Church politics and by religious views regarding the proper disposal of the body after death. Rather do I propose to show how the science of anatomy may be, and indeed is, directly related to a number of modern social problems which form the basis for political controversy.

It is a commonplace statement that had Cleopatra's nose been a quarter of an inch longer the whole history of the world might have been changed. Here is an instance where a slight anatomical variation may be fraught with political issues of the most extensive nature. But, you may suggest, it is rather fantastic to quote this as an example of the way in which anatomy is related to politics to-day. Yet I assure you that if you were to-day a member of the German nation you would very soon find that the anatomical contour of the nose may involve some individuals in very terrible political issues. The question of racial anatomy is being brought into great prominence by the development of current controversies regarding the question of the inherent superiority or inferiority of different racial groups. This is quite an old idea which has lately been revived in a very insidious form. With the development of an intense nationalism in certain European countries there has been expounded the doctrine of the "chosen race" as a legitimate excuse for a policy of

aggrandisement at the expense of so-called inferior races in neighbouring countries. We are all aware of the attempts being made in Germany to prostitute anthropological science to political ends. The Nordic race was first extolled as the supreme product of human evolution, under the mistaken impression that the German nation is equivalent to the Nordic race. When the fallacy of this doctrine was exposed the term "Aryan" was substituted for "Nordic," even though it is well known that an "Aryan race" is a pure figment of the imagination, for the word "Aryan" has a linguistic connotation and has never been related to any definite physical type. It is interesting to note that the Nordic theory is by no means new in Germany. It was brought into prominence at the end of the Franco-Prussian war by an animated discussion between the French anthropologist de Quatrefages and the German scientist Virchow. The former stated that the Prussians were not really of Teutonic type but were composed of what he called Finno-Slav elements. Actually it has only been in recent years that we have gained any knowledge of the physical anthropology of the modern German population. During the late war my old chief, Professor Parsons, and I made some observations on German prisoners of war, the results of which were published in a paper by Parsons.¹ He arrived at the conclusion that "since the sixth century the broad-headed Alpine race has been slowly and steadily supplanting the long-headed Nordic type, not only in Prussia but in every part of Germany, and . . . there is no reason for thinking that there is any part of modern Germany in which the Alpine or Slav characteristics have not dominated the Teutonic or Nordic." There is certainly no basis for the Nordic theory here. Huxley and Haddon put the matter very trenchantly in their book "We Europeans"² when they remark: "Our German neighbours have ascribed to themselves a Teutonic type that is fair, long-headed, tall and virile. Let us make a composite picture of a typical Teuton from the most prominent exponents of this view. Let him be as blonde as Hitler, as dolichocephalic as Rosenberg, as tall as Goebbels, as slender as Goering, and as manly as Streicher. How much would he resemble the German ideal?"

The absurdity of the Nordic or Aryan theory of the German nation is so patent that it would seem hardly worth while controverting it. And yet similar appeals to such racial considerations have been made by politicians to justify claims for territorial re-adjustment in the Balkans, to justify immigration laws in the United States, and so on. The whole subject is further complicated by the claim of some nationalist-minded people that certain physical types are necessarily associated with certain mental traits—that, for instance, the "Nordic" frame harbours a noble mind, while the non-Aryan body (whatever that may mean) always betokens an inferior intellect and unpleasant temperamental proclivities. Time and again attempts have been made, on a scientific basis, to seek for correlations between physical features and mental attributes in the racial groups of Europe, but with no ultimate success. The so-called criminal type of physique does not exist, and there is no evidence that one or other physical type among the European populations is

1 F. G. Parsons. "Anthropological Observations on German Prisoners of War."
Journ. Royal Anthr. Inst. Vol. 49, 1919.

2 J. S. Huxley and A. C. Haddon. "We Europeans," Jonathan Cape, London, 1935.



correlated with intellectual pre-eminence in any particular field of achievement. Such a conception is, for one thing, negatived by modern genetical research, which shows that innumerable characters, physical and mental, can be combined and re-combined in single individuals in an almost endless series of variations. Yet it is necessary continually to clarify the public mind in these matters in order to counteract the possible harmful effect of policies which are based on a false representation of anthropological science. Some may suggest that it is not the scientist's place to "butt in" on such mundane controversies. But it is very much his place to intervene, for the scientific expert is the only one who can, with proper authority, state the real issues in any problem which involves his own particular branch of knowledge. The scientist is, moreover, a member of a social group, and he owes it as a duty that he should play his part in promoting the interests of his community by holding it rigidly to the truth. Political controversies which have lately been based on an appeal to ethnological considerations have aroused public interest in the racial question, and a number of books have been written within the last few years in an attempt to state the ethnological issue scientifically and impartially. One of the great difficulties has been the definition of terms frequently in use by anthropologists, such as race, culture, population, etc. A loose employment of these terms by scientists has opened the way to popular misrepresentation.¹

