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## SCARAB BEETLES IN HUMAN CULTURE

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### Abstract

The use of scarab beetles (Coleoptera: Scarabaeidae) by primarily pre- and non-industrial peoples throughout the world is reviewed. These uses consist of (1) religion and folklore, (2) folk medicine, (3) food, and (4) regalia and body ornamentation. The use of scarabs in religion or cosmology, once widespread in ancient Egypt, exists only rarely today in other cultures. Scarabs have a minor role in folk medicine today although they may have been more important in the past. The predominant utilization of these beetles today, and probably in the past as well, is as food with emphasis on the larval stage. Lastly, particularly large or brightly colored scarabs (or their parts) are used (mostly in the New World) to adorn the body or as regalia.

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*If one advances confidently in the direction of his dreams and endeavors to live the life which he has imagined, he will meet with a success unexpected in the common hours.*—Thoreau

This paper is warmly dedicated to Henry Howden in celebration of his many long years of dedicated field work in the Neotropics and the many fine papers on scarab systematics that flowed from his exploration and research. Henry's illustrious career has added immeasurably to our knowledge of all things scarabaeoid. His students and colleagues have all benefited from his mentoring, advice, and wealth of knowledge. For many decades, he has been considered *Mr. Scarab* to the world community. I am proud to have him as a friend and colleague and to have had my career materially influenced by his example.

The following review illustrates the various ways in which scarab beetles are (were) perceived or used by pre- or non-industrial peoples throughout the world. Ruddle (1973) noted that the scientific literature dealing with the use of insects in pre-industrial societies is both scattered and sparse and is generally of a cursory nature. The nonfood uses of insects are not usually mentioned, and this may result from the strong, culturally conditioned repugnance with which many non-entomologist researchers perceive insects. Ruddle concluded that many of these researchers regarded entomophagy as either a curiosity or a relic of barbarism, and this may, unfortunately, have persuaded indigenous populations to withhold information from investigators. I have excluded from this discussion the use of scarabs by modern, technological societies because this usually consists of agricultural or artistic applications. Scarabs, for example, are often used in modern cultures for art (painting, sculpture, baskets, wood, and lacquer ware). Similarly, extensive use is made of scarabs as toys (plastic primarily) and as "entertainment" in the form of betting on fights between adults of horned rhinoceros beetles such as *Xylotrupes gideon* (L.) (Dynastinae) in Malaysia and

the Philippines. These kinds of uses are too numerous and varied for this particular treatment. Below I discuss the use of scarabs on each continent. Some of the uses are historical, while other parts reflect modern utilization of scarab beetles.

## Africa

### *The Egyptian Sacred Scarab*

The first documented use of scarab beetles by humankind was a small alabaster case in the shape of a scarab (dung beetle) by the ancient Egyptians in the early first dynasty (ca. 3,000 B.C.) (Cambefort 1994). The behavior and nest-building activities of some dung beetles were such that the Egyptians established a complex symbolism for them as far back as 2,700 B.C. (Crowson 1981; Cambefort 1994).

Historically, dung beetles of the genera *Kheper*, *Scarabaeus*, *Gymnopleurus*, *Copris*, and *Catharsius* (all Scarabaeinae) played an important and prominent role in the mythology of ancient Egypt. Cambefort (1994) suggested the first scarab symbol was the metallic *Kheper aegyptiorum* (Latreille). Collectively known as the sacred scarab, these insects and their ball-rolling behavior (at least in the first three genera listed above; *Copris* and *Catharsius* are not ball rollers) symbolized certain parts of the Egyptian polytheistic theory of the universe. Ra, according to Egyptian theology, was the Sun God responsible for the daily shepherding of the sun across the sky. Ra, in this belief system, was also the first ruler of Egypt. A cult developed whereby Ra was symbolized by the scarab, and the sun was represented by the dung ball. The scarab pushing its ball was an earthly manifestation of Ra escorting the sun on its daily journey across the sky (Fig. 1). The setting of the sun was also presumably correlated with burial of the dung ball in the earth by the scarab.

According to Klausnitzer (1981), scarab reproductions are known from Egypt as early as the third millennium B.C., and an “embalmed” scarab was found belonging to the later period of the New Empire (700–33 B.C.). Hieroglyphics show a scarab representing creative power, and this glyph is interpreted as a symbol of Khepri, the God of Creation. The scarab also represented the abstract concept “cheper” which meant “to become,” “to come into being,” or “that which has come into being.”

After 200 B.C., during the Middle Kingdom, older interpretations of the role of scarabs changed so that the beetle was credited with the supernatural powers of insuring rebirth after death. This developed, in part, from the belief that all dung beetles were male, and that they could procreate their own young. Thus, the Sun God, Ra, did not originate from the joining of two beings of opposite sex but was instead born out of primary matter. An incomplete knowledge of the beetle’s life cycle contributed to its mystique.

