

29th. The wound is almost completely healed.

1st October. The patient was raised out of bed, and placed on a chair, with his arm in a sling, and remained sitting for several hours.

10th. The wound is completely closed, and the patient moves his arm quite freely, with the exception, that he cannot make a complete extension, in which he is chiefly prevented by the scar. The pulse of the radial artery is still very weak, and only perceptible when the finger is applied to it very gently. After repeated friction with olive oil, over the whole elbow, the patient stretches out his arm tolerably well.

25th. The boy, who, as far as his weakly constitution would allow, was again restored to his strength, was dismissed from the hospital, and moved the right and left arm with equal power.

## IX.

*Concise Observations on Anæmia\**, a Disease which attacked all the Workmen of a Gallery in a Coal Mine, now worked at Anzain, Frenes, and Vieux Condé, near Valenciennes; and which has been observed and treated, in Four of these Workmen, at the Hospital of the School of Medicine of Paris. By M. HALLE, Professor at the School of Medicine at Paris †.

It is not my intention to give a complete detail of the disease which has attacked the workmen of the mine at Anzain, till the observations on it be completed, and till those commissioned to

\* Lieutaud (V. *Precis de Medecine Pratique*, pag. 75.) is the only person who has described this kind of disease, which is seldom idiopathic, if it be not confounded with chlorosis, to which it bears a very strong analogy. The symptoms which Lieutaud attributes to it, differ, in some respects, from those of which we here give the detail, and resemble them in others. Besides, the disease of which we are now speaking appeared epidemically, and was attended with an uniformity of symptoms which, in a particular manner, characterizes it; but a part of these symptoms may belong to the particular nature of its cause, whatever that cause may be. Their uniformity in all the patients who have been infected with it, clearly demonstrates that it is local, and that it belongs exclusively to those places where the disease has been contracted.

† See *Journal de Medecine, Chirurgie, Pharmacie, &c.* Par M. M. Corvisart, Leroux, et Boyer, Tom. IX. p. 3. 8vo. Paris, An. XIII.

to give an account of it have finished their charge. I shall, therefore, at present, confine my observations to those points which relate chiefly to the natural history of this epidemic, and which indicate that mode of treatment which is most proper to effectuate a cure. Of all the galleries in the mine of pit-coal near Valenciennes, the principal establishment of which is at Anzain, one only has been infected with the epidemic in question. This gallery, however, differs in no respect from the rest; it is of the same depth, being 234 metres (120 fathoms) below ground; it is excavated in the same manner, only, it is longer, and less easily admits of a renewal of air; and the apertures that have been made for this purpose have not had any beneficial effect. Its temperature is  $64^{\circ}$  Fahr.; it exhales an odour of sulphurated hydrogen gas; in it respiration is difficult; and the workmen affirm, that the water which filters across the mine, on touching their hands, or the naked parts of their bodies, produces blisters and boils. Nevertheless, they have had the imprudence, notwithstanding the fresh water which is provided, and the prohibitions which have been given, to use it sometimes to allay their thirst; and yet, before the summer of the eleventh year, no disease had been observed similar to that which I am now going to describe.

According to the description of it sent to the School of Medicine, it chiefly has the following characters: It commences with violent colics, pains in the intestines and stomach, difficulty in respiration, palpitations, loss of strength, inflation of the belly, and black and green stools. This state continues for 10 or 12 days, or more; then the abdominal pains cease; the pulse remains feeble, contracted, and weak; the skin loses its colour, and gets a yellow tinge; walking is difficult, and accompanied by extreme fatigue; frequent palpitations cause an extremely painful state of anxiety; the face is swollen; and there are frequent, and even habitual sweats. This state continues for many months, and even more than a year, and is always attended by wasting and emaciation. At last, the original symptoms recur, with violent headachs, frequent faintings, intolerance of light and sound, inflation and pain of the belly, and purulent stools. These last torments are soon terminated by death.

When these details were transmitted to the Society of the School of Medicine, out of fifty attacked with it, three had died, and none were cured. Bark, camphor, opium, wine, spare diet, and many other means which seemed proper, were used, without success.

The Society, upon deliberation, drew out at first a plan of treatment, conformable to the general indications, in which it considered

considered particularly the analogy which the disease seemed to present with the metallic colics, and with some chronic consequences of the *asphyxia*, known to vintagers under the name of *plomb*. Then, upon the supposition, unfortunately too probable, of the inutility of a plan of treatment drawn up in a general way, from apparent indications, the Society proposed, according to particular observations, and in an empirical manner, the trial of mercurial frictions, the internal use of oxygenated muriatic acid, diluted with water, &c. But, above all, it demanded more particular details of the state of the places; recommended the opening of the dead bodies, which had hitherto been omitted; and expressed a desire that it should have an opportunity of directly observing some of those affected, which could be easily done, since the second stage of the disease was sufficiently long to enable some of the workmen, most severely affected, to be sent to Paris, which has accordingly been done.