As a matter of fact it is extraordinarily difficult to give a satisfactory definition of the term "race" as applied to existing groups of mankind. In the biologists' sense, race is equivalent to sub-species; and the various sub-species of animals and plants can usually be defined by quite clear-cut morphological criteria. The difficulty with *Homo sapiens*, however (as Huxley and Haddon have emphasised), is that free migrations and intermixture between different groups have been so prevalent from earliest times that it is now practically impossible to find any pure races left in the world. Differentiation of the various forms of life has usually taken place by a process of divergent evolution. Occasionally new forms may arise by the hybridisation of two originally distinct varieties. It appears that *Homo sapiens*, in the later stages of his development, has been the subject of what is called reticulate evolution; that is to say, different groups have come into existence as the result of a complicated process involving periods of divergent modification alternating with periods of hybridisation and intermixture. It is small wonder, therefore, that the physical anthropologist has found it so difficult to unravel the fundamental racial elements which go to make up the European nations of to-day. Certainly there is not the slightest basis, on anatomical grounds, for the political use of the term "race" in reference to national aspirations.

If it is a matter of practical impossibility to equate European nations in terms of definite races or sub-species of *Homo sapiens*, each endowed with distinctive physical features and mental attributes, it may be otherwise with the primary races in other parts of the world. There is considerable excuse for the belief that the major sub-divisions of mankind are not equal in physique or in intellectual potentialities. One race may be superior in one field of activity—another race may be more

¹ See "Race and Culture," published by the Royal Anthropological Institute, and the Institute of Sociology, 1935.

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effective along other lines. The negro *appears* so different from the white man that we inevitably assume that the difference is really fundamental and not merely one of superficialities. Yet if you dissect a negro and compare his organs one by one with those of a European, there is no startling contrast in the more deeply situated tissues to be demonstrated. Certain anomalies of muscles and arteries may be slightly less uncommon in the negro—certain organs may weigh slightly more or less on the average. It is possible that a detailed study of endocrine functions may elicit quite important differences which might go some way to explaining the physiological basis of differences in pigmentation, in body proportions, etc. Speculation in this field has been rife for many years now, but unfortunately we are almost completely lacking in sound evidence which might support or demolish the theories which have been built around the suggestion of hormonal control of evolution.¹ Certainly recent events suggest that the negro is in no way inferior to the white man in his physical abilities. The magnificent accomplishments of the negro athlete, Jesse Owens, in the Olympic Games led one Sunday paper to aver that Owens has "revolutionised the speed events and has opened up entirely new possibilities for the human race."

It is to the brain that we turn with most interest in making a comparative study of such sharply contrasted human types as the white man and the negro. Since the progressive elaboration of the cerebrum is the outstanding feature of the later phases of human evolution, and since it represents the physical basis of mental activities, we may expect the brain to give some indication of evolutionary and intellectual status. We know that the average brain-weight and cranial capacity of the negro are somewhat smaller than those of the European—but this does not carry us very far. It suggests at first sight a less efficient cerebral mechanism, but actually it tells us nothing definite in this regard. We have only to think of the Eskimo, who can claim a larger brain than the European, and yet, so far as we know, he is not superior to the European in intellectual performance. Of course the factor of social environment and conditions of life generally must be taken into account. Daily life in the Arctic can give very limited scope for higher mental powers. Perhaps if the Eskimo population were bodily transported to an environment favourable to the expression of intellectual potentialities they would manifest an intellectual superiority far surpassing our own level of attainment. Perhaps the fortuitous migrations of early man in response to the climatic changes during the Ice Age have led accidentally to the marooning in the Arctic circle of the very sub-species which evolutionary development had marked out for "superman"—an evolutionary tragedy terrible to contemplate. We may perhaps console ourselves with the thought that when we have annihilated each other by devastating international wars we shall leave the field clear for the migration south into Europe of the big-brained Eskimo, who will build a new civilisation far superior to that which we try to enjoy now!

