

The Roots of Ophidian Symbolism

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INTRODUCTION

The proposition that the motives that impel man to attribute symbolic significances to an animal species arise from complex, often obscure psychological factors needs little initial justification. Cases like the Iroquois Indian custom of naming their clans after animals, even though these are not at all totemic; the bear-cult among certain Siberian tribes (Alekseenko 1968); excessive preoccupation of Nuer with cattle (Evans-Pritchard 1956); and cobra-worship by the Hindus (Mandlik 1896) exemplify peoples who, in their daily lives, venerate, attribute supernatural powers to, or invoke animals in simile and metaphor. The fundamental reasons that prompt these attitudes, even when they are accurately identifiable, may not yield to generalization. One view, to be discussed later, suggests that an animal may command selective attention when certain "anomalies" of appearance or behavior make its accommodation difficult in non-Linnaean "taxonomic" schemes, primarily of primitive societies. However,

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various other reasons may prevail when man attaches emblematic significances to particular species of animals.

One factor, that of fear, is largely neglected in cross-cultural anthropological studies of people who exhibit sharp emotional sensitivities to animals they regard, whether justifiably or irrationally, as dangerous. The manifestations of fear, however, are easily discernible from a variety of scientific viewpoints, including evolutionary aspects of physiology, genetics, ontogeny, sexual differences, and the psychology of primate behavior. In addition, fear, as an irrationally phobic, often transient, reaction incited by specific phenomena, objects, or memories of these, is unequivocally apparent—to the extent that its neurological effects, such as bodily secretions and muscular tone, can be assessed by quantitative physical and chemical means in individual test subjects (Gray 1971). It is different from covert emotional states like guilt, shame, perplexity, attachment to one's clan, etc., which find their main, collective expressions in a society's customs and attitudes such as religious zeal or tendency to devise symbols or invent myths. These may equally be caused by fear. However, the *recognition* of fear, in the sense of uncompounded terror or deep anxiety, involves none of the uncertainties and ambiguities inherent in a psychoanalytic approach, upon which alone those who seek the "meanings" of symbols generally depend when they interpret human attitudes that are shaped by obscure emotional states not triggered by fear.

It is impossible in this brief review to convey an adequate impression of the explicit role of fear of the serpent in religious and secular beliefs of almost every society throughout the world.¹ This animal seems to compel an extraordinary fascination, repugnance, and reverence in ways that few other species, perhaps none, can match. This statement is prompted by information presented in the section on ophidiophobia *via-à-vis* evolution of the primates and is reinforced in the concluding, theoretical discussion of facets of science and the humanities that are far less applicable to fear of animals other than the serpent. We must first briefly elucidate the manifestations of ophidiophobia and ophiolatry and compare these with man's attitudes toward a few other fear-engendering species.

¹ Every theme touched upon in this article will be expanded and illustrated in a book that I will publish in due course.

THE VENERATION OF SERPENTS

It is important to recognize both the antiquity and the global aspect of serpent veneration. No cult animal has a geographical distribution comparable to that of the serpent. Its northern limits extend as far as the Arctic Circle and the southern to the tips of the continents, though there is a sharp drop in its populations at these extremes. Faunas vary drastically according to climate and geographic zone, but between latitudes 65°N and 48°S there are few places where poisonous serpents are absent (Darlington 1957:182–183). This augments the species' range of effectiveness as a myth-maker. It is represented, apparently in cultic contexts, in prehistoric art from the Lake Onega, White Sea, and Scandinavian regions of far northern Europe (Hallström 1960; Moora 1957; Raudonikas 1936) and is engraved on rock in the Swiss Alps (Zindel 1968–1969:171), where the adder ranges to an elevation of over 3048 meters (10,000 feet). In Ireland, whose fauna totally lacks serpents, impressive, rupes-tral carvings of them and of sun motifs, apparently cultic, occur in passage-graves of the fourth millennium B.C. (O'Kelley 1973), and the later, pre-Christian Irish represented an extensive catalogue of fantastic serpents in their myths and iconography (Ross 1967:345–348).

Monolithic slabs incised with human figures bearing ophidian and solar cult symbols, datable perhaps to the Upper Paleolithic period, occur in central Siberia (Lipskii 1970). They are probably the forerunners of the strong ophidian traditions that survived among several northeastern Siberian tribes up to recent times. The Yakuts, for example, held that the body of their "first shaman" consisted of a mass of serpents (Mikhailowski 1894:64; Eliade 1964:152).

The Northwest Pacific Coast Indians of Vancouver Island, British Columbia, where serpents are scarce and venomous species nonexistent (Drucker 1951:154) have a very extensive body of terror-laden myths built around a revulsive, fantastic, ophidian creature, the *sisiutl* (Boas 1935; McIlwraith 1948). Eskimo art retains traces of a probable serpent motif, the *palraiyyuk* (Borden 1976:441). Persistences like these reflect deep-seated psychological sensitivities as eloquently as the irrational serpent phobias of modern, urban societies. They are comparable with other cross-cultural manifestations of fear, like that

of darkness, thunder, and of being alone. I have previously suggested that the cult of the serpent had an extraordinarily early origin in human societies, and I have utilized this theme as a background in discussing prehistoric migrations from Siberia to the New World (Mundkur 1976).

Certain distinctively ophidian attributes have generated a vast variety of superstitions and myths in the most primitive as well as civilized societies. In essence, these beliefs are almost universal, and perhaps have similar origins traceable to some herpetological oddity. They are related primarily to one fundamental cause: fear of the serpent's venom. Were this not so, it is doubtful that its other qualities could compel inordinately greater attention than do most other animals. Its stealthy and unpredictable ways often aggravate the uncertainties of distinguishing harmless from venomous species and prompt reverential fear of the entire ophidian family. On the other hand, shrewd possessors of knowledge of its behavioral traits often handle deadly poisonous species with impunity, filling the roles of shaman, priest, or entertainer impressively.

How inveterate is the awe of reptiles may be gauged from explicit statements in ancient texts: From the hymns of the *Atharva Veda* of the Hindus we have: "With my eye do I slay thy eye, with poison do I slay thy poison. O Serpent, die, do not live; back upon thee shall thy poison turn" (*AV.* V, 13, 4); "May the serpent, ye gods, not slay us along with our children and our men! . . . Reverence (be) to the divine folk" (*AV.* VI, 56, 1); "To Indra belongs the first chariot, to the gods the second chariot. . . . [The] serpent's chariot is the last. It shall hit a post and come to grief" (*AV.* X, 4, 1); "Indra slew thy first ancestor, O Serpent, and since they are crushed, what strength, forsooth, can be theirs?" (*AV.* X, 4, 18). The *Atharva Veda* has apotropaisms for no other dreadful animal except the scorpion and, once, for the wolf, but these lack the ardor of the hymns just quoted. A prayer (XII, 1[46]), epitomizes the fear of serpents unleashed by the rains. It is addressed to Prithvī, the goddess "Earth" of the Hindus: "The serpent—the scorpion with thirsty fangs—that hibernating torpidly lies upon thee; the worm, and whatever living thing, O Earth, moves in the rainy season, shall, when it creeps, not creep upon us: with what is auspicious (on thee) be gracious to us." The odious thought of a serpent creeping over an unsuspecting or sleeping person is concrete in the

etymology of an epithet for serpent in Sanskrit and in the demotic Pali: *Urag* and *Uraṅg*. In both, the prefix *ur* is derived from *uras*, meaning “breast,” “bosom.” The suffix, *ag* means “to wind, curl, move tortuously in a zigzag way”; as an adjective it also means “serpent,” while *Aṅg* signifies “body”; thus *uras-gāmin* connotes a “going over the breast,” specifically [by] a reptile” (Apte 1890:9, 18, 340). Ophidian themes in Hindu mythology and religious art are well documented (Vogel 1926; Zimmer 1960).

