

2nd. The occurrences of hydrocarbons in the gaseous inclusions of the crystals of igneous rocks.

3rd. The occurrence of petroleum (liquid, semi-liquid and solid) in greenstone traps, in basalts, in trachytes, in dolorites and other volcanic rocks.

4th. The occurrence of diamond and gaseous hydrocarbons in volcanic necks and pipes.

5th. The occurrence of gaseous and liquid petroleum in the volcanic emanations of to-day.

6th. The occurrence of petroleum in freshly ejected scoriae from the volcano Vesuvius.

In confirmation of the above a few other direct proofs of the occurrence of petroleum in crystalline rocks, in volcanic or igneous rocks or in close connection with these, and in metalliferous veins, may be cited:—

1st. Oil in crystalline gneiss:—In Placerita Canyon, five miles east of Newhall, Los Angeles county, California, a very light oil, almost naphtha, of a gravity between 50° and 60° B., is produced from crystalline gneisses which overlay the San Gabriel granite (⁹). It was discovered in shafting for gold. There are seven wells there, producing from depths of between 400 and 1,100 feet, one of them yielding between five and six barrels per day of oil with 30 or 40 barrels of salt water, and another spouted high when the oil was first struck. The crystalline schist or gneiss in which the oil occurs is micaceous and granitic, conspicuously banded and greatly contorted.

2nd. Oil and bitumen in the quicksilver deposits of California:—The occurrence of petroleum in the Redington quicksilver mine, New Idria, Cal., and in the other quicksilver mines of that State, has been reported by Luther Wagoner (¹⁰), Prof. Egleston (¹¹), Becker (¹²), Prof. Christy (¹³), and many others. It occurs abundantly as liquid oil, viscous tar, solid asphalt, and also in the gaseous state of natural gas intimately associated in the veins with the cinnabar and with metallic native mercury. Many other

9. Bull. U.S. Geol. Surv. No. 309, pp. 100-101.

10. Eng. and Min. Journ., Vol. XXXIV, p. 334.

11. Trans. Am. Inst. Min. Eng. III, p. 273.

12. U.S. Geol. Surv. Monograph, XIII, pp. 371-373.

13. Trans. Am. Inst. Min. Eng., XIII, pp. 547-548.