



## XLII. Analysis of aloes

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This precipitate when collected and distilled in a retort yielded an ammoniacal liquor, from which it should seem that the substance in question is nothing more than a coagulated vegetable albumen.

*Action of Alcohol.*—Four ounces of hepatic aloes were dissolved in alcohol: there remained an insoluble mass, weighing  $4\frac{1}{2}$  drachms, which was albumen.

The alcoholic solution was evaporated to dryness, and the residue was boiled with water. It was entirely dissolved; but upon cooling the resin separated from it. By this means we obtained three ounces of saponaceous principle, and  $2\frac{1}{2}$  drachms of resin.

From all the above experiments the author has drawn the following consequences:

1. Socotrine aloes are completely dissolved in boiling water. The resinous part is separated from it by cooling.

2. It is also dissolved in alcohol without leaving any residue.

3. The parts which are soluble in water contain more bitter principle than those which are soluble in alcohol, although these last are not entirely free from it.

4. The hepatic aloes differ from the socotrine, in so far as they contain an albuminous vegetable matter, and less resin than the latter.

5. It is not completely dissolved in boiling water, for the coagulated albumen resists it.

6. It is not wholly dissolved in alcohol. This is the way in which we may distinguish it very evidently from socotrine aloes, even when their physical characters are the same.

## XLII. Analysis of Aloes. By M. BRACONNOT\*.

§ I. ALOES are procured from several plants which bear the same name: at Morviedris in Spain the *aloë vulgaris* furnishes three sorts, which only differ from each other in the way in which they are prepared. In the West Indies the substance in question is extracted from the *aloë barbadensis*, which, as well as the foregoing species, is regarded by some writers as a variety of the *aloë perfoliata*, and which is cultivated in the most wretched soils. The *aloë spicata* a distinct species from the above, also furnishes juice of a good quality; but the purest and most valuable is brought in bladders from the island of Socotra, situated at the entrance of the Arabian Gulph in the Indian Seas: it is ob-

\* *Annales de Chimie*, tome lxxviii. p. 20.

tained by cutting transversely the leaves of the *aloë perfoliata socotrina*, placing earthen vessels underneath it to receive the juice, which is thickened in the sun.

The aloes which was made the subject of the examination is of a yellowish red, and semi-transparent: it presents, in its fracture, several yellow points which glisten on a red ground: reduced to powder it is a fine yellow colour: it has a very bitter taste, and a smell which some persons think is not disagreeable: it does not become electrical on friction.

When exposed to a heat of  $80^{\circ} + 0$  of Reaumur, it begins to soften, and then melts: on account of its being easy of fusion, it is much easier to pulverize it in winter than in summer. If we present a piece of it to the flame of a candle, it melts with a crackling noise, and inflames.

§ II. 50 grammes of aloes were distilled at a heat very gentle at first, and incapable of decomposing it, when the following products were obtained: 1st. Eight grammes of water charged with an essential oil which gives aloes their smell. 2d. At a greater heat there passed over 8.7 grammes of almost colourless water, in which I found one gramme of acetic acid, but no ammonia, on adding quicklime in powder to the liquor. 3d. Five grammes of a heavy red oil soluble in alcohol. 4th. A great quantity of oleaginous hydrogen gas and carbonic acid. 5th. There remained in the retort (which had begun to melt) twenty grammes of a hard charcoal very voluminous and honeycombed, which retained a great quantity of hydrogen, which we saw burnt by exposing it a long time in a crucible at a strong heat in order to incinerate it, which was impossible: it preserved all its blackness, its shining appearance, and a great hardness: it had lost however 12.5, which I attribute in a great measure to the hydrogen. The 7.5 grammes which remained did not contain any potash. This charcoal was treated with muriatic acid: the filtered liquor was precipitated by ammonia, which separated oxide of iron and a small quantity of phosphate of lime: the carbonate of potash precipitated some decigrammes of carbonate of lime.

If we heat nitric acid on this charcoal, we obtain a small quantity of tanning matter which precipitates strong glue.

§ III. Aloes in powder, bruised in a glass mortar with cold water, yielded a mass which, squeezed through the hands, was tacky like turpentine. We succeeded in obtaining a complete solution by adding water in successive quantities, but it required a great quantity; the last portion which remained to dissolve was similar to the first in point of

bitterness and its other properties: this solution became frothy on being shaken.

One hundred and forty-eight grammes of water at  $32^{\circ}+0$  of Reaumur were sufficient entirely to dissolve four grammes of aloes, with the exception of one decigramme of an impure ligneous matter: the liquor became turbid as it cooled, and deposited part of the matter dissolved. This solubility of aloes in water increases in such a manner, in consequence of heat, that we may obtain a syrupy solution, which then ceases to deposit any sediment.