Accordingly, four pitmen were sent to Paris, with the necessary information, either written, or delivered verbally by the physician who attended them. A plan of the galleries of the mine, air and water taken in the infected gallery, farther details concerning the sick, and minute accounts of the examination of two dead bodies were given. It was observed, that the methods proposed by the Society of the School of Medicine had been comparatively employed; that of six workmen to whom the frictions had been applied, two were cured, and had resumed their labour, but the other four were yet under treatment; and that doubts were entertained, whether to this remedy they were indebted for the cure. In fine, it was observed, that among the infected workmen, the number of whom was increasing, there were two states, considerably different: Some, having been attacked in the mine itself, were very severely affected, and, of these, none had been cured; but others had been seized with the disease since the gallery had been shut up, and to many of these health had been restored.

We received no written account relative to the particular history of the men who have been sent; but as they had been ill for eight, twelve, or fifteen months, and as they began to be affected when they were at work, we believe that they ought to be ranked in the first class.

When they arrived, they were of a wan yellow colour, not like that of men affected by the jaundice, but like white wax which has been long kept. They were œdematous; the face, as also the superior extremities, were swollen in a particular manner; the legs were also swelled, but this, perhaps, might be owing to the fatigue of the journey; and indeed, after two days rest, they became

became less œdematous, and as lean as in their natural state. The loss of colour was general over the surface of the body; and not only was the skin wan and yellowish, but the conjunctive, the inside of the eye-lids, of the lips and mouth, and the tongue, were also deprived of their natural colour. No ramification of capillary vessels appeared on any of these; and, in general, no vein was visible on the arm, bend of the fore-arm, and back of the hand, either by its colour or convexity.

The belly presented no disorder sensible to the touch, only the mesentery seemed to be considerably larger, though soft; and the hypochondriac regions appeared to be free.

The pulse was constantly quick, beating eighty, ninety, and a hundred times in a minute, without, however, the skin being hot. Yet, at any time, when actual fever supervened, the skin became warm, the pulse was also quickened, and the other symptoms announced a change in the habitual action of the functions. Besides, the pulse was frequently altered by the palpitations; and the heart, even when it did not palpitate, beat very strongly against the ribs.

Another symptom, no less constant, but different from palpitations, and which may well be supposed to be a consequence of them, was the patients inability to walk, without being obliged to stop, and to sit down at the end of a few steps. They could not even mount one pair of stairs, without being obliged to sit down frequently in the staircase. Still the percussion of the breast did not indicate any congestion in the viscera of that cavity, nor any quantity of diffused water. The palms of their hands were frequently moist, and they had habitual night-sweats. Besides, these men, one of them excepted, had a good appetite; they ate, with avidity, food which was agreeable to their taste. They disliked butcher-meat; and had other tastes, which appeared to be the effect of habit, rather than of disease. They digested easily; but their stools did not indicate a perfect or equal digestion. They were often half liquid, sometimes liquid, brown, yellow, and sometimes green. The urine, in general, had its ordinary colour.

Thus the characteristic symptoms were the universal loss of colour and yellow tinge of the skin, swelling, impossibility of walking without suffocation, palpitations, and habitual sweats. Some days after the arrival of these men, and when they were familiarized with the objects around them, considerable attention was paid to the regulation of their diet. Substantial aliments and foods, such as they desired, and for the most part roasted, were given them. They were also supplied, at first, with excellent beer, then with good wine, and bread well baked. Their appetites and desires were satisfied, as far as prudence would permit, consistently

consistently with the necessity of selecting their food in a proper manner. In a word, nothing was neglected to prevent any moral affection from aggravating their disease.

Guided by the report of the physician who accompanied them, and the presumed success of the mercurial frictions, they were administered, at first, every third day, in doses of a drachm, and, at the same time, antiscorbutic wine was given them, and bitter drink, made of hops and little centaury; which corresponded both to the apparent indication drawn from the symptoms and the inconvenience naturally to be dreaded from the use of the mercury.

