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Contributors

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ON THE
MEDICINAL PROPERTIES OF BEBEERINE.

By DOUGLAS MACLAGAN, M. D., F. R. S. E., &c.

(From the Edin. Med. and Surg. Journal, No. 163.)

IN April 1843, I communicated to the Royal Society of Edinburgh some chemical and pharmaceutical remarks on the Bebeeru, or Greenheart Tree of British Guiana, in which Dr Rodie of that colony had pointed out the existence of a vegetable alkali which he called Bebeerine, and which he considered to be possessed of antiperiodic virtues. This paper has appeared in the Transactions of the Royal Society, Vol. xv. In August of the same year I published in Cormack's Monthly Journal a few observations on the medicinal qualities of Bebeerine, in which I narrated a series of cases furnished me by others, or observed by myself, which served to show that bebeerine is possessed of considerable antiperiodic and general tonic qualities, resembling quinine in its general effects, but without its liability to excite the circulation or produce the constitutional irritation to which the cinchona alkalies are too apt to give rise.

My present object is to lay before the profession further evidence as to its powers, with a view to its being employed, if it stand the test of experience, as a substitute for quinine.

Before, however, narrating cases illustrative of its medicinal action, I may be allowed to mention one or two points of informa-

tion which I have gained regarding its natural history and pharmacy, since the date of the above papers.

In my communication to the Royal Society I stated that the plant was unknown to me, and that although it had been referred to the natural order *Lauraceae* by Hooker, Lindley, and Schomburgk, nothing precise was known regarding it. Since that time flowering specimens of the plant, which were sent to me by Dr Watt of Demerara, and especially the examination of the plant by M. Schomburgk, have confirmed its lauraceous origin, and Schomburgk finds it to be a species of the genus *Nectandra*, to which he has given the specific name of *N. Rodiei*, in honour of Dr Rodie, the original discoverer of its medicinal powers. (Hooker's London Journal of Botany, December 1844.)

With regard to the chemical history of the active principle, I may state that subsequent trials have led me to believe that what I described as a second alkali, under the name of Sipeerine, is only a product of the oxidation of bebeerine, and that there is really only one alkali in the bark. My other avocations have prevented me from completing an inquiry into its ultimate chemical constitution, in which I have been engaged along with Professor Tilley of Birmingham. This investigation is now in progress, and, as I have put a portion of the sulphate into the hands of Professor Liebig, I hope also soon to learn that it has been examined in the Giessen laboratory.

A more important fact in relation to our present object is, that a very great improvement has been effected in the manufacture of bebeerine intended for medicinal use. I cannot refrain from noticing the spirited exertions made by Mr J. F. Macfarlane of this city, and the continued perseverance of Mr Brown, the superintendent of his laboratory, to improve the quality and appearance of the salt; and I am glad to have this opportunity of saying, that the latest manufactures bear ample testimony to the success of their endeavours. The principal point in which the more recently made sulphate seems to have the advantage over former manufactures is, in the salt being kept a little basic, in which condition it is not so liable to be affected during drying as the completely neutral salt is. The only difference resulting from this is, that, like disulphate of quina, it requires the addition of a few drops of sulphuric acid to form a perfect solution. On comparing this salt with perfectly neutral sulphate, analyzed by myself in the course of my former experiments, I find that the comparative constitution of the two salts, when carefully dried, is the following:—

Neutral sulphate, Maclagan, Trans. Royal Soc. of Ed. Loc. cit.		Mr Macfarlane's basic, Commercial sulphate.
Bebeerine, .	36.39	90.83
Sulphuric acid, .	13.61	9.17
	100.00	100.00

The salts are anhydrous. Mr Macfarlane's preparation (after being carried to my class-room in a paper instead of a bottle) contained only 0.11 per cent. of hygrometric moisture.

I may further add, that Mr Macfarlane finds that he will probably be able to sell the sulphate at 6s. per oz. This is less than one-half the price of sulphate of quinine, which now costs 12s. 6d. per oz.

In adducing further evidence of the medicinal virtues of Bebeerine, which is my object at present, I shall confine myself to those testimonies to its value which I have received from other quarters, contenting myself on my own part with the general statement, that I have not met with any circumstances tending to shake the opinion expressed in the following sentence, which I quote from my paper in Cormack's Journal for August 1843. "As regards the features, which are characteristic of Bebeerine as a therapeutic agent generally, I think that the above cases entitle us to consider that it is a marked antiperiodic and tonic, and consequently that there is good reason to believe that it may be applied to the same purposes for which the more expensive quinine is employed."

I shall first give the more recent reports which I have got, regarding its action in remittent and intermittent fevers, along with a tabular view of all the cases treated by it with which I am acquainted, and then notice its employment in periodic headach, neuralgia, &c.

Intermittent and Remittent Fever.—My friend Dr Watt of Georgetown, Demerara, whose first series of cases were published by me in 1843, has made farther trial of the Bebeerine, and has favoured me with the following additional reports.

CASE I.—(*Quotidian.*) Josephina Pereira, native of Madeira, age about 38; has been four years in Demerara, and has had frequent attacks of intermittent fever since her arrival. She labours in the cane fields, and has an infant of four months at the breast.

27th November 1843. Was seized with ague and fever on the 24th, between the hours of nine and ten A. M., and it has returned at the same hour every day since. To-day is the fourth paroxysm, and she is now (noon) in the hot stage, and vomiting. Has had calomel and jalap. No bile in the matters vomited to day; tongue clean; pulse 116. To have twelve grains bebeerine evening, and same dose at six A. M. to-morrow.

28th. Took bebeerine last evening, but did not get the dose this morning till ague was coming on, and she did not take it. Ague and fever came on at usual hour to-day. To have twelve grains bebeerine evening and twelve grains early to-morrow morning.

29th. Took the two doses of bebeerine as directed. The ague

did not return at the usual hour this forenoon, and she went out to wash some clothes for her baby. Just now (noon) she has been seized with ague, and has returned to her chamber. To confine herself to her chamber entirely, and continue the bebeerine, twelve grains evenings and mornings.

1st December. No return of fever yesterday or to-day; has had one drachm bebeerine altogether; and has had no deafness or ringing of the ears or any affection of the head.

1st June. Has had no return of fever since.

CASE II.—(*Tertian.*) Maria de Jesus, from Madeira, four years in the colony, and occasionally subject to intermittent fever, which generally comes on every second day.

29th December 1843. Had a paroxysm of intermittent fever the day before yesterday and again to-day. Is now (noon) in the hot stage, during the cold stage vomited bile; pulse 120; skin hot and dry. To have ten grains calomel and twenty-five grains jalap now, and twelve grains bebeerine at bed-time. To-morrow to have twelve grains bebeerine morning and noon.

31st. Taken the medicines as ordered. The thirty-six grains bebeerine have had no effect upon her head. As this is her fever day let her have twelve grains bebeerine immediately.

1st January 1844.—Fever has not returned.

3d. Convalescent.

1st June. This woman soon after left the estate, and I saw nothing of her since.

CASE III.—(*Enlarged Spleen and Fever.*) José da Brio, from Madeira, about three or four years in the colony; very subject to intermittent fever; has a pale emaciated appearance, with great enlargement of the spleen, which extends to near the right ilium.

3d January 1844. was seized at 5 P. M. on the 1st with intermittent fever, which continued all night, but went off yesterday morning and returned again at 5 in the afternoon and continued the whole night. Skin is now (10 A. M.) moist, and pulse 90, small and soft; tongue much furred; stomach irritable. To have an emetic now, ten grains calomel at bed-time, and twenty-five grains of jalap to-morrow morning.

5th January. Took the emetic; but as the fever had only remitted, and returned with increased violence towards evening of the 3d, he refused the calomel in the evening and the jalap yesterday. Yesterday there was merely a remission in the forenoon with increase of fever towards the evening. To-day he has likewise had remission of fever in the morning; but now (1 P. M.) his skin is hot and dry, and pulse 116. Take of opium six grains; tartar-emetic one grain; calomel ten grains. Mix and divide into four pills. One to be given every six hours while the fever continues.

6th January. Fever still continues with remissions; skin sometimes moist, sometimes dry, always hot; complains of pain on pres-

sure in the spleen. To have a blister over the spleen ; the remaining pill now, and half a drachm of jalap two hours after it. Twelve grains of bebeerine at bed-time.

7th. Fever left him last evening. Refused the blister, but took the other medicines, and has passed much bile. Twelve grains of bebeerine twice to day.

8th. No return of fever. Took two doses only of the bebeerine yesterday and the third early this morning. Slept some during the night, and feels better, but very weak. To have twelve grains of bebeerine at noon, and to be allowed a little wine, soup, &c.

10th. Has had no return of fever ; tongue cleaning ; spleen softer and smaller, and says he has no pain in it. To have thirty-five grains of jalap and one drachm of cream of tartar.

12th. Continues convalescent. Bebeerine had no effect on his head.

1st June. I believe he has had once or twice slight attacks of fever and ague since, but so slight that he has not again put himself under medical treatment.

