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ON ALBINISM.

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THERE have recently been exhibited in Boston two female albino children, born in the State of New York, of parents perfectly black; there have been several other children born to the same parents perfectly black, and one other female albino, who died young. These girls are of about the ages of 4 and 7 years, and between them was born a black child; the parents are healthy. In these children the hair of the head, eye-brows, eye-lashes, and down on the body, are milk-white, with a slight yellowish tinge on the head; it presents, under the microscope, all the characteristics of the negro hair except color. The nose is flattened, the lips thick and protuberant, and the heels prominent, as in the negro; the voice, attitudes, movements and actions are such as are seen in ordinary black children; indeed, but for the color, they in every way resemble young negroes. The skin is everywhere very white and soft; the pigment is also absent from the eyes, and the iris and pupil have the characteristic pink color due to the coloration of the vascular choroid appearing through the translucent membranes of the organ. As the iris does not act as a diaphragm to shut off the excess of rays of light, but allows the whole flood to pour in upon the retina, these girls shield their eyes from the glare of the sun or artificial light by means of the hands, by partially closing the lids, and by a downward and lateral position of the head, as in ordinary cases of photophobia from disease; they are also near-sighted, and like to examine objects very close to the eye. They are playful, as intelligent as common uneducated children of their ages, with by no means a disagreeable expression of countenance; they are healthy, and as well proportioned as any of their race.

This condition of albinism has been noticed from the earliest historic period, and is no more a characteristic of a race than is that of gigantic or dwarfish stature, but is the result of an indi-

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vidual and accidental modification, and has occurred in all races and in all climates. It also occurs in mammals, birds, and fishes, as in the familiar cases of white monkeys, moles, ferrets, mice, rabbits, elephants, and otters; and in white crows, blackbirds, robins, martins, swallows, sparrows, parrots and ducks; and also in the silver variety of the gold fish. It is especially common among domesticated animals; some mollusks, as the genus *Oliva*, are occasionally albino; and perhaps the etiolation of plants kept in the dark may be brought under the same category.

Albinism is the most common, according to Is. G. St. Hilaire, in the races of tropical climates, interesting in connection with the fact that the nearer we approach the pole, the more the white color prevails in animals, as in the white bear, fox, ermine and ptarmigan. It is also the most common in the dark races, being very rare in the white races. It seems also to occur more frequently in females than in males, probably from their naturally more feeble constitution. There have generally been a large number of children in families presenting albinos; and undoubted cases are on record of albino twins.

Albinism may be complete, as in the case of these children—partial, or confined to certain regions of the body—or imperfect, in which pigment is not entirely absent. Perfect albinos are generally of feeble constitution and short lived, and most on record have died of phthisis. They are said in the books to be incapable of perpetuating their race *inter se*. This assertion does not appear to rest upon any foundation of actual experiment, and the circumstances which would render it possible must rarely occur in civilized regions; albino females, however, are fertile with black males, and produce, according to the observations of President Jefferson, progeny either entirely black or albino, and never one in part black and in part white. Albinos of other races in Europe have been proved to be prolific with individuals not albino. As white mice and albino rabbits are prolific *inter se*, it would seem *à priori* that there was no physiological reason why albino men and women should be necessarily sterile *inter se*.

Cases are on record of black persons becoming white in adult life; and pied individuals, both men and animals, with the spots unsymmetrically arranged, are sometimes seen. In imperfect albinism the color may be uniformly lighter than the normal, in pure races, displaying, as it were, the first degree of albinism. Perfect and imperfect albinism are always, it is believed, congenital; but partial albinism, at least in man, is generally if not always acquired, and the result of a diseased modification of the pigment cells not well understood.

There is another class of facts which it would seem must be explained by any hypothesis which would account for albinism—such as the rapid change of the human hair from dark to white, from fright or grief, in so short a space of time that there could be no

alteration in the texture of the hair—the change to white in the winter covering of arctic mammals and birds, as in hares, the ermine, the grouse, &c. These may possibly find an explanation in the way formerly suggested by Dr. Weinland, viz., by some chemical change in the oily matter of the pigment from acid or other ill-understood cause, or by a rapid reabsorption of the coloring matter, as takes place slowly in the natural progress of age.

There is an opposite condition of the system, called *melanism*, in which there is an excess of coloring matter in the skin, hair, and iris; this is more common in domesticated than in wild animals, and occurs with partial albinism, this co-existence of opposite anomalies indicating that the causes which produce the deficiency and excess may be local in their character. The genus *felis* (the cats) is very subject to melanism, while albinism is rare in this family. Unlike albinism, melanism is most common in temperate and even cold climates. Dr. J. C. Prichard alludes to three cases of children born albinos, in which coloring matter in the course of their growth was developed in the skin and iris.

It is beyond dispute that albinism depends upon a congenital absence of pigmentary matter in the skin, hair and iris. According to Quekett, this pigmentary matter in the eye (and it is doubtless very much the same in the skin) consists of granules of a peculiar animal principle, the chief constituent of which is carbon, and on this last account the strongest acids and chlorine are incapable of destroying the color; in albinos, he says, the pigment cells exist, but they are destitute of the granular pigment matter.

