

of the hair (Spiess, Landois), the white spots appeared dark by transmitted light, and white by reflected light. When on the stage of the microscope penetrating fluids were added to the hair after it had been cut at a white spot, air-bubbles were disengaged, the fluid saturated the hair tissue, and the white patch assumed the same color as the adjoining brown ones; besides, the microscope confirmed the observation made by the touch, that the hair-shaft was expanded on the white patches, where it was distinctly, though slightly, thicker than on the brown spots.

In order to explain the origin of ringed hair (*pili annulati*—Karsch), Landois (l. c., 2) has formulated the hypothesis "that by an intermittent irritation of trophic and vasomotor nerves, a hair-tissue is formed, within which a periodic interstitial development of gas takes place."

Treatment.

In the present state of science we can dispose briefly of the treatment of whitening of the hair. No further explanation is required to show that the "physiological" canities senilis is not amenable to treatment; but even for the other forms of whitening therapeutics will be available only in the very exceptional cases in which the dependence of canities upon a curable fundamental affection is probable. We know as little of remedies having a direct influence on the pigment-forming function of the hair matrix as we do of such as might be able to check a disposition to the development of gas.

According to old chemical analyses (Vauquelin¹), the color of the hair is due to contained sulphur, iron, and an oily ingredient. With the idea "of supplying the body with those substances which it lacked for the pigmentation of the hair," Eble and Pfaff gave these metals internally and had the head anointed with yolk of eggs, which is well known to contain sulphur and iron in considerable quantity. The good results which both authors claim for this method of treatment are probably illusory.

The hair possesses the quality of absorbing dye stuffs supplied to it from without. To this quality is due the abnormal coloration of the hair connected with some industrial occupations (blue color in cobalt and indigo workers, green in copper workers).

The method of giving the hair a darker lustre by anointing with oleum nuc. Jugland., oleum cassiæ cinnamomeæ, oleum macidis, is harmless, but insufficient where the canities has gained some extent, and at best of very temporary benefit. The metallic dye stuffs (combinations of lead, sulphur, iron, copper, silver, and bismuth) have the reputation of having injurious influence on the health or at least on the growth of the hair. At present it seems that nitrate of silver has displaced all other hair-dyes. Clever hair-dressers secure by it, according to the concentration of the solution employed and the duration of its action, the most various shades, from light-blond to deep black. The application of the silver nitrate solution is to be followed by moistening the hair with a solution of levigated sulphur (about 3:100), where a blond tint is intended to be produced; for black, the latter substance is to be replaced by pyrogallic acid in a concentration of 0.5:200. Since the toxic effect of pyrogallic acid has become known,² some caution is to be advised in the use of this agent. The use of lead preparations is to be directly discountenanced.

I am assured by thoroughly reliable persons that dyeing the hair with silver nitrate, alone or in combination with sulphur, has absolutely no injurious effects.

Anilin colors are said to be inapplicable because they are washed off too readily.

¹ Annales de Chimie, T. lviii., 1806, Avril, pp. 41-53; translated in Gehlen's Journal für Chemie u. Physik, 3 Bd., 2 Hft., No. 7, by Eble, l. c., p. 62.

² Neisser, Zeitschr. f. klin. Medicin, Bd. 1, Heft 1, 1879.

ANOMALIES IN THE COLOR OF THE SKIN.

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PIGMENT HYPERTROPHY.

As in the different human races the pigmentation of the skin varies between the deep black of certain negro races and the often almost white color of the Caucasian, so we see similar, though much slighter variations in the color of the skin in the individual races, without our being able to term them pathological. In this respect we find in every race individual differences which may not be inconsiderable, but the cause of which is still quite obscure and which are not of the slightest pathological importance. The only etiology we are able to give for this is heredity. The diffuse pigment hypertrophy in certain diseases will be discussed hereafter.

In this connection it may be remarked that this congenital pigment hypertrophy always develops in extra-uterine life. In the strictest sense of the word, therefore, we can only speak of a congenital predisposition; however, this relation prevails especially in many cases of pigmentation, whether due to a physiological or a pathological cause, and in this respect I call to mind only the well-known fact that the children of the colored races are born with a perfectly white skin, and the pigmentation peculiar to them does not develop until the first period of extra-uterine life.

Diffuse hyperpigmentation is opposed to circumscribed accumulation of pigment which likewise is in part physiological, *e. g.*, the greater pigmentation of the nipples and genitals.

