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ILLUSTRATIONS

OF THE

MEDICAL PROPERTIES OF QUININA.

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Read July 8, 1823.

AMONG the energetic substances which the industry and sagacity of continental chemists have extracted from various articles of the *Materia Medica*, and upon which the peculiar properties of these appear to depend, none have hitherto been turned to any medical purpose in their separate state, I believe, except the Hydrocyanic Acid, Iodine, Morphina, Emetina, and some of those which are furnished by Cinchona. An account of the properties of Strychnina, Veratrina, Hyoscyamina, and other alkaline substances procured from vegetable narcotics, is to be found, not in works upon the practice of medicine, but in Orfila's *Treatise upon Poisons*, or in similar writings of experimental physiologists. The Hydrocyanic Acid

has been investigated as a medicine both here and abroad, and deserves a place in our Pharmacopœia, although destitute of the high pretensions which were at first injudiciously proclaimed. Of the powers of Iodine in bronchocele, we have abundant testimony: I have seen sufficient to satisfy myself, and they would seem equally great in certain other structural diseases*. Very little has been written upon the medical virtues of Morphina, but it is much employed, in combination with acetic acid, by some eminent physicians, instead of opium; and both it and Emetina, as well as the Hydrocyanic Acid, have a place in the *Codex Medicamentarius* of Paris. The curative powers of Quinina have been highly extolled in French publications, but I am not aware that any thing has appeared in this country upon the subject, and it is for the purpose of beginning to supply this deficiency, that I do myself the honour of offering the present communication to the Society.

Of the three substances discovered in Cinchona†,—the alkali Quinina, found in Cinchona Cordifolia, and more abundantly in the Oblongifolia,—the alkali Cinchonina‡, found in Cinchona

* Some valuable cases of the successful exhibition of the hydriodate of potassa are related by Dr. Baron of Gloucester, in his "*Illustrations of the Inquiry into Tuberculous Diseases.*"

† Pelletier and Caventou, *Journal de Pharmacie*. Fevrier. 1821.

‡ All the additional alkaline bodies have so lately come to light, that their names are not yet settled. The French terminate their appellations in *ine*; ex. gr. *morphine*, *brucine*, *strychnine*; but, for

Lancifolia and also more abundantly in the Oblongifolia*,—and the Kinic Acid, found in combination with lime in all three species and also with Quinina in the Cordifolia, with Cinchonina in the Lancifolia, and with both Quinina and Cinchonina in the Oblongifolia; the two alcalies only, if I mistake not, have been tried as remedies, and of them the Cinchonina appears to have been but once exhibited †.

the sake of uniformity with the names of the old alcalies, the final should be *a*, and it seems to me most eligible to adopt the French appellations with the change of the final *e* into *a*; ex. gr. *morphina*, *brucina*, *strychnina*. Some have proposed to designate *quinina*, quina or kina.: but the latter at least is too similar to the word kino, and would besides lead any one to suppose the substance it denotes must be the basis of kinic acid,—another instance, I may remark, of objectionable nomenclature, from the circumstance of a very different article being termed kino. *Cinchonina* is by some called cinchonia, but the word is evidently too similar to cinchona; and the same observation applies to the word *hyoscyama*, which would be easily mistaken for *hyoscyamus*; and the objection must be still stronger if the alkalies *cinchonina* and *hyoscyamina* should ever be prescribed. The uniform termination in *ina* would be very distinctive.

* A chemist, therefore, would suppose the red bark the best. It is preferred by Dr. Chapman, Professor of Materia Medica at New York (*Discourses on the Elements of Therapeutics*); the late Dr. Saunders of Guy's Hospital wrote expressly to prove its superiority, and collected a large body of most respectable evidence (*Observations on the superior efficacy of the Red Peruvian Bark, in the cure of Fevers, &c.*); Dr. Rigby of Norwich (*An Essay on the use of the Red Peruvian Bark in the cure of Intermittents*); and Dr. Skeete (*Experiments and Observations on Quilled and Red Peruvian Bark*), followed in support of the same opinion.

