Observations on the preparation of yellow bark and other medicines / by Richard Battley.

OBSERVATIONS

ON

THE PREPARATION

OF

YELLOW BARK,

AND OTHER MEDICINES,

BY

RICHARD BATTLEY.

(Addressed to and read at the Royal College of Physicians, Monday, the 7th May, 1838.*)*

TO THE PRESIDENT AND FELLOWS OF THE ROYAL COLLEGE OF PHYSICIANS.

GENTLEMEN,

My attention having been directed, during the earlier part of my life, to the practice, and during a long period of time, to the preparation, of Medicine, I beg your permission to submit to you the following observations, in the hope that they may not be without effect in the treatment of disease.

The Materia Medica is presented to the physician by the hand of the pharmaceutical chemist, both in its natural and its artificial state.

The natural, takes precedence of the artificial, being the medicine which a merciful Providence gives us to heal our sickness; and to obtain which, manipulation need only be employed, as I conceive, to separate the remedial agents from their various admixtures.

The artificial state, is the work of chemistry, as usually now conducted; proceeding by effecting the separation of the *base* of the medicine, from the combinations in which it is naturally held.

Far from adopting this view of the subject, it has been my endeavour, generally speaking, to maintain the combinations which nature has formed, and with few exceptions, when separation becomes necessary, to effect the re-combination of the separated matter.

At the outset of modern chemistry, the *base* of a thing so essential to life, as atmospheric air, was seized upon with avidity; but in its application as a remedy for disease, vital air has not been found to be even a substitute, much less an improvement, on pure atmospheric air, as it is given us in its just proportions by the Divine Artificer.

In the decomposition of the various

articles of the Materia Medica, art has succeeded, to a certain extent, withsome of the remedies, of which Morphine and Quinine may be referred to by way of illustration; but it remains to be *proved* whether or no these *bases* of Opium and Bark, even when re-combined with Acids, be equally efficacious as when administered in their native combinations, purified and concentrated, only, as in the case of Bark, or more freely divided, as in the case of Opium.

Without impugning, therefore, the science of chemistry in multiplying the number of potent poisons by these separations, some of which cannot stand their ground, from the impossibility of adjusting them to a standard sufficiently uniform, or if adjusted, of controlling their action on the living body, with a due regard to its safety; I have arrived at the conclusion, that the *desideratum* in pharmaceutical chemistry, is:—

To leave unchanged the medicinal quality of the substance acted upon, separating and removing therefrom, as far as may be possible, every matter not possessing remedial virtue. And I may further premise, that I am thoroughly impressed with the belief, that the active medicinal virtues are, in their natural state, generally, if not always, held in solution by acids. To maintain this combination undisturbed, should be the chief aim and end of the pharmaceutical chemist.

The principal agent applied by me, in effecting these important separations, is distilled water, generally cold; and I proceed to submit to the attention of the President and Royal College, the details of the processes by which some of the various forms of medicine, which I have now the honour to submit to their inspection, have been procured.

CORDIFOLIA OR YELLOW BARK.

Fine subpulverized *Yellow Bark*, having been macerated in cold water, yielded a transparent liquid, of an amber colour, very fragrant and extremely bitter, s. g. 1009; a free acid being indicated by litmus paper. By the condensation of this fluid, at a low temperature (130°), to the consistence of syrup, a dark and transparent mass resulted, possessing in the highest degree all the characters of the cold infusion.

The analysis of this fluid mass gave the following results:—viz.

Tannin,
Quinine,
Resin,
Bitter Extractive,
Colouring Matter,
Wax,
Lime,
} held in solution by the vegetable acid peculiar to Bark, and yielding aroma in a high degree; the acid also existing in the infusion in a free state,

together with,—

Muriate of Potash,
and
Sulphate of Potash.

This first maceration, appears to

me, to have the effect of separating and securing, nearly the whole of the medicinal properties of the Bark; since by the second maceration, lime, in union with some of the acid, a little colouring matter and other properties of the Bark, in very minute degree, were the only results; and on boiling the residuum in water, little was obtained besides starch.

It is sufficiently evident then, that unless the starch contain medicinal virtue, the first maceration leaves little besides a portion of the vegetable acid to which that property can be attributed; and with regard to this acid, sufficient is procured, to hold in solution, the quinine, resin, extractive, colouring matter and wax, together with the tannin; and the importance attaching to this process may be considered as fully established, when I add, that the acid is a ready solvent of quinine, *even without the assistance of heat*, the usual solvent being dilute *sulphuric acid* at the *boiling point*, and that the bitter procured by the first, is far more intense than that produced by the latter; one being the compound prepared in the great laboratory of nature, the other artificial.

