PO_4, SO_4 and CO_3 as essential constituents included in the molecule.

There is still a great abundance of yellowish green vesuvianite at the quarry, and the granular masses contain seams and veinlets of white, minutely fibrous calcium silicates, showing differences in indices and amount of hydration. They indicate that quite a range of fibrous calcium silicates exist with similar ratios of CaO to SiO_2 and with indices governed by the amount of water present. The new mineral, plazolite, described by Foshag[1] occurred imbedded in these seams and its close similarity to garnet should be noted. In its crystal form, physical properties, high index and anomalous birefringence, and chemical composition the mineral suggests garnet. It lacks but one molecule of SiO_2 to make it a pure calcium garnet, but, on the other hand, contains CO_2 and H_2O, evolved at high temperature. Instead of a true garnet forming, a hydrated crystallization has taken place, having certain of the characteristics of a garnet.

TSUNASHIRO WADA

GEORGE F. KUNZ

New York City.

By the death of Dr. Tsunashiro Wada, of Tokyo, on December 20, 1920, Japan has lost one of her leading scientific men. His attainments earned for him a wide recognition in America and Europe, and they were duly rewarded in his native land, where he so eminently occupied many of the most important stations in the institutions of geology, mineralogy, mining and mettallurgy.

He was born March 15, 1856, at Obama, province of Wakasà, Japan. His studies were pursued at the Imperial University of Tokyo, and in 1875 he was appointed an assistant professor there. In 1878 he entered the service of the Home Department, and in 1880 became its Director. In 1880, also, he became Director of the Imperial Geological Survey of Japan, and delivered lectures in Mineralogy and Lithology at the Imperial University. The Japanese Government chose him as the national representative to the International Geological Congress at Berlin in 1884, and on his way thither he was enabled to visit several American and European countries. On his return to Japan he

[1] Plazolite, a new mineral. *This Journal*, **5**, 183, 1920.

was appointed, in 1885, Professor of Mineralogy and Lithology in the Imperial University, holding this professorship until 1891, without ceasing to be Director of the Geological Survey, to which office he added, in 1889, that of Director of the Imperial Mining Bureau of Japan. These positions as director he held until 1893, when the pressure of his other duties obliged him to resign them. In 1894, he was again active as a lecturer in the University of Tokyo, and his thoro knowledge of mining led to his appointment to the post of Technical Adviser to the Imperial Household Department.

Even before the completion of the great Japanese Steel Works in 1900, at a cost of $10,000,000, Dr. Wada's great practical experience in mining induced his selection in 1897 as president of the undertaking. This was followed in 1899 by another season of travel in Europe and America by Government order. In 1901 he resigned the presidency of the Steel Works, where his services had so greatly promoted the iron and steel industry of Japan; an important measure having been the conclusion of the purchase contract with the Daiya Iron Mine in China, a step that much facilitated the extension of the steel works in later days, thus contributing in no small degree to the victory of Japan over Russia in 1905. In 1902, he made extensive journeys thru North and Middle China, accompanied by a group of engineers and geologists, and wrote a splendid paper on the lapidary work of precious stones in China. Then he devoted himself to a careful study of the mines and of the economic geology of the country. Dr. Wada served as director and juror in the mining and metallurgical section of each of the Japanese National Expositions, of which the first was held in 1877 and the latest in 1901.

From 1896 to 1908 he was president of the Japanese Institute of Mining Engineers (The "Nippon Kogyoki"). In 1905 he was offered a new field for his activity, when the late Prince Ito made him General Adviser in Mining to the Korean Government, and he retained this position after Prince Ito's death and after the annexation of Korea to Japan. An association of the principal mine-owners of Japan (The Kosan Konwa Kai) was organized by him in 1908. On December 9, 1910, he was elected an honorary member of the American Institute of Mining Engineers.[1] It is needless to state what he did to welcome the Institute party

[1] *Bull. Am. Inst. Mining Eng.*, Jan., 1911, 5.

during the Japan excursion of 1911. The Metallurgical Research Institute (Kinzo-ku-Kogyo Kenkyu-Sho) was formed by him in 1916, and he presided over it. The same year marked the purchase of the Cottrell Patent from the International Precipitation Company of Los Angeles, so that it could be applied to smelters and factories in Japan, and the success of this acquisition has given eloquent testimony of his foresight and the accuracy of his judgment. In 1917 he was nominated by the Emperor a member of the House of Peers, being practically the first and the only representative of the mining experts to have a seat in that body. On several occasions Dr. Wada has been decorated with medals by the Emperor of Japan and by the governments of various other nations. On the report of his critical condition, he was promoted by one rank to the fourth rank of the Senior Grade, and by two orders from the fourth to the second Order of Merit.

He was survived by his wife, Madame Saki, by four sons, Mikio, Goro, Rokuro and Schichiro, and by three daughters, now Mrs. S. Sakuma, Mrs. T. Hasegawa and Mrs. I. Gota.