Observing a scarab emerging from a corpse-like mummy (the pupa) was likened to rebirth. Cambefort (1994) suggested that Egyptian priests thought that whatever happened to the sun under ground (after it set) was essentially the same as scarab metamorphosis. The sun entered the ground at the end of the day as did the scarab and “his” ball of dung. The sun then traveled underground from west to east while undergoing a metamorphosis, or kheprus, that resulted in regeneration the following morning when the sun rose again from the ground as the scarab god Khepri. If the scarab and the sun could be reborn from the earth after death and transformation, why could this not then be possible for humans? Cambefort postulated that the beetle’s pupal stage inspired the process of human mummification. The mummy was the imitation of the scarab pupa, which was

a temporary condition prior to rebirth. The name given to scarabs, Cheper, was descriptive of the god-like powers attributed to it, *i.e.*, spontaneous generation, "to come into being," and rebirth in the same form after death.

Klausnitzer (1981) noted that, with the spread of the cult of the god Osiris and its associated concept of *judgment* of the dead, heart scarabs carved from greenstone (green being a particularly lucky color) began to replace the heart of the dead in burial chambers or placed in the wrappings of mummies. These heart scarabs frequently had verse from the Egyptian *Book of the Dead* written on the bottom surface. Associated with these scarabs was the idea that at the Day of Judgment, the true heart should not bear witness against its owner.

With magical powers being attributed to it, the scarab's likeness was fashioned into amulets, jewelry, and seals (Fig. 2). Pharaoh Amenophis III (*ca.* 1,400 B.C.) commemorated special occasions (such as his marriage or a hunt) by issuing scarabs (Fig. 3) ... much in the same fashion as commemorative coins are issued today (Reitter 1961). These scarabs were often of large size (Fig. 4) and were of excellent workmanship. Scarabs soon became more generally associated with good fortune, and craftsmen produced increasingly greater numbers of them made from stone or fired clay. The oval underside often bore an inscription such as "good luck," "life," or "health" as well as the names or symbols of the gods. Scarabs were strung on cords or copper wire and worn around the neck. The use of scarab amulets expanded until they were used as good luck charms by many cultures, including the later rulers of Egypt, Persians, Macedonians, Romans, and especially the Phoenicians. Cambefort (1994) noted that scarabs were very important to the Carthaginians and were found in abundance in their tombs, having been imported in large quantities from Egypt. Sardinia developed an industry for making scarabs, and it was from there that many ornamental scarabs went to Rome.

Scarabs apparently had medicinal powers ascribed to them as well. The origin of this is probably derived from religious veneration. Amulets were worn as protection against evil spells, and several papyrus documents provide information about using scarabs in popular medicine. Even today, a cottage industry in Cairo and the Nile Valley continues to manufacture scarabs for the tourist trade and, to a lesser extent, for fine jewelry.

#### *The Remainder of Africa*

Africa, especially south of the Sahara, has a diverse scarab fauna. Some of these scarabs are also relatively large (*e.g.*, *Augosoma centaurus* [Fabr.] and *Oryctes* spp.) (both Dynastinae), and yet I am unfamiliar with any reference that mentions the use of scarab body parts (especially elytra, pronota, or horns) being used as ornamentation on items of clothing, headdresses, jewelry, or ceremonial objects.

Despite the lack of reliable data, it is known that insects are an important dietary item in many aboriginal societies, both to supplement protein deficiencies during lean times as well as to complement other food resources at certain seasons (Ruddle 1973). Native hunter-gatherers or subsistence farmers traditionally eat insects, and people in many parts of Africa routinely use insects, including scarabs, as human food. The Betsileo of Madagascar, a pastoral people who, despite their herds, are essentially vegetarians, eat cockchafer grubs (Melolonthinae), other insects, and small fish (Bodenheimer 1951).

Tessmann (1913) recorded that the larva of the large dynastine, *Augosoma centaurus* (Fabr.), was forbidden to the uninitiated Pangwe men of the Cameroons. Adults of *Popillia femoralis* Klug (Rutelinae) were sold as food by



the basketful in the Dschang region of the Cameroons (Lisle 1945). Ghesquière (1947) observed that *Platygenia* sp. (Cetoniinae) were sold living or fried in oil in almost all the native markets of tropical Africa, and that the larva of *A. centaurus* were also consumed. The larvae and occasionally the adults of *Oryctes boas* (Fabr.), *O. owariensis* (Palisot de Beauvois), and *O. monoceras* (Olivier) (Dynastinae) are eaten in South Africa (Bodenheimer 1951). The larvae of some species of *Goliathus* (Cetoniinae) are considered a delicacy in the Congo (Bequaert 1921). The Bedouin of Egypt roast and eat with salt the adults of *Scarabaeus sacer* L. (Scarabaeinae) (Bristowe 1932), while Hope (1842) and Bodenheimer (1951) both reported that some women in North Africa eat adult dung beetles (*Scarabaeus* sp.) with the idea of achieving the proper degree of plumpness (a trait of attractiveness in the region).

Reitter (1961) observed that the bushmen and Hottentots of southern Africa eat rhinoceros beetles (probably *Oryctes* sp., possibly *Augosoma centaurus*) in order to acquire the “special powers” they associate with these large (ca. 40–65 mm) beetles. This is known as imitative magic, and these rituals were reviewed by Cherry (2005).

