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OBSERVATIONS AND RESEARCHES

ON

ALBINISM IN THE NEGRO RACE.

BY

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OBSERVATIONS AND RESEARCHES ON ALBINISM (LEUCOPATHIA, LEUCÆTHIOPIA) IN THE NEGRO.

SECTION I.

DESCRIPTION OF ALBINISM IN THE NEGRO RACE.

My attention was directed to the following interesting case of albinism, by my friend and colleague Doctor Thomas R. Jennings, Prof. of Anatomy in the Medical Department of the University of Nashville.

Alfred Aikins, age eighteen months, second son of Lewis and Margaret Aikins, negro man and woman.

The skin over the entire surface of the little negro is perfectly white; rivalling in whiteness that of the fairest and most delicate white child of the same age.

Iris very pale, bordering on pink, with light bluish and purplish reflections.

Pupils bright pink.

Strong light is painful to the eyes of this little albino; and the eyes present a constant tremulous or dancing motion. In a strong light the features are contracted and contorted, and the impression is evidently painful, and the vision rendered indistinct.

Features "thoroughly negro":—flat nose, thick lips, and low forehead. Feet present the usual characteristics of the African race.

Hair of head crisp and curled, perfectly white, and similar in all respects, with the exception of the color, to the crisp, curling wool-like hair of the father and mother.

The limbs and muscles generally appear to be well developed; his spirits are excellent, and he appears to be disposed to domineer over his little negro companions, of the same color, biting, scratching, and striking them whenever they interfere with his childish plays. Whether the position which he assumes towards his black

companions is due to the "superiority of color," or the necessary result of the great adoration and deference paid him by his mother and friends, we will not attempt to determine.

The photograph (Plate I.) from nature represents the little albino, in the arms of his fat, black mother, and conveys a fuller and more truthful idea of this "*lusus naturæ*" and his sable origin than the most elaborate description.

WILLIAM AIKINS (albino), brother of the child Alfred just described, and *first-born* of Lewis and Margaret Aikins. This albino resembled in all respects the boy Alfred, his brother.

Constitution rather feeble: died during the period of teething, at the age of fourteen months.

Two of the fingers of the right hand were united—a congenital deformity. The eyes were pink, and the hair perfectly white, resembling in all respects that of his brother.

The photograph (Plate II.) was taken of this child after death.

MARGARET AIKINS, mother of the albino, stout, hearty negro woman, with glossy skin and hair, cheerful countenance and kind disposition. Features more regular, and nose somewhat more prominent than usual with negroes. The photograph presents a good likeness of this woman, with her albino child in her arms. Age 26. Has a few perfectly white spots upon the arms, and says that similar spots exist upon her thighs. The contrast between the dark skin and the milk-white spots is very striking. The white spots are irregular in shape, and about three-tenths of an inch in diameter. Margaret enjoys good health, and has never been sick in her life. The mother appears to be very proud of her *white* child.

LEWIS AIKINS, father of the albinos, Albert and William, and husband of Margaret. Stout, active negro man, with black complexion like that of his wife, and with similar black, curling, wool-like hair. Age 30; has all the characteristics of the negro.

SARAH HILL, mother of Margaret Aikins, and grandmother of albino children, age 54. Complexion considerable lighter than that of her daughter, but features and hair that of the negro.

About fourteen years ago, the mistress of Sarah called her attention to white spots upon her arm, and fearing that it was the leprosy, sent for a physician.

Until her attention had been directed to the spots by her mistress, Sarah had never observed their existence. The physician who examined the spots declared that it was unnecessary to ad-

MARGARET AIKINS AND HER ALBINO SON ALFRED.

THE DUVAL STEAM LITHOGRAPHIC CO. PHILA.

WILLIAM AIKINS, ALBINO CHILD OF MARGARET & LOUIS AIKINS.

minister medicine, and Sarah applied to an old negro doctor, who gave her *bitters* (decoction of some vegetable leaves and roots). Sarah affirms that the spots which had been increasing rapidly before the administration of the old negro doctor's medicine, ceased to increase in size and number, and many of them commenced to turn dark.

The anterior surface of her face, arms, and thighs presents a mottled appearance, with whitish and dark-brown spots upon the dark brownish-yellow skin. Twenty-four perfectly white spots of irregular shape and size, the largest being about four-tenths of an inch in diameter, were counted upon the anterior surface of the arm, between the elbow-joint and the wrist. There is a scar over the upper portion of the breast-bone, just at the junction of the neck with the trunk, resulting from a slight burn in childhood. A short distance below this scar there are three white spots about half an inch in diameter.

Sarah Hill has always enjoyed good health; there is no appearance of any disease of the skin; has had five children, three of whom died in infancy; she observed no spots upon them. We have already given the description of her daughter, the mother of the little albino. The other child of Sarah is a stout grown negro man, who, like his half-sister and mother, has several white spots upon his arms and thighs. He is married to a stout, hearty black woman, and has one child, of a light-brown color and without spots.

Sarah had four brothers, none of whom had spots, as far as her information extends; she had seven sisters, all of whom had white spots, and several of their children also have small white spots.

The first husband of Sarah, the grandfather of the little albino, and father of Margaret, was a stout, large negro, weighing about two hundred pounds, of a dark skin, like that of his daughter, who resembles him in size and appearance.

Abner Evans, father of Sarah, grandfather of Margaret, and great-grandfather of albino child. Described by his daughter as a small active man, with light complexion, like that of his daughter, with no admixture of white blood.

Abner had white spots on arms and legs, which increased with age. This man enjoyed good health, was the father of fourteen children, eleven of whom were borne to him by the mother of Sarah, and, as we have before said, the seven daughters had white spots like their father. His first wife (the mother of eleven chil-

dren), was a stout, active, dark-colored negro woman; she had no spots, and died at the age of 60 from dropsy. Abner reached the good old age of 80 years.

ROBERT CREWS, albino negro man; age fifty-two; height about five feet eight and a half inches; weight one hundred and forty-two pounds. Born in Halifax Co., Virginia; moved to Tennessee when eight years of age; has been living in Nashville twenty-six years. Says that the hair of his head was perfectly white when young, and eyes pink; now the hair is of a light yellowish-brown, and his eyes of a clear brown color, with dark pupils. The hair is crisp, and wool-like, resembling in all respects the hair of the negro. Eyes restless and weak; strong light is painful, and the contraction of the muscles of the face, consequent upon the action of light, has given a permanent expression and cast to the features. When examining any object in a bright light, the eyes are nearly closed, and they are placed very near, and moved from side to side in a restless manner.

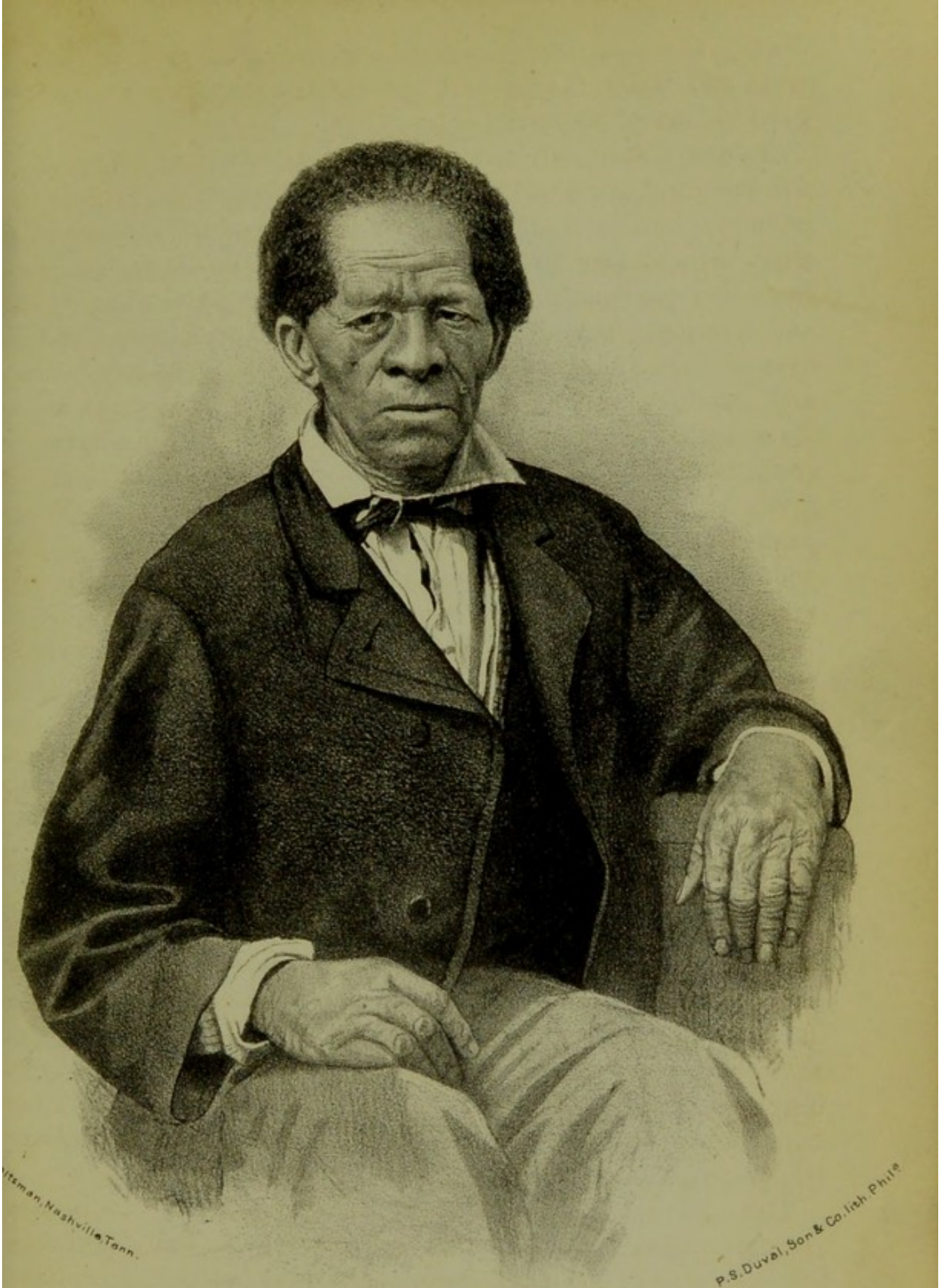
His first master employed him as a cook, but his eyes were so painfully affected by the fire that he had to give this occupation up.

Features those of a negro, with flat nose and low forehead; complexion florid, and capable of showing the blush of anger, and the effects of emotion upon the capillary circulation. Has always enjoyed good health, and for a number of years has driven a small wagon, and engaged in the moving of furniture.

