



Philosophical Magazine Series 3

ISSN: 1941-5966 (Print) 1941-5974 (Online) Journal homepage: <http://www.tandfonline.com/loi/tphm14>

Analysis of the elie pyrope or garnet

Prof. Connell

To cite this article: Prof. Connell (1846) Analysis of the elie pyrope or garnet, Philosophical Magazine Series 3, 28:185, 152-154, DOI: [10.1080/14786444608645379](https://doi.org/10.1080/14786444608645379)

To link to this article: <http://dx.doi.org/10.1080/14786444608645379>



Published online: 30 Apr 2009.



Submit your article to this journal [↗](#)



Article views: 3



View related articles [↗](#)

We may therefore consider it as composed of—

Twelve eqs. of silica	$16 \times 12 = 192$	44·75
Nine ... alumina	$18 \times 9 = 162$	37·76
One ... potash	$= 48$	11·20
Three ... water	$9 \times 3 = 27$	6·29
	<u>429</u>	<u>100</u>

Ann. de Ch. et de Phys., Octobre 1845.

HYDRATED SILICATE OF MAGNESIA. BY M. A. DELESSE.

This substance is arranged at the Ecole des Mines with the mineral species which M. Breithaupt has named *Kerolite*, and it appeared to M. Delesse to require examination. It comes from Germany, its locality however is unknown; but it has evidently occurred in serpentine.

Its colour is yellowish-white, it is opaline and slightly transparent; its fracture resembles wax, and it is greasy to the touch; it is occasionally spotted with milk-white spots, which appear to be a different substance. Its specific gravity is 2·335; when slightly heated in a glass tube it becomes black and loses water; when strongly heated it becomes of a dead-white colour, and loses its transparency. The black colour appears to be owing to bitumen, for it disappears when the substance is strongly heated in a closed tube; this property belongs also to kerolite, mestaxite, saponite, &c.

When put into water after calcination it emits a great number of bubbles of gas, becomes hard, and is with difficulty acted upon by acids; whereas before heating it is scratched by calcspar and easily acted upon; it is completely infusible; with the salt of phosphorus it gives a skeleton of silica.

A qualitative analysis showed that this substance contains only water, silica, magnesia, a little alumina and traces of iron, which appear to be in the state of peroxide, and disseminated in small veins throughout the mass.

By analysis this mineral gave—

Silica	53·5
Magnesia	28·6
Alumina and a trace of oxide of iron	00·9
Water	16·4
	<u>99·4</u>

Annales des Mines, 1844.

ANALYSIS OF THE ELIE PYROPE OR GARNET.

BY PROF. CONNELL.

This mineral, which is known to amateur collectors under the name of Elie ruby, is found on the sea shore at Elie, in the county of Fife, proceeding from the debris of trap-rocks. It has been long known to Scottish mineralogists, and has been regarded as one of the varieties of precious garnet, and is occasionally called pyrope. It is not crystallized, but occurs in angular grains, which evidently

have not come from any distance. Its other leading external characters, including transparency and colour, agree with those of precious garnet and pyrope, the colour approaching the deeper tint of the latter; its specific gravity is 3·661.

Twenty grains of this mineral in very fine powder, were fused with four times their weight of carbonate of potash; the mass was treated with muriatic acid, and no smell of chlorine observed. Silica was separated by the usual method; the precipitate obtained by ammonia was dissolved in muriatic acid, the solution boiled with excess of potash which took up the alumina, and the matter left by this alkali was dissolved in muriatic acid; to this solution tartaric acid and ammonia in excess were added, and a current of sulphuretted hydrogen, passed into it, threw down sulphuret of iron with a little sulphuret of manganese. The filtered liquid was evaporated to dryness, and the residue incinerated was pure white; it was carefully examined for yttria, which Dr. Apjohn, some few years ago, announced that he discovered in pyrope. This white matter was dissolved in muriatic acid, and muriate of ammonia and excess of ammonia were added; a gelatinous precipitate fell, which by ignition acquired a greenish-yellow tint, and magnesia was left in solution. The ignited precipitate was again dissolved in muriatic acid, and yielded a gelatinous precipitate by treatment with ammonia and its muriate; this was dissolved to a great extent by potash, leaving a substance which was principally oxide of iron, but gave a permanent fine, though pale emerald-green colour to salt of phosphorus, and therefore contained a trace of oxide of chromium. It was determined by a separate experiment that the iron contained in the mineral was entirely in the state of peroxide.

One hundred parts of this substance were found to consist of

Silica	42·80
Alumina	28·65
Peroxide of iron	9·31
Protoxide of manganese	0·25
Lime	4·78
Magnesia	10·67
Oxide of chromium, trace	
	<hr/> 96·46

The deficiency Prof. Connell conceives to be probably owing to some magnesia which might have escaped precipitation by the carbonate of potash.

Prof. Connell remarks, that even if the oxide of iron in this mineral were held to be protoxide (instead of peroxide, as he found it), there would be quite as much difficulty in bringing the result under the garnet formula as there is in bringing the leading analyses of Bohemian pyrope under it. This circumstance, as well as the general conformity between the above result and the analyses of pyrope, comprising those of Klaproth, Wachtmeister and Von Kobell, particularly as respects the considerable quantity of magnesia and the comparatively small quantity of oxide of iron, notwithstanding the

discrepancy as to the state of oxidation of the latter, tend to show a close connexion between the Elie mineral and pyrope. The occurrence of oxide of chromium in both minerals, and their specific gravity, which is 3·661 for the Elie mineral, 3·78 for pyrope, while that of precious garnet exceeds 4, lead to a similar view of this connection.—*Jameson's Journal*, Oct. 1845.

ANALYSIS OF METEORIC IRON FROM BURLINGTON, OSTEGO COUNTY, NEW YORK. BY MR. C. H. ROCKWELL.

In the year 1819 two or three masses of native iron, as it appeared to be, were procured from the farmer who first turned it over with his plough, in a field near the north line of the town of Burlington, Ostego County, New York. These consisted of remnants of an entire mass originally supposed to weigh between one and two hundred pounds, and found several years before. It had been in the forge of a country blacksmith, and the whole heated in order to enable him to cut off portions for the manufacture of such articles as the farmer most needed.

The mass was divided by broad laminæ, crossing each other at an angle of 60° and 120°, cutting up the surface into triangular and rhombohedral figures. It broke with a hackly fracture, and only with the greatest difficulty on the thinnest edges.

Two deep and broad sutures marked its two most regular opposite faces, made by the wedge or chisel by the smith, who severed it from the adjoining portion. It bore the marks of having been intensely heated in the forge, and numerous microscopic crystals, of a black colour and brilliant lustre, covered some parts of its surface; they resembled phosphate of iron, but were too small to be detached.

The specific gravity was 7·501; it dissolved quickly and completely in nitric acid, with the application of a gentle heat. The solution, treated with nitrate of silver, gave no cloudiness, showing the absence of chlorine; it yielded by the usual process for separating iron from nickel,

Iron.....	92·291
Nickel.....	8·146
	<hr/> 100·437

No trace of any other substances could be detected.—*Silliman's Journal*, vol. xlv.

PREPARATION OF CHLORO-ACETIC ACID.

M. Malaguti recommends the following process for the preparation of chloro-acetic acid readily and in large quantity:—Let chlorine act upon sulphuric æther, by which sesquichloride of carbon is obtained, and then the water which is suffered to remain in the bottles with the rough product is merely a solution of chloro-acetic and hydrochloric acids; or perchloric æther is prepared, and by distilling it and causing the product of the distillation to mix with water, a solution of chloro-acetic and hydrochloric acids is obtained. In both