Klausnitzer (1981), expanding on the theme of magical properties derived from beetles, reported that conspicuously horned, tropical rhinoceros beetles served as aphrodisiacs. Belief in the efficacy of such a potion was encouraged by the increased development of body size and especially horns in these scarabs. Many prescriptions apparently recommended that the horns alone should be taken in water, and such aphrodisiac preparations continue to be used today.

### Europe

The ancient Greeks and Romans adopted, to varying degrees, the Egyptian sacred scarab. This took the form of employing the scarab primarily as a good luck charm without incorporating the Egyptian components of “life after death” messages to the “keeper of the balance” during judgment in the netherworld, or sun god symbolism. Two scarabs, apparently from northern Syria, were recently found on a Bronze Age shipwreck discovered at Uluburun in southern Turkey (Pulak and Bass 2002). A unique gold scarab naming Nefertiti was found in the wreck. Nefertiti was the wife of the heretic 18th Dynasty Egyptian pharaoh Akhenaten (1352–1336 B.C.), the promoter of monotheism in Egypt. The trading vessel sank approximately 1,300 B.C. and was probably of the Canaanite culture (Bower 1984, 1989). Elsewhere, on the island of Crete, hand-sized representations of rhinoceros beetles (probably *Oryctes* sp.) have been excavated from a Minoan shrine dating from about 1,600 B.C. (Klausnitzer 1981). The Romans especially had great faith in the scarab’s protective powers, particularly in battle, and many artificial scarabs have been found in Roman

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**Figs. 1–4.** (1): Rectangular pendant with blue scarab between two green, sacred baboons. Pendant made from gold, lapis-lazuli, turquoise, and carnelian. Photo courtesy of Egyptian Museum, Cairo. (2): Scarab armband in the Egyptian Museum (Cairo) made of gold, lapis-lazuli, quartz, and carnelian. Photo by Margarete Busing, Ausstellung Tutanchamun. (3): Commemorative heart scarab highlighting a hunt of king Amenophis III, New Empire, 1,580–00 B.C. Photo by author. (4): Giant granite scarab at the Temple of Amun at Karnak, Egypt. Photo by C. Messenger.

graves dating from before 400 A.D. Until recently, the only scarab, indeed the only beetle, ever to appear on ancient coins was a sacred scarab and its dung ball. Only a few ancient Greek and Roman coins bear its likeness. Poland introduced a very attractive two Złote coin in 1997 with a stag beetle, *Lucanus cervus* (L.), adorning it.

During the Middle Ages, according to Reitter (1961), the ecclesiastical courts (as opposed to the civil courts) actually tried cases against pest animals (rats, mice, caterpillars, grasshoppers, and chafer larvae [*Melolontha* sp., Melolonthinae]) when they appeared in such large numbers so as to endanger harvests or affect the life and property of the community. The intention of the court was to make these animals desist from their actions that were causing or threatening loss. The proceedings consisted of prayers, exhortations, exorcisms, and the use of holy water. On the preliminary trial day a prosecutor would read the charges against the accused (representatives of whom were in court). The judge would thrice order them to leave the area with curses and maledictions, and the accused were then released. As one would expect, this had no effect. After three days, the second stage of the trial took place before the Bishop or his representative. The prosecution would demand that the sentence should be carried out inasmuch as the orders of the first court were disregarded by the accused. Consequently, a number of the accused were brought before the court and executed while the judge called down curses upon their relatives. In 1478, the Bishop of Lausanne (Switzerland) instituted proceedings against the white grub larvae of chafers that were causing devastation throughout the countryside (Reitter 1961). The larvae were declared excommunicate from the church pulpit by a lay preacher, whereupon the congregation was asked their support by saying three *Ave Marias* and three *Paternosters*.

A more enlightened attitude regarding chafers developed later when Europeans began to consume both adults and larvae. Revenge was not a factor, but nutrition. As noted by Meyer-Rochow (1973), the absence of insects from European menus is fairly recent. It wasn't just a lack of larger game animals that caused humans to eat insects. The fact that entomophagy was once so widespread in almost every culture (regardless of food or protein shortages) indicates there were other reasons to eat insects. It is doubtful that primitive humans ever felt an instinctive aversion to eating insects, and there is no evidence to suggest that there is anything basically repellent about insects. Insects were, and are, consumed because they have a high nutritive value and are abundant. The aversion to insects as food is a recently established custom and prejudice of western civilization (Bodenheimer 1951), although Cherry (personal communication, January 2006) rejects this and believes that cultures around the world simply abandon eating insects as their supply of meat and fish increases.

Scarab beetles in Europe have been prepared in a variety of ways, although the abdomen and the thorax of adults were generally favored because the remaining parts were too chitinous; all except the head capsule of the larva was usable. Illiger (1804) presented recipes for preparing May beetles (*Melolontha* sp.), and as late as the end of the last century it was possible to find chafer bouillon in some of the finest French restaurants (Klausnitzer 1981). Erasmus Darwin (1800) advocated using both the adults and larvae of chafers as food. Westerman (1821) reported some mountain peoples of Europe eating chafers. Hope (1842) indicated chafers (*Melolontha* sp.) and *Rhizotrogus pini* (Olivier) (Melolonthinae) were consumed in Moldavia and Walachia. Holt (1885), in his remarkably

entertaining book, *Why Not Eat Insects*, waxed poetic on eating the chafer, *Melolontha vulgaris* Fabricius.

