

TEA AND COFFEE.

A STRONG infusion of tea is sometimes used in poisoning by tartar emetic or the alkaloids, for the sake of the tannin which precipitates these substances.

Few substances are more to be avoided in flatulent dyspepsia than tea. It is harmful in two ways; for tea itself in this complaint is found to promote flatulence; and women, the chief sufferers from this disagreeable form of dyspepsia, are apt to drink large quantities of weak tea, and the excess of fluid keeps up the distension.

Coffee is slightly purgative to some persons.

The active principle of tea and coffee is absorbed, and acts as a stimulant to the nervous system. These beverages are especially useful in a fatigued state of the system; indeed, under ordinary circumstances they are preferable in this respect to alcoholic drinks.

"Coffee" says Dr. Parkes, in his work on hygiene, "is a most important article of diet for soldiers, as not only is it invigorating, without producing subsequent collapse, but the hot infusion is almost equally serviceable against both cold and heat; in the one case the warmth of the infusion, in the other the action of the skin, being useful; while in both cases the nervous stimulation is very desirable. Dr. Hooker tells us that in the Antarctic Expedition the men all preferred coffee to spirits, and this was the case in the Schleswig-Holstein war of 1849. The experience of Algeria and India (where coffee is coming more and more into use) proves its use in hot climates." The same authority, speaking of tea, says, "Tea seems to have a very decidedly stimulative and restorative action on the nervous system, which is perhaps aided by the warmth of the infusion. No depression follows this. The pulse is a little quickened. The amount of pulmonary carbonic is, according to E. Smith, increased. The action of the skin is increased, that of the bowels lessened.

The kidney excretion is little affected, perhaps the urea is a little lessened, but this is uncertain."

"As an article of diet for soldiers, tea is most useful. The hot infusion, like that of coffee, is potent against both heat and cold, is most useful in great fatigue, especially in hot climates (Ranald Martin), and also has a great purifying effect on water."

Dr. Fothergill finds that caffeine strengthens the contractions of frogs' hearts, and M. Jaccoud believes that it acts on the heart and blood vessels like digitalis, strengthening the heart and increasing arterial pressure.

These beverages, are useful in the headache of nervousness and exhaustion, and as an aid in rousing and keeping a patient awake in opium poisoning.

A small cup of very strong coffee is often very useful in the paroxysm of asthma; in fact it gives relief in most cases but in very unequal degree.

Although tea and coffee are very wholesome beverages, yet in some persons one or the other, or both, will occasion palpitation of the heart, sleeplessness, and mental excitement.

Coffee in certain individuals increases rather considerably the urinary water, and it is said to lessen the formation of urea, and so to check metamorphosis; but Dr. Squarey's careful experiments disprove this conclusion with respect to urea.

CINCHONA AND ITS ALKALOIDS.

SALTS OF QUINIA are protoplasmic poisons, arresting amoeboid movements and the allied movements of the white corpuscles. Even weak solutions are highly poisonous to protozoa and infusoria (Binz), more so even than salts of strychnia or morphia. Small quantities of quinia salts destroy septic germs, and arrest putrefaction, more thoroughly than most

antiseptics, including even arsenic and creasote. Quinia, moreover, hinders alcoholic and butyric fermentations more than other bitters, with the exception of strychnia. Cinchona possesses the same properties, but in a weaker degree than quinia.

Powdered bark contains, besides various alkaloids, a considerable quantity of tannin, which should be borne in mind when we administer bark, or any of its preparations.

Finely powdered bark has been applied, apparently with great benefit, to foul, indolent, sloughing, and even gangrenous ulcers. It is to be dusted thickly over the sore, and left to form a kind of poultice. Hospital gangrene has been successfully treated in this way.

Bark has been employed as a dusting powder to check profuse formation of pus, mucus, or the secretion of eczema. Its success probably depends on the tannin it contains, and other and cheaper preparations of tannin might prove equally useful.

Cinchona bark and its preparations are bitter to the taste, and, like all bitter substances, stimulate temporarily the salivary glands. The tannin of the bark precipitates the mucus of the mouth, and acts likewise as an astringent to the mucous membrane itself.

Powdered bark is a frequent constituent of tooth-powders.

The alkaloids, when swallowed in an insoluble form, combine with the acids of the gastric juice, and become soluble, so that, except for convenience, it is unnecessary to administer quinia and cinchonia with acids. A large dose merely suspended in fluid is far less bitter than when dissolved.

