A Short Note Upon So-called "Hereditary Optic-Nerve Atrophy"—as a Contribution to the Question of Transmission of Structural Peculiarity.

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Deeming it possible that the question of "The Transmission of Structural Peculiarity" may be judiciously studied from a pathological standpoint, as shown in the peculiar disease of man generally known as Hereditary Optic-Nerve Atrophy, where certain morbid changes of optic-nerve structures of a sufficient amount for ready recognition take place during the years just previous to adolescence in subjects who frequently have consanguineous ties, extending in some instances through several generations, the writer has ventured the following terse notes of one such family that he has had the opportunity to submit several of its members to careful and prolonged clinical research extending over several years.

In 1892, he saw for the first time a man, aged twenty-seven years, who stated that for the past year the sight of both eyes had been gradually failing, this being accompanied by frontal headaches and dizziness. No history of any general sickness was given and no clinical evidences of the introduction of any toxic agents into the system could be obtained. He asserted that his mother's three brothers were similarly affected.

Examination showed that central vision for both form and color was highly defective. The ophthalmoscopic appearances were those of a semiatrophic condition of the optic-nerve head.

At irregular intervals, though especially later in the disease, variously colored phosphenes appeared in the centre of the visual fields and attacks of "fogging of vision" during perspiration without watering of the eyes came on. Ocular pain upon exposure to light, with gradual decreasing color perception, passing through the failure of recognizing green, red, blue and yellow ensued, until at last nothing but equal intensities of "color" were laid side by side without reference to tint.

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This peculiar history and the patient's assertion that his three maternal uncles had suffered in the same manner induced a careful ocular examination to be made of as many of the family as possible. This resulted in the finding of more or less similar ocular symptoms and conditions in all that could be seen. It also elicited the fact that the disease with one exception had passed from unaffected mothers to affected sons through six generations on the maternal side; a family that the writer had the privilege to study in a number of its members ten years ago and had careful clinical notes of several in the earlier generations.

This brief history of a gross pathological condition first appearing about or a short time before adolescence, and eventuating in permanent partial blindness at about twenty-seven years of age, is here given as one among many facts based upon pathological changes that may be placed side by side with those so-called normal physiological acts and physical peculiarities of structure which are so often seen passing through several generations especially by ties of consanguinity.

In other words, this fault of optic-nerve structure, which does not show itself for several years after the birth of the individual, indicates to the writer's mind at least that here there is an inheritance of a physical material which is not only shorter lived than that which is found in the same organ in other organisms, but that it has a briefer existence than the other organs in the same general organism; a fault which shows that an imperfect material has been born, and dies prematurely because it is subjected to an amount of wear and tear that would not seriously disturb or injure a properly formed substance. Further, it serves as a living evidence that a substance has been improperly made most probably on account of physical imperfection and repetition of faulty cell combination of similar kind extending through several generations; an evidence which in measure says that primarily acquired pathological characteristics of structural form may be transmitted through forthcoming generations as imperfect formation of similar structure in due proportion to both the want of hygiene and care given to the afflicted subjects and the reassociation of similarly degraded developmental cells; an evidence which gives answer in part to the transmission of ordinary structural characteristics, which, if acted upon in the same way as those which are not made, as it were, in the same peculiar manner,

will produce far different and even what may be termed idiocratic results.

In other words, this disease, for example, which manifests itself as faulty transmission, teaches us conversely that a peculiar physical condition which has been obtained from frequently repeated physiological acts during the life existence of some antecedent containing animal form, may be transmitted to the offspring (more particularly by consanguineous ties of the parents) and thus render the new organism more capable of evolving certain definite acts that are the physiological representatives of heredity of physical structure; the partial answer at least for so-termed hereditary genius.