When tried by the re-agents, the solution of aloes in water presented the following effects:

1. It reddened turnsole tincture in a very marked manner.

2. The alkalis and lime water render the colour darker, without precipitating any thing from it.

3. The sulphate of iron produces a brown colour, and a precipitate of the same colour soon afterwards.

4. The decoction of gall nuts forms a flaky yellowish precipitate. The supernatant liquor is much less bitter, and weaker in colour.

5. The subacetate of lead also produces a precipitate in this liquor. The supernatant liquor becomes almost colourless.

6. The nitrate of copper and of lead and muriate of tin produce slight sediments in it, but which do not appear to me to be true chemical combinations; for solutions of muriate of soda and of the other neutral salts produce quite as much. These saline matters therefore act on the solution of aloes in the same manner as upon that of tannin in water, by weakening the action of this fluid on the not very soluble matter which is dissolved in it.

The above solution of aloes, which was of a fine golden colour, was put into three bottles: the first, which held a pint, was entirely filled with it and well corked: the second, which was of the same capacity, was half filled and left open: the third, being a medicine phial, was one quarter filled. In two months and a half the following phenomena were observed: The liquor of the first bottle had preserved its colour without alteration; that of the second was a very dark red, and was discoloured by the oxygenized muriatic acid, which produced a flaky precipitate. In the third a quantity of mucus was formed. The coloured liquor of these two last bottles had acquired a kind of viscosity. It would seem, in fact, that there is a substance produced analogous to gelatine; for the decoction of gall nuts formed in

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it a precipitate very abundant in comparison of that which is produced in the recent solution of aloes.

These facts, in my opinion, amply prove that aloes does not constitute a species of the resins.

§ IV. Alcohol at 38° entirely dissolves aloes very speedily, particularly if heat be employed; which announces the absence of gummy or extractive matter in this substance. The filtered liquor was of such a deep red colour that its transparency could scarcely be perceived: water produces an abundant sediment in it of a pale yellow colour, owing to this liquid which is retained in it, for it resumes its primitive brown colour on desiccation.

If we evaporate the alcoholic solution of aloes, we remark that the least motion, the slightest breathing on the liquid, produces a kind of crystallization in it, which disappears and then is reproduced. Although alcohol dissolves this substance very well, this is not the case with the fixed and volatile oils. I exposed to heat a mixture of oil of olives and aloes, and this last substance remained in a melted state at the bottom: the essence of turpentine, which I boiled with the aloes, acted nearly in the same manner: the volatile oil nevertheless assumed a slight amber colour.

§ V. Alkaline solutions dissolve aloes cold and with much facility: combinations are formed in which the bitterness seems in some measure marked. Acids produce in these solutions abundant precipitates which are coloured on desiccation. The volatile alkali diluted in water, also dissolves aloes perfectly: after having filtered the liquor, it was of a deep red colour: and it was evaporated slowly, to drive off the excess of ammonia. In proportion as this liquor was thickened the surface exhibited a continual motion, which seemed to indicate a tendency to crystallization; for we remarked other needles which successively appeared and disappeared. On continuing the evaporation almost to dryness, we obtained crystals in needles attached to a resinous-like mass: on heating this matter with a certain quantity of lime and water, a very evident extrication of ammonia takes place.

§ VI. The weak acids have not a very remarkable action upon aloes: nevertheless they dissolve it better than water, which whitens the solution of aloes in distilled vinegar. The mineral acids act much more energetically upon it. Nitric acid dissolves it very well when cold, and there results a deep red liquor, from which water throws down an abundant precipitate.

Ten grammes of aloes were treated in a retort with eighty  
P 2 grammes

grammes of nitric acid at  $36^{\circ}$ , taking care to administer the fire with caution. There was a brisk re-action, and liberation of abundant red vapours. When they disappeared, the retort was removed from the fire, and the liquor which it contained was of a deep yellow colour. It deposited upon cooling a great quantity of a flaky yellow substance. The liquor, when evaporated to the consistence of honey, was diluted in water and filtered. There remained in the filter a yellow substance, which, after having been washed and dried, formed one fourth of the aloes employed in the experiment. I thought at first that this matter was a portion of the aloes which had escaped the action of the nitric acid: but the following properties soon convinced me that it was an acid with some analogy to the yellow acid, and the detonating matter which Messrs. Fourcroy and Vauquelin obtained by the action of the nitric acid on animal substances, but which differs from it in several respects.

The yellow aloetic acid, when well washed and dried, is of a very fine yellow colour, and extremely bitter. It does not crystallize, reddens blue turnsole paper, and effervesces with the alkaline carbonates.

It has an agreeable aromatic smell, particularly when it is gently heated. It melts like nitre, gives out an aromatic vapour mixed with bitterness, and leaves an abundant charry residue.