The alkaloids of bark probably undergo no other change in the stomach than that just mentioned. Their action in the digestive tract is similar to that of bitters generally, acting as slight irritants to the mucous membrane, and so producing, both in the mouth and stomach, an increase of mucus. It is generally stated that cinchona, increases the amount of the gastric juice for a short time, to a small extent, and further experiments show that cinchona and its alkaloids

check the digestion of food by the gastric juice, and also check fermentations, as that of sugar by yeast. The effects of cinchona, therefore appear to be that it increases for a short time the production of both saliva and gastric juice, and so in a small measure may aid digestion; that it is an irritant to the mucous membrane, and promotes the secretion of mucus of the mouth and stomach; and that it checks the digestive action of the gastric juice and fermentation.

Our theoretical knowledge thus would appear to show that quinia neither increases appetite when the stomach is healthy, nor aids digestion in any great measure, yet experience fails to support these conclusions; for even when the stomach appears to be healthy, quinine certainly seems to sharpen appetite and assist digestion, particularly in the case of inhabitants of large towns, and of elderly people.

These substances are useful to check unhealthy or excessive fermentation in the digestive canal.

If too long employed, these alkaloids disorder the stomach, producing heat and weight at the epigastrium, loss of appetite, nausea, sickness, and even diarrhoea. Poisonous doses excite great thirst, burning pain at the epigastrium, and vomiting.

Quinine appears to exert no influence on the secretion of bile.

These alkaloids affect the intestines in the same manner as the stomach.

They are given with benefit in cases of worms; but as decoction of cinchona appears to have no direct influence on ascarides and tæniæ, the good effects of quinia must be due to the improvement it effects in the mucous membrane, by preventing the production of the abundant mucus which favours the development and growth of these worms.

When quinia is taken in large quantities, some of it is said to pass off with the fæces.

Quinia readily passes into the blood, and probably very little is decomposed in the body, as it can be detected unchanged in the urine, sweat, and secretions of healthy persons

and fever patients. It is almost exclusively eliminated by the urine, most of it being excreted in six hours.

Large doses affect sight and hearing, and excite subjective noises, as of bells ringing in the ears, and occasionally produce deafness. Sometimes, but very rarely, the sense of hearing has been lost for life; but usually, in a short time, it may be in a few days, the noises cease, and the hearing again becomes natural. Large doses often dim the sight, and sometimes cause total temporary blindness. The author has noticed that on some occasions, strange to say, the defect of vision is limited to one eye, or begins first in one eye. The pupil of the affected eye is very generally dilated; sometimes to an extreme extent. Severe frontal headache, generally dull, heavy, and tensive, but sometimes agonizing, is one of the most distressing, as well as constant, symptoms following a large dose of quinia. While these symptoms last, and indeed generally before they appear, the face is flushed, the eyes suffused, and the expression is dull and stupid. Even small doses in some persons very susceptible to the action of this medicine, will produce some of the foregoing symptoms, especially the headache and mental disturbance.

It has become somewhat the practice of late to treat pyæmia, acute rheumatism, typhus fever, etc., with oft-repeated large doses of quinia, even to the enormous extent of several drachms in the day, yet without producing any of these toxic symptoms. Workers in barks sometimes suffer from a scaly papular eruption; sometimes from a vesicular weeping eruption; occasionally with great swelling of the genitals or of the face and eyelids, with redness of the eyes. They sometimes complain of great itching of the whole body, and it is known that quinia sometimes produces urticaria.

The statements concerning the influence of quinia on the pulse are discrepant. It is often said, that large doses reduce, while small doses increase, the number of beats.

Mr. Gill and the author investigated the effect of large doses of quinia on the pulse and temperature. Their experi-

ments were conducted on a boy aged ten, convalescent from rheumatic fever, and a healthy girl of thirteen.

Before experimenting on the girl, her pulse beat from sixty to sixty-four; and the following table shows the effects of a daily dose of quinia:—

Dose.	Rise began.	Reached.
gr. 8	in 35 minutes	94
„ 10	„ 15 „	72
„ 12	„ 95 „	72
„ 20	immediately	120
„ 20	in 50 minutes	96

In the last observation the pulse for about the first thirty minutes fell in frequency; but this did not occur with the other observations. We shall mention presently the depression in the temperature we obtained in the experiments; here it is only necessary to state that the pulse was at its fastest when the temperature began to be depressed by the quinia. The increase in the frequency continued after—

gr. 10	170 minutes.
„ 20	195 „
„ 20	Did not fall much.

