

# Igorot Mining Methods

By LAURENCE L. WILSON

Tradition indicates that the knowledge of gold may have been brought with him by the Igorot when, as the advance guard of the Malay race, he came out of the West, invaded the Philippines, and finally settled in these mountains; possibly about the time that Solomon was getting gold from Ophir. Traces of his early Hindu culture are seen in such practices as animal sacrifice, augury, and trial by ordeal. The Igorots still treasure an old volume written in the ancient script which they have long since forgotten how to read.

This knowledge of gold was no doubt stimulated and increased by the Chinese who, as pirates and merchants, were visiting the Philippines as far back as the third century. The Chinese did considerable mining here at times—both lode and placer—and traces of their influence are sometimes seen in methods of timbering the shafts, use of tools, and other practices.

The Spanish influence was apparently little felt—as the fierce highlanders ably defended their mountain fastnesses and were unconquered by the Spanish until 1846. Even then, the conquerors got most of their gold from the Igorots and taught them little. The Igorots, who love a practical joke, sometimes led the Spanish speculators to drive quite extensive tunnels where there was no chance of getting rich.

Thus, while learning from others, these industrious people have, through the centuries, developed their own methods, due to their peculiar manner of life and the type of ore in which they find the precious metal.

The Americans have brought modern mining methods into these mountains and employ many Igorots in their rich mines where they have become efficient with jack hammers and dynamite. But I shall endeavor to describe the Igorot processes as unimproved by modern invention and as still practiced in some localities.

The Kankanaï and Nabaloi tribes of Igorots have developed into the best miners; most of the gold being found in their territory. While this attractive metal is found more or less all through these much tangled and tumbled mountains, the main Igorot mining districts are those around the barrios of Suyoc, Tabio, Akupan, and Antamok. Suyoc is usually considered to have been the first large mining center and Suyoc miners are still said to be the most expert.

Of course in this brief general description of Igorot mining methods, it must be remembered that different customs and modes may exist side by side, that there are all grades of ability, and that not all the Igorots are miners—no more than are the inhabitants of Grass Valley or Virginia City. Many a time we have been guided by some enthusiastic Igorot over steep mountain trails, through runo and bamboo thickets, and up rough, rocky gorges—only to arrive at a barren lode.

These mountain men are indefatigable prospectors. Also their other life interests—hunting, fishing, going to distant

camote patches and rice paddies, gathering wood, attending live stock, and other activities, all lead them to visit every neck of the woods where outcrops, slides, and cuts are investigated for gold bearing veins. Thus, while modern American methods have developed old veins and opened adjacent new ones into among the richest mines in the world, gold has not yet been discovered in localities unknown to the Igorot.

He is a gallant gambler, not only in looking for surface indications, but will often tunnel in on a likely looking prospect until past the hope of developing a paying proposition. Moreover, by his industry and simple living, he is enabled to work many stringers on which an American would soon starve.

Gold mining is more or less of a community affair. The allied family in one small barrio may own a combination of the lode and placer mine in a portion of a mountain together with the gold bearing gravel of the stream flowing therefrom. They usually work it individually, each person taking for his own that which he produces. Occasionally, when they feel that they can trust each other, they mine in common—each receiving an equal share of the gold produced; but the head man receiving a larger share for supervision. Often of course, one man will own the mine and employ help on a share basis, or for a daily wage.

Much of the mining is seasonal; so that farming and other minor industries go on alternately, and often coincidentally, with the mining industry.

The primitive tools of these patient miners are: a short, pointed gad made of fire tempered wood or steel—sometimes lengthened with a wooden handle, a stone or hardwood hammer, wooden wedges, a short wooden shovel—together with various

sized baskets, woven of split bamboo.

While most of the iron is imported, the people early learned to work the metal and are good smiths. The bar is heated in a charcoal fire, shaped with a stone hammer, and tempered by plunging into water. The bellows, used to produce an air draft on the charcoal, may be a clever arrangement of wooden pistons working alternately in two or four bamboo cylinders. Sometimes hollowed logs, or boxes constructed of slabs of wood, have been used in place of the bamboo. One box type has a single double-acting piston. An opening is provided in each end for the admission of air during the back stroke and a flap of hide is placed over this to act as a check valve during the down stroke. The simplest bellows is two fans, woven of split bamboo, which are waved alternately back and forth quite efficiently.

For lighting the tunnels a torch may be formed of a bundle of long thin splinters of pitchy pine wood. It has been the custom to start a fire either by striking flint with steel or through friction heat produced by rapidly twisting one bamboo stick in the hollow of another.

(Please turn to next page.)

## A RELIGIOUS MINER

I have told you something about the physical and social aspects of Igorot mining; but I should not neglect the religious aspect. For the Igorot is a very superstitious person and his daily life is much influenced by his religious ideas.

The Igorot believes in one supreme being—Kabunian—and in many supernatural beings of various ranks and characteristics. These Anitos have the intelligence and sensibilities of human beings; but have superior abilities and lack a corporal body. They may be good or bad—friend or foe, and one must keep on friendly terms with them, by means of obedience and sacrifice, if he is to succeed in his undertakings. Favored men or women, whom I will call WISE MEN, have the ability of communicating with these Anitos and expect to themselves become Anitos upon their death. I will pass on to you some of the lore of these WISE MEN which has come to me.

