ART. V.—*Notice of some Minerals from New Jersey;* by Prof. W. T. RŒPPER, of Bethlehem, Pa.

1. *Iron, Manganese, Zinc, Chrysolite.*

THE Stirling Hill, Sussex county, N. J., which with its neighbor, the Minehill, seems to be an inexhaustible storehouse of interesting minerals, both scientifically and commercially, has furnished an antitype to Prof. Brush's Hortonolite from the adjoining Orange county.

Some years ago I examined a black crystalline massive mineral from this locality, and found it to be a unisilicate of the protoxyds of iron, manganese, zinc and magnesium, and as it showed many of the characteristic physical and chemical properties of chrysolitic minerals, especially that peculiar mottled coloring, which is so marked in olivines, I supposed it a variety of tephroite, that peculiar subspecies of the group having shortly before been rediscovered by Prof. Brush. During a visit to the locality in the course of last year, I succeeded in finding distinct crystals, which at once ranged the mineral unmistakably among the chrysolites.

Crystallization.—The crystals occur in great numbers, grouped together, and of all sizes, from an eighth of an inch to two inches in length and nearly one inch in breadth. They are mostly rounded, owing to an incipient alteration of the surface through meteoric waters, black and dull on the outside, but with lustrous and brilliant cleavages on being broken. Some of them, however, are sharp, and allow of a measurement of angles at least by the hand-goniometer. The dominant forms are: $i\bar{2}$ (angle over $i\breve{1}$, 130°), $i\breve{1}$ ($i\bar{2} \wedge i\breve{1}$, 115°), $1\bar{1}$ (angle at top, 77°). Generally subordinate I have observed the following forms: $i\breve{1}$, 1-$\breve{\infty}$, 1-$\bar{2}$, O, and a face replacing combination edge $i\text{-}\bar{2} \wedge 1\text{-}\bar{1}$ with parallel

intersection-edges, in which therefore $n' = \frac{2m'}{m'-m}$, to which among simple coefficients the forms 2-$\bar{4}$ or 3-$\bar{3}$ would answer. The face is too small and dull to allow of a measurement of angle; 2-$\bar{4}$ appears however the more likely form, as chrysolites seem to have a preference for the ratio 1:2. *Cleavages*, three rectangular; O and *i*-$\breve{i}$ very and almost equally eminent, with vitreo-pearly luster approaching the sub-adamantine; *i*-$\bar{i}$ splintery. *Hardness*=5·5–6. *Sp. G.*=3·95–4·08. The average of nine determinations with Jolly's spring balance gave 4·023. *Color*, dark green to black but eminently mottled, so that thin splinters or laminæ transmit a pale yellow light. *Streak*, light-yellowish-reddish-gray. The powder is slightly attracted by the magnet. BB. rather refractory, fusing at thin edges to a dull black slag. On charcoal gives a zinc coating, more distinctly on addition of soda. With the fluxes the usual reactions for silica, iron and manganese. The borax and microcosmic beads give in the O. F. the characteristic brownish purple color, indicating mixtures of iron and manganese, which becomes green in the reducing flame. With acids gelatinizes readily and completely. Some specimens leave a bright green undissolved residue, which I judge to be spinel both from its hardness, its not being attacked by fusion with soda, and complete decomposition by bisulphate of soda.

In the following analyses the silica was separated in the usual manner, the filtrate from the silica neutralized by carbonate of soda, then acidified with acetic acid and a current of sulphuretted hydrogen passed through the solution, which separated the zinc as sulphid. This was filtered off, redissolved in HCl, and then precipitated from the uninterruptedly boiling solution by slowly adding $\dot{N}a\breve{C}$, and the $\dot{Z}n\breve{C}$ finally converted into $\dot{Z}n$ by ignition. The filtrate after the separation of the zinc was then boiled with the addition of $1KO,\breve{C}lO_5$ to sesquioxydize the iron, the iron precipitated in the usual manner as subacetate, redissolved and reprecipitated by ammonia, the manganese separated by bromine and determined as pyrophosphate with the precautions pointed out by Dr. Gibbs, (this Journal, No. XXXI, p. 216), and lastly the magnesia determined as pyrophosphate. I will here remark, that I did not succeed in separating the oxyd of zinc from the iron by the usual acetate of soda process, but that a great and often the greater part of the $\dot{Z}n$ went down with the iron, which I attribute to the necessary boiling of a dilute solution (vid. Johnson's Qual. Fresenius). Hence my former analyses were not correct, gave too little zinc and resulted in uni-oxygen ratio only on account of the near proximity of the equivalents of iron, manganese and zinc-oxyds. I may, however, not have handled the method correctly.

