Original Communications.

DYSCROMATODERMA; OR, DISCOLOURATION OF THE SKIN.

By ERASMUS WILSON, F.R.S.

CHROMATOGENESIS, or the production of colour, is an animal function enjoyed by the skin, in common with certain other of the organs of the body; for example, the eyeball, the liver, the lungs, etc. It is the source of the varieties of tint which are met with in the human race; which distinguish the Ethiopian, the American Indian, the Mongolian, the Caucasian, and the Albino; and, like other functions, it is subject, besides its physiological variations, to changes which are of a pathological nature, and which constitute the so-called "disorders of the chromato-genous function."

The disorders of the chromato-genous or pigmentary function of the skin, giving rise to dyschromatoderma, are all represented by the four colours—black, white, yellow, and blue, and the combinations of black and yellow constituting the various tints of brown.

Black is the archæus of melanopathia, melasma or nigredo cutis, ephelis, and stearrhœa nigricans; while the absence of black constitutes leucopathia, leucosma or aliphosis, and albinismus. Yellow is represented by lentigo, flavedo cutis, and stearrhœa flavescens; and the blending of black and yellow gives rise to the various hues of chloasma and fuscado cutis; the yellow and the black together sometimes producing a greenish tint, as in certain varieties of chloasma and lentigo. The presence of blue pigment in the skin, constitutes the cyanopathia cutanea of Billard d'Angers.

Melasma or nigredo cutis (nigrities) has of late attracted some notice in consequence of the researches of Addison and others; it has received the additional synonym of "bronze skin"; and, possibly, some further observations on this morbid state may not prove uninteresting to those who have given their attention to the subject or are seeking information with regard to a very curious but not very rare pathological phenomenon.

The main points that I propose to illustrate in this essay, are: Firstly, the existence of a peculiar form of anæmia, which may be termed melanæmia, in association with melasma; secondly, the origin of melanæmia and melasma in debility and exhaustion of parts of the nervous system; and, thirdly, to deduce from these premises a principle of medical treatment.

Anæmia is practically a deficiency of the red element of the blood; but, besides the red element, the blood is known to possess a yellow colouring principle, and, probably, a black colouring principle. Under the influence of certain physiological or pathological operations, these three principles may undergo changes—changes of quantity and intensity; and accompanying these changes the anæmia may assume a diversity of complexion. The anæmia may have a colourless character, leucanæmia; it may have a yellow and greenish tint, chloranæmia; or, as I shall endeavour to show, it may have a blackish hue, and so give rise to a form of anæmia which I have commonly observed in relation with melasma and the melasmic diathesis; and which is accurately described by the term melanæmia.

The diagnosis of anæmia is generally determined by the appearance of the skin, of the mucous membrane of the mouth, of the gums, and especially of the conjunctiva; and according to the extent of deficiency of the red principle of the blood, will be the degree of blanching of these several parts. Consequently, there may

exist every shade of variety of degree of anæmia, from the merest indication of that state to the most confirmed bloodlessness.

So in melanæmia, the anæmia may be slight or strongly marked; and the peculiar darkness of hue which the eyeball acquires, may be scarcely apparent, or so striking as to attract the attention of the most cursory observer. In melanæmia, the mucous membrane of the mouth generally presents no differences from the ordinary appearance of anæmia, nor in many instances does the conjunctiva; but the especial sign of melanæmia is, a vivid brightness, a brilliancy, and sparkling lustre of the eyeball, a liquid depth of colour of the humours of the eye, and a strongly contrasting whiteness of the sclerótica, the effect being often increased by a more or less deep tint of a dull blackness of the integument of the eyelids, more especially of the fold of skin of the upper eyelid which immediately borders the eyelashes. It is difficult to convey in words an appearance which is only recognisable to the observer as the result of close attention, and which can only be distinguished by careful comparison with the normal standard. But, in a well-marked example, there is no fact in medicine more demonstrable than the melanæmic or melasmic eye, not only in association with melasma of the skin; but, also, independently of the latter affection.