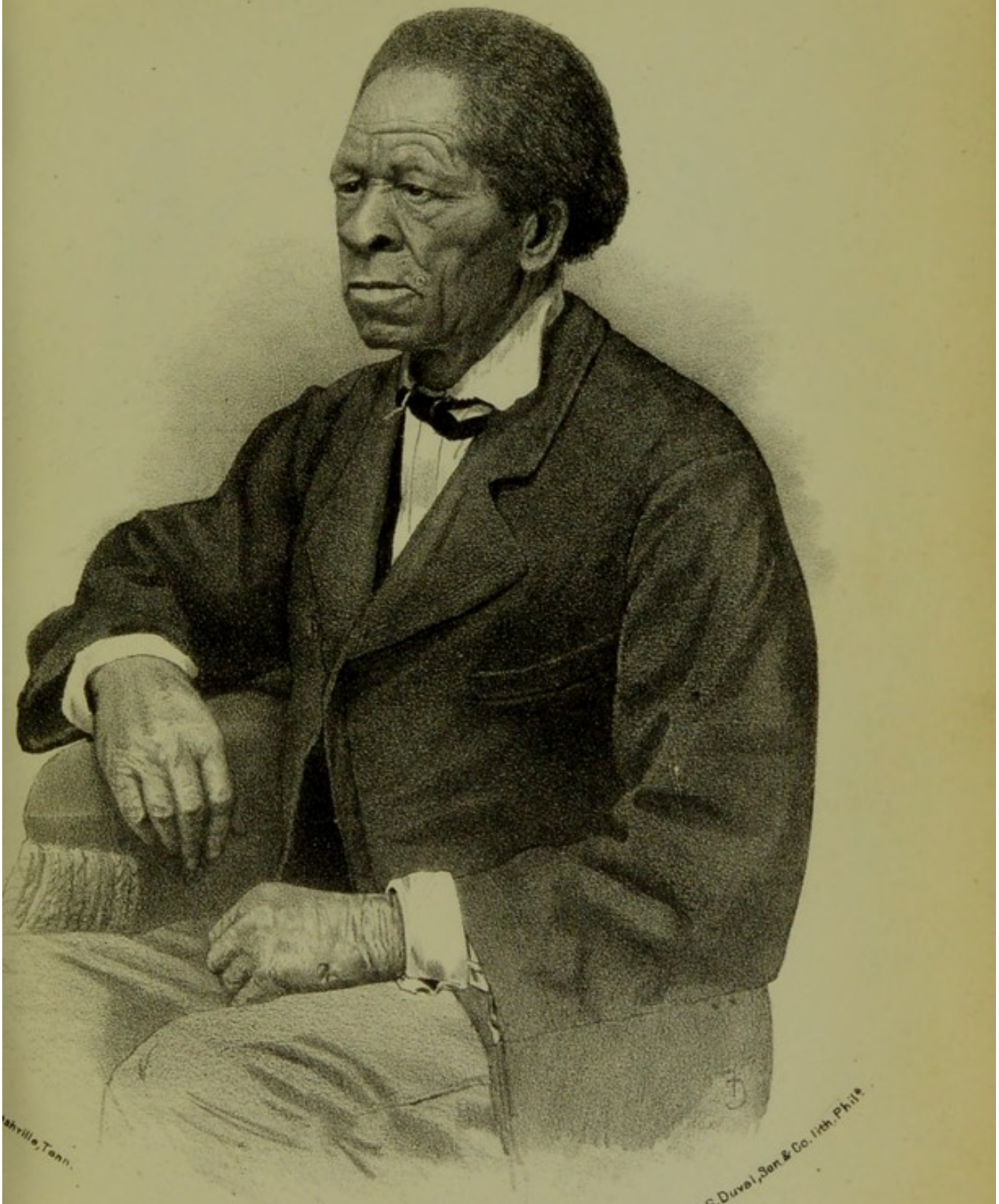
Has been married for twenty-four years, but has never had children. His wife had a child by her first husband, at an early age, before his marriage, and he says that the physician who attended her in the confinement "stated that she would not have any more children." Sexual organs of this albino well developed, and no deficiency of sexual appetite. Mother and father both dark-colored negroes. Had three brothers and two sisters, who were all dark-colored, and some of them black.

This albino has more than the usual amount of intelligence amongst negroes, and has always led an active and industrious life. As a proof of his industrious and active habits, he purchased his freedom for $750, several years before the recent civil war.

Plates III. and IV. present accurate representations of this albino.

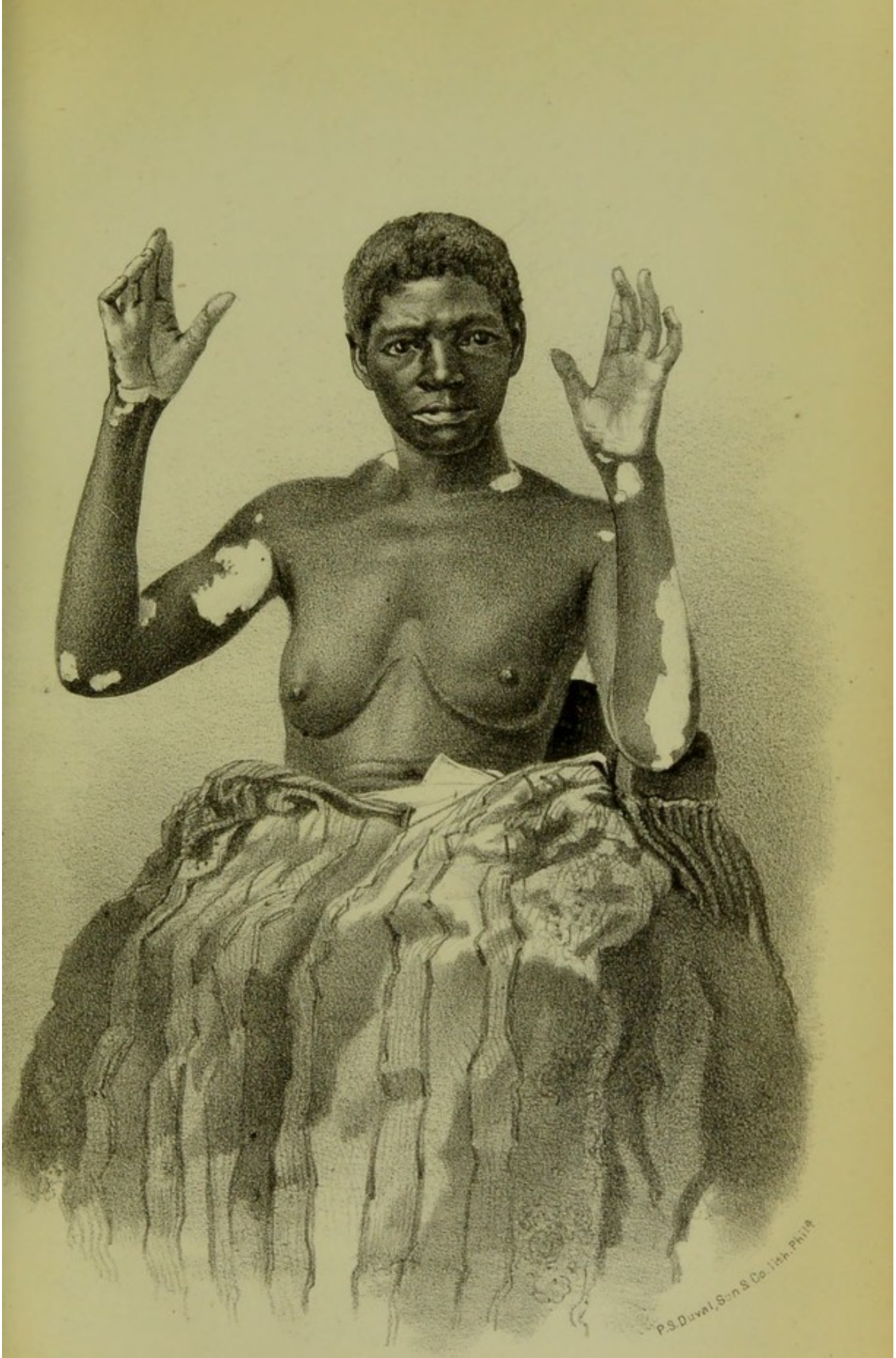


ALBINO NEGRO MAN ROBERT CREWS.
(Full Face.)



ALBINO NEGRO MAN ROBERT CREWS.

(Side Face.)



SPOTTED NEGRESS, LEMISA BERT.

SECTION II.

THE SKIN OF THE NEGRO, ORIGINALLY BLACK, MAY, AT A PERIOD SUBSEQUENT TO BIRTH, GRADUALLY CHANGE ITS COLOR FROM BLACK TO WHITE, UNTIL THE COMPLETE ALBINO CHARACTER IS INDUCED.

Two instances have come to my knowledge, one of which I examined myself, and the other I received upon reliable testimony, in which spots appeared in the skin of negroes, about the middle of life and progressively increased in number and size, as in the case of Abner Aikins.

In addition to these cases, I have recently (September, 1867) examined the following case:—

LEMISA BERT (Plate V.), spotted negress. True African features, woolly head, flat nose, thick lips, low forehead, black skin; age forty-five; born in Tennessee; at the present time follows the occupation of rag picker in and around Nashville, assisted by her youngest (mulatto) child. Mother and father native Africans. The father had sixteen children, and presented a condition similar to that of his daughter, with white lips and hands. One of Lemisa's sisters was spotted like herself, only more extensively, and some of the spots presented a yellow color.

Lemisa Bert has enjoyed pretty good health with the exception of "falling of the womb;" has had six children, three of whom, she says, died of scrofula; the youngest child (by a white man), is a smart mulatto girl, of eleven years. One of her children, a young woman of eighteen years, whose father was a negro, is spotted like her mother, only to a greater extent, and many of the spots presenting a yellow color.

Lemisa Bert has been turning white during the past nineteen years; the change commenced in small spots, which have progressively increased. Complains of some itching of the skin during warm weather; I could detect no disease of the skin, however, with the magnifying glass. The palms of the hands are white, and Lemisa has perfectly white spots on arms and neck; on the right arm near the axilla, a large spot, about four inches in the longest diameter, and three inches in the shortest diameter. Both to the naked eye and under the magnifying glass these spots present mainly the same appearance as the skin of the white, and the blue veins are distinctly seen as in the fairest skin.

Several observers have recorded the gradual change of the skin of the negro from black to white.

In 1697, Will Byrd, Esq., F. R. S., gave the following "account of a negro boy dappled in several places of his body with white spots."

"This negro boy, of about eleven years of age, was born on the upper part of Rappahannock River, in Virginia; his father and mother were both perfect negroes, and the boy himself till he came to be three years old, was in all respects like other black children; and then, without any distemper, he began to have several little white specks on his neck and breast, which increased with his age, both in number and size; so that now from the upper part of the neck, where some of his wool is become white, down to his knees, he is everywhere dappled with white spots, some of which are broader than the palm of a man's hand. They are very white and do not show flesh and blood so lively through them as the skin of white people; the reason of which may be that the skin of a negro is much thicker. His face, arms, and legs are perfectly black."[1]

Mr. James Bate, Surgeon in Maryland, published in the *Philosophical Transactions* of 1759, the following observations "On the Remarkable Alteration of Color in a Negro Woman."

"Frank, a cook-maid in Col. Barnes's family, a native of Virginia, about 40 years of age, remarkably healthy, of a strong and robust constitution, had her skin originally as dark as that of the most swarthy African; but about fifteen years before, that membrane in the parts next adjoining to the finger nails became white. Her mouth soon underwent the same change, and the phenomenon had since continued gradually to extend itself on the whole body; so that every part of its surface became more or less the subject of this surprising alteration.

"At the above date, four parts in five of the skin were white, smooth, and transparent, as in a fair European, elegantly showing the ramifications of the subjacent bloodvessels; the parts remaining sooty, daily lost their blackness, and in some measure partook of the prevailing color; so that a very few years would, in all probability, induce a total change. The neck and back, along the course of the vertebræ, maintained their pristine hue the most, and in some spots proclaimed their original state; the head, face, and breast, with belly, legs, arms, and thighs, were almost wholly white; the pudenda

[1] Philosophical Transactions, 1697, vol. xix. p. 781, No. 235.

and axillæ partly colored; the skin of these parts, as far as white, being covered with white hair; when dark, with black. Her face and breast, as often as the passions anger, shame, etc., had been excited in her, had been immediately observed to glow with flushes; as also when, in pursuance of her business, she had been exposed to the action of the fire on these parts; some freckles had made their appearance.

