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ANNOTATED CHECKLIST OF APPARENTLY UNKNOWN ANIMALS WITH WHICH CRYPTOZOOLOGY IS CONCERNED

BERNARD HEUVELMANS
Verlhiac, Saint-Chamassy, 24260 Le Bugue, France

ABSTRACT: An annotated checklist of unknown animals of interest to cryptozoology is presented. The checklist is compiled from information in the files of the Center for Cryptozoology, which contain over 20,000 references. Between 110 and at least 138 animal forms are listed. Of these, 40 to 52 are aquatic forms—21 to 24 living in seas and oceans, and 19 to 28 in freshwater bodies—and from 70 to 85 are terrestrial forms. All of the world's zoogeographical regions are represented. It is hoped that future work by other researchers will help improve this first-ever checklist of animals of concern to cryptozoology.

INTRODUCTION

The present checklist has been compiled from the files and library of the author's Center for Cryptozoology, representing over 20,000 references from books, periodical articles, private communications, and personal field-work. A thorough analysis of this mass of information, conducted over a period of more than 35 years, has resulted in a number of hypotheses—some well supported, some not so well—concerning the most probable identity of the sundry animal forms listed. Opinions of other cryptozoologists are also mentioned whenever they seem judicious to the author.

Not all the listed forms necessarily represent new, still undiscovered species or subspecies. Whereas some are so well defined as to deserve a scientific description, others may well be based upon misidentifications, exaggerations, or hoaxes. But all should be carefully investigated to determine whether or not they should continue to be of concern to cryptozoology. Sources are given only when well documented works covering most of the particulars of a certain case are available. Otherwise, the sources are buried in the heterogeneous information material filed systematically in the author's Center. Due to space considerations, they cannot be itemized here.

Except for marine forms, the various animals appearing in this list are classified according to the zoogeographical regions from which they have

TABLE 1.—Breakdown of apparently unknown marine animals with which cryptozoology is concerned, and their most probable position, determined as accurately as possible, within the zoological system (Cl. = Class; O. = Order; So. = Suborder).

Mammalia	O. Carnivora: So. Pinnipedia	2
	O. Cetacea: So. Archeoceti (3); So. Odontoceti (8)	11
	O. Sirenia: Dugongidae	2
	Incertae sedis: O. Sirenia?; O. Primates?	1
Reptilia	*Incertae sedis:* O. Crocodilia: So. Thalattosuchia?; O. Squamata: So. Sauria: Mosasauridae?	1–2
Pisces	*Incertae sedis:* O. Selachii?; O. Anguilliformes?	1–2
Mollusca	Cl. Cephalopoda: O. Decabrachiata (1); O. Octobrachiata (1)	2
Invertebrata	*Incertae sedis:* Cl. Ctenophora?; Cl. Thaliacea?	1–2
Total		21–24

been reported. The freshwater forms have been grouped according to the main climatic zones. Whenever an apparently similar animal is reported from several far-flung geographical regions, it is, in each instance, considered a distinct form, as it probably represents a particular geographical race (subspecies).

Between 110 and *at least* 138 animal forms are listed (the upper figures should always be taken as representing a minimum). Of these, from 40 to 52 are aquatic forms (21 to 24 living in seas and oceans, and 19 to 28 in freshwater bodies), and from 70 to 85 are terrestrial forms. The marine forms (Table 1) seem to comprise 16 mammals (two pinnipeds, three archaic whales, eight toothed whales, one large sea cow and another sirenian, and one mammal of uncertain status—either a sirenian or a primate); one or two reptiles (a sea crocodile or a mosasaur, or both); one or two fishes of uncertain status (sharks? eels?); two mollusks (one squid and one octopus); and one or two other soft-bodied invertebrates. The freshwater forms (Table 2) seem to comprise six to eight mammals (two pinnipeds, one to three sirenians, and three others of uncertain status); nine to 15 reptiles (two possible plesiosaurs, one or two sauropod dinosaurs, six monitor lizards, one possible mosasaur, and one snake); and four or five fishes (one shark, two or three catfishes, and one fish of uncertain status).

The terrestrial forms (Table 3) seem to comprise 57 to 68 mammals (four or five marsupials, one ground sloth, one fruit bat, 24 to 30 primates—lemurs, monkeys, apes, and men—17 to 19 carnivores—bears, dogs, and cats—three to five elephants, one rhinoceros and one zebra, one deer and one antelope, three forms of uncertain status—one being either a monotreme or an otter, another either a sabre-toothed marsupial or a sabre-toothed carnivore, and the last either a hyrax or a rodent); three birds (one gigantic

TABLE 2.—Breakdown of apparently unknown freshwater animals with which cryptozoology is concerned, and their most probable position, determined as accurately as possible, within the zoological system (Cl. = Class; O. = Order; So. = Suborder).

Mammalia	O. Carnivora: So. Pinnipedia	2
	O. Sirenia: Trichechidae or Dugongidae	1–3
	Incertae sedis: So. Pinnipedia?; So. Sirenia?; O. Edentata?	3
Reptilia	O. Sauropterygia: So. Plesiosauria	0–2
	O. Saurischia: So. Sauropodomorphi	1–2
	O. Ornithischia: So. Ornithopoda	0–1
	O. Crocodilia	1–2
	O. Squamata: So. Sauria: Varanidae (6); Mosasauridae (0–1); So. Ophidia: Boidae (1)	7–8
Pisces	O. Selachii (1); O. Siluriformes (2–3); *Incertae sedis* (1)	4–5
Total		19–28

vulture, one small moa, and one flightless rail); eight to 10 reptiles (one ceratopsian dinosaur, one or two lizards and one monitor lizard, and five or six snakes); and, finally, one or two vertebrates of uncertain status (bats? pterosaurs?).

In summary, of all these 110 to 138 apparently unknown animal forms, 79 to 92—almost three-quarters—appear to be mammals. Only three are birds, 18 to 27—close to one-fifth—appear to be reptiles, and only five to seven appear to be fishes. There are, moreover, two to four vertebrates of uncertain status, two definite mollusks, and one or two other invertebrates of more dubious status.

The checklist is for *a priori* reasons far from complete, since the number of large-to-medium-sized animals still to be discovered exceeds the hundred-odd discussed here (Heuvelmans 1983a). It is also incomplete because it is mainly based on the investigations of a single individual; it is hoped that other researchers will, in the future, help improve it by providing well-documented information they may have collected themselves. Finally, it must be considered incomplete because forms based only on vague traditions or rumors, or upon a single sighting, have deliberately been omitted, and because forms of uncertain status—one does not know whether they are on the verge of extinction or already extinct—are not listed either, as they are far too numerous: the Tasmanian thylacine is just one of at least a dozen of such species, and the Eastern U.S. cougar just one out of dozens of such subspecies. The search for these already well-known animals, although sometimes using cryptozoological methods, is in any event more relevant to traditional zoology than to cryptozoology.

This checklist is, of course, neither restrictive nor fixed, and is thus by its very nature provisional. It remains open to change and already differs con-

TABLE 3.—Breakdown of apparently unknown terrestrial animals with which cryptozoology is concerned, and their most probable position, determined as accurately as possible, within the zoological system (Cl. = Class; O. = Order; So. = Suborder).

Mammalia	O. Marsupiala: Macropodidae or Diprodontidae (2–3); Thylacidae (2)	4–5
	O. Edentata: Mylodontidae or Megalonychidae	1
	O. Chiroptera: So. Megachiroptera: Pteropidae	1
	O. Primates: So. Prosimii (1–2); So. Anthropoidea: Cercopithecidae (1); Pongidae (6); *Gigantopithecus* sp. (3); Hominidae (10); *Incertae sedis:* Pongidae?; *Australopithecus* sp.?; Hominidae? (2–6); Cebidae?; Pongidae?; Hominidae? (1–2)	24–30
	O. Carnivora: Ursidae (4–6); Canidae (3); Felidae (10)	17–19
	O. Proboscidea: Mastodontidae (0–1); Elephantidae (3); Dinotheriidae (0–1)	3–5
	O. Perissodactyla: Rhinocerotidae (1); Equidae (1)	2
	O. Artiodactyla: Cervidae (1); Bovidae (1)	2
	Incertae sedis: O. Monotremata?; O. Carnivora: Lutrinae? (1); O. Marsupiala: Thylacosmilidae?; O. Carnivora: Felidae? (1); O. Hyracoidea?; O. Rodentia? (1)	3
Aves	O. Falconiformes: Teratornithidae	1
	O. Apterygiformes: Dinornithidae	1
	O. Gruiformes: Rallidae	1
Reptilia	O. Ornithiscia: So. Ceratopsia	1
	O. Squamata: So. Sauria: Scincidae or Anguidae (1); Varanidae (1); *Incertae sedis* (0–1); So. Ophidia: Boidae (3); Colubridae (1); Viperidae or Crotalidae (1); *Incertae sedis* (0–1)	7–9
Vertebrata	*Incertae sedis:* Cl. Mammalia: O. Chiroptera?; Cl. Reptilia: O. Pterosauria?	2–4
Total		70–85

siderably, thanks to contributions by others, from the brief survey already published by the author (Heuvelmans 1984). In fact, the present checklist is essentially intended to mark the approximate status of cryptozoological research up to 1985. Supplements with emendations will probably be published in the future.

MARINE FORMS

Unknown species of cetaceans for which no specimens have ever been recorded:

- A high-finned sperm-whale, 60 feet in length, said to have been frequently seen about the Shetland Islands in the 17th century. It was observed by Sir Robert Sibbald, the "father of cetology," and described by him in 1692 as *Physeter tursio* (Heuvelmans 1965b: 28, 1968: 37).