CASE. IV.—Julio de — from Madeira, aged 12, had an attack of congestive remittent fever in August last, and was insensible for two days.

January 1844. Has had tertian fever latterly. I gave him bebeerine in the same way that I usually give quinine, and the fever was completely checked. My notes of this case are lost or mislaid.

CASE V.—(*Bilious Intermittent*.) Mr William C., native of Scotland, aged 20, has been about three or four years in the colony as a field overseer, where he is constantly exposed to the sun and weather. Says that about two years ago he had yellow fever, and was very ill, since which, however, he has enjoyed very good health.

April 15th. Between ten and eleven o'clock to-day he was suddenly seized in the field with bilious vomiting and fever ; but without any perceptible cold stage. He is now (3 P. M.) sweating very profusely ; pulse 120 and full ; severe pain across the forehead ; urine deeply tinged with bile ; tongue covered with fur. To have four pills containing sixteen grains of the compound colocyath mass, with twelve grains of calomel, and a full dose of Epsom salts to-morrow morning.

16th. Free of fever and headach this morning ; pills and salts have acted freely ; stools dark green at first, and now yellow ; urine very high coloured ; medicines still acting.

17th. Three o'clock yesterday afternoon the fever returned without any perceptible cold stage. Took salts again this morning, which have acted freely ; stools still very bilious and urine the same. Was seized at 11 A. M. with smart ague, which lasted nearly an hour, during which time he vomited copiously of thick yellow bile. 1 P. M., his skin is now hot and dry ; pulse 120 and full ; severe frontal

pain. The head to be frequently bathed with vinegar and water, and wet cloths applied to the brow.

R *Sulph. Bebeer.* ℥ij. et gr. viii. ; *Calomelanos*, gr. xxiv. ;
Mucilag. Ac. Arab. q. s. *M. ft. massa in pil.* xii. *dividenda.*

Three of the pills to be taken in two hours, three again at bedtime, and three early to-morrow morning.

18th. Yesterday the sweating commenced about four, and the fever left him about seven P. M. Has had a good night, and taken nine of the pills as directed. No pain nor fulness in the head, and is quite certain he has had no ringing in the ears ; tongue still much furred ; pills have acted thrice on his bowels ; urine scarcely so high in colour. To have forty-five grains of jalap with some cream of tartar.

19th. 7 A. M. No return of fever. The jalap acted scantily, having vomited about an hour and a half after it was taken. Had a good night, and this morning feels inclined to eat ; pulse 80, and natural ; tongue still covered with a greenish fur ; urine deeper in colour ; eyes slightly yellow. To have three of the pills of bebeerine and calomel now.

1 P. M. Called on my return up the coast, and find he has had two eggs with tea and toast, since which he feels very full and uncomfortable about the stomach, with nausea and restlessness.

5 P. M. Have just been called to him. Soon after I left he vomited the eggs, &c. and about two o'clock was seized with fever, which was soon followed by copious perspiration. His pulse is now 84, and full, and he is still perspiring freely. He feels very full and uncomfortable about the hypogastrium ; urine and eyes more tinged with bile since the fever returned. To have a purgative glyster now ; three of the pills of bebeerine with calomel at bedtime, and three again to-morrow morning.

20th. Took the pills as directed, (thirty-six grains of bebeerine last twenty-four hours.) No ringing of ears nor deafness, nor any peculiar feeling about the head ; pulse 80, and soft ; skin moist ; passed a tolerable night, but the enema did not act, and he still complains of the fulness in the hypogastrium. To have Epsom salts now, as he prefers that purgative. Three pills of bebeerine with calomel in the evening, and three to-morrow morning.

22d. Took the medicines as directed, and another dose of Epsom salts this morning ; eyes and urine less tinged with bile ; pulse and skin natural ; gums slightly affected by the calomel ; feels hungry ; and has had no return of fever since the 17th, with exception of the slight attack after the error in diet on afternoon of 19th.

23d. Continues convalescent.

29th. Resumed his duties in the sugar works, where he is not exposed to the sun or weather.

May 9th. Mr C. returned to his duties in the field a few days ago, and got well drenched with rain, which, he says, gave him a cold in the head. At noon on the 7th he was seized with ague and

fever, and again at the same hours yesterday and to-day. The fever did not last more than from two to three hours on each occasion. Tongue is slightly furred.

R *Mass. pil. Coloc. comp.* gr. xvi.; *Calomel.* gr. x. *M. ft. pil.*
No. iv. h. s. s., and Epsom salts to-morrow morning.

10th. The pills and salts have acted well, and brought away dark-coloured stools. The fever returned at noon as usual, being the fourth daily paroxysm.

R *Sulph. Bebeer.* ℥ii.; *Muc. Ac. Ar. q. s.* *M. ft. mass. in pil.*
No. xii. dividenda. Three to be taken at bed-time, three at six, and three at ten A. M. to-morrow.

11th. Took the nine pills as directed; still the fever returned at noon as usual, being the fifth daily paroxysm. To have the three remaining pills of bebeerine early to-morrow morning.

13th. Has had no fever yesterday or to-day.

June 1st. Continues well.

CASE VI.—Doctor F. in December last had symptomatic fever from abscess, for which he was advised to take full doses of quinine during the remissions. This he did on three several days, but on each occasion, in two hours after taking the quinine, his whole body became covered with nettle-rash, which generally lasted for six hours at a time, and caused great irritation and annoyance. In January he was again recommended to take full doses of quinine, (ten grain doses,) and thinking that on the former occasion the nettle-rash might have arisen from some impurity in the quinine, which bore to have been made at Philadelphia, he had recourse to French quinine by different makers, but the nettle-rash invariably appeared after each dose, though one of them was as low as six grains. Altogether this occurred six or seven several times.

On the 4th of February, having again occasion for a similar remedy, he determined to substitute the sulphate of bebeerine, of which he took ten grains rubbed up with brown sugar. The bebeerine was not followed by urticaria, though it was followed by the same remedial effects as he had usually experienced from the quinine on former occasions. Since then he has had occasion to take the bebeerine, at intervals, three several times, making four times altogether, and it has always been followed by the same remedial effects, without the slightest tendency to produce the urticaria. On one occasion he took fourteen grains at a single dose, without any perceptible effects on the ears or head, or any of that nervous feeling which commonly follows full doses of quinine.

Remarks.—Quinine in full doses is occasionally followed by rather unpleasant symptoms. When under its influence, the head becomes confused and feels larger than usual, with ringing of the ears and deafness. The whole nervous system appears to become affected, and sometimes the hands are so unsteady that the patient can scarcely write. These symptoms, in a greater or less degree, generally follow the exhibition in twenty-four hours of from twenty

to thirty grains of the quinine, and it is seldom that a smaller quantity will suffice to check an intermittent when once it is fully formed. Quinine likewise acts powerfully on the skin and gall-ducts, causing an increased flow of perspiration and bile, and a very small overdose will now and then produce alarming cold sweats, sinking of the pulse, and great irritability of stomach. In all the cases of this kind which I have seen, the patient had taken the quinine by guess, instead of weighing the doses, so that it is impossible to say exactly how many grains had been taken to cause these symptoms, but I should think in each case probably not more than forty to forty-five grains in the twenty-four hours. On the other hand, in the yellow fever of this country, the late Dr Smith, Physician to the Seaman's Hospital, and several other practitioners, have been in the habit of giving, and with great success, twenty to twenty-four grain doses of quinine combined with calomel every four hours until the symptoms abated, without such doses having been followed by any alarming symptoms, and even the ears did not become affected until the fever had yielded. The fact is, quinine appears to act much after a law similar to that pointed out by Marshall Hall with regard to blood-letting ;—the more in need the patient is of quinine, the greater quantity will he bear without affecting his nervous system, and the less he requires it, the smaller quantity affects him. Six or eight grains, taken to prevent an accession of fever, before a regular paroxysm has appeared, will generally cause ringing of the ears ; while three times that quantity will be required to produce a similar effect after a paroxysm has once taken place. This, however, by the way.

Should the bebeerine be found equally efficacious with the quinine, in checking fever, and as an antidote to malarious diseases in general, which, I think, we already have good reason to anticipate, how far superior will it prove, in that it leaves the head and nervous system comparatively free and unaffected, while in no case within my knowledge has it ever caused irritation of stomach or cold sweat. In Mr C.'s case, No. V., where ninety-six grains of the bebeerine were taken in three days and a half, I should not have ventured to give the same quantity of quinine in the same period for fear of cold sweats, sinking pulse, and irritability of stomach, more especially, as, when the system is charged with bile, those untoward symptoms are more apt to follow the free exhibition of the quinine.

I have a suspicion that the bebeerine is somewhat tardier, however, in developing its febrifuge effects, as witness case No. I. where the fever returned once after the system, with quinine, would have been under its effect ; and again, in Case V. the fever likewise returned once after the system should have been under its influence, though both of these might certainly have arisen from the indiscretion of the patients, the first by exposing himself prematurely, and the other from an error in diet. This, however, does not apply to a similar recurrence of the quotidian in No. V.'s case in May.

