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Dissertation on phloridzin

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Annual Examination
in the
Medical Institution of Yale College,
January 18-20,
1843.



XVIII.

Dissertation
on
Phloridzin.

By
Charles Barnes Whittlesey
of Berlin, Connecticut,
Candidate for the degree of Doctor in Medicine.

Phloridzin

This substance, which is now receiving much attention in various parts of Europe, was first noticed by Professor Seiger of Heidelberg in Germany, as existing in the bark of the trunk and roots of the apple, pear, cherry and plum trees.

The name is derived from two Greek words $\phi\lambda\omicron\omicron\varsigma$ and $\rho\iota\zeta\alpha$, signifying the inner bark of the root.

It was first obtained in a separate state by Dr Koninek, who gave it the name of Phloridzite.

The processes for obtaining it, as given by Thompson are as follows. The fresh bark of the root of the apple tree is boiled for two hours in a quantity of water sufficient to cover it. This water is decanted off, and the boiling repeated with a second portion, and this last decoction must be kept from the first. It commonly deposits in twenty-four hours a considerable quantity of granular crystals of Phloridzin, which when dissolved in distilled water, and treated with animal charcoal are rendered quite pure. an additional quantity may be obtained by evaporating the liquid down to one fifth. In this state of concentration it deposits

the whole Phloridzin which it contains, when left at rest for a couple of days. The bark of apple tree root, when treated in this way, yields about three percent. By another process we may obtain about five percent. Digest the fresh bark of the root in weak alcohol at about the temperature of 122° . The digestion is continued from eight to ten hours when a greater part of the alcohol may be distilled off, and the residuum set aside to crystallize. The first crystals obtained, are whiter than those obtained by the first process but are to be purified in the same manner.

All the processes mentioned by authors agree very nearly with the above.

That by which I obtained this sample was similar to the first mentioned. The bark used was from the roots of the apple tree, it was boiled in two portions of water for something more than an hour each. The liquid was poured off, and here I may remark there is no necessity whatever of keeping the two portions separate from each other as directed by Thompson, after cooling, in from thirty to forty hours, the Phloridzin was deposited, having

a deep red velvety appearance.

This I attempted to purify, by treating with animal charcoal, as recommended, but did not succeed. I then washed it upon a strainer with cold water, removing as much saccharine, and other foreign matter as possible, evaporated the remainder to dryness, then dissolved the whole in alcohol, and filtered through animal charcoal, after evaporating the alcohol, the result was Phloridzin such as you see, possessing the properties ascribed to it by Dr Koninek.

Sensible Properties

Phloridzin is of a dull, yellowish ~~brown~~ white color, crystallized in silky needles. Its taste is both bitter and sweet, the former being quite permanent, the taste remaining in the mouth for a considerable length of time.

Chemical Properties

It is scarcely soluble at all in cold water, that fluid at 72° or lower dissolving only one thousandth part of its own weight of it.

From 76° to 212° it dissolves it in all proportions.

It is entirely soluble in absolute alcohol at

the common temperature of the atmosphere: but is very little soluble in ether. It has no action upon vegetable colors. Its specific gravity is 1.4289. nearly one and five tenths, when heated to 212° it loses all its water of crystallization, and when it is thus once driven off it is not again absorbed even in a moist atmosphere. It melts at 262° , and boils at 350° at 379° it begins to be decomposed, a small quantity of benzoic acid is formed, some acetone, and a brown oil heavier than water.

The concentrated acids dissolve it without decomposition while it retains its water. But when anhydrous it is strongly attacked by sulphuric acid and forms a reddish brown solution. Nitric acid acts in a similar manner while cold. but by heat it converts it into oxalic acid, muriatic acid converts it into a white insoluble substance which separates

The alkalis dissolve it without alteration.

Chlorine, Bromine, and Iodine, act upon it with violence, producing a brown resinous substance, which is insoluble in water but soluble in alcohol,

much heat is evolved. and muriatic, hydrobromic, and hydriotic acids are respectively given out.

Persulphate of iron gives with solution of - Phloridzin a yellowish brown precipitate, and perchlorid of iron a very dark brown precipitate.

The protosulphate of iron has no action. the same may be said of the neutral mettallie salts.

Aqueous solutions of chlorine throw down a yellowish precipitate.