When distilled at a gentle heat, it furnished all the usual products of vegetable substances, and ended by detonating, producing at the same time a purple flame. A very abundant charcoal remained, forming the third part of the substance employed.

This acid is not very soluble in water. It required two hectogrammes and a half of this fluid at  $10^{\circ} + 0$  Reaumur to dissolve entirely two decigrammes of it. This solution was of the fine red colour of arterial blood. The muriate of tin produced in it a precipitate of the colour of wine-lees, and the sulphate of iron heightens the colour.

Fifteen grammes of alcohol at  $38^{\circ}$  could only dissolve a decigramme of this yellow acid, and the solution was of a very deep red colour.

The mineral acids, warm, dissolve this yellow matter without extricating any thing from it; but it is soon deposited afterwards on account of its insolubility.

Potash forms with it a combination capable of crystallizing, and of a deep-red. This red salt detonates with the violence of gunpowder, either on exposing it to a certain heat, or by touching it with a lighted coal, and leaves after

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its combustion a slight charry trace, and a remarkable smell of prussic acid, which might lead us to suspect the presence of azote.

We may easily produce this red detonating substance, by pouring on the yellow acid of aloes a slight warm solution of caustic potash, which has but a weak dissolving action upon it.

The nitric liquor, from which the yellow aloetic acid has been separated, was saturated by potash. A very small quantity of red detonating matter was deposited at the end of four-and-twenty hours. Nitrate of lime, which was poured upon it, produced an abundant precipitate of oxalate of lime: when well washed and dried it weighed  $3\frac{1}{2}$  grammes. The liquor separated from the oxalate of lime was precipitated by the nitrate of lead. The sediment, when treated with one third of its weight of weak sulphuric acid, furnished about one gramme of malic acid, partly dried.

§ VII. It results from the above facts, that aloes is not a gum resin, as has been thought, since we do not find in it either the one or the other of these associated principles: nor can we class aloes among the resins, although it resembles them much more than the gums. It is therefore a principle *sui generis*, which I propose, from its properties, to call *resino-amer*. This principle is probably widely diffused, and has its species like other vegetable substances. It is this which had been at first confounded with the resins, which have been sometimes taken for oxygenated extractive matter, and which M. Vauquelin has amply described in his interesting memoir upon different species of quinquina. It is also the same substance which is deposited more or less abundantly from the decoctions of many of the bitter plants, in which febrifuge virtues have been for a long time recognised; such as the *artemisia absinthium*, the *centauria calitrapa* and *benedicta*, chicory and fumitory\*.

It is true that the virtues of these plants have been reckoned less efficacious than the astringent febrifuges: and I am persuaded that in kina, the principle which acts specifically against the fever, and the periodical return of diseases, is owing to the combination of the *resino-amer* with tannin, or some similar substance. My colleague, Dr. Hal-dats, directed by these views, is about to enter upon some important experiments, of which he will give an account,

\* It appears to me that the resiniform matter found in the bile by M. The-nard greatly resembles the *resino-amer* of aloes.

and which may perhaps lead to some great and useful discoveries.

We know that aloes taken internally act as a very active tonic, and are powerfully antiseptic when applied externally. Surgeons daily use aloes in tincture, as a detergent for old ulcers, caries, and gangrenes, which proceed rapidly. Would it have this antiseptic property if taken internally? We know it besides for its febrifuge and purgative virtues :— but it has certainly never been known before, that it ceases to purge the instant it is united to gall-nuts in powder, as I have had occasion to verify.

**XLIII.** *A Fatal Case of Inguinal Hernia, by JOHN TAUNTON, Esq. Surgeon to the City and Finsbury Dispensaries, and to the City Truss Society for the Relief of the Ruptured Poor.*

*To Mr. Tillock.*

SIR, **S**HOULD the following case of hernia (which was attended with some important peculiarities) be deemed worthy of a place in your valuable Magazine, the recording of it will give me pleasure.

Mr. J. H. æt. 53, an able-bodied man, of a good constitution, has always lived a very regular life, and enjoyed good health, has been subject to hernia in the left groin for many years; for which complaint he constantly wore a truss, which prevented him from suffering any serious inconvenience.

On the 5th of August the intestine passed through the abdominal ring, and formed a tumour of considerable size in the left side of the scrotum. The tumour was very tense and painful on pressure, but was apparently reduced with considerable difficulty by a surgeon who resided near the patient.

The abdomen continued painful on pressure, the pain being referred principally to the umbilicus and region of the stomach, with a sensation of heat. Fomentations and the warm bath were employed without any relief. The bowels remained in a constipated state: no stool could be procured either by medicines taken by the mouth, or by cathartic glysters, several of which were injected.

The hiccough became very troublesome; every thing taken by the mouth was rejected by the stomach; feculent matter was vomited in large quantities; the tongue was  
much