## THE CAÑAO

Gold has been grown by, and belongs to the Anitos. When it is found in a tunnel the miner must make an offering payment either of blood, by cutting the finger or toe of one of the men, or else a cañao is made. A cañao is a ceremonial feast and sacrifice, typified by slaughter of animals, feasting, dancing and usually drinking tapuy (rice wine). Only pigs are killed at cañaos made in relation to mining gold. After they kill the pig the WISE MEN pray: "We would not take this gold if we were not hungry. Please forgive us and accept this pig as payment for the gold." Then the pig is butchered, cooked and eaten.

When the ore is taken out the gold must be extracted as soon as possible or some will go away. A cañao should also be made before melting and refining the gold so that none of it will leave.

Using his simple tools the Igorot has made many excavations along the line of the gold bearing veins. He would break down the rock by building a fire against its face and dashing cold water on the heated surface. He carries out the ore in baskets, the gangue likewise, or drags it out in larger baskets or stoneboats made of hollowed logs attached to carabao hide thongs. Many tunnels are necessarily small and tortuous—following the ore in the hard rock; but some creditable shafts, raises, winzes, stopes, and fills are seen. The best Igorot methods of timbering, stoping, and back filling are admired even by American miners.

The Igorot worked in and down as far as feasible; driving tunnels many meters long and putting in raises or shafts until stopped by very hard rock or waterflow. They endured the foul air until their smoky torches refused to burn. All the modern mines are developments of old, partly abandoned, Igorot workings.

The Igorot is expert in the recovery of gold from the ore. This is the work of the women. At a glance they pick out the pieces containing gold. These are broken, if necessary, to about the size of a pea and then crushed by being placed on a large, hard, flat rock and rolled with a heavy stone—say fifty centimeters in diameter.

This ore is carried to a spring or stream where it is ground to a slime by rubbing. A hard, flat rock, placed perhaps on a wooden frame for convenience, is used for the nether stone; the ore is placed thereon, soaked with water, and rubbed back and forth with a fitted hand stone. There may be as many as a dozen of these rocks in one group or "mill", the women working sociably together and the small children playing about.

The slime is then panned out in a shallow bark, or thin wooden shell—bound with bamboo. It is about seventy centimeters long and thirty centimeters wide—turned up some six centimeters on the sides, being open at the ends—one slightly more flaring. Water is slowly admitted at the opposite end and, accompanied

by a certain gentle shaking movement all its own, together with handling, the waste is separated and washed off, leaving the glittering gold in the tail. This is removed to a half coconut shell and later stored in a small section of bamboo. Sometimes the juice of the leaf of the aplayan plant or of dampened tobacco, is squeezed in the water while panning. This is to cause the fine floating gold to go to the bottom—the reverse of the modern flotation process.

In free milling ores the clever women recover a very high per cent of the gold; but in complex ores, such as the tellurides and pyrites, they are not so successful. Sometimes they roast the ore before grinding; or they may afterwards set it away in a tunnel with salt, where natural disintegration takes place. They then pan it out each year for a number of years—saying that the gold is growing in the ore. But they have back filled tunnels with waste which assayed as high as \$100.00 per ton; and certain of their discarded concentrates have assayed \$2,500.00 per ton.

When enough gold has been accumulated it is melted in a clay dish, with a charcoal fire, into bullion. It is often purified by means of several heatings: previously wrapping the impure gold together with some flux—salt, tobacco, clay, soda, ground glass, or a certain green leaf—in a piece of pig's gut; and knocking off the slag each time. Some of the Igorots are very adept at adulterating the gold and improving its color by the addition of copper and silver and a final light roasting in salt.

Much of the Igorot mining is placer. All the streams flowing from the auriferous regions are regularly worked after each rainy season. The best sections are usually owned and worked by certain individuals, some of whom have built quite intricate, permanent rock walled sluice boxes which catch the descending gold throughout the rainy season.

At the beginning of the dry season the men open up and repair or rebuild the sluice boxes—some of which are twenty-five meters long. The rough surface of the bed rock of the river channel serves as the bottom of the sluice box;

while the sides are more or less symmetrically placed convenient boulders. A part of the stream is directed into this "box" and the gravel deposited during the high water, sluiced through; the heavy gold sinking to the bottom and being caught by the natural riffles formed by crevices in the rock bottom. These riffles are then carefully cleaned out and the contents panned by the women in the same manner as related previously.

The most characteristic manner of Igorot mining is to start working the gold bearing vein where it outcrops—maybe near the top of the mountain. During the dry season the men dig pot holes and dog holes one above the other. A long ditch is dug along the mountain to catch water during the rainy season or perchance, to conduct it from a convenient stream or spring. This ditch may lead directly to the workings, or to a storage reservoir, according to conditions. When a sufficient head of water is acquired it is directed into the workings and they are boomed out—exposing the vein for the next season's work.

In this way big cuts and slides are made. At Suyoc the huge Pelidan Slide is half a kilometer wide; and the rich vein from which half a million pesos worth of gold is reported to have been taken, is covered several hundred feet underneath. In some places where the whole mountain is permeated with free gold and small stringers, the entire mass is being washed down; a part each year as the water is directed into different gullies.

In any case, the stream below is worked during the dry season and the gold bearing gravel panned by the women.

While of necessity, much of the gold is disposed of in the form of bullion, the Igorots of course love the beautiful metal for itself and have made ornaments and utensils for their own use. They mould and hammer out earrings, necklaces, finger rings, carabao and pig figures; and at Tabio they mined the gold which they beat out into gold dishes and even a hat. José Fianza, a former rich owner of an Antamok mine, had manufactured from gold a whole set of dishes and numerous other articles.

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