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Plasticity in Child Development

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Instability of Human Types

When we try to judge the ability of races of man, we make the silent assumption that ability is something permanent and stationary, that it depends upon heredity, and that, as compared to it, environmental, modifying influences are, comparatively speaking, of slight importance. While in a comparative study of the physical characteristics of races that are as distinct as the white and the negro, or the negro and the Mongol, this assumption might be accepted as a basis for further studies, its validity is not so clear in a comparison of the mental characteristics of branches of the same race. When, for instance, it is claimed that certain types of Europe show better mental endowment than other types of Europe, the assumption is made that these types are stable, and cannot undergo far-reaching differences when placed in a new social or geographical environment.

It would seem, therefore, that a study of the stability of race-types has not only a fundamental biological importance, but that it will also determine our views of the relative mental endowment of different types of man.

A theoretical investigation of this problem will show that the assumption of an absolute stability of human types is not plausible. Observations on growth have shown that the amount of growth of the whole body depends upon more or less favourable conditions which prevail during the period of development. Unfavourable conditions retard growth; exceptionally favourable conditions accelerate it. A more detailed study of the phenomena of growth has shown that the development of different parts of the body does not proceed by any means at the same rate at a given period. Thus at the time of birth the bulk of the body and stature are very small, and increase with great rapidity until about the fourteenth year in girls, and the sixteenth year in boys. On the other hand, the size of the head increases rapidly only for one or two years; and from this time on the increment is, comparatively speaking, slight. Similar conditions prevail in regard to the growth of the face, which grows rapidly for a few years only, and later on increases, comparatively speaking, slowly. The amount of water contained in the brain also changes with a fair amount of rapidity during the early years of life, and remains about the same later on. It follows from this observation that if an individual is retarded by unfavourable conditions after a certain organ has obtained nearly its full development, while other organs are still in the process of rapid evolution, the former cannot be much influenced, while the latter may bear evidence of the unfavourable conditions which were controlling during

a certain period of life. This must necessarily have the result that the proportions of the body of the adult will depend upon the general conditions of life prevailing during youth, and the effects of these conditions will be most noticeable in those organs which have the longest period of development.

It is a well-known fact that the central nervous system continues to develop in structure longer perhaps than any other part of the body, and it may therefore be inferred that it will be apt to show the most far-reaching influences of environment.

It follows from this consideration that social and geographical environment must have an influence upon the form of the body of the adult, and upon the development of his central nervous system.

This theoretical consideration is borne out by observation. The investigations of Bolk have shown clearly that an increase in stature has occurred in Europe during the last decades, due evidently to a change of environment; and the numerous investigations which have been made on the proportions of the body of the well-to-do and of the poor, of able students and poor students—all show characteristic differences, which may be explained in great part as effects of the retardation and acceleration to which we have referred.

It would seem, however, that besides the influences of more or less favourable environment which affect the form of the body during the period of growth, a number of other causes may modify the form of the body. Professor Ridgeway goes so far as to think that the stability of human types in definite areas and for long periods is an expression, not of the influence of heredity, but of the influence of environment; and that, on the other hand, the modifications of the human form which are found in the Mediterranean area, in Central Europe, and in North-western Europe, are due to the differences of climate, soil, and natural products. It does not seem to me that adequate proof can be given for modifications of the human form as far-reaching as those claimed by Professor Ridgeway, although we must grant the possibility of such influences. We have, however, good evidence which shows that the various European types undergo certain changes in a new environment. The observations on which this conclusion is based were made by me on emigrants from various European countries who live in the city of New York, and on their descendants.

The investigation of a large number of families has shown that every single measurement that has been studied has one value among individuals born in Europe, another one among individuals of the same families born in America. Thus, among the East European Jews the head of the European-born is shorter than the head of the American-born. It is wider among the European-born than it is among the American-born. At the same time the American-born is taller. As a result of the increase in the growth of head, and decrease of the width of head, the length-breadth index is considerably less than the corresponding index in the European-born. All these differences seem to increase with the time elapsed between the emigration of the parents and the birth of the child, and are much more marked in the second generation of American-born individuals.