Should further experience confirm this suspicion of a somewhat tardier action, may it not be accounted for by the quinine acting more immediately on the nervous system, and the bebeerine through the blood; and may the bebeerine, therefore, not be likely to produce a more permanent febrifuge effect? Arsenic, we know, takes eight to ten or twelve days to arrest an ague, but it is far more permanent in its effects than the bark, and may we not hope something similar from the bebeerine? Time and further experience will show.—I am, &c.

P. F. WATT, M. D.

Georgetown, Demerara,
June 4, 1844.*

In August 1843, I forwarded to Dr Nicolson, Deputy-Inspector of Hospitals at Madras, a few ounces of the sulphate, which he at my request placed at the disposal, partly of the medical officers of H. M.'s troops, and partly in the hands of those of the Company's service. I gladly embrace this opportunity of thanking Dr Nicolson and the other officers whose names are mentioned below, for their prompt attention to my requests regarding this matter.

"Her Majesty's 21st Fusiliers.—Fevers. Six cases treated with Sulphate of Bebeerine."

Febris Intermittens Quot. James Templeton, private, aged 25; temperament sanguineous; line of life cotton-spinner; resident in India four years and three months. 20th November 1843.—Admitted at noon, having had a paroxysm of fever on the two preceding days at ten o'clock. The rigor was of short duration, followed

* Whilst this paper was going through the press I received, by the West India mail of February, a letter from Dr Watt, containing the following additional remarks.

"Thinking it would be better to have cases from other medical men, than always from the same, who might be supposed to be prepossessed in its favour, I gave away most of the sulphate in my possession to other medical practitioners for trial, retaining merely a portion for my personal use, as I frequently require a full dose, and I cannot take the quinine without its giving me eight to ten hours nettle-rash all over my body. Owing to this I have no new cases myself, and none of my medical friends, with the exception of Dr M'Farlane, (son of the Principal), have, I believe, yet tried it. Dr M'Farlane gave it to several children, in whom he thought it did good as a tonic. He afterwards took the remainder of it himself in an attack of intermittent; but the fever returned notwithstanding. He is not certain, however, that the quantity he took was sufficient. So this case tells neither way. It did not affect his head in any way, and acted gently on his bowels as a laxative. This effect it likewise invariably has with me. If I take twelve or fifteen grains at bed-time, I am certain to have one copious bulky evacuation the following morning.

When quinine is given in sufficient quantity in the interval, a paroxysm seldom follows. This is not, however, always the case with the bebeerine,—one paroxysm does sometimes come on after its full exhibition,—but, so far as my experience yet goes, no second paroxysm. It is important that this should be fully known, otherwise disappointment is sure to ensue.

The bebeerine is tardier in cutting short an intermittent, but its effects seem more permanent. This, I think, I mentioned in my note accompanying the cases sent you on 4th June last."

by headach and great heat of skin, and with but little perspiration. *Habt. haust. Emeticum more solito; Pulv. Jalap Co. ʒi. c. Infus. Sennæ ʒij.; Vesp. pediluvium et Mist. Diaphor. ʒi. 2dis horis.* Spoon diet.

21st. The emetic and purgative acted freely; slept badly; is at present free from fever; pulse calm; skin soft; tongue clean; anorexia. *Capt. q. p. Sulph. Beberinæ. gr. v. in Extr. Gentian. et rept. hor. decima.*

Vesp. Very slight pyrexia at nine o'clock; no regular paroxysm; bowels are loose; tongue clean. *Habt. pilul. purg. ij. H. S.*

22d. Slept well; no fever; tongue clean; pulse regular. *Repr. pil. (ut heri) ter die.* Low diet.

Vesp. Is free from fever.

23d. No return of the paroxysm. *Cont. Med. ter die.*

24th Convalescent; bowels free. *Infus. Gentian. ʒiij. ter. die Omitt. S. Beberinæ.*

25th. Is quite well. Discharged.

Febris Remittens. James Barber, private, aged 21; temperament robust; line of life labourer; resident in India one year and two months. 24th November 1843.—Complained of febrile symptoms and soreness all over him, and says he felt suddenly unwell at the barracks; pulse of ordinary strength and frequency; skin harsh; tongue slightly furred; anorexia and thirst.

Habt. Haust. Emeticum q. p.; postea, Calomel. gr. vi.; Pulv. Jalap. Co. ʒi; Mist. Diaphor. ʒi. 2dis horis. Utatur balneo calido, et capt. pil. Calomelanos et P. Antimon. H. S. Spoon diet.

25th. Was freely purged; perspired after the bath, and slept well last night; apyrexia; pulse calm; skin soft; tongue whitish.

Capt. Sulph. Beberinæ gr. v. in Extr. Gentian. et repr. 3tis horis. Cont. Mist Diaphor. si opus sit.

26th. No return of fever yesterday; slept well; bowels free; appetite returned; pulse calm; tongue clean. *Cont. pil ut supra ter die.* Low diet.

27th. No return of fever; bowels loose; tongue clean; slept well. *Pergat ut heri.*

28th. Convalescent; bowels free. *Infus. Gentian. more solito.* Half diet.

29th. Bowels open.

30th. Is quite well. Discharged.

Febris Remittens. James Axford, private, aged 23; temperament plethoric; line of life labourer; resident in India four years. 27th November 1843.—Complains of febrile symptoms, which attacked him the evening before last; says he slept in a current of air in the barracks; general health good; last admission in July 1842 with diarrhœa; pulse full and frequent; headach; heat of the skin, and furred tongue; bowels confined.

Fiat venesection ad ʒxxiv. Habt. haust. emeticum q. p.; postea Cal. gr. vi.; Pulv. Jalap Co. ʒi. Spoon diet.

Vesp. Apyrexia. *Capt. Sol. Tart. Antimon.* ʒi. *horâ quâque secundâ et pil. Calomel. et. P. Antimon.* *H.S.*

28th. V. S. removed the headach; the emetic operated freely; the purgative only acted twice. Slept well, and feels greatly better; pulse 78; skin soft; tongue white, is thirsty. *Capt. Mist. Sennæ* $\text{ʒiv. q. p. et habt. Pil ex Sulph. Beberinæ gr. v. in Extr. Gentian. 4tis horæ, et cont. Sol. Tartar. Antimon. si opus sit.}$

29th. Continues free from fever; bowels are loose; pulse calm; skin soft; tongue clean; appetite improved. *Cont. Med. ut heri.* Low diet.

30th. Is quite well. *Cont. med.* Discharged.

Febris Intermitt. John Jerrold, private, aged 23; temperament sanguineous; line of life labourer; resident in India three years and three months.

Vesp. 29th November 1843.—Complains of having been seized at 3 P. M. with alternate fits of cold (with shivering) and heat, lasting for nearly three hours. Cannot assign any cause for the attack. Pulse regular; skin soft; tongue white; had a similar attack last month.

Habt. Haust. Emeticum q. p.; post., Calomel. gr. vi. c. Pulv. Jalap. Co. ʒi Utatur pediluvio et Pil. Calomel. c. P. Antimon. H. S.

30th. The emetic and purgative operated freely; slept well, and is at present free from fever; pulse 76; skin soft; tongue cleaning. *Sumat q. p. Sulph. Beberinæ gr. v. et repr. 4tis horis. Capt. Mist. Diaphor. si opus sit. Spoon diet.*

December 1st. No paroxysm yesterday. Bowels free; slept well. *Cont. Med. ut heri.*

2d. No return of the paroxysm. Bowels acted freely; slept well; tongue clean; pulse regular; skin moist; appetite returned. *Cont. Sulph. Beberinæ ut heri. Low diet.*

3d. Continues free from fever. Bowels loose; tongue clean; appetite good.

Omitt. Sulph. Beberinæ et capt. Infus. Gentian. ʒiij. ter die.

4th, Continues to improve. No fever; bowels free; tongue clean; appetite good. *Cont. remedia ut supra.*

5th. Improving. No fever; bowels free. *Idem.*

6th. *Idem.* Half diet.

7th. Discharged.

Febris Intermittens Quot. James M'Chrink, private, aged 28; temperament phlegmatic; line of life, ship smith; resident in India three years and three months. 22d November 1843.—Admitted at 6 P. M., of a pale cachectic appearance, having had severe rigors, followed by acute febrile symptoms, about 10 A. M. the same day. He stated that he had been subject to severe attacks of ague during the previous sixteen months. The febrile symptoms were reduced by an emetic, purgative, and leeches to the temples. Subsequently fifteen grains of the sulphate of bebeerine were given

daily in pill until the 25th November, when the occurrence of hepatitis prevented its employment for three days. On the 28th November the fever returned, but without the cold stage, and again on the 29th. His mouth was affected by the remedies employed in the hepatitis, and the bebeerine was continued until the 8th December, when he was discharged to duty. Fever has not since recurred.