Egyptian mortuary texts reflect fear of venomous bites that threatened even their dead. Among the charms against serpents inscribed within the pyramids of the Pharaohs Unis, Teti, and Seti I (ca. 2500–2400 B.C.) are: “Back with thee, hidden snake! Hide thyself! Thou shalt not make King Unis see thee. Back with thee, hidden snake! Hide thyself! Thou shalt not come to the place where King Unis is, turn about, turn about, O Monster, lie down.” (Wilson 1955:326). The Egyptians also had a *Book for freeing a house from the poison of any snake, male or female*; Nehebkau, a deity whose ophidian aspects are markedly stressed in art and religious texts, was invoked for the protection of dwellings from serpents entering through a hole in the wall or door (Shorter 1935:48); and the important ophidian goddess, Mertseger, was likewise ambivalently dreaded and venerated (Brugère 1930).

Sumerian cuneiform tablets containing several allusions to “the dreadful, raging serpent,” its venom, and the crushing of its head underfoot, and references to its eyes, tongue, and mouth are listed by Heimpel (1968:467, 469–470, 472–473). Ugaritic charms and incantations, addressed to the goddess Saps and dealing with the destruction of serpents’ poison glands and fangs, have been translated by Astour (1968:15–16, 30–33). Saggs (1962:322) lists apotropaisms used against venomous snakes intruding in Mesopotamian homes. Sirsir, the Sumerian mariner’s god, may have been ophidian (Landsberger 1950:366), a possible reflection of the danger of bites of sea-snakes, all of which are venomous and a threat to pearl-divers in the Persian Gulf even today. The creatures of Kar in Sumerian mythology (Kramer 1961:76) are serpents living in a watery abode. So are the evil Kingu, Tiamat, and her brood who dwell in the chaotic abyss of primeval waters mentioned in the Babylonian creation myth *Enuma elish*. They are “monster-serpents,

sharp of tooth, unsparing of fang" (Speiser 1965:62). The prominence of ophidian deities throughout the ancient Near East is apparent from sphragistics of the early Neolithic and subsequent periods (Frankfort 1939).

"Even with the best of serpents, crush its head," is a Jewish saying, but Jews reciting their sacred *Amidah* must follow another dictum. They must not interrupt their prayers by unnecessary killing "even if a serpent is coiled around one's heel" (Feliks 1971:15–16). Similar ambivalences among modern, Islamic peoples are derived from pre-Islamic influences shared by all the Semites of the Near East. In a fourteenth-century Arabic encyclopedia on animals, the serpent tops the list easily in the attention it receives—surpassing even the horse and the camel (Mundkur n.d.).

Greek religion is replete with serpent divinities and semi-divinities. Zeus is represented as a bearded serpent in early sculpture. The celestial chariots of certain Greek divinities are yoked to serpents. Dracontius underlines the latter's fearsomeness even when they are so benevolently graced: "Then came the snakes/ raising their combs aloft and viperous throats/ Scaly; and lo, their crested crowns shot flame./ The chariot was a torch, sulphur the yoke,/ The pole bitumen; cypress was the wheel;/ Yea, poison made that bridle-bit compact,/ And lead that axle, stolen from five tombs" (Cook 1964–1965:211–257).

Aztec prayers, intended simultaneously to propitiate and quell fearsome vipers, are recorded by Ruiz de Alarcon (1639: 54, 55, 80–84), and Diaz Bolio (1964) has extensively documented the pervasiveness of ophidian symbolism as a central theme in the religious art and architecture of the ancient Maya. Hopi priests, during rain-dance rituals involving undefanged rattlesnakes, prayed that they may not be bitten, and admit to being *mamkasi*, "scared," despite the fervor of their initial hunt for the reptiles (Fewkes 1897:288; Voth 1903:290).

In Chinese beliefs, She Wang and Shê-mo Wang are, respectively, the celestial King of Serpents and the Serpent-King of Devils. Both were propitiated in fear of their evil potentials. The former was represented as a real serpent or as a man (variously named) with a bifid tongue. The latter personage was regarded as the spirit of fire metamorphosed into a serpent (Werner 1961:416).

The pre-Christian, Baltic people were generally "sympathetic"

to serpents, since the reptile they venerated as a house-snake—a symbol of prosperity and human fertility—was a nonpoisonous species. However, in Lithuanian and Latvian folk tales, the heroine's husband is generally a serpent, or a man named *Zaltys* (serpent), or the devil. After living with him several years and bearing his children, the serpent- or devil-husband is almost invariably killed by the heroine's brothers. Typical, fearful consequences featured in serpent myths far outnumber the beneficial—twenty-seven versus four. Like so many other peoples, the Lithuanians hoped to avert snakebites by desisting from making direct references to reptiles, but used circumlocutions like “the long one” or “the dappled one,” instead of the literal word *gyvatė* (Bradūnas 1975:10–11, 20–23). The Hindus' list of circumlocutions occurring in the classical Sanskrit lexicon *Amara-kośa* is very extensive—“the one whose eyes are his ears,” “the rope that bites,” “rope full of teeth,” “the long-backed one,” “the wicked one,” “ladle” (a reference to the cobra's hood), “the venomous one,” “the one with concealed feet,” “she who casts away her blouse”—are a few of these.

The Luo of western Kenya avoid the literal word for serpent, *thuol*, but use the circumlocutory *tond-bungu*, “rope of the forest” (Hauge 1974:43, 90, 91).² The Galla of Ethiopia carry a leather amulet to avert snakebite. When a serpent is encountered, be it dead or alive, they utter the words “we are akin and sworn brothers” after spitting and throwing grass at it. Serpents are venerated but also ambivalently equated with ghosts and with men become possessed; they may be killed, burnt, and the ash employed in their *gada* ceremonies (Haberland 1959:308, 1963:393, 516, 715). Bantu tribes in Angola have an important fetish, a sacred serpent, fed and looked after by a priestess on behalf of their king. He must never personally enter into contact with this symbol of kingship. For it is simultaneously a powerful benefactor as well as destroyer, an animal that makes life possible while also threatening it (Hauenstein 1960:223). The Kgatla tribes of Botswana stage elaborate rain-making rites involving a “rain-snake,” *Kgwanyape*. The “dung,” collected from its lair in *fantasized encounters* with the reptile under great

² Hauge (1974:90) mentions only one other animal, the hyena, which the Luo refer to circumlocutorily—not because they fear it physically, but in order to avert its “craftiness.”

fear of being bitten by it, is smeared over the tribal chief conducting the ceremonies (Schapera 1971:34–42).