Apart from the actual size of the brain, the question arises whether there are qualitative differences in the brains of well-defined racial types. I must here refer to the work of Gordon, and his colleague Vint, in Kenya colony—partly because it

1 See S. Zackerman, "Hormones and Evolution." *Man*, Vol. 36, 1936.

has gained a certain amount of publicity in the popular press and partly because it is suggested that it has a very direct bearing on the policy of colonial administrators in respect of native populations. Dr. Gordon is a specialist in mental disorders, and he was primarily impressed by the apparent inefficiency of the average Kenya native in work requiring a modicum of skill and intelligence.¹ He carried out a systematic survey of natives with a view to assessing their intelligence, and he found a very high proportion of aments. He found this to be correlated with a rather low cranial capacity as inferred by measurements of the head in life and with a general retardation of growth. Whereas the young and immature native is often bright and quite markedly intelligent (contrasting favourably with the white youth of the same age), as he approaches maturity his development in physique and mental ability slows up and he is outstripped by the European of corresponding age. Gordon has applied the term "Bradyphysis" to this phenomenon of intellectual and bodily retardation.

The microscopic anatomy of the cerebral cortex of the Kenya native has been studied by Vint,² and he came to the conclusion that in the thickness of the cortex, in the relative differentiation of its cell layers and in the structure of the cells themselves, the brain of the Kenya native is definitely less well developed than the European brain. If substantiated, these observations are certainly of the greatest importance. It is necessary to point out, however, that the technique involved in such a study is exceptionally difficult and must be most rigidly standardised to allow of accurate comparisons. Very slight differences in the method of fixation and staining of the cortex may lead to quite marked differences in the histological appearance of the cortical cells. I myself feel rather dubious in regard to the interpretation of Vint's results, and Dr. Vint himself is careful to note that corroboration is required by similar studies pursued on a more extensive scale. What he does stress, and I think very rightly, is that his preliminary work emphasises the necessity for a comprehensive programme of research into the growth and physique of native populations as a necessary basis for a rational development of colonial administration.

In all these questions of intelligence tests and brain structure the first doubt that arises is whether we are dealing with normal healthy people. How much is the apparent dullness of intellect due to a discouraging social environment either at the time or during the early years of mental development in childhood? How much is due to chronic ill-health—the result perhaps of intermittent infections with tropical fevers, or to persistent parasitic infestation extending over many years? Only a few weeks ago a contributor to the *British Medical Journal* stated that, in his experience of Africa, as soon as natives were brought into hygienic surroundings, ridden of parasitic infections, and given full scope for their normal development, they showed remarkable improvement in physique and also in mental alertness.

During a period of three years' work in Borneo I had a great deal of experience with the local Malay population. Malays are an easy-going people and have the reputation as a race of being lethargic and even lazy. This is commonly regarded

1 H. L. Gordon. "Amentia in the East African." *Eugenics Review*, Jan., 1934.

2 F. W. Vint. "The Brain of the Kenya Native." *Journ. Anat.*, Vol. 68, 1933-34.

as a racial trait, but a very large proportion of them suffer from chronic anchylostomiasis, and it is a question whether their lethargy may not really be due to a mild degree of chronic anæmia, which is the usual result of such a parasitic infection.

The relation of physique in different racial types to diet has recently been demonstrated in some very striking experiments by Sir Robert McCarrison.¹ He made a careful note of the diets of different types in India, such as the Sikh, Pathan, Bengali and Madrassi, and observed that there appeared to be a close relation between the physical types and the absence or presence of certain well-known food factors in the diet. Then he availed himself of large colonies of white rats, which he kept in his laboratory and divided them up into groups, to each of which he gave the exact diet of one of the Indian racial types. Each group had adequate food as far as quantity was concerned—but the quality differed. It was very remarkable to find that as a result of this dietetic experiment the development and physique of each group of rats paralleled quite closely the development and physique of the human tribes whose diet they had been subjected to. Sir Robert concludes that “the level of physical efficiency of Indian races is, above all else, a matter of food. No other single factor—race, climate, endemic disease, etc.—has so profound an influence on their physique.”