Among the pathological circumscribed hyperpigmentations we distinguish, as the first division, the *nævi*, *lentigines*, and *ephelides* which are either congenital or rest on a congenital predisposition; as the second group, the local pigmentations occurring with certain alterations of the body, the *chloasmata*, and the pigmentations in consequence of external irritations and after diseases of the skin.

NÆVUS.

Under this title we group together those congenital alterations of the skin in which is present, in the first place, a circumscribed augmentation of pigment, but in which other parts of the skin, the corium, the papillary body, the corneous layer, may also be hypertrophied. Hence nævi may be divided for the present into two sub-classes—smooth nævi (*N. spilus*), in which we have to deal essentially only with an abnormal pigmentation, and verrucose nævi (*N. verrucosus*), in which other parts of the skin are at the same time more or less hypertrophic. Verrucose nævi may be still further subdivided into nævi cornei, pilosi, papilloi, and mollusciformes; but as we meet here with the most manifold combinations and transitions, it is impossible to strictly carry out such a division.

We have finally a third one, sharply demarcated by its etiology—that of nævi of the nerves (*nævus unius lateris*, v. *Bärensprung*; *papilloma neuropathicum*, Gerhardt), characterized by the occurrence of formations corresponding to the other, either smooth or verrucose, but strictly confined to the region of one or several cutaneous nerves, the cause of which, consequently, must be ascribed to an intra-uterine trophoneurotic disturbance.

The smooth nævi represent simple pigment spots, varying in size from the head of a pin to the palm of the hand and even larger. Generally they are sharply but irregularly demarcated, and are sometimes surrounded by a border which, though darker than the normal skin, is still lighter than the central portions of the nævus. These nævi may be found on any part of the body, and no predilection for certain sites can be observed. They are not rare even on the points of transition between skin and mucous membrane, on the vermilion border of the lips, and on the glans penis. Their color is yellowish-brown or brown, and hardly ever attains the dark, often blackish-brown tint of the verrucose forms.

The anatomical examination of these spots shows that, besides an abnormally great pigmentation of the deeper layer of the rete mucosum, there is also a more or less great accumulation of pigment in the corium, and, according to *Demiéville's* investigations, mostly in cordlike agglomerations of cells following the course of the blood-vessels—a fact which, together with the frequent presence of pigment deposits in the adventitia of the vessels, renders still more probable the direct origin of the pigment from the blood.

These flat pigment moles, as also the other forms of nævi, during extra-uterine life grow only in proportion to the enlargement of the territory occupied by them. Otherwise no change is to be observed on these spots. The skin at these places functionates quite normally, no desquamation occurs, and the nævi are of no consequence for their bearers, aside from the disfigurement and the danger of the development of malignant tumors.

The second group, the verrucose nævi, present the most manifold appearances. If slightly developed, they are but little elevated above the normal skin; have an uneven, warty surface, are light to dark blackish-brown in color, and generally covered with numerous hairs. In more strongly developed cases, they assume a papillomatous character, the several elevations being higher and separated by deep furrows. Sometimes they present considerable hypertrophy of the corneous layer, every single protuberance being covered with a horny mass up to several millimetres in thickness. These forms, indeed, have in numerous instances been described as circumscribed ichthyosis.¹ These

¹ "Ueber Pigmentflecken der Haut," *Virch. Arch.*, Bd. 81, p. 333.

² *Flittner*, "Ein Fall von umschriebener Ichthyosis cornea." *Arch. f. Dermat. u. Syph.*, 1870, p. 653.

nævi with strongly hypertrophic corneous layer are sometimes surrounded by a narrow border within which the skin, though thickened, exhibits neither abnormally great pigmentation nor the formation of horn. They are not found covered with abnormally strong growth of hair, but generally only with a few lanugo hairs. In the highest degree of development, in which the subcutaneous connective tissue likewise participates materially, there finally arise actual tumors or even elephantiasis-like formations. The latter may cause true functional disturbances, for instance, when the eyelids are affected.

The size of these nævi varies extremely. Some are small, no larger than a lentil; others reach the size of a dollar, of the palm of the hands; often even whole regions of the body, in some cases almost the whole surface of the body is occupied by them. At birth, these nævi usually are but slightly pigmented, and gradually assume their subsequent dark color. The larger ones are mostly solitary, but sometimes are multiple. They do not enlarge, aside from the normal growth corresponding to the development of the entire organism.

The anatomical structure is extremely variable, but at all events we have always to deal only with true hyperplasiae, never with heteroplastic formations of tissue.