Dreams of serpents (“the manifest content,” according to the psychoanalysts) are not uncommon. The Cherokee of the southeastern United States were so seized by fear of rattlesnakes that a person who had dreamt that he had been bitten by one was treated as though he were actually envenomated. Their medicine men rubbed herbal lotions over the “wound” in the exact part of the body where the bite was envisioned, and an entire complex set of magic formulas was recited to remove the “venom” (Mooney and Olbrechts 1932:176–177). The Ainu of Japan worship a serpent-deity, Kinashut Kamui, and fear her vindictive reptilian subjects. Propitiated chiefly by women, they attribute their emotional outbursts and bodily ailments to possession by the spirits of serpents seen in dreams or, dead or alive, in the flesh (Munro 1963:64, 108). Serpents figure prominently in dream symbolism of the Lacandon Maya of Mexico, one of the least accultured Yucatec groups. Dreams involving a rope, or even tobacco, signify encounters with serpents, and according to one interpretation, dreams of serpents prophesy death (Bruce 1975:30, 31, 44). Among Zulu (Lee 1958:table 1, 278–289) dreams are more prevalent among women than men, the dominant visions being those of serpents. As though suggested by the latter’s sinuous form, flooded rivers and a riverine, mythical creature called *tokoloshe* that assaults women are also common subjects of dreams. Lee mentions no other dangerous animals as subjects of dreams. Dreams of serpents among Australian aborigines are given much attention by Róheim (1972).

Only about 412 out of about 2700 known species of Ophidia are venomous, but the toll of lives they take in the tropics and subtropics is not inconsiderable, as Swaroop and Grab’s (1954) worldwide mortality figures reveal. This minority only enhances a keen awareness of reptilian traits—whether inscrutable, real, or imaginary—and an aversion for even harmless species, many of which mimic the venomous ones in appearance and aggressive stance. Yet, the bites of even the most venomous species are not always fatal. Many factors, such as the degree of toxicity of the venom, the amount of it entering the victim’s bloodstream, the age and size of the serpent, and the resistance of the victim, determine whether the latter will recover (McCreary

and Wurzel 1959; Klauber 1972:742–744). These variables are a fertile ground for the shaman to exercise his powers. It would be out of place to discuss the peculiarities of ophidian biology and behavior that have inspired the ambivalent sentiments of fear and veneration of the serpent, exemplified above. These peculiarities are more impressive and subtle than is generally realized. Their influence upon psychological sensitivities is made clear by the zoological literature³ and is given tangible meaning in the mythologies and religious and secular symbolism of people almost everywhere. The development of these sensitivities in primitive thought is no less remarkable than their persistence in highly modern, urban societies.

OPHIOLATRY CONTRASTED WITH OTHER ANIMAL CULTS

It is important to recognize that many of the symbolic roles assigned to serpents may in different societies, and perhaps in the same society, be possessed by a variety of animals and plants. Thus, there are winged bulls and lions; the wolf's potential for evil matches the serpent's; the bear, bull, hare, hippopotamus and pomegranate are emblems of fertility; the fox symbolizes craftiness; insects may presage rain; and so on. Among primitive people, mundane superstitions and religious myths are often separated by only a thin line. It is often difficult to pinpoint the species a tribe regards as most awesome. Therefore, to stress the numinous, I have fortified my examples with unambiguous extracts from the religious literature of the civilizations of antiquity. In this respect, innumerable species, otherwise common in popular superstition, are greatly reduced in rank or absent. The most ubiquitous survivors are the serpent and its mythical variants and the bird—an animal that is far more obtrusive visually and more widely distributed geo-

³ Complex interactions of many diurnal and seasonal variables influence reptilian behavior. These include thermoregulatory effects, changes in duration of daylight, hormonal balance, sensitivity to direction and intensity of sunlight, the body's water economy, reproductive physiology, etc. The effects of the last three factors are easily observed in nature and directly suggest how certain ophidian myths may have originated. Pertinent details of normal and aberrant morphology and behavior are given by Klauber (1972), Biggs, (1907:1019), Caras (1975:136), Minton and Minton (1973:220–225), Bogert (1943:341), Corkill (1939:46), Boulanger (1897:74), Logan Home (1928:610), Gillespie (1938), Fraser (1893:307), and Wall (1907:730, 1913:250–253).

graphically than the serpent. The biology of the bird, as food for symbolic thought, is unexciting. Its chief characteristic—flight—is antithetically emblematic of traits primarily the serpent's, whose subterranean domain, venom, fertility, and pluvial symbolism it does not ordinarily share, though it grants the serpent its own solar symbolism. In this sense, the bird is subordinate. Moreover, it is remarkable that the bird's almost universal, metaphoric opposite is the serpent, rather than another creeping, burrowing subterranean species. In Greece, "the human-headed bird was a creature of mythology, whereas the bearded human snake was the object of a cult" (Harrison 1932: 331).

The importance of the bull is high but restricted mainly to the Hellenic world and the Near East, where it had solar associations (Cook 1964–1965; Frankfort 1939:155–175). The bull is rather less prominent in India, where it is connected with Vedic deities.

As regards ferocious wild animals vis-à-vis the serpent, I may cite but two examples, the bear and the feline, both of which have previously been discussed in cultic contexts (Mundkur 1976:437, 440, 448–449).

Now, every species in any fauna may be regarded as potentially numinous. Let us, however, confine ourselves to a list of those animals that man often regards as dangerous (Caras 1975) and narrow it down to certain Arthropoda—spiders, centipedes and millipedes, and scorpions—as the forms that may most logically be compared with serpents, because they fall in primitive man's "taxonomic" category of creeping things, they attack silently, have exceedingly dangerous representatives, share the serpent's habitat, and invade human dwellings in large areas of the world. The first three animals can be disposed of easily. The number of fatalities they cause hardly compares with that from snakebites; however, several species among them inflict extremely painful stings or bites. Their neurotoxic venom may cause anaphylactic shock and even death. In the Middle Ages, tarantism—hysteria incited by spider bites—was a mass anxiety reaction whose etiology of "symbolism, ambivalence, displacement, phobia formation, and other ego defenses of individual tarantists plus the psychodynamics [impelled them to] group themselves together" to dance to music "as the only effective cure" (Gloyne 1950). About spiders, Caras

(1975:280) says that, in general, their "power to give people the creeps [is] second only perhaps to snakes. They are feared and hated far beyond their power to do harm." But some are dangerous and pestilential enough to have necessitated the production of antivenin to protect victims. In tropical Asia, particularly India, Burma, and Malaysia, centipedes may attain lengths of almost thirty centimeters and look almost like a small serpent. Their bites can be very severe, keeping victims bed-ridden for up to three months. Symptoms produced by a Malayan species are said to be more spectacular than those produced by the venom of a viper. Millipedes are not venomous, but some of them secrete hydrocyanic acid, which causes skin-rash and even blindness. In general, spiders, centipedes, and millipedes can be disconcerting, if not outright dangerous. One may expect deities to be modeled around them. I am totally unaware of any such deities.

