June 24. Since the 22d, we have been coming up the river with the tide, the wind being either very light or contrary. About noon to-day we reached Gravesend, and landed.

London, July 16. I have just ascertained the specific gravities of the different specimens of sea-water which I took up between the Cape and England. There appeared to be no sensible loss by evaporation. Each bottle was quite sweet and unaltered. I used the delicate balance of the Royal Institution, and a bottle with a long neck, weighing 778 grains, and of the temperature of 63°, holding 970.3 grains of distilled water. On the sides of the glass stople there was a fine groove. The temperature of the different specimens of sea-water was the same as that of distilled water, viz. 63°. Most of the experiments were twice repeated.

No.	Lat.	Long.	Specific Gravity.
1	30° 6′ S.	11° 42′ E.	102667
2	26 55	7 34	102671
3	6 0 N.	19 17 W.	102667
4	9 5	25 8	102671
5	12 6	28 28	102671
6	15 56	32 38	102762
7	18 15	34 6	102762
8	20 55	35 49	102762
9	23 27	37 8	102823
10	28 1	37 57	102823
11	31 8	38 27	102762
12	34 8	37 57	102823
13	42 10	30 36	102742
14	44 51	26 37	102721
15	47 5	14 12	102721
16	49 3	8 1	102721
17	Off Dover ½ mile.	—	102648

ART. XIV.—*Description of Gmelinite, a New Mineral Species.* By DAVID BREWSTER, LL. D. F. R. S. Lond. and Sec. R. S. Edin.

AMONG the minerals of Monte Somma, the late Mr Thomson of Cambridge discovered some crystals of a flesh-red colour, to which he gave the name of *Sarcolite*. The Abbé Hauy, to whom he sent some fragments of these crystals,

found them to be cubes, having their solid angles replaced by eight faces, each of which was inclined about 125° to the faces of the cube. As these crystals had a vitreous aspect, and scratched glass, Hauy did not scruple to consider them as a variety of Analcime.* In this opinion, he has been followed by all succeeding writers on mineralogy, and when cubical crystals of a flesh-red colour were discovered in Arthur Seat, the same trivial name of *sarcolite* was used to designate that acknowledged variety of Analcime.

At Montecchio-Maggiore, and at Castel, in the Vicentine, there was afterwards discovered another substance which Hauy and other mineralogists have regarded as sarcolite. It was of a flesh-red colour, and occurred in small rounded masses engaged in wacke. It accompanied white crystals of Analcime, and though it had a less vitreous fracture than the sarcolite of Thomson, yet, by Hauy's observations, it was found to pass into the Analcime, assuming by degrees the vitreous tissue of the latter.

According to the analysis of Vauquelin, however, the flesh-coloured crystals of the Vicentine contained less soda, and more water, than Analcime, and although M. Leman had disengaged from a mass of sarcolite from Castel some crystals of the form of hexaedral prisms, terminated by hexaedral pyramids, which Vauquelin considered to be the same as the amorphous variety, yet Hauy and all succeeding writers on mineralogy have still regarded these substances as Analcime.† That the six-sided prisms of Leman could not possibly be united to Analcime ought to have been very obvious; but their similarity in form, composition, hardness, and specific gravity to Chabasie rendered it probable that they belonged to that species.

Mr Allan, whose cabinet has enriched mineralogy with so many new species, had the good fortune to pick up in the Little Deer Park of Glenarm, in the county of Antrim, a specimen, containing two or three fine crystals of a whitish aspect, resembling the six-sided prisms of Leman, and which

* *Traité*, 2d Edit. Tom. III. p. 177, 179.

† De Dree, in his *Catalogue des Huit Collections*, p. 18, designates the substance analysed by Vauquelin by the name of Hydrolite, a name given by Sir George Mackenzie to the Stalactitical Opal produced by hot springs.

he considered as the same substance.* As I had devoted much attention to the examination of the Analcime and the Chabasie, Mr Haidinger was so good as to put into my hands this interesting specimen, and also a specimen of the flesh-coloured masses from the Vicentine. The slightest comparison of these substances in their optical characters, put it beyond a doubt, that they had no relation to Analcime or Chabasie, and that the whitish crystals from Glenarm were similar to the flesh-coloured masses from the Vicentine, and formed a new and a very interesting mineral species.

To this species I propose to give the name of *Gmelinite*, in compliment to G. C. GMELIN, Professor of Chemistry in the University of Tübingen, whose analyses of minerals have ranked him among the first analytical chemists of the present day, and whose friendship I am happy to have the present opportunity of acknowledging.

This new species comprehends the flat six-sided prisms from Glenarm, and the flesh-coloured masses which accompany them; the flesh-coloured mineral from the Vicentine, and probably the six-sided prisms observed by Leman.

The Gmelinite from Glenarm crystallises in the form shown in Plate VIII. Fig. 2, which is a regular hexagonal prism, terminated at both ends by six-sided pyramids, with flat summits. The following are the angles of the crystal, taken with the reflective goniometer. See Plate VIII. Fig. 2.

u upon y	131° 48
o —+— y	138 14
u —— u	120° 0
y —— y'	96° 24

Rhombohedral. Combination $P - \infty$. P. $P + \infty$. The angles of the isosceles pyramid = 145° 54′, 71° 48′.

Cleavage distinct, parallel to R. Fracture uneven. Surface streaked, the prism in a horizontal direction, the isosceles pyramid parallel to the edges of combination with R; $R - \infty$ rough, but even.†

The flesh-coloured Gmelinite, from the Vicentine, has more than one cleavage. It is very imperfectly crystallized;

* *Mineralogical Nomenclature*, Edit. 1810, Voc. ANALCIME.