Dr. Wada's publications include a work on mineralogy, written when he was but twenty years of age. To this succeeded in 1877, two volumes, one entitled "Crystallography," the other "The Mineral Industry of Japan"; of this latter work he published, in 1904, in Japanese and English, an enlarged and revised edition, the "Minerals of Japan," with numerous photographs of crystals. In 1893, when he resigned as director of the Geological Survey and The Imperial Mining Bureau, he recorded his long experience in a work entitled "The Mining Industry of Japan during the last twenty-five years, 1867–1893," issued by the Mining Bureau, Department of Agriculture and Commerce of Japan, 1893. Since 1904, Dr. Wada has issued in Tokyo successive supplements to his "Minerals of Japan," under the German title "Beiträge zur Mineralogie von Japan."[1] In spite of the German name, the articles in this serial publication are almost all in English. It is also well worthy of note that he had assembled the greatest collection of fine Japanese minerals.

A few items from Dr. Wada's "Minerals of Japan" give us some idea of the resources of this land in the precious metals and gem stones. Of gold he remarks (p. 12): "Formosa stands at the front of the gold-producing regions of Japan. The chief

[1] George F. Kunz, "Minerals of Japan," *Science* [N.S.] **47**, 45–46, Jan. 11 1918.

localities are Zuiho and Kimkwaseki, near Taihoka in the northeastern part of the island." Alluvial gold occurs in numerous places in the Japanese islands of Honshu and Hokkaido (Yeso) as well as in Formosa, the richest of these deposits being in Hokkaido. The largest nugget came from the mining district of Esashi; it weighed 769.2 grams (nearly 25 ounces troy) and was worth about $500. Platinum and iridosmine are found in association with gold in the Yubari-gawa and Pechan, and in other rivers of Hokkaido (p. 8). Of course, as is well known, copper is the chief metallic product of Japan.

The first of the gem-stones are the topazes (pp. 89–113). These occur in pegmatite veins in granite, for example, Takayame and Hosokut, Mino Province, and Ishigure, Ise Province. The first exhibition of Japanese topazes was at the National Exposition of Tokio in 1877. Besides colorless stones, there have been found those of the following hues: wine-yellow, or bluish-yellow; pale blue; jade brown and pale blue in sectors; pale-green, and brown. This latter hue in only observable in recently extracted stones, as on exposure to daylight the brown and brownish-yellow topazes shade into blue and later tend to become colorless. Other gem-stones, occasionally of gem quality, are the amethysts of Fujiya, Hoki Province and the rose quartz of Gota, Maki Province; fine crystals of vivianite, and also transparent blue tourmaline crystals, these occuring at Takayama, Mino Province, where beryl has been found as well; a pale greenish-yellow crystal of chrysoberyl was discovered at this locality, in stanniferous sand (p. 82).

Dr. Wada's work on the mining industry of Japan[1] embraces a brief historical section, which contains many interesting items. He finds that the name of Columbus "is directly connected with the mines of Japan," for the discoverer was animated by a wish, to reach the precious-metal treasures of Zipangu (Japan), of which he had read Marco Polo's description.

Japanese mining is stated to date back to a period between the seventh and the beginning of the eighth century of our era. In this period gold, silver, copper, tin, iron, cinnabar and lead were extracted in exceedingly small quantities. In the ninth century mining industry exhibited considerable progress, and from this date the Tada silver mine, the Ikuno gold mine, the

[1] Wada, Tsunashiro, "The mining industry of Japan during the last twenty-five years, 1867–1892," printed at the Tokyo Tsukijo Type Foundry, 1893. 304 pp., 5 maps and plans, 4to.

Yoshioka copper mine, the Handa silver mine and several other mines which are still being operated successfully in our day.

The author notes the wonderful mineral wealth of Japan, the coal deposits in Hokkaido and Kiushu, the antimony in Shikoku and Kiushu, and the gold, silver, copper and iron of these and other provinces. In the order of production copper occupies the first rank, next come gold and silver, followed by coal, antimony, manganese and sulfur. The methods of working employed in the mines at present, and all the most important details relating to them, are given at great length and very satisfactorily. The processes of smelting and refining are treated of in an equally thoro way, and the statistics of the production down to 1890 or a little later are also presented.

Especially valuable are the data regarding deposits, and the careful characterization of the particular qualities of the coal and the minerals extracted.

TEXAS, LANCASTER COUNTY, PENNSYLVANIA

SAMUEL G. GORDON

Academy of Natural Sciences of Philadelphia

This locality, which includes two townships, is a relict of the days when precise statement of the source of a mineral was considered an unnecessary refinement. The district, named from New Texas, a small village in Fulton township, lies along the Pennsylvania-Maryland line between the Susquehanna River and Octoraro Creek, and may be reached from Conowingo on the Pennsylvania Railroad (Columbia and Port Deposit Branch) on the west, or from Sylmar on the Penna. R. R. (P. W. & B. R. R., Maryland Division) on the east. All the localities lie in the northern part of the Havre de Grace quadrangle, and will be referred to below in ninth-coördinate symbols.

The rocks of the region comprise an igneous complex overlain by mica-schists.[1] All these rocks have been intruded by a fine grained gray granitic gneiss, and pegmatite. From south to north the igneous rocks appear in the order: granodiorite, gabbro, norite, and meta-peridotite and meta-pyroxenite (serpentine, etc.), possibly representing a section of a batholithic mass which had undergone differentiation *in situ*. The mineral

[1] The Maryland geology has been described by F. Bascom: *Maryland Geological Survey, Cecil County*, 83–148, 1902.