The realisation has only recently been forced upon us that the physique of whole groups of people may after all not be an expression of an innate racial tendency but merely the result of diet. The rapid development of the science of eugenics—coupled with the application of genetics to Man—has rather tended to over-emphasise the hereditary factor in the production of poor physique. The possibility arises that similar considerations may apply to the incidence of diseases of different kinds.

The question now arises—how far is the physique of our own population dependent on environmental as opposed to hereditary factors?

The problem of malnutrition in this country has lately aroused widespread interest; it has formed the subject of memoranda issued by the Ministry of Health; it has stimulated several studies which have been reported in medical journals and it received considerable attention at the meeting of the British Association this year. It is suggested by some that there is quite considerable malnutrition in this country—among children and adults—and especially in the special or distressed areas, and that this is showing its effect in stunted growth of children and in poor physique and sub-normal health in adults.

If the matter is considered entirely from the point of view of diet it is impossible to avoid the conclusion that this must be so. In 1933 the Council of the British Medical Association appointed a committee to determine the *minimum* weekly expenditure on food if health and working capacity are to be maintained, and to

1 R. McCarrison. “Nutrition and National Health.” Cantor Lectures, Royal Society of Arts, 1936.

construct specimen diets. Some of the findings of the committee are shown in the following table :—

| | | | | Cost per head (1933). | |
|------------------|-----|-----|-----|-----------------------|-----|
| | | | | s. | d. |
| Adult Male | ... | ... | ... | 5 | 11 |
| Adult Female | ... | ... | ... | 4 | 11 |
| Child aged 12-14 | ... | ... | ... | 5 | 4 |
| „ „ 6-8 | ... | ... | ... | 3 | 7 |
| „ „ 1-2 | ... | ... | ... | 2 | 8 |
| | | | | <hr/> | |
| | | | | £1 | 2 5 |
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On this basis a family with three children of, say, 12, 6 and 2, must spend a *minimum* of £1 2s. 5d. to maintain health. Since it has been shown by an enquiry at Stockton-on-Tees that about 55 % of the net income of a working-class family has to be spent on rent, fuel, light, insurance, clothing, etc., it will be obvious that many working-class families will not have enough left over to feed on even the minimum diet. Indeed, Sir John Orr has estimated that ten million people in Great Britain live at or below the threshold of adequate nutrition. This is a conclusion which can be tested from the anatomical side by anthropometrical studies of physique and growth, and it is a matter of national importance that such an investigation should be made on an extensive scale. It is well known that the children of professional classes are for their age heavier and taller than children of the labouring and artisan classes. That this difference is due entirely to diet is strongly supported by an experiment carried out in 1926 by Corry Mann on a village colony for boys.¹ Dr. Corry Mann divided these boys into separate groups. To one group he gave a basic diet constructed on a physiological basis, and to each of the other groups he gave the basic diet with the addition of some item such as sugar, butter, casein or milk, using quantities of an equivalent calory value. It is remarkable that at the end of two years the group with additional milk had outstripped all the others in growth. Compared with the group fed on the basic diet only, the average height increase was more than 1½ inches greater and the weight increase 5 lbs. more.

Medical Officers of Health, in studying these urgent problems, have continually been handicapped by the lack of adequate anthropometric standards by which they can assess degrees of nutritional deficiency—that is to say, it is a matter of great difficulty to define the normal range of variation in stature, weight, etc. in children who are brought up on an adequate diet. Normality has too often been confused with the average, and the average physique or health of a particular group of children and adults in any particular area is known to be in some cases well below the optimum standard. No one would maintain, for instance, as McNally has pointed out,² that a “normal” child is one with dental decay, and yet if “average” and “normal” are confused in this particular matter it would be necessary to form that conclusion. It is remarkable that there exists in this country no satisfactory and accepted routine method by which the nutritional status of an individual can be assessed and by which the findings of different observers can be compared.