Among the long-headed Sicilians similar observations have been made, but the changes are in a different direction. The stature does not change much; if anything, it is shorter among the American-born than among the European-born. The head is shorter among the American-born, and at the same time wider, than among the European-born. Thus a certain approach of the two distinct types may be observed.

It would of course be saying too much to claim that this approach expresses a tendency of diverse European types to assume the same form in America. Our studies prove only a modification of the type; but we are not able to determine what the ultimate amount of these modifications will be, and whether there is any real tendency of modifying diverse types in such a way that one particular American type should develop, rather than a limited modification of each particular European type.

The people of Bohemia and Hungary show also the effect of the changed environment. Among them both width of head and length of head decrease. The face becomes much narrower, the stature taller.

It is most remarkable that the change in head-form of American-born individuals occurs almost immediately after the arrival of their parents in America. A comparison of individuals born in Europe with those born in America shows that the change of head-form is almost abrupt at the time of immigration. The child born abroad, even if it is less than one year old at the time of arrival, has the head-form of the European-born. The child born in America, even if born only a few months after the arrival of the parents, has the head-form of the American-born. The failure of American environment to influence the foreign-born might be expected, because the total change of the head-index from early youth to adult life is very small. On the other hand, those measurements of the body which continue to change during the period of growth show a marked influence of American environment upon European-born individuals who arrive in America as young children. Thus the stature of European-born individuals increases the more the younger they were at the time of their arrival in America. The width of the faces decreases the more the younger the child that came to America.

These observations are of importance, because it might be claimed that the changes in head-form develop because the mechanical treatment of children in America differs from their treatment in Europe. The European child is swaddled, while the American child is allowed to lie free in the cradle. The change in the face diameters and in stature show, however, that such mechanical considerations alone cannot explain the changes that actually take place.

The results obtained by a rough comparison of European-born and American-born have been corroborated by a direct comparison of European-born parents and their own American-born children, and also by a comparison of the European immigrants who came to America in one particular year, and of their descendants born in America. In all these cases the same types of differences were found.

These observations seem to indicate a decided plasticity of human types; but I wish to repeat that the limits of this plasticity are not known to us. It follows, however, directly, that if the bodily form undergoes far-reaching changes under a new environment, concomitant changes of the mind may be expected. The same reasons which led us to the conclusion that more or less favourable conditions during the period of growth will have the greater influence the longer the period of development of a particular part of the body, make it plausible that a change of environment will influence those parts of the body most thoroughly which have the longest period of growth and development. I believe, therefore, that the American observations compel us to assume that the mental make-up of a certain type of man may be considerably influenced by his social and geographical environment. It is, of course, exceedingly difficult to give an actual proof of this conclusion by observation, because we know that the mental manifestations depend to a great extent upon the social group in which each individual grows up; but it is evident that the burden of proof is shifted upon those who claim absolute stability of mental characteristics of the same type under all possible conditions under which it may be found.

It may be pointed out here that the change of type which has been observed in America is in a way analogous to the difference of type that has been observed in Europe in a comparison between the urban population and the rural population. In all those cases in which thorough investigations have been made in regard to this problem, a difference in type has been found. The interpretation given in this phenomenon is, however, entirely different from the one attempted here. One group of observers, particularly Ridolfo Livi, believe that the type found in urban communities is largely due to the greater mixture of local types found in cities when compared to the open country. Others, notably Otto Ammon and Röse, believe that we have here evidence of natural selection, and that the better type survives. It seems to my mind that the latter theory cannot be substantiated, but that both mixture and change of type are sufficient to explain what is taking place in the transition from rural life to urban life.

It will naturally be asked, what produces changes in human types? Can these changes

be so directed as to bring about an improvement of the race? I do not believe that these questions can be answered in the present state of our knowledge. The structural changes which must necessarily accompany the modifications of gross form are entirely unknown, and the physiological functions which are affected by the new environment cannot even be surmised. It seems, therefore, a vain endeavour to give a satisfactory explanation of the phenomenon at the present time. The investigation should be extended over numerous types, and carried on in different climates and different social environments, before we can hope to understand the correlation between bodily form and function and outward influences. The old idea of absolute stability of human types must, however, evidently be given up, and with it the belief of the hereditary superiority of certain types over others.