The melanæmic or melasmic eye is sometimes the only sign of anæmia which can be discovered in the individual, who, possibly, regards himself as in perfect health; but where it exists, it may be looked upon as indicating a predominance in the blood of the melanic principle, and a predisposition to melanæmia and melasma; in a word, it manifests a melasmic diathesis. On the other hand, melasma may exist without this symptom of melanæmia being present; apparently, because, in the latter instance, the colouring principle finds a natural outlet through the skin, and the melanopathia its special field of development in the cutaneous tissue; or, perchance, the abnormal pigment may at the same time be eliminated from the blood through some other emunctory organ.

It will be seen by these observations that I look upon melasma and melanopathia, not as a substantive disease, but as depending upon an altered state of the blood, a cacochymatous or dyscrasic condition of the blood, in which there exists a deficiency of the red principle and an excess of the black pigmentary principle; not, possibly, in the precise form which it afterwards assumes in the cells of the rete mucosum, but in that more elementary and diffusible shape in which it is first generated and held in solution or suspension in the vital fluid.

The term melanæmia is one of recent origin and was intended by its first author to signify the actual presence of pigment in the blood, as demonstrable by the microscope. To determine the diagnosis of melanæmia, therefore, according to this view, it becomes necessary to be provided with the appurtenances of science, and moreover with leisure. A portion of blood must be taken; it must be properly diluted; it must be disposed on a suitable slide; it must be attentively examined; and then, the important fact is demonstrated of the presence of pigment, it may be in the form of granules or perhaps in that of cells or scales. But it is clear that this process so valuable in our schools of pathology—namely, our hospitals and infirmaries—is inapplicable to the daily routine of medical life, and that melanæmia as a demonstrable fact must be regarded as a scientific curiosity, comparatively unapproachable by the physician or the surgeon engaged in active practice.

But the term melanæmia, as used by me, has a different signification from that described above, and is intended to point out a clinical sign which may be tested by every one, and by which the presence of pigment in the blood may, as I believe, be as certainly determined as by the actual physical examination of that fluid. This clinical

sign is the melanæmic or melasmic eye already mentioned, and which I regard as an unfailing indication of a melasmic diathesis.

For a comprehension of what is included by the term melasmic diathesis, we are indebted to the researches of Frerichs of Berlin. Dr. Frerichs has shown that the blood of the spleen, as a consequence of retardation or torpor of its venous circulation, passes into a state of partial coagulation, and that the red corpuscles, at the same time, by a process of morbid chemical metamorphosis, are converted into pigmentary matter. The pigmentary matter is discoverable, with the aid of the microscope, in the form of free granules, and of cells and scales containing pigment-granules, and bearing in themselves the evidence of being altered blood-corpuscles. It is found in the blood of the splenic and portal vein, and may be traced thence through the pulmonary vessels into the general circulation. It is not improbable that any cause capable of producing torpor of portal circulation may give rise to similar results, and that the melanæmic or melasmic eye may in this way become an important sign by which the diagnosis of disorder of the abdominal organs may be determined when no other apparent symptom exists.

Dr. Frerichs has also shown that the pigment-matter may be detected in the lobules of the liver, and that its presence there occasions certain morbid phenomena. And that, next to the liver, it makes its way to the brain, and there gives rise to certain peculiar appearances and, doubtless, to altered function of that organ. And, furthermore, that it may, through the arterial current, reach every part of the body. The arrest of the pigment in the liver may, no doubt, in part, be mechanical; but its detention by the cerebral substance would seem to indicate an affinity between the nervous-matter and the pigmentary-matter, and suggest an explanation of the curious nervous and cerebral symptoms which are not unfrequently associated with melasma.

Another phenomenon will follow upon this; pigment-matter being proved to be actually present in the blood; the emunctory organs by which it is naturally eliminated will be excited to a more active secretion; the rete mucosum will receive a larger share of the pigment-pabulum; and the colour of the skin will be consequently deepened, either generally or partially, in obedience to other physiological and pathological laws. The tendency of the pigment-matter to seek the brain is a curious fact, and suggests the idea that this election may explain the early suffusion of the eyeball with the pigment, and the occurrence of the melanæmic or melasmic eye, when no other outward symptom of melasma is present. In observing this peculiar eye with attention, it has seemed to me that the choroid coat of the eyeball was more deeply pigmented than usual; that this extremely deep tint threw a stronger shade of blackness on the humours, and was the origin of part of the vivid brilliancy of the eye; and that, moreover, the extreme depth of black of the pigmentum nigrum was perceptible through the tunica albuginea.