“Cockchafers are not only common but of a most serviceable size and plumpness ... What a godsend to housekeepers to discover a new *entrée* to vary the monotony of the present round! Why should invention, which makes such gigantic strides in other directions, stand still in cookery? Here then, mistresses, who thirst to place new and dainty dishes before your guests, what better could you have than ‘Curried Maychafers’, or, if you want a more mysterious title, *Larvae Melolonthae à la Grugru*. Landowning guests ought to relish the opportunity of retaliating, at your table, under the *lex talionis*, upon this, one of their worst insect tormentors. Another dish, which should take with the farmer, would be *Fried Chafers with Wireworm sauce*. Perhaps, however, the little word ‘worm’ might be objected to. So let us pander to the refined senses of the delicately fastidious by writing it upon our *menu* as *Fried Melolonthae with Elater sauce*.”

The eating of larval and adult cockchafers was clearly once widespread in Europe with the custom still surviving today here and there in Europe (Bates 1959).

The use of the May beetle, *Melolontha vulgaris*, in folk medicine was widespread in Europe in the past. Oil obtained from the larvae was used as a medicine on scratches and other wounds as well as a cure for rheumatism, and adults soaked in wine were supposed to be helpful in treating anemia. Biting off the head of the first May beetle of the year was believed to give protection against fever for the next twelve months (Reitter 1961). Pulverized chafers were thought to help in the treatment of epilepsy, and the Roman scholar Pliny was said to have advocated that a chafer, *Polyphylla fullo* (L.) Melolonthinae, tied between two lizards is a cure for four-day fever (malaria) (Netolitzky 1920). Klausnitzer (1981) indicated that the three-horned Dor beetle (*Typhoeus typhoeus* [L.], Geotrupidae) was a folk cure for many illnesses when hung around the neck, and that dung beetles brought relief in cases of ear-ache, bladder stones, and dropsy. Even the *dung balls* rolled up by the sacred scarab (*Scarabaeus* sp.) were used in costly medications, thus giving real meaning to the expletive, “holy shit!”

Holt (1885) observed that the general abhorrence of insects seemed to have increased owing to the fact that they are no longer commonly used as medicines. The fact that they used to be prescribed as remedies by village quacks and wise men made people, at any rate, familiar with the idea of *swallowing* them. Now, 120 years later, it is even worse as people become even more insulated from the plants and animals surrounding them.

Another geotrupid scarab, *Geotrupes stercorarius* L., was widely associated in the Middle Ages with malevolent powers (Reitter 1961). Reitter reported that the ancient Greeks regarded it as the devil’s steed (see cover!) as did the central Europeans later because of some association with a storm god. In Finland, the rescue of this scarab would help to allay storms and crop losses, while in Austria it was associated with ghostly manifestations. In Sweden the beetle was imbued with supernatural powers, and in eastern Germany it was associated with witches. This scarab was also used to forecast the weather and tell fortunes. According to a French legend, it drank drops of Jesus’ blood at the foot of the cross at Golgotha, a loose correlation to the fact that the insect exudes a drop of red fluid when alarmed (Reitter 1961).



Scarabaeoid symbolism using stag beetles (*Lucanus cervus* [L.]) was widespread in Germany and surrounding regions. The stag beetle was commonly associated with Thor, the god of thunder and lightning. According to Cambefort (1994), the association that the scarab symbolized Christ was widely accepted, and the German artist, Albrecht Dürer, placed the stag beetle with Christ in many of his paintings. Pliny the Elder observed that both the Greeks and Romans recommended hanging the head of a stag beetle around the neck of a child to ward off illness (Sprecher and Taroni 2004). In Germany, the stag beetle can still be found as an accessory on traditional Bavarian costumes. Sprecher and Taroni (2004) also reported that the ashes of the stag beetle (*L. cervus*), originally used as a sexual stimulant, was an effective love potion. Conversely, the mandibles of the beetle were worn in Austria as an amulet to prevent cramps or as a diuretic.

The origins of these folk beliefs and their spread in Europe are lost in the mists of time. For example, to suit the different fauna and circumstances in Europe, the predominantly Mediterranean sacred scarabs were replaced by other species of scarabs for purposes other than the original Egyptian cosmology.

### Asia

The human utilization of scarab beetles in Asia is primarily that of food with occasional uses in medicine, religion (Taoism), or art. The consumption of insects is widespread among indigenous peoples in Asia as it is in South America, probably because insects are abundant and relatively nutritious. A variety of insects were eaten in Japan and China, but I have no citation referring specifically to scarabs except Donovan (1798) who referred to the larvae of *Catharsius molossus* (L.) (Scarabaeinae) being eaten in China. The larvae, pupae, and adults of Scarabaeidae continue to be regularly eaten in many parts of Southeast Asia, although reports for Southwest Asia are apparently rare.