† For this character of the combination and cleavage, as well as the figure, I have been indebted to Mr Haidinger.

but transmits light when reduced to a considerable degree of thinness. It often contains small spherical groupes of filamentous crystals, intensely white, which, if they are Gmelinite, which is not probable, must have lost their water of crystallization.

The specific gravity of the flesh-coloured Gmelinite, from the Vicentine, is 2.05, and its hardness about 4.5, scratching glass with some difficulty. The crystallized variety from Glenarm appears to have a less degree of hardness.

The optical structure of the Gmelinite differs entirely from that of the Analcime, or the Chabasie, both of which are composite minerals, the individuals of which they are composed having never yet been found in nature. The double refraction of Gmelinite exceeds that of Analcime and Chabasie, and may be distinctly seen through the two opposite faces of the pyramid by immersing it in water, which gives a great degree of transparency to the Glenarm crystals. The double refraction is negative in relation to the axis of prism, which is the axis of double refraction.

The flesh-coloured masses from the Vicentine are also simple substances, which, though rendered imperfectly transparent by flaws and disseminated matter, give distinctly the colours of polarised light. Their index of ordinary refraction is about 1.474, less than that of almond oil. By immersing the summit of one of the Glenarm crystals in a parallelopiped of almond oil, I was enabled, without detaching the crystal from its matrix, to ascertain that its refractive power was also inferior to that of almond oil, and in the same degree as the flesh-coloured masses. As the refractive power, both of Analcime and Chabasie exceed considerably that of almond oil, this simple experiment, which requires no other skill than that of looking through the crystal, establishes the identity of the minerals from Glenarm and the Vicentine, and fixes them as a new mineral species different from Analcime and Chabasie.

The chemical characters of Gmelinite are not less distinctive and interesting than its optical ones. When we hold a fragment of the Vicentine crystals near the flame of the candle, and supported in a loop of platinum wire, small portions gradually raise themselves, and after standing on their ends as if they were under the influence of electricity, they are propelled

with violence from the fragment. The continued application of the heat drives off the water of crystallization, and reduces the fragment to a white fibrous-looking powder. In performing this experiment, by exposing the fragment on a piece of glass to the fire, I was surprised to observe, upon looking at the powder with a microscope, that many of the particles were in a state of restlessness, some of them leaping from the glass, and others endeavouring to separate themselves from the larger particles to which they were attached. This effect was no doubt owing to the heat of the glass, which continued to expel the water of crystallization which still remained in some of the particles, for I could not discover in the powder any trace of pyro-electricity. The property which has now been described is possessed also by the Gmelinite from Glenarm, but it is not possessed by Analcime or Chabasie, or, so far as I know, by any other mineral, and may be regarded as an infallible chemical character of this species.

The following is the composition of the Gmelinites from the Vicentine, according to Vauquelin.

	Gmelinite from Montecchio Maggiore.	Gmelinite from Castel.
Silex	50	50
Alumine	20	20
Lime	4.5	4.25
Soda	4.5	4.25
Water	21	20
Loss	0	1.5
	100	100

I cannot conclude this notice without directing the attention of the philosophical mineralogist to the peculiar value of optical characters. The analysis of the Vicentine minerals by Vauquelin gave results so like those obtained from the Chabasies, that the chemical mineralogists even never felt themselves authorized to consider them as new. In hardness and specific gravity these minerals were almost exactly the same as Chabasie, and the obtuse rhomboid from which the six-sided prisms from Castel are derivable, has almost the same angle as that of Chabasie. Hence, Mr Haidinger was led to consider them as Chabasies, and, indeed, in any system which does not take cognizance of chemical and optical characters,

they must be ranked with that species. From this perplexity the optical method immediately relieves us, not merely by detecting unequivocal characters in the mineral under examination, but by insulating, as it were, the kindred species of Analcime and Chabasie, which possess a composite structure of the most remarkable kind.

ART. XV.—*Description of a New Quicksilver Pump.** Invented by Mr THOMAS CLARK, Edinburgh. Communicated by the Inventor.

THE new machine invented by Mr Thomas Clark, for raising water, is a quicksilver pump, and works without friction. It has great power in drawing and forcing water to any height, and is extremely simple in its construction. It is made by twisting a piece of iron tube into the form of a ring, ABC, Plate IV. Fig. 4, having the ends of the tube bent into the centre D, and again bent outwards so as to form an axle to the wheel or ring thus formed. One of the ends of the axle is inserted, by means of a stuffing box at D, into the side of the main pipe EF, which leads down to the well, which allows it to move easily, and at the same time keeps it air tight. In the main pipe EF, immediately below where the axle is inserted, or at any other convenient distance, is placed a valve *g* lifting upwards, another valve *h* lifting upwards is also placed immediately above the axle, or at any other convenient distance. There is now put into the iron ring a quantity of quicksilver, filling it from *k* to *l*, which slides backwards and forwards as the ring is made to vibrate upon its axis in the stuffing box at D, forming a vacuum in the main pipe as the silver recedes in the tube from A to C; the water rushes up from F to fill the vacuum, and when the silver slides back again towards A, the water is expelled through the upper valve *h*, and escapes at the top of the main pipe at *i*. A wheel of twelve or thirteen feet diameter will lift water the same height as a common lifting pump, and force it 150 feet higher, without any friction.

* Our readers will observe, that this very ingenious quicksilver pump is essentially different from that of Mr Haskins, which is described in the EDINBURGH ENCYCLOPÆDIA, Art. PUMP, Vol. XVII. p. 307.