- A beaked-whale, 30 feet long, black above and white below, with the flippers white on the upper surface and thus contrasting sharply with the black body. Philip H. Gosse spent no less than twelve hours watching a shoal of such still undescribed whales in the North Atlantic (Heuvelmans 1965b: 28, 1968: 37).
- A whale of rather large size (from 20 to 30 feet long) with an extremely long, erect back fin, almost sabre-shaped. Apparently confined to the Antarctic Ocean, it was mentioned by both Sir James Ross and McCormick, and three of them were sighted in January, 1902, and four more the following month by Edward A. Wilson, who went on Robert Scott's *Discovery* expedition (Heuvelmans 1965b: 28, 1968: 37).
- A kind of killer-whale, entirely sepia brown with white star-shaped scars, which was sighted several times in the eastern Gulf of Aden, north of the village of Alula, by Captain W. F. J. Mörzer Bruyns, who named it provisionally the "Alula whale." It is about 20 feet long and its dorsal fin is at least 2 feet high (Mörzer Bruyns 1971).
- A dolphin with two dorsal fins, both curved backwards, the anterior one set on the forehead like a horn. It was first described by Rafinesque as *Oxypterus mongitori* after Mongitore's observation of it in the Mediterranean. Quoy and Gaimard confirmed the existence of such strangely endowed dolphins when, during the *Uranie* and *Physicienne* expedition, they saw a whole school of them, spotted with black and white, between Sandwich Islands and New South Wales in 1819. They named this species *Delphinus rhinoceros* (Heuvelmans 1965b: 27–28, 1968: 36).
- A Mediterranean dolphin looking very much like the striped dolphin (*Stenella coeruleoalba*), but lacking its peculiar harness pattern. It has been provisionally described as the "Greek dolphin" (*Stenella* sp.) by Mörzer Bruyns, who has seen some on several occasions (Mörzer Bruyns 1971).
- A similar dolphin, differing slightly from the bridled dolphin (*Stenella attenuata*) and observed in great numbers by Mörzer Bruyns along the Senegal coast, which was accordingly described by him as the "Senegal dolphin" (*Stenella* sp.) (Mörzer Bruyns 1971).
- A kind of dolphin very similar in shape and size to the mellon-headed whale (*Peponocephala electra*), but more brightly colored, with a brown back, yellow flanks, and a pink belly. It had been named the "Illigan dolphin" by Mörzer Bruyns, and accurately portrayed by him when he observed it in the Mindanao Sea, off of the Philippines, even before the jet black mellon-headed whale, long thought to be a species of *Lagenorhynchus,* was placed in a genus of its own by M. Nishiwaki and K. S. Norris in 1966 (Mörzer Bruyns 1971).

Merfolk-like animals not necessarily related to the present dugong and manatees—their classical scientific explanation:

- "Mermaids" and "mermen" reported from seas where no recent species

of sirenians are known to have lived during historical times. In the most complete work devoted to the mermaid legend (Benwell and Waugh 1961), 70 sightings of such creatures are listed. Out of these, 52 (almost three-quarters) have alledgedly occurred far from the areas where the three species of manatee, the dugong, and the enormous Steller's sea-cow are known to be or to have been confined: 47 in European waters, three off of Greenland and in the extreme northeast of North America, one in Polynesia, and one in the Arctic Ocean. In these regions, the existence of seals, sea-lions, or walruses, cannot, as has been suggested, make up for the absence of sirenians, since pinnipeds lack the essential—almost indispensable—feature which makes an aquatic animal congruent with the mythical archetype of the mermaid (the devouring mother or the ever-deceiving vamp): the pectoral mammae. Only a still-unrecorded species of recent Sirenia, or possibly—though much less likely—an unknown form of primate adapted to sea-life, could explain the abundance and persistence of merfolk reports in certain seas up to modern times.

- Surviving herds of the largest sirenian, Steller's sea-cow (*Hydrodamalis gigas*), in the Bering Sea. Since such gigantic animals were known in the 18th century all along the Kamchatkan coast, and probably even further north to St. Lawrence Island, and since some seem to have been sighted quite recently off Cape Navarin, the survivors may not belong to the same geographical race, and even not to the same species as those exterminated before 1880 off of the Komandorski Islands. Obviously very specialized and even degenerate, the latter were confined to the shores of these islands because of a highly exclusive diet restricted to particular kinds of sea-weed and sea-kale, and, characteristically enough, they never tried to escape from their persecutors in spite of the abundance of other islands and the vastness of the sea (Heuvelmans 1965b, 1968, Mackal 1980).

- In the northern Pacific, south of the Aleutian Islands, an unidentified merfolk-like animal of much smaller size (5 feet long) observed for over two hours by naturalist Georg Wilhelm Steller in 1741, and described by him as a "sea-ape." It seemed devoid of forelimbs, and had an asymmetrical tail of which the upper fin was longer than the lower one, as is the case in sharks. Could this be the aquatic form of primate alluded to above? Roy P. Mackal suggests that this animal, which sometimes raised itself one-third of its length out of the water (as pinnipeds often do), could be either a northern form of the leopard seal (*Hydrurga leptonyx*), only known at present from the Antarctic Ocean, or a very young specimen of a surviving zeuglodon (*Basilosaurus*). The survival of this fossil archeocete would moreover account for native traditions of a large long-necked sea "monster" called *tizheruk* on King Island and *pal rai yuk* on Nunivak Island (Mackal 1980). The front flippers of both animals could have been held so closely pressed to the body

as to pass unnoticed in Steller's specimen. But none of these hypotheses can explain the disturbing shark-like tail of the "sea-ape."

Huge, mostly elongated marine animals traditionally referred to as "sea serpents," but of obviously different shape, habits, and geographical distribution (some are world-ranging and some confined to restricted areas). They may represent either supposedly extinct forms, such as primitive cetaceans or ancient sea-faring crocodiles or lizards, or quite original forms of very specialized pinnipeds and fishes—or even invertebrates.

A careful statistical analysis of almost 600 sightings of these "sea serpents" reported between 1639 and 1965 enabled the author (Heuvelmans 1965b: 644–650, 1968: 565–569) to describe five well-defined new species, and to distinguish two further, less well-defined forms, one at least certainly heterogeneous:

- *Hyperhydra egedei,* or "Egede's super-otter," known to the Scandinavians as *soe-orm* ("sea-worm"), an extremely primitive pre-zeuglodon archeocete, confined to the icy Arctic Ocean, which probably became extinct during the last century.

- *Plurigibbosus novaeangliae,* or "the many-humped of New England," i.e., the famous "American sea-serpent," actually distributed throughout the cold temperate regions of the North Atlantic. Having recent cetaceans' features, such as a dorsal fin and a bilobate tail, it seems to be a more specialized form of archeocete, closely related to the fossil zeuglodon (*Basilosaurus*).

- *Cetioscolopendra aeliani,* or "Aelian's cetacean centipede," another archeocete, strangely provided with many lateral fins and with a segmented, jointed armour of bony dermal plaques which were common among archaic whales. It is found only in the belt of tropical and subtropical waters around the world, and is known to the Malagasies as *tompondrano* ("lord-of-the-sea"), and to the Vietnamese as *con rit* ("millipede").

- *Megalotaria longicollis,* or "the big sea-lion with a long neck," the most common "sea serpent," a gigantic cosmopolitan pinniped which can occasionally crawl on land. Living normally near the surface, it often enters fjord-like sea-arms, where some of its populations seem to have been imprisoned during glacial times, when a lowering of ocean levels resulted in such fjords becoming landlocked and transformed into steep-shored lakes (see below, *In Cold Temperate Lakes and Rivers*).

- *Halshippus olaimagni,* or "the sea-horse of Olaus Magnus," another cosmopolitan pinniped, with a long floating mane and well-developed whiskers, but also with enormous eyes, apparently adapted to very dim light and thus to semi-abyssal depths, in contrast with the preceding species; it thus cannot be the male form of the former.

- A marine saurian; that is, a huge ocean-dwelling reptile shaped like a crocodile or a lizard. It could be either one of the thalattosuchian crocodiles

of the Mesozoic Era, which had a fish-tail and the hind-legs transformed into flippers, or a surviving mosasaurian, an outsized sea cousin of the monitor lizards. It is even possible that both of these survive separately in tropical waters.

• Super-eels; actually a host of large eel-like fishes adapted to abyssal depths and only seen on the surface in exceptional circumstances, apparently writhing in their death-throes. These include big snake-like sharks, perhaps related to *Chlamydoselachus anguineus,* the present frilled shark, which does not exceed 6 feet in length.

• To Heuvelmans' seven vertebrate types of "sea serpents" some very elongated invertebrates ought to be added, because, as has been postulated by Roy P. Mackal, such are needed to account for some particularly problematical cases. For instance, colonies of salp-like tunicates (Pyrosomida or Salpida) or ctenophores (comb jellies) of the Venus' girdle type, of unrecorded length or belonging to unknown species (Mackal 1980).

Gigantic cephalopods by far exceeding the dimensions of the largest recorded specimens:

• Giant squids more than 100 and even 200 feet long overall (the largest measured specimens of *Architeuthis* are only about 50 feet long). Claims for much larger creatures have been conjectured from the size of scars left by the toothed suckers of large squid on the skin of sperm-whales, and from the length and thickness of the arms of squids found in the bellies of—or vomited up by—these carnivorous whales, the ratio between the dimensions of the greatest suckers and the body-length, and the ratio between the dimensions of the sessile arms and this same length being approximately constant in *Architeuthis.* Of course, quite differently proportioned squids of unknown genera could be responsible for both outsized sucker marks and the cession of relatively enormous arms, but this would be even more unlikely than the existence of individual specimens of *Architeuthis* of much bigger size, or of a larger unknown species of this genus (Heuvelmans 1958b, 1968).

