Description and analysis of pennine

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to circumstances, the proto- and perchlorides of iron with excess of arsenite or arseniate of potash.

Protoarsenite of Iron.—This is immediately precipitated in whitish flocks; but by washing and the contact of the air, it soon becomes of an ochre-yellow colour. Dried in this state and heated in a tube, it yields water, and afterwards fuses, swells up and produces a white crystalline sublimate of arsenious acid. The fused mass is of a deep rust colour.

When treated with potash it becomes of a very black colour, which is to be attributed to the black magnetic oxide resulting from the partial oxidizement of the protoxide of iron; by continued exposure to the air while moist, it became of the brown colour of hydrated peroxide of iron.

Perarsenite of Iron.—This was of a fine ochre-yellow colour, which did not alter during washing carried on in contact with the air. Dried and heated in a glass tube it swelled up and fused, yielding at first water and afterwards a white sublimate of arsenious acid. When treated with potash the greater portion of it was dissolved; the solution, as well as the undissolved portion, were of the colour of rust of iron.

Protoarsenate of Iron.—Recently precipitated it is of a white colour, but becomes bluish-gray by exposure to the air. Dried at a moderate heat and then heated to redness in a tube it fused, yielding water and a white sublimate, which was not crystalline, but destroyed the transparency of the glass; the fused mass became of a blackish colour. The protoarsenate, which had partly become arseniate of the black oxide of iron, by exposure to the air, was mixed with potash and became immediately of a black colour; this, by some days' exposure to the air while moist, became of the brown colour of hydrated peroxide of iron.

Protoarsenate of iron dissolved in cold hydrochloric acid, and treated with a few drops of a solution of chloride of sodium and gold, soon occasioned the production of a considerable quantity of a brown powder, which, when exposed to the heat of the blowpipe, fused into a brilliant globule.

Perarsenate of Iron was white with a tint of gray; washed in contact with the air its appearance did not alter. After drying at a moderate temperature it was heated to redness in a tube, and yielded water without undergoing fusion, and without producing any sublimate. Put into contact with potash it became immediately of a rust-brown colour, without any black tint.—*Ann. de Ch. et de Phys.*, Avril 1844.

DESCRIPTION AND ANALYSIS OF PENNINE. BY MM. MARIGNAC AND DESCLOIZEAUX.

This substance, discovered and named by M. Fröbel of Zurich, occurs in crystals or large lamellar crystalline masses.

The primary form is an acute rhomboid of $63^{\circ} 15'$. The very small crystals only possess this form perfectly; the larger ones are very deeply truncated in a direction perpendicular to the axis, so that they become tables of less or greater thickness, with triangular or hexagonal bases, the planes of which are triangles or trapeziums, forming

alternately with the base an acute angle of $79^{\circ} 30'$, and an obtuse supplementary angle. This substance cleaves readily into very small laminae perpendicular to the axis; when these are not too thick they may be broken in the direction of the three sides of an equilateral triangle, parallel to three faces of the rhomboid.

The hardness on the bases rather exceeds that of gypsum, and on the faces of the rhomboid it is nearly equal to that of carbonate of lime; the thin laminae are very ductile, but not elastic; the powder, which is light greenish-white, is greasy to the feel.

The specific gravity varies from 2.653 to 2.659; this difference appears to be owing to the presence, in some of the crystals, of octahedral iron.

When heated to redness in a tube, water is obtained; it splits into leaves before the blowpipe, becomes white and fuses with difficulty into a gray enamel. It dissolves in the salt of phosphorus, or leaves a skeleton of silica; the glass, coloured by the iron while hot, becomes opaline on cooling. With soda on a strip of platina a slight yellow colour is produced.

When in fine powder it is perfectly acted upon by long boiling in hydrochloric acid.

Two very pure crystals from the valley of Zermatt in the Valais, and a third in foliated crystalline masses from the valley of Binnen (Valais), gave by analysis the following results:—

	I.	II.	III.
Silica	33.36	33.40	33.95
Alumina	13.24	13.41	13.46
Oxide of chromium . .	0.20	0.15	0.24
Peroxide of iron	5.93	5.73	6.12
Magnesia	34.21	34.57	33.71
Water	12.80	12.74	12.52
	<u>99.74</u>	<u>100.</u>	<u>100.</u>

Pennine is found in amianthiform chloritic slate, in the serpentine rocks near Monte Rosa. It was first observed in crystals having the appearance of long triangular prisms, which are merely ill-formed rhomboids, in a grayish-white schist in the valley of Binnen; it is the mineral which M. Necker in his *Traité de Mineralogie* calls *hydrotalc*.—*Ann. de Ch. et de Phys.*, Avril 1844.

ON THE PREPARATION AND PROPERTIES OF CERTAIN CHLORATES. BY M. ALEXANDER WAECHTER.

Chlorate of Lithia.—This compound was prepared by dissolving carbonate of lithia in solution of chloric acid. The neutral liquor was evaporated over sulphuric acid; it yielded no crystals of determinate form, but became a radiating crystalline mass. It was pressed between folds of blotting-paper, and then perfectly dried over sulphuric acid.

The chlorate of lithia thus procured is a white, deliquescent saline mass, which is very soluble in alcohol; it fuses at 122° Fahr., and begins to lose water, oxygen and a little chlorine at 284° ; when heated till gas ceases to be evolved, there remains chloride of lithium