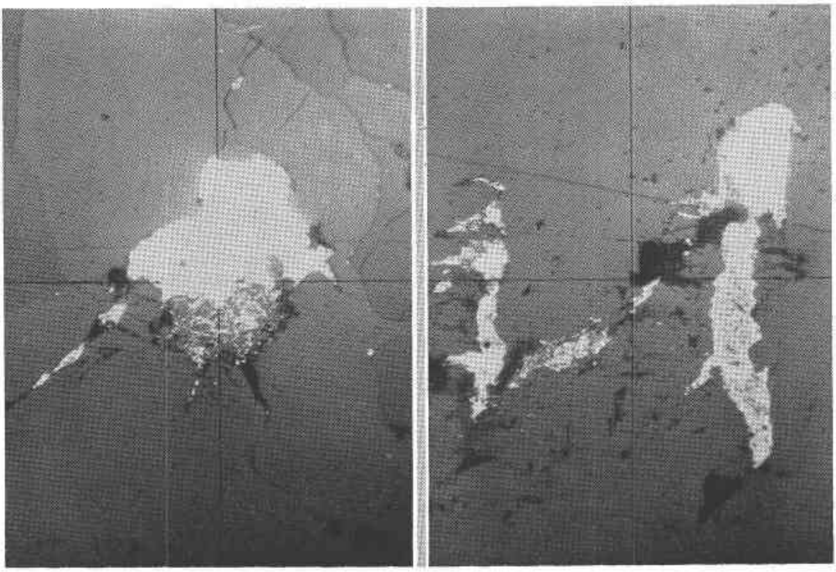
NATIVE TIN ASSOCIATED WITH PITCHBLENDE AT NESBITT LABINE URANIUM MINES, BEAVERLODGE, SASKATCHEWAN

JACK F. B. SILMAN, *Queen's University, Kingston, Ontario, Canada.*

Pitchblende at Nesbitt LaBine Uranium Mines occurs in fractures cross-cutting a slatey formation. Certain parts of the fractures are heavily mineralized with calcite, hematite and pitchblende. Associated with the pitchblende is pyrite, chalcopyrite, bornite, chalcocite, covellite, sphalerite, galena and native tin. Samples from three separate veins on the first



FIGS. 1 and 2. Photographs of native tin in polished section (×102). Native tin (white) in calcite (grey).

level and from one vein on the second level of the mine are unique in containing native tin.

The native tin was first found in polished sections prepared on lead laps using tin oxide abrasive. Later sections containing the mineral were polished on linen with chromium oxide to preclude any possible contamination. In polished sections the tin is creamy white in colour, ductile, very soft (approximating the hardness of argentite) and occurs in discrete grains up to 1.5 mm. in diameter. Feathery tongues from the main masses penetrate the host calcite (Figs. 1 and 2). Under crossed nicols the mineral is weakly anisotropic with polarization colours yellowish grey to bluish grey.

Each reaction with the standard reagents on the grains and on a standard are as follows:

Reagent	Sample	Standard of Refined Tin
HNO_3	Fumes stain irridescent	Fumes stain irridescent, white deposit noticed on larger sample.
	Liquid causes effervescence and etching, stains brownish black	Liquid causes effervescence and etching stains brownish black, leaves white deposit
HCl	Fumes tarnish light brown, eventually irridescent	Fumes tarnish light brown, eventually irridescent
	Liquid slowly stains dark brown to black	Liquid slowly stains differentially light brown to dark brown to black
KCN	Fumes negative	Fumes negative
	Liquid negative	Liquid very slowly stains light brown
$FeCl_3$	Fumes negative	Fumes negative
	Liquid quickly stains light brown to dark brown to black	Liquid quickly stains light brown to dark brown to black, leaves white deposit
KOH	Fumes negative	Fumes negative
	Liquid negative	Liquid slowly stains light brown
$HgCl_2$	Fumes negative	Fumes negative
	Liquid quickly stains dark brown to black	Liquid quickly stains dark brown to black
Aqua Regia	Fumes stain light brown to irridescent	Fumes stain light brown to irridescent
	Liquid quickly stains dark brown to black	Liquid quickly stains dark brown to black

Confirmation of Native Tin

The identity of the mineral has been confirmed both by x-ray and spectrographic means. X-ray photographs of three samples were taken; two from one polished section and one from another from a different vein. The three photographs are identical with a master photograph prepared from refined tin. One of the samples studied with x-rays was analyzed spectrographically by conventional D.C. arc methods and proved to contain only tin with traces of copper and silver. Approximately fifty grams of vein material were pulverized, leached with HCl and evaporated to dryness. A spectrographic analysis of the residue again confirmed the presence of tin.

Native tin associated with cassiterite has been found in gravel deposits from several localities. To the writer's knowledge native tin *in situ* has not been reported. Its presence indicates a reducing environment, free from iron, sulphur etc. at the time of formation otherwise cassiterite or some other compound of tin would have been formed. The sequence of deposition of the vein minerals appears to be as follows: minor calcite and quartz; hematite, pitchblende and pyrite; late calcite and hematite;

chalcopyrite, bornite, chalcocite, covellite, sphalerite and galena; native tin. The actual age relation of the tin to other metallics is indeterminate as it occurs in and completely surrounded by late calcite. Study of this peculiar occurrence is continuing.

ON THE OCCURRENCE AND ORIGIN OF XONOTLITE[1]

CHARLES H. SMITH,[2] *Geological Survey of Canada, Ottawa, Canada.*

The recently reported occurrence of xonotlite ($5CaO \cdot 5SiO_2 \cdot H_2O$) in Puerto Rico by Kaye (1953, p. 860) resembles similar occurrences associated with the ultrabasic rocks of the Bay of Islands Igneous Complex, western Newfoundland. The latter are believed to be the first reported Canadian occurrences. The mineral has similar optical properties to those described by Larsen (1923) and others, and gives an x-ray pattern similar to xonotlite from Isle Royale, Michigan (McMurdie & Flint, 1943) but variations in the modes of occurrence have a bearing on the origins of xonotlite suggested by Kaye. The specimens studied are now deposited in the Brush Mineral collection at Yale University (Specimen Nos. 6776 and 6777).

The Puerto Rican occurrence is located at the fault contact of serpentinite and a metavolcanic rock. Kaye concludes that conditions at the contact were critical to its formation, and suggests that either heat generated during shearing caused a calcite vein to alter to xonotlite in the presence of siliceous emanations from the serpentinite, or that the xonotlite formed prior to movement but later movements caused recrystallization of the "massive" xonotlite into "parallel-fibrous" xonotlite.

Both massive, i.e. unoriented xonotlite aggregates, and fibrous forms of xonotlite are found in the Bay of Islands area. Fibrous xonotlite occurs in veins up to 3 inches in width and several feet long, cutting altered sedimentary rocks near faulted contacts with serpentinite at Winter House Brook and Shoal Brook, Bonne Bay, and near First Trout River Pond. Fibrous and massive xonotlite are found with other lime-bearing minerals filling joints in serpentinite near the basal contact of the North Arm Mountain pluton. Four separate bodies, composed of prehnite, pectolite, phlogophite and xonotlite, are exposed in the valley walls of a stream draining into North Arm, Bay of Islands. The largest body is 55 feet long and 10 feet wide. Xonotlite also occurs as a secondary alteration mineral formed from the metamorphic minerals related to the ultrabasic

[1] Published by permission of the Deputy Minister, Department of Mines and Technical Surveys, Ottawa, Canada.

[2] Geologist, Geological Survey of Canada.