But the melanæmic or melasmic eyeball looks as if it were suffused with a transparent pigmental fluid; or I might compare its appearance to a pure white seen through a black tinted glass; suggesting the idea of the black pigment being in the state of solution in the blood and in the fluids derived from the blood, as well as being corporeally visible in the shape of granules, as already described. Indeed, it is evident that the pigment, to be secreted by the skin, must be in a state of solution. This solution may be, and no doubt is, in part, supplied by the pigment-granules; but there are, besides, other soluble pigments, no doubt formed during the metamorphosis of the red corpuscles of the blood.

The origin of pigment by the metamorphosis of the red corpuscles of the blood explains the association of *anæmia* and *melasma*; and the presence of the melanæmic

or of the melanæmic eye becomes the proof that the change which has taken place in the blood is not, as in *leucæmia*, the reduction of the normal proportion of hæmatine and the development of white corpuscles, but the destructive metamorphosis of the red corpuscles (*hæmic dyscrasis*) and the conversion of the hæmatine into a melanic pigment. What the true explanation of this curious change in the economy may be, whether it depend upon physiological conditions or a more or less intense pathological action, is not at present easy to decide; but of two facts I have satisfied myself—namely, the frequent association of morbid nervous phenomena with *melanæmia*, and a greater difficulty in restoring the normal condition of the blood than in ordinary *leucanæmia*.

As may be inferred from these observations, the melanæmic eye is far from being uncommon; I have seen it three or four times in the course of a morning's duty. But *melasma* is comparatively rare. The melanæmic eye indicates a melasmic diathesis; that is to say, that state of the constitution in which there exists a tendency to torpid or obstructed circulation of the portal vessels, with a disposition to the metamorphosis of the red element of the blood-corpuscles into pigment. It is always associated with the common signs of *anæmia* to a greater or lesser degree, with more or less debility, and commonly with symptoms of dyspepsia, often with nausea and weight or oppression at the epigastrium, and sometimes with slight cutaneous disorder or other affection of the economy.

Let me cite a few instances, taken as they occur in my daily practice, as a further illustration of this phenomenon.

A young physician was introduced to me by his friend to ask my opinion as to the best course to pursue in reference to practice. Our conversation ended, I demonstrated to him the melasmic eye, of which he was, unknown to himself, the subject. Like all aspirants for medical honours, he had been working too hard; he had lowered his nervous tone. His digestive powers had suffered in consequence. There was, doubtless, torpor of circulation in the portal system, and the consequent development of pigment in the blood, or *melhæmic dyscrasis*. His conjunctiva and tongue were slightly pale, and he had the characteristic black transparency of the eyeball. Both he and his friend recognised the melasmic eye; and I suggested to him, as a medicine appropriate for the removal of its cause, the nitromuriatic acid with tincture of gentian.

My friend F. brought to me his daughter, a little lady of nine years old, for a slight *pitryiasis* of the scalp. I was glad of the opportunity of demonstrating to my friend the melasmic eye, which in this young lady was well marked; there was, besides, a slight but general sombre or ashy hue of the complexion which seemed due to a blending of black, yellow and blue, and a certain metallic polish of the skin. When she was seated by her sister, who was also out of health, the contrast was very apparent. There were no symptoms of ailment about the young lady that would have attracted attention but for the *pitryiasis*; and for this alone she was brought to me. Her appetite was not quite so good as usual; but her father had not observed anything else.

A surgeon of eminence brought to me his son, suffering under a slight attack of leprous *psoriasis*. The boy possessed a large cerebral development, was pale and thin and had the melanæmic eye of moderate intensity. His father told me that he had been to the sea-coast; but that since his return he had suddenly and unaccountably fallen off in strength, and that under the influence of this state of debility, the squamous eruption had appeared on his skin. My reading of the case was: Abnormal activity of an excitable brain induced by study, partial exhaustion of the nervous system by growth, and consequent debility of the organic functions; then, as

an ulterior consequence of lowered nervous tone and retarded circulation of the chylipoietic organs; hæmic-dyscrasis, assuming the melanic type.