The scorpions are quite another story. Very widely distributed in the warmer countries of the world, but mostly in the drier sections, they are as insidious as the serpent. They are, like many serpent species, largely nocturnal, gain access easily into man's dwellings, and many species are dangerously venomous. Their stings are neurotoxic, varying in effect from extremely painful to fatal, death ensuing within forty-five minutes to fifteen hours. They can resist burning heat from the sun as well. They may infest the land densely. Caras (1975:288) describes swarms in Angola, with individuals occurring every few feet. They exhibit a prolonged premating dance during which a couple cavorts back and forth with arched tails. After copulation, the female may devour her partner. The progeny may be so numerous that they conceal the mother's back, to which they attach themselves for about two weeks. Scorpions are terrestrial, "taxonomic anomalies," their powerful pedipalps with pincer-like claws giving them the appearance of aquatic crustaceans such as crayfish, crabs, or lobsters. Their stings produce symptoms closely recalling those of snakebite. Scorpions are very *bons à penser*, particularly when we reckon that their geographical distribution coincides with that of the serpent.

Yet, on the whole, the scorpion has not excited man's fantasies nearly as much as the serpent. In Angola, the serpent is a dominant cult animal, not the scorpion (Hauenstein 1960). In Mexico, where annual mortality from scorpion stings in some

areas is nearly ten times that from snakebites (Caras 1975:185), its mythic significance hardly compares with the serpent's; the Huichol Indians have a deity "La Toruca," with scorpion attributes. However, the major deities of Mexico are ophidian,⁴ not scorpoid. This is reflected in the profusion of serpent motifs and the singular deficiency of scorpion motifs in Mesoamerican archeological relics (Antúnez 1972:2, 4).⁵ The scorpion is eclipsed by the serpent in Hindu mythology and religious art and literature, and there is not a single deity who bears the scorpion symbol. Only in ancient Egypt, and more so in Mesopotamia, do scorpions assume great importance, rivaling, but hardly ousting, the serpent from its place. The Egyptians, in addition to two minor deities with scorpion attributes, had a scorpion-goddess, Selket, who protected wayfarers from scorpion bites. Yet, as consort of Seth, the deity who personified evil, Selket was "the mother of serpents" (Griffiths 1960:136). In Mesopotamia, the principal scorpoid deity was Ishara. She presided over human and agricultural fertility. Other important deities who had scorpion attributes were Ningishzida and Ishtar, but their primary attributes were ophidian. The literature on the scorpion aspect of Mesopotamian divinities is reviewed by Deonna (1959) and the serpent aspect by Van Buren (1935).

The fact remains, that, as among many primitive peoples, in important myths like those of creation, cosmogony, and fertility, the serpent's hold over thought in ancient civilizations is remarkable. From the beginning of time, serpents dominated the Mesopotamian, primeval ocean of Chaos—"Apsu, the begetter of the great gods"; "Naught but the primordial Apsu [and] MummuTiamat, she who bore them all . . ." (Speiser 1965:61, lines 29, 3, 4).

In Egypt, the creature that materializes in the primeval abyss before any others is a serpent, Iru-to, or Sito. "Nothing was yet in existence; not even serpents or worms!" declares the Creator in an Egyptian text quoted by Posener (1970:264). "While still submerged in the primeval sea, I created from among them some in the form of torpid beings." And, in another text

⁴ To wit: Tlaloc, Quetzalcoatl, Coatlicue, Chicomecoatl (Xilonen), and Cocijo. Several others, including Tonatiuh and Huitzilopochtli, have serpent motifs as their characteristic symbols.

⁵ However, scorpions do sometimes figure in the Mayan codices. They are not, in any event, as prominent as the ophidian motif in Mayan art in general.

(Clark 1959:50–52), “God is the serpent . . . ‘Creator of Earth’. . . . At the end of time the world will revert to the primary state of chaos and Atum will become a serpent once more.”

Why serpents? Why not scorpions, centipedes, spiders, sharks, lions, driver ants, horses, birds, jellyfish, bats, or bulls?

OPHIDIOPHOBIA AND EVOLUTION OF THE PRIMATES

Why does the serpent so powerfully excite human emotion? Is fear of it innate or is it learned? Is it fundamentally rooted in the evolution of primate physiology and behavior? If fear of the serpent is indeed a primordial one, would this not be suggestive of the great antiquity of ophidian deities, both diabolical and benign, and explain the extraordinary prestige of the animal in myths of creation, fecundity, weather, etc., of almost every society? The answers seem to lie in a variety of disciplines.

Certain experiments with nonhuman primates are pertinent to the question of human social learning and cultural transmission.⁶ Yerkes (1943:34, 120–121) investigated chimpanzees’ fear of serpents and tortoises, animals “potentially dangerous in the African habitat of the ape [since] they might be instinctively feared and avoided. . . . In infancy or early childhood there is slight indication of specific fear of [these animals] though responses may be cautious, some individuals persistently avoiding contact with them. But this is common in the face of any unfamiliar object. [However] adult apes, in the presence of snake or tortoise, are either hostilely aggressive or stirred to excitement, retreat or flight. Jack, [a large adult] born in Africa but for several years a captive, on seeing a tortoise promptly retreated and hid from it, and later, when the harmless animal approached him, screamed shrilly and climbed out of the way. That this behavior in the adult ape is no ordinary object response is conclusively proved by our often demonstrated ability to drive a refractory individual into a restraining cage simply by presenting a tortoise or snake.” Extreme fear often resulted in violent responses of the bowels, circulatory, and respiratory

⁶ The problems connected with cross-taxa comparisons of primates (Larsen 1976) pertain to *communal* behavior; they have little or no relevance to the manifest expressions of fear in an individual, as the ensuing paragraphs will show.

systems. That fear of serpents is not necessarily acquired by "social conditioning" or imitation is known from studies of chimpanzees reared in isolation (McCulloch and Haselrud 1939).

More recent experiments (Menzel, Davenport, and Rogers 1972:161, 162, 168, 169) indicate that the responses displayed by chimpanzees to novel objects are of the same class as those stimulated by serpents (Davenport, personal communication). Their findings (*italics mine*) "suggest that even 'simple' and 'instinctive' behaviors are influenced by culture-like processes . . . that a given response to a novel object can be passed along several 'social generations,' *even after the original instigators of the change in response are no longer present.* The data are of special interest because most of the individuals involved had been reared with extremely limited social and object experience, and by comparison with wild-born controls were grossly retarded in social behavior and learning performance. *Thus some forms of tradition and culture might not require even normal chimpanzee intelligence.*" These authors believe that "culture-like phenomena are much more widespread than previously thought" and that "air-tight theoretical dichotomies between learning and instinct, and cultural and individual learning are invalid." They do not imply that "chimpanzee protocultural behavior is necessarily acquired in the same fashion as are human culturally-determined attitudes towards objects and events." Nevertheless, they regard "attempts to define cultural phenomena as only those behaviors which are transmitted by specifically humanoid means such as oral and or written language, or by symbolism, as overly restrictive." In this sense, their views are not in accord with those of Kroeber and Kluckhohn (1952).

The significance of the experiments of Menzel, Davenport, and Rogers is enhanced by the correspondences between chimpanzee and human reactions, specifically toward serpents. Experiments by Jones and Jones (1928) show that both chimpanzees and humans who have never had contact with serpents react in much the same way at the sight of one. The humans knew that the creature used in the test was torpid and harmless. Neither year-old chimpanzees nor young children up to five exhibited any fear of this reptile. It increased among older children and adolescents to the extent of producing slight caution; but most older humans showed strong avoidance, even reactions of "horror." Likewise, the adult, cage-reared chim-

panzees who had never before seen a serpent, were “disturbed, very much so, [their] reactions being about as strong as a man’s.”