• Huge octopuses spanning 60 feet or more, in the western Atlantic, especially off of the Bahamas, where they are known as *lusca* to the Andros Island fishermen. They have been described as *Octopus giganteus* by A. E. Verrill based on a report and a few photographs of a mutilated and decomposed specimen stranded on a Florida beach (Verrill 1897a, 1897b). This description was almost immediately repudiated by Verrill himself, who came to the conclusion that the specimen was just a mass of whale blubber (Verrill 1897c). However, a more recent histological analysis of some of the preserved tissue revealed that it could not have come from a mammal, had indeed come from a cephalopod, and, furthermore, one less closely related to squids than to octopuses (Wood and Gennaro 1971). The full, intricate story of all this was painstakingly reconstructed some years ago (Mangiacopra 1975, 1976, Mackal 1980).[1] After his first examination of the photographic evidence, Verrill had sensibly suggested that what he then took for a gigantic octopus might be related to *Cirroteuthis* because two stumps of the stranded mass looked like the remains of the lateral fins which characterize this swimming octopus. This was rather unlikely at the time, since all cirrate—that is, ciliated octopuses—then known were of very small size. However, as an octopus of this family, more than 8 feet in length, was filmed at a depth of 8,500 feet over the hydrothermal springs of the eastern Pacific by the French scientific research submarine *Cyana* in 1984, this hypothesis gains new support.

According to Michel Raynal, because the cirri fringing the row of suckers in Cirromorpha look very much like hairs, it could even account for the name "him of the hairy hands" sometimes given to the *lusca* of Andros Island. Raynal thus proposes to change the generic name associated with the Florida type-specimen from *Octopus* to *Otoctopus,* "the eared octopus," this name alluding to the lateral fins actually resembling projecting ears. The scientific name of the gigantic, seemingly semi-abyssal cephalopod would by this process become *Otoctopus giganteus* (Raynal 1986).

Freshwater Forms

(1) In Cold Temperate Lakes and Rivers

Like all animals, marine ones excepted, freshwater forms should be classified according to the zoogeographic regions they inhabit. However, the alternate method of grouping them according to the main zones of temperature, as done here, has the advantage of emphasizing the peculiar uniformity of those reported from cold temperate climates in both hemispheres:

• So called "lake monsters," generally described as the long-necked type of "sea serpent" capable of crawling on land (*Megalotaria longicollis*), in Loch Ness and several other Scottish locks, but also throughout the northern regions in the lakes of Wales, Ireland, Iceland, Norway, Denmark, Sweden, Finland, the Soviet Union, Japan, Canada and the U.S.A. (Costello 1974, Mackal 1980, Bord and Bord 1980). Incidentally, the Loch Ness animals have been described as *Nessiteras rhombopteryx* on the basis of an underwater photograph of a diamond-shaped fin (Scott and Rines 1975). This generic name is long antedated by *Megalotaria* (Heuvelmans 1965b), but the specific name may well be retained as valid, even as just subspecific, since it is very likely that the diverse landlocked, freshwater forms differ at least slightly from the ocean-dwelling one.

• "Lake monsters" similarly described, in Argentinean (*iemisch*?), south

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[1] See Mackal's Research Report elsewhere in this issue for further biochemical results—Editor.

Australian (*bunyip*) and Tasmanian lakes (Heuvelmans 1955, 1958a, Mackal 1980), but also in the Orange River and in the tributaries of the Vaal River (*groot slang*) in South Africa (Heuvelmans 1978).

Attention must be drawn to the fact that all these long-necked animals have been reported from stretches of freshwater located around isothermic lines 10°C; that is, between 0°C and 20°C (i.e., 50°F, between 32°F and 67°F) in both Northern and Southern hemispheres. One could hardly wish for better circumstantial evidence of their existence.

(2) In Tropical Lakes, Rivers, and Swamps

As will be obvious below, the freshwater "monsters" from warmer climates do not have much in common. If they are grouped here together, it is to place emphasis on their extreme diversity, in contrast with the unknown freshwater forms from cold climates. For clarity's sake, they have nevertheless been grouped here by continent, so as to be easily inserted hereafter into the sections of their proper zoogeographical region. Since many of these animals are actually amphibious, some could likewise have been listed with the terrestrial forms.

In Asia (Oriental Region):

- Amphibious animals, probably huge monitor lizards, some up to 20 feet in length—and thus larger than the Komodo dragon (*Varanus komodoensis*)—currently reported from India and neighboring countries. In the Gir area (Kathiawar Peninsula), where they are known as *jhoor,* they are largely mythicized, but they have been fairly well observed in the Sundarbans (mouths of the Ganges), where, strangely enough, they live in symbiosis with the salt-water crocodile (*Crocodylus porosus*). In Assam, where they are known as *buru* to the Apa Tanis, they seem to have been exterminated in modern times (Izzard 1951, Mackal 1980). In Bhutan, however, some have recently been sighted in one of the northern lakes, once by the King himself, and they have also been reported from Burma. There is even a historical record extant of their existence in Sumatra during the 16th century (Heuvelmans 1965a).
- A dinosaur-like animal resembling a sauropod, or possibly a plesiosaur-like animal, seen in two lakes of Pahang, in the Malaysian Peninsula: the Tasek Bera and the Tasek Chini.
- A similarly-described reptile in Lake Patenggang, in western Java.

In Africa (Ethiopian Region):

- Unknown species of sirenians, differing probably from both the manatee of West Africa and the Red Sea dugong, reported from Lake Tana, in Ethiopia (*auli, aila, ia-bahr-tedcha*), from Lake Chad, and even Lake Yoan, one of the Ounianga swamps, both in Chad (Heuvelmans 1978).
- Large, long-necked, amphibious animals, capable of walking on land and said to be vegetarian, thus resembling sauropod dinosaurs, in Gabon (*n'yamala*), the Congo (*mokélé-mbêmbé*), and the Central African Republic (*diba, songo, badigui, ngakula-ngu, guaneru*) (Heuvelmans 1978, Mackal 1980, 1986).
- Aquatic animals described as gigantic snakes in the Upper Nile swamps (*lau, jâk-anywong*) and in Lake Victoria (*lukwata*). They probably belong to undescribed species of very large catfishes (Heuvelmans 1978).

In Central and South America (Neotropical Region):

- A 12-foot long aquatic animal resembling either a seal or a manatee, near the islands of Titicaca and Tiquina, and near the peninsulas of Copacavana and Tiquina, in Lake Titicaca, Peru (Bandelier 1910).
- Large amphibious reptiles, usually said to be dinosaur-like (but resembling more ornithopods—that is, iguanodons or duckbills—than sauropods), or, more rarely, plesiosaur-like, in a vast area of the northwest of the continent stretching over Peru, Ecuador, Colombia, Venezuela, and the Brazilian State of Amazonas.
- Giant anacondas up to 60 feet long (*Sucuriju gigante*)—and thus possibly belonging to a species distinct from *Eunectes murinus*—in the Amazon basin (Heuvelmans 1955, 1958a).
- An even larger freshwater "sea serpent" known as *minhocão* ("giant earthworm"), in the Upper Paraguay, Upper Parana and Uruguay Rivers. It is presumably an amphibious burrowing mammal (Heuvelmans 1955, 1958a).
- A "scaly serpent," 25 to 30 feet long, known as *huilla,* in the East Coast River, Trinidad. It is said to rise and fall "in arches," which is impossible for a snake, and usually indicates a mammalian origin.
- A gigantic "fish" given to capsizing canoes in Lake Origuere, in the Mojos Indian territory, Bolivia (Métraux 1947).
- A mysterious beast of the Paraguayan Chaco, described as "a slug-like snake," but as broad as a horse and having the head of a dog and a poisonous barbed spike in its stumpy tail. It is most probably what some of the local Indians call *manguruyú* or giant catfish, an 18-foot-long fish said to grow up to half a ton in weight (Craig 1954).

In Australasia (Australasian Region):

- Gigantic monitor lizards, up to 30 feet in length, known to some Aborigines as *mungoon-galli,* in various places of eastern Australia, particularly in the forests of northern Queensland, but also further south (see Terrestrial Forms, *In Australasia [Australasian Region]*). They could be relic individuals of *Varanus priscus* from the Upper Pleistocene of Australia.
- Similar amphibious monitor lizards, almost as large, and called *au angi-angi* by the Papuans of eastern New Guinea (Heuvelmans 1965a).
- An unknown species of crocodile (or is it, as has been suggested, a surviving mosasaur?) known as *migo,* in Lake Dakataua, on the island of New Britain, in the Bismarck Archipelago (Neill 1956).

• Another still-undescribed species of crocodile suspected to inhabit the ancient lakes of Celebes (Schmidt 1935, Hooijer 1954).

• A wrongfully disputed freshwater shark (*Carcharhinus* sp.) in Lake Sentani, 20 miles inland from the north coast of New Guinea. During World War II, American anthropologist George Agogino actually saw one brought to the surface (stunned or dead) after he had dropped a hand bomb into the lake from a dugout to get a supply of fresh fish for his army unit. The shark soon began to sink, but he had enough time to make a quick drawing of it and to ascertain that it was over 12 feet in length.

Terrestrial Forms

(1) In Europe (Palearctic Region)

• Wild hairy men, most probably Neanderthals having survived into historical times. Known as *satyrs* in classical antiquity—a name borrowed from the Hebrew *se'ir* ("the hairy one")—and as *wudewása* ("wood being") in the Middle Ages, they were reported until the 13th century in Ireland, until the 16th century in Saxony and Norway, until the 18th century on the Swedish island of Öland and in Estonia, in the Pyrénées (*iretges, basajaun*) up to 1774 at least, and in the Carpathians ("wild man" of Kronstadt) up to 1784 at least.

