

THE PHYSICAL BASIS OF PERSONALITY.

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In any analysis of human personality one must keep in mind that man is a natural being, and that he shares with other animals their structural and functional characteristics. Of course, this does not mean that he is directly related to an ape or a cow; but in an indirect sense he shares with these lower animals their common heritage. Thus, the origin, birth and subsequent development of a human being differs very slightly from that of other mammals. The same life processes, which guide human behavior, contribute likewise toward the behavior of these lower animals. Such instincts as self-preservation and sex; the body functions of digestion, respiration and circulation are readily paralleled in other forms of animate life.

If we accept the above premise, then it is possible to define personality as the sum total of mental and physical traits, inborn and acquired, which affect visibly the behavior of an individual. In the discussion which follows, such factors will be presented as seem to warrant this general conclusion.

For convenience, the forces which initiate or modify the actions of living things may be grouped under three heads; namely, heredity, environment, and training. The last two function as external factors and are subject to some degree of modification, especially by man. Environment includes all such natural forces as seasonal cycles, temperature, humidity, altitude and the like, which can be altered to a very limited extent. Training is much more susceptible to man's modification, and under it we can place all those personality units which are the direct result of education and experience. These two forces are entirely supplementary in their effects and mold the organism primarily after it is formed. Heredity, on the contrary, includes all those factors which, for good or evil, are handed down to the offspring through the germplasm of its parents. These last are very difficult to define concretely, but since they enter into the formation of the organism and persist unaltered throughout its life, it can readily be seen that they are of fundamental importance.

Insofar as morphological peculiarities affect human behavior, it is undoubtedly true that personality can be molded before the individual is born. We are short or tall, have light skins or dark, not because we willed them so, but because through the vicissitudes of chance we developed from two germinal cells possessed of these specific characteristics. In a similar way if one inherits a defective auditory or visual apparatus, these physical defects impose at once limitations to the development of his personality along specific lines. For example, if an individual can not distinguish the finer harmonic relations between tones, it is unlikely that he will become enthusiastic over subtle operatic

selections requiring this particular faculty. The present vogue of jazz music, which is simply a medley of loud sounds, and readily followed, might be explained in this way.

From this standpoint the potentialities which we possess at birth determine to a large degree our later activities. This may sound like a reversion to the discredited fatalism of former days, and yet it is literally true. The differences, that we have all observed between normal and abnormal mental types of humanity, are readily traced to corresponding differences in the structure of the cerebral cortex. The acidulous dispeptic, the hypochondriac, the epileptic, are some common personality types which we can trace directly to the improper functioning of some organ. For every response there must be a corresponding stimulus. And the stimulus, in the case of a pleasing external personality, is the proper coördination and function of the internal organs. This basic fact is frequently lost sight of by well meaning but misguided individuals. To admonish a small boy to "sit still" when every cell of his body demands action, is to impose a cruel if not an impossible restriction.

In recent years there has developed a school of endocrine therapeutics, which has produced some astonishing results. Doddering millionaires have been rendered active; decadent actresses have had restored to them some of the bloom of youth; and even idiotic children of certain types have been rendered normal. These seemingly magical results have been traced directly to certain endocrine glands in the body, which elaborate small amounts of substances designated as hormones. These hormones are discharged directly into the blood stream and are carried by it to different organs of the body. In some manner not yet understood they stimulate these organs to perform their normal functions. The glands which furnish these internal secretions to the body are the pineal, pituitary, thyroid, parathyroids, thymus, and adrenals. Small, differentiated areas also occur in the pancreas, liver, testes, and ovaries, which have a similar function. Without elaborating technical details, the following table is submitted to show how intricate is the relationship existing between these hormone secreting structures and other organs of the body:

Pituitary	at base of brain; controls growth of skeleton, and action of smooth muscles; defects result in gigantism and dwarfism, depending on whether it over- or under-secretes.
Pineal	above the thalamus; stimulates growth of muscles and bones; controls development of brain and gonads.
Thyroid	in neck; controls growth of cerebrum and gonads; deficient secretion results in cretinism.
Parathyroids	attached to thyroids; concerned with removal of toxic substances from the blood; controls excitability of muscles and nerves.

- Thymusbehind the sternum; over-secretion delays maturity and development of gonads.
- Adrenalsone above each kidney; control growth of brain and development of gonads; raises blood pressure.

The secretions derived from these glands may be normal, less than normal, or greater than normal. With different states are associated strikingly different effects. An individual in whom one gland over-secretes is known as a centric of that gland. We thus have pituito-centrics, thymo-centrics and the like. Let us now observe some of the peculiar personality types that are produced, if the general balance is disturbed by the improper functioning of one or other of these glands.