The gorilla’s fear of serpents is well documented. Shortly after their capture, individuals of one batch have been described as nervously refusing to enter a section of an enclosure where a serpent was eventually found to have had its residence. The personality of Toto, a gorilla captured when she was only two months old and raised in an American home like a family member, is equally revealing. Often unmanageable in adulthood, she also had a deep fear of serpents. Her keeper could extract obedience from her only by exhibiting one of several serpents kept expressly for this purpose (Hoyt 1941:187–188).

New World *Saimiri* show unusual sensitivity to the presence of serpents, whether stationary or moving. Experiments show that this genus is visually inept at recognizing discriminanda placed in Plexiglas-fronted bins, but can “*immediately* detect whether a jar is empty or whether there is a snake within . . . a sensitivity so marked and so resistant to extinction, with the fear evidenced in response to jar + snake [so obviously manifest, as compared to reactions to empty jars or jars filled with other discriminanda] that we have used it as a test to determine recovery levels of monkeys exposed to near-vacuum atmospheric pressures” (Rumbaugh 1968:294–295). It is significant that rhesus monkeys, *Macaca mulatta*, yield no evidence of innate ophidiophobia under unnatural ecological conditions. These Asian monkeys, captive laboratory- and jungle-reared individuals, were tested with a nonpoisonous, North American garter snake (Wolin, Ord, and Dillman 1963). By contrast, prolonged field studies of a related species, *Macaca sinica*, led Dittus (1975:139) to report that their “response to the python, *Python molurus pimbura*, and the poisonous snakes, cobra, *Naja n. naja*, and Russell’s viper, *Vipera russelli pilchella*, was one of alarm, avoidance, and curiosity. . . . Nonpoisonous snakes did not elicit these responses.”⁷

Struhsaker’s (1967:305) field studies in Africa show that vervet monkeys emit a “snake chatter”—a *specific* alarm signaled

⁷ The exceptional instances of reports that question the innateness of monkeys’ fear of serpents may be attributed to just such factors of ecology. This is especially pertinent in laboratory observations where the necessary controls such as species-specificity, age, sex, and history of the individual primate tested are not purposefully devised, or are subordinated to our goals. See for example, the two contradictory cases mentioned by Bertrand (1969:143).

primarily, if not exclusively, by adult females and juveniles and provoked only by cobras and vipers. Yet, attacks by them seem in reality to be as insignificant as pressure from any predator with the possible exception of pythons, whose impact could not be studied. But in Madagascar where serpents are also an insignificant threat (the island has no truly venomous species), *Lemur* “are not instinctively afraid of serpents”; however, low-flying hawks, the lemur’s natural predators, do elicit shrieks, whereas the harmless parrot and bat do not (Jolly 1966:85; 1972:70–72). Observations such as these clearly suggest the importance of phylogenetic factors as determinants of ophidiophobia and prompt a closer examination of how special a type of fear it may be in man.

That susceptibility to fears and phobias in general undergo changes correlated to age is disclosed by Rachman’s (1974:14, 44) surveys, which indicate that young children have extensive fears, but that the majority of these undergo a steady, natural decline in intensity and frequency. It is important to note that fear of serpents, which Rachman (p. 13) classifies as generally “acute,” follows a precisely contrary ontogenetic pattern. Young chimpanzees and humans are alike in that they are devoid of this fear but acquire it intensely as they mature, as we must recall from the experiments of Jones and Jones, cited above. Maurer’s (1965) studies of American children between the ages of five and a half and fourteen and a half show that “they do not fear the things they have been taught to be careful about: street traffic and germs. The strange truth is that they fear an unrealistic source of danger in our urban civilization: wild animals.” This was the sole category mentioned in 64% of the responses to the question “What are the things to be afraid of?”, asked in a neutral tone to forestall defensive answers to other forms of questioning. “The most unpopular animal,” says Maurer, “is the snake,” followed in order of fearsomeness by lions and tigers, among thirty-eight other animals named by the children.

Griffiths (1935) cites numerous psychological studies of children from London and Brisbane, mostly five-year-olds, who *fantasize* situations of terror in which serpents (and even a “wolf-snake” hybrid!) and sometimes biting dogs occur in contexts of anxiety or death. Similar responses were noted in six- to twelve-year-old American schoolchildren, evaluated psycho-

logically by Koppitz (1968:64, 131, 154). She had made circumscribed requests for drawings of human figures. Nevertheless, several pupils also drew animals as ancillary subjects; except for a swordfish, a "wolfman," and humanoid monsters, they included only a "sea-serpent"; "dangerous, biting, poisonous snakes"; a "two-headed dragon"; and a "poisonous lizard." It is not surprising, then, that a parallel situation has been reported in at least one primitive society: DuBois' (1944:170, 567) studies of culturally determined phases of personality structure revealed that the serpent easily topped the list (preceding hawk and chicken) of animals most frequently portrayed by six- to sixteen-year-old Alorese children, when asked to make pencil sketches of any subject they chose to portray. This may not be unexpected, since the serpent is commonly seen and is considered loathsome in Alorese society. What is noteworthy is that snails and walking-stick insects, which "like the serpent produce shudders of revulsion," figured very rarely in these drawings.

The subconscious mind revealing itself in dreams offers important facets for our survey. The influences of culture on the manifest content of dreams, however, are complex and remain unresolved (D'Andrade 1961:402). I have given a few examples earlier. Lee's (1958:277, 282) statistical studies of Zulu dreams in which serpents constitute their "manifest content" reveal that 17% of the dreamers were women, and only 3% were men. Surveys of London elementary school children reveal an almost equal frequency (20%) of dreams of terror of animals among both boys and girls. Serpents, dogs, and rats predominated in the girls' visions, while larger animals like lions and bulls predominated in the boys' (Kimmins 1931:532). Urban, adult Americans, to whom, too, the threat posed by animals is unrealistic, have equally noteworthy dreams: of 1170 objects mentioned by 1000 persons studied, the serpent figured more frequently by far than any other animal except the familiar dog (Hall and van de Castle 1966:243-272).

One of the ways the subconscious mind can be uncovered is through the hallucinogenic potion, *ayahuasca*, or *natemä*, of eastern Peruvian forest tribes. The sensations it induces are remarkable because they follow a consistently repeatable pattern. The very first effects are visions of extremely gruesome attacks by venomous serpents, anacondas, and boa constrictors.

One tribe, the Sharanahua, uses the drug in shaman initiation rites. These involve eating the heart of a boa, rubbing of a serpent's tongue over the initiate's face, and chanting the while to neutralize the anticipated horrors. The action of the drug is discussed at length by Siskind (1973:28, 32), Dobkin de Rios (1973:78–79), Harner (1973:15, 160), and Kensinger (1973:9–12), all of whom report high frequencies of serpent visions as the initial reaction; Kensinger assigns a secondary position to visions of jaguars and ocelots.

As a final illustration of the link between ophidiophobia and the deeper reaches of the human mind, we should note the experiments of Cowden, Reynolds, and Ford (1961). They disclose that chronic schizophrenics are markedly unemotional and much less fearful than mentally normal control groups exposed to the test object—a harmless serpent.