Febris Con. Com. Joshua Richards, private, aged 24; temperament sanguineous; line of life shoemaker; resident in India four years. 29th November 1843.—Admitted at 6 A. M.; stated that he had been seized with rigors the preceding evening, succeeded by headach, much heat of skin, and thirst. On the subsidence of these symptoms 10 grains of the sulphate of bebeerine were given daily for a week. The disease having returned with severity on the evening of the 11th December, attended with much determination to the head and relaxed bowels, and again on the following day, fifteen grains were now given daily during the apyrexia, and he continued free from fever for upwards of ten days. On his return to his duty he was again attacked with the disease, and as all the bebeerine had been expended, quinine was employed.

In the above cases the medicine did not produce *tinnitus aurium* or deafness.

J. DEMPSTER, M.D. Surgeon,

Kamptee, 19th January 1844.

H. M. 21st Fusiliers.

The following are the reports from the medical officers of the H. E. I. C.'s Service.

To the Superintending Surgeon Ceded Districts.

Sir,—In reference to memorandum No. 389, dated Medical Board Office, 2d May 1844, I have the honour to inform you, that, from not having had any well-marked cases of periodic fevers in hospital during the time alluded to, I was unable to make fair trial of the effects of the sulphate of bebeerine,

On two or three out-patients, however, its febrifuge power did not appear satisfactory, whilst its unpleasant taste and astringency were complained of.—I have, &c., &c.

(Signed) J. GODFREY, Garrison Surgeon,
Bellary, 9th May 1844.

To the Secretary to the Medical Board Madras.

Sir,—Having expended the small supply of sulphate of bebeerine sent to me for trial in fever of miasmatic origin, I have much satisfaction in forwarding a brief statement of the various cases in which it was employed.

It will be observed that, though given when fever was present, it only in one instance affected the brain, and that transiently; that it has a decided tendency to induce perspiration, allaying fever and

checking exacerbations ; and that it seems to exert a peculiar power over the alvine secretions, changing them to a brick-red colour. This appearance of the evacuations, however, being far from uncommon in remittent fevers, cannot be regarded as solely owing to the influence of bebeerine, if indeed at all.

Notwithstanding my limited experience, I cannot but believe that bebeerine is a medicine of the highest efficacy in checking fever, and that it will prove a valuable substitute for quinine.—I have, &c., &c.

(Signed) J. DORWARD, Assist. Surgeon 13 Reg. N. I.
Chicacole, 13th May 1844.

Febris Remittens. Veerasaamy, aged 24, Sepoy, C. Company, thin spare habit. 12th December 1843. Admitted at 6 A. M. ; complains of having had fever for two days, with frequent chills, giddiness, and prostration of strength ; skin hot ; pulse quick ; eyes suffuse ; tongue red.

Habt. stat. pulv. Ipecac. ʒj. ; Ant. Potass-tart. gr. i. M. ft. pulv. ; postea Pulv. jalap. Co. ʒj.

R. Calomelanos, Pulv. antimon. co. āā. gr. iiss. M. ft. pil. qq. horā tertiā.

13th, 7 A. M. Slight remission of fever was experienced yesterday after the action of the medicine, but an exacerbation came on at night with delirium preceded by rigors ; skin warm and dry ; pulse quick ; great thirst ; no pain ; head at present clear.

Pulv. jalap. et. Pil. Calomelanos rept. ut heri.

R. Liqr. Ammon. acet. ʒj. ; Ant. potassio-tartrat. gr. ij. ; Misturæ camphoræ ʒiij. ft. mist. Capiat ʒj. quāque horā tertiā.

14th, 7 A. M. Occasional chills ; fever and low delirium all night. Was violently purged yesterday by the medicine ; head symptoms and fever now remitting partially.

R. Quininæ Disulph gr. ij. omni horā sumend.

16th, 7 A. M. A better night ; no delirium ; dry warm skin continues, with occasional rigors ; considerable debility. *Cont. Quinæ disulph.*

16th, 7 A. M. Had a severe accession of fever last night with delirium, and still mutters when left alone. Complains of chilliness. Skin dry and warm ; lips parched ; tongue dry ; bowels free.

Emplast. vesicat. occipit appl. ; habt. Stat. Bebeerinæ grs. x. et merid. rept.

17th, 7 A. M. Fever less. Three hours after taking the first dose of bebeerine, which seemed to affect his head a good deal, an accession of fever took place, and the second dose was not given. The blister rose well, he passed a better night, and looks more lively. *Habt. st. Bebeerinæ grs. x. et merid. rept.*

18th. No accession of fever since last report. Skin continues warm and dry with a feeling of chilliness ; took both doses of be-

beerine yesterday, which induced perspiration. No delirium. *Cont. Bebeerina ut heri.*

19th, 7 A. M. Skin for the first time soft and cool. Had a copious brick-red feculent motion in the night. *Cont. Bebeerina ut heri.*

20th. Free from fever. *Cont. Bebeerina dos. grs. v. bis die.*

21st. Complains only of debility. *Omitt. Bebeerina.*

27th. Well. Discharged.

Febris Remittens.—Soobroyah, aged 34, Sepoy, F Company, No 322, weak and emaciated. Admitted 29th December 1843, at 7 A. M., complaining of fever for the last two days, with exacerbations about noon, and constant giddiness. Skin warm and dry; pulse frequent; tongue foul. Was in hospital from the 16th November to the 19th instant, labouring under *febris continua*, and has never properly regained his strength. *Hab. stat. Pulv. Ipecac. ʒj. ; Pulv. Jalap. co. ʒj.*

Vesp. Had an accession of fever with rigors at 1 P. M. Complains of chilliness; skin hot and dry; bowels freely opened; stools dark-brown. *Hab. Calomelanos, Pulv. Antim. Co. āā.gr. iij. ft. pil. h.s.*

30th. Passed a restless night, the feeling of chilliness continues, and the skin dry and warmer than natural. *Hab. stat. Bebeerinæ, grs. v. et merid. rept.*

31st. Perspired profusely after the bebeerine; an exacerbation of fever with considerable giddiness came on at 2 P. M.; passed a better night, however; fever still present. Bebeerine continued *ut heri.*

Jan. 1st. Fever left him in the night; skin cool, feels chilly; has had several brick-red looking stools. Bebeerine continued.

2d. Had a paroxysm of fever ushered in by rigors from three to six A. M. this morning. Bebeerine continued.

3d No fever nor chilliness. Bebeerine continued.

4th. Continues free from fever, feels stronger and better. Bebeerine continued.

6th. Convalescent. Omit bebeerine.

11th. Well. Discharged.

Febris Intermit. Quotid.—Rammanah, aged 50, Sepoy, B Company, No. 284, 41st regiment Native Infantry.

23d March 1844. Admitted at 7 A. M., complaining of attacks of fever, preceded by rigors yesterday and the day before, from noon until night; pulse quick; skin dry; tongue furred. *Hab. st. Pulv. Ipecac, ʒj. ; Antimon. Potass-tart gr.j. ; postea, Pulv Jalap. Co. ʒj.*

24th. Medicine acted well; fever returned in the evening, took a pill containing *Calomel. grs. iiss. ; Pulv. Antimon. Co. grs. iiss.* Passed a feverish, restless night; skin moist, but warmer than natural; thirst.

Hab. Pulv. Jalap Co. ʒj. ; St. Mist. Salin. Co. ʒj. q. q. 2dā horā.

25th. Exacerbation of fever last night; no rigors; complains of a burning sensation all over his body; pulse frequent; skin dry.

Rept. Pulv. Jalap. Co. Cont. Mist Salina.

- 26th. Has had fever all night; slight remission; bowels free.
Habl. Bebeerinæ grs. v; quâque horâ tertiâ.
 27th. Free from fever; took twenty grains of bebeerine yesterday.
 28th. No fever. Continue bebeerine.
 29th. No fever, weak. Omit bebeerine.
 April 5th. Discharged.
Chicacole, (Signed) J. DORWARD, Assist.-Surgeon,
 13th May 1844. 13th Regiment, Native Infantry.

Five cases of intermittent fever treated by the sulphate of bebeerine, in the hospital, 3d Battalion of Artillery at Kamptee.

Febris Inter. Quotid.—T. G. Doyle, gunner, aged 30, ten years resident in India; nervous temperament. Admitted at six o'clock A. M. on the 26th November 1843, a man of spare habit, temperate. Returned this morning from Nagpore, where he has been on duty during the last fourteen days. By his account he has had daily paroxysms of fever for the last nine days. They began at nine in the morning, and terminated at three or four o'clock in the afternoon. There was no cold stage; the symptoms are said to have been headach, heat of skin, thirst, nausea, &c., followed by profuse perspiration, bowels lax, tongue furred. At present skin is cool and pulse natural, but he complains of headach, which does not leave him during the intermission.

Has taken no medicine since he was first attacked. *Olei Ricini ℥i. Aquæ, ℥iss. M. ft. haust. statim sumend.* Spoon diet.

Five o'clock P. M.—Fever returned at nine o'clock, and is still present; complains of the headach being severe, of nausea and thirst; skin hot and dry; pulse 104, full and soft; four stools, consisting of orange-coloured mucus and some loose feculent matter. Owing to the return of the fever, the leeches, although they operated well, did not relieve the pain of head. Has taken an ounce of the following mixture, at intervals, since the return of the fever.