Opposed to the forms thus far discussed is the third group, separated from them by the etiological factor—that of the nævi of the nerves. This form has become better known through v. *Bärensprung*,¹ who described it as *Nævus unius lateris*, and in analogy with zoster assumed for its cause an intra-uterine affection of the spinal ganglia. Since that time a whole series of cases has been reported, among others, by *Neumann*,² who gives a complete bibliography.

In these cases we find flat or verrucose nævi, often forming large tumors, the first obvious peculiarity of which, the one-sidedness, is expressed by the name chosen by v. *Bärensprung*. The distribution always corresponds to the region of either the trigeminus or of one or frequently of several spinal nerves. In *Neumann's* cases even one entire half of the body was darkly pigmented and partly covered with papillary proliferations. In such cases, of course, we must look for the cause not in the spinal ganglia, but in a more central part of the nervous system. As, in zoster, vesicles appear by no means on the whole field of distribution of the affected nerve, so in nævus of the nerves we usually find entirely normal portions of the skin between the altered parts; often the latter form only small islands in the otherwise normal skin, but the general arrangement always coincides with the distribution of the nerve. These nævi, too, aside from the normal growth, exhibit no alterations.

Two other forms of local pigmentation, lentigines and ephelides, are very closely related to nævi, the former of which, especially, can hardly be separated from them. In the first place there are no essential anatomical differences, and in the second place, even the most weighty reason for separating them—that lentigines occur only during extra-uterine life, while the congenital formations alone can be included among the nævi—will not bear close scrutiny. For not rarely it may be observed that pigment spots appear in after-years at precisely the same places on which similar congenital anomalies are found in the parents or brothers and sisters of these persons. This fact cannot be explained in

¹ *Charité-Annalen*, 1863, Bd. xi., Heft 3.

² *Oestr. Jahrb. f. Pädiatrik*, 1877, Bd. ii., p. 165.

any other way than by assuming a congenital disposition which did not develop until a subsequent period. And so also in the case of ephelides, from the fact that they develop with such extraordinary frequency in persons with a certain color of the skin and hair, we are justified in drawing the conclusion that in them there is likewise a congenital disposition which does not declare itself in after-life except after the action of external causes.

Lentigenes occur either isolated or in large numbers. They have no particular place of predilection and may be met with on any part of the body. Of course, they are most conspicuous in the face. Some are flat, others more or less elevated, and in that case usually set with a number of dark, thick hairs. Lentigenes, indeed, can only be distinguished from congenital nævi, both flat and elevated, if the beginning of the former has been observed during extra-uterine life. But if they are present without our knowing when they have appeared, they cannot be distinguished at all.

By ephelides, freckles, are meant those small pigment spots which seldom exceed the size of a hemp-seed, never appear singly, but always in large number, and generally exhibit a quite definite localization. Their form is irregular, and the outlines are generally slightly serrated. They are met with almost exclusively in the face, on the hands and arms, that is, on parts of the body which are usually uncovered, and are observed very rarely on covered parts, as the penis and the buttocks. In the latter case the persons in question have always numerous ephelides also on the usual places of predilection. Their color is never very dark, but chiefly yellowish-brown, at any rate never as dark as in the warty moles. Anatomical examination shows that there is essentially an increase of the epidermal pigment, without any accumulation of pigment in the corium.

Ephelides are never present at birth, but usually do not develop before the sixth or eighth year of life. They are conspicuous only in summer, while they fade in winter so as to be barely perceptible. In later years they generally disappear again. They are rare in brunettes, but extremely frequent in red-haired persons, who generally have a remarkably clear complexion.

In view of all these facts, it appears to me unquestionable that ephelides rest on a congenital disposition to these pigment formations, but which require for their development certain external conditions, especially the influence of light. I believe that this is the most natural explanation of their occurrence chiefly in certain individuals, and of the localization and the variations in intensity according to the seasons. Hebra has expressed himself against this view, especially because ephelides come under observation also on parts which are not exposed to the light. But this negative reason is insufficient, for there are other cases in which there is an influence on distant parts of the skin which are not directly affected by the agent producing the pigmentation.

As regards the prognosis, nævi and allied formations are generally of no importance; still, in a few rare cases, they may give rise to an unfavorable prognosis. On the one hand, cases have been reported in which numerous nævi were found at the same time with melanotic sarcomata in internal organs,¹ and, on the other hand, the nævi themselves may develop into malignant tumors, usually melanotic sarcomata likewise, especially after the influence of any external irritation.²

¹ Jablokoff and J. Klein, Vierteljahrscr. f. Derm. u. Syph., 1879, p. 632.