• Wolf-like predators, killing domestic animals and sometimes human beings, periodically reported from various places in France, Switzerland, or Italy. The most famous one is "the Beast of Gévaudan," said to be responsible for the deaths of a hundred people between 1765 and 1767 in the Lozère (France). Wolves are usually blamed for these massacres, despite the fact that they do not normally attack humans unless they have rabies. Furthermore, the way the victims were dispatched does not usually correspond with their normal method of killing. Such "beasts" usually turn out to be feral dogs, although wolf-dog hybrids could be the culprits in certain cases. It is also possible that human sadists of the "serial killer" type took advantage of the local "beasts"' deeds to commit gruesome crimes with impunity. This is without the slightest doubt what happened in the Gévaudan area in the 18th century (Ménatory 1976).

• When similar obnoxious "beasts" of prey are reported from Great Britain, where they have been recorded all over the country, from Devon to Kent and from Sussex to Caithness, they are almost always described as catlike and said to resemble lynxes, American pumas, and even African lions. They are only referred to as dogs when they are black and definitely ghostlike (Bord and Bord 1980). Here also, large feral dogs could explain the tracks which are found, and they are generally to be blamed for the depredations, much more frequently, at least, than wild cats, although the latter still exist in Scotland (*Felis silvestris grampia*). One researcher has been bold

enough to suggest that there could be an unknown form of cat in the British Isles (Francis 1983). This, of course, is quite unacceptable to most zoologists, but it should be remembered that lynxes survived until recent times in Britain, and may even have lingered into the present. After all, cats are most elusive creatures, as will be seen below.

• A big wild cat on the Mediterranean Ile du Levant, one of the Iles d'Hyères, off the coast of the Var, France. In 1932, an individual which used to dwell at a certain spot looked so large to the numerous inhabitants who sighted it that it was dubbed *le lynx de la Paille.* During World War II, several of these cats were caught in rabbit jaw-traps set by poachers: some of the cats were reported to the author to weigh more than 22 lb (10 kilos), and even up to 33 lb (15 kilos)—which was probably an exaggeration. In 1958, one was observed several times by the author himself, who saw it savagely attacking feral cats. This still-undescribed insular cat probably belongs to a particular race, like the Corsican wild cat (*Felis reyi*), only known by three specimens, the still mysterious Sardinian wild cat (*Felis sarda*), and the Cretan wild cat (*Felis agrius*), which is in danger of extinction through genetic "dilution," since it often interbreeds with feral cats. It must be stressed that the various cat races of the Mediterranean islands, first thought to be subspecies of the European wild cat (*Felis silvestris*), are now considered subspecies of the African wild cat (*Felis libyca*). It still remains to be established whether the wild cat of the Ile du Levant, lying much nearer to the mainland—a race which could be described as *levantina* (subsp. nov.)—is to be classified similarly or not.

• A stumpy reptile or amphibian, about 3 feet long, looking like a skink or a glass-snake (*tatzelwurm, stollwurm*) in the Swiss, Bavarian, and Austrian Alps. It could be closely related to the scheltopusik (*Ophisaurus apodus*), the largest of all glass-snakes, with a length of almost 4 feet, which is found not only in southwestern Asia, but also in southeastern Europe (Heuvelmans 1955, 1958a).

• Large snakes, from 9 to 13 feet long, currently reported from the Mediterranean provinces of France, northern Italy and Greece, but also sometimes from inland provinces such as the Hautes-Alpes or the Vienne, in France. The most likely explanation is either that they are stray individuals of the Montpellier snake (*Malpolon monspessulana*), which can exceptionally reach 9 feet in length, or that the geographical distribution of this alledgedly coastal species, and of its Balkan relative, is more extended than generally believed.

(2) In Cold Temperate Asia (Palearctic Region)

• Neanderthal-like men, generally known locally as "wild men," "hairy men" or "bear-men," reported alive from most of the mountain ranges of Palearctic Asia: in the U.S.S.R., from the Caucasus Mountains (*kaptar,*

tkhiskatsy, achokochi, abnauayu, lakshir, agash-kishi, ingushei, almasty) and the Pamir Mountains (*yavan-adam, golub-yavan, jez-tyrmak, khaivan-akvan*) through the Altay and Sayan Mountains (*almast, albasty*) up to the Verkhoyansk Range and the Chukotka Peninsula (*chuchuna, kuchuna, moolena, kéédieki, abas*); in Iran (*dev, nasnas, ghool-biaban, meshae-adam, veshshi-adam, tukhli-adam, kara-pishik*); in Afghanistan (*yavoi-adam, yavo-khalg, yabalik-adam*); in China, from the Karakoram foothills (*adam-yapayisy*), the Tien Shan Range (*adam-ayu, kiik-adam*) and Dzungaria (*ksygyik*) westward to the Sennongyia Mountains and the Quinling Range in the center of the country (*ye-ren, mao-ren, ren-xiong*) and southward to northern Tibet (*mi-gö*) and the southern provinces (*fei-fei*); and, finally, in Mongolia (*almas, khün-görüessü*).

These wild hairy men have also spread through the valleys of the Irrawaddy, Salween, and Melong Rivers into the tropical southeast of the continent (see below, *In Tropical Asia [Oriental Region]*), over Burma and Thailand into Laos, Cambodia and Vietnam, more exceptionally into southern Malaysia (*b'lian*) (Porshnev 1963). The type-specimen of this form (*Homo pongoides* or *Homo neanderthalensis pongoides*) was actually shot in Vietnam in the mid-1960's and then smuggled into the U.S.A., where it was exhibited deep-frozen for a number of years (Heuvelmans 1969, Heuvelmans and Porchnev 1974).

- Gigantic hairy hominoids (most probably *Gigantopithecus* sp.) in southern Tibet (*nyalmo, mi-chen-po*), Sikkim and northern Bangladesh, from where, like the Neanderthal-like men, they spread into the Oriental Region, namely Burma (*tok, kung-lu*), China up to Manchuria (*xiao, da-mao-ren*), and North Vietnam (*shan-tu*).

- A white bear from the Shennongjia mountain forests, in the Hubei Province of central China. Known for centuries to the Chinese as *bai-xiong* (white bear), it was confused with the giant panda when the latter was discovered, although this piebald bear-like animal would certainly have been named "black and white bear." Since 1963, four specimens have been captured, which can be seen in the Wuhan and Beijing Zoos. It has been stated that these bears, smaller than the polar bear, are not albino freaks of the local black bear, but belong to a distinct form resulting from a long evolutionary process.

- Mammoths (*Elephas primigenius*) alledgedly surviving in Siberia's taiga, an endless evergreen forest of pine and birch. The age-old rumors claiming their survival seem to be based mainly upon specimens frozen from between 9,000 end 13,000 years B.P., complete with muscles, skin, and hair. These impressive carcasses have occasionally been seen "emerging" from blocks of melting peat by terrified natives. There is only one detailed report of an actual encounter with a live animal: an elderly hunter born in the Usuri region told a French consul in 1918 that, two years before, he had sighted a huge elephant with very curved tusks and fairly long hair after having followed its enormous tracks in the woods for several days. Although perfectly matter-of-fact and ingenuous, this story is so vaguely and even absurdly located that it is considered far from reliable (Heuvelmans 1958a).

- A short and stocky snake, between 2 and 3 feet in length, said to inhabit the mountains of the larger islands of Japan (Honshu, Shikoku, and Kyushu), and Korea on the Asiatic mainland. With a very wide head, separated by a constricted neck from an even wider body ending in a short tail, it looks very much like an African puff adder (*Bitis*). Although still unrecorded by science, it has been reported since the 13th century, and has been given no less than forty different names, the most common being *tzuchinoko,* which alludes to its shape reminiscent of a straw bat (*tzuchi*). It is said to have extremely large eyes with eye-lids (possibly protruding scales), two facial pits between the eyes and the nostrils, erect horns (probably scaly horns), two crests along the spine (a double line of markings?), and very large scales all over the body. On the upper parts, the color is a mixture of iridescent grey and dark brown, marked with large black spots, and it is bright orange on the belly. The tail is said to be a prehensile. The so-called straw bat snake can move by both the usual lateral undulations of most snakes and the rectilinear forward progression of some heavy-bodied vipers. Being able to curl itself up into a ball, or a "balloon tire," it alledgedly rolls down hills in a similar way as that attributed to the legendary "hoop-snake" of North American folklore. It is also credited with prodigious leaps, and is a good swimmer. Finally, it is reputed to be aggressive and highly venomous (Yamamoto 1973, 1985).

Owning to the overwhelming amount of anatomical and behavioral traits it shares with both true vipers and pit vipers, the *tzuchinoko* should be classified within either the Viperidae or Crotalidae. Because of its facial pits, and the fact that the only vipers known from Japan are representatives of two genera of Crotalidae, *Agkistrodon* and *Trimeresurus*—the latter being confined to the smaller islands—it presumably belongs to the same family, and could thus represent a new species within the genus *Agkistrodon* (Dethier and Dethier-Sakamoto 1986). However, since it shows an unprecedented combination of traits from both true vipers and pit vipers almost equally, it may well constitute a distinct new genus.

(3) In North Africa (Palearctic Region)

- A large wolf-like animal, differing from both jackals and foxes, in the Sahara Desert. The Tuareg are said to call the male *adjulé* and the female *tarhsît*. It is obviously the same animal, which is also known as *kelb-el-khela* (bushdog) in Mauritania. It is currently referred to as a still-unknown animal,

although it was clearly established by Theodore Monod as early as 1928 that it is the African hunting dog (*Lycaon pictus*), which thus appears not to be strictly confined to savanna and bush and to the tropics (Monod 1928).