"This woman declared that, excepting about seventeen years before, when she was delivered of a child, she had never been afflicted by any complaint of twenty-four hours' continuance, and that she never remembered the catamenia to have been either irregular or obstructed, only during this pregnancy; she had never been subject to any cutaneous disorders, nor made use of any external applications by which this phenomenon might be produced. The effects of the bile on the skin are well known to physicians, and had given rise to an opinion, that its color was determined by it; but this did not appear to have anything to do here, since from all the circumstances it was impossible to find the least reason to suspect that this fluid, whether cystic or hepatic, had undergone any alteration.

"As ustion is known to make the skin of negroes become white, and as she was daily employed in the business of cooking, it might perhaps be supposed the effect of heat; but this could never be the case, as she had ever been well clad; and the change was as obvious in the parts protected from the action of that element as in those most exposed to it. As an emunctory, the skin seemed to perform its office as well as possible, the sweat with the greatest freedom indifferently pervading the black and white parts."[1]

The Rev. Samuel Stanhope Smith, D. D., LL. D., in his "Essay on the Causes of the Variety of Complexion and Figure in the Human Species," originally pronounced as an oration before the American Philosophical Society in 1787, relates the following interesting case:—

"Henry Moss, a negro in the State of Maryland, began upwards of twenty years ago, to undergo a change in the color of the skin, from a deep black to a clear and healthy white. The change commenced about the abdomen, and gradually extended over different parts of the body till, at the end of seven years, the period at which I saw him, the white had already overspread the greater

[1] The Philosophical Transactions of the Royal Society of London, vol. li. p. 175; also Abridgment of same by Charles Hallon, Shaw and Pearson, vol. xi. p. 370.

portion of his skin. It had nothing of the appearance of a sickly or albino hue, as if it had been the effect of disease. He was a vigorous and active man, and had never suffered any disease either at the commencement or during the progress of the change. The white complexion did not advance by regularly spreading from a single centre over the whole surface. But soon after it made its appearance on the abdomen, it began to show itself on various parts of the body, nearly at the same time, whence it gradually encroached in different directions on the original color, till at length the black was left only here and there in spots of various sizes and shapes. These spots were largest and most frequent where the body, from the nakedness of the parts or the ruggedness of his clothing, was most exposed to the rays of the sun.

"This extraordinary change did not proceed by gradually and equably diluting the intensity of the shades of the black color over the whole person at once; but the original black, reduced to spots, when I saw it, by the encroachments of the white, resembled dark clouds insensibly melting at their edges.

"The back of his hands, and his face, retained a larger proportion of the black than other parts of his body; of these, however, the greater portion was changed. And the white color had extended itself to a considerable distance under the hair. Wherever this took place, the woolly substance entirely disappeared, and a fine, straight hair, of silky softness, succeeded in its room." Dr. Smith adds, in a foot-note, that "the extraordinary nature of this phenomenon strongly attracted the attention and benevolence of the public; and the man obtained, from the liberality of those who visited him, a sum sufficient to purchase his freedom, with a surplus to be applied afterwards to his own use. I examined him in company with the Rev. Dr. Rodgers, and John R. B. Rodgers, M. D. of New York, gentlemen, than whom none are more capable of observing and examining a fact of this nature, with a sound and accurate judgment.

"Shortly after this period, Henry Moss removed into the State of Virginia, since which time I have not had an opportunity of seeing him; but I have been informed by respectable authority that the whitening process was soon afterwards completed; he could not be distinguished from a native Anglo-American."[1]

Dr. Smith inferred from this case: "In the first place, that secre-

[1] Pp. 92–94.

tion in the skin which contributes chiefly to the formation of the negro complexion, seems to be the chief cause also of the curl or woolly appearance of the hair; for wherever the white color in this man extended beneath the hair, there the form of that excrescence was entirely changed. In the next place, although there was evidently a strong and general tendency in the constitution of this negro to a change of color, yet this tendency was much longer resisted in those parts of the body which were most exposed to the immediate action of the sun's rays, than in others. As he was a laboring man, wherever there were rents in the thin clothes which covered him, there were generally seen the largest spots of black; whence I infer that when any dark color has been contracted by the human skin, the solar influence alone, and the free contact of external air, will be sufficient to continue it a long time, even in those climates which are most favorable to the fair complexion. It is found by experience that different shades of the dark complexion are easily impressed by different causes on a skin originally fair, and when once impressed, the slightest influence of the same causes is sufficient to continue it."[1]

The partial albino (or examples of individuals spotted with different colors, where the whiteness of the skin exists in certain parts of the surface only, while the remainder of the body is of the ordinary color), was not unknown to the ancients, and other well authenticated cases, where the skin of the negro has gradually changed its color from black to white, have been recorded by Gaultier, Le Cart, Rayer, and Rush.

Blumenbach has described a negro of this kind whom he saw in London, a servant to the person who kept the animals at Exeter Change. He was a young man, perfectly black, excepting the umbilical and hypogastric regions of the abdomen and the middle of the lower limbs, including the knees and neighboring parts of the thighs and legs, which were of a clear and almost snowy whiteness, but spotted with black like the skin of a panther. His hair was of two colors. On the middle of the front of the head, from the vertex to the forehead, where it ended in a sharp point, there was a white spot with a yellower tinge than those on the trunk and legs. The hair covering this was white, but resembled the rest in other respects. On comparing the picture of this man with three others (a boy and two girls), Blumenbach observes that the white spots

[1] Pp. 94–95.

occupied the abdomen and thighs, never appearing on the hands and feet, which parts, with the groins, are the first to turn black in the newly-born negroes; and that the arrangement of the white parts was symmetrical. Both the parents of this man and of the others of whom Blumenbach had collected accounts were entirely black. Blumenbach also records two instances in Germans; one of a youth, the other of a man sixty years old, both of whom had a rather tawny skin, marked here and there with various sized spots of the clearest white. These spots appeared first in the former in infancy, and in the latter at the age of manhood.

Jefferson mentions a negro, born black, of black parents, in whose chin, when a boy, a white spot appeared, and continued to increase till he became a man, when it extended over the chin, lips, one cheek, the under jaw and neck of the same side.[1]

Caldani states that a negro, who was a shoemaker at Venice, was black when brought during infancy to that city, but became gradually lighter, and had the hue of a person laboring under slight jaundice; and Klinkosch mentions the case of a negro who lost his blackness and became yellow.

An English lady, who had formerly resided in Virginia, informed Dr. Parsons that Admiral Franklin took a Spanish ship in war-time and brought her into Carolina, and in searching found a picture of a boy who was as beautifully mottled all over with black and white spots as any dog that ever was seen; it was uncertain which was the ground, or which color the spots were of. Several copies of the picture were taken in Carolina, and they said it was a portrait of a child born of negro parents on the Spanish main; the ship was bound to old Spain.[2]

SECTION III.

ALBINOS OCCUR AMONGST ALL THE RACES OF MEN, AS WELL AS AMONGST MANY OF THE SPECIES OF DOMESTIC AND WILD ANIMALS.

The occurrence of albinism amongst the negroes of the southern United States is by no means rare. I have myself met with several other instances, and in one case an albino woman in my native county (Liberty County, Georgia), whom I have seen upon numer-

[1] Lectures on Comparative Anatomy, Physiology, Zoology, and the Natural History of Man, by William Lawrence, F. R. S., pp. 207–8.

[2] Philosophical Trans. Roy. Soc. of London, vol. lv. p. 45, 1765.

ous occasions, bore children to a black man, and the children had reddish woolly hair and yellow complexions, and I am inclined to attribute the yellow color in the great-grandfather and grandmother of the albino child described in this paper, to the same causes which produced the white complexion, and not to any admixture of the blood of any white race. In the grandmother, the color of the entire body is mottled, and not uniform; this is especially seen in the skin of the face. These facts support the opinion that there is a tendency to the development and propagation of this peculiarity in certain families. During my collegiate course I had two college mates, who were true albinos and brothers; and I was informed that several other members of this family manifested the same peculiarity.

Some of the earliest writers did not hesitate to affirm that albinos were confined to the offspring of negroes. But it appears, from the testimony of various observers, that they were not only known from the earliest times, but that they occur amongst all nations; and that there is no race of men, nor any part of the globe, in which this freak of nature may not be manifested. It has even been asserted that whole tribes of albinos have been seen in Africa, Java, Ceylon, and the Isthmus of Darien. As this variation of the skin first attracted attention in the African, from the great difference of color, the individuals were termed leucæthiopes, or white negroes. From their avoiding the light, the Dutch are said to have given them in the island of Java, the contemptuous appellation of kakkerlakken, cockroaches, insects that run about in the dark; whilst the Spaniards call them albinos, and the French blafards.

Pliny, in the second chapter of the Seventh Book of his Natural History, quotes Isigonus of Nicæa, who relates that in Albania there is a certain race of men, whose eyes are of a sea-green color, and who have white hair from their earliest childhood, and see better in the night than in the day. Cuvier, in his observations upon this passage of Pliny's Natural History, supposes that the variety of the human species to which the term Albino has been applied, from the whiteness of their hair and skin, is more frequently found in the close valleys of the mountainous districts, and may therefore have been often met with in Albania, which is composed of valleys in the Caucasian range.

In the eighth chapter of the Fifth Book, Pliny calls a certain people of Africa Leucæthiopians, or white Ethiopians; the same

term was used by Pomponius Mela and Ptolemy; but as these writers give no description of the people thus designated, some have supposed that the Leucæthiopes were a tribe of negroes whose complexion was less dark than that of Africans generally.

Cortez, in his narrative of the conquest of Mexico, in describing the palace of Montezuma, amongst other objects of rarity or curiosity which were found in it, mentions male and female albinos.

"In hujus palatii particula tenebat homines, pueros, fœminasquæ a nativitate candidos in facie, corpore capilis, superciliis, et palpebris."

Wafer, who accompanied Dampier in one of his voyages, relates that albinos are not unfrequently found amongst the inhabitants of the Isthmus of Darien. Wafer described their skin as milk-white, much like the color of a white horse, and covered with a short and whitish down, and the hair upon their head and upon their eyebrows of a milky white, and the former, which is exceedingly beautiful, is rather frizzled, and in length from seven to eight inches. "They see not very well in the sun, poring in the clearest day, their eyes being but weak, and running with water if the sun shines towards them, so that in the daytime they care not to go abroad, unless it be a cloudy dark day. But notwithstanding their being thus sluggish and dull in the daytime, yet when moonshiny nights come they are all life and activity, running abroad and into the woods, skipping about like wild bucks; and running as fast by moonlight, even in the gloom and shade of the woods, as the other Indians by day, being as nimble as they, though not so strong and lusty."

Various travellers, as Ribeyro, Percival, Cordiner, and others, and various naturalists, have met with albinos in some of the oriental isles, and more especially in Java and Ceylon, exhibiting the white skin and hair and pink eyes, while in other respects they conformed to the external characters of the native race.

According to Dubois, albinos are not uncommon amongst the Hindoos.

Cook, in his first voyage, saw six albinos in Otaheite; in his second voyage he saw one in New Caledonia, and in his third voyage he met with three in the Friendly Isles.

Blumenbach saw sixteen albinos in various parts of Germany, and they have been noticed in England, Ireland, Denmark, France, Switzerland, Italy, Hungary, Austria, the Grecian Archipelago, and in North and South America.

We are informed by Marsden that in Java the gallinaceous fowls are often affected with albinism, and many travellers assure us that this peculiarity often appears in the human species in the Sunda Isles.

