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XXIX. *Process for extracting the Salt, with a Base of Lime, contained in Yellow Cinchona. Communicated to M. FOURCROY by C. DESCHAMPS, of Lyons*.*

TAKE twelve pounds of yellow cinchona, of a good quality, pounded, and sifted through a hair sieve†. Put it into a large pitcher with a beak, and pour over it fifty French pints of pure cold water. Suffer it to macerate for twenty-four hours, taking care to stir it several times in the course of the day. Decant it next morning, pouring the liquor, which has been left to form a deposit during the night, through a close sieve made of goats' hair. Then pour this and the following infusions into vessels, which must be preserved in a cool place:

Pour over the remaining matter, after the moisture has been suffered to drain off, thirty French pints of cold water. Leave it to infuse for twenty-four hours, stirring it as before; then decant the liquor, and pour over the matter, when well drained, twenty pints of cold water, which makes the whole of the water to be 100 pints.

At the end of twelve hours' maceration, squeeze the matter in a press; then filter all these infusions united, and put them to evaporate in a large broad bason of silver, or of tinned copper. Maintain the evaporation by a gentle heat, that the liquor may not approach the degree of ebullition; and when reduced nearly to a half, pour it into a vessel and leave it till it is perfectly cold; then filter it, and wash several times by pouring water almost cold through the filter the deposit which has been left upon it.

Unite these lotions to the filtered liquor, and continue the evaporation in a smaller vessel until it be reduced six or seven pints. Then leave it to cool, filter it again and wash the resino-mucous matter as before, until the last portions furnish very little precipitate by the addition of carbonate of potash.

* From the *Annales de Chimie*, No. 142.

† The cinchona which I have hitherto employed in preference for extracting this salt was the yellow kind. It furnished it in more abundance, and presented less difficulty in purification than the red and the gray, which I treated also. The quantity which it produced may be estimated at an ounce and three gros per pound of the yellow cinchona employed. This result never varied in the specimens I used. The weight of the cinchona I employed was at least twelve pounds. The loss by this quantity was less than if I had operated with a smaller quantity; the crystals, besides, were larger and more distinct.

Continue this evaporation, filtration, and washing, until the liquor, by means of a gentle heat, has been brought to half the consistence of syrup. Then pour the liquid into a vessel of earthen ware *, which must be deposited in a cool place and left at rest for a fortnight.

At the end of that time pour off, by inclining the vessel, the condensed liquor, which will float over the crystals that have been formed. Wash them with a sufficient quantity of water, rubbing them gently with a small soft brush, or the barb of a quill, in order to free them from the thick extract which adheres to them.

After this washing, detach the crystals, removing as little as possible the resino-extractive matter to which they are often fixed in this first crystallization †. Pound the salt and dissolve it, triturating it several times in a sufficient quantity of cold water. Filter these solutions, including the liquor which arises from the washing of the crystals, and evaporate the whole to the consistence proper for crystallization ‡.

By this first purification you will obtain crystals very little coloured, and much less mixed with substances foreign to the salt. If you wish to obtain them of a greater degree of purity, you must proceed to a second purification in the following manner :

After having washed and detached the crystals, dissolve them cold as before; filter the liquid, wash the deposit, and reduce the whole by slow evaporation to the proper degree.

The salt obtained will be exceedingly beautiful and perfectly pure. Its crystals are formed of laminæ truncated

* For these crystallizations I prefer flat dishes to those which are conical.

† If care has been taken to filter the liquor several times, according as it is concentrated, and always after it has been suffered to cool, it will be so much freed from the resino-gummy part, that after the first crystallization, though the saline mass will still be of a russet colour, the base of the crystals will be free from that matter which it was my chief object to remove.

The small portion of salt, which I had the pleasure of sending to you arose from the first crystallization alone. When the infusion was reduced to six or seven pints, I took care in the course of the subsequent evaporation to filter it cold at three different times. By pursuing this course, very little matter adheres to the saline crust, and the supernatant extractive matter can be separated with the greater facility.