• Small-sized bears said to be common in the mountains of the Rif, near Kétama, in Morocco. Such a dwarfish bear (*Ursus arctos faidherbianus*) has been described from the Upper Pleistocene of North Africa, and it seems to have survived into historical times, its remains having been found associated with human artifacts dating to the Christian Era. It is most probably a surviving individual of this form, killed at the foot of the Tetuan mountains, also in northern Morocco, which was described in 1844 by Schinz as *Ursus crowtheri*; an effort was made to preserve its skin, but unfortunately in vain (Heuvelmans 1982). Strikingly enough, it is precisely from the same area that living bears are now reported. It must be kept in mind, however, that this could be the result of a confusion between bear and hyaena, the former's Arabic name being *dubb,* whereas the latter's Arabic name is *dubbah.*

• Very large snakes reported from eastern Morocco to Tunisia, and often said to be long-haired (crested, or, much more likely, seen shedding their skins). They could be pythons surviving—just as crocodiles have—in scraps of tropical vegetation remaining north of the Sahara Desert, and occasionally straying from them (Heuvelmans 1978).

(4) In Tropical Asia (Oriental Region)

• Giant bats, said to be the size of a small child, reported from Vietnam, Java (*aul*), and the Philippines.

• Neanderthal-like men in the southeast of the continent, including the Malay Peninsula (see above, *In Cold Temperate Asia [Palearctic Region]*).

• Gigantic hairy hominoids (*Gigantopithecus*?) in Burma, southern China, and North Vietnam (see above, *In Cold Temperate Asia [Palearctic Region]*).

• Anthropoid apes (probably mainland orang-utans surviving from the Pleistocene, or just traditions about them), in Assam (*olo-banda, bir sindic*), Burma (*iu-wun*), southern China (*xing-xing*) and Vietnam (*kra-dhan, con lu'o'i u'o'i, bêc'-boc*).

• A youth-sized ape with a conical head, reported since classical antiquity ("Pan with wedge-shaped head") and now sensationalized as the Abominable Snowman, in northern India and the Himalayas, from Kashmir (*vana-manusha*) to Bhutan (*jungli admi*), through Nepal (*yeh-teh* or *yeti, mi-teh*), Sikkim (*shukpa*) and Bangladesh (*ban-manush*). It has long been confused with both the Neanderthal-like men and the *Gigantopithecus*-like hominoids mentioned above, but it is obviously a true ape, running on all fours when hurried (Izzard 1955). It is probably a remnant of the rich fossil pongid fauna of the Siwaliks, which includes *Sivapithecus.* It has been described as *Dinanthropoides nivalis* (Heuvelmans 1958). While it is quite possible that the fossil anthropoid apes referred to above are more closely related to this form than to the orang-utan, it is equally possible that the so-called Snowman is merely a particular form of orang-utan, more terrestrial than the tree-dwelling kind.

• Small hairy hominoids, with long, straight hair on the head, exterminated at the end of the 18th century in Sri Lanka (*nittaewo*), but seemingly still alive in Sumatra (*sedapa, orang pendek*) and Borneo (*batūtūt*). According to primatologist W. C. Osman Hill, these dwarfs could be modern representatives of *Homo erectus* (Hill 1945).

• Large, blue tigers persistently reported since the early 1920's from Fukien (now Fujian) Province, in southeastern China. One of them, described as having "a deep shade of maltese, changing into almost deep blue on the underparts" between the regular black stripes, was even observed by a well-known missionary and big-game hunter, Harry R. Caldwell. He personally thought it was a freakish mutation related to melanism; but even the existence of melanistic (black) tigers is based on testimonial evidence only.

• Pythons of unusual size (up to 40 feet long), and thus belonging possibly to a species distinct from the well-known ones, said to have been observed in India, Bangladesh, and Thailand.

(5) In Tropical and Southern Africa (Ethiopian Region)

• Still unknown lemurs (*tsongomby, habeby, kalonoro,* etc.), most of them probably becoming extinct in recent times; some, however, still suspected to exist by unidentifiable calls heard in Madagascar.

• Rare remnants of a vanishing race of pygmies (*kimos*), or recent traditions about them, in Madagascar.

• Controversial species of anthropoid apes, such as the chimpanzee of inner Gabon and southern Cameroons (*kooloo-kamba, dédiéka, koola-nguia, ebôt*); the chimpanzee of Malawi (*fireti, ufiti*); and the pygmy gorilla of the Rembo Nkomi delta, on the coast of Gabon (Heuvelmans 1980).[2]

• Hairy or long-haired hominoids of very small size, sometimes largely mythicized, considered remnants of ancestral races or species of men, in West Africa (*sansandryi, wokolo, kudeni, fating'ho, egbéré, temu, kenkob, betsan, mohin-goohé, séhité, mmoatia, abonesi, aziza, ijiméré*), in Central Africa (*kakundakari, amajungi, niaka-ambuguza,* etc.), in East Africa (*doko, cincallé, mau, mberikimo, agogwe, wa-mbilikimo, watu wa miti*), and in Southern Africa (*chimanimani, tokoleshe,* etc.). These could be either proto-

[2] Since this article was submitted for publication, the existence of the pygmy gorilla has been denied by Colin P. Groves in *Cryptozoology* (Vol. 4: 37–44, 1985). According to Heuvelmans, however, this refutation is based upon still controversial evidence, and the case should be considered as still unresolved—Editor.

pygmies, proto-bushmen, or australopithecines of the gracile kind (*Australopithecus africanus*) (Heuvelmans 1980).

• Large hominoids of equally ambiguous identity in Sudan (*amanit, woaddel-uma, wa'ab*), Zaire (*bangenza, lisisingo, mulahu, kikomba, apamandi, zaluzugu*), Kenya (*gerit, nanauner, ngoloko, ntyii*), and Cameroons (*ngend*). These could be either unknown species of apes, ape-men (*Homo erectus*), or australopithecines of the robust kind (*Australopithecus robustus*) (Heuvelmans 1980).

• An alledged bear of unparalleled ferocity in East Africa (*chemisit, ketit, shivuverre, koddoelo,* Nandi Bear). Reports are often based upon sightings of very large black ratels or honey-badgers (*Mellivora capensis*), and upon the savage deeds of spotted hyaenas of unusual color or size, but probably also, originally, upon encounters with gigantic baboons supposedly extinct (*Theropithecus* [*Simopithecus*] sp.) (Heuvelmans 1982).

• Anomalous felines, such as black, red, or white lions, green leopards, and striped cheetahs, reported from many African countries (Heuvelmans 1983b). Most are just individual mutations, but since some are becoming more and more numerous in certain areas, and in unusual habitats, these could be considered new subspecies or even new species in the making. The best documented of these cases is that of the king cheetah, described as a separate species (*Acinonyx rex*) in 1927, but now recognized as merely an anomalous variant of the common cheetah (*Acinonyx jubatus*), but adorned with sumptuous stripes and blotches, and also more nocturnal and forest-dwelling (Bottriell 1985).

• Spotted lions, taken for crosses between lion and leopard, in mountain forests of Cameroons (*bung bung*), the Central African Republic (*bakanga*), Uganda (*enturargo*), Rwanda (*ikimizi*), Kenya (*marozi*), and Ethiopia (*abasambo*). Here, too, this particular form, always linked with a habitat somewhat abnormal for lions, can be considered a newly emerging subspecies, which has been named by the author *Panthera leo maculatus* (Heuvelmans 1955, Vol. 2: 165, 1958a: 371–372).

• Gigantic tabby cats (*mngwa, nunda*) sometimes reported from the Tanzanian coast. They could belong to a giant subspecies of the golden cat (*Profelis aurata*) (Heuvelmans 1983b).

• Large-sized sabre-toothed cats belonging to two different forms distinguished by their habitat, one being partly aquatic and the other inhabiting mountainous terrain. The water-dwelling kind is possibly known as *n'yamalé* to the Orungu of Gabon and certainly known as *coje ya menia* ("water lion") to the Mbunda of Angola; as *ntambue ya mai, ntambo wa luy* and *simba ya mai* (always meaning "water lion"), depending on the region in southern Zaire; more vaguely as chipekwé ("monster") in the Lake Bangweulu area, Zambia; as *dingonek* to the Wa-Ndorobo, as *ol-umaina*(?) or *ol-maima* to the Maasai, and *ndamathia* to the Kikuyu, in Kenya; perhaps also as *nyokodoing* in the swamps of the Upper Nile, Sudan; and, finally, in the Central African Republic, as *muru-ngu* ("water leopard") to the Banda; *ze-ti-ngu* (also "water leopard") to the Sangho; *mamaimé* ("water lion") or *ngoroli* ("water elephant") to the Zandé; and *dilali* ("water lion") to the Baya.

The mountain-dwelling kind is known as *vassoko* or *gassingrâm*(?) in unidentified languages of the Central African Republic; as *coq-ninji* or *coq-djingé* to the Youlou of the same country (a name freely translated as *tigre de montagne*—that is, "mountain tiger"—by the French-speaking people); as *hadjel* to the Hadjeray of the southwest of the Ouadaï district, Chad; and known also under still indefinite names to the Zagoua of the Ennedi and the Toubou of the Tibesti, more to the north of that country (Heuvelmans 1983b).