Bristowe (1932) observed that Thais considered Laotians “dirty feeders” because of their insect eating habits, especially for their liking of dung beetles (Scarabaeinae) and their larvae. Actually the Thais themselves consume some scarabs, although it is not prevalent. In Thailand, adults of *Copris* sp. and *Onthophagus* sp. (Scarabaeinae), as well as the adults of *Holotrichia* sp. (Melolonthinae), are eaten (Watanabe and Satrawaha 1984). *Anomala antigua* (Gyll.) (Rutelinae) is also eaten (Defoliart, personal communication 1989).

Bristowe (1932) reviewed the scarabs that were eaten in Laos. *Adoretus compressus* Weber and *A. convexus* Burm. (Rutelinae) were popular, being collected at night when swarming around lights. They were typically roasted, and then the elytra were pulled off. Among the rhinoceros beetles (subfamily Dynastinae), the larvae, pupae, and adults of *Oryctes rhinoceros* (L.) were especially favored with the larvae and adults being most highly prized. This species was searched for under cow and buffalo dung. Although not a dung beetle, the larvae are often found feeding in compost or other decaying plant matter, including dung. The adults were usually roasted (sometimes fried), and either eaten alone after breaking off the hard, chitinous parts or used in curries; larvae and pupae were soaked in coconut milk and then roasted. Another large rhinoceros beetle, *Xylotrupes gideon* (L.) (Dynastinae), was also eaten but with less enthusiasm. The larvae are occasionally pests of coconut and sugar palms and are easily found there. In the Philippines and Malaysia, the males of this species were pitted in fights against one another for “sport”, but so much money changed hands on these occasions that a law was enacted prohibiting beetle fights (Bristowe 1932). Among dung beetles, *Onitis virens* Lansberg (Scarabaeinae) was

common in cattle dung, and the adults were roasted and eaten with salt. Large (ca. 60 mm), black species of *Heliocopris* (Scarabaeinae) were roasted, pulverized, and added to curry. In the Shan region of Burma, the pupae of *Heliocopris bucephalus* (Fabr.) were considered a delicacy and were even exported (Ghosh 1924). From March through May they were sought after as they rested in their dung brood balls one to two feet beneath the surface of the ground. Various other grubs found in cattle droppings were also gathered and eaten during the rainy season including the larvae of *Oryctes rhinoceros* and *Xylotrupes gideon* (Dynastinae).

In Vietnam, according to Bodenheimer (1951), adults of a chafer (Melolonthinae) were collected in April, killed, and soaked overnight in *nuocmam* sauce after first having the elytra, wings, antennae, legs, and intestines removed. This was considered such a delicacy that a king of Hue once sent to the emperor in Peking a personal gift of this preparation as part of a triennial tribute.

At least four different species of Melolonthinae [*Lepidiota stigma* (Fabr.), *Lepidiota* sp., and two species of *Leucopholis*] were eaten in Malaysia and Thailand (Annandale 1900). The larvae and adults of all four species were sold in the local markets. A conventional representation of the larva was often carved on the rice stirrers and other objects of household use. These scarabs were prepared by either being roasted or fried in coconut oil.

The report by Netolitzky (1920) that *Megasoma actaeon* (L.) (Dynastinae) is eaten in Malaysia is based on an incorrect identification; this beetle is found only in the New World tropics ... unless this was a precursor to the feast shown in the motion picture, *Indiana Jones and the Temple of Doom*, where *M. actaeon* was served with great fanfare ... in India!

The use of scarabs in traditional folk medicine has been and remains widespread in Asia, especially China. Bristowe (1932) reported that in Laos *Heliocopris* species (Scarabaeinae) were used as a medicine for diarrhea and dysentery. Roasted, pulverized beetles and a little powdered lime (=calcium) and saffron were added to water which was to be drunk. The calcium carbonate component of the concoction would be helpful to an upset stomach. Note, however, that dung beetles are intermediate hosts for tapeworms, helminths, and pathogenic bacteria! I can't help but wonder if "roasting" is done at a sufficiently high temperature to neutralize all stages of the parasites and microbes. Xu *et al.* (2003) reported *Escherichia coli* O157:H7 from the intestines of *Catharsius molossus* (L.) in China and noted that the same strain was isolated from fecal samples of 383 patients with diarrhea from the same region. Most importantly, using pulsed field gel electrophoresis (PFGE) of chromosomal DNA restriction fragments and PCR method, they found that the PFGE pattern and virulence genes of beetle isolates were identical to those of the human isolates, such as Shiga-toxins (*stx*) and enterohemorrhagic *Escherichia coli* hemolysin A (EHEC-*hlyA*). Nevertheless, dung beetles continue to be commonly used in traditional Chinese folk medicine for many ailments, especially for the treatment of cancer, *e.g.*, Huang *et al.* (2005), APTMNET (2005), Lei Yun Shang Song Fen Tang Co. (2005), and Corona Science and Technology Development Co. (2005). Klausnitzer (1981) referred to the use of scarabs in Japanese folk medicine.