† Dr. Chomel once prescribed the sulphate of cinchonina in in-

The Quinina, in the state of sulphate, is very extensively employed in France, and many relations of its efficacy have been published in the journals of that country. As soon as the two alcalies of Cinchona were discovered, M. Pelletier sent a quantity to Dr. Magendie, who administered them to dogs in large doses without nausea, vomiting, or other apparent result. The indefatigable and acute physiologist then injected into the veins of these animals from two to ten grains of the sulphate and of the acetate of Quinina and Cinchonina in solution, but with no more effect. Satisfied of the innocence of the substances, he ordered the sulphate of quinina to several scrofulous children affected with ulcers, and in a fortnight the most decided benefit was obtained. One child, in particular, he mentions, four years of age, who had scarcely been able to move for ten months, was constantly crying and ate nothing; but at the end of six weeks, after taking two grains of the sulphate daily, it acquired a good appetite, became cheerful, walked well, and would not readily have been recognised. In the same paper he states that a phthisical patient derived considerable benefit from the medicine*.

M. Pelletier furnished Dr. Chomel, also of La Charité, with a large quantity of the sulphates, and the following was the result of the exhibi-

termittent fever. Six grains mitigated the paroxysms; twenty put a stop to them. *Journal de Pharmacie*. Mars. 1821. p. 137.

* l. c. p. 138 sq.

tion of the sulphate of Quinina in thirteen cases of intermittent fever. Ten were cured; five by the first doses, five by the second: in two the paroxysms were merely mitigated, and in one no sensible effect was produced. In the three unsuccessful cases, the Cinchona itself equally failed. The medicine was taken dissolved in water, on an empty stomach, before the accession of the paroxysm, and the whole quantity was generally six or eight grains, but twice this amount when necessary*.

In September and October, 1820, M. Double tried the sulphate of Quinina in six cases of intermittent fever. In the first, the disease never returned after the exhibition of three grains three times in the interval; smaller doses were subsequently continued for some time. In the second, which occurred in a child, one grain night and morning retarded and deranged the course of the first paroxysm, and a second never took place: the medicine was given for some days in gradually diminished doses, and the patient recovered her strength and a healthy state of her digestive organs. The third case occurred in a young female, and was cured with two grains night and morning. The fever, which was quotidian, instantly lost its intensity and ceased after the third day, and the patient's health improved in a way that could not have been expected. The fourth was a tertian.

* l. c. p. 134 sqq.

Four grains were taken twice in the interval; the next paroxysm was of the slightest description, and no other was experienced: the medicine was continued some time.

The fifth and sixth cases were equally decisive. M. Double prescribed it in a variety of diseases, which are usually treated with Cinchona; and for the most part, he says, with satisfactory results.

Instances of the equally successful exhibition of the sulphate of Quinina, by MM. Villermé*, Magendie †, Fallot ‡, and Dupré §, are also recorded.

M. Piedagnel has published a case of violent periodic pain of the supra-orbital nerve entirely cured by the administration of ten grains of the sulphate, during one of the daily intermissions, and a repetition of the same doses in the following twelve hours with the view of greater security||. M. Dupré relates a case of violent periodic pain of the infra-orbital nerve, that subsided after the exhibition of twenty-four grains in small doses during two intermissions; and one of remittent sciatica which yielded very speedily¶. Two instances of periodic

* *Bulletin de la Société Médicale d'Emulation de Paris.* Janvier. 1821.

† *Journal de Physiologie Expérimentale.* Octobre. 1821.

‡ *Journal Complémentaire du Dictionnaire des Sciences Médicales.* Mai. 1822.

§ *Journal de Phys. Exp.* Août. 1822.

|| l. c. Avril. 1822.

¶ l. c. Août. 1822.

pain of the facial nerve treated with equal success by M. Ribes, will be found in the same pages. M. Dupré gives us a case likewise of Typhus, in which a rapid amendment took place after the use of the sulphate of Quinina was commenced.