• Still controversial pygmy elephants—often said to be partly aquatic—throughout Equatorial Africa, where they are always given locally a specific vernacular name, such as *mussaga* in Gabon or *essala* and *bakiri* in the Central African Republic. One, known in Cameroons as *messala,* was described scientifically in 1906 under the name *Elephas pumilio.* Another, quite similar, animal, known around Lake Leopold II in western Zaire as *wakawaka,* was described later, in 1914, under the name *Elephas fransseni.* All these dwarfish elephants possibly represent a third subspecies of African elephant—now called *Loxodonta africana*—which should thus be named *L. a. pumilio,* smaller than the forest elephant (*L. a. cyclotis*), which in turn is smaller than the savanna (bush) elephant (*L. a. africana*). The pygmy race is said to dwell only in dense and dark rain forest and even in swampy areas, which would explain its stuntedness. It has also been suggested that some reports of decidedly aquatic elephants, distinctly different from the regular ones, could well have been based upon relict dinotheriums, of which a certain species (*Dinotherium hopwoodi*) survived at least until the Upper Pleistocene in East Africa (Heuvelmans 1955, 1958a).

• A pygmy forest rhinoceros, possibly more aquatic than the ordinary savanna-dwelling ones, in Liberia, eastern Cameroons, and Gabon, and also around the middle Congo River (Heuvelmans 1955, 1958a). Because it is described as decidedly aquatic, one-horned, elephant-sized, and with a heavy tail in the Likouala region of the northern Congo, where it is called *emela-ntouka* ("killer of elephants"), Roy P. Mackal suggests, but with the greatest reservations, that a surviving ceratopsian dinosaur, such as *Monoclonius,* could be involved (Mackal 1986).

• Surviving specimens of the quagga (*Equus quagga*), thought to be extinct since 1875, reported from Namibia (South West Africa). As the local, almost waterless deserts do not resemble at all the normal habitat of the quagga, which was an inhabitant of the veld (that is, the savanna), the quagga-like

zebras involved are probably freak individuals of Burchell's zebra (*E. burchelli*), less distinctly striped because of cases of incomplete albinism.

- An unidentified small-sized animal, resembling a hyrax or a marmot, seen in southern Ethiopia and well known to the natives.
- A deer, apparently known since Egyptian antiquity, recently reported also from southern Ethiopia. It most probably belongs to the genus *Climatoceras,* of which fossil remains have been collected locally and which date from the Miocene.
- A small, entirely spotted bushbuck antelope, known only from an incomplete skin (preserved in the Zoological Museum of Berlin University) from Liberia (Pathé 1940).
- Flying lizard-like animals reminiscent of the pterosaurs of the Mesozoic Era, in Zimbabwe and Zambia (*kongamato*), around Mounts Kenya and Meru in East Africa, in the Kasai Province of Zaire, in Cameroons (*olitiau,* an obvious misunderstanding for *ole ntya,* "the forked-one," i.e., the Christian devil), and in Ghana (*sasabonsam*). Some of these could actually be unknown species of giant bats, or even the strange-looking hammer-headed bat (*Hypsignathus monstrosus*) (Heuvelmans 1978).
- Pythons of unusual size (up to 40 feet long) in Central Africa, namely in Zaire, where they are given the special name of *pumina* (Heuvelmans 1978).
- Rather large snakes, said to be crested and often to have a cry like the crow of a rooster, reported throughout tropical Africa. They are known as *n'gôk-wiki* to the Baya of the Central African Republic (Heuvelmans 1978). Described as truly gigantic in the Mataba River area, in the northern Congo, where they are known as *nguma-monene* (great snake), similar reptiles with a serrated ridge running along the spine could, according to Roy P. Mackal, be outsized monitor lizards, or even more primitive snake-like lizards (Mackal 1986).

(6) In North America (Nearctic Region)

- Gigantic, hairy hominoids, leaving huge human-like footprints, some showing distinct dermatoglyphs, reported from most Canadian provinces and American states, from Alaska to Florida, but more frequently from those bordering the west coast of the continent (*sasquatch, oh-mah, tokémussi,* Bigfoot) (Sprague and Krantz 1977, Green 1978, Bord and Bord 1982). This form, generally thought to be related to the fossil gigantopithecines of Asia, *Gigantopithecus blacki* of China and *Gigantopithecus bilaspurensis* of India, has, in fact, been formally assigned to *Gigantopithecus blacki* by Grover S. Krantz (1986). Krantz has also proposed that, should the living form prove to be sufficiently different, *Gigantanthropus canadensis* would be an appropriate name.
- A chimpanzee-like ape, mainly nocturnal and capable of swimming,

reported from North American swamps and in temperate bottomland hollows. It is probably the same creature which is known as *bukwus* to the Tsimshian Indians, and after which they carved wooden masks. Despite its smaller size and its quite different habits, it has generally been confused with the former hairy giants. According to Loren Coleman, it could be a Nearctic representative of the dryopithecines, believed until now to have been restricted to the Old World from the Miocene to the Pleistocene (Coleman 1983).

- An anomalous bear, looking like a cross between a grizzly and a polar bear, from the Anderson River region in the Northwest Territories of Canada. Although well-known in Indian traditions, only a single specimen of this species—a skin and a skull—is preserved in the Smithsonian Institution collections: it has been described as Farlane's Bear (*Vetularctos inopinatus*) by C. H. Merriam (Goodwin 1946).
- Large felines with manes, and thus resembling male African lions, sporadically reported from various parts of North America, principally from the great Mississippi-Ohio-Missouri basin, more exceptionally from such distant places as Ontario, in Canada, and Georgia, California, and Washington, in the U.S.A. Developing a suggestion made by Mark A. Hall, Loren Coleman proposes that these large cats could well represent a relict population of a giant American lion of the Pleistocene, *Panthera leo atrox* which was alive only 10,000 years ago (Coleman 1983).
- Mammoths and/or mastodons having survived at least until the 18th century, particularly in Alaska.
- Gigantic flying birds of prey, with a wing span of between 10 and 16 feet, and thus larger than the Andean Condor. Generally dubbed "thunderbirds," they are suspected of attempts to abduct small children, and have been reported from innumerable parts of the southern half of the U.S.A. Loren Coleman suggests that they could be North American teratorns surviving from the Pleistocene. The most common of them, *Teratornis merriami,* had a wing-span of 10 to 12 feet, and *Teratornis incredibilis,* from Nevada and California, may have approached 17 feet. Some of the remains of these huge carnivorous birds are only 8,000 years old: it seems that they were hunted by early Amerindians (Coleman 1985).
- Outsized lizards, snakes, beavers, and even kangaroos—not to mention dinosaurs, unicorns, and flying men—reported from many parts of the U.S.A., but obviously based in most instances upon misidentifications, gross exaggeration, or plain hoaxes.

(7) In Central and South America (Neotropical Region)

- A middle-sized ground sloth (*ellengassen*) in Patagonia, or closer to the Equator in more northern tropical forests (Heuvelmans 1955, 1958a).
- Man-sized apes or monkeys, and/or hairy hominoids, in Guatemala

(*sisemite, liticayo*), Honduras (*sicimici*), Nicaragua and Panama, Colombia (*tranco, shiru*), Venezuela (*achi, vasitri, kanimas*), Guayana (*quato, di-di* or *dai-dai*), Bolivia and Brazil (*mapinguary, kubê-rop, pe de garrafa*), Peru (*tarma*), Paraguay (*carugua*), the State of Salta, Argentina (*ukumar*), and northern Chile (*tranco*) (Heuvelmans 1958a).

- Unknown bears, apparently differing from the spectacled bear of the Andes (*Tremarctos ornatus*), in the Muscarena Mountains of Colombia, and in the Campa Indian country of the Upper Amazon, in Peru (*milne*).
- The still controversial Andean wolf, a supposedly mountainous and long-haired counterpart of the lowland maned wolf (*Chrysocyon brachyurus*), described by Ingo Krumbiegel as *Dasycyon hagenbecki* on the strength of a skin and of a skull larger than the average maned wolf's cranium, both said to have come from the Andes (Krumbiegel 1949, 1953). The skin turned out to be almost identical to pelts of Canadian black wolves, which are simply a melanistic phase of the ordinary wolf (*Canis lupus*). However, the large skull, coming from a mountain region where the maned wolf, a true plains runner, is not known to dwell, remains to be explained.
- A puma-like cat, known for centuries to the Aztecs as *cuitlamiztli* and now as *onza* to modern Mexicans, who have always distinguished it from the local puma. Helmut Hemmer thinks that it may represent the native North American cheetah of the Upper Pleistocene (*Acinonyx* [*Miracinonyx*] *trumani*) surviving to the present in Mexico (Hemmer 1985).[3]
- A striped, saber-toothed cat of middle size in the mountain jungles of Colombia and Ecuador. It could be distantly related to true felids with saber teeth of the genus *Smilodon,* which were still alive in North America some 10,000 years ago. It is, however, much more likely that it belongs to the sabre-toothed marsupials of South America, the Thylacosmilidae, although these are thought to have been extinct for 4 million years.