The catch-penny attractions of a circus invariably include a giant and a dwarf. In gazing upon these human abnormalities, most of us simply think of them as "freaks" and seldom trouble to ask for the cause. These strikingly dissimilar abnormalities are the direct result, strange as it may seem, of the secretion of a single gland, the pituitary. If this gland over-secretes, the bones, especially, grow at an abnormal rate and a tall, gawky human being is the result. Let this same gland be deficient in its secretion, and the bones refuse to grow further, retaining the size at which this deficiency occurred. Dwarfism can also be produced by the over-secretion of the thyroid gland. In this case the individual develops so rapidly that he is fully matured without, however, the muscles and bones of his body reaching the normal size.

The thyroid affects profoundly the mental state. Let a child be born with a deficient thyroid gland, and unless prompt measures are taken to correct the same, he will develop into a cretin. Correct this deficiency by feeding the child extract of the thyroid glands of other animals, and he will become a normal human being. Assuredly, no better proof can be given, that what we are and what we do are simply outward manifestations of internal physical and physiological forces.

Those of us who have been to the farm have had occasion to observe the aggressive actions of such male animals as the stallion, the bull or the cock. Contrast in your mind the difference between an angry, snorting bull and the emasculated steer. The former is dangerous to approach even with a pitch fork, the latter is fat and docile, and can be driven in any direction without protest. These secondary sexual characteristics are traceable directly to the secretions produced by the reproductive glands of both sexes. When an animal of either sex is deprived of its reproductive organs, either through operation, parasitism or disease, it tends to assume the characteristics of the opposite sex. Thus if a cockerel is caponized, it does not develop a comb and wattles, nor crow, like the functional male bird. Instead, it becomes fat and flabby, and will even sit on eggs and tend young chicks after the manner of a hen. Analogous effects can be traced to the same cause in other animals, including man.

Sex anomalies, such as the above, may also result from the abnormal functioning of the adrenal glands. The secretion of these

glands is a very powerful substance known as adrenin. An extract of these glands is on the market and goes under the trade name of "adrenalin." This drug will markedly increase the blood-pressure of any animal into which it is injected, even in such extreme dilutions as one part in ten million. In the living animal adrenin is produced chiefly under the influence of emotional stress. At such times it is poured into the blood-stream in large quantities, and is directly responsible for the aggressive actions associated with a fit of anger. It has likewise been determined that those animals which are timid by nature and flee from other animals, possess small adrenal glands in proportion to their size. On the other hand, habitually preying animals have an unusually large adrenal cortex. Thus, the wolf, the fox and the lion have much larger adrenal glands than the deer, the ox, or cattle in general. What is true of these animals is likewise true with respect to human beings. Some individuals are by nature confident, aggressive, and even pugnacious; others are retiring and timid. These different types of personality are the direct result of differences in function of the adrenal glands. If the individual is an adreno-centric, that is, if his adrenals secrete more than the normal amount of their specific hormone, the first type of personality is the result. Women adreno-centrics acquire masculine characteristics, such as hair on the face, disinclination for domestic life, tendency to freckles and the like. These apparent defects are, however, compensated for by an alert mind, and an assertive, self-reliant personality. Most of the women in business and in public life exemplify this type.

The factors thus far considered are hereditary in the strict sense of the term. It is true that our inclinations and tendencies are not transmitted to us directly from our parents, but if a specific glandular organ is the cause of a specific personality factor, it is easily seen how this last can be inherited. By analyzing the physical and physiological endowment of the parents, and applying to them the known laws of heredity, we can predict quite accurately what the resulting offspring will be like.

Mention has already been made of the forces which mould personality after the birth of the individual. We shall now return to their more careful consideration.

Environment affects materially the welfare of living things. All organisms require an optimum temperature, exact humidity, and the proper food for their best development. Man is no exception to this rule. Civilized races can alter these conditions to some extent, but in the main, mankind must accommodate himself to the forces of nature. To mention one or two instances, man has been unable to check floods and cyclones, or to populate the arctic regions on an extensive scale, even with the wealth of scientific knowledge at his command. Only where the climate is mild, and the rainfall adequate to raise the necessary food, do we find extensive settlements of human beings. Even these conditions do not suffice, for in the tropics, where food and moisture are adequate, white races have been unable to establish themselves due to extreme temperatures, and their susceptibility to disease. Un-

doubtedly, environmental forces are very important in developing different types of human beings. Just how these forces acted to produce such diverse races, as the blond Nordics and the Negroes, is still a disputed question. These digressions may seem irrelevant, yet when we consider that an individual personality is the expression of a racial personality, they do acquire a deeper significance. If we knew more of the ethnology of different races we could approach the many perplexing social problems with greater confidence.

