XLII. On the composition of certain mineral substances of organic origin

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A mathematical friend having suggested to me that the mode of arriving at the equations (7.), just mentioned, wants a little more explanation, I have reconsidered this part of the investigation, and find that I have left it obscure. The previous equations give for n^2 two values, denoted by n_1^2 and n_2^2 , and for ρ two corresponding values denoted by ρ_1 and ρ_2 . It follows, therefore, that either of the values of n , and the corresponding value of ρ , may be substituted for n and ρ in the expression (2.). But since the equations (1.) are of the first degree, they may be satisfied not only by the values of η and ζ corresponding to each value of n , but by taking for η and ζ the sums of these particular values, in which we may change the value of a as n changes. Hence the equations (1.) may be satisfied by the equations (7.). Compare Poisson, *Traité de Mécanique*, No. 546.

I hope Mr. Archibald Smith will communicate to your Journal that step of the analysis to which Mr. Sylvester alludes, at p. 78, as being wanted to make the development complete.

XLII. *On the Composition of certain Mineral Substances of Organic Origin.* By JAMES F. W. JOHNSTON, M.A., F.R.SS. L. & E., F.G.S., Professor of Chemistry and Mineralogy, Durham.*

1. *Middletonite.*

THE substance for which I propose the name of Middletonite, occurs about the middle of the Main coal or Haigh Moor seam, at the Middleton Collieries near Leeds. It presents itself sometimes in little round masses, seldom larger than a pea, but generally forms thin layers, rarely thicker than the sixteenth of an inch, interposed between the layers of coal. These layers vary in extent from two or three to probably twelve inches, and lie over each other at irregular intervals near the centre of the coal seam, which is here about five feet in thickness.

It is hard, brittle, easily scraped to powder by a knife, in small fragments is transparent, by reflected light of a reddish brown, by transmitted of a deep red colour, and gives a light-brown powder. It has a specific gravity of about 1.6, a resinous lustre, and is void of taste or smell. By exposure to the air for a length of time it blackens, and is then distinguishable from the mass of coal only by a slight peculiarity in the lustre, which it still retains. It is unaffected by heat

* Communicated by the Author.

of 400° Fahr. Thrown on a red cinder it burns like resin with much smoke, cakes, and leaves a bulky charcoal, which afterwards disappears without residue.

Alcohol, æther, and oil of turpentine boiled on the mineral in the state of powder, acquire a yellow tint, but on distillation the coloured solutions leave a mere trace of a dark-coloured friable resinous matter.

Heated in a close tube over the flame of a lamp it melts, blackens, and gives empyreumatic products. The residual charcoal burns away in the air with extreme slowness, leaving an almost inappreciable quantity of a white ash; 3·02 grs. left 0·005.

In boiling nitric acid it softens, melts, causes an emission of red fumes, and slowly disappears, giving a brown solution. From this solution on cooling a brown flocky matter falls, which is more fully precipitated by the addition of water. The yellow supernatant acid liquid gives no precipitate with acetate of lead or nitrate of mercury.

Concentrated sulphuric acid dissolves it in the cold, giving a dark-brown solution and evolving sulphurous acid.

Burned with oxide of copper,

4·35 grs. gave 13·6 grs. of carbonic acid, and 3·135 of water.

4·56 grs. gave 14·09 grs. of carbonic acid, and 3·295 of water.

5·18 grs. gave 16·265 grs. of carbonic acid, and 3·755 of water.

These results give the following for the constitution of the mineral:—

	1.	2.	3.
Carbon... =	86·437	85·440	86·738
Hydrogen =	8·007	8·029	8·046
Oxygen... =	5·563	6·531	5·215
	<hr/> 100·007	<hr/> 100·	<hr/> 10

This agrees with

20 Carbon	=	15·2875	86·506
11 Hydrogen.....	=	1·3727	7·780
1 Oxygen.....	=	1·0000	5·714
		<hr/> 17·6602	<hr/> 100·

and it may be represented by the rational formula

This formula is analogous to that of Dumas and Peligot, $\text{C}_{10}\text{H}_8 + 3\text{HO}$, for the supposed hydrate of oil of turpentine.* Whether the rational formula above given, however, be the true

* See Lond. and Edinb. Phil. Mag. vol. vii. p. 537.—EDIT.

one, the nature of the substance itself renders it very difficult to determine, while the want of a sufficient supply has prevented me from obtaining any proof that it is really a hydrate.

Durham, Feb. 5, 1838.

XLIII. *Notices respecting New Books.*

The Flora of Jamaica, by JAMES MACFADYEN. Vol. I., containing
RANUNCULACEÆ—LEGUMINOSÆ. London, 1837. 8vo.

A Systematic account of the plants of this interesting island has long been wanting, and we are happy to find that the author has so well supplied this deficiency. All we formerly knew of the plants of this fertile region was scattered through the various and voluminous works of Sloane, Browne, Plumier, Swartz, and many others, and the only work of easy access, which could be of any comparative use to those interested in the Flora of this island, was the *Hortus Jamaicensis*, of Mr. Lunan, which according to Mr. Macfadyen's statement "scarcely comprised one half of the plants at present known to be indigenous to the island." A long residence has enabled the author to visit a considerable portion of the island, and he has thus had the opportunity of carefully studying the floras of the several districts, and of paying great attention to most of the plants in their various states of growth. The arrangement adopted is the natural system, which is undoubtedly the best suited, as such natural families combine individuals not only related to one another by coincident peculiarities of form and structure, but also by their medicinal properties. This, however, being not so well adapted for the tyro in botany, the author intends to give at the end of the natural system an arrangement of the genera according to the artificial system of Linnæus, in order to facilitate the progress of the young student. In the arrangement of the orders, the author has followed that of De Candolle as laid down in his *Prodromus Systematis Universalis Regni Vegetabilis*, as also for the definition of the genera. For the descriptions of the orders the works of Lindley and Richard have carefully been consulted. The author has also greatly added to the value of the work by his details of the history, medicinal properties, and general uses to which the various vegetable products of Jamaica are applied. We have selected one passage, the space to which we are limited not allowing of more, which will no doubt be of some interest to our readers.

"In the cultivation of the Indigo plant (*Indigofera tinctoria*), the best time, for ploughing or preparing the land, is immediately after the October rains. It has been found that sowing broad-cast succeeds better than in drills. A bushel of seed will plant from six to eight acres. In the course of a few days the young plants come up; soon after which they ought to be cleaned and moulded. As the plant grows wild in river courses and in dry gravelly situations, a soil of a similar character is found the best adapted for its cultivation. The rains ought also to be light and seasonable, and it is of importance that