The melanæmic or melasmic eye as a sign of aberration of health is a purely medical symptom; it is rarely or never so marked as to attract the attention of the patient; and it is therefore of the more importance that the medical man should be acquainted with it; inasmuch as it serves to denote the presence of a *causa morbi* in the economy; and, moreover, a cause which if not removed, may run on silently and insidiously and be productive of serious ultimate consequences.

In the preceding three cases I have alluded to three common causes of melanæmia; namely, exhausted nervous power from over study; altered nutrition accompanying the growth of the body; and weakened nutritive powers originating in the exercise of a morbidly excitable nervous system. I have also seen it associated with other temporary disorders of the economy, as in the following example. A veterinary surgeon consulted me for exfoliating macule on the palms of the hands, caused, as he believed, and no doubt excited by the use of a blistering fluid to a horse's legs. The eruption appeared immediately after rubbing in a quantity of this fluid and leaving it on his hands for some time afterwards. As I knew at the first glance that the eruption was syphilitic, I beat over the usual ground of symptoms, skin, throat, nerves, etc., but found no trace of a corroborating secondary symptom. I then pushed my inquiry home to the lair of the evil, and discovered a small red patch in the sinus præputii, and a little induration. He informed me that the chancre had been so slight that he had given it very little attention, and, not suspecting its nature, he had adopted no treatment whatever. It commenced nine weeks back, and the eruption on his hands two weeks ago. He had taken arsenic for the latter; and but for my diagnosis and inquiry, would never have connected the two disorders. This patient had a melasmic eye; but, as it had not attracted his notice, he was unable to tell me if it had shown itself before or subsequently to the chancre.

I could multiply these cases of melanæmic or melasmic eye, for they are very common, to an indefinite extent, but the enumeration would be little more than a repetition of the four cases already detailed. But I am not at present dealing with the question of the physiological origin and distribution of the pigment element of composition of the animal organism, but simply with its pathological origin. It seems to me not unlikely that the normal origin of the black pigment of the organism may be a metamorphosis of the hæmatine of the blood; but the abnormal source of the pigmentary element appears decidedly, as Dr. Frerichs states, to have this origin; to be in fact, a hæmic or melhæmic dyscrasis. The pigment principle is no doubt diffused throughout the entire circulation; and under the influence of the special conditions of the skin is developed in the rete mucosum as a pigmentary substance, and is regulated and controlled by physiological laws. But, when it is developed pathologically, its control by physiological laws is no longer possible.

To a process similar to that described by Dr. Frerichs as occurring in the spleen, but in a different locality, namely, the uterine veins, is probably to be ascribed the deep discolourations of the integument of the eyelids in menstruation. In a case of hysteria which once came under my notice, the black pigmentary secretion was eliminated by the skin of the eyelids in such abundance as to appear on the surface as a moist secretion that could be wiped away with a sponge. And the blood of this patient was so loaded with the pigmentary matter, that it was observed in the fluids which were thrown from the stomach by vomiting, in the egesta from the bowels, and in the urine. It is needless to repeat that, together with this destructive metamorphosis of the red

corpuscles of the blood, there was a deficiency of hæmatine to an extreme degree.