On every occasion there was a loss of force with the increase in the frequency. Briquet has shown by the aid of the hæmadynamometer that the lateral pressure of the blood on the arteries is lessened in proportion to the dose of quinine.

The effect on the boy's pulse was different, for his pulse beat 112 to 120 in the minute. The rheumatism from which he had recovered had left a mitral regurgitant murmur, and had probably damaged the heart's substance. Two doses of ten grains each were given him on one day, without altering the frequency of the pulse on either occasion; on each occasion, however, its strength was diminished. On another day, after taking a single dose of ten grains, the pulse fell during fifty minutes from 108 and 112 to 104 and 96, growing at the same time in strength. After this it attained a frequency of

120 in the minute, and again fell in force. On two occasions the girl's pulse, when at its quickest, became irregular both in force and rhythm.

Mr. Gill and the author investigated at the same time the influence of quinia on the temperature of fever-free persons. The following table shows the results of our observations:—

BOY.	
Dose.	Effect on Temperature.
gr. 10	None
„ 10	Fell 0.2°
„ 10	None
GIRL.	
Dose.	Effect on Temperature.
gr. 8	Fell 0.2°
„ 10	None
„ 10	None
„ 20	Fell 1°
„ 20	Fell 0.4°

It appears that quinia will reduce the temperature, but that to effect this in any appreciable degree large doses, to the extent of twenty grains, must be given, and even then the depression is but slight, and may not amount to half a degree Fahrenheit.

It may be said that the fall in the temperature does not represent the whole effect of the quinia, as a rise in the temperature would have taken place at the time the depression occurred, so that if we wish to learn the whole influence of the quinia we must add to the amount of depression the rise which should have happened; but to this the author is able to answer that on this point he made many careful observations, and found that the heat of the body remains always very constant between nine a.m. and four p.m., and the foregoing observations were made between these hours.

This table gives the time the depression occurred after the quinia, and the period it lasted. The occasions when the fall reached only 0.2° are not included, since even when the

greatest care is taken, so slight a depression may easily be produced by accidental causes.

Dose.	Time.	Depression lasted.
gr. 20	in 55 minutes	3 hours 15 minutes.
„ 20	„ 80 „	45 „

Other observers prove that quinia reduces the body temperature in health.

Piorry has shown that during a fit of ague quinine diminishes at once the size of the spleen. It is said that the drug exerts a similar effect on this organ during other fevers, and even in health.

The influence of cinchona and its alkaloids on the various forms of intermittent fever is well known. It controls this formerly common complaint more effectively than any known drug. How it acts is at present quite unknown. It has been supposed to check the fever by its influence on the spleen; but, granting this assumption, it yet remains to show how the influence of the quinia on the spleen prevents the return of the fever paroxysms.

Quinia generally arrests the disease at once. It is well, however, to bear in mind that this remedy may dissociate the other symptoms from the elevation of the temperature; or, in other words, it may remove the shivering, sweating, quick pulse, while the temperature may remain as great, or nearly as great, as on previous days. Mere rest will occasionally effect the same dissociation. This fact it is necessary to recollect, otherwise it may be concluded that with the removal of the more obvious symptoms the disease itself is cured, and thus the patient may be permitted to return to his usual avocations. Unless the unnatural elevation of temperature has been restrained, the paroxysms will speedily return.

A still more curious circumstance remains to be stated. It appears that quinia may check all the symptoms, even the periodical elevation of the temperature, and yet about the same time of day that the series of symptoms were wont to

take place, an increase in the urea and urinary water may occur as marked as during a severe paroxysm; that is, all the symptoms of the paroxysm are absent except those pertaining to the urine.

Two experiments made by the author render it probable that quinia, given after the fit has begun, is powerless to prevent the elevation of temperature of that attack, although it may effectually prevent it in succeeding paroxysms. It is said that when employed subcutaneously after the paroxysm has begun, quinia will arrest the fit. Some hold that quinia is less efficacious than the powdered bark, even when the cinchona is allowed for, and it is even held that powdered bark is more tonic than quinia. On the other hand, no doubt powdered bark, by reason of its bulk, and of the tannin it contains frequently upsets the stomach.

There is great variation of practice regarding the administration of quinia. Some give small doses, repeated several times daily; others prefer a single large dose daily; both methods are useful, but under different circumstances. In the mild forms of ague, like those now met with in this country small doses several times daily are sufficient; but in malignant forms of the disease, large doses, given even several times a day, may be required to arrest the disease summarily. Some say the drug should be given at the very commencement of the fit; but this practice is held to be bad and to make the immediate attack more severe.