One environmental factor that we can discuss with some degree of confidence is the subject of foods, or more properly nutrition. Investigations conducted by Funk, Osborne, McCollum and others promise some alluring possibilities in this field. It has been found that certain foods contain small amounts of undetermined ingredients collectively known as vitamins. The absence of these substances from the food of an animal will result in very distressing physiological derangements. In this connection an experiment by Osborne and Mendel (*Abstracts of Bacteriology*, vol. III, no. 6) may be of interest. "We have obtained potent preparations (vitamins) as follows: Spinach leaves and young clover respectively dried in a current of air at about 60° C. were extracted with U. S. P. ether; the resultant green extract, yielding an oily residue, equal to about three per cent of the dried plant, was evaporated upon starch. These preparations, fed in daily quantities equivalent to one to two grams of the dried plants, promoted recovery and renewal of growth in rats declining in weight on diets deficient in fat soluble vitamins. Inasmuch as only 30 mgm. per day of the ether extract of spinach sufficed for this purpose, it appears that this substance ranks among the most potent of oils heretofore tested."

Dr. McCollum, in a recent lecture, made the statement that he has succeeded in producing defective dentition of almost every type in rats, by feeding them on a diet deficient in the necessary vitamins. He claims that whether a child will have perfect teeth or defective teeth is determined by the kind of a diet the mother receives before the baby is born. Also, that a great many evils to which civilized man is heir, such as polyneuritis, pellagra, sprue, ricketts, and the like, are the direct results of canned, cooked, pickled and otherwise thoroughly de-vitaminized foods. In polyneuritis there is a progressive degeneration of the motor cells of the spinal cord. If, as it now appears, this condition is amenable to proper feeding, it may be possible in the future to prevent other types of nervous disorders. Considering the fact that in lower animals, such as bees, the food factor is alone responsible for the differences existing between a functional queen and non-functional workers, which are also females, the above speculations are by no means impossible of realization.

The last personality factor which remains to be considered is training, and it is the most difficult to define concretely. What constitutes proper or improper training is determined to a large extent by the environment. A child well trained for one environment may be utterly unsuited for another environment. Thus an efficient back-woodsman, agile and active when engaged at his own calling, is a very ungainly

being when, as sometimes happens, he is stranded upon a city boulevard. The physical, social and moral developments of human beings are the chief objectives of most of the training processes. That they have gained little actual headway, in the long years of their application, many of us will admit. This failure to attain apparently worthy objectives may be due to the illogical manner in which these problems have been approached. If, as this thesis assumes, mind is largely the outward expression of the chemical and physical processes going on within the brain cells, a normal mind can hardly result from abnormal cell function. It seems foolish, therefore, to urge masses of sub-normal human beings to soar to philosophic heights, if, still considering their mental state, they can barely walk. Of course this type of training can do no harm, but likewise it is productive of little result. These statements are based on the results shown in the psychological tests given to over two million of our soldiers during the late war.

Every community has its "Jukes" and "Kallikak" families, on whom thousands and hundreds of thousands of dollars of the taxpayers' money is expended every year. Those individuals and organizations who have been ministering to the wants of these defectives are usually the first to oppose any real attempt towards the solution of this problem. Before poverty can be eliminated we must eliminate the causes of poverty, and as feeble-mindedness is the primary cause of this condition, systematic attempts to eliminate the feeble-minded seem indicated. This elimination can not be accomplished by building more and more institutions for increasing numbers of mentally deficient human beings. A systematic attempt should be made to eliminate the defectives themselves. The science of eugenics offers an answer to this problem; namely, segregate the obviously defective individuals, and prevent them from reproducing their own kind. In two or three generations the problem could thus be solved. Drastic as this remedy sounds, it will finally have to be applied, as the burden of supporting the ever-increasing numbers of defectives will make the community resort to it in self-defense.

The recent tirades of George Bernard Shaw against modern civilization contain more than a grain of truth. History records the decline of numerous nations only after they became thoroughly "civilized," that is, thoroughly devitalized by artificial living. Why presumably intelligent human beings should violate all biological laws and assume that their bodies are something apart from, and not subject to, the laws governing the rest of organic nature, is one of the conundrums of "civilization." Man is the only animal that insists on doing things he should not do, and omits doing many things that quite obviously should be done. We accept it as "good business" to employ little children for tasks beyond their strength, and to rear them on synthetic foods. When in later life these same children are unable to compete on equal terms with other members of the community, we blame their plight on any cause but the correct one. But, one might be tempted to ask, why bring in all these unrelated items under training? The answer is that they are basic. Experience and education can do little for

an individual unless he is of the stuff that can be trained. A marble statue can not be carved out of clay even by a master artist. All that the best training can do is to mould and bring out capacities which are already present.

The above discussion is not designed to be exhaustive in its treatment of personality. If, however, this paper stimulates interest in such factors as have been presented, its object will have been served. A good finished product in the form of an intelligent, capable citizen, can only be developed from a good quality of raw material. Real social progress can only occur where a conscious effort is made to preserve the best, and to eliminate the least desirable germinal strains. Through intelligent effort we can stretch the bonds which heredity has imposed upon our personality, but, and this is to the vital point, we can not break those bonds. Each individual, and every community, needs to take an inventory of its capacities and limitations, and try to develop those which offer the best promise. If, as is assumed, personality is the visible complex of mental and physical forces, then the initial step toward developing desirable types of personality would be the intelligent application of these natural laws and principles which we already possess.