During this treatment, one of the patients fell a victim to the disease. He had always appeared more languid, and had less appetite than the rest, and was affected with a rheum for a few days after his arrival. The frictions had been commenced upon him, as well as the rest, on the 15th of *Messidor*, but were discontinued on the 25th, because a very sensible tendency to fever was observed during these days. The fever continued; and on the 6th of *Thermidor*, it assumed a serious aspect; it was continued in its form, with pain in the limbs, and acute headach, and the pulse was even hard. Notwithstanding the violence of the fever, and the dryness and burning of the skin, neither the tongue, the lips, nor conjunctive was coloured; and the tongue was perfectly clean, as well as that of the other patients. The belly was swollen, and painful to the touch; and along the inferior edge of the ribs of the right side, a resistance was felt, which was supposed to be the liver. At the end of 48 hours, the fever abated, the pulse became weak, and there were efforts of vomiting, which only produced some slimy matter, to assist which, an emetic cordial potion was given, without the desired success. Great oppression, a feeble and intermitting pulse, and cold extremities, succeeded. A blister applied to the side, and repeated as a stimulant, raised the pulse only for some hours. The intermission increased, as well as the cold extremities and oppression of the breast, and the patient at last died.

The belly was a little swollen; there were no livid marks on the skin, and the colour was in general the same as in the course of the disease.

The abdomen contained no serous exudation. The intestines, and especially the colon, were very much distended; and the fat, both subcutaneous, and in the omentum and mesentery, was very yellow. The liver was small, and did not project beyond the ribs; it was soft and pliable in every part; it was of a pale yellow colour, both externally, and in its substance, which was soft and unctuous to the touch. The gall bladder was half full of bile,

of a colour like the yolk of an egg; and when analyzed, was found to contain much coagulable albumen, and possessed some other peculiar properties. The spleen was small, and softer than ordinary; and the liquid which flowed from it, as it generally is, was red, like the dregs of red wine.

The stomach, when opened, was found half full of a liquid, coloured like the dregs of wine. The duodenum and the jejunum were lined with a mucous membrane, of a similar colour; and when that mucous was removed, the membrane, both in the stomach and intestines, in all their extent, appeared white and sound. The matter contained in the rectum was thick and figured, and of a greenish brown colour. All the other abdominal viscera were sound.

In the cavity of the thorax, the right lung adhered almost every where to the pleura, and especially on its anterior part, but the left lung was almost entirely free. In neither was there any remarkable quantity of serosity; both were light, decrepitated under the fingers, and there was no congestion. They were externally white, and mottled with dark blue spots; and, on incision, a frothy yellowish serosity issued from all points of their substance, but not from any preternatural collection. The heart was of a very ordinary size, and its flesh as pale as that of muscles which have been washed and macerated. Its parietes were soft, and the *columnæ carneæ* small. Its structure was not at all affected. Not a drop of red blood escaped from any of its cavities; but in the left ventricle, a coagulum, as pale as the flesh of the heart itself, was observed, which contained no perceptible portion of colouring matter; the pericardium contained no serosity.

The brain was white; the cineritious substance pale, and little distinguished from the medullary substance. Two or three scruples of serosity only were found in the posterior part of the left ventricle; and the choroid plexus was red, but very pale.

In the three cavities, all the vessels, both arteries and veins, were destitute of coloured blood, and contained only a small quantity of a serous liquid. No blood was found in the aorta as far as its crural subdivisions, nor in the axillaries as far as the brachial subdivisions, nor in the accompanying veins, nor in the system of the hepatic vessels, nor in any of the sinuses of the brain. Upon making a deep incision into the flesh of the thighs, there flowed out a small quantity of liquid and black blood, but from no other part did any flow. The flesh of the muscles which cover the thorax was exceedingly red; but that of the extremities not so much so.

It is worthy of remark, that the same absence of blood occurred

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red in all the dissections made where the disease appeared ; that it agrees with the general loss of colour observed in all the parts which are naturally red, and especially the surface, where the red blood is obviously admitted into the capillary system. It may be regarded, therefore, as a state particularly dependent on the disease ; as exhibiting itself by evident symptoms during its whole continuance ; and arriving at its height when the disease is at its termination, or its last stage.

Struck by this phenomenon, and the generally sound state of the substance of all the organs, we immediately thought that the use of chalybeates would perhaps have been a better treatment, than that of simple bitters, antiscorbutics, and especially mercurials, for we knew that cinchona itself had been given without success. We therefore determined, immediately to change the treatment ; and without abandoning the bitter and antiscorbutic tonics, and cinchona, we proposed to give iron in large doses. We prescribed an opiate with a drachm of bark, as a tonic, with a drachm of muriate of ammonia as a stimulant, and a drachm of levigated filings of iron ; this quantity was to be used by each patient in the course of a day. But having observed that the patients felt from time to time racking pains in the bowels, we suppressed the muriate of ammonia, and the pains ceased.