(8) In Australasia (Australasian Region)

- An otter-like animal known as *waitoreke* (or *kaureke*?) to the Maori, on South Island, New Zealand, a country containing no aboriginal mammals, not even marsupials. It is not excluded that it could be a species of monotreme (an archaic oviparous mammal-like platypus) rather than a new species of otter (Heuvelmans 1955, 1958a).
- Gigantic monitor lizards, up to 30 feet in length, reported from tropical rivers and lakes of eastern Australia (see above, Freshwater Forms, *In Australasia [Australasian Region]*), but also reported in scrub-covered mountain ranges of New South Wales, around the Murray River, and even further south near Lake Alexandrina in Victoria.
- Unidentified species of large marsupials in Australian deserts sometimes described as outsized "rabbits" and known to the Aborigines of central Australia by such names as *kadimakara* and *gyedarra.* They could be either giant wombats of the supposedly extinct *Diprotodon* genus, or giant kangaroos of the fossil genus *Palorchestes,* but their descriptions could also be based upon ancient oral traditions referring to these creatures (Heuvelmans 1955, 1958a).
- A large tapir-like marsupial known as *gazeka* reported from the mountains of the Owen Stanley Range, in Papua New Guinea. From its outer appearance, it could well be related to the Australian *Diprotodon.*
- Medium-sized carnivorous marsupials, distinctly striped and thus referred to as pouched "tigers," reported mostly from all the western and southeastern states of Australia. They have been considered surviving representatives of the fossil genus *Thylacoleo,* or marsupial "lion," but are much more probably relicts of the supposedly extinct mainland form of the thylacine (*Thylacinus cynocephalus*), also called the marsupial "wolf" (Heuvelmans 1955, 1958a).[4]
- A large, dog-like animal on Mount Giluwe, in Papua New Guinea. As fossil thylacines have been found in this region, it is quite possible that some still survive.
- Man-sized hominoids, extremely hairy, in southeastern Australia (*yowie, yahoo*) (Joyner 1977, 1980). They could be remnants of the Kow Swamp Man (*Homo erectus*?), who still roamed the Murray River area some 10,000 years ago.[5]
- Small, hairy hominoids, said to walk on all fours and to live in trees, and thus thought to be ape-men, on Malaita, one of the Solomon Islands.
- A tall, hairy man, with long straight hair on his head and long nails (*mumulou*), in the mountains of Laudari, on Guadalcanal, another of the Solomon Islands.
- Small, dark men, with long straight hair on their heads, and sometimes slanderously said to be endowed with the Christian devil's attributes, such as a tail and goat's feet (*vui, wui*), on some of the New Hebrides islands.
- Largely mythicized pygmies with high conical heads (*vele*), on the Fiji Islands.

[3] Since this article was submitted for publication, a specimen of an Onza was shot by a Mexican rancher and made available to American investigators. Preliminary studies indicate that it is not closely related to the fossil species *Acinonyx trumani.* It may, however, be an intermediate form between *A. trumani* and modern puma, or a modern, long-legged kind of puma whose systematic position may be determined after biochemical and osteological studies (see *The ISC Newsletter,* Spring, 1985)—Editor.

[4] Since this article was submitted for publication, photos of the supposed mainland form of the thylacine, taken near Perth, Western Australia, have been published in *New Scientist* (Vol. 110: 44–47, 1986). Heuvelmans considers these new photos to represent "the greatest cryptozoological victory of the last two decennia"—Editor.

[5] See article by Colin P. Groves elsewhere in this issue—Editor.

- Feral cats of unusual size in southwestern Australia, thought by some to be transplanted American pumas (cougars).
- An unknown species of flightless bird on Hiva Oa, one of the Marquesas Islands (*koao*). It has been suggested that it is closely related to the New Zealand *takahe,* and thus a species of *Notornis* (Raynal 1980–81). What can be put forward more safely is that it looks indeed like a rail, but larger than the local *Porzana tabuensis,* thought to be locally extinct and surviving only on other islands of the same archipelago.
- A surviving species of the Moa family (Dinornithidae), the size of a turkey, known to some as *roa-roa,* which has occasionally been reported on South Island, New Zealand. It could possibly belong to the genus *Megalapteryx,* of which remains less than two hundred years old have been discovered (Heuvelmans 1955, 1958a, Mackal 1980).

ADDENDUM

No general bibliography of cryptozoology is yet available. Although very incomplete and listing only items published in the English language, by far the best source of references to many of the animal forms listed above is George M. Eberhart's *Monsters: A Guide to Information on Unaccounted-for Creatures, Including Bigfoot, Many Water Monsters, and Other Irregular Animals,* published by Garland, New York and London, 1983 (see review in *Cryptozoology,* Vol. 4: 88–90, 1985).

References Cited

Bandelier, Adolph F.
1910 *The Islands of Titicaca and Koati.* New York: The Hispanic Society of America.

Benwell, Gwen, and Arthur Waugh
1961 *Sea Enchantress: The Tale of the Mermaid and Her Kin.* London: Hutchinson.

Bord, Janet, and Colin Bord
1980 *Alien Animals.* London: Paul Elek-Granada.
1982 *The Bigfoot Casebook.* London: Granada.

Bottriell, Lena
1985 *The King Cheetah.* Manuscript awaiting publication.

Coleman, Loren
1983 *Mysterious America.* London-Boston: Faber & Faber.
1985 *Curious Encounters.* London-Boston: Faber & Faber.

Costello, Peter
1974 *In Search of Lake Monsters.* London: Garnstone; New York: Coward, McCann & Geoghegan.

Craig, Charles William Thurlow
1954 *Black Jack's Spurs—An Autobiography.* London: Hutchinson.

Dethier, Michel, and Ayako Dethier-Sakamoto
1986 *The tzuchinoko: Unidentified Reptile from Japan.* Manuscript awaiting publication.

Francis, Di
1983 *Cat Country: The Quest for the British Big Cat.* Newton Abbot, Devon: David & Charles.

Goodwin, George G.
1946 Inopinatus—The Unexpected. *Natural History* (November).

Green, John
1978 *Sasquatch: The Apes Among Us.* Saanichton, British Columbia: Hancock House.

Hemmer, Helmut
1985 The Onza as a Paleo-Cheetah: An Example of Possible Pleistocene Persistence. Paper presented at the Symposium "Cryptozoology: The Search for Unknown or Supposedly Extinct Animals," III International Congress of Systematic and Evolutionary Biology, July 7, 1985, University of Sussex, Brighton, England.

Heuvelmans, Bernard
1955 *Sur la Piste des Bêtes Ignorées.* Paris: Plon (Repr. Paris: François Beauval; Geneva: Famot, 1982).
1958a *On the Track of Unknown Animals.* London: Rupert Hart-Davis; New York: Hill & Wang.
1958b *Dans le Sillage des Monstres Marins: Le Kraken et le Poulpe Colossal.* Paris: Plon (Repr. Paris: François Beauval; Geneva: Famot, 1974).
1965a Les Dragons sont Toujours Parmi Nous. *Atlas* (October).
1965b *Le Grand Serpent-de-Mer: Le Problème Zoologique et sa Solution.* Paris: Plon (Revised edition, 1975).
1968 *In the Wake of the Sea-Serpents.* London: Rupert Hart-Davis; New York: Hill & Wang.
1969 Note Préliminaire sur un Spécimen Conservé dans la Glace d'une Forme Encore Inconnue d'Hominidé Vivant: *Homo pongoides* (sp. seu subsp. nov.). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique,* Vol. 45(4): 1–24.
1978 *Les Derniers Dragons d'Afrique.* Paris: Plon.
1980 *Les Bêtes Humaines d'Afrique.* Paris: Plon.
1982 *Les Ours Insolites d'Afrique.* Manuscript awaiting publication.
1983a How Many Animal Species Remain to be Discovered? *Cryptozoology,* Vol. 2: 1–24.
1983b *Les Félins Encore Inconnus d'Afrique.* Manuscript awaiting publication.
1984 Cryptozoology is After Both Aquatic and Terrestrial Animals, not to Mention Misinformed Zoologists. *Cryptozoology,* Vol. 3: 115–18.

Heuvelmans, Bernard, and Boris F. Porchnev
1974 *L'Homme de Néanderthal est Toujours Vivant.* Paris: Plon.

Hill, W. C. Osman
1945 Nittaewo, an Unsolved Problem of Ceylon. *Loris,* Vol. 4: 251–62.

Hooijer, D. A.
1954 Crocodilian Remains From the Pleistocene of Celebes. *Copeia,* (4): 266.

Izzard, Ralph
1951 *The Hunt for the Buru.* London: Hodder & Stoughton.
1955 *The Abominable Snowman Adventure.* London: Hodder & Stoughton.

Joyner, Graham C.
1977 *The Hairy Man of South Eastern Australia.* Canberra: published by the author.
1980 *More Historical Evidence For the Yahoo, Hairy Man, Wild Man or Australian "Gorilla."* National Library of Australia, MS 3889.

Krantz, Grover S.
1986 A Species Named from Footprints. *Northwest Anthropological Research Notes,* Vol. 19(1): 93–99.

Krumbiegel, Ingo
1949 Der Andenwolf, ein Neuentdecktes Grosstier. *Umschau,* Vol. 49(9): 590–91.
1953 Der "Andenwolf" *Dasicyon hagenbecki* (Krumbiegel, 1949). *Säugetierkundliche Mitteilungen,* Vol. 1: 97–104.