Charles Pickering, in his *Races of Man*, mentions an albino amongst the Malay race inhabiting the Ellice or Vaiterpan group of Islands; albinos were also spoken of by the inhabitants as occurring in Tahiti. Dr. Pickering at Reeva observed a male albino of the Papuan race, whose complexion was even fairer than that of Europeans when equally exposed to the sun, but was not free from brownish specks; the iris was blue without any perceptible tinge of red; and he had his brows always knit, as if affected by the light. The hair was not white but flaxen. Several albinos were enumerated by residents, and Dr. Pickering was inclined to think that they occur more frequently in the Papuan than in any other race.

Dr. Azara, in his *History of the Quadrupeds of Paraguay*, has given numerous examples of albinos among the animals, as well as among the Indians and negroes in South America.

It is thought, however, that albinism occurs most frequently amongst the negroes in Africa.

Thus Dr. Winterbottom observed eleven instances among the native tribes about Sierra Leone. De la Croix informs us that albinos compose a considerable body of attendants at the court of the King of Loango, and Ludolf has made a similar statement; and Bowditch observes that the King of Ashantee had, at his court, "nearly one hundred negroes of different colors, through the shades of red and copper to white." Dr. Winterbottom mentions an albino negro, born in Nova Scotia, and Mr. Jefferson, in his *Notes on Virginia*, gives seven examples of this peculiarity in the negro slaves of Virginia.[1]

[1] Dr. James Parsons exhibited to the Royal Society a "white negro" (albino), and detailed the following history of the case:—

It appeared that the parents of this boy were brought, among many others, above 300 miles, from an inland country, to the gold coast in Africa, and put on board a ship bound to Virginia, where they arrived in the year 1755. They became the property of Colonel Benjamin Chambers, of Cumberland County, in Pennsylvania, and were then employed on an estate of the Colonel's in Virginia; but the Colonel lived with his family in Pennsylvania, when he sold his boy to his then master—of which fact Dr. P. saw the bill of sale that passed between the Colonel and him.

The parents were perfectly black, and both very young when landed; and the

Dr. Pickering observed two albino children amongst the negroes of Africa, in whom the negro aspect had so entirely disappeared that they might have passed for the children of Europeans, but for the remarkable appearance of the hair, which could only be compared to a white fleece.

Dr. Charles Bachman, of South Carolina, in his valuable work on *The Doctrine of the Unity of the Human Race examined on the*

woman being asked how far she was gone with child, answered, so as to be understood to mean, that she was with child something more than six moons, and that this was her first pregnancy. They also declared that they had never seen a white person before they came to the shore where the Europeans were employed buying black slaves.

The owner of this boy was Mr. James Hill Clark, whom Dr. Parsons informed of what had passed between Dr. Franklin and himself on this subject; for he paid him a visit, and in the course of conversation he informed him that, while he was in England before, he received a letter from his lady, in which was some of the wool of a white negro child's head, by way of curiosity; and when he mentioned it to Mr. Clark, he assured him that this same boy was shown in Pennsylvania as a great rarity, and that, to his own knowledge, the wool sent in this letter was taken from this child's head. He was born about six or seven weeks after his parents landed in Virginia, in the year 1755, and was purchased by Mr. Hill Clark of Col. Chambers in 1764, so that he appeared not to be quite ten years old; and his mother had had two children after, who were both as black as the parents.

Dr. Parsons states that instances of the same kind had happened before. There was one, about four years before, in London, which was a white girl, something younger than this boy, but exactly similar in color, wool, etc., and was said by the person who made a show of her, to have been the offspring of a black father and mother. The lady of a respectable family who came to live in Red Lion Square, after having lived in Virginia for several years, related the following case to Dr. Parsons:—

About nineteen years previous, on a small plantation in Virginia, two slaves, both black, were married, and the woman brought forth a white girl. When the poor woman was told that the child was like the white children of white people, she was in great dread of her husband, declaring, at the same time, that she never had anything to do with a white man in her life, and therefore begged they would keep the place dark that he might not see it.

When he came to ask her how she did, he wanted to see the child, and wondered why the room was shut up, which was not usual. The woman's fears increased when he had brought it into the light; but while he looked at it he seemed highly pleased, returned the child, and behaved with extraordinary tenderness. She imagined that he dissembled his resentment till she should be able to go about, and that then he would leave her. But in a few days he said to her, "you are afraid of me, and therefore keep the room dark because my child is white; but I love it the better for that—for my own father was a white man, though my grandfather and grandmother were as black as you and myself; and, although we came from a place where no white people ever were seen, yet there was always a white child in every family that was related to us."—*Philosophical Transactions of the Royal Society of London*, 1765, vol. lv. p. 45.

Principles of Science, affirms that he has seen a number of examples of albinism amongst the blacks of South Carolina; and says that he has been informed that, in St. Domingo, Guadeloupe, and Martinico, the negroes of African origin produce one, out of six or seven children, of this albino variety. He does not, however, vouch for the entire truth of this assertion.

As far as my own observations extend, I have been led to the belief that this freak of nature occurs as often amongst the white races as amongst the African; the apparent disparity is perhaps due, in great measure, to the more striking and wonderful contrast in the negro.

Amongst wild animals, I have observed albinos in turtle doves (Ectopistes Carolinensis), ground dove (Columba passerina), crow (Corvus Americanus), hooting owl (Syrnium nebulosum), leather-wing bat (Vespertilio Carolinensis), fox squirrel (Sciurus capes-tratus), gray squirrel (Sciurus Carolinensis), and common rabbit (Lepus sylvaticus).

And amongst domestic birds and animals I have observed this peculiarity in the English and Muscovy ducks, common chicken, pigeon, rabbit, horse, hog, cow, cat and dog, and mice.

After extended investigation and examination of thousands of living specimens, I have never observed an albino amongst cold-blooded animals.

When this class of animals have been confined in dark caves, and excluded from the action of the light, they present the appearance of the albino; and it is probable that, if the negro children which are almost white at the time of their birth were reared in total darkness, they would in like manner be white.

I have seen living sirens from the caves of Africa, without a particle of coloring matter in their skins, and so transparent that the form and pulsations of the heart, and the circulation of the blood, could be discerned through the walls of the abdomen and chest, and Dr. Blackie has informed me that he has seen similar colorless salamanders in the dark caves of Northern Georgia.

I have in my possession specimens of the blind fish (*Amblyopsis spelvens*), the blind cray-fish (*Astacus pellucidus*), and of the crickets, with eyes of the dark caverns of the caves of Kentucky; which are entirely wanting in coloring resembling albinos. The absence of the ball from the socket of the eye in the blind fish, and the absence of the eye from the peduncles of the blind cray-fish, may be most philosophically attributed to the absence of that

agent upon which the production of color depends. And it is now well established that we may arrest and alter the development of the tadpole, and other animals, by raising the amount of the physical forces heat and light.

The white color of animals (or rather the colorless and transparent nature) which have been excluded from the light, is a different phenomenon from that of albinism, although the thorough discussion of the effects of physical agents in arresting or accelerating the development of the blood, color, organs, and structures of animals is destined to throw much light upon the phenomena of albinism.

SECTION IV.

THE ALBINO IS NOT NECESSARILY FEEBLE OR STERILE; BUT IS CAPABLE OF PROCREATION, AND WHEN TWO ALBINOS ARE UNITED, THERE IS A TENDENCY TO THE ESTABLISHMENT OF A PERMANENT VARIETY.

Some writers have expressed the opinion that the albino possesses a general delicacy of habit and constitution, and even exhibits a deficiency of mental power; and is incapable of propagation. Blumenbach conceived that albinos labor under a disease, which he referred to the cachexiæ, and considers as akin to leprosy; and Dr. Winterbottom describes them, not under the head of the native Africans, but classes the affection under the head of diseases.

G. St. Hilaire supposes that there are two species of albinism, one the effect of disease, the other a true anomaly.

Mansfeldt ascribed the production of the albino state to some shock given to the fœtus by an impression made upon the mother; and G. St. Hilaire essentially adopts this hypothesis, ascribing the peculiar state of the skin to an arrest of development, in consequence of which the coloring matter is not formed at the requisite period.

Herodotus maintained that the difference of color in different races was manifest in like manner in the seminal fluid: thus, in his third book (Thalia 101), he describes the Indians, who have a complexion closely resembling that of the Ethiopians, as having intercourse openly like cattle, and emitting seed, not white as that of other men, but black as their skin. Herodotus also affirms that the Ethiopians emit similar seed. This idea, which was controverted by Aristotle, has been revived by Maupertuis, and the color of the negro has been referred by Le Cart to a peculiar substance which he names "Ethiope Animal," which he supposes is contained in

their fluids, and the absence of this substance converts the negro into an albino.

The celebrated Count de Buffon considered albinism as a kind of malady, and albinos as "individuals who had degenerated from their race by some accidental cause." Buffon says: "This last opinion appears to me, I own, the most probable; and had travellers given us as exact descriptions of the Bedas and of the Chacrelas as Wafer has done of the Dariens, we should perhaps have discovered that the former could no more have been of European origin than the latter. What seems to give great weight to this notion is, that among the negroes there are also white children born of black parents. Of two of these white negroes we have a description in the history of the French Academy; one of the two I saw myself; and we are assured there are not a few to be met with in Africa among the other negroes.

"From what I have myself observed, independently of the information of travellers, I have no doubt that these white negroes are negroes degenerated from their race. Instead of being a peculiar and established species of men, they are only particular individuals who happen to form an accidental variety. In a word, they are among the negroes what Wafer says our white Indians are among the yellow Indians, and what to all appearance the Chacrelas and the Bedas are among the brown Indians. Still more singular it is, not only that this variation never happens but from black to white, but that all the nations of the East Indies, of Africa, and of America, in which these white men are found, are in one latitude. The Isthmus of Darien, the country of the negroes, and Ceylon, are absolutely under the same line. White, then appears to be the primitive color of nature, which climate, food, and manners alter, and even change into yellow, into brown, or into black; and which, in certain circumstances, reappears, though by no means equal to what it was, on account of its corruption from the causes here mentioned.

"Nature in her full perfection has made men white, and nature reduced to the last stage of adulteration, renders them white again. But the white of the species, or the natural white, is widely different from the white of the individual, or the accidental white. In plants, as well as in men and in animals, do we find examples of this truth. The white rose, the white gillyflower, etc., are greatly different, even in point of white, from the red roses, or the red

gillyflowers, which become white in autumn, after suffering the evening colds and the frosty chills of that season.

"A farther proof still that these white men are in fact merely individuals who have degenerated from their species, is, that they are all less strong and less vigorous than the others, and that they have eyes extremely weak. This fact will appear less extraordinary when were collect that, among ourselves, those men, who are remarkable for the flaxen fairness of their complexions, are commonly remarkable also for the weakness of their eyes. I have remarked also that such people are often slow of hearing, and it is pretended that their dogs, which are absolutely white and without a spot, are deaf. Whether this observation is generally just, I know not; all I can assert is, that, in a number of instances, I have seen it confirmed."[1]

Flavius Josephus, in his great work on the "Antiquities of the Jews," on the other hand, in his account of the creation of the world, says that *Adam* implies, in the Hebrew language, *red*, because the first man was formed of the purest and richest kind of earth, which is of that color.

John Hunter, in his interesting and curious remarks "On the Color of the Pigmentum of the Eye in Different Animals," contained in his *Observations on Certain Parts of the Animal Economy*, unlike Buffon, advocates the view that the *changes of color in man and animals are always from the dark to the lighter tints.*

This celebrated observer says:—

"The propagation or continuance of animals in their distinct classes is an established law of nature, and in a general way is preserved with a tolerable degree of uniformity; but in the individuals of each species, varieties are every day produced in color, shape, size, and disposition. Some of these changes are permanent with respect to the propagation of the animal, becoming so far a part of its nature as to be continued in the offspring.