Trousseau advised that fifteen grains should be taken immediately after the fit, and repeated with an interval, first of one, then of two, three, and four days, and so on. Probably this is a good way to extirpate the latent tendency to the disease, and to ensure a perfect cure; for it must be recollected that, judging by the temperature, a patient may unconsciously undergo even a severe fit, a fact proving the great importance of employing the thermometer while treating this disease. Moreover, Trousseau's plan is judicious; for even when the quinine has removed all symptoms, the patient is liable to a recurrence of the attack from various causes, as

depression of the health, or a sudden shock, as from an accident or operation; indeed, in many instances, this tendency to ague lasts for years.

It is important to recollect that the effect of quinia on the fit bears no relation to its physiological operation, either in time or degree, for a small dose may prevent the occurrence of a fit otherwise due twenty-four hours afterwards, the effects of the dose on the system meanwhile never becoming apparent, or having long ere this passed quite away.

Quinia is of especial use in the malignant forms of ague. The dose should be large, and given in a non-febrile period. In these severe forms of the disease, no circumstances are to be considered as contra-indicating its use. If it cannot be borne by the stomach, it may be given by the rectum or hypodermically. For injection it is recommended to dissolve the quinine in ether as this solution is less irritating than an acid, alcoholic or chloroformic solvent. Salts of quinidine on account of their solubility have been recommended for hypodermic use. Quinidine of commerce is generally very impure.

In remittent fever, large and often-repeated doses should be administered during the remission.

The more recent the attack, the sooner and more certainly will quinia cure.

It is less efficacious in quartan than in other forms of ague, probably because old ague generally assumes the quartan type. In obstinate cases resisting quinia, arsenic often succeeds.

In some cases where this medicine appears powerless the administration of an emetic each morning sometimes brings the disease at once under the control of quinia.

Quinia is used as a preventive of ague, and in the navy it is a very useful sanitary precaution to give sailors sent ashore quinia before and after landing, where this fever prevails. This preventive effect is forcibly illustrated in some observations recorded by Dr. J. B. Hamilton, of the Royal Artillery, who treated his men with quinia, and but few succumbed to

ague, and those were attacked mildly; whilst another doctor, disbelieving in the preventive action of quinia, allowed his men to go unprotected by quinia, and a large number were struck down with fever and several died. Dr. Hamilton believes that cinchonia is superior as a prophylactic to quinia, and quinoidia very inferior to quinia.

The other alkaloids of bark, although inferior to quinia, will check ague. Cinchonia, it is said, must be given in doses one third larger than quinia.

The Medical Committee appointed by the Indian Government to estimate the relative value of the alkaloids cinchonia, quinia, quinidinia, and cinchonidinia, decided in favour of the use of all of them in ague. Naturally, there were individual differences of opinion concerning their exact relative value, but all agreed that they are most efficacious against ague.

The general opinion was that sulphate of quinia and sulphate of quinidia possess equal febrifuge power; that sulphate of cinchonidia is only slightly less efficacious; and that sulphate of cinchonia, though considerably inferior to the other constituents, is a valuable agent in fever.

It is a fact well known that in the case of persons who have encountered ague, even many years beforehand, that disease in them is prone to take on an intermittent type and that quinia here is often of great service.

Again, certain forms of neuralgia not uncommonly depend on malarial poison, and are then apt to assume a type distinctly periodical. Here quinia is highly serviceable in large doses given shortly before the expected attack. Quinia often proves useful too in non-malarial forms of neuralgia, presenting this periodical character. Even when the element of periodicity is quite absent, large doses of quinia often succeed in removing the pain of this distressing malady. Quinia is said to control neuralgia and ordinary face-ache more effectively when the powder is taken in minute quantities every few minutes,—for instance, as much as will adhere to the finger's tip dipped into the powder.

It has long been recognized that quinia has most influence

on neuralgia of the supro-orbital branch of the fifth. This branch is most often affected with malarial neuralgia and non-malarial periodic neuralgia; but even non-periodic neuralgia of this branch is probably more amenable to quinia than neuralgia of the other branches of the fifth or of other nerves.