Recurring to the phenomena described by Dr. Frerichs, namely, the partial coagulation of the torpid stream of venous blood in the sinuses of the spleen; the decomposition and metamorphosis of the red corpuscles of these coagulated agglomerations into pigment matter, and the detention of the particles of the pigment by the liver, where they excite a variety of morbid processes; the question arises: Do not these changes take place even more frequently than Dr. Frerichs imagines? Do they not take a prominent share in the production of many of the disorders of daily observation? Are they not continually before us without attracting our attention? I think they do, and are; and I am led to this conclusion by the great frequency of the melasmic eye and its associated symptoms. Let me cite an example of everyday experience. A lady, of fifty, leucæmic, complained to me of constant nausea, vomiting after every meal, frequent diarrhoea; a feeling of extreme uneasiness with weight at the epigastrium, and extreme languor and lassitude, with great weariness. I prescribed for her, quinine. A fortnight later I saw her again, and she gave me the following account of herself: "I felt," she said, "that there was something that required moving from here," placing her hand over the epigastrium, and including in its stretch a part of the stomach, the duodenum, and the central portion of the liver; "I therefore took four grains of blue pill at night, and the following morning a senna draught. The quantity of black offensive stuff that came away was quite wonderful, and my nausea, my sickness, and the uneasiness and weight at the pit of my stomach were immediately removed." Was not this a case of melasmic excretion from the liver? I must confess I thought so, and think so still. But, it may be suggested, this patient was leucæmic; yes, she was so, as far as the eye and skin were concerned; but only because the melanic matter was all collected in the liver, where it had been detained by a process of filtration, and whence it was subsequently eliminated.

In further corroboration of this, the practical bearing of the subject, I may call to mind the constant accompaniment of nausea and an uneasy epigastric sensation with melasma; and the unshaken conviction of the patient that the liver is the source of the evils complained of. A lady whose case is reported (Case 1) remarks that a dose of calomel immediately dissipates her unpleasant feelings; that her complexion immediately becomes clear, and the melasmic blotches on her face less evident; and that, when she has failed to take the remedy, she has more than once suffered an attack of jaundice. And in truth, theoretically as well as practically, we must admit the capability of a dose of blue pill or calomel of disgorging the liver of its "atra bilis"—of its melanic accumulation—and of rendering more active and free the abdominal venous circulation.

Passing onwards to my second proposition—that melanæmia takes its primary origin in debility or exhaustion of the nutritive or trophic filaments of the nervous system, I must appeal for my illustration to the cases which I am about to report. I may observe that I have been led to this conclusion by the history of the patient, and by tracing the origin of the malady to its apparent source. It is remarkable that the subjects of melasma are, for the most part, of the female sex—of a sex in whom the nervous system plays a more conspicuous part than it does in man; that they range in age between twenty-five and fifty—a period during which the harsher realities of life are most pungent in their operation on the nervous system; and that, in almost every instance, an exciting cause may be found in injury done to the nervous system, either indirectly as an effect of some exhausting disease or organic lesion, or directly in the form of a sudden or violent shock.

The operation of the injury to the nervous system

would seem to be expended on the nutritive organs, with a consequent deterioration of their functions. The innervation and circulation of the chylipoietic apparatus is disturbed and impeded; nutrition is weakened; assimilation is imperfect; and cacochymia follows; and with cacochymia a want of the natural harmony of proportion of the different pigimentary principles of the blood. It may be that the red principle—the hæmatine of the blood—is chemically converted into the melanic pigment; or it may be that the melanic principle is simply a carbonaceous product resulting from the waste of the organic tissues.

In melasma, we find an illustration of a principle not uncommon in pathology; namely, the persistence of the local abnormal action of the part after the general economy is restored to health. It would seem to be the natural habit of the blotches of melasma to remain for years or for life, when a constitutional debility or a morbid cause capable of keeping them up can no longer be traced. And, in one of the cases reported in this paper, after the restoration of the patient to a better state of health, after the establishment of a healthier hæmatisis, and after the removal of the stains by local means, the general tint of the complexion acquired a deeper, but, at the same time, a distinctly healthier tone than before. My patient exchanged a complexion of a faded, patchy, muddy hue, for that of a handsome brunette, the tint of brown being richer and brighter than before, and suggestive of the idea of a more copious oily secretion being blended with the pigimentary secretion.