#### Australia, New Guinea, Melanesia

Some Australian aboriginals used scarab beetles both as totems and as food. Inasmuch as these nomadic peoples ate almost any animal they found (Spencer 1922; Abrams 1987), they consumed insect larvae (including those of

Scarabaeidae) at nearly every opportunity. In such cases, the larvae were usually placed on the coals of a fire for a brief time until they "straighten out" and are "cooked." Hope (1842) reported that *Anoplognathus viridaeneus* (Donovan) (Rutelinae) was eaten by aboriginals in northern Australia.

The use of insects as totems is known only from certain groups in central Australia who placed special significance on the larvae of a small scarab (*uchalka*) and a longhorn beetle (Cerambycidae; *idnimita*). Spencer (1928) observed that the totem animal was eaten as part of the ceremonies involving a fertility rite. If the totem animal was not eaten there was a danger that the insect would not subsequently occur in sufficient numbers to be utilized as a source of food.

In New Guinea, Miklucho-Maclay (1875) noted that all insects, especially big beetles, were eaten raw or cooked by the Papuans. Many of New Guinea's large beetles are scarabs or longhorn beetles. The Chuave, part of the Chimbu people who live in the Central Highlands of New Guinea, eagerly sought out all animals for food, including the wood boring and root feeding larvae of scarabs. The Onabasulu, inhabiting an area north of Mt. Bosavi, ate rhinoceros beetles as well as the larvae of *Oryctes centaurus* Sternberg (Dynastinae) (Meyer-Rochow 1973).

Bernatzik (1936) recorded that larvae of *Oryctes rhinoceros* were highly prized as a food item by the people of Owa Raha in the Solomon Islands. The Kiriwinians, a Melanesian people inhabiting the Trobriand Islands, ate a variety of insects, including the larvae of the rhinoceros beetle, *Scapanes* sp. (Dynastinae) (Meyer-Rochow 1973).

#### North America

The Indians of North America were familiar with a variety of different insects, including scarab beetles. Each tribe had its own names for these insects, and a brief example of the linguistic component of culture is given below for the Navajo of the Southwest. North American Indians largely ignored insects as food (Hitchcock 1962), medicine, or in ceremonies. A perusal of various volumes of the Handbook of North American Indians (Heizer 1978; Trigger 1978; Ortiz 1979; d'Azevedo 1986) consistently shows no references to scarabs, beetles, or even insects. Perhaps this is correlated with the greater and/or consistent availability of animal protein found in shellfish, fish, birds, and mammals.

Cherry (1993), citing Clausen (1954), related one myth of the Cherokee of the southeastern United States, where the behavior of the larvae of the green June beetle (*Cotinis nitida* [L.]; Cetoniinae) is explained. The *Cotinis* grub, acting as the Chief of a council meeting, became so amused at a suggestion that he fell over backward with laughter. When he tried to get to his feet, he could not and so had to crawl away on his back. And that is the reason why, today, larvae of *C. nitida*, unlike other scarabs, are known to move on their backs.

Native methods of "naming" organisms are of considerable interest to the ethnobiologist because they provide some insights about the evolution of classification systems. Hitchcock (1962) observed that individual species of insects were not often distinguished by Indians in general, and that the generic term for insects sometimes included other diverse groups of animals. This was in sharp contrast to the skill with which Indians distinguished between closely related forms of mammals. Generally, the more uses an Indian group made of insects, the greater number of names they had for the different types. In studies conducted by Wyman and Bailey (1964), 701 valid Navajo names were obtained from the 1,027 species of insects represented in an identified reference collection. Among 204 species of beetles present, 87% were given specific names, and

a number of these were scarab beetles. The Navajo applied names to animals that may have all belonged to the same taxonomic group but also to animals from very different groups that grossly resembled each other. These distinctions between groups were made on the basis of similarity in structure, behavior, and habitat much in the same way that early European biologists classified whales with fishes instead of with mammals.

Dung beetles (Scarabaeinae) and occasionally other families of beetles are collectively known among the Navajo as “dung rollers” (in the English rendition), because these beetles are commonly found in dung. *Canthon* species are also referred to as “square-urine squirter” apparently in loose reference to the shape of the body and the alarm or reflex voiding of waste fluids by the beetle when handled (Wyman and Bailey 1964). The larvae of *Orizabus pyriformis* (LeConte) (Dynastinae) are known as “wood-eater” (applied equally to termites) and “big tree killer”, either in reference to the larvae living in dead and rotting trees or the Navajo belief that the larvae *cause* the death of a host tree (which they do not).