I do not know that any thing more has been recorded respecting the powers of this remedy; but, from the activity which prevails throughout the profession, and from the number of journals which are published, it is not unlikely that some statements have escaped my notice:

In the common run of cases in which we prescribe Cinchona, its efficacy is not particularly striking, as we generally employ at the same time nutritious food, wine, perhaps, and porter, and every thing calculated to strengthen. But in these cases I have always been equally satisfied with the sulphate of Quinina. I ordered it largely and perseveringly in one case of irregularly intermittent and in one of remittent pain of the face, but without advantage. Like M. Dupré I employed it in a case of typhus, and with eminent advantage. A poor Irish-woman, half-starved and flooding, was brought into St. Thomas's labouring under severe typhus, on the 19th of June. She was supported by plenty of beef-tea and milk; the epigastrium, forehead, and occiput were blistered; and Hyd:

cum Creta was prescribed in doses of ʒi , and sometimes ʒij every six hour still the mouth grew sore. The delirium and stupor were entirely subdued, and the tongue became clean and moist, but the debility increased hourly. The face became ghastly, and the body sunk lower in the bed. I ordered three, and soon five grains of the Sulphate of Quinina, to be given every six hours, and the diet to remain as before. A striking amendment was observed the next day, and she speedily recovered. After being convalescent some time, the medicine was omitted; but, when I thought of discharging her, she suddenly relapsed into extreme prostration of strength, passed her urine and fæces again involuntarily, and grew delirious; but the tongue remained clean and moist. The two blisters to the head were repeated, and the sulphate ordered as before, milk and beef tea *ad libitum* continuing to be her diet. The amendment was not so sudden, but from the first day of recurring to the medicine, the debility ceased to increase; in a few days she clearly gained strength, and was soon convalescent. After taking the full diet of the house, and a pint of porter daily for two or three weeks, she was discharged perfectly strong and well*.

I may add, that, although in doses of five grains

* This case has been added since the paper was read to the Society.

every six hours, I have never observed any disturbance of the functions, a dose of ten grains occasioned vomiting in the three only instances in which the medicine was carried to this extent from its not strengthening the patients in ordinary doses.

The three following are all the cases of intermittent fever in which I have prescribed it, and they corroborate the assertions of the French. They occurred in St. Thomas's Hospital, as well as the rest which I shall detail. The medicine was given in the form of pills.

1. Elizabeth Taylor came under my care, as an out-patient, on the 19th September last.

She had laboured under intermittent fever nearly a twelvemonth, in Gloucestershire, when thirteen years of age, and had since experienced a solitary paroxysm occasionally, and once so severe a return, as to confine her two months in St. Thomas's Hospital. The disease had now regularly recurred in the quartan type for six months.

I prescribed gr. v. of the sulphate of Quinina every six hours. On the tenth day (Sept. 28), I saw her again, and learnt that a paroxysm took place on the first regular day, viz. the 21st of the month, but without any cold stage; that the hot stage was very mild, and that the disease had not

subsequently returned. The same prescription was continued.

On the 18th day (Oct. 6th), she informed me, that there still had been no return, and I continued the prescription. She never applied again, remaining, no doubt, perfectly well.

2. The second case was that of an Irishman, named Hugh Kaney, who was admitted into the hospital on the 27th March.

He had laboured under tertian for five days. I prescribed gr. v. of the sulphate of Quinina every six hours.

A paroxysm took place on the day after his admission; but although he remained in the hospital till the 8th May, he never experienced another. The medicine was continued, and in the same quantity, till the 22d April.

3. The third case proved more refractory, but the disease was instantly influenced by the medicine, and removed in little more than a fortnight*.

* I have reason to believe, that the medicine which this man took was unavoidably not obtained from the usual source, and was of inferior quality. It should be intensely bitter, as white as snow, and extremely light, resembling benzoic acid in its appearance.

Robert Tindall was admitted into the hospital on the 27th March, having laboured under tertian for a month.

I prescribed gr. v. of the sulphate of Quinina every six hours. On the 6th day (April 1), I found that the paroxysms had returned regularly, but less severely, and at a later hour. On the 10th (April 5), that they were still milder, and on the 13th (April 8), that they had become much milder. On the 15th (April 10), the paroxysm was severer than it had lately been; but on the 19th (April 14), it returned very mildly, and for the last time.

The same quantity of the medicine was continued till the 26th day (April 22), and he left the hospital on the 49th (May 15), without the least return of the disorder.