We were afraid lest the sad fate of the first patient should have had an influence on the minds of his companions ; but in this respect, we had no difficulty to encounter. The hope that the opening of his body would put us upon a more successful mode of treatment, without taking away their regret for his loss, prevailed over it decidedly ; and, without doubt, this impression had very good effects.

In fact, the treatment having been established on the basis just now pointed out, at the end of eight days symptoms of a very happy change became evident. It was first indicated by the obvious swelling of the veins, then by the coloured traces of the vessels, which became visible through the skin on the fore part of the wrist ; in fine, by the patients being able to mount the staircase without being obliged to stop. They shewed us every day new vessels, which they pretended were not seen the preceding evening ; and in fact the conjunctive, the inside of the eyelids and of the lips, the gums and the tongue, were plainly regaining their colour. The appetite became better ; and digestion, though variable, successively became more regular. A bowel-complaint, relieved by diascordium, was not of long continuance. At present, these men take very long walks in Paris, without experiencing any fatigue, only the palpitations of the heart have been very inconvenient, and have not yet disappeared.

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There is however one, whose re-establishment has not followed the same course; and who, tormented by frequent headachs, seemed to be threatened with a less favourable issue. We have understood, and are convinced, that, besides the common causes of the disease, there were others acting, capable of inducing very serious consequences. These, we think, we have succeeded in removing; and, since that time, his appetite and activity have returned, so that, although less advanced than his companions, he is now in the same way which has led them to that point of amelioration in which they now are. The other patients have at present a colour but little different from that which is natural. The palmar surface of the forearm, the skin of which is more transparent than that of the other visible external parts of the body, is now of the healthy colour. It is three months since they arrived at the School of Medicine.

According to these phenomena, and the physical state, to which we do not doubt but they correspond, we think it proper to give to this disease the name of *Anæmia*, (deficiency of blood) imagined by Lieutaud, and to distinguish *anæmia chlorosis* and *anæmia consecutiva*, which are consequences of different diseases, from the *anæmia*, which depend upon the different causes mentioned by Lieutaud, and many others, upon which several of our brethren have communicated to us their ideas, and of which they have promised us the details. But it is not proper here to enter on a deep discussion on that subject. We hope to be enabled to follow out our observations on many other workmen equally affected by the same causes, and in the same place; and then, perhaps, we shall be able to announce with more certainty what we here offer only as probabilities.

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*Additional Observations on the Four Patients mentioned in the preceding Essay. By Professor Hallé.*

THE subsequent observations, which have been made upon the patients attacked by a disease contracted in the coal-mines of Frenes, Anzain, and Vieux-Condé, deserve to be annexed to the preceding essay, as they give rise to some useful reflections.

1. One of them, named *Jean Louis Calard*, aged twenty-one years, of a strong constitution, had wrought in the mine for eight years, was attacked only nine months ago; and continued to work several months afterwards.

In him it did not commence by colics, but only by anxieties, dyspnoea, palpitations, the passage of black and brown feces, loss of colour, œdema, headach, and great debility.



He had got several times the tartrate of antimony, then sulphate of magnesia, in the dose of six drachms a-day, and sudorifics; and after having tried opium, camphor, and ether, recourse was had to wine prepared with red bark, for six weeks.

At his arrival, he was less sick than the others. His pulse not being so much accelerated, was, for the most part, 70 in a minute. His body was less meagre, his face and extremities less œdematous, and his skin was not dry.

He was dismissed on the 11th of *Vendémiaire*, having recovered his strength, and having his face less pale than at his arrival, but still feeling some palpitations. After an interruption of the cure for five days, he again began to lose colour; but on resuming his remedies it returned; and ten days after, he was dismissed with his comrades.

2. *Joseph Jolly*, the second, aged twenty, of a weak constitution, had wrought in the mine for ten years, and became sick only about nine months ago. His disease began by loss of strength; and he had suffered little from colics and purging, but the loss of colour supervened, attended by frequent syncope, general œdema, headachs, &c.

He had been formerly treated with purgatives, administered fifteen days in succession; after which, recourse was had to the analeptic regimen, wine of cinchona, tonic and cordial potions, and now and then to the sulphate of magnesia, to obviate constipation.

At his arrival, he was better than he had been previous to spring; his skin was sometimes moist, and sometimes dry; the pulse, in general, was about eighty-six; and, in the course of the treatment, it was observed that he had contracted a habit, exceedingly fatal in his situation, and which gave rise to his violent headachs, which had been falsely ascribed to his disease.