Gelatine produces no action on its solutions.

Its analysis affords carbon, hydrogen and oxygen.

There are two analyses given the first is that of Petersen, one hundred parts are taken and he gives

Carbon	56.16
Hydrogen	5.82
Oxygen	<u>38.02</u>

The second is by Dr Koninek, he takes the same quantity and gives

Carbon	51.0
Hydrogen	5.6
Oxygen	<u>43.4</u>

The two differing widely in the proportions owing probably to the greater or less degree of purity of the article operated upon.

Are we then to consider this an acid or alkaline substance:

from the manner in which it unites with Bromine, Iodine, Iron &c. and from its composition viz. Carbon, Hydrogen and Oxygen. I am inclined to think it an acid, analagous to the Tannic and Gallic acids, though I believe no author considers it as such, to prove this point satisfactorily, it will require a larger quantity of the article and numerous experiments.

Medical Properties.

That but little is known concerning this article or its peculiar properties is evident both from the very short accounts given of it, amounting in all to but few small pages and those as would appear mostly copies one from the other, and also from the many and various names given it by different writers,

For instance, Phloridzinum, Phloridzinum,
Phloridria, Phlorizine, Phloridzin,
Phloridrine &c -

Says Braithwaite in his Retrospect of practical medicine and surgery for 1842 Part 5. ¹⁶

"Phloridrine that being the name he gives it is a new medicine which is very highly spoken of by French practitioners as a useful adjunct to our cinchona preparations. It has been used for some years in Germany, Poland and France."

I would rather say an old medicine in a new and advantageous form.

Mr. Lebaudy editor of one of the French medical Journals. says. "Its efficacy is so decided that we cannot hesitate to class it among the most powerful febrifuges; and it has this advantage over Quinine, that it never produces Gastralgia".

Dr. Koninck found that from ten to fourteen grains given for a dose with a dram of sugar produced the most marked effects in intermittent fever, where Quinine had failed.

In four cases reported by Dr. Van Mons of Bruxelles, the disease was arrested by the first sixteen grains; other cases required sixteen grains a few hours before the first paroxysm; twelve grains before the second; six before the third; and four before the fourth.

Five successful cases are likewise given by

M. Mathysen at the Hospital St Pierre.

Bruxelles: It was administered in one case by way of lavement twenty-four grains being given in ~~four~~^{three} lavements.

The paroxysm returned, but was less violent. In two days afterwards the same quantity was given in the same manner, and the fever did not return.

Not having had a sufficient quantity of the substance, or any cases of intermittent, I can do no more than give the evidence of foreign practitioners upon this point.

But one only so far as I know denies its febrifuge power.

Professor Ives of this Institution^{the}, administered a small quantity, with which I furnished him to a patient that had been troubled for a long time with various chronic affections, as Jaundice, disturbance of the digestive organs generally, pains in the back &c. in doses of two grains three times a day, for ten days with evident abatement of the symptoms.

The article being all consumed, the experiment

of course stopped.

He is disposed to think very favorably of it. considering it a valuable Tonic and Stobstruent. allied to Salicine possessing all its medicinal powers. and in addition the one last named. he also believes it to act particularly upon the mucous membranes. thus rendering it very serviceable in numerous diseases. arising from or dependent upon ~~the~~ ~~removing~~ ~~the~~ morbid action of those tissues.

It may be administered in form of pill. or mechanically combined with sugar in form of fine powder.

The use of the crude barks of which this is the active principle. has long been well and popularly known. both to the Physician and the Peasant. and their efficacy in most of the diseases mentioned. and also many others. is to well understood. by the learned and experienced. Gentlemen before me. to require comment from me at the present time. without that experience which ~~alone~~ makes the science approach perfection. and whose mind

is already too much confused, by forcing upon it all the various branches of medicine in the short space of sixteen weeks. (a time far too short, thoroughly to master any one branch taught here.) to treat of any single part as it deserves.

Thus have I described in a hasty and doubtless very imperfect manner, a substance which promises much and which I trust will soon receive that attention by medical men in this which it has received by those of other countries that they may at least keep pace with them, and that we may have at our command every remedy, which will aid in the performance of our duty, that of alleviating the sufferings of our fellow-mortals.

C. B. Whittlesey

New Haven, Yale Medical Institution

January 18th 1843



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