A short time ago it was the custom to treat pyæmia with large doses of quinia. It was said that the quinia produced great reduction in the temperature; but the author is convinced that the falls were often normal, occurring in the course of the disease, independently of the action of quinia. In pyæmia a sudden and extensive rise of the temperature often occurs twice or three times a-day, to fall again, however, in a few hours to the natural or almost natural standard.

Quinia is recommended in other febrile diseases, as typhoid fever, bronchitis, broncho-pneumonia, pneumonia, and acute phthisis. The observations of Weber, Murchison and Ogle, prove that large doses effect sometimes a temporary reduction of temperature, occasionally a considerable fall, but it appears in other respects to leave the disease unaffected. Hence quinia cannot be considered of much service in these affections, as their symptoms and the dangers incident to them are not chiefly due to the elevation of temperature. Thus we meet with patients suffering from simple fever, and sometimes phthisical patients with a temperature of 104 or higher, who are able notwithstanding to continue their daily work, or at all events are but slightly disabled, their appetite being but little affected; whilst a typhus patient with a corresponding temperature, is unable to eat, and lies prostrate, delirious, with dried baked tongue. The dangerous symptoms, therefore, may be independent of the fever; and a remedy, to be serviceable, must control these, and there is no evidence that quinia has this power.

Quinia in large doses of ten to thirty grains, repeated several times a-day, has been recommenced in acute rheumatism. Some advocate its use at the commencement, others at the termination, of the attack; at the beginning, with the

view of shortening the course of the attack and diminishing the chance of relapsing; and at the termination, with the hope of preventing the profound anæmia which so generally accompanies acute rheumatism. Other authorities are altogether adverse to the use of this drug, maintaining that it favours relapses, and merely disguises the pain, but in no degree shortens the attack. In this controversy, which side is in the right, if either is, remains to be proved.

Quinia is often given with decided advantage, to check the profuse sweating of exhausting chronic diseases, as chronic phthisis. If a small dose fail to check this excretion, a large dose of six or eight grains, administered at once, or in portions, repeated hourly, sometimes succeeds.

A night draught, composed of quinia, sulphate of zinc, and sulphuric acid, is very useful in many cases of profuse sweating.

Quinia is sometimes useful in the vomiting of pregnancy. Many American writers believe that quinia strengthens the contractions of the womb during delivery, and some use it in preference to ergot. Other writers deny to quinia this action, but on the rather inconsequent ground that, when given during pregnancy as for ague, quinia does not cause premature labour.

In diseases of malnutrition, quinine is often employed with much benefit, as in impetigo and ecthyma. It is also of great benefit to the pale and badly fed of large populous towns. It is at present undetermined whether its good effects are dependent on its action on the stomach, or on the tissues after its absorption into the blood. Quinia has been recommended in passive bleeding, in undue suppuration, profuse menstruation, spermatorrhœa, and in excessive secretion of milk.

Quinia appears to be useful in some, but quite useless in other, cases of intermittent hæmaturia.

Quinia is found in the blood, which dissolves more of it than water; in the saliva, bronchial mucus, milk, and in dropsical effusions. It is said to be eliminated slightly with

the sweat; but Briquet, after giving large doses, could detect none in this secretion.

Both quinia and cinchona pass off in part by the urine, but a portion appears to be consumed in the blood, or to be eliminated in some other way. Kerner says that "a respiratory power of 3,000 c. c. can destroy fifteen grains of sulphate of quinia in twenty-four hours; any amount over this will pass into the urine." Quinia appears in the urine of healthy individuals in the course of two to five hours, but more quickly in young than old persons. In some diseases (intermittents, pulmonary emphysema, pneumonia, morbus Brightii) its exit is much delayed, and in three cases in which large doses were given, Dietl detected it in the urine many weeks after the last dose, showing that it is not easily destroyed in the body.

Dr. Ranke has made the important observation, that a scruple of disulphate of quinia lessens by one-half the excretion or the formation of uric acid, the effect continuing about two days after a single large dose, the other constituents of the urine remaining unaffected. It would seem likely that the uric acid is not simply retained in the system; for as in Ranke's cases no subsequent increased excretion took place after the effect of the quinia had gone off, its formation was absolutely lessened, or it must have been converted into some other substance. (Parkes on urine.)

Certain circumstances modify the operation of the salts of quinia. The physiological symptoms appear early in young people who can resist the toxic action of the drug; but on the other hand, the effects of quinia are more marked in old people. Diffusible stimulants, as wine and coffee, are said to counteract the action of quinia.

It has been asserted that quinia given to a healthy person will produce fever.