The virtue of the medicine evidently resided in the Quinina, and this, if not rendered perfectly pure, could be afforded at a much smaller price than the sulphate. I, therefore, determined on trying the Quinina itself, and the following cases of its exhibition in intermittent fever prove its efficacy. I trust they will be acceptable to the Society, as I have been unable to find an account of the exhibition of simple Quinina in any disease*. Like the sulphate, it was given in pills.

* The article was prepared for my use by digesting cinchona

The history of some of these cases is not sufficiently extensive to *prove* the curative powers of the remedy, but they are related with the rest, because I wish to lay before the Society the *whole* of my experience of it in intermittent fever; and, as far as they go, they all show its power. Not one presents the shadow of an exception. That failures will occur, is, however, nearly certain. For no remedy is so specific but that the previous removal or diminution of some morbid, or at least unfavourable, condition may be requisite to its success, and this is particularly exemplified in intermittent fever.

1. I first prescribed the Quinina, on the 29th November, for a woman named Martha Pallow, who had been affected with quotidian for a fortnight, the paroxysms commencing always at four o'clock, a. m.

Five grains every six hours were ordered.

in a very dilute solution of sulphuric acid (ʒij. to four gallons of water), straining, and then adding magnesia to saturation, by which means the Quinina was precipitated from the acid, mixed with tannin and extractive matter, and sulphate of magnesia remained in solution. The precipitate was again dissolved in sulphuric acid, again precipitated, and finally washed and dried. A pound of cinchona cordifolia furnishes about an ounce of this impure Quinina, or about two drachms of pure sulphate of Quinina by another process, in which the Quinina is obtained pure, by means of alcohol previously to its formation into a sulphate, whence the greater real expence of this article.

She visited me again December 7, the next day for seeing out-patients, and said she had experienced no paroxysm since the 7th day (Dec. 4). The medicine was continued, and in the same doses, but she never applied again, and therefore, probably remained in good health.

2. William Johnson was admitted into the hospital January 23, having laboured under tertian for ten weeks.

He was ordered the same doses at the same intervals. A paroxysm occurred on the day of his admission, but more mildly than before, and he had no other up to the 5th day (Jan. 27), when he left the house of his own accord.

3. William Johnson was admitted on the 23d January, ill ten weeks with tertian.

The same prescription.

He had a paroxysm the day after his admission, but more slightly than before; and on the 6th day (January 28), he voluntarily left the hospital without having suffered another.

4. Edward Capon had tertian in Norfolk twelve years ago: was now a surgical patient in the hospital, and desired my assistance on the 4th Febru-

ary, on account of a quotidian which had existed three weeks.

The same prescription.

On the fifth day (February 4), I found that he had experienced no paroxysm, but merely a coldness of the loins, legs, and feet at the customary time of the paroxysm.

On the eighth day (February 11), he said that even the coldness had ceased to take place, and up to the 1st of May, he remained free from the disease.

5. Francis Douglas had been afflicted with intermittent fever irregularly for eighteen months: at first daily for six weeks in the West Indies. Since that time he had made a voyage to China; and for five months had no paroxysm.

One attacked him on the 2d of February last in the morning; one on the 6th, in the evening; and one on the 8th, at noon—the day on which I first prescribed for him.

He complained of a degree of shivering every day.

The same prescription was written for him.

He had no paroxysm from the day he commenced the use of the medicine till the eighth (February 15), and then none till the fourteenth (February 21).

No other occurred during his residence in the hospital.

6. Daniel Duff was admitted on the 13th February, having laboured under quotidian a fortnight.

The same prescription.

A paroxysm took place on the two first days after his admission, but they were slight, and the second slighter than the first; and up to the 27th of the month he had no return, and was then discharged.

7. Edward Perry, ill a month with tertian, was admitted February 13.

He had laboured under the disease in Wiltshire thirty-six years ago, but never since that period till the present time.

The same prescription.

The paroxysms at once became slighter, and recurred but twice after the use of the medicine.

8. John Ferguson, affected with tertian for three weeks, was admitted on the 8th March.

The same prescription.