There is a time in the growth of the embryo, when there is no pigment, and albinism would seem to be an arrest of development in this direction just at this point, the other characters of the black race (in the present and the most common examples) going on to their ultimate development, indicating that color is rather an accidental than an essential character of races. Other facts pointing towards an arrest of development are the uncommonly downy skin and the persistence of the foetal pupillary membrane in albinos beyond the ordinary time of their disappearance.

The question then arises, what is the cause of such an arrest of development? It is hardly worth while to mention the fabulous physical, mental, and moral causes; neither does it seem due to any well ascertained debilitating causes. Dr. Addison, a few years ago, and more recently Dr. Brown-Séquard, maintained that the supra-renal capsules are not mere transitory embryonic organs, like the thymus gland, but that they are of permanent utility, presiding over the secretion of pigmentary matter in the animal economy. Hundreds of dogs, cats, Guinea pigs, rabbits, and rats, met an untimely end, from the removal of these capsules, in order that that the latter physiologist might be able to say that the blood of these animals contained an increased amount of pigment and often in plates larger than the diameter of the capillaries of the brain, and

that death took place sooner after this operation than after the removal of the kidneys themselves. From this accumulation of pigment in the blood of animals, and in a few instances in the human skin when these capsules were found diseased, it has been concluded that the function of these organs is to modify the substance capable of transformation into pigment. If, then, cessation of the function of these organs lead to excess of pigmentary matter in the blood and skin, it would seem that their increased action might in the same way be connected with deficiency of coloring matter, and indeed with congenital albinism. Other physiologists, however, deny that there is any necessary connection between the supra-renal capsules and the production of pigmentary matter, maintaining that in the case of man the connection has been merely accidental, and that the death in the case of animals was not due to any accumulation of pigment in the blood, but to the inflammation or other results of such a severe operation. These capsules have been removed from albino rats, and the animals have survived from two to ten weeks, whereas in ordinary animals death is sudden when their functions have been quickly and completely arrested. The fact, if it be a fact, that pigment matter is accumulated in the blood after the removal of these capsules, whether the cause of death or not, and the longer survival of albino animals in which, as no pigment is formed, this modifying function of these organs would find no chance for exercise, would seem to show some connection between the capsules and the distribution of pigment; but experiments show, according to Brown-Séquard, that even albino rats die in two or three days after the simultaneous removal of both capsules, indicating that they have other important functions in the animal economy than the modification of pigment matter. The present condition of physiological science does not show conclusively a connection between the supra-renal capsules and the state of albinism, any more than between the latter and the equally embryonic thymus and thyroid glands. We must therefore apparently look to the pigment matter itself for an explanation. This has been seen to be highly carbonaceous. Sachs, an albino himself and having an albino sister, says that, according to the chemist Vauquelin, albino hair contains no iron. As this element gives color to the red corpuscles of the blood, it has been supposed to be concerned in the coloration of pigment matter. How far this last may be connected with the phenomena of albinism may be interesting from the occurrence of discoloration of the surface in chlorosis and the blanching of the hair in chronic and debilitating diseases. There are cases, too, in which the preparations of iron administered internally have arrested the change of dark hair to gray, and have even restored the black color. Physiological chemistry does not yet enable one to decide to what subtle alchemy of nature's processes the arrest of development in regard to pigmentary matter is due—whether to some deficiency

in the iron of the blood of the mother or the child, to unnatural activity of the carbon-eliminating organs, to an insufficient supply of the carbonaceous materials of the pigment, or to some other cause or causes entirely different from these.

As an example of the use to which albinism has been put by the advocates of the specific unity of the human races, it may be stated that Dr. John Davy, brother of Sir Humphry Davy, says, in his work on the Island of Ceylon, that albinos are frequently seen there; he describes one, 12 years old, as having light blue eyes, light hair, a fresh and rather rosy complexion, such as would not be regarded as peculiar in Norway or even England. Though this does not answer to what is properly albinism, Prichard makes it an argument in favor of his theory, and quotes further from Dr. Davy, approving of the following remarks of the latter. "It is easy to conceive that an accidental variety of the kind might propagate, and that the white race of mankind is sprung from such an accidental variety. The Indians are of this opinion, and there is a tradition or story amongst them in which this origin is assigned to us." This would satisfy the most ardent advocate of Mr. Darwin's theory of the origin of species by natural selection.

The following examination, by Dr. B. Joy Jeffries, is interesting in connection with the foregoing remarks.