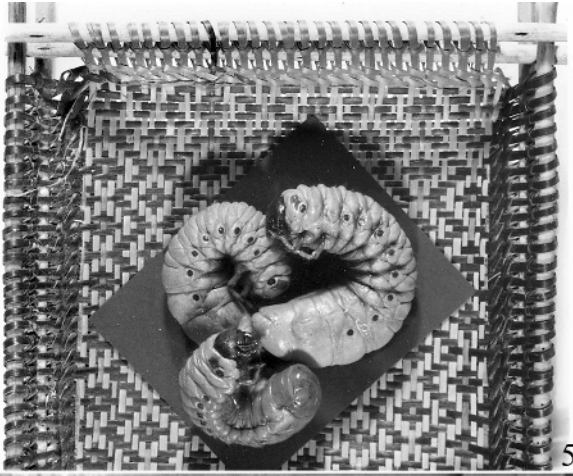
For the Navajo, a number of beetles or beetle-like insects (including scarabs) are called “rock beavers” or “big rock beaver” if the insect is larger. “Rock beaver’s young” refers to smaller (but adult) species of Scarabaeidae (e.g., Aphodiinae: *Aphodius* sp.; Melolonthinae: *Diplotaxis* sp., *Phyllophaga* sp.; Dynastinae: *Cyclocephala* sp., *Tomarus* sp.). “Striped rock beaver” is the name given to adults of *Polyphylla* sp. (Melolonthinae) because they are distinctively striped. “Yellow rock beaver” and “red rock beaver” refer to other scarab beetles that show a predominant color.

### Latin America

Entomophagy often plays an integral and complementary role in the diets of indigenous peoples because it compensates for the general deficiency of animal protein. Insects are not consumed as delicacies but as basic nutritional elements lacking in their diets. Those insects most widely eaten in large quantities have a high calorific value and are rich in fats and proteins (Defoliart 1975; Conconi *et al.* 1984). Insects are less important sources of mineral salts and vitamins.

Numerous insects are consumed in Mexico (personal observation; Conconi *et al.* 1984). Indians eat the larvae of *Strategus* sp. in Nayarit and Chiapas, the larvae of *Xyloryctes* sp. in Chiapas (both Dynastinae), and also the larvae of *Phyllophaga* sp. (Melolonthinae) in Michoacan (Conconi and Bourges 1977). Historically, the Aztecs used a chafer (scarab) like a “brilliant red spider” for divination. A cross was drawn on the ground and a chafer placed in the center of the cross and spat upon. If the chafer ran to the north, the subject under consideration knew he was going to die, but if it ran in any other direction, the person would live (Hitchcock 1962).

Many Indian tribes in South America routinely use insects in their diets. The larvae of palm weevils (Curculionidae, *Rhynchophorus* sp.), longhorn beetles (Cerambycidae), and passalid beetles (Passalidae) are most prominently featured in the literature that deals with native foods. The Wapishana of Guyana considered larvae a delicacy and ate them raw or split them open and baked them with boiled rice (Roth 1924). Passalids are semi-colonial, and so it is possible to find many larvae at once in the rotten logs in which they live. Dufour (1987) studied the Tukanoan Indians of the northwest Amazon in the Colombian Vaupes region. These people are slash and burn horticulturalists who eat a variety of insects. They deliberately fell palm trees to attract adult palm weevils and passalids which oviposit in the decaying pith where the larvae then develop. The



5



6

**Figs. 5-6.** (5): Scarab larvae, probably *Megasoma actaeon* (L.) (Dynastinae), collected near Manaus, Brazil. Photo by author. (6): *Platycoelia lutescens* being sold for food in a market in Quito, Ecuador, 1999. Photo by A. Paucar.

larvae constitute a managed resource. Although beetle larvae are preferred over adults, the Tukanoans favored the adults of *Megaceras crassum* Prell (Dynastinae), a large (ca. 40 mm) scarab, more than larvae. Dufour noted that some insects (including scarabs) were less predictable in space and time and so were collected opportunistically in small quantities (Fig. 5). Other insect foods, like palm weevil larvae, termites (*Syntermes* sp.), and leaf cutter ants (*Atta* sp.), were sought after and collected in larger quantities.

Netolitzky (1920) reported that in Minas Gerais, Brazil, the large grubs of *Megasoma hector* Gory (= *M. anubis* [Chevrolat]) were roasted over coals. The Guyaki, who lived in the forests of eastern Paraguay, relish the grubs of passalid beetles that live in decaying pindo palms. Like the Tukanoan Indians of the

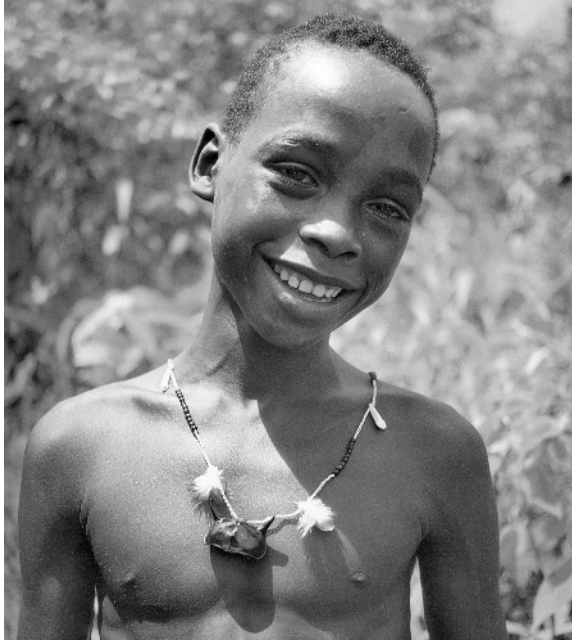


Fig. 7. Jivaro headdress incorporating three entire *Chrysophora chysochlora* adults (arrows) on the headband. Each beetle is approximately 30 mm long. Photo by author.

northwest Amazon, they increased the supply of grubs by felling or notching the trees to provide breeding sites for the passalids (Metraux and Baldus 1963).

