

FUNGI



***EXTRAORDINARY
FUNGI OF THE WORLD***

***Supernatural
Endangered***

Aquatic Mushrooms

Devastating Pathogens

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A Rare Wonder of the Fungal World

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“Simply extraordinary!” was what I said over and over as I held this old object taken out of the storage collection at Harvard’s Peabody Museum in Cambridge, Massachusetts. It was like no other *Ganoderma* fruiting body that I had ever come across and I have seen many from all over the world. My first impression was, and maybe it was yours as well looking at the photograph, “It can’t be real.” But after very close inspection it was revealed to be a single natural piece; no fabrication, nothing added or altered. It is an exceedingly unusual and wonderful fruiting body. If there was a selection for the seven wonders of the fungal world, this would be my number one.

History of the object

Patrick T. L. Putnam studied anthropology at Harvard University and graduated in 1925. Immediately after graduation he set off on an independent expedition to Dutch New Guinea (now called West Papua Province in the Republic of Indonesia). At about the same time the Smithsonian co-sponsored the Dutch and American New Guinea Expedition. This was one of the least known areas of the globe and anthropologists were eager to study native people from this region and collect materials to better understand their culture (Taylor, 2006). In the village of Boeti near the mouth of the Maro (Merauk) River, Putnam collected ethnographic materials from the tribesmen there (Peabody Museum accession notes 27-56-70/D2797). Unfortunately, no other collection notes are



A typical annual
Ganoderma fruiting body
produced in the tropics. The laccate
bracket-like basidiocarp grows to
maturity and does not regrow.



New initials of regrowth on the fruiting body have a remarkable resemblance to fingers with knuckle-like growths and tips with a beginning pore layer that look like fingernails.

available from this early expedition. The shiny and colorful *Ganoderma* with finger-like projections had apparently been an ornament owned by one of the village headman or medicine men (back then often called witch doctors). It must have been of special interest to Putnam and seemingly represented a mysterious symbol of power. A reed cord allowed the object to be worn around the neck and it would undoubtedly have been an impressive sight to see this strange and brilliantly colored 8 by 10 inch pendant being worn. How this remarkable object with the details of human fingers was used is not known. It is easy to imagine that such a strange object would be a prized possession used for all sorts of supernatural rituals. This was an object that Putnam knew he had to have. It was exactly what his trip was designed to find, one of the world's most unusual objects to illustrate the material culture from the inhabitants of one of the world's last frontiers. The object was among the collections he brought back to Harvard where it was placed in the Peabody Museum in 1926 in hopes of future studies. Putnam went on to study in the Congo, spending the rest of his life in Africa. He did not publish anything about the materials he brought back and for the past nine decades this extraordinary object has remained in the storage collection of the museum.

A Ganoderma like no other

The brightly colored lacinate or varnished looking *Ganoderma* are taxonomically placed into the *Ganoderma lucidum* complex which contains many species (Moncalvo and Ryvarden, 1997; Seo and Kirk, 2000). In the wild, it produces a stipe that extends up from the roots or stump of infected trees where it produces a bracket-like pileus. This polypore enlarges during the year and when mature it stops growing and will not regrow in subsequent years. Other *Ganoderma*, such as *Ganoderma applanatum*, are perennial and can produce new growth the following year with new pore layers produced annually. These fruiting bodies are geotropic and produce the pore layer toward the ground. If a log with *Ganoderma applanatum* sporophores were to be rolled over, the next year's fruiting body will reorient its pore layer so that the openings are facing the ground. The fungi in the *Ganoderma lucidum* group are different and usually do not regrow. They may, however, produce long stipes or what is commonly called the antler-like form (Stamets, 2000). Environmental factors influence the growth characteristics of *Ganoderma* with light, CO₂ concentration and humidity affecting fruiting body formation. High CO₂ environment and little to no light

will induce antler-like stipes to form without a pileus. The *Ganoderma* fruiting body from Dutch New Guinea is very unusual because it has secondary growth occurring from the edge of a fully formed sporophore. Over 20 new growths sprouted out from the original fruiting body with growth patterns resembling human fingers and the beginning white pore layer on the tips of the new growth giving the eerie appearance to finger nails. What scenario could have produced such uncommon fruiting? I can only postulate that it likely resulted when a fully formed but still expanding fruiting body was somehow flipped so the pileus edge was upright and then covered by a considerable layer of wet moss or other vegetation. The tropical conditions and change in the microenvironment around the fungus triggered new fruiting body initials to form. High CO₂ concentrations and lack of light could have promoted the finger development. Just when a new pore layer was starting to form on these fingers, one of the natives noticed the fungus, snatched it up and revered it for all its ghostly beauty. It is not the first time that *Ganoderma* have been thought to have mystical properties as seen in the historical record of ancient China for *Ganoderma lucidum* (Pegler, 2002; McMeekin, 2004). The bright coloration and surreal varnished appearance readily attracts attention and collection. The long historic use in Chinese traditional medicine has led to it being named the "mushroom of immortality" (Powell, 2014). The native people of Dutch New Guinea may have also thought that finding one of these beautiful lacquered objects growing naturally was very special. Finding this particular *Ganoderma* with its bold color, shiny appearance and human fingers projecting out of it had to be an extraordinary event. Undoubtedly it ended up being the ideal talisman for a chief or shaman.

What species of Ganoderma?

The taxonomy of the various species that make up the *Ganoderma lucidum* complex is currently being studied and I was very keen to find out what species this West Papua *Ganoderma* could be. Permission to sample the object for rDNA extraction and sequencing was granted by the Peabody Museum and a small sample of fungal tissue was obtained by the curator from the outer



Ganoderma fingers produced as secondary growth from a fully formed fruiting body. The regrowth is an amazing phenomenon for this fungus.

edge of the main stipe. However, the age of the specimen and possible use of insecticides in the early years of museum storage had adverse effects on DNA preservation and it was not possible to get sufficient DNA extracted from the sample for sequencing and positive identification. This fungus has similarities to other tropical *Ganoderma*, like the one shown, that has a normal type of fruiting but this fungus is from the tropics of Ecuador and not likely the same taxa.

A challenge to Ganoderma growers

Regrowth from laccate *Ganoderma* is a very unusual event. Furthermore, getting a group of finger-like projections all emanating from the edge of a fruiting body in the same plane is an exceedingly rare event that likely has never been repeated. For this fruiting body, the original stipe, large pileus and fingers were all produced in the same plane allowing this to be worn flat on the chest as a necklace. With the tremendous interest in growing *lingzhi* and *reishi* mushrooms and modern facilities to regulate environmental factors that govern its growth, it should be possible to recreate a *Ganoderma* that is similar to this rare and unique object. Can duplicates of this wonder of the fungal world be produced by growers? I suspect that it can if the specific conditions that occurred in the tropics of Dutch New Guinea can be mimicked. We are fortunate to have this natural wonder of the fungal world to view, ponder and discuss. Thanks to the native person who found this weird and wonderful natural object, to Patrick Putnam who recognized the significance of the object and his keen desire to preserve this historic cultural heritage and to the Peabody Museum who has kept great care of the object for many decades and allowed it to be studied so that its mycological significance could be better known.

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Finger-like growths of *Ganoderma* add to the ethnological mystique of this beautiful object.

permission by the Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge MA 02138. Photographs of the object were taken by the author and ©2015 is held by the President and Fellows of Harvard College.

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