An ophthalmoscopic examination of the eyes of the two albino children, now at the "Aquarial Gardens," was made on Thursday, by permission of Mr. Laggon. The pupils were *not* artificially dilated. The light used was a *single* common candle. The instrument employed, that of Prof. Edward Jäger, manufactured by Kraft, of Vienna.* Only the *weak reflector* was used, which is composed of three plane-surfaced pieces of glass, laid together. The constant *voluntary* motions, and, after a few seconds of steady gazing, the involuntary oscillations of the eyes *from side to side*, in a horizontal direction, naturally rendered a perfectly satisfactory examination impossible. Yet, after carefully looking, during the few seconds that the eyes could be kept fixed, the following was made out with the "upright image." The general coloring of the bottom of the eyes was very light red, but darker in the younger of the two children, whose sight Mr. Laggon thought was the better. This child appeared also to be somewhat near-sighted. Its power of accommodation, the ophthalmoscope showed to be active. The retinal vessels, so far as could be traced, were normal. They appeared to stand out more in relief than in an eye in which pigment is present, probably from the contrast to the general light coloring. The entrance of the optic nerve was not readily distinguish-

* A description and engraving of which is given in a pamphlet entitled "*Über Staar und Staaroperationen*," Wien, 1854.

able, on account of its injected state, and the consequent *want* of contrast between it and the surrounding choroidal vessels.

The fine granulated appearance which the bottom of the normal eye has, when viewed with the "image upright," was of course wanting, and, instead of this, the delicate anterior and coarser posterior vessels of the choroid were seen. From the want of pigment behind and between them, their outlines were not so marked as might have been expected. This was also owing to the white sclerotic shining through their meshes, and thereby adding to the general *light color* of the bottom of the eye.

The appearances are therefore those which would be, *a priori*, expected, and which are, to a greater or less extent, found where disease has loosened and removed the normal pigment of the choroid, and broken down the "internal pigment layer," and so left that portion of the eye affected, similar to the state in which it is found in the albino.

It may be said that an ophthalmoscopic examination of the eye of an albino would be hardly possible with any other form of instrument, or with a much stronger light; for in sunlight they are almost blind, so great is the amount of light received upon the retina through the pupil, *iris* and *sclerotic*. Not that they see any *better* than others in a dim light, but they *cannot* see in a strong one. The amount of light thrown into the eye by the instrument used, may be easily found by placing three pieces of clear thin window glass upon each other, and, in a darkened room, holding them a few inches from the eye, and reflecting into it the light from a single candle held on a level with, and a few inches from, the ear of the same side. With these children it was not enough to cause contraction of the pupil sufficiently to interfere materially with the examination. This is in general all the light that is requisite with this form of ophthalmoscope.

The power of accommodation of course greatly interfered in such an examination. Could this have been destroyed for the time being, by artificial dilatation of the pupil, a much more minute and prolonged view might have been obtained, even in spite of the curious and perpetual horizontal oscillation of the eyes in both children. But, with dilated and fixed pupils, the light of the exhibition room would have been intolerable for these albinos who were about to return to it at the time of examination.

The reflection of light from the bottom of the eye, which gives the pink instead of the ordinary black appearance to the pupil of the albino, shows that but little more light need be thrown in upon it to render it visible, and, could the observer's eye be rightly placed to receive the rays of light reflected out of the eye, perhaps the retinal and choroidal vessels might be seen without artificial aid; for, in addition to that which passes through the pupil (most of which would be intercepted by the observer's head) a

good deal must go through the iris, and more particularly the sclerotic. The albino's iris appears darker than it really is, by the shade thrown upon it, particularly in a side light, by that portion of the sclerotic which projects forward beyond the outer edge or attachment of the iris.

No print of the bottom of the eye of the albino can be referred to, for, unfortunately, by an unforeseen accident, Prof. Jæger was prevented from adding one to his truly wonderfully truthful delineations of ophthalmoscopic appearances, entitled "*Beiträge zur Pathologie des Auges*," Wien, 1855.

DR. ELWELL'S MEDICO-LEGAL TREATISE ON MALPRACTICE AND MEDICAL EVIDENCE.

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THE physician is summoned by the government or the defence. He is a witness for both. The examination *in chief* being finished, he is passed to the cross-examination, with a "*the witness is yours*." This relation to a trial should never be lost sight of by the witness. It aids him in every way. He is for no party. He is for justice, not for a man. His memory is aided, and he keeps to his facts. If he goes for a moment out of these, it is only to give them more life—more force. No matter what may be the tone of the cross-examination—no matter what the effort to break him down. He is calm—firm—cool. He knows the object which would now oppress him—viz., a verdict—and he feels, if he feel at all, that that is the true object of the issue. The deep sense of duty—the solemn precept under which he speaks—the deep sense of his whole responsibility, never hurts him. It amazingly helps him, and makes noble and true—at least to himself—what he says. The jury always sees this, and for defence nothing can be stronger.

The physician in court must carry with him all the knowledge of his case which he can possibly attain to. He is to make a diagnosis both differential and direct. He may get previous knowledge at second hand, through counsel, or from the accused. He is consulted. The case is stated. His views of it obtained. If to be summoned, he knows it, and makes preparation for his office. However the mode, let him get knowledge—wisdom—for it will be truly power to him.

A question arises here, which it is very important to answer. Is the expert to believe all he learns? His belief must often be much after the order of faith, as is the case in his daily professional relations—it must be very much the substance of things hoped for, the evidence of things not seen. He may be told that the opinions of an expert are facts in law—another mode of presenting the apostolic formula. But of infinite importance is it—