R Antimon. potassio-tart., gr. i.; Magnesie Sulphatis ℥ss.; Aquæ Acet. Ammon. ℥ij.; Misturæ camphoræ, ℥viij. M. fiat mistura.

R Calomelanos; Pulv. Ipecac. comp. aa gr. vi.; Confect. aromat. q. s. ft. pil. horâ somni sumend.

27th. At ten o'clock P. M. the paroxysm terminated in profuse perspiration, and since that time the headach has been gradually diminishing in severity. Skin is now cool; pulse 76; three stools, they consist of brownish mucus and slime; has no abdominal uneasiness.

Had three grains of the sulphate of bebeerine dissolved in an ounce of water at four o'clock, and the same was repeated at five, six, seven, eight, and nine o'clock.

Vespere. Took all the bebeerine ordered, (eighteen grains,) and the fever has not returned; skin has been cool, and pulse natural; headach has not entirely left. The only sensible effect from the bebeerine was its impression on the palate. He describes its taste as a mixture of sweet and bitter. Four stools, a greenish mucus.

R *Massæ pil. Hydrarg.* gr. vj.; *Pil. Rhei comp.* gr. x. *M. ft. pilulæ*, iij. h. s. s.

28th. Continues free from fever; one stool, a small quantity of natural fæces; headach is now very slight; tongue furred in the centre. Nil.

Vesp. No return of fever, still has slight headach. Three loose natural stools. *Rept. pilulæ h. s. ut heri.*

29th. No headach; tongue clean; two feculent stools; appetite returns. Four ounces of bread extra.

30th. Continues well.

1st December. Chicken diet.

2d. Discharged from hospital.

Febris Inter. Tertiana. Patrick Fitzpatrick, gunner, aged 30, thirteen years resident in India; sanguine temperament; a muscular man of the ordinary height; temperate. Admitted at eleven o'clock A. M., on the 28th November 1843, in the cold stage of an intermittent, which he says attacked him on the 26th instant at same hour. Soon after admission his skin became hot and pulse frequent. He complained of headach, nausea, and loss of appetite, aching pain in the legs, thirst, giddiness, and prostration of strength; was ordered on admission one grain of tartar emetic and a scruple of ipecacuan, which caused a free emetic effect; and he afterwards took, as his bowels were confined, six grains of calomel and two scruples of compound jalap powder, by which he has been moved four times; stools are loose but not otherwise unnatural; fever is leaving him; he begins to perspire. Nil. Spoon diet.

29th. Complains only of headach, and it is not severe; tongue is very little furred, moist; pulse and skin natural; two stools. Nil.

30th. Since last report free from fever, but he expects its return to-day; no stool during the last twenty-four hours. *Haust. purgant.* $\bar{z}$ iv.

6 P. M. At half-past nine o'clock this morning felt cold and chilly; nails blue. After ten o'clock the skin became hot and dry; he was restless; complained of thirst, nausea, and giddiness; pulse frequent. As the draught taken in the morning purged him repeatedly, no other medicine was ordered. At two o'clock he perspired copiously, and he now complains only of giddiness and debility; skin cool, and pulse of natural frequency.

R *Massæ pil. Hydrarg.*; *Pulv. Antimon. comp.* a a. grs. v. *M. fiat pilulæ* ij. h. s. s.

1st December. Remains without fever; no stool during the night.

R *Antim. Potassio-tartrat.* gr. j.; *Magnes. Sulphat.* $\bar{z}$ ss.; *Mist. Camphoræ* $\bar{z}$ vj. *M. ft. Mist.* $\bar{z}$ iss. *ter in die.*

2d. Took at four o'clock A. M. three grains of sulphate of bebeerine dissolved in an ounce of water. The same was repeated at five, six, seven, eight, and nine o'clock.

Vespere. Fever has not returned. Nil.

3d. Continues free from fever, but bowels have not been moved since the first. *Pulv. Jalap. C. ʒj. stat. sumend.*

4th. No fever ; appetite improves ; two stools. Chicken diet.

5th. Continues well ; discharged to duty.

Febris Inter. Tertiana. Charles Lowther, bombardier, aged 29, six years and three months resident in India ; sanguine temperament ; muscular ; of sober habits. Admitted into hospital on the 31st March 1844, at four o'clock P. M. in the hot stage of a paroxysm of intermittent fever ; complains of headach, thirst, loss of appetite, and debility ; pulse 108, full ; tongue white ; bowels confined. By account had on the 27th and 29th of the present month attacks of fever ; each began at two in the afternoon with rigor, and terminated in profuse perspiration at five o'clock in the evening. Took on admission one grain of tartar emetic and a scruple of powdered ipecacuan, and soon after four grains of calomel and fifty of compound jalap powder.

1st April. After the operation of the emetic there was profuse perspiration, followed by relief of all the symptoms ; two stools after the purgative ; is cool this morning and free from uneasiness ; pulse natural. Nil.

2d. Since last report no fever ; but this morning complains of headach ; no stool since the evening of admission. *Haust. purgant. ʒiv.*

5 P. M. Immediately after the morning visit the fever returned, commencing with rigor ; headach is very severe ; several copious but not unnatural stools.

R Antimon. pot-tart. gr. j. ; Aquæ ʒvj., solve ; sumat ʒiiss, om. horâ ad 3tiam vicem ; Temporib. admov. hirud xvj.

3d. At half past six o'clock the fever terminated in profuse perspiration ; headach removed by the leeching. He passed a very good night, and this morning is cool and without uneasiness ; tongue clean ; bowels open. Nil.

Vesp. This afternoon headach, without heat of surface or other marked febrile symptoms ; bowels not moved to-day.

R Calomelanos, gr. iv. ; Extr. Colocynth. C. gr. vj. M. ft. pilulæ ij. h. s. s. ; Temporibus admovr. hirud. xij.

4th. Continues without fever ; no headach since the operation of the leeches ; one natural stool ; took three grains of sulphate of bebeerine dissolved in an ounce of water at five, six, seven, eight, nine, and ten o'clock.

6 P. M. After the bebeerine (eighteen grains) fever returned at eleven o'clock. The rigor was slight, and he began to perspire at three o'clock ; skin now cool and moist, and he complains only of headach ; bowels not moved. The fever was less than on any previous occasion. *Rept. hirud. xij. temporib. applic. ; rept. pilulæ h. s. s.*

5th. Headach again removed by the leeches ; complains only of debility ; tongue a little furred ; several stools containing a little slime. Nil.

6th. No fever yesterday ; one stool, a small quantity of slime ; pulse 84. The bebeerine was repeated as on the 4th at four, five, six, seven, eight, nine, ten, and eleven o'clock.

Olei Ricini ℥j. *meridie*.

7th. Escaped fever yesterday after taking twenty-four grains of the bebeerine, which neither affected the head nor the pulse ; pulse 80, soft ; bowels open. Nil.

8th. Remains without fever. Nil.

9th. Feels well and wishes to return to duty ; appetite keen ; bowels open.

11th. Well. Discharged.

Febris Inter. Quotidian.—Daniel Murphy, gunner, aged 30 ; five years resident in India ; sanguine temperament ; sober ; of robust health. Admitted at six o'clock A. M. on the 13th May 1844, when he complained of loss of appetite, slight headach, giddiness, thirst and debility, tongue furred, moist, skin cool, pulse natural, bowels by account regular.

States that he had on the 10th, 11th, and 12th paroxysms of intermittent fever, commencing each day at three o'clock in the afternoon, with rigor followed by heat of skin and headach, and terminating in perspiration about six o'clock in the evening ; can assign no cause for the attack.

℞ *Antimon. Potassio-tart.* gr. i. ; *Pulv. Ipecac. rad. contrit.* ℥i.
M. fiat pulv. statim sumend.

Vespere. Emetic acted well ; paroxysm returned to-day at ten o'clock. There was no rigor, but his face became flushed ; headach increased in severity, and he complains of pain in the back and lower extremities, of thirst, nausea, and great prostration of strength ; skin hot and dry ; pulse 104, full ; took frequently one ounce and a half of the following mixture ; it nauseated him, but has not moved his bowels.

℞ *Mist. camphor.* ℥ix. ; *Antimon. Potassio-tart.* gr. iss. ; *Magnes. Sulph.* ℥vi. *M. ft. Mist.*

℞ *Calomelanos*, gr. vj. ; *Pulv. Jalapæ Co.* ℥ ij. *M. ft. pulv. statim sumend.*

14th. The sweating stage commenced at six o'clock P. M. He is this morning cool, feels very little headach ; pulse 78, soft ; bowels were freely moved with the assistance of a purgative enema. Took three grains of sulphate of bebeerine dissolved in an ounce of water at four, five, six, seven, eight, nine, and ten o'clock.

Vesp. Took the twenty-one grains of bebeerine ; it produced no sensible effect either on the pulse or head. Fever returned at three o'clock P. M., but was slight. He is now perspiring ; bowels again moved ; stools feculent. He perspired freely while taking the bebeerine, but that is attributable to the weather, which is intensely warm.