² Benzler: "Die Nævi als Ursprungstätte melanotischer Geschwülste." Diss. Berlin, 1880.

The treatment, therefore, will have to fulfil two indications—firstly, the removal of the disfigurement produced by the pigmentation, and secondly, the ablation of the nævi on account of the danger of the development of malignant tumors.

There are indeed some remedies by which the pigmented epidermis can be removed, and after the employment of which the new-formed epidermis contains at first less pigment than the preceding. These are some acids, the caustic alkalies, and particularly corrosive sublimate. In the case of flat nævi and ephelides, as well as of chloasma and local pigmentations to be discussed hereafter, the sublimate is best employed in one or two per cent solution, being either painted repeatedly over the affected place, or by dipping a piece of linen the size of the spot to be decolorized into the solution and keeping it there for four hours, during which time it must not be allowed to become dry. This is Hebra's direction. Then follows a more or less violent exfoliation of the epidermis, while the new-forming skin is colorless or slightly pigmented. However, this result is unfortunately of short duration, and after a number of weeks the pigmentation is again as intense as before. A definite removal, therefore, will be possible only by operation. It is self-evident that the latter course alone will be effectual when the formation of actual tumors has taken place.

As regards the second indication—preventing the formation of melanotic tumors—it would really be most appropriate to remove all nævi and lentigenes, unless insuperable obstacles are presented by their size; but inasmuch as nearly every man has a large number, this is of course a matter of impossibility. But, at any rate, it will be imperative to remove such a formation which manifests notable enlargement, even if there is no other alarming symptom.

The pigment anomalies thus far considered stand opposed to a series of others which indeed rest on no kind of congenital disposition. These are, first, the pigmentations occurring with certain physiological and pathological conditions of the body; second, the pigmentations arising in consequence of external irritations, and lastly, those remaining after diseases of the skin.

The term chloasma gravidarum or chloasma uterinum is applied to those pigmentations occurring in spots which appear chiefly in the face, in rarer cases also on other parts of the body of pregnant women or those suffering from disturbances of the genital organs. The most common localization is in the face; the forehead and the temporal regions being most frequently affected. The discoloration forms large brown spots with sharp irregular limits; on the forehead they usually reach close to the hairy scalp, from which, however, they remain separated by a narrow light stripe; less frequently they occupy the cheeks, the nose, and the parts around the mouth. Often the spots reach the size of the palm of the hand, at other times they are smaller, and then usually appear symmetrically; in the larger ones there are often light stripes or islands. In rarer cases, similar spots occur also on other parts of the body, occasionally there may ensue even a darker pigmentation of the entire surface of the body.¹ This discoloration imparts to the face quite a peculiar changed expression.

That these pigment anomalies are really connected with the functions of the genital apparatus is perfectly certain. They never occur in girls before puberty, they recur in many women with every pregnancy, after the termination of which they fade, and they finally disappear at the menopause. In the same way we see, in women suffering

¹ Rayer: "Trait. des mal. de la peau." Brux., 1836, p. 388.

from some uterine disease and affected with chloasma, that, with the recovery from the former trouble, the latter likewise disappears.

The proximate causes of these accumulations of pigment are altogether unknown.

Similar local pigmentations are observed in the train of certain exhausting diseases, particularly phthisis pulmonum, whence they are called chloasmata cachecticorum. The pigmentations, especially of the skin of the face, in congenitally syphilitic children also would belong under this head. These forms, of course, come under observation both in men and in women.

To these alterations are to be added the pigment changes induced by external irritations, which are termed chloasma caloricum, toxicum, and traumaticum. Generally known is the "tanning" of parts of the body which are long and often exposed to the light of the sun, as the face and hands after a prolonged sojourn in the country, but especially after tours across glaciers and fields of snow where the sun's power is heightened by the reflection. For the same reason, in country people, the face and neck, the arms as far as they are exposed, the feet and legs, often also a part of the chest, become in summer quite deep brown, so dark that the color often equals that of a mulatto. These colorations fade again in winter.

The influence of sunlight on the development of pigment has been pointed out above under ephelides, and it becomes manifest, furthermore, if we simply bear in mind the fact that the inhabitants of the hotter zones are always more darkly pigmented, while the inhabitants of colder zones are lighter in color. I am inclined to believe that, in this sense, the color of the darker races may be looked upon as a chloasma caloricum, which, by inheritance in the course of long ages, became gradually intensified until it finally remained permanently.