"Animals living in a free and natural state are subject to few deviations from their specific character; but nature is less uniform in its operations when influenced by culture. Considerable varieties are produced under such circumstances, of which the most frequent are changes in the color. These changes are always, I believe, from the dark to the lighter tints, and the alteration very

[1] The Natural History of Animals, Vegetables, and Minerals, with the Theory of the Earth in General, trans. from the French of Count de Buffon, by W. Kenrick, LL.D., vol i. pp. 269–270.

gradual in certain species, requiring in the Canary bird several generations; while in the crow, mouse, etc., it is completed in one. But this change is not always to white, though still approaching nearer to it in the young than in the parent, being sometimes to dun, at others to spotted, of all the various shades between the two extremes. This alteration in color being constantly from dark to lighter, may we not reasonably infer that in all animals subject to such variation the darkest of the species should be reckoned nearest to the original; and that where there are specimens of a particular kind, entirely black, the whole have been originally black? Without this supposition it will be impossible, on the principle I have stated, to account for individuals of any class being black. Every such variety may be considered as arising in the cultivated state of animals; but whether, if left to themselves, they would in time resume their original appearances, I do not know.

"The color of the pigmentum of the eye always corresponds, I believe, with that of the hair and skin, especially if the animals be only of one color, but is principally determined by the hair; and the most general color is a very dark brown, approaching to black, whence it had the name nigrum pigmentum. . . .

"The human species is a striking example of the color of the pigmentum corresponding with that of the skin and hair; and though the skin and hair of one person differ very considerably from the skin and hair of another, yet it is not in so great a degree as in many animals. There are cattle perfectly white, white sheep, white dogs, white cats, and rabbits; but there are few of the human species that we can say are perfectly white. They rather pass from the black into the brown, red, and even light yellow; and we find this pigmentum, although only of one color, varying through all the different corresponding shades. In the African negro, the blackness of whose hair and skin is a great distinguishing characteristic, this pigmentum is also very black. In the mulatto, who has not the skin so dark as the African, but the hair nearly as black, this pigmentum is of a shade not quite so deep; yet still it does not approach so near to the middle tint as the skin, rather following the color of the hair. In people of a swarthy complexion, as Indians, Turks, Tartars, Moors, etc., we find the hair always of a jet black, and this substance of a much darker brown than in those that are fair. In those of very dark complexions, and having very black hair, although descended from fair parents, the same

thing holds good. There are few species of animals, or even individuals of a species whose bodies are only of one color. Crows and some others are exceptions; but the greatest number are of two or more, being variously spotted or streaked either with different colors, or with shades of the same. Many species are constantly lighter in some parts of the body than in others, and, with a few exceptions, animals are generally lighter, as to color, on the lower, or what may be called the foreparts, than on the upper or backparts. The fair man or woman may strictly be considered as a spotted or variegated animal. In many persons the hair of the head, eyebrows, eyelashes, beard, and hair on the pubes, all vary in color. The hair of the first three may be called fœtal, and are oftener all of the same than of a different color; the last two are to be considered as adult hair, and are commonly alike in color, which yet frequently varies from that of the fœtus, which last is more liable to change its color than the other; and the change is generally that of growing darker, especially on the head and eyelashes. This difference in the color of the hair on different parts of the body is not so observable in those nations who are dark or swarthy, as in people inhabiting many of the northern climates."[1]

But few observations have been recorded which show any actual disease in the albino. The extreme sensitiveness of the albino to the action of light is not due to any peculiarity of organization in the nervous structures; but to the absence of the black pigment, which has the important office of absorbing superfluous portions of light, and thus as it were deadening its effects. As the ultimate distribution and arrangement of the optic nerve are the same in the retina of the eye of the albino as in that of ordinary human beings having the usual amount of pigmentum nigrum, it follows as a necessary consequence that the action of the rays of light, and especially that portion of the rays which excites active chemical change, must be far more intense in the former. This abnormal excitement of the nervous system of the albino under the stimulus of light is due not to any inherent weakness, nor to any pathological condition of the nerve centres, but simply to a physical and mechanical defect in the apparatus of vision.

It is, therefore, chiefly to the bright light and high heat of the tropics that we must attribute the apparent delicacy of albinos in Africa. The morbid condition of the skin induced by the heat is

[1] The works of John Hunter, F.R.S., edited by James F. Palmer, London, 1837, pp. 277–280.

not observed in the European albino in cold climates. The effect of the hot sun in blistering the fair skin of the white man in warm regions is well known; and from the far greater delicacy of the skin of the albino, the blistering and cracking effects of the hot sun are far greater. From these causes, as well as from the idea of imperfection, the albino is generally regarded in Africa with a degree of compassion and even contempt. Dubois observes that they are named lepers by birth, amongst the negroes, and that when they die their bodies are not buried or burnt, but cast on dung-hills. According to Vossius, they are avoided by the other negroes, because they are supposed to be diseased; and De la Croix says the negroes regard them as monsters, and do not permit them to multiply.

Dr. Winterbottom saw a white African woman with a remarkably coarse and wrinkled skin. In this case he described the skin as dry and harsh to the touch, and marked by deep furrows; it had a reddish tinge in parts exposed to the sun, and was of a dirty white in other situations, and black spots, like freckles, of the size of a pea, were thickly scattered over the skin. Another tall and well-formed white negro had a similar rough, harsh, and freckled skin, and, another white negress had the skin of an unpleasant dead-looking white, and, although pretty smooth, beginning to assume a cracked appearance from the action of the sun.

Cook described the skin of the albino which he observed at Otaheite, as of a dead white, scurfy, and covered with white down.

As far as my experience and knowledge extend, the albino many be, nay is, most generally strong and healthy, and executes all the functions of life in a vigorous and perfect manner.

In the cases which we have recorded, the grandfather, grandmother, and mother, notwithstanding the marked tendency which they exhibited to albinism in the spots of the skin, were strong, healthy, robust, and hardy; the little living albino is one of the finest looking and most sprightly negro children that I have ever seen; the albino negro man pursues his daily labor and enjoys excellent health; and of several other instances which have come under my observation, of grown negro and Anglo-Saxon albinos, male and female, the usual amount of health and physical strength was enjoyed.

In two cases of albino negro women that have come under my observation, the individuals have been able to perform active labors, and have borne children to their husbands.

The albinos which I have observed amongst animal have been

neither diseased nor wanting in strength, nor the power to propagate their species, and even to transmit the characteristic color to their offspring. In my boyhood I attended school in an extensive forest, on the coast of Georgia, and upon the banks of a small stream about a quarter of a mile from the school-house, a family of white rabbits of the common species of the country (Lepus sylvaticus) bred for years, and were seen from time to time by the little company attending the log school-house.

The ability of the domestic white rabbit, and of the tame white mouse to procreate, and to propagate a special variety, is known to all naturalists.

The original color of the domesticated rabbit (Lepus caniculus) in its wild state in England and on the continent is, upon the upper surface, uniformly gray, without varieties in its native warrens; yet in its domesticated state the European rabbit has produced an *albino race,* which has been propagated for centuries.

Dr. Bachman, of Charleston, South Carolina, has kept this variety separate from others, and observed it closely, and he affirms that in the period of twenty years, when there must have been a hundred generations in that prolific breed, not one of a different color was produced, nor did they exhibit the slightest tendency to disease. The same may be said of the white mice, the albino rats, and the albino ferrets of England and France.

In proof of the assertion that albino varieties sometimes originate and may be propagated continuously amongst wild animals, Dr. Bachman cites the existence of a family of white raccoons (Procyon loter), which had existed in Christ Church parish, near Charleston, for many years, from which neighborhood this distinguished naturalist had from time to time received specimens. Dr. Bachman observed that about half of these white raccoons had the pink eyes of the albino.

Gray, of London, has described a raccoon from Texas, under the name of *procyon nivea,* which Dr. Bachman ascertained, by an examination of the original specimen, to be of this white variety. Dr. Bachman has also seen several families of the Carolina gray squirrel, that were albinos. This close observer and accomplished naturalist has said that he had "not a doubt that could the albinos of various species of animals be prevented from mixing with the common varieties, they would perpetuate their breeds possessing this peculiarity."[1]

[1] Doctrine of the Unity of the Human Race, pp. 187–189.

It is well established, therefore, that in all the lower animals, albinos mated with each other produce albinos that are perfectly healthy, and propagate as rapidly as any other varieties.

It has been still further shown by naturalists that the albino may lose the pink color of the eye, and, at the same time, regain the usual tolerance of light and strength of vision of those who have the choroid coat of the eye of a black color.

Dr. Bachman examined about a dozen specimens of Virginia deer, that were either altogether or nearly white, and found but one possessing pink eyes; and he has also observed that in the domesticated white rabbits and other quadrupeds, as well as in many wild birds, the smallest dark spot on the quadruped or bird is followed by the usual natural color in the eyes; in a white rabbit, having a black spot on one of its ears, the eye on the same side was of the common color, and the opposite one pink; and in domesticated animals, birds, horses, cows, sheep, goats, pigs, turkeys, geese, ducks, fowls, and pigeons, that are of a uniformly white color, pink eyes are scarcely ever observed.

John Hunter has some interesting observations upon the same subject. When treating of the *color of the pigmentum of the eye in different animals*, he says:—

"In animals which are variegated let us observe the color of this pigmentum, and we shall find it regulated by some general principle, and corresponding with the color of the eyelashes. The magpie, for instance, is nearly one-third or fourth part white; and the two colors, if blended, would make the compound gray; but the eyelashes being black the pigmentum is black also. We sometimes meet with people whose skin and hair are very white, and yet the iris is dark, which is a sign of a dark pigmentum; but if we examine more carefully we shall also find that the eyelashes are dark, although the eyebrows may be the color of the common hair. . . . .

"In people remarkably fair, whether they are of a race that is naturally so, or what may be called monstrous in respect to color, as white Æthiopians, still we find this pigmentum following the color of the skin and hair, being in some of a light brown, and in others almost white, according to the color of the hair in such people. . . . .

"The variation of color appears most remarkable when a white starts up, either when the whole species is black, as in the crow or blackbird, or when only a certain part of the species is black (but

permanently so), as a white child born of black parents; and a perfectly white child, whose hair is white, and who has the pigmentum also white, though born of parents who are fair, should as much be considered as a play of nature as the others. All these *lusus naturæ*, such as the white negro, the pure white mice, etc., have likewise a white pigmentum corresponding with the color of the hair, feathers and skin."[1]

In some cases children born with red eyes and white hair, in their progress to maturity gradually lose these peculiarities, and their eyes, hair, and complexions assume more natural colors.

Professor Graves, of Dublin, has given the following illustration of this change in the albino:—

"Last year Dr. Ascherson informed me that he had seen a case of the after development of the pigment of the eye in an albino boy three years old. This child had at its birth white hair, and violet-colored eyes, with dark red pupils. At the end of the third year its hair was light brown, and its eyes were blue, but they had still, in a remarkable degree, though less so than before, that restlessness peculiar to albinos. This was the only case of the kind I ever heard of, except that communicated by Michäelis, in Blumenbach's *Medicinische Bibliothek*, vol. iii. p. 679; which, however, rests only on the uncertain authority of some peasants. Singularly enough, I had soon the good fortune to meet with a similar case myself. In my younger days there were two children, a brother and sister living near me, who presented such striking symptoms of leucosis in their eyes, hair, and skin, that they were recognized as albinos even by non-medical persons. My attention was lately drawn to them by an advertisement in the papers in which their name occurred; and I learned that the brother had become a tobacconist; but to my great astonishment, on going to see him, I found that his eyes had changed from violet-red to gray, and his hair from white to light brown, and that the susceptibility of the eyes to the light had greatly diminished."