℞ *Massæ pil. Hydrarg.* gr. vj. ; *Ipecac. rad. contrit.* gr. ii.
M. ft. pilulæ ij. h s. s.

15th. An excellent night ; pulse 78 ; skin cool and moist. Bebeerine repeated as yesterday.

6 P. M. The fever returned at noon. There was more headach than during the previous paroxysms in the hot stage; his pulse was 100; face flushed; conjunctiva injected; perspiration commences; one not unnatural stool. *Rept. pilulæ h. s. ut heri.*

16th. Fever terminated as before in copious perspiration; pulse 84; tongue coated with a white fur, moist; one stool.

Three grains of sulphate of quinine were dissolved in an ounce of water, and given at the same hours as the bebeerine.

6 P. M. Took twenty-one grains of the quinine. There has been no return of fever; weak, but has no particular uneasiness; two natural stools. Nil.

17th. A good night; pulse 80; no symptom of fever.

18th. Convalescence; regains his appetite; bowels open. Four ounces of bread extra.

20th. Continues well; has an excellent appetite; bowels regular. Chicken diet.

23d. Half diet.

24th. Well. Discharged.

Febris Inter. Tertiana.—Mrs Ann Dogherty, aged 28, five years resident in India; of spare habit. Admitted into hospital at 6 o'clock P. M. on the 10th May 1844 in the hot stage of a paroxysm of intermittent fever, which she states commenced with rigor about an hour before admission. She complains of severe headach, pain in the back and lower extremities, of thirst, nausea, and loss of appetite. Skin is hot and dry; pulse 106, full, but compressible; tongue coated with a thick fur, but moist; bowels confined.

By her account had attacks of fever on the 6th and 8th. They commenced at 4 o'clock P. M. and continued for several hours. No cause for the seizure can be assigned.

℞ *Antim. Potassio-tart.* gr. i.; *Ipecac. rad. contrit.* ʒi. *M. ft. pulv. statim sumend.*

℞ *Calomelanos* gr. v.; *Pulv. Jalapæ comp.* ʒi. *M. fiat pulv. post horas tres sumendus.*

11th. Emetic brought on the sweating stage, she ejected a quantity of greenish fluid; purge has acted several times; headach, thirst, and debility are what she now complains of; skin cool; pulse 84, soft; tongue clean.

℞ *Antimon. Potassio-tartrat.* gr. i; *Magnes. Sulph.* ʒi; *Aqua* ʒviij. *M. ft. mistura cujus sumat ʒiss. ter in die.*

12th. Had no fever yesterday; feels weak and giddy in the erect posture, but in other respects is well; bowels open. 6 P. M. Paroxysm returned at one o'clock, rigor followed by heat and sweating, the latter commencing about half an hour ago. The attack was attended by severe headach and acceleration of the pulse, flushing of the face and urgent thirst; the headach remains. Has taken several doses of the saline mixture, which has produced both an emetic and purgative effect. Stools watery, but contain some healthy feculent matter. *Temporibus admovr. hirud. xvj.*

13th. Headach relieved by leeches; it is not complained of this morning; is weak and scarcely able to stand from giddiness.

14th. Fever expected to-day ; one stool yesterday ; pulse 64 ; three grains of sulphate of bebeerine dissolved in an ounce of water were given at 5, 6, 7, 8, 9, 10, and 11 o'clock. 6 P. M. Took twenty-one grains of the bebeerine, the last dose at 11 o'clock, but fever returned at noon. There was no cold stage, the skin suddenly became hot and dry. She complained of headach and thirst, and was restless, bowels not having been moved in the morning, she took during the attack an ounce of castor-oil. Thinks the present attack the mildest ; the headach remains. Began to perspire at 5 o'clock ; pulse 98 ; oil has not yet acted.

Rept. hirudines xiv. tempor. applic.

R. Massæ pil. Hydrarg. gr. vi. ; Pulv. Ipecac. gr. ij. M. fiat pilulæ ij. h. s. s.

15th. Headach removed by the leeches ; complains only of debility ; several brown feculent stools.

Rept. pilulæ h. s. ut heri.

16th. This is the fever day ; weak, and does not regain her appetite ; bowels open ; three grains of the sulphate of quinine were dissolved in an ounce of water and given at the same hours as the bebeerine. 6 P. M. Had a slight attack of fever ; it commenced at four and left at five o'clock ; tongue still furred but moist ; slight deafness from the quinine, but no headach ; pulse 96.

Rept. pilulæ c. Pulv. Antimon. c. gr. iv.

17th. Tongue remains furred ; thirst ; skin cool ; no stool since yesterday morning. *Olei. Ricini ʒj.*

18th. Oil operated several times ; tongue cleans ; quinine repeated as before.

19th. Not the slightest symptom of fever yesterday ; weak, but appetite returns. Bowels open.

20th. No return of fever ; gains strength.

21st. Chicken diet.

24th. Well. Discharged.

Remarks.—These five cases being ascertained by observation in hospital to be regular uncomplicated intermittent fevers, they were considered favourable for testing the antiperiodic virtue of the sulphate of bebeerine. After the functions of the stomach and bowels had been regulated by an emetic, mild mercurial and aperient medicine, the time of the paroxysm being known, the sulphate of bebeerine was ordered in three grain doses hourly, till from eighteen to twenty-four grains were taken. It was managed so that the last dose was taken immediately before the expected return of the fever. In the two cases that the bebeerine did not prevent the paroxysm, the sulphate of quinine was substituted for the bebeerine, for the purpose of contrasting the effects of the two remedies.

In the cases of Doyle and Fitzpatrick eighteen grains of the sulphate of bebeerine prevented the return of the fever. In that of Lowther, although the same quantity did not have a similar effect, the paroxysm that followed was later in appearing and milder than those that preceded it, and on the next expected recurrence of the fever twenty-four grains were given with perfect success. In these

three cases the antiperiodic power of the bebeerine was fully equal to what I should have expected from the sulphate of quinine similarly administered.

In the case of Murphy twenty-one grains of the bebeerine were insufficient to prevent the coming paroxysm, which, however, was slight and postponed. The same quantity of bebeerine was repeated before the next paroxysm, but contrary to expectation it returned at an earlier hour, and was more severe than the previous one. Quinine was then substituted for the bebeerine, and twenty-one grains similarly administered were followed by recovery.

To the woman Dogherty twenty-one grains of the sulphate of bebeerine were given, without any marked influence on the fever, while the same quantity of quinine, subsequently given, had to be repeated before it prevented the return of the fever.

From these cases I infer that the sulphate of bebeerine possesses considerable antiperiodic power, and although inferior to, it is likely to be a valuable substitute for the sulphate of quinine. The bebeerine neither excited the circulation nor affected the head.

(Signed) J. ANDERSON, M. D. Assist. Surgeon.

(Signed) D. FALCONER, Actg. Supg. Surgeon.
N. S. Force.

Kamptee, 24th May 1844.

The following case, in which bebeerine was tried in a case where the constitution had long suffered from intermittent, was kindly furnished me by my friend Dr Bennett.

Bronchitis ; intermittent fever of thirty-two years' duration ; regular quartan ; enlargement and induration of spleen ; treated by sulphate of Bebeerine.—Alexander Murray, aged 56, admitted November 21st, complaining of dyspnœa and cough, attended with expectoration. On percussion the chest is resonant on both sides. The respiratory murmurs are indistinctly heard over anterior part of chest. Over the sides and back a slight sonorous râle may be heard at the termination of the expiration. The expectoration is copious, composed of muco-purulent matter, loosely connected together in masses. Complains of dyspnœa, which sometimes amounts to orthopnœa. Can only sleep with his shoulders elevated. The dyspnœa comes on in paroxysms, and is induced by exertion, and by an east wind.

The cardiac dulness measures two and a-half inches across. The sounds of the heart are heard most distinctly about two inches below the left nipple. In this situation he complains of pain, which is increased on exertion. A slight rough murmur accompanies the second sound of the heart. Pulse 52, and of good strength.

While percussing in the cardiac region, an intense degree of dulness and sense of resistance were perceptible immediately under the false ribs, external and inferior to the cardiac region. This extended for about four and a-half inches from above downwards, and about three inches from before backwards. On inquiring whether he has ever suffered from ague, it appears that he laboured under that dis-

ease thirty-two years ago, when a soldier in the Peninsula. It attacked him in Madrid, when it was present seven months continuously. Since then he has scarcely ever been free from it.

Complains of pain in the head, *muscæ volitantes*, occasional vertigo, and pains between the shoulders. Tongue furred; appetite good; thirst; bowels have been opened five times yesterday by medicine. His countenance and general aspect present the peculiar dull and haggard character indicative of long suffering from ague. There is no œdema of the lips.