To correlate the data on nonhuman and human primates: Most psychoanalysts opine that fear of serpents is “learned” in human societies, but the information available so far contradicts this view in significant ways. In particular, there may be a lesson in the observation that certain lower primates, like vervets, are remarkably ophidiophobic despite little or no ecological justification. This suggests that, evolutionarily, the incipience of ophidiophobia may have entailed little more than a neutral, “nervous” response, occasioned perhaps by the bodily form and sinuous movement of the serpent—its venomousness and predacity gaining increasing importance as “reinforcing events”⁸ during phylogenetic differentiation of the higher primates and culminating in the extremely severe anxieties of chimpanzee and man. However, I am not aware of systematic comparative studies of the pattern of development of phobias throughout the order of primates. Thus it is difficult to say whether the lemur's insensitivity to serpents is related to ecological factors or to relatively poor neural development in this very lowly group of prosimians.

Certain patterns of primate behavior discernible by experimental psychological methods cannot, according to Hebb (1972: 203, 215, 278, 281) be derived from anatomy and physiology,

⁸ A “reinforcing event” (in contexts of experiments on fear and stress) is a *punishment* or *threat of punishment* that stimulates symptoms of fear, which “members of the [test] species concerned will work to terminate, escape from, or avoid” (Gray 1971:9).

though they are compatible with physiological knowledge. He states that the list of objects that cause fear in chimpanzees is a long one; that they are, as a species, "much more susceptible than dogs to fears that do not arise from pain or threat of pain," that emotional disturbance in both humans and chimpanzees is correlated with intelligence and growth, older individuals being much more easily perturbed. Hebb (1972:205) emphasizes that the chimpanzee's fear of serpents is *not* learned, though why this emotion exists at all is not clear. Psychological maturation apparently is a very strong factor, as in humans, since there is direct evidence that emotional susceptibility to such fear is correlated with age. Differences in sensitivities related to sex and hereditary predisposition are additional variables.

Paragenetic phenomena seem manifest in observations like these, especially in the light of the experiments of Menzel, Davenport, and Rogers. Their demonstration that certain "instinctive" behaviors in chimpanzees are persistent despite withdrawal of inciting stimuli several social generations earlier has a parallel in nature. It concerns a group of eighty baboons under observation in Nairobi Park (Washburn and Hamburg 1965:3-5). Until two of them were shot for parasitological study, this group was easily approachable by car. But even eight months later, the baboons remained extremely agitated and unapproachable, though they were daily exposed to the sight of cars. They had learned to recognize danger in just one violent trial, and memories of the incident were strong. Though it is unlikely that the shooting was witnessed by more than a very few in the group, the high survival value of ability to recognize danger had ensured that the actual experience of these few would quickly become part of the whole group's adaptive behavior. It is a well-known observation that when a dominant baboon scampers away with a warning cry, others in the group flee instantly without looking for the source of danger. Thus group psychology should not be dismissed as a factor in avoidance behavior incited by fear, especially since auditory communication is highly developed in all primates.

Yet, a competent observer like Bolwig (1966:276), who studied the behavior of baboons in the field, states that they "have an innate fear of snakes and other cylindrical bodies which can bend and wiggle. . . . Towards other animals which do not serve as food, they normally show indifference and on occasion ju-

veniles take pleasure in teasing animals [like] Kudu and lions.”⁹ In addition, our data show that fear of serpents is primarily a reflex response governed by a characteristic ontogenetic pattern of development and is seemingly largely independent of learning as far as its *origins* in an individual are concerned. It would appear that social communication only enhances and perpetuates it. Oddly, in the tropics, the survival value of ophidiophobia seems to be low in nonhuman primates, for Jolly (1972:70) attaches little significance, if any, to snakebites as a cause of their mortality. This can hardly be said about rural human populations, as Swaroop and Grab’s (1954) statistics glaringly prove. But the remarkable fact is that the pattern of development of ophidiophobia persists today in highly modern, urban, northern temperate zone societies where its significance is zero.

The theoretical verdict is yet due, but the implications are noteworthy even now. Was ophidiophobia (like fear of thunder and darkness and, perhaps to a lesser extent, of certain other animals) “reinforced” during man’s social evolution in a very early period when serpents were dangerous intruders in his huts and cave shelters? Is the serpent lore among peoples of northern latitudes, where dangerous reptiles are rare or absent—for example, *sisiutl* phobia among Kwakiutl—or the ophidian themes of far northern, prehistoric European art, survivals of attitudes originally acquired in warmer regions? To what extent might they be ecologically unprovoked, nervous expressions of memories that are entwined with primate evolution? And to what extent with the development of human societies themselves?

Archeology, unlike the biological sciences, cannot reach far back enough for clues and, in any case, can provide only supplemental rather than determinative evidence. There are several important depictions of serpents from paleolithic cultures, but this is more evident in the pottery motifs and ophidian or anthropo-ophidian cult images of the neolithic and chalcolithic periods, discussion of which is difficult here as it necessitates extensive pictorial documentation of the relics. In brief, human populations and urban settlements were rapidly expanding in

⁹ Note that baboons are ferociously aggressive in contrast to the shy and retiring chimpanzee. But it is not known whether baboons show nervousness toward an equally wide range of harmless moving objects as that which affected chimpanzees in the experiments of Hebb, just cited.

the wake of the neolithic agricultural revolution (Childe 1954; Adams and Nissen 1972); risk of snakebite to field workers must have been high; stored grain undoubtedly attracted rodents and, to prey on them, serpents, in lands already infested with them. Moreover, the great religions of antiquity were taking shape among the riverine societies of Mesopotamia, Egypt, India, and China, and in the Mediterranean, Hellenic world. It is in their religious texts and mythologies that we find very revealing, unambiguous evidences of ophiolatrous attitudes. The excerpts I have given bear this out sufficiently. There are, in addition, the archeological evidences from regions such as Mesoamerica, the basin of the Danube, and other areas of prehistoric Europe (Gimbutas 1974).

“Physical shuddering, ghostly horror, fear, sudden terror, reverence, humility, adoration, profound apprehension, enthusiasm” states van der Leeuw (1938:48) in referring to religious emotion,—all these lie in nuce within the awe experienced in the presence of Power. And because these two attitudes show two main tendencies, one away from power, and the other towards it, we speak of the ambivalent nature of awe.”

These attitudes are brought to a focus in serpent-handling rituals. Only religious fervor and the psychology motivating zealots’ conquest of fear of venomous bites explain their existence. There is, as far as I know, no other dangerous animal more intimately involved in ritual practices that court death. Photographs by Miller and Bedi (1970), Fewkes (1897, 1900), Gillespie (1938:114), and Schwarz (1960) reveal these cult practices forcefully.

THEORETICAL DISCUSSION

The structural anthropological view that all animals have the potential of suggesting “a mode of thought,” because they are *bons à penser*, is a useful tenet¹⁰ from which the serpent cannot be exempted at certain levels of abstraction. But the question remains whether this animal excites human emotion in a fundamentally unique and pervasively influential way that is not en-

¹⁰ I refrain from elaborating on this view, originally attributable to Lévi-Strauss (1963), because its details, which are adequately mentioned by Leach (1974) and Willis (1974), are not strictly pertinent here.

visioned in current hypotheses as to why animals elicit symbolic thought.