To the prolific, intelligent, and vigorous nature of albinos, several writers have testified.

Mr. Jefferson describes the seven examples of albinos, in the negro race, which came under his observation, as uncommonly shrewd and quick in their apprehension and reply. Three of these were sisters, having two other full sisters who were black.

[1] Loc. cit., pp. 280-281.

Two of them bore black children to black men; another white albino negress had a black daughter by a black man; and another albino negress much freckled, and with very weak eyes, bore an albino child to a black man. All the individuals observed by Mr. Jefferson were well formed, strong, and healthy.

M. Sachs, who gives a minute account of this peculiarity in his own person and that of his sister, repels the charge that the intellect of the albino is weak.

Winterbottom mentions cases of fertility among albinos, and in an example which he mentions, the daughter of two mulattoes, born in Nova Scotia, who had all the negro features, with woolly hair of a dirty white color, and a skin equalling in whiteness that of a European, there were no signs of cachexia or leprosy, and the skin was without anything disagreeable in appearance or texture.

No signs of disease were discovered in the two Swiss youths described by Blumenbach and Saussure; and Pallas considered the notion of disease in the African albinos as unfounded.

Dr. William Lawrence considers the view that albinos labor under a diseased state as completely incorrect; in fact this distinguished surgeon and physiologist, in his *Lectures on Physiology, Zoology, and the Natural History of Man*, affirms that they do not exhibit a single character of disease; all their functions are executed as in other persons; they are born of healthy parents, occur amongst the robust and hardy members of savage tribes, and can both beget and conceive.

Dr. Lawrence sustains this assertion by ample and uncontrovertible examples.

Dr. Bachman says that, to his certain knowledge, both sexes of the albinos are prolific, and cites examples, proving this proposition, occurring in Virginia and South Carolina. And we conclude this section of our inquiry in the language of this naturalist:—

"If, as we here perceive, nature makes so wide a stride, as without a single step black races of quadrupeds or birds are converted by the process of nature into white races, and a black pair in the human race produces a white progeny, we may learn how many phenomena there are in nature which the knife of the anatomist cannot reach, and all the investigations in physiology are unable to fathom. Even admitting that the case cannot be reversed in regard to our species, and that the white pair never produces a black offspring, they will recollect that they have afforded us no evidence that our white race, in the present acceptation of the term,

is of the color of the original man; that, therefore, as in conformity with the other operations of nature, a variety does not return to the characteristics of the original species, so we can have no well grounded belief that any change will convert the white into a colored man; on the other hand, if the original color was dark, whatever may have been the shade, this was the very color of the races in which, in all ages and countries, the greatest number of white varieties have been produced. In the production of these albinos, however, we perceive at least how suddenly nature carries one extreme to the other, and how many admonitions are offered us not to pronounce a hasty judgment, without being supported by such facts as will warrant us in arriving at a correct conclusion."[1]

SECTION V.

SEAT AND NATURE OF THE CHANGE OF COLOR IN THE ALBINO.

EYES.—M. Blumenbach accounted for the red color of the pupil, and the extreme sensibility of the eye to light, by the absence of the *pigmentum nigrum*.

He observes that Simon Pontius, in his treatise, "De Coloribus Oculorum," long ago remarked that the interior membranes of blue eyes are less abundantly supplied with that brown or blackish mucus which, about the fifth week of conception, covers all the interior parts of the eye, and are therefore more sensible of the action of light. He adds that this sensibility of blue eyes is very conformable to the situation of northern people during their long twilight; and that, on the contrary, the deep black eyes of negroes enable them to bear the strong glare of the sun's beams in the torrid zone. As to the connection between the red color of the eyes and the whiteness of the skin and hair, Blumenbach held that it is owing to a similarity of structure. This black mucus is formed, as he asserts, only in the delicate cellular substance, which has numerous bloodvessels contiguous to it, but contains no fat, like the inside of the eye, the skin of the negro, the spotted palate of several domestic animals, etc., and the color of the hair generally corresponds with that of the iris.

About the same time, M. Buzzi, surgeon to the hospital at Milan, demonstrated by dissection the truth of the hypothesis of M. Blumenbach.

[1] Loc. cit., p. 191.

In dissecting the body of a peasant who died at the age of 30 years, in the hospital of Milan, of a pulmonary disorder, and who was remarkable for the uncommon whiteness of his skin, hair, beard, and all the other covered parts of the body, M. Buzzi found the iris of the eyes perfectly white, and the pupil of a rose color; and the eyes were altogether destitute of the pigmentum nigrum, or black membrane, which was not discernible either behind the iris or under the retina. Within the eye he found the choroid coat extremely thin, and tinged of a pale color, by vessels filled with discolored blood. The skin, when separated from different parts of the body, appeared to be almost wholly divested of the rete mucosum, nor was the least trace of it to be discovered by maceration, even in the wrinkles of the abdomen, where it is most abundant and most visible. The whiteness of the skin and hair were ascribed by M. Buzzi to the absence of the rete mucosum, which in his judgment gives the color to the cuticle and to the hairs that are scattered over it. In proof of this opinion, he alleges a well-known fact, that if the skin of the blackest horse be accidentally destroyed in any part of the body, the hairs that afterwards grow on that part are always white, because the rete mucosum which tinges these hairs is never regenerated with the skin.

The peculiar appearance of the eye of the albino is due to the absence of pigment from both portions of the vascular tunic or *uvea* of the eyeball, the choroid, and the iris.

The color of the iris depends upon the fine vessels which are so numerous in its composition, and that of the pupil on the still greater number of capillaries, which almost entirely form the choroid membrane; the black pigment which lines the choroid, as well as the coloring substance of the iris, being defective, a red tinge is imparted to the light which penetrates the transparent blood-vessels of the iris and the anterior part of the eye. This absence of the black pigment, which has the important office of absorbing superfluous portions of light, renders the eye preternaturally sensible to this stimulus.

In the natural eye, the pigmentum nigrum which forms the inner layer of the choroid and rests upon the external thicker and vascular layer of this membrane, is a continuous purely cellular layer completely investing the inner or vascular surface of the choroid, and consisting, as far as the ora serrata, of a single layer of almost regularly hexahedral, contiguous cells, disposed in an elegant mosaic manner, and filled with brownish-black pigment.

From the ora serrata onwards, the pigment cells are disposed in several layers, and are so entirely filled with pigment that the nuclei even are scarcely visible. The pigment of the choroid consists of minute, flattened, oval corpuscles, the largest of which are not more than 0.0007 of a line long. In albinos, only the pigment of the hexahedral choroid cells is wanting; the cells which, in other animals, contain this coloring matter, forming the pigmentum nigrum, exist, but they are perfectly colorless. The red color, therefore, of the eye of the albino, is due, not only to the absence from these cells of the pigmentary matter, but also to the blood filling the vessels of the vascular layer of the choroid.

SKIN.—The varieties in the color of man and animals have their seat in the epidermis, or outer coating of the body, external to the true skin; and to this exodermal structure must be referred also such appendages as the hair, feathers, horns, and hoofs.

Careful microscopical research has shown that the *rete mucosum* of the epidermis, first described by Malpighi, and in which the color of the skin resides, is not a distinct membrane, but is nothing more than a soft epidermic layer of delicate polyhedral cells, which are incessantly transformed into the flattened and comparatively dry scales of the cuticle, and are constantly reproduced from the surface of the dermis. The three distinct parts of the integument of the negro described by Albinus, the four layers described by Cruikshank in his series of observations on the skin of the negro affected by the smallpox, as well as the four layers described by M. Gaultier, and M. Flourens, interposed between the cuticle and the true skin, have all been shown by the careful microscopical researches of Henlé, Parkinge, Schwann, Kölliker, Bowman, and others, to be not distinct membranes, but only the complicated cellular structure of the outer skin. The series of layers of cells which compose the epidermis are continually wearing off at the external surface, and are being as continuously renewed at the surface of the true skin, so that the newest and deepest layers become the oldest and most superficial, and are at last thrown off by slow desquamation; and in their progress from the internal to the external surface of the epidermis the cells undergo a series of well-marked changes involving not only their form, but also their chemical constitution and color.

The innermost layer (*rete mucosum*) resting upon the true skin, in which the coloring matter of the different races resides, consists of small, soft, easily destroyed nuclei and cells in various stages of

development, held together, according to most observers, by a tenacious semi-fluid substance. In albino individuals, both of the negro and other races, and in the pure unmixed white races, this soft epidermic layer is colorless, and, like the cuticle, translucent, and hence it allows the color and vascularity of the dermis to be seen; in the negro, its cells, especially the deeper ones, are filled with brown or black pigmentary matter, which produces the characteristic color of the race; smaller quantities of the same material give rise to the various shades of complexion of other races, and of different individuals of the same race, and even of different parts of the skin of the same person.

The sunburnt complexion, the periodic changes in the color of the nipple in the female, the dark moles and congenital marks of the skin, and freckles in the fair complexion, are all due to the development or increase of the same coloring matter in the developing cells of the deepest portion of the epidermis.

According to Henlé, the dark color of the negro is caused by the presence of pigment cells in this portion of the epidermis, resembling those of the choroid in almost every respect save their size, which is somewhat less. These are intermixed with colorless cells, and on the proportion of the two, the depth of the color of different parts depends. According to the same authority, the darker parts of the European skin owe their color to pigment cells like those of the negro, only still smaller in size, less defined in their outline, and less numerous. In the negro, Henlé found the cells which contain the black pigment aggregated, especially on those parts of the rete which project and correspond with the furrows on the surface of the cutis. They resemble in form the cells in the pigment of the eye, that is, they are sometimes completely hexangular, but more commonly only approximating to this shape, being polyhedral, or irregularly spherical. Their length, according to Henlé, reached to 0.0039–0.0062 line; their breadth to about 0.005 line.

Krause affirms that the dark color of the cuticle, both of the negro and white races, depends chiefly on the presence of cells which have dark brown nuclei, the substance of the cell being also tinged, but less deeply than the nucleus, and the color being diffused through the mass, and not caused by molecules. He admits that a few true pigment cells are found in the negro's skin.

According to Bowman, the coloring matter, however various in quantity and hue, consists of oblong or oval grains of extreme minuteness ($\frac{1}{20,000}$ of an inch in their long diameter), and occupy-

ing the interior of some of the epidermic particles; in the negro it accumulates in large quantity and completely envelops the nuclei, immediately resting upon the cutis. On examining a vertical section of the whole cuticle of the negro, the coloring matter will be seen to gradually diminish towards the surface, and no true line of demarcation can be discovered between the two portions; and in the most deeply colored portions it is even possible to discover a sort of stream of colored grains advancing towards the surface.