R. *Antim. Tart.* gr. j.; *Spt. Eth. Nitr.* ℥iss.; *Mist. Scillæ* ℥vss.; *Sol. Mur. Morph.* ℥ij. M. *Sumat* ℥j. *quartâ quâque horâ.*

Nov. 22d. Passed a sleepless night, owing to frequent paroxysms of dyspnœa and cough; sputa slightly tinged with blood; mucous râles heard all over chest; complains of great pain of head and vertigo. *Appl. cuc. cruent. et extrahatur sanguis ad* ℥xii. *pectore dextro.*

25th. Has been much relieved since cupping; the respiration has been more easy; sputa still tinged with blood.

Dec. 3d. Bronchitic symptoms have now nearly disappeared. Last night had an attack of intermittent fever. Says it returns every third night.

Dec. 5th. R. *Sulph. Quinæ* ℥j.; *Pulv. Capsici*, gr. ix. M. *dividuntur in chart. iij.*; *cujus capiat unam statim, et repetatur quâque quartâ horâ.*

6th. Took the three powders yesterday before the attack, which was less severe than on former occasions.

8th. Repeat the powders.

9th. The attack last night, notwithstanding the powders of quinine, was much more severe than that of the 6th. There is considerable pain of head and suffusion of the eyes induced by the powders.

12th. Last night had another attack, which was very severe. The quinine powders were purposely omitted, in order than the duration and severity of the attack might be observed. The cold stage and shivering continued three-quarters of an hour, and the sweating was very profuse, and continued for two or three hours.

R. *Bebeerin. Sulph.* gr. v.; *Pulv. Capsici*, gr. iij. M. *ft. pulv. Mitte tales* vj.; *Sumat unum ter in die.*

15th. The attack came on last night, and was of the same length as that noticed at last report. The shivering was not so severe, nor was the sweating so profuse.

23d. R. *Bebeerin. Sulph.* ℥j.; *Pulv. Capsici*, gr. ix. M. *ft. pulv. tales* iii. *Capiat unum quâque quartâ horâ.*

24th. In the attack of last night the cold stage was of twenty-five minutes' duration.

27th. Is ordered to take the bebeerine powders, containing five grains each, three times a-day during the interval, and three powders, each containing a scruple, on the day previous to the attack. Last night the cold stage was of twenty minutes' duration, and was much less severe. Considerable cephalalgia.

30th. Last night the cold stage was of sixteen minutes' duration, and the sweating stage was very slight. Still cephalalgia.

Jan. 2d. Last night the cold stage lasted fifteen minutes, and was of much less severity than formerly; cephalalgia more severe; considerable suffusion of the eyes and vertigo.

R *Pil. Col. co. ij. h. s. sumend.*

R *Hausi. Cath. ʒiv. cras. mane sumendum.*

5th. Last night the cold stage lasted for thirteen minutes; cephalalgia much diminished. The dose of bebeerine on the day of attack to be diminished to ten grains in each powder.

8th. The cold stage last night was of ten minutes' duration and very slight.

He was permitted to leave the hospital to obtain his pension at Glasgow. He returned on the evening of the 12th in a state of intoxication, and was so disorderly in the porter's lodge that he was sent to the police office, and has not since been heard of.

Copied from Journal of Ward No. 2., commencing Nov. 7. 1844.

M. YOUNG, Clerk.

Remarks.—This man entered the hospital complaining of asthma and bronchitis. The pulmonary symptoms were successfully combated by expectorants combined with an antispasmodic, and by local depletion. It is singular that, although he laboured under a very intense form of intermittent fever, he did not complain of it. The enlargement and induration of the spleen, as determined by percussion, led to its discovery. When the bronchitis and dyspnoea had subsided, I treated the ague first by large doses of quinine, which, although they had a slight effect upon the intensity and duration of the attack on one occasion, produced none whatever on being tried a second time. On each of these occasions ʒj. of the sulphate, with nine grains of *Pulv. Capsici*, were given during the twelve hours preceding the attack. I then determined to try the sulphate of bebeerine, but previously watched an attack of the fever, when no drug whatever had been given. On this occasion the shivering was very violent, and the cold stage continued three-quarters of an hour; the hot and sweating stages were prolonged to between two and three hours. Fifteen grains of the bebeerine were given daily during the interval, in three doses, and ʒj. every third day, when the attack was expected. The first attack experienced after this treatment was adopted was of the same duration, but much diminished in severity. In the second attack, the cold stage, instead of lasting 45 minutes, continued only 25 minutes. In the third attack it continued 20; in the fourth, 16; in the fifth, 15; in the sixth, 13; and in the seventh, 8. At this time he left the hospital, and has never returned. I much regret that the spleen was not again percussed before his departure.

The action of the medicine appeared to me in every respect similar to that of quinine. The relative power of each, of course, is only to be ascertained by more extended trial. But so far as their actions as an antiperiodic and as a stimulant are concerned, they appear to me to be identical. The same congestion of the brain

was experienced in the above case after taking 9j. doses of both drugs. Indeed, from what I have observed of its therapeutic effects in this instance, I have no doubt that bebeerine possesses all the valuable properties of quinine in an equal if not a superior degree.

J. H. BENNETT, M. D.

The cases of fevers treated with bebeerine with which I am acquainted, amount to about 40, and they are all collected in the subjoined tabular statement. It will be seen on inspecting the table, (p. 383,) that bebeerine has been tried in various climates, including Edinburgh, Canada, the West and East Indies, in all the various forms of remittent and intermittent, and at all ages from twelve to seventy-four. In all of them it appears to have manifested more or less of antiperiodic action. In 6 cases, or nearly 1 in 7, it does not seem to have acted satisfactorily. Of 26 cases, the details of which are given, 5 only suffered from any unpleasant effect, and this seems not to have gone beyond a little *tinnitus aurium*. It appears therefore to be entitled to a fair trial, especially in the public services, where alone such cases can be found and properly observed, and where its cheapness, contrasted with the price of quinine, might be matter of importance.

Periodic headach and neuralgias.—Professor Simpson having made pretty extensive trial of bebeerine in Edinburgh, I begged of him to let me know what results he had obtained. These he has embodied in the following letter to me.

22, Albany Street, 30th January 1845.

My Dear Sir,—You must allow me to give you the general impressions which I have derived from observations made upon the use of the bebeerine, as I have little time to enter into particulars. You know that Piorry and others have somewhat frightened us accoucheurs from employing quinine during pregnancy, alleging, as they do, that it is apt to produce abortion or premature labour. Nor is arsenic a medicine which one would choose to exhibit to a pregnant female. Though thus deprived of the advantages to be derived from the use of these two potent remedies in periodic neuralgias, still, as you well know, such neuralgias are far from being uncommon during utero-gestation.

Latterly I have used your sulphate of bebeerine in some instances of this kind, and, as it has appeared both to me and to my patients, with the most perfect and satisfactory success. I prescribed it about a couple of months ago to a lady who had one of the most severe attacks of forehead and face neuralgia that I remember to have seen. It came on towards noon, and kept her in blindness and agony for some time. The ordinary medical attendant on the family had leeched her, &c. without relief. I advised the bebeerine to be given in two grain pills repeatedly during the interval between the paroxysms. As the medicine seemed to have no effect I gradually in-

TABULAR VIEW OF INTERMITTENT AND REMITTENT FEVERS TREATED WITH BEBEERINE.

No.	Case.	Sex.	Age.	By whom Treated.	Where.	Form of Disease.	Duration in days.	Quant. Beb. ingr.	Remarks.
1	Mr C.	M.	27	Dr Douglas MacLagan	Edin.	Tertian	5	...	First dose vomited when bowels loaded.
2	...	M.	25	Do.	Do.	Do.	...	40	No unpleasant effects.
3	J. P.	M.	74	Do.	Do.	Do. ?	7	45	Do.
4	J. M.	F.	...	Dr Watt	Demerara	...	...	...	Quinine and arsenic had failed.
5	M. de J.	F.	38	Do.	Do.	Tertian	No recur.	20	Caused <i>tinnitus aurium</i> .
6	G. J.	F.	21	Do.	Do.	Do.	4	80	Caused some tinnitus.
7	D. F.	M.	25	Do.	Do.	Do.	4	40	Affected ears much.
8	J. G.	M.	20	Dr P. W. MacLagan	Canada	Do.	3	45	No unpleasant effects.
9	J. F.	M.	22	Dr Blair	Demerara	Yellow Fever	13	10 gr. dos.	Disliked from nauseous taste.
10-14	...	...	...	Dr Rodie	Do.	...	...	...	Quinine had failed.
15	J. P.	F.	38	Dr Watt	Do.	Quotidian	4	60	No unpleasant effects.
16	M. de J.	F.	40	Do.	Do.	Tertian	3	48	No affection of head.
17	J. da B.	M.	...	Do.	Do.	Quotidian	9	60	Complicated with affection of spleen; no bad effects.
18	Julio	M.	12	Do.	Do.	Tertian	...	...	Notes of the case lost by Dr Watt.
19	W. C.	M.	20	Do.	Do.	Bilious Remit.	14	84	Relapse from error in diet; no bad effects.
20	W. C.	M.	20	Do.	Do.	Quotidian	4	40	No unpleasant effects.
21	A. M.	M.	56	Dr Bennett.	Ed. Infr.	Tertian	30	240	Head seemed affected by large doses.
22	J. T.	M.	25	Dr Dempster, 21st Regt.	India	Quotidian	5	25	No unpleasant effects.
23	J. B.	M.	21	Do.	Do.	Remittent	6	45	Do.
24	J. A.	M.	23	Do.	Do.	Do.	3	90	Do.
25	J. J.	M.	23	Do.	Do.	Quotidian	9	120	Do.
26	J. M.	M.	26	Do.	Do.	Do.	16	120	Complicated with hepatitis; no bad effects.
27	J. R.	M.	24	Do.	Do.	Feb. cont. com.	23	240 ?	No bad effects. Quinine substit. when bebeerine exhausted.
28	V.	M.	24	Dr Dorward 13th N. I.	Do.	Remittent	15	80	Head appeared affected; patient delirious at the time.
29	S.	M.	34	Do.	Do.	Do.	13	70	No unpleasant effects.
30	R.	M.	50	Do.	Do.	Quotidian	6	40	Do.
31	T. G. D.	M.	30	Dr Anderson, 3 Batt. A.	Do.	Do.	6	18	Do.
32	P. F.	M.	30	Do.	Do.	Tertian	7	18	Do.
33	C. L.	M.	29	Do.	Do.	Do.	12	42	Do.
34	D. M.	M.	30	Do.	Do.	Quotidian	11	42	Not effectual; quinine substituted with success.
35	A. D.	F.	28	Do.	Do.	Tertian	14	21	Do.
36-40	4 cases ?	...	...	Dr Godfrey, Bellary	Do.	...	...	...	Not satisfactory.