1 H. C. Corry Mann. “Diets for Boys during School Age.” Med. Research Council Report, 1926.

2 C. E. McNally. “Public Ill-Health.” Gollantz, London, 1935.

There are, of course, anthropometric records available for different sections of the population, giving the height and weight in relation to age. But even where these measurements have been made by careful observers they are not of much use for assessing the physical condition of individuals, since the variation is so great even in well-nourished people. It is not possible to predict the weight of a normal child by reference to its age or height. Thus nutritional indices constructed on the basis of height and weight are open to serious objection. Such are Röhler's index, in which the state of nutrition = $\frac{P \times 100}{H^3}$, where P is the weight in grammes and H the height

in centimetres; or Pirquet's index, $\sqrt[3]{\frac{\text{Weight} \times 10}{\text{sitting height}}}$, in which nutrition is judged

to be inadequate when the ratio falls below 0.945. In Central Europe, after the war, food was given by the American Relief Fund to children whose index was below 0.92. Another difficulty arises from the fact that the height standard seems to be changing from year to year. This is well established to be the case in a number of European countries as well as in America and apparently affects every section of the population. A recent study by Bowles¹ has shown that in the student population at Harvard University the mean increase in height has been 1 centimetre for every 12½ years. A considerable amount of work on the assessment of physique has recently been carried out in America, and an important paper on physical measures of growth and nutrition has recently been published by the American Child Health Association.² From these studies it appears that hip width rather than height is much more closely correlated with weight in children. Measurements were also taken of sub-cutaneous tissue by the use of special calipers, and of muscles such as the deltoid. With measurements of the limbs it was thus possible to get some idea of the relative development of skeletal, muscular and adipose tissues in each individual. As a result of a comprehensive survey of this kind the ACH index was elaborated by Franzen and Palmer.³ This index is based on the arm girth, chest depth and hip width. It involves, therefore, only three measurements, all of which can be made easily and with a little experience. The index is used for routine work in order to select out children who may then be submitted to a detailed clinical examination. It would be a matter of great interest to apply the ACH index to a study of children in this country for comparative purposes. What is needed most urgently, however, is some routine method by which it may be possible to detect under-nourishment in *individuals* rather than in groups of children and adults, and no satisfactory method has yet been evolved. Clinical assessment of nutrition has been shown to be unreliable, even when made by experienced clinicians who give ample time to their examination. Growth curves in children would no doubt provide an important criterion, but this necessitates a series of observations carried out at relatively long intervals, and for this reason such a method is not very practicable. Radiography of epiphyseal development has been suggested, and a basis for such a study has been provided by the work of Wallis on children in private schools in America.⁴ Other

1 "New Types of Old Americans at Harvard." Harvard Univ. Press, 1932.

2 R. Franzen. "Physical Measures of Growth and Nutrition." School Health Research Monographs, No. 2.

3 R. Franzen and G. T. Palmer. "The ACH Index of Nutritional Status."

4 R. S. Wallis. "How Children Grow," Univ. of Iowa Studies in Child Welfare. Univ. of Iowa, Iowa City.

points which suggest themselves are hair growth and nail growth, in so far as there may be an expression of tissue growth in general. Experimental work has shown a general atrophy of the skin in rats suffering from Vitamin A or Vitamin B deficiency,¹ while observations made on Russian famine victims at the end of the war suggest that hair and nail growth was retarded.² Hair growth is difficult to measure. Nail growth, on the other hand, can be measured fairly accurately, and I think it would be worth while to see to what extent this is affected by under-nourishment. Such a study might be carried out in the first place by making observations on nail growth in well-nourished children and on children of the poorest sections of the population. I have found that by making a fine file mark on the nail and measuring its displacement distally from the margin of the lunula it is possible to follow the growth of the nail day by day to an accuracy of 0.1 mm. For this purpose I use a Beck Luminex magnifier provided with a scale marked in tenths of a millimetre.

Various biochemical tests for slight degrees of vitamin deficiency have been suggested by L. J. Harris, of the Cambridge University Nutritional Laboratory, but they will not be discussed here since they do not come within the scope of anatomy. Obviously these tests are likely to be of the greatest value if they can be shown to provide accurate indices of nutritional status.

The problem of malnutrition and physique in this country is of extreme importance at the present time, and the anatomist can contribute to its solution by providing data in regard to normal growth and physique of children, and by suggesting practicable means by which deviations from the normal which are directly due to dietetic insufficiency can be most readily detected.

1 Portman. *Acta Path. et Microbiol. Scandinavia*, Vol. 4, 1927.

2 A. Ivanovsky. *Amer. Journ. Phys. Anthropol.*, Vol. 10, 1916.



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