No paroxysm took place after the use of the medicine was begun.

9. An old woman of the name of Traylen, had laboured under quartan for ten weeks. She had been subject to it for many years, but always stopped the paroxysms before by a smaller quantity of cinchona than had failed the last spring.

The same doses of Quinina were followed by an immediate cessation of the disease, and though three months have elapsed, it has not recurred.

10. Daniel Carthy was admitted May 29, on account of tertian. He had the same prescription as the rest. The only paroxysm that took place was on the day after his admission, and he was discharged at his own desire at the end of three weeks.

11. Bryan Summers was also admitted May 29, on account of a tertian, caught at Tilbury Fort. The same prescription was given to him. A paroxysm occurred immediately after his admission, but it was not succeeded by another. A chillness of the legs came on every other day for some little

time ; but this gradually decreased, and he was discharged at the end of three weeks.

My general experience of simple Quinina, as a tonic, is the same as of the sulphate ; but I have never observed derangement of the stomach induced by doses of the impure preparation I employed, so large as ten grains, given every six hours.

I beg not to be misunderstood as recommending simple Quinina in preference to the sulphate. My object is merely to illustrate the virtues of the substance whether simple or combined. I may here state that although none of my friends have yet employed simple Quinina, several have prescribed the sulphate, and all with the most satisfactory results. Every case of intermittent fever has presently yielded to it, and in some, the bark had previously failed*.

* Had there been sufficient time, it was my intention to collect these cases, and lay them, with the permission of my friends, before the Society. I regret my want of opportunity the less, because, as they were chiefly examples of intermittent fever, the narrations would all have been exactly similar to those which have been read : a patient would only have been said to have laboured under intermittent fever, to have taken the sulphate, and presently lost his disease. But the following case, furnished me by my friend and colleague, Dr. Roots, is exceedingly worthy of detail, as affording an instance of the immediate success of the sulphate, after the failure of both bark and arsenic.

“ M. Sullivan was admitted into St. Pancras Infirmary on

It has been apprehended that the alkalies of cinchona may be analogous to those of narcotics,

May 7th, and had been suffering under tertian for nearly a month. She took the liquor arsenicalis from the 8th of May to the 23d, and every two or three days rhubarb and calomel, without any advantage. From the 23d of May to June 6th, she took cinchona in drachm doses every six hours, with the decoction and tincture, continuing at times the rhubarb and calomel. As the paroxysms still returned at the regular period, the cinchona was discontinued, and the liquor arsenicalis resumed in doses of $\text{m} \text{ix}$, every six hours, which she took from the 6th of June till the 20th. On the 20th, finding the paroxysms still return at the usual period, I ordered her five grains of the sulphate of Quinina, in pill, to be given every six hours.

“ She took twelve doses, never having any return of the paroxysm after the first dose, and was discharged on the 2d of July.

“ It is right to mention, that the day prior to the sulphate of Quinina being ordered, she was allowed a pint of porter daily.”

Dr. Roots, I may add, has employed the medicine but once besides, and says, in his letter to me, “ In another case of quartan, the sulphate was given in doses of two grains every six hours, and was equally successful.”

While correcting the press, I have witnessed the power of the sulphate in a fourth case of intermittent. A poor man, of the name of Charles Hunt, was conveyed to me on *Monday morning*, September 1, and, with difficulty, supported into the house. He said that he had laboured under ague at Cowes, in the Isle of Wight, twenty years ago, but was attacked a fortnight since with violent vomiting and pyrexia, for which, at the suggestion of some friend, he drank large quantities of cold water: that in a few days, a severe tertian commenced, without any alleviation of the other symptoms; and that he had experienced four paroxysms, every successive one invading an hour earlier, and each of the three stages lasting always nearly three hours. I found him excessively hot and thirsty, vomiting every thing

and their exhibition consequently not altogether free from danger. But the fear is groundless. I have used many ounces of both Quinina and its sulphate, have frequently given them every day for several weeks, and, even when the quantity of the sulphate or of the impure Quinina was a scruple in the twenty-four hours, have never observed the slightest unpleasant effect. Yet there can be no