Durkheim (1915:188, 234) employs the word “fear,” as I do, in a cultic context, though not at all in the precise, scientific sense I have circumscribed so far. “If a certain species of animal or vegetable is the object of reverential fear,” says he, “this is not because of its special properties . . .,” for “each group [of totemists simply takes] as its insignia the animal or plant that [is] the commonest in the vicinity of the place where it had the habit of meeting.”

The serpent, of course, is not the only animal that can evoke a *particular* mode of thought, and fear itself need have no relation to an animal’s potential harmfulness. An animal may be the most innocuous imaginable, yet be as repugnant as a venomous reptile. What determines the choice of a particular species for a symbolic role is hard to generalize.

Douglas (1966:169, 173; 1975:27ff) suggests that it is prompted by anomalies of an animal’s appearance or habits that make its accommodation in primitive classificatory schemes irksome. Her interpretation of the reasons why the Lele of Central Africa revere the “taxonomically anomalous” pangolin as a cult animal is worth examining. She holds that its sacred role stems from its distinctive features. It is quadruped but is fish-like in possessing scales; it is given to climbing trees; is monoviviparous; and, most remarkable, is so innocuous that, when accosted by man, it neither attacks nor retreats but curls up shyly into a ball—a voluntary victim for ritual eating. The pangolin may be docile to the Lele, but Douglas’ view is inapplicable to other societies. The pangolin is greatly feared in parts of Asia. In Burma, the Chin regard encountering one in the daytime an exceedingly evil omen. Its cries are believed to mimic the human voice, and if a person responds to the name it calls out, he will die at once. The superstition is strong enough in Burma, generally, that, in the jungle, people will not respond when called from a distance. In addition, unlike the prolific serpent, the pangolin bears only one offspring per birth; yet, it is a sexual symbol to the Chinese, who use its parts as an aphrodisiac (Venning 1909:255; Hopwood 1917:149). Clearly, ambivalent human attitudes are not exclusively under the serpent’s domain, nor is it possible to extend Douglas’ line of reasoning, or its variations, to the case of this animal.

Other examples might be cited to show the paradoxes of expanding interpretations of animal symbolism into broad hypotheses. The Bini of Nigeria, unlike the Lele, do not regard the pangolin as an “anomalous” creature. On the other hand, the much-dreaded serpent *ovibvie* (the venomous black mamba) fits Douglas’ criterion of anomalies neatly, since Bini imagine that its head resembles that of a cock and that it crows as it spits (Ben-Amos 1976:250, 251 fn. 6, 252 fn. 22). Unfortunately, Douglas (1975) provides no information on the mamba, which also inhabits Lele territory. Perhaps they attach no special significance to it.¹¹ Another difficulty arises from her typing the tortoise (from what, she imagines, is the implicit, Lele point of view) as an anomalous *reptile* (“its shell distinguishes it from other reptiles, but, as a four-footed creature, it is anomalous in that it lays eggs” [p. 30]). It is extremely doubtful that the Lele, in common with most simple people, are aware that the tortoise is a reptile in the zoological sense and that it is kin to crocodile and serpent. That it is an anomalous *mammal* need be no less implicit in Lele thought. It is four-footed, hairless, and tailed, like the pangolin. Were the tortoise regarded as a mammal, its oviparity would be no less out of character than the hairy, “anomalous” bat’s bird-like flight.

Another, “structuralist,” view is that of Willis (1974:9, 10) who also explains why animals play significant roles in human thought. Discussing three African societies, he believes that it “is possible to establish that in each society the relation consists of a hierarchy of symbolically significant animals, with one animal at the apex of the hierarchical pyramid: the ox in the case of the Nuer; the pangolin for the Leles; and the python for the Fipa.”

Willis does not indicate whether fear figures in any way in the Fipa python cult nor that other African tribes like the Ngola and the Togo (Hauenstein 1960:223) to whom, also, the python is the supreme cult animal, regard it as dangerous. Actually, pythons are rarely a threat to human life or to livestock, and it is perhaps chiefly for their impressive size that they are selected for veneration. The king never has personal contact with the reptiles, for they are regarded as a continual threat to his life. Never-

¹¹ Mary Douglas, in a personal communication, informs me that the Lele “have a custom of turning snakes away by singing nine songs to them when they meet them in the path, and they believe that snakes are spirits, potentially able to help humans.”

theless, a sacred python is “married” to, and looked after by, the king’s wife, the priestess. Clearly, it is the zoological suborder Serpentes (Ophidia) that receives Ngola homage, not merely the sluggish, harmless python.

“I argue,” continues Willis, “that these three beasts [ox, pangolin, python] symbolize for these three societies, the ultimate value—what we might call the ‘meaning of life.’ If my analysis is correct, what these animals symbolize is, respectively: transcendence of individual personality in pure, inner selfhood; transcendence of individual differentiation in pure communalism; and pure becoming, or developmental change, both social and personal.”

One may or may not detect overtones of mysticism, whether they are intended or not, in these sentences. But at certain levels of abstraction they might equally be applicable to varied symbols incited by *any* animal besides the three considered by Willis. “To the Fipa,” he says (1974:112, 124), “the python image represents an immortal antagonist without and within; it also appears as a giver and creator of life. . . . [It] embodies the multidimensional structure of the Fipa universe and binds the various levels of experience through the common theme of a unitary process.”

Such explanations may reflect qualities that elicit universal attention, irrespective of the symbolism they may engender.¹² In this sense, they diverge little from Durkheim’s position, and much the same can be said of the varied and conflicting interpretations of animal symbolism advanced by Sperber (1975), Bulmer (1967:21), and Tambiah (1969:452), among others. The innocuous pangolin illustrates this concretely. Its geographic

¹² In innumerable societies, the serpent evokes no cultic fervor but only fear and active antagonism.

¹³ Cf. Adler (1969:100–109; Becker 1968:340–342). For examples of dream-subjects that are interpreted as indicators of “penis envy,” “castration-wish,” and “castration anxiety” see chap. 12 in Hall and van de Castle (1966). Note also their table 15-29 (p. 236) and appendix A, which lists frequencies of objects envisioned in dreams of American adults. Among other items listed, breasts were reported by four men and one woman; penis by two men, no women; vagina by four men, no women; semen by one man, no women. By contrast, serpents (including rattlesnake and python) were reported by eight men and five women. The authors do not state whether or not the reptiles figured independently, were part of a nonerotic dream, and whether they signify eroticism. If the latter interpretation is adopted (as some psychoanalysts are prone to do, no matter what their explanation of this relatively high frequency of serpent-dreams might be), it is odd that modern, urban adults, who rarely think about or see serpents, should invoke them in sexual dreams as symbolic “substitutes” for more realistic, gratifying visions!

distribution is wide in India and southeast Asia. Yet, at least in India, it commands no attention, as far as I have been able to determine. Elsewhere, its power to engender awe is hardly remarkable, except for superstitious fear of the animal's voice among the Burmese Chin, as already noted. The Lele make a major cult of a small species of pangolin but ignore a larger one of the same genus, while the Bini see no anomaly at all in these animals. These situations contrast sharply with the revulsion and fear of the entire family of serpents, felt by almost all people everywhere.