In another case, one of melano-leucopathia, which I published several years back (portraits), I drew attention to the curious results to the economy of a variation of the standard of colour of the skin. In this case, there were four shades of colour present at the same time, the natural tint, the leucosma, the general melasma, and the partial melasma. Nature had, so to speak, physiologically adopted these four tints, and the question arose: Which would she decree to be the proper standard when a process of restoration of the pigment in the leucosmic patches was established? I solved this question experimentally by inducing a restoration of the pigment secretion on the white patches, through the agency of a stimulant application; the colour returned on these patches. I had set the melanic machinery in motion; but how was I to control it? It passed the original normal standard; it went on, and it passed the deep tint of general melasma; it still went on, until it reached and almost exceeded the deepest tint of all, the partial melasma. Here, then, was an example, not of a natural standard, but of an acquired or morbid standard.

[To be continued.]

COMPOUND COMMINUTED FRACTURE OF BOTH LEGS: DOUBLE AMPUTATION: RECOVERY.

By ANTHONY MARTIN, Esq., Evesham.

WILLIAM ROBBINS, aged 11, a spare, thin looking lad, came under my care on April 6th last, with the above accident. It appears that he was in the act of crossing the line of the West Midland Railway, to speak to his father, who was at the time engaged in loading a cart, when a luggage train, which was shunting goods, came on the line he was crossing, and knocked him down in the middle of the space between the rails, whence he tried to extricate himself; and, in so doing, got both his legs across the rail, and the wheels of six or seven trucks passed over them.

Upon examination, it was found that the right leg from the middle third to the ankle-joint was completely crushed, the large vessels and nerves ruptured, and the muscles in front and back of the leg totally destroyed;

the foot was wholly denuded of its integuments. The left limb was not injured so much as regards external appearance. The foot was completely crushed, but the integuments of the limb were whole, with the exception of an aperture high up close to the junction of the posterior tibial with the popliteal artery, from which considerable hæmorrhage was taking place, the artery being found to be ruptured. The soft parts of this limb were evidently much bruised as high as the middle third of the thigh. I adopted the circular incision in both instances, removing the right leg below the knee-joint in the upper third. There was considerable difficulty in tying the posterior tibial artery, from the unusual amount of retraction. The left limb I removed immediately above the knee-joint, on account of the division of the posterior tibial artery. No difficulty occurred in this operation; but the muscles were very dark, from the bruising before mentioned, presenting almost an ecchymosed appearance. The patient was put under the influence of chloroform.

Immediately on the completion of the operation, he was removed to the workhouse; the stumps were dressed with strapping and wet lint, a few points of suture being first introduced, and an opiate was administered.

April 7th, 10.30 A.M. He had passed a good night, and looked cheerful and composed. Pulse 110, and fluttering. He complained of no pain.

April 8th. The dressings were removed this morning. The general appearance of the stumps was good, though the soft parts of the left stump were much contused. Pulse 120, and very compressible. The opiate was repeated.

April 9th, 7.30 A.M. He slept well after the opiate; but the tongue was inclined to dryness. The bowels were freely relieved, and there was some discharge from the wounds.

April 11th. There was no apparent change, except that the left stump did not seem to be healing as well as the right.

April 13th. Some considerable bleeding took place in the night from the left stump, which looked gaping and sloughy. The last of the sutures was removed this morning. The pulse was much quicker, 135, and feebler. His appetite was good. Beef-tea and wine were given freely, and the opiates were continued.

April 19th. The left stump was still sloughy, discharging freely. Most of the ligatures on the arteries came away this day. The pulse was still very quick; it had not unfrequently been up to 150 since the last report.

April 22nd. There was slight improvement in the left stump. The sloughs had separated to a considerable extent. The pulse had diminished in frequency, though still very weak. The ligature from the femoral artery had come away this day. The wine and beef-tea were continued, with a mixture of cinchona and mineral acid.

April 30th. The general condition of the lad had greatly improved since the last note. The sloughs of the left stump had been very considerable, and the bone was protruding, but the right stump had gone on remarkably well.

May 15th. The right stump was healed; from the left, about an inch of the femur was removed.

The lad is now perfectly recovered; but, from the severity of the case, it seemed desirable to publish a report of it. The only untoward circumstance was the extensive sloughing in the left limb; this was occasioned by the nature of the injury, which could not be accurately diagnosed before the operation. But, had it been foreseen, I should rather have risked the irritation of the gangrenous inflammation than have amputated the limb high enough to remove all the injured portion of the muscles.