he swallowed, with a feeble rapid pulse, and so weak as to have fallen three times that morning, in walking through a yard belonging to his house. Five grains of the sulphate every six hours, in the form of pill, were ordered. The medicine was not procured that day, and in the evening he had a paroxysm an hour earlier than the preceding, and more violent than any. The next day (*Tuesday*) he began its use, and on *Wednesday*, to his great delight, he experienced no paroxysm, but merely a chilliness for about ten minutes, followed by neither heat nor sweating. On *Friday*, I found him much stronger, much cooler, with little thirst, with his pulse greatly reduced, and able to retain every sort of food, —he had not vomited since the first dose of the remedy. I write this on *Monday*, September 8, and he tells me to-day, that he has had not the slightest paroxysm, and feels perfectly well; indeed he walked to my house, a distance of three miles, and purposed walking home again.

This case is particularly striking, not merely as an illustration of the immediate cure of the disease, but from the circumstance of the violent vomiting and pyrexia, which were constantly present and which would have deterred any one from exhibiting bark in the first instance, yielding completely to the remedy. I obtained the medicine for him at St. Thomas's Hospital, where the article we have at present is very beautiful. It seems to me more successfully manufactured than when I first employed it, and in describing its sensible qualities at page 552, I should have added that, if good, it cannot be afforded at a lower price than three guineas an ounce.

question that an excessive quantity of so intense a tonic and bitter may disturb. Accordingly ten grains of the sulphate at a dose occasioned vomiting, as I mentioned, in my own practice. An instance has been related to me of a gentleman experiencing nausea and head-ache from a dose of ten grains taken without advice; and another in which five grains repeated every three hours for six times, caused a degree of uneasiness; and Dr. Magendie says, that when practitioners have gone considerably beyond ten grains (*dépassé de beaucoup cette dose*) in the twenty-four hours, the patient has sometimes experienced a high degree of excitement, and of disturbance of the head*. But quantities that can disagree, are not required, five grains of the sulphate every six hours is the largest dose that can be necessary: many cases of intermittent fever have been cured with three, two, and even one grain, every six hours.

I would always continue the medicine, whether using the sulphate or simple Quinina, for about a week after the ague has ceased, because I have heard of relapses where it had been omitted immediately that the disease gave way.

It is very true that Quinina and Cinchonina cannot strictly be called new medicines, because they exist, one or both, in the Cinchona which we have

* *Formulaire pour la préparation et l'emploi de plusieurs nouveaux médicamens.* p. 49. Paris. 1822.

all been prescribing. We are in the situation of M. Jourdain, in Moliere's *Bourgeois Gentilhomme*, who had been speaking prose all his life without knowing it; and we might address the chemists, to whose labours we are so deeply indebted, in language similar to that of the worthy man, on receiving the information from his Maître de Philosophie.—“ Par ma foi, il y a plus de quarante ans que je dis la prose, sans que j'en susse rien; et je vous suis le plus obligé du monde, de m'avoir appris cela.”

But although we have not gained a new medicine, the acquisition of so compendious a form of bark, if one may so speak, is highly important. I have often smiled at the common application of the passage in the *Georgics*, where Virgil describes the effect of throwing a little dust upon bees engaged in battle, to the effect of bark upon intermittent fevers:—

Hæc certamina tanta,
Pulveris exigui jactu, compressa quiescunt.

The powder of bark requires generally to be *thrown in*, according to the apt expression of old practitioners, in pretty large quantities before the disease is removed, and not unfrequently it fails. But the quotation is strictly applicable to Quinina and its sulphate. The patient has only to take a pill, and is spared the annoyance of swallowing any

of the mass of inert powder* which remains after the extraction of Quinina, and which frequently, whatever may be the disease, so disgusts him, or so oppresses his stomach, and deranges his system at large, that bark cannot be borne in efficient quantity, or at all: and, what is particularly interesting, we find that they succeed when bark has failed,—that they cure cases of intermittent fever which have resisted bark, although perfectly well borne, and freely administered.

* After the extraction of the Quinina, the yellow bark is as tasteless as so much wet saw-dust; and I presume the same is the case with the pale, after the extraction of the Cinchonina, and with the red after the extraction of both.