creased it, till on the third day she took about half a drachm of the sulphate during the fourteen or sixteen hours' intermission. To tell you the truth I was beginning to despair of seeing the sufferings of my patient in any way relieved by it, and would have changed it for some other remedy next day, but such change was not required, as, after the large dose I have mentioned, the usual fit was greatly less in severity, and in a day or two entirely disappeared. Of her own accord my patient fell back upon the bebeerine pills some time afterwards, when the neuralgia was again threatened, and it again speedily disappeared.

Last year I saw a similar case of periodic tic in the face in a lady far advanced in pregnancy. The disease was by no means so severe as in the instance I have already mentioned, but still it was sufficiently annoying. It yielded rapidly when the patient was using the sulphate of bebeerine alone.

I have a lady at present under my care, who, after miscarrying twice in the country, has been suffering from distressing pains in the face, shoulder, and other parts of the body. Before I saw her she had been put on the use of guaiacum, colchicum, &c. under the supposition that the pains were rheumatic. They occur with a kind of irregular periodicity. The patient at the same time suffers from menorrhagia. Quinine, arsenic, &c. have failed to relieve her. Latterly, I placed her upon the use of the sulphate of bebeerine, and at my last visit she stoutly declared that she had derived far more benefit from this medicine than from any others that I had previously prescribed for her. The pains have returned as usual, but are much less severe in their character, and manifestly diminishing in intensity.

During the last year I have seen two or three cases in which ladies, during their puerperal convalescence, have suffered from slight periodic attacks of chilliness, heat, &c., resembling fits of imperfect ague. In one of them the attacks were of a tertian type, and yielded at last to the use of bark. In another, in which the fits of rigor have been more irregular, after in vain trying quinine, arsenic, zinc, &c., the patient has appeared to get more relief, and the disease to be more checked by the bebeerine than by any other form of drug I had used. Both of the two ladies I allude to had, within the last two years, lived abroad in climates where they might have been exposed to marsh miasma.

I have a patient from India, where she had suffered from ague, and whose stomach seems always to rebel against quinine. Since coming to Edinburgh she has had repeatedly a recurrence of aguish symptoms, and has taken the sulphate of bebeerine for them without feeling those symptoms of gastric irritation and headach which the quinine seems to inflict upon her.

In other cases where I have employed the bebeerine, either as antiperiodic or as a tonic, it has appeared to me to have caused far less of those irritating and stimulant effects which we see in some constitutions to be produced by the use of quinine.

If these remarks can be of any use to you they are very heartily at your service.—Yours very truly,

J. Y. SIMPSON.

For the following case I am indebted to my friend, Dr Macfarlan of Charlotte Square, who requested me to see the patient along with him, in consequence of my having in casual conversation with him suggested a trial of the bebeerine.

Case of Intermittent Neuralgia.—A lady, now in her 48th year, was first attacked with supra-orbital tic about sixteen years ago while nursing her fifth child. The attack came on in November and during the prevalent cold north-easterly winds. The suffering was most intense and lasted generally about two hours, coming on about four or five in the afternoon, and on this occasion continuing only for a fortnight, and seeming to yield to Huxham's tincture of bark and generous diet. The disease returned next May, but not in a very severe form. The following spring, however, the powers of the constitution having been much exhausted by anxiety, and the long-continued nursing of a sixth child, whose system had been drained by the depletion necessary to remove a violent bronchitic attack, it came on in a very aggravated form; the pain of forehead agonizing in the extreme; the paroxysm lasting for many hours, and generally ushered in with a chilly fit, and gradually declining under the use of quinine, large quantities of wine, brandy, and animal food during the intermission: the powers of the digestive organs seeming to suffer no diminution by the derangement in the nerves of sensation. These attacks continued to recur with pretty much the same train of symptoms every spring for several years during the prevalence of our easterly winds. Change of air, generally to a sheltered nook in Stirlingshire, proved decidedly beneficial when it could be had recourse to. In 1842, however, the system was considerably enfeebled by her attendance on several members of her family, who required her care on account of scarlatina, &c. In the month of March of that year; and on the approach of east wind in April, the disease set in with great severity and continued longer than usual. Quinine was given to the extent of twenty grains a-day, but not without producing the many unpleasant feelings which generally accompany its use in large and long-continued doses, such as ringing in the ears, derangement of the digestive functions, and a severe febrile state of system. A removal to Stirlingshire, as usual, was followed by a very decided improvement, although the debility on setting out was so great as to make her medical attendant almost dread the risk of removal. 1843 also had its spring of suffering from the disease, and from its antidote. In 1844, by the kind advice of Dr D. MacLagan, she substituted the sulphate of bebeerine for that of quinine, and for weeks took the former in the shape of pill, commencing early in the morning, so as to anticipate the attack, with a dose of gr. iij. repeated every hour or two till she

had taken daily for four or five days as much as gr. xv. ; and at an average for a fortnight gr. xi. a-day. Under this plan the symptoms gradually subsided, or rather never attained to the same degree of severity as in former seasons. I am quite aware that we are not entitled, from a single instance, to infer the superiority of bebeerine to quinine as an antiperiodic in all cases ; but I am very certain that the same quantity of quinine taken by the same individual would have produced very disagreeable effects on the general state and feelings of the patient ; and consequently that in her case the new drug proved a very valuable addition to our *materia medica*.

The following is an extract from a letter to me from Dr Johnston of Berwick-on-Tweed in reply to some inquiries which I addressed to him regarding a case where I understood the bebeerine had been employed. "Mrs D. is not a patient of mine, but I know her well enough. She has suffered of late from several attacks of tic in the face, which have lasted for two or three weeks at a time. She cannot take quinine, for it makes her feverish and nervously irritable, and this always whenever she has tried the remedy. In her last attack, which was about three weeks since, her husband gave her the bebeerine in the same doses that he would have given quinine, and it soon relieved the pain, nor has she had any return of it. She continued the bebeerine for some time, and it produced no inconvenience."

The above cases convey to my mind very good evidence of the powers of bebeerine as a remedial agent. I have confined myself to the testimony in favour of its antiperiodic virtues as communicated to me by others whose ideas cannot be supposed in any way to be biased in its favour, and I have given the cases at full length, that the grounds on which my opinion is founded may be patent to the profession. Of its qualities as a general tonic I am satisfied from repeated trials ; but this is a point of view in which it is not capable of being so precisely observed as in its use in periodic diseases.

The success attending a secret preparation called Warburg's drops, which I regarded as a preparation of bebeerine, cannot, as I formerly thought, be adduced as evidence in its favour ; for I find from a note appended to an abstract of my paper in Buchner's *Repertorium*, (New Series, vol. xxxv. part 3d,) that Buchner and Winckler have detected quinine in this nostrum. I find however, that Winckler agrees with me in believing that bebeerine enters into its composition.

I formerly expressed my opinion that bebeerine differs from quinine in not being so liable to excite the circulation, or affect the nervous system ; and this seems to be borne out by the above

reports, especially those of the neuralgic cases; and it has been found useful by others as well as by myself in other cases where excitant action would be hurtful, as in cases of phthisis accompanied by atonic dyspepsia.

With regard to the mode of administration of bebeerine, I have commonly given it in pill with conserve of roses, in the same way and the same doses as quinine. It can also be readily given in the liquid form, the addition of a few drops of diluted sulphuric acid sufficing to form with it a perfect solution.

129, *George Street, Edinburgh,*
February 14th 1845.