I have, for some time past, received repeated assurances from high medical authority, of the superiority of the medicine prepared by cold infusion and subsequent condensation, but I have only recently ascertained the high solvent power of this acid.

SENNA.

To double its weight of cold distilled water, imparted nearly half its own weight. The analysis of this liquor was as follows; viz.

Gum,
Resin,
Extractive,
Lime,
Alumina,
Magnesia,
} held in solution by a vegetable acid, and yielding aroma in a high degree; the acid also existing in the infusion in a free state,

together with,—

Sulphate of Potash,
and
Muriate of Potash.

It has appeared to me, as the result of much observation, that the object to be desired in the preparation of Senna, for medicinal purposes, is, to retain the whole of these properties in their native combination, and for this purpose the great tendency to separation and precipitation of that, which I apprehend to be the most effective property of the drug, namely the resin, is particularly to be guarded against; for if that effect or consequence be allowed, the medicine ceases to be of value. I find that these constituents are secured with the least disturbance, by this method of cold infusion, and that the medicine so procured may be made to preserve its efficacy for a great length of time.

RHUBARB.

Requires to be treated in a similar manner to Senna.

JALAP.

Contains:

Resin,
Extractive Matter,
Starch,
Gum,
Alumina,
Lime,
} held in solution in its peculiar acid, the acid also existing copiously in a free state.

together with,—

Muriate of Potash,
and
Sulphate of Potash.

To extract the medicinal properties of this root, a high temperature is required, and may be safely used, beginning by cold infusion,

One pound troy, yielded extract 6 oz.
To which was added, by boiling in Papin's digester 4

10 oz.

In the extract, the predominance of free acid is highly remarkable, nearly 2 oz. of alkali being required to neutralize the free acid from one pound of Jalap.

CONIUM.

Contains:

Muriatic Acid, *in great quantity*,
Resinous Matter, combining *a highly volatile and very subtle principle*,
Essential Oil,
Gum in great abundance,
Colouring Matter,
Muriate of Potash,
Sulphate of Potash.

The active medicinal properties of this plant appear to reside chiefly in the subtle principle above-mentioned.

In the Medical Gazette, for July 1831, I stated, that in the ordinary manner of preparing the extract of Conium from the expressed juice of of the plant, this principle volatilizes and escapes at the temperature of 120°, but I am now of opinion that that is an extreme limit, and that volatilization commences at a still lower temperature.

The great care and caution necessary therefore, in the preparation of the medicine, must be obvious, and the admitted uncertainty of its effect, under the hand of the physician, is explained by the simple fact, that a temperature much exceeding 120° is ordinarily employed in its preparation, and hence it too often proves to be powerless.

To secure the resinous matter without decomposing or disturbing the volatile principle, I have adopted the method of heating the juice, to a temperature just sufficient to produce the separation of this matter (commencing at about 100°), which being thus separated, is removed from time to time, as the separation proceeds. The liquor remaining and in which muriatic acid is abundant, is evaporated to the

consistence of thick syrup; the resinous matter is then admixed therewith, and thus the extract is formed, after which it may be interesting to remark, that several weeks are required to effect the desired re-union of the resinous matter, in the manner essential to the efficacy of the medicine, and which re-union I believe to be effected chiefly by the agency of the muriatic acid. However this may be, extract of Conium, thus prepared, is a medicine not only of considerable power, but equally to be relied upon with any other medicine duly prepared. It is a medicine *of great power, and is uniform in its operation.*

OPIUM.

This secretion from the poppy head requires more attention than it is in my power, at present, to devote to the analytic explanation, which its great importance and the complexity of its details require, but I cannot close this paper without observing, that in separating the two antagonist principles which it contains, the stimulant and the sedative, I have, I believe, secured all the principles of the sedative power, in combination with the peculiar acid of the secretion by which they are held in solution, free from any admixture of the stimulant principles.

REMARKS.

Bark, yields all its medicinal properties to cold water, a moderate elevation of temperature, only, being used in its condensation.

Senna and Rhubarb, yield their medicinal properties without the aid of heat.

Jalap, on the contrary, requires a very high temperature for the complete extraction of its medicinal virtues.

Conium; The separations required for the purpose of my preparation of this medicine, are effected at a low degree of heat, and I have stated, as the fact is, that the medicine as thus prepared, is of great and uniform power, but it will, notwithstanding, be the object of my endeavour still further to improve this medicine.

The properties of the above mentioned and other vegetable acids, will, in particular, be the object of my future attention, and I shall hope to be permitted to submit the results of those and other investigations, to the consideration of the Members of the Royal College.

I have the honor to be,

Gentlemen,

Your obedient Servant,

RICHARD BATTLEY.

Laboratory, Saunderian Institution,
Royal Ophthalmic Hospital,
Moorfields, 28th of April, 1838.