LXXVII. On sillimanite

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rightly understood the latest anatomical labours on the structure of muscles, on their relations with the tendons and the sarcolema, I cannot hesitate to regard the proper current, or that from the tendon to the surface of the muscle, as the most simple case of the muscular current. The tendinous fibres are in connexion with the muscular fibres, whilst the sarcolema envelopes the muscular fibres only. This result is rendered still more probable when we recollect, that the same laws regulate the proper current and the muscular current.

LXXXVII. On *Sillimanite*. By THOMAS THOMSON, M.D.,
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THE name *Sillimanite* (from Prof. Silliman) was imposed by Mr. Bowen on a mineral discovered in 1817 at Saybrook in Connecticut. An account of it, together with an analysis by Mr. Bowen, was published in the 8th volume of *Silliman's Journal* (p. 114), in 1824. A few years afterwards I received a specimen of this mineral from Mr. Nutall, and gave it for analysis to Dr. Thomas Muir, who was at that time a practical student of chemistry in my laboratory. He had devoted several years of his life to mineral analysis, and had acquired much skill and was remarkable for his accuracy. He found sillimanite composed of

Silica	38·670
Alumina	35·106
Zirconia	18·510
Peroxide of iron	7·216
	<hr/> 99·502

In consequence of this analysis I placed sillimanite among the zirconia minerals in my *Outlines of Mineralogy*. The specimen of sillimanite from which Dr. Muir made his analyses was small; so much so, that only 5·64 grains could be obtained for taking its specific gravity. This put it out of my power to draw up a correct description of the mineral, or to compare it with others to which it seemed to bear an affinity. But five or six years ago I got from a friend in America a very fine collection of specimens, partly from Saybrook and partly from Petty Pang, both in Connecticut. The mineral was in crystals, several inches long, running through granular quartz in a gneiss rock. I was immediately struck with their resemblance to bucholzite, a specimen of which, from Chester on the Delaware, I had also got from Mr. Nutall. This induced me to subject it to analysis. I was surprised to find

* Communicated by the Author.

it quite free from zirconia, and identical in its composition with bucholzite, which is a *silicate of alumina*. How Dr. Muir fell into the mistake I do not know. I looked over all my specimens, and found in one small crystals which had the aspect of zircons. It might be that the same crystals existed in the specimen which he analysed. That it was impure is obvious from the quantity of iron which he obtained.

The mistake of Dr. Muir had escaped my memory till it was recalled by the notices in the new edition of Phillips's Mineralogy by Mr. Alger. To set mineralogists right I repeated the analyses of sillimanite which I had made several years ago. This I shall give at the end of this notice, after drawing up a short description of the mineral.

Sillimanite, *bucholzite* and *fibrolite* are all synonyms of the same mineral, the chemical constitution of which is Al_2SiO_5 , or a simple silicate of alumina.

In all the specimens which I have seen the mineral is in long crystals, consisting of oblique prisms, with angles of about 80° to 100° .

The colour is gray or rather mottled, in some places nearly white, in others gray, more or less dark. The texture is foliated, or in some crystals fibrous. The lustre vitreous. The hardness 5, or about that of phosphate of lime. It is opaque, or only slightly translucent when in thin plates. It is easily frangible, especially in the direction perpendicular to the axis of the prism.

The specific gravity in very pure crystals I found to vary from 3.200 to 3.357.

Before the blowpipe it becomes white but does not fuse. With soda it forms a bead, transparent and red while hot, but becoming white and opaque when cold. With microcosmic salt it forms a colourless bead.

Being subjected to analysis, I found it composed of—

Silica	45.65
Alumina.....	49.50
Protoxide of iron	4.10
	<hr/> 99.25

This is exactly

20.75 atoms of silica,
20 atoms of alumina,
0.827 atom of protoxide of iron.

From the colour of the mineral there could be no doubt that the iron was in the state of protoxide; while from its mottled appearance it was evident that the iron was not combined but mixed unequally with the pure sillimanite. If we

suppose the protoxide of iron to be combined with silica in the form of silicate of iron, and this silicate scattered through the crystal, it is obvious that the mineral, if pure, would be an anhydrous silicate of alumina, having an atomic weight of 4.25.

I have compared the specimens of bucholzite from America with sillimanite, and find them to agree, excepting that the bucholzite is not so pure as the sillimanite. The shape of the crystals, the hardness and lustre, and the specific gravity agree very nearly.

I have never seen the *fibrolite* of Bournon and Chenevix, but the descriptions and analysis correspond with those of sillimanite.

Henceforward the terms *sillimanite*, *bucholzite* and *fibrolite* may be dropt, and the species distinguished by the name of *silicate of alumina*, which indicates the chemical constitution of the mineral.

LXXVIII. *Proceedings of Learned Societies.*

ROYAL SOCIETY.

[Continued from p. 452.]

April 17, "DESCRIPTION of a Self-registering Thermometer." 1845. By Mr. Mansfield Harrison. Communicated by James Alderson, M.D., F.R.S.

The instrument here described is composed of two parallel bars, the one of iron and the other of copper, united at their lower end, and registering their differences of expansion by heat, by means of a series of multiplying levers, carrying a pencil which is made to press on paper wound round a cylinder moved by clock-work.

"On the Viscous Theory of Glacier Motion. Part I. containing Experiments on the Flow of Plastic Bodies, and Observations on the Phenomena of Lava Streams." By James D. Forbes, Esq., F.R.S. Lond. and Edin., Corresponding Member of the Institute of France, and Professor of Natural Philosophy in the University of Edinburgh.

The author adduces some new experiments in confirmation of his theory of the nature and causes of the motion of glaciers, and which present an analogy with the phenomena exhibited by the flow of masses of semifluid or viscous matter contained in a narrow channel, along which they move by the force of gravity; and also with the ripple marks on the surface of a stream of water when its course is impeded by obstacles. These latter phenomena, he remarks, were noticed and accurately described by Leonardo da Vinci. Analogies of a still more striking nature are presented by the appearance of streams of lava in their flow from volcanos and in the progress of their descent, which illustrate a great number of the phenomena of glacier motion, and corroborate the views of the author as to their