‡ The more I advanced in the purification of my salt, the less I thickened the liquor: the degree of concentration must be proportioned to the quantity of extractive or resino-mucous matter it may have contained. It is not easy to hit this point.

at their extremity and applied obliquely to each other: I propose to call it *cinchonate of lime*.

I have several times obtained in the crystallized mass a different disposition; which struck me the more, as it is not often found, namely, in groups, perfectly round and regular in the divergency of the laminæ of which they are composed. They are in a manner insulated, and each of them exhibits a summit which hangs over the plane surface of the other crystals. This variation in the assemblage took place only in the first crystallizations: I never observed it in those which produced the purified salt.

The process here indicated is not sufficient, as may readily be conceived, to extract from cinchona the whole of the salt it is capable of furnishing. The thick liquor which floated over the first crystallization, and which has been laid aside, still contains a great deal of it. To obtain it, the extractive matter must be freed as much as possible from the other two immediate materials of cinchona which oppose most the separation of the saline substance, the resin and the mucous matter, which are extracted separately or combined.

For this purpose, when I wished to ascertain in the most precise manner the quantity of this salt which yellow cinchona might contain, confining myself always to water as an agent, I treated, cold, this compound extract, as indicated for the purification of the first product, and repeating the dilution, filtration, and evaporation, I found means to insulate, in a manner, the extract of cinchona, which when thus treated retains scarcely any thing but the mucous part.

When the saline liquor, thus purified, refused to furnish crystals, I united it to that which floated over the salt carried to the highest degree of purity, mentioned in the first article of this process. This mixture still furnished me with abundance, and in the last result the liquor I abandoned had still such a saline appearance as to give me reason to expect something more to add to my recapitulation of its contents. On examination I found nothing but products similar to those which I obtained from the decomposition of the crystallized salt. The matter which I precipitated is absolutely of the same nature; it is only more coloured in proportion to the resino-extractive matter it contains.

The means which I have here described are attended with considerable embarrassment, and require a good deal of time and expense, which no doubt might be avoided by treating the bark differently. I have several times thought, that by
employing

employing fewer lotions, infusions, &c., I should obtain a less quantity of salt, but that, as this would change nothing in the nature of the product, I should find it more advantageous.

Having in the first place proceeded to an analysis, and wishing that as little of the salt as possible should escape me, I conducted the process in a rigorous manner; and since that time I have practised the same manipulation.

There is reason, however, to think that the operation might be much shortened by the help of alcohol: as this fluid has no action on the calcareous salt of cinchona, it might be employed two ways to remove the resin, which forms the greatest obstacle to the extraction of this saline substance, either by subjecting the cinchona in its natural state to the alcohol before proceeding to aqueous infusion, or by exposing to its action the extractive matter which results from the concentration of the first infusions.

XXX. On Galvanism. By a Correspondent.

To Mr. Tilloch.

SIR,
 NOT having seen or heard any satisfactory hypothesis concerning the increased effect produced by the Galvanic battery upon animals by increasing the number of plates, and upon metals by enlarging their surface, I beg, through your valuable miscellany, to call the attention of Mr. Davy and other philosophers to the subject; and shall be happy to receive, through the same channel, an explanation of these apparently inconsistent phenomena.

It is well known that the effect on animal bodies is proportionate to the series or number of plates of which the battery is composed, and that on metals it increases with the area or surface of the plates employed. The fact is attempted to be accounted for upon the supposition that the skin, from being an imperfect conductor, is capable of transmitting only a certain portion of Galvanic fluid, and that metals, being perfect conductors, can transmit any indefinitely larger quantity. But this theory, although it may be supported by experiment when *equal numbers* of small and large plates are employed, does not appear to me to account for the phenomena when *different numbers* of plates of *equal sizes* are used.

I conceive