The adults of *Platycoelia lutescens* Blanchard (Rutelinae) are sold as a traditional food item in Quito, Ecuador (Fig. 6). Smith and Paucar (2000) gave a detailed review of how these beetles are gathered, prepared, cooked, and who eats them. According to Ruddle (1973), the less acculturated Yukpa-Yuko Indians of Venezuela and Colombia retain insects as an important element of their diet in response to their physiological need for protein and fats. In their society, beetles constitute a minor, but relished, source of food. The larvae and adults of *Podischnus agenor* (Olivier) (Dynastinae) are particularly sought after because they “contain a lot of meat.” Some people, mostly children, eat them raw although the preferred method is to remove the head, thorax, legs, and wings and skewer the abdomen on a small stick for roasting lightly. Ruddle concluded that with the depletion of the macrofauna due to hunting and habitat destruction, many Yukpa were faced with a shortage of animal protein. Animal species adapted to these forests are becoming scarce and are being replaced by species associated with human-induced habitats, which provide a poorer base of animal proteins. Consequently, the consumption of insects is being reinforced by the increasing scarcity of larger game rather than disappearing under the impact of acculturation.

Non-food uses of scarabs in Latin America are few. The feathers of birds are the prime components in regalia decoration, but ornaments are also made from brilliantly colored insect wing covers, especially those of scarabs and wood boring beetles (Buprestidae) (Gilmore 1963). The Jivaro, of the eastern lowlands of Ecuador, make beautiful headdresses (Fig. 7) and necklaces using the brilliant,



**Fig. 8.** Pronotum of *Megasoma actaeon* being worn by a boy in South America. Photo courtesy of Shogakukan, Inc., Tokyo, Japan.

metallic green elytra, pronota, or entire bodies of *Chrysophora chrysochlora* (Latreille) (Rutelinae). Sabah (2004) reported similar uses by the Shuar and Sequoia Indians in Ecuador. The horns of large dynastines are also fashioned into necklaces (Fig. 8) in Brazil, Venezuela, and Colombia (personal observation; Sabah 2004) and the Guianas (Sakaguchi 1983). Ruddle (1973) noted that the Yukpa of Venezuela and Colombia use the elytra and hind wings of larger beetles together with the hind wings of dragonflies as necklace ornaments, and that the femora of larger beetles, especially *Podischnus agenor* (Olivier), are employed as bead separators.

Koch-Grunberg (1921) observed a masked dance of the Kauga in extreme northwestern Brazil that was known as the “Dance of the Dung Beetles.” Dancing hand in hand and singing, they rolled a stick (representing a dung ball) back and forth with ceremonial staffs. Koch-Grunberg’s interpretation of the dance was that it was based on an idea of the magic power of purification which was capable of driving off demons and encouraging fertility. The movements of the dance were supposed to mimic the behavior of a dung beetle.

Reitter (1961) indicated that some Indians ate *Dynastes hercules* L. (Dynastini) in the belief that the special powers associated with the size of these animals (ca. 150 mm) could be acquired by eating them (imitative magic). To the Aymara of the Lake Titicaca Plateau in Bolivia, a certain scarab beetle was believed to cause madness, and occasionally, in referring to an insane person, they would say “someone has given him a scarab to drink” (LaBarre 1950).

Cambeport (1994) observed that creation myths involving scarabs exist in some shamanic societies such as certain Indian tribes from the Chaco region of

South America where a large scarab named Aksak molded man and woman from clay.

### Summary

Scarab beetles, because of their size, numbers, and beauty, have played various roles in their interactions with humankind. The principal categories of human utilization of scarabs have been religion and folklore, folk medicine, food, and ornamentation of regalia.

Scarabs do not figure prominently in religion in any society today, although they once did with the ancient Egyptians and, to a lesser extent, nearby Mediterranean cultures. Their utilization in folk medicine continues in several places, and the literature suggests that most of this occurs in contemporary Asia. The brightly colored parts of scarabs (elytra, pronota, legs) or their impressive horns (in Dynastinae) have been widely used to adorn both costume and body. The ancient Egyptians attached much religious and symbolic significance to scarab beetles, and those who came later retained the sacred scarab as a charm. The horns of large dynastines that are worn as totems by natives living in the tropics today are indications of imitative magic. Otherwise, scarabs or their parts have been worn simply because they are attractive or aesthetically pleasing.

The most widespread human use of scarabs currently is as food. Using insects as food was arrived at independently in numerous societies. While many natives are selective with insects and will eat only certain kinds, others will eat almost any insect they can catch. The larvae and occasionally adults of larger scarabs seem to be most favored as food items because of their size. When all is said and done, size *does* matter! *Scarabaei regnant!*

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