The samples No. 1 and 2 were fresh pieces of cleavage crystals carefully examined by the lens so as to avoid all visible admixtures. No. 1 was lighter in color than No. 2, *a* and *b*, which latter are analyses of the same powder. No. 3 are analyses of two different powders of the massive variety.

	1.	2.		3.		Oxygen				
		a	*b*	*a*	*b*	1.	2, *a*.	2, *b*.	3, *a*.	3, *b*.
$\dot{S}i$	30·76	29·90	30·56	30·67	30·42	16·41	15·95	16·30	16·36	16·22
$\dot{F}e$	33·78	35·60	35·44	35·37	34·20	7·51	7·91	7·88	7·86	7·60
$\dot{M}n$	16·25	16·90	16·93	17·81	17·67	3·66	3·81	3·82	4·01	3·98
$\dot{Z}n$	10·96	10·66	10·70	9·87	9·09	2·16	2·11	2·11	1·95	1·80
$\dot{M}g$	7·60	5·81	5·44	5·69	6·49	3·04	2·32	2·18	2·28	2·60
Insol.		1·03	1·04	1·39	2·65					
	99·35	99·90	100·11	100·80	100·52	16·37	16·15	15·99	16·10	15·98

The foregoing oxygen ratios make the mineral a unisilicate. The crystallization being orthorhombic with the parametric ratios of the chrysolite group, which is confirmed by the other physical and chemical characters; it is hence an iron-manganese-*zinc* chrysolite, the first, to the best of my knowledge, of the group, into the composition of which zinc enters as a constituent.

It occurs, as before said, on Stirling hill, accompanied by Willemite, Franklinite, Jeffersonite and spinel.

2. *Manganesian Dolomite.*

In the vast vein of Willemite, which is being worked on Minehill by the New Jersey Zinc Company, there occur small masses of a beautiful delicate pink mineral with a rhombohedral cleavage, which by their contrast with the purely apple-green Willemite make exceedingly pretty specimens. An analysis gave the following composition:

$\dot{C}a\ddot{C}$	$\dot{M}n\ddot{C}$	$\dot{F}e\ddot{C}$	$\dot{M}g\ddot{C}$	Insol.	
50·40	43·54	·76	5·69	0·08	= 100·47

Specific gravity = 3·052. Hardness = 4.

The mineral differs from the known dialogites by its greater proportion of carbonate of lime, and may be considered either as a dialogite in which a little more than one-half of the $\dot{M}n$ is replaced by lime, or as a dolomite in which about five-sixths of the magnesia is replaced by $\dot{M}n$.

3. *A pseudomorph of opal after a micaceous mineral probably some chlorite.*

On Scotch mountain, Warren county, N. J., not far from New Village, among the Laurentian syenitic gneiss formation of that region, there occur, scattered over the ground, numerous masses of a white quartzose mineral apparently of agglutinated rounded granules of about $\frac{1}{8}$ inch diameter. Upon close examination,

many of these granules show distinct cleavages, which exhibit a hexagonal outline. Searching the ground carefully I found wormlike contorted crystals, in shape like the similar forms of some chloritic minerals. The substance is distinguished from quartz by its low specific gravity =1·961, and inferior hardness (near 6). It is mostly soluble in caustic potash, leaving only 8 per cent insoluble, which seemed to consist, in part at least, of the original mineral. On ignition it loses 7·27 per cent water. It is therefore manifestly amorphous quartz or opal. Indeed small masses of unquestionable opal of various colors are found in the neighborhood.

It hence appears, that micaceous structure is not, as is frequently assumed, the absolute closing scene of the metamorphism of minerals, but that the replacing power of silica is able to overcome the antimetamorphic energies of minerals even, which have arrived at the micaceous stage.

Bethlehem, April 22, 1870.