



Action of acids and alkalies on asparagin and aspartic acid

M. Piria

To cite this article: M. Piria (1848) Action of acids and alkalies on asparagin and aspartic acid, Philosophical Magazine Series 3, 32:215, 317-319, DOI: [10.1080/14786444808645990](https://doi.org/10.1080/14786444808645990)

To link to this article: <http://dx.doi.org/10.1080/14786444808645990>



Published online: 30 Apr 2009.



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The zinc has then been replaced by copper. If this ammoniacal solution of copper be agitated with zinc, this metal, conformably to its greater affinity for oxygen, will in its turn displace the copper, and it is precipitated upon the zinc in a very fine powder, and in a short time the liquor ceases to be blackened by sulphuretted hydrogen.

This, then, furnishes an example of reciprocal affinity which is worthy of attention, and from which chemical analysis may derive utility.—*Ann. de Ch. et de Phys.*, Janvier 1848.

ON THE HYDRATE OF CADMIUM. BY M. J. NICKLÈS.

This hydrate may be obtained, like that of zinc, by means of ammonia, iron and cadmium, or by causing copper to act upon an ammoniacal solution of oxide of cadmium.

It is but slightly permanent, and is partially decomposed in the liquid in which it is formed. It would seem that this ready decomposition is owing to the energy of the reaction; at any rate the author has obtained it perfectly homogeneous, operating slowly by putting a strip of cadmium in communication with a bar of hardened iron, and immersing the whole in a U-shaped tube full of ammonia.

By allowing the ammoniacal mother-waters to stand, a fresh quantity of hydrate is deposited. If the surface of evaporation is great, it is deposited in flocculi; if, on the contrary, the evaporation takes place in an imperfectly corked bottle, it is formed in mammillated masses, with traces of crystallization; and this is the form in which the author has usually obtained it.

M. Nicklès had only a small portion of this substance for analysis. It yielded—

Oxide of cadmium....	89.74
Water	10.26
	<hr/> 100.00

Calculation requires 87.63 of oxide and 12.37 of water; the substance had therefore evidently undergone some change previous to analysis.—*Ibid.*

ACTION OF ACIDS AND ALKALIES ON ASPARAGIN AND ASPARTIC ACID. BY M. PIRIA.

The author observes, that all chemists who have examined asparagin have observed the great tendency which it possesses to be decomposed by acids and alkalies, yielding ammonia and aspartic acid. M. Liebig states, even aspartic acid, when boiled in strong hydrochloric acid or fused with potash, is converted into ammonia and a new acid. M. Piria has arrived at a very different conclusion; he finding that neither hydrochloric nor sulphuric acid sensibly acts on aspartic acid, nor is any effect produced by nitric acid when free from nitrous vapour. Asparagin, on the other hand, is decomposed by various acids at a boiling heat, yielding ammonia, which combines with the acid employed, and free aspartic acid.

M. Piria found that crystallized asparagin, boiled for about an

hour in concentrated hydrochloric acid, gave a solution which yielded no crystals on cooling.

The liquid being evaporated to a syrupy consistence yielded crystalline laminae, which were very soluble in water, and deliquesced by exposure to the air. M. Piria at first thought he had obtained the new acid mentioned by Liebig; but he found it was aspartic acid, and that the liquid contained sal-ammoniac. Aspartic acid treated in the same way yielded crystalline laminae of the acid unchanged, but the solution contained no sal-ammoniac.

It appears, therefore, that concentrated hydrochloric acid when heated converts asparagin into aspartic acid and ammonia, and by combining with the latter forms sal-ammoniac; the hydrochloric acid renders the aspartic acid soluble, without it the acid is scarcely soluble in cold water.

Aspartic acid retains hydrochloric acid even after evaporation to dryness and heated to 212° ; this dissolved in water abundantly precipitates nitrate of silver. The substance which M. Liebig supposed to be a new acid is a concentrated solution of aspartic and hydrochloric acids. With nitric acid, aspartic acid and nitrate of ammonia were obtained; when pure nitric acid is employed, no nitrous or other gases are evolved.

Aspartic acid obtained by means of nitric acid gave—

	Experiment.	Calculation.
Carbon	35.99	36.09
Hydrogen	5.47	5.26
Nitrogen	10.78	10.53
Oxygen	47.76	48.12
	<hr/> 100.00	<hr/> 100.00

The formula is $C^8 H^7 N O^8$, as already determined.

From these and various other experiments M. Piria has arrived at the following conclusions:—

1st. Asparagin, discovered by Vauquelin and Robiquet in asparagus, and since in many other vegetables, exists in great abundance in vetches.

2nd. Asparagin does not pre-exist in the seed, but is developed during germination and vegetation, either in the light or in the dark, and disappears at flowering time.

3rd. Asparagin, hitherto regarded as a neutral body, possesses an acid reaction, and displaces acetic acid from its combination with oxide of copper; the compound of which with asparagin has for its formula $CuO, C^8 H^7 N^2 O^5$, and proves that asparagin, heated to $212^{\circ} F.$, that is, till it ceases to lose weight, still contains one equivalent of water separable by bases.