According to Kölliker, the horny layer of the epidermis, in the white races, is colorless and transparent or slightly yellowish, the mucous layer yellowish-white or brownish. The color is deepest in the *areola* and in the nipple, passing even into blackish-brown, especially in women during pregnancy and after they have borne children; it is less intense in the *labia majora*, the *scrotum*, and the *penis*, where for the rest it varies greatly, being sometimes almost entirely absent, sometimes very distinct, and is least considerable in the axilla and around the anus. Besides these situations, which in most individuals are more or less tinged, in the dark complexioned more than in the fair, a lighter or more deeply colored, frequently very dark pigment is deposited in various other localities, in the stratum Malpighii; in pregnant women in the *linea alba*, and in the face (rhubarb-colored spots); in persons who are exposed to the sun, in the face, especially the brow, chin, and cheeks; in the neck, the thorax, the back of the hands, the forearm; and in dark persons over almost the whole body. These tints, according to Kölliker, are not produced by special pigment cells, but are seated in the common cells of the mucous layer, round whose nuclei a finely granular or more homogeneous coloring matter or actual pigment granules are deposited. When the skin is only slightly colored, it is mostly only the neighborhood of the nuclei, and in fact only the lowermost layers of cells, which are implicated, so that in perpendicular sections the papillæ are seen to be surrounded by a yellowish fringe; dark shades are produced by the extension of the color to two, three, four, and more layers of cells, and over the whole cell contents; sometimes by a darker coloration of the deepest layer of cells; the two conditions commonly coexisting. In the negro, and the other *colored human races*, it is only the epidermis which is colored, whilst the *corium* completely resembles that of Europeans. The pigment, however, is far darker and more abundant. In the negro, in whom, as regards the arrangement and size of the cells, the epidermis is precisely like

that of the European, it is the perpendicular cells of the deepest part of the mucous layer which are darkest (dark brown or blackish-brown), and they form a sharply marked fringe contrasted with the clear *corium*. To these succeed clearer but still brown cells, which are accumulated particularly in the depressions between the papillæ, but are also found on their points and lateral portions in many layers; finally at the boundary close to the horny layer there follow brownish-yellow or yellow, or rather pale, more transparent layers. All these cells are colored throughout, with the exception of their membranes, and especially the parts round the nuclei, which, in the internal layers, are by far the darkest portions of the cells. The horny layer of the negro also inclines to yellow or brownish. In the yellowish skin of the Malay head in the anatomical collection at Würzburg, Kölliker found the same appearance as in a dark-colored European scrotum.

This distinguished microscopist and anatomist concludes from his investigations, "*that the epidermis of the colored races is in no essential point distinguishable from the colored regions in the white man, and it even agrees in nearly all respects with that of certain localities* (*the areola of the nipple, for instance*)."

Schwann has shown that the chemical properties of the cells of the epidermis become modified as they pass through their various changes and approach the surface, becoming finally hard, horny, and dry, and almost identical in composition with hair, horns, and hoofs; and there can be but little doubt but that the decrease of color in the superficial laminæ in the colored races is due to this chemical change which gradually takes place in the interior of the epidermic particles.

It is therefore more just to look upon the cuticle as a continuous cell-growth evolved from the superficial surface of the cutis or true skin; and the idea that it was formed of distinctly organized membranes, continuous and independent of the contiguous structures, was inferred from the crude and imperfect methods of dissection and examination with the naked eye. By the simple and comparatively rude processes of maceration and dissection apart from microscopical examination, the epidermis from the different physical and chemical properties of the different layers of cells was readily divided by the older anatomists into different layers or membranes, as they expressed it; but the results of such method of investigation hardly warrant the conclusion of M. Flourens and others, that

the skin of the negro is specifically different from that of the white race.

Many facts, recorded by various observers, are wholly unintelligible, if the proposition maintained by M. Flourens be true.

It is well known that disordered states of the constitution may occasion marked changes in the complexion of the white races.

Malarial fever renders the complexion sallow and dusky. Dr. Strach mentions the case of a man who, after a fever, became as black as a negro. We have before considered the changes in the color of certain portions of the skin during the period of pregnancy.

Bowman mentions a French peasant, whose abdomen became entirely black during each pregnancy. Camper has given an account of a female of rank who had naturally a white skin and beautiful complexion, but whenever she became pregnant began immediately to grow brown; after delivery the dark color gradually disappeared. Blumenbach possessed the part of the skin taken from the abdomen of a beggar, which was as black as the skin of an African.

Blumenbach has seen two instances in Germans; one of a youth, the other of a man sixty years old; they both had a rather tawny skin, marked here and there with various sized spots of the clearest white. They appeared first in the former in infancy, and in the latter at the age of manhood.

The offspring of the black and white races may be either black or white, instead of being mixed; and in some rare cases it has been spotted.

Dr. James Parsons has recorded two singular instances which sustain this proposition.

A black man married a white woman in York, England. The woman soon proved with child, and in due time brought forth one entirely black, and in every particular of color and features resembling the father, without the least participation from the mother. This was thought a very singular case, because people naturally expect the issue of such a marriage would be tawny; which indeed is the usual effect produced by the congress of black and white persons. The second case was of a black man, servant to a gentleman who lived in the neighborhood of Gray's Inn. He married a white woman who lived in the same family; and when she proved with child, took a lodging for her in Gray's Inn Lane; when she was at her full time, the master had business out of town, and took his man with him, and did not return till ten or twelve days after

the woman was delivered of a girl, which was as fair a child to look at as any born of white parents, and her features exactly like the mother's. The black, at his return, was much disturbed at the appearance of the child, and swore it was not his; but the nurse who attended the lying-in woman soon satisfied him; for she undressed the infant and showed him the right buttock and thigh, which were as black as the father, and reconciled him immediately to both mother and child. Dr. Parsons was informed of the fact, and went to the place, where he examined the child, and found it true; this was in the spring of the year 1747, as his notes specified which he took on the spot.[1]

A negress had twins by an Englishman; one was perfectly black, with short woolly curled hair; the other was light, with long hair.

Dr. Winterbottom says that in a family of six persons, which he knew, one half was almost as light colored as mulattoes, while the other was jet black. The father was a deep black, the mother a mulatto.[2]

We have already given examples of negroes who were gradually changed into spotted and even white persons, without any accompanying disease.

Dr. Gustav Simon, of Berlin, after a careful investigation of the various discolorations, or diversities of hue, which make their appearance on the skins of Europeans, including healthy and natural varieties of tint, and those which occur in morbid states of the system (discoloration of the areola mammarum, brown discoloration of circumscribed spots, *nævi materni*, or congenital spots, moles, summer freckles, lentigo), arrived at the important conclusion that they depend upon the presence of similar cells filled with pigment, which impart the color to the skin of the negro and the dark races of mankind.

The correctness of this conclusion has been established by the investigations of Krause, Bärensprung, and Kölliker. These authors have also shown that in certain diseased states of the skin, as in ichthyosis, and in cicatrices after chronic inflammation of the skin, the pigment may be developed directly from the blood-corpuscles, and may be deposited in the corium and papillæ.

A colored epidermis may be also produced by a parasitic vege-

[1] Philosophical Transactions, 1765, vol. lv. p. 45.

[2] Laurence's Lectures, p. 205.

table growth, as in yellow spots of ephelides, or pityriasis versicolor. Dark colorations of the white races may also arise from a deposition of the coloring matters of the bile, and also of certain metallic substances, as oxide of silver. Such cases therefore must be carefully distinguished from the foregoing discolorations of the skin.

The greatest variations of color are witnessed among animals and birds; and these marked changes are not confined to domesticated animals and birds.

Not only may white sheep produce black lambs, and every variety of color spring up in the same drove of horses, herd of cattle, and flock of ducks and fowls; but many species of wild birds and quadrupeds present themselves under two or more distinct liveries in the course of the year.

Dr. Bachman, in an attempt to explain the process of nature in which these changes are produced, says:—

"These semi-annual changes in color are not confined to such species as have a constituted predisposition to such phenomena, but they spring up from causes which no one is able to explain, in species where color is generally uniform.

"We received from a friend a wild turkey, caught in a trap. At the moulting season, in the following summer, the new feathers came out nearly white, but after some weeks gradually returned to the original color. Our friend, Dr. Campbell, of Charleston, directed our attention to a top-knotted hen, on his premises, which had been received from Baltimore, whose color had been originally black, but which, after the moulting season, had become pure white, and continued so for a year, until the next moult, when it once more became black. Thus it continued for several years to alternate between the two opposite colors. All this while the bird remained in perfect health, and laid the usual number of eggs.

"Horses brought across the Atlantic are found to have white patches of hair over those portions where the skin had been rubbed off on the voyage. We perceive from hence how easily the coloring matter under the skin becomes deranged, and from what slight causes it imparts an entirely opposite color."

The congenital varieties arising amongst domestic animals may, as is well known, be established as permanent varieties, if the individuals with these new characters constantly intermix. Thus, the white rabbit and ferret have become fixed varieties. And facts are not wanting to show that similar varieties of color may be propagated in the human race; and in addition to those which we

have already recorded, we will quote the testimony of Hon. Joel R. Poinsett, as given by Dr. Bachman, to show that a race of spotted men exist in Mexico. "Saw, in the capital of Mexico, a regiment to number of six hundred men, called Los pintado, who were all spotted with blue spots in some parts of the body. The people are found along the Pacific coast just north of Acapulco. This regiment was commanded by Gen. Alvarez." Dr. Bachman continues: "These persons were all in fine health, and propagated these varieties from generation to generation. What there was in food, the climate, or the geological structure of the western coast of America, to produce this strangely-colored variety in the human species, we are unable even to conjecture. It was certainly not disease, as Mr. Poinsett represents them as a regiment of fine, healthy-looking men, in which there was not a solitary individual who was not spotted in this manner."[1]

Dr. James Cowlis Prichard, in his learned and elaborate work on the *Natural History of Man*, has well remarked that "it will be worth while to observe that the epidermic or horny tissue, corresponding in many tribes of animals to the extra-cutaneous texture which is the seat of variations in color, and in the hair of human beings, is precisely that part of the organic system which undergoes the most striking, and even surprising, alterations. It is the tissue which displays the variety of horns in tribes possessed of such appendages, some races of the same species having a great profusion of frontal antlers, while others are entirely destitute of them; and these variations, as we have seen upon evidence, were known actually to arise within the limits of one stock."

The hoofs, which are parts of the same structure, undergo similar changes; and in the remarkable instance of the solid-hoofed swine, there appears an imitation of the really specific structures of other tribes of animals. The appearance and structure of the epidermis undergo remarkable changes during the domestication of many wild animals. Thus, the rough, tuberculated skin of the wild asses of Persia disappears on domestication. And the history of the remarkable Porcupine family of England not only affords a striking illustration of the anomalies which display themselves in the textures external to the true skin, and of the wide range of variation to which those external coatings of the human body are subject, but it also illustrates the possibility of transmitting these peculiarities, unchanged, from parent to child.

[1] Loc. cit., p. 182.

"It appears, therefore, past all doubt," says Mr. Baker, who communicated an account of the father of the Porcupine family to the Royal Philosophical Society of London, "that a race of people may be propagated by this man, having such rugged coats and coverings as himself; and if this should even happen, and the accidental original be forgotten, it is not improbable they might be deemed a different species of mankind."

From these researches upon the changes of the color of the skin in the albino, in its relations to similar changes in the different races of man, and in the lower animals, we feel justified in drawing the following conclusion.

Between the epidermis of the white and the colored races, there is an identity of structure, and no such organic difference as indicates a diversity of origin and species of the different races. The only difference is, that the young epidermic cells of whites contain little or no coloring matter, or pigment granules, except in certain situations; while those of the black race are filled with coloring matter. The marked variations of hue in the same race, the sudden appearance of albinos in the races of man and animals, and the possibility of propagating this peculiarity; the gradual, and sometimes even sudden, appearance of pigment cells in various parts of the epidermis of the white races, and the gradual disappearance of the pigment cells from circumscribed portions, and even from the entire epidermis of the negro, all show that this difference can scarcely be regarded as permanent or structural, but is one of degree rather than of kind, and that the different complexions of mankind are not permanent and specific characters.

HAIR.—The hair of the negro albino is peculiarly adapted for investigation and comparison with the hair of other varieties of the human race; and I spared no effort to obtain accurate results.