Another type of explanation that is unhelpful to my theme is that which involves the psychoanalytical interpretation of dreams of animals;¹³ however, the phenomenon *per se* of dreaming surely conceals much of fundamental value. Serpents, even their color, visualized in dreams, have been variously interpreted in terms of their "meanings"—detailing sexual or other, emotional qualities in a manner reminiscent of the efforts made in another way by some structural anthropologists who interpret the social significance of animal symbolism unrelated to dreams. Each type of inquiry has its built-in, quite severe constraints: the psychoanalyst is too remote from the experiences and unconscious mind of the dreamer and must contend with too many variables before attempting to formulate a reliable, generalized interpretation. The cultural anthropologist, as Cooper (1975) shows, must penetrate (if he can) remote social and psychological spheres before he can overcome the impediments to understanding the "logic" of "primitive" thought. The problems of achieving interdisciplinary syncretism seem grave. Edgerton (1974:62–64) asserts that "most cross-cultural psychologists are committed to experimental procedures," while "most anthropologists whose research involves psychological data are fundamentally opposed to experimental procedures"; Price-Williams (1974) discusses the differences of perspective.

How much of the fear of serpents is "instinctive" in man and what part "learning" plays in perpetuating it may not now be decisively known. It is an area to which current views on symbolism can contribute little. But it stands out as one where a number of different lines of inquiry, both in the laboratory and in the field, can be integrated. The concensus among researchers on stress (Gray 1971:15, 21) and on children's fears (Zlotowicz 1974:28, 70–83) is that it seems to be largely instinctive, and

the data I have presented tend to support this. The line of inquiry most likely to yield further rewards is through experiment, primarily in the basic biological sciences with their many applied subdivisions, the cementing force issuing from studies in the evolution of the neurophysiology and behavior of primates.

It is important to recall that the mere presence of serpents or sight of their sinuous movement, and even of artificial wiggling cylindrical objects, is sufficient to induce severe anxieties and fear in certain anthropoids, but not in prosimians, and that the pattern of development and persistence of ophidiophobia differ from the way other phobias are shed during maturation of individuals, both ape and human. Martin's (1973) review of the literature on various stimuli affecting physiologically related emotional responses suggests that some individual humans are constitutionally predisposed to show strong reactions of the sympathetic nervous system, whereas others are autonomically less reactive. Eysenck (1973) analyses the role of reinforcing factors connected with "conditioned" emotions of fear and anxiety. In these contexts, the physiological concomitants of fear (for example, secretion of epinephrine) can be precisely determined by experiment and may with advantage be evaluated in genetic and behavioral studies of different taxonomic groups of primates, including man.

In these contexts, too, the link between ophidiophobia and the unconscious mind seems to be a strong one, as exemplified by the peculiar features of dreams and fantasies involving animals. Not only primitive people, but also certain schools of modern psychology attach much significance to them. The serpent, above other animals, is given important recognition as "one of the most pregnant symbols of the unconscious mind, so much so that it often stands for the unconscious itself. . . . [It] is the personification of the chthonic earthly unconscious, of the instinctual layer with all its secret, mantic and curative powers as well as its inherent dangers which must be overcome. It is precisely this ambiguity which explains the veneration and fear inspired by the snake."¹⁴ Ironically, a part of this pronouncement may

¹⁴ In this and the next paragraphs, I have relied on, and quoted from, the extensive treatment of several pertinent psychological viewpoints discussed by Ellenberger (1970:705–737) and Adler (1969:100–104). The latter, in particular, specifically refers to the symbolism of serpents when these appear in dreams and myths.

seem, at least superficially, to be consistent with my information on the deep-seated nature of ophidiophobia. However, I must point out that this, like similar, psychological views, is based on highly imaginary, subjective interpretations of dreams to which symbolic values are assigned exactly as with dreams completely devoid of visions of the serpent.

Therefore, as a mechanistically inclined biologist, I disavow from my viewpoint every connotation of Jungian and Alderian mysticism inherent in psychological references to "universal, primordial images"; "archetypes—the centers of psychic energy"; "the collective unconscious"; and "universal symbols which appear in religious myth as well as in psychotic delusions." Thus, my differences are methodological, and my goal depends on an understanding of the basic nature of fear itself, of which that of the serpent is merely a quite special case. It involves no religious or mythic sentiments (except insofar as they illustrate this fear in man), for ophidiophobia is detectable in non-human primates as well. To me, dreams merely reflect a level of neural biochemistry that is amenable to experimental analyses correlated to the factor of behavior.

One of the traits that separates anthropoid apes from man, it is said, is the latter's symbol-making propensity. This seemingly reasonable criterion encounters a disturbing contradiction in the world of intrusive memories and symbols—the world of dreams. The characteristics of neurophysiological events occurring during sleep are, in every essential respect, precisely identical in monkeys, apes, and humans, to the extent that experimental evidence of dreaming has been obtained from behavioral responses of rhesus monkeys (Snyder 1969). Now, studies of the influence of hallucinogenic drugs in altering an organism's level of consciousness have an important bearing on the subject of latent emotions. That dreams and drug-induced hallucinations appear to be essentially similar in origin and very probably are connected with recent as well as remote memories and experiences is an inference that opens exciting possibilities for further work (Evarts 1962; Hernandez-Peon 1966; Frith 1973). Clearly, hallucinogens can be of great value in releasing deep-seated emotions like fear, which are linked to symbol-making, that is, mentally associative, propensities. Intensive experiments with human subjects have certain drawbacks despite the great advantage of accurately recording the contents of

drug-induced visions directly from oral descriptions. Non-human primates are more pliable, as the ingenious combinations of electrophysiological, mechanical, and experimental psychological techniques employed in sleep and dream research prove (Adey, Kado, Rhodes 1963; Bert and Colomb 1966; Snyder 1969; Vaughan 1964).

From these perspectives, one may now focus afresh on the hallucinogenic plant extract, *ayahuasca* (or *yagé*), mentioned earlier. In certain tribes of the Peruvian, western Amazon, whose shamans use it ritually, this drug produces—consistently, and as the primary effect—extremely terrifying visions of attacks by vipers, boa constrictors, anacondas, and fearsome forest creatures like the jaguar. Systematic anthropological studies show that it elicits identical effects in urbanized, tribal emigres (Dobkin de Rios 1973:78). What is more remarkable is that harmaline, the pharmacologically active component of *ayahuasca*, produced similar, recurring visions in urban, *white* Chileans studied experimentally (Naranjo 1973:183). These Chileans were neither aware of the effects normally associated with the drug, nor of its connection with *ayahuasca* and its consumption by Peruvian, forest-dwelling indigenes. Clearly, their hallucinatory fear of reptiles and wild felines transcends the factors of personal experience and cultural conditioning.

It is doubtful that there are many species that share the serpent's capacity to fascinate¹⁵ man and arouse his emotions in ways that are so diverse, yet as direct and evolutionarily primordial as those enumerated above. These, surely, must overshadow any narrowly hypothetical explanation as to why this animal may have particular symbolic "meanings" or engender particular attitudes among different peoples.

If, as our survey suggests, the serpent's power to incite symbolic, mental associations is rooted in man's biological past and only secondarily is governed by fickle cultural idiosyncrasies, ophiolatry acquires additional significance as one of the earliest of animal cults. Its varied facets, in any case, demand a deeper inquiry into several complex neurophysiological parameters that affect primate behavior, including, and in addition to, those that I have been able to muster for this brief review.

¹⁵ It may be of interest that the *Concise Oxford Dictionary* (fourth ed.) invokes the case "esp. of serpents" when defining the word "fascinate."

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