4th. Asparagin dissolved in water with the presence of the juice of vetches, undergoes a kind of fermentation, by which it is converted into succinate of ammonia, appropriating four equivalents of hydrogen and two equivalents of oxygen.

5th. Asparagin, boiled in pure hydrochloric acid, or in nitric acid free from nitrous acid, is converted into ammonia, which remains combined with the acid, and into aspartic acid. When fused with

potash it disengages ammonia and afterwards hydrogen, and is changed into acetic and oxalic acids.

6th. Asparagin and aspartic acid, treated with hyponitric acid, are converted, like the amides, into water, nitrogen, and into malic acid, which remains in the liquor. This result leads to the adoption of the opinion that these two bodies are amides of malic acid, corresponding to oxamide and oxamic acid.—*Ann. de Ch. et de Phys.*, Fevrier 1848.

METEOROLOGICAL OBSERVATIONS FOR FEB. 1848.

Chiswick.—February 1, 2. Clear and fine. 3. Cloudy. 4. Overcast: rain. 5. Densely overcast: heavy rain at night. 6. Overcast and mild. 7. Densely overcast: rain. 8. Cloudy and fine. 9. Cloudy: boisterous: clear. 10. Very fine: heavy rain at night. 11, 12. Very fine. 13. Overcast. 14. Rain. 15. Densely overcast: rain. 16. Frosty: clear and fine. 17. Clear: cloudy and fine. 18. Fine. 19. Rain: hazy and damp. 20. Foggy: cloudy: clear. 21. Overcast: rain. 22. Rain. 23. Heavy clouds: fine. 24. Densely overcast: rain. 25. Rain: showery. 26. Barometer most remarkably low: boisterous, with heavy rain. 27. Heavy rain: clear and boisterous at night. 28. Fine: clear. 29. Very clear: boisterous, with rain at night.

Mean temperature of the month 39°·62

Mean temperature of Feb. 1847 34·79

Mean temperature of Feb. for the last twenty years 39·32

Average amount of rain in Feb. 1·95 inch.

Boston.—Feb. 1, 2. Fine. 3. Cloudy. 4. Rain. 5. Cloudy: rain p.m. 6. Rain. 7. Cloudy. 8. Cloudy: rain p.m. 9. Cloudy: rain early a.m.: rain a.m. 10—13. Fine. 14. Rain: rain p.m. 15. Cloudy: rain early a.m. 16—18. Fine. 19. Cloudy: snow early a.m. 20. Rain. 21. Fine: rain p.m. 22. Cloudy: rain p.m. 23. Fine: rain p.m. 24. Cloudy: rain p.m. 25. Fine. 26. Fine: rain early a.m. 27. Cloudy: rain early a.m.: rain a.m. 28. Cloudy. 29. Fine.

Applegarth Manse, Dumfries-shire.—Feb. 1. Hard frost a.m.: thaw and rain p.m. 2. Thaw: threatening frost again. 3. Thaw: rain: high wind. 4. Heavy rain: snow gone. 5. Heavy rain: floods. 6. Moist a.m.: showery p.m. 7. Thick fog ending in rain. 8. Heavy rain all day. 9. Rain a.m.: cleared: rain p.m. 10. Slight showers. 11. Very fine spring day. 12. Dull morning: wet p.m. 13. Heavy rain and high winds. 14. Fair, but threatening change. 15. Rain all day. 16. Frost: a shower of snow. 17. Hard frost: hills white: snow. 18. Hard frost: rain p.m. 19. Showery. 20. Beautiful day: slight frost a.m. 21. Raw frost a.m.: moist. 22. Storm of rain and wind: flood. 23. Stormy day: violent showers. 24. Snow for two hours: heavy rain. 25. Fair and milder. 26. Fair a.m.: drizzle p.m. 27. Heavy rain all day. 28. Heavy rain: thunder. 29. Showers: hail.

Mean temperature of the month 40°·1

Mean temperature of Feb. 1847 36·2

Mean temperature of Feb. for twenty-five years 37·3

Rain 5·53 inches.

Mean rain in Feb. for twenty years 2·04 "

Sandwick Manse, Orkney.—Feb. 1. Snow showers: cloudy. 2. Frost: clear. 3. Cloudy: showers. 4. Rain: damp. 5. Snow-drift: snow. 6. Snow: cloudy. 7. Rain. 8. Bright: showers. 9. Cloudy: damp. 10. Rain: cloudy. 11. Bright: cloudy. 12. Rain: showers. 13. Showers. 14. Showers: clear. 15. Damp: rain. 16, 17. Bright: frost. 18. Sleet: rain. 19. Sleet-showers: showers. 20. Bright: snow-showers. 21. Snow: red aurora. 22, 23. Cloudy: rain: aurora. 24. Bright: frost: fine: aurora. 25. Showers. 26. Cloudy: showers. 27. Showers: rain. 28. Damp: rain. 29. Clear: cloudy.

The following are the averages for Dec. 1847, with which we have been favoured by our correspondent the Rev. Ch. Clouston of Sandwick Manse, whose usual report miscarried owing to the stormy weather which then prevailed:—

Barometer.		Thermometer.		Rain
A.M.	P.M.	A.M.	P.M.	in inches.
29·597	29·595	39·93	40·66	5·24