The hair of the mother, father, grandmother, and of several other members of the family, connected by marriage and by blood with the albino children, as well as the hair of a number of other "black, woolly-headed, flat-nosed, and thick-lipped" negroes, and of mulattoes, quadroons, half-breed Indians and negroes, and of American and European white men, women, and children, and the wool, hair, and fur of several varieties of sheep and goats, and of various animals, as the tiger, panther, conger, bear, dog, mink, mole, muskrat, deer, etc., were carefully examined under the microscope, and subjected to the action of chemical reagents.

It is not my intention at the present time to enter into all the details of this investigation, especially as the differences in the hair,

wool, and fur of different animals would require long and elaborate descriptions, and careful drawings for their elucidation.

The hairs of the heads of the two albino children, and of the albino man, were, as in the case with the hair of the different varieties of the human race, composed of three well-defined portions.

In presenting the results of this inquiry, we will proceed from the exterior to the interior of the structures composing the hair of the head.

1st. The cuticle, or delicate external investment of fibrous substance, investing and closely united to the cortical substance.

The cuticle was marked by numerous, dark, irregular, and jagged lines, formed by the projecting edges of the component scales. In some parts of the outline of the hair, when viewed under high magnifying powers, small serrations were observed, which were due to the edges of the cuticular plates, which are directed upwards and outwards along the shaft.

By the use of a solution of potassa we were able to separate the cuticle, and to determine that it was composed of altered cells in the form of transparent flat plates. The slight bristling or serration of the edges in some hairs was due to the implicated manner in which these plates were disposed; and in many hairs, and in parts of the same hair, this serration was scarcely observed. Those writers are in error, however, who assert that the edge of the hair as viewed in profile is perfectly smooth. A perfectly smooth profile is manifestly impossible in a shaft covered with *plates*. This slight serration, however, originally must not be confounded with the deep regular serrations of wool.

I found a magnifying power of 430 diameters the best for the clear definition of the edges of the cuticular plates enveloping the cortical substance of the hair.

The appearance of the cuticle of the white hair of the albinos differed in no respect from that presented by the white hair of aged negroes, or of aged white persons.

The examination of the cuticle of the jet-black hair of the negro required more time and care, as it was not so readily distinguishable under the microscope, on account of the intense black of the entire structure. By the use of reagents, however, and especially of liquor potassæ, it was possible to detach the cuticle, and it was found to differ in no respect, either in its arrangement or general characters, with the exception of its color, from that of the albino or of the aged negro. The same result was observed upon a care-

ful examination and comparison with the hair of the white race, male and females, and of different ages.

I could perceive no essential, marked, or specific difference between the cuticle of the hairs of the albino, the black negro, the mulatto, quadroon, half-breed Indian and negro, and the white race.

On the other hand, the cuticle of the wool and fur of various animals is far more varied in its markings, and the serrations formed by the individual plates more distinct.

The wool of the sheep is far smaller in diameter than the hair of the human head, and the cuticular plates are more fully and regularly developed, and are not so thoroughly fused into each other.

The chief difference between wool and hair appears to be in the mode of development and disposition of the plates composing the cuticle, and the smaller size and more flattened and ribbon-like form. Hair and wool, although differing in these peculiarities, must be considered as intrinsically the same in their horny texture, relations to the skin, mode of development, and growth.

Not only are both wool and hair found in the covering of most animals, but the relative proportions of each may be altered by climate and other influences.

It was known from the earliest times that wool possessed the property of felting, but it has been shown only at a comparatively recent date, by Mr. Youatt, that the true cause of the felting property of wool, and at the same time its distinguishing character, when contrasted with hair, consists in its external serrated structure.

M. Monge was the first to assert that a feathered, or barbed edge, must be the structure of the surface of wool; that "the surface is formed of lamella, or little plates, which cover each other from the root to the point, pretty much in the same manner as the scales of a fish cover that animal from head to tail, or like rows placed one over another, as is observed in the structure of horns."

It does not appear, however, that M. Monge actually saw this peculiar structure under the microscope; and the credit of the demonstration rests with Mr. Youatt, who thus announced his discovery.

"On the evening of the 7th of February, 1835, Mr. Thomas Plint, woollen manufacturer, resident at Leeds; Mr. Symonds, clothing agent, of Cateaton Street, London; Mr. T. Millington, Surgeon of London; an esteemed friend, Mr. E. Brady, veterinary surgeon, at that time assisting the author in his practice; Mr. W.

H. Coates, of Leeds, veterinary pupil; Mr. Powell, the maker of the microscope; the author himself, were assembled in the parlor. A fibre was taken from a Merino fleece, without selection, and placed on the frame, to be examined as a transparent object. A power of 300 (linear) was used; and after Mr. Powell, Mr. Plint had the first ocular demonstration of the irregularities in the surface of the wool, the palpable proof of the cause of the most valuable of its properties, its disposition to felt. The fibre thus looked at assumed a flattened, ribbon-like form. It was of a pearly-gray color, with faint lines across it. The edges were evidently hooked, or more properly, serrated; they resembled the teeth of a fine saw. They were somewhat irregular in different parts of the field of view, both as to size and number. The area of the field was one-fortieth of an inch in diameter. By means of a micrometer, we divided this into four, and we then counted the number of serrations in each division. Three of us counted all four divisions—for there was a difference in some of them. The number was set down privately, and it was found that we had all estimated it at fifteen in each division. Having multiplied this by four, to obtain the whole field, and that by forty, the proportionate part of an inch, of which the field consisted, we obtained, as a result, that there were 2400 serrations in the space of an inch, all of which projected in the same direction, viz., from the root to the point. . . . . We next endeavored to explore the cause of this serrated appearance, and the nature of the irregularities on the surface, which might possibly account for the production of these tooth-like projections; we therefore took another fibre, and mounted it as an opaque object. . . . . We were presented with a beautiful glittering column, with lines of division across it, in number and distance seemingly corresponding with the serrations that we had observed in the other fibre, that had been viewed as a transparent object. It was not at once that the eye could adapt itself to the brilliancy of the object; but by degrees these divisions developed themselves, and could be accurately traced. They were not so marked as the inverted cones which the bat's wool presented, but they were distinct enough; and the apex of the superior one, yet comparatively little diminished in bulk, was received in the excavated base of the one immediately beneath; while the edge of this base, formed into a cup-like shape, projected, and had a serrated or indented edge, bearing no indistinct resemblance to the ancient

crown. All these projecting edges pointed in a direction from root to point."

The difference, then, between wool and hair, according to Mr. Youatt, are as follows: The fibre of wool is crisped or curled, the curls increasing according to the firmness and felting property of the wool; and in addition to this it is decidedly serrated; whilst hair, though sometimes curled, but in a very limited degree in comparison with wool, has its edge only scaly or rugose, and never truly serrated; and hence it is that hair, though it will entangle and barb to a certain extent, will not fold into a compact mass.

Dr. Eble, as quoted by Dr. Prichard, who examined with the microscope the wool of the Merino and of the Chinese sheep, says that all wool displays filaments twisted and matted in all directions; and, moreover, the shaft of the filament of wool does not keep an uniform calibre, but appears thickened here and there, and often swelled out with an appearance of knots. He adds, "I could everywhere distinguish clearly the so termed medulla or pith—the transparent canal; and could accurately discriminate between this and the cortical substance. Yet in the various proportions which these parts bear to each other is to be found the chief difference between the finest and coarsest wool. The cortical parts appeared in both almost equally thick and untransparent, at least near the edge. But the canal in common wool seemed divided into more numerous spaces, resembling irregular cells; while in the wool of the Merino sheep the cells appear more regularly arranged. The whole canal of the sheath seems to be separated by regularly interposed fine transverse laminæ. The hair of the Thibetan goat, of which the cashmere shawls are made, approaches in its texture very nearly to the Merino wool, only it is smaller in the diameter of the sheath, and the transverse laminæ appear not so regularly placed. The Chinese sheep has wool, and interspersed among it rough coarse hair."

In the wool of the bat the scales are so prominent as to produce the appearance of a series of cups, placed one in another, and having indented edges; the wool of the rabbit is fine, with sharp angular serrations, whilst the hair is covered with a scaly incrustation, and cannot be said to be serrated; the wool of the tiger, bear, seal, and Italian wolf-dog, have distinct and numerous serrations, while the hair of the animals is covered with scales like the back of a sole.

These well-known examples, which have been given by Mr.

Youatt and others, illustrate the difference between wool and hair; it must be acknowledged, however, that we need an extended investigation of this subject, embracing an inquiry into the mode in which changes of climate, culture, diet, and other circumstances, affect the growth and character of the clothing of animals.

2d. The fibrous, or cortical longitudinally striated substance of the hair.

In the albino, and in the white hair of the aged negro, and of the white race, these fibres are transparent; in hair of different colors they vary in the depth of the shade, and in the negro they are black. The only distinguishable difference in these fibres in the hair of different races, is the greater abundance of pigmentary matter in the hair of the negro.

In all the varieties of hair of the different races which we examined, the fibres of the cortical substance were resolvable under the action of strong chemical reagents into aggregations of flat, elongated fibre cells or plates, more firmly united longitudinally or at their ends, than in the direction of their breadth or sides.

In hair of different colors, the cortex in like manner presented various hues, and in addition contained darker spots, due to the accumulation of pigmentary matter. The accumulation of the black pigmentary matter in the cortex of the hair of the negro is immense and complete (the black is "dyed in the wool"), and the entire hair under the microscope resembled an opaque black rod.

By the application of reagents, however, it is possible to break up the component elements of the cuticle and cortex, in the hair of the negro, and by dividing the fibres and decreasing the intense black color, to reveal an entirely similar structure to that of the hair of the other varieties of the human race.

3d. The central or medullary substance was well defined in the hair of the albino, and in the white hair of old negroes.

In many of the hairs of the albino children it presented a yellowish color, and this gave the light yellowish tinge to the hair when viewed in mass.

The color of the medullary cells was also well marked and deeper in the brownish-yellow hair of the adult negro albino.

In the light hair of the white race, the medullary substance was in like manner more highly colored than the cortex and cuticle, thus establishing a close correspondence, even in the distribution in the coloring matter of the two races.

In the jet black opaque hair of the negro and mulatto, it was

easy to demonstrate the presence of the central medullary matter, by the use of the solution of potassa. These investigations were conducted carefully, and through comparatively long periods of time. The hairs were first examined in their natural state, and then subjected to chemical reagents whilst they were still under the magnifying glass.

The assertion that the hair of the negro is without a central medullary portion, distinct from the fibrinous cortex, is incorrect; with proper care and the proper reagents, it can be demonstrated under the microscope as readily as in the hair of the albino, or in the hair of the aged of other races, and in the lighter shades of hair of the white race.

In the negro, as well as in the white race, the medulla was composed of similar morphological elements, isolated cells, differing in form and arrangement from the fibres of the cortex.

From this investigation of the hair, we conclude—

(1) *The hair of the negro albino differs in no respect from that of the black negro, and from the hair of the mixed and pure varieties of the human race, except in the absence of pigment.*

(2) *The hair of the negro is similar in its development and structure, and in its ultimate morphological elements, to that of the other varieties of the human race. Whilst the shape or roundness of the hair of the negro is not so uniform as that of the white race, mulatto, and Indian; on the other hand, there is a variation in this respect in the individual hairs, which are frequently perfectly round in some parts, and more elliptical and twisted in others. Similar variations of the form of the individual hairs are met with in the closely curled black hair of individuals of the white race.*

(3) *The hair of the negro possesses all the characteristics of hair, and is not wool.*