ART. XXII.—*Contributions from the Sheffield Laboratory of Yale College.*—XIII. *On Native Crystallized Terpin;* by S. W. JOHNSON.

IN October, 1866, the writer received from Wm. M. Gabb, Esq., of the Geological Survey of California, a small quantity of crystals found in "cavities near the core of a semi-decomposed pine stump that was buried three or four feet below the surface in Shasta Co., California." The crystals were discovered by Mr. Voy of San Francisco.

At the request of Mr. Gabb I have examined these crystals, which, in the sample received, were still partly adhering to a fragment of pine, where they were associated with another crystalline substance of a yellowish color and resinous aspect.

The crystals were colorless and transparent, the largest individual was three-eighths of an inch long, one-eighth of an inch wide and one-sixteenth of an inch thick. They were of brilliant luster and well terminated at the free ends. From their occurring in buried pine wood and from their general appearance, it

was at once suspected they might be identical with crystallized terpin. Their faint resinous taste and odor, not to be distinguished from that of the artificial substance, confirmed this view.

To obtain full information regarding the crystallometrical characters of the substance, I applied to my friend, Mr. John M. Blake of New Haven, to make a comparison between the native crystals and those of artificial preparation from the chemical cabinet of the Sheffield Scientific School. Some of the highly interesting results of these investigations are communicated by Mr. Blake in the paper that follows, and leave no doubt of the identity of the two substances, although their crystals are not developed in the same manner, and exhibit other physical differences which, as he states, disappear when both are recrystallized from the same solvent.*

After Mr. Blake had finished his examinations, a combustion was made on nearly the whole available substance. The hydrogen determination was lost by the fracture of the CaCl tube, but the estimation of carbon fully confirmed the conclusions previously arrived at. The combustion was effected in a tube partly filled with oxyd of copper and in a stream of oxygen, the substance itself being placed in a tray of platinum. On application of heat it swelled and afterwards vaporized completely, without blackening and without leaving a weighable residue. On the cold parts of the tube silky crystals of anhydrous terpin condensed. This deportment is characteristic of terpin.

The amount of substance burned was but 0·0975 grm. The increase in weight of the potash bulbs and tube was 0·225 grm. This gives carbon 62·93 *per cent.* The calculated quantity is 63·16 *per cent.*

The substance is therefore hydrated terpin or crystallized turpentine camphor $C_{20}H_{20}O_4+2aq$. Perhaps we should say it is one of the terpins, since, according to Berthelot, the different oils of turpentine, on hydration, yield crystals of different degrees of solubility.

The formation of this substance in the buried tree presents no difficulties, since we know on the authority of Dumas, Deville and others, that oil of turpentine in contact with water, combines with the latter in absence of acids or other powerful agents of chemical change.

Prof. Brewer, who is familiar with the timber of California, is of the opinion that the wood to which the crystals were attached is that of a pitch pine, *Pinus ponderosa.*

This appears to be the first recorded instance of the occurrence of crystallized terpin, native.

November, 1866.

* Mr. Blake has measured and figured both the native and artificial crystals and has in reserve some other valuable observations which it is to be hoped he will shortly publish.—S. W. J.