Besides, the pigmentations of the skin provoked by chemical irritations are exceedingly frequent. I shall enumerate here only, as the best known, the pigmentations after the employment of mustard poultices, cantharides, iodine, and chrysarobin. A single application of a mustard poultice for a few minutes may be followed by an augmentation of pigment at the point in question, which may frequently persist through life. The employment of cantharidal plaster may likewise give rise to these persistent pigmentations.

The coloration of the skin after the employment of chrysarobin is of a different nature. For not only the places coming into direct contact with the drug are stained, but the pigmentation extends over far greater portions of the skin; ordinarily dark colorations appear most rapidly in the face, around the eyes, although it is with special regard to the eyes that the application of remedies containing chrysarobin is never made to the head, or at least never should be made. Chrysarobin produces a diffuse dermatitis, accompanied by intense pigmentation, which occasionally may extend over the whole surface of the body, even if but isolated portions of it have been treated with this agent. The spots to which the most immediate effect of the chrysarobin was directed, that is, the points of the psoriatic, syphilitic, or other efflorescences, on account of which the remedy was employed, remain uncolored and subsequently appear as light islands on a dark ground. The cause of this immunity has not yet been cleared up. The discoloration of the skin after the employment of chrysarobin is generally a very dark brownish-red to brown. Fortunately the normal color of the skin is restored in one or two weeks, after a general desquamation of the epidermis.

Finally, we may apply the term chloasma traumaticum to those pigmentations of the skin which are brought about by external influences of a mechanical nature. Such pig-

mentations may arise at points exposed to a frequently repeated, but not continuous pressure from clothing, tools, etc. Furthermore, all the lesser injuries inflicted on the skin almost always leave small pigmented patches or cicatrices with strongly pigmented surroundings. (The lesions produced by parasites, and by scratching.) These pigmentations, by their arrangement and localization, often permit us to deduce from them their respective cause, even if it have been long removed.

It need hardly be mentioned that in the chronic cutaneous diseases accompanied by itching these pigmentations reach the highest degrees (prurigo and intractable pediculi vestimenti). In these cases—that is, in patients suffering for a long time from an intense prurigo or in individuals affected for decades with clothes lice—we observe pigmentations of the skin which may impart to it almost the color of the negro.

A partial pigmentation of the skin is produced by a combination of chemical and traumatic irritations, namely, by Baunscheidtismus. This procedure consists in the application of a small scarifying apparatus with a number of fine, circularly arranged needles and friction of the wounds with a substance consisting in the main of croton oil. This leaves behind very neat small circles of brown dots.

Finally there is a whole series of cutaneous diseases which provoke an increase of pigment, viz., those which give rise to chronic hyperæmias. It is impossible to specially enumerate every disease belonging under this head, because almost every chronic dermatosis may produce excessive pigmentation in this manner. These hyperæmias and their sequels, the pigmentations, appear most intensely on parts of the body in which the circulation takes place under unfavorable conditions, hence particularly on the legs. The deep pigmentations around ulcers, or the cicatrices left by them, I should ascribe likewise to the fact that a chronic inflammatory condition has prevailed for a length of time at these places. The cause provoking these ulcers is quite immaterial as regards the secondary pigmentations. In these processes, however, the pigmentation does not rest simply on an increase of pigment in the deepest layers of the rete mucosum, but there are almost always accumulations of pigment in the corium which are derived from the transformation of the coloring matter of the blood in former small extravasations.

However, two diseases require special mention in this respect, viz., lichen ruber and syphilis. The deep, often brownish-black pigmentations in the former disease are well known, and I refer to the respective section of this book. Also as regards syphilis, it is a well-known fact that the efflorescences on the skin very often disappear while leaving deeply pigmented spots; particularly the papular efflorescences, not alone those belonging to the secondary period which heal without the formation of cicatrices, but in a still higher degree those tertiary papular eruptions which almost always terminate with the formation of cicatrices. In such cases we find quite constantly at the place of the papule a slightly depressed cicatrix which is at first dark-brown in color, but gradually becomes perfectly white. Mention has been made above of the chloasma-like pigmentations of hereditarily syphilitic children, and still another alteration of pigment occurring with syphilis, the so-called pigment syphilis, will be discussed under a different head.

We can hardly speak of a treatment of these conditions, aside from the pigmentations in syphilis; however, occasionally a trial might be made with the above enumerated agents for the removal of pigment. In syphilis, of course, the most rapid absorption of the pigment can be expected from an appropriate general treatment and the local application of emplastrum hydrargyri; but the pigmentations are much more rebellious to treatment than the other symptoms.