This patient was for a long time in a more languishing state than the others, but appeared better at his departure; nevertheless, he still experienced pains in his limbs; was pale; and was very far from being completely cured.

3. *P. J. Galliard*, betwixt nineteen and twenty years of age, had wrought in the mine for eight years, but had been unable to work for the last eleven months.

His disease began by very violent colics, which continued nearly a month. Anxiety, loss of colour, general œdema, violent headachs, tinkling of the ears, vomiting, and palpitations, had rendered his condition truly distressing.

Oily and sedative potions, anodyne injections, and mild purgatives, had been administered, after that, tonic and stimulating

ing potions, which had restored his strength a little, and also the oxygenated muriatic acid, in the form of lemonade.

At his arrival, we were informed that he was greatly bettered by the fine weather; but his pulse was 104, without any sensible increase of heat. Besides that quickness of pulse, he had often other symptoms of fever, which at first had remissions in the course of the day, and then became continued, with burning heat, and violent headachs; and he fell at last into that state which occasioned his death, and of which we have spoken at sufficient length in the preceding part of the paper.

4. *Theophilus Habart* was aged sixteen years, and still had the appearance of a boy. He had wrought in the mine for six years, and had been ill for twelve or thirteen months.

His disease began by colics, universal lassitude, purging, palpitations, general œdema, which has continued for many months, debility, to such a degree as rendered him unable to walk, loss of colour, and headachs, &c.

He had used emetics repeatedly, sudorifics, and sedative potions; he had continued for a long time the use of aperients, conjoined with tonics, had now and then recourse to laxatives, and for a month, the oxygenated muriatic acid diluted with water.

At his arrival, we are told that he was much better, but his pulse was 94. His belly was very large, his face very much swollen, and his debility great.

After having perfectly recovered his strength, he was dismissed, as well as *Jean Louis Calard*, with whom he took very long walks in Paris. His face, however, had still a soft fulness, which might be taken for a swelling, and his colour had experienced the same changes as that of *Calard*.

From these details it appears, that *Gaillard*, the worst of those four, had died, with symptoms extremely similar to those which were reported as characteristic of the last stage of this singular disease; that some serious circumstances, unconnected with the disease, had retarded, and rendered more uncertain the cure of another (*Jolly*); that of the two, *Calard* and *Habart*, who had obtained the most complete cure, one had been ill only eight or nine, and the other twelve or thirteen months: That *Calard*, who had been least ill, had however continued his work for several months before being obliged to abandon the mine, consequently, that the disease of all had been contracted in it, which, according to the report of the physicians of the place, was an untoward circumstance: That in *Calard*, the disease had not commenced by colics, and was attended with symptoms less violent than in his comrades; but that the other (*Habart*), the youngest of all, had

a very violent and long attack with colics. It is obvious, that all have been treated in the hospital of the school of medicine only in the calm stage of the disease, in which the cachexy and loss of colour insensibly increased until they reached their acmé; and that it was in this only, that the patients could be transported from so great a distance. In fine, deplorable as the state was in which we received them, it is obvious, from the report of the physicians who had seen them at Frènes, that it had been still worse.

However, it also appears, that that extreme debility, which had arrested the patients almost at every step, and which is the most serious, and may be regarded as the fundamental symptom of the disease, has been entirely removed in *Calard* and *Habart*, and its removal may be dated from the time that chalybeates were added to the tonics; that these two patients, among the three who have survived, are the only ones who were free from symptoms foreign to the principal disease; and that the tonics, to which the chalybeates were united, had been previously used without success.

It may be presumed therefore, with great probability, that the chalybeates contributed principally to re-establish the patients, and consequently, that great advantage may be derived from these remedies, in diseases of the nature of chlorosis.

But it must be observed, that the loss of colour has been but imperfectly cured by this remedy; that the disposition to palpitations was not entirely removed; and, that regarding these symptoms only as consequences, and subordinate to the principal symptom, their continuance proves that the cure is by no means complete, and ought to be prosecuted by the same means which appear to have commenced it.

However that may be, it is to be wished, that these reflections were confirmed by the observation of other physicians, who may have the charge of patients of this kind, and that an opportunity may be afforded us of completing them, upon some of the pitmen who are still affected with the disease.

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## X.

### *Biographical Sketch of Vicq D'Azyr.*

**FELIX VICQ D'AZYR**, a distinguished French anatomist and medical philosopher, was born at Valognes in 1748. His father was a physician at that place. Little is known of his early years,