Mackal, Roy P.
1980 *Searching for Hidden Animals: An Inquiry into Zoological Mysteries.* New York: Doubleday.
1986 *Mokele-Mbembe: Living Dinosaur*? Manuscript awaiting publication.
Mangiacopra, Gary S.
1975 *Octopus giganteus* Verrill: A New Species of Cephalopod. *Of Sea and Shore,* Vol. 6(1): 3–10.
1976 The Great Ones. *Of Sea and Shore,* Vol. 7(2): 51–52.
Ménatory, Gérard
1976 *La Bête du Gévaudan.* Mende: Imprimerie Chaptal et Fils.
Métraux, Alfred
1947 *The Native Tribes of Eastern Bolivia and Western Matto Grosso.* Washington, D.C.: Bureau of American Ethnology, Smithsonian Institution (Bulletin 134).
Monod, Theodore
1928 Sur la Présence au Sahara du *Lycaon pictus* (Temm.) (Résultats Scientifiques de la Mission Saharienne Augiéras-Draper). *Bulletin de la Société Zoologique de France,* Vol. 53: 262–64.
Mörzer Bruyns, Willem Frederick Jacob
1971 *Field Guide of Whales and Dolphins.* Amsterdam: Tor/C.A. Mees.
Neill, Wilfred T.
1956 The Possibility of an Undescribed Crocodile on New Britain. *Herpetologica,* Vol. 12: 174–76.
Pathé, Moritz
1940 *Die Suche nach dem Fabeltier.* Berlin: Deutscher Verlag.
Porshnev, Boris F.
1963 *Sovremennoe Sostoyanie Voprosa o Relikhtovykh Hominoidakh* [Present Status of the Problem of Relict Hominoids]. Moscow: Viniti.
Raynal, Michel
1980–81 "Koau," l'Oiseau Insaisissable des Iles Marquises. *Bulletin de la Société d'Etude des Sciences Naturelles de Béziers,* N.S., Vol. 8(49): 20–26.
1986 New Generic Name Proposed for the Giant Octopus of Florida. Manuscript awaiting publication.
Schmidt, Karl P.
1935 A New Crocodile From the Philippine Islands. *Publications of the Field Museum of Natural History, Chicago* (Zoological Series), Vol. 20(8): 67–70.
Scott, Sir Peter, and Robert Rines
1975 Naming the Loch Ness Monster. *Nature,* Vol. 258: 466–68.
Sprague, Roderick, and Grover S. Krantz (eds.)
1977 *The Scientist Looks at the Sasquatch.* Moscow, Idaho: University Press of Idaho.
Verrill, Addison E.
1897a A Gigantic Cephalopod on the Florida Coast. *American Journal of Science and the Arts,* Ser. 4, Vol. 3: 79.
1897b Additional Information Concerning the Giant Cephalopod of Florida. *American Journal of Science and the Arts,* Ser. 4, Vol. 3: 162–63.
1897c The Supposed Great Octopus of Florida: Certainly not a Cephalopod. *American Journal of Science and the Arts,* Ser. 4, Vol. 3: 355–56.
Wood, Forrest G., and Joseph G. Gennaro, Jr.
1971 An Octopus Trilogy. *Natural History* (March).
Yamamoto, Soseki
1973 *Nigero, Tzuchinoko!* [Scram, Tzuchinoko!]. Tokyo: Futami.
1985 *Yamazumi Mandara* [Scenes from Mountain Life]. Tokyo: Cross Roads.

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INVESTIGATING SASQUATCH EVIDENCE IN THE PACIFIC NORTHWEST

JAMES A. HEWKIN[1]
Oregon Department of Fish and Wildlife,
Forest Grove, Oregon 97116, U.S.A.

ABSTRACT: Unpublicized Sasquatch investigations were conducted in remote areas of the Cascade Mountains of Oregon, and other areas of the Pacific Northwest, over a 10-year period beginning in 1973. Various forms of evidence were uncovered, including eyewitness testimony, footprint tracks, split stumps and logs, and rock piles. Some of the evidence indicates the presence of a still-unrecognized species of large, bipedal primate in North America.

INTRODUCTION

As a professional wildlife biologist, the author first became interested in Sasquatch reports in the late 1950's. Since that time, Sasquatch, believed by many to be an unknown, bipedal primate, remains unrecognized as a living member of the natural fauna on the North American continent. Sighting reports continue to make news in the Northwest; the sources are citizens of all walks of life. However, numerous sighting reports are not made public, and are not solicited. Good Sasquatch data are difficult to obtain. There are hundreds of Sasquatch stories. Many do not bear scrutiny, while those of sound basis spark considerable interest among serious investigators. Readers interested in general works on the subject should refer to Byrne (1975), Green (1978), Hunter with Dahinden (1973), Markotic and Krantz (1984), Napier (1973), and Sprague and Krantz (1979).

The author's part-time Sasquatch investigations in the field started in 1973. These were conducted in an unpublicized, low-key manner. More than 200 trips were taken into remote mountain areas, mostly on the western slope of the Oregon Cascades; some time was also expended in the Coast Ranges, Siskiyous and British Columbia. Most Pacific Northwest areas where Sasquatch has been reported have been visited, primarily to determine if here is a discernible pattern of evidence. I have concluded that Sasquatch is a wilderness animal associated with remote, rugged areas, and I have selected evidence that may have value in eventually developing a realistic description of this animal. This paper includes observations of rock piles and pits, examination of torn up stumps and logs, the finding of footprints, and interviews with witnesses.

[1]Present address: 35237 Aubuchon Drive, St. Helens, Oregon 97051, U.S.A.

Ecology of the Western Slope of the Cascade Mountains

Before intervention by man, the western slopes of the Cascade Mountains were dominated by dense stands of old-growth coniferous forests. Now there are hundreds of thousands of acres of timberland growing into diverse plant communities of second-growth forest. Forestlands are replanted with conifers, but growth rates, survival, and health vary with soil type, elevation, exposure, moisture, and a host of other factors, including insects, fire, disease, etc. Human intervention and population growth have eliminated considerable forest habitat, while creating urban areas and intensively-managed agricultural lands. Most remaining old-growth forest is located in remote rugged portions of the mountain ranges.

In general, lower- to mid-elevation forests contain a mix of Douglas fir, hemlock, and western red cedar (about 1,500 to 3,000 feet elevation). These species give way to Pacific silver fir, noble fir, and mountain hemlock at higher elevations (about 3,000 to 4,500 feet). Subalpine meadows are present on some high ridges (about 4,200 to 5,500 feet), often associated with volcanic upthrust that form rock points and steep talus slides. Riparian habitats include swift bouldered streams, small lakes, ponds, and bogs, which provide good biotic diversity. Common mammals include mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), puma (*Felis concolor*), bobcat (*Felis rufus*), coyote (*Canis latrans*), black bear (*Ursus americanus*), and many smaller animals. Habitat alterations by man cause dramatic changes in the abundance and distribution of these animal populations.

Most moisture falls in the form of snow in the higher elevations (above 3,200 feet) throughout the winter months (November to March). In general, the region receives a high amount of rainfall (about 48 inches annually in low elevations, and as much as 78 inches in the higher elevations). The winter snowpack in the higher elevations will vary 3 to 9 feet, depending on exposure and drift. Generally, by early June, hard-packed snow remains on the ridges at the 4,000-foot elevation. July and August are generally dry. In many areas, the understory is difficult to penetrate by foot travel, and access is usually gained by game trails and/or established trail systems. The U.S. Forest Service maintains a few trails, but many have been abandoned. Plant species forming dense stands include salal, sword fern, Oregon grape, thimbleberry and salmonberry in various combinations and sometimes in pure stands. Rhododendron often forms the understory of elevations above 3,500 feet, and fingers of white alder thickets are common along steep spring-fed slopes. These shrubs are generally deformed by the heavy annual winter snow drifts that remain until mid-June.

Review of Evidence

Rock piles and pits.—One of the most revealing Sasquatch sightings reported took place in the Oregon Cascades in 1967. A logger described the activities of what he thought was a family of three Sasquatches (two adults and an infant) as they searched for hibernating rodents on a rocky ridge, digging up rocks and piling them up, finding nests of rodents, and eating them on the spot (Green 1968).

On September 3, 1973, I located this site after spending 3 days searching the area. Further examination on the ridge indicated many old rock piles and diggings. The only digging marks that appeared fresh were those which had been reported by the logger. During several seasons of visiting this area, I noted the presence of chipmunks (*Eutamias*), golden-mantled ground squirrels (*Spermophilus lateralis*), and pikas (*Ochotona princeps*). The golden-mantled ground squirrel is perhaps the best candidate for the meals which were reportedly dug up by the Sasquatches. These small rodents are heavy sleepers, and remain in a comatose state during hibernation.

While searching other ridges and canyons in the Cascades, I found much evidence of similar rock piles and pits. They were very old and moss-covered, with only one digging that appeared fresh. A departure from the pits and rock piles was an odd arrangement of trench-like excavations located on a remote rocky butte. The rocks were weathered and covered with lichens, indicating the digging was very old. Most of these rocks were of a size a man could handle (15–50 pounds), but it is difficult to explain the digging in terms of human activity. Approximately 50 feet of trench extended along the side of a steep talus slope, and another trench, approximately 15 feet in length, jutted away on another angle along the slope. I propose that Sasquatches may have piled rocks in this manner while attempting to capture pikas. These little rodents do not hibernate, and they would be difficult to catch while scampering under rocks.

In 1974, I teamed up with Jack Sullivan, who had worked intermittently with other Sasquatch investigators since the summer of 1969, and who was knowledgeable on other investigations in the Northwest. Through Sullivan, I was able to meet the logger who had reportedly witnessed the Sasquatches piling rocks. I conversed with this logger on several occasions, and always found him sincere, interesting, and not anxious to create publicity. (Sullivan and I interviewed several other witnesses during an 8-year period, and we conducted about two dozen field trips. However, our part-time commitment meant we were always short on time to expand on these activities.)

On June 23, 1978, I located a different arrangement of rock piles in a canyon. This work also was old and covered with lichens and moss. However, the rocks were quite large (5 to 100+ pounds), had been piled in heaps, and were associated with trenches. There were 22 rock piles of various sizes (3–6 feet high). Some of these rocks were too large for a human to handle.

In order to satisfy my curiosity as to whether miners could have been involved, I led a person who was acquainted with gold mining to this site; he stated that the digging and rock piles didn't make any sense to him. This particular site was located at the bottom of a slide area.

Footprints.—The terrain in the Cascade Mountains is not easy for foot travel, and it does not show footprints clearly. It is usually hard and rocky, or in heavy timber. The forest floor is often "springy," with thick moss and leaf litter. Only on two occasions have I noticed strange prints which could be interpreted as having been made by Sasquatch. The first incident occurred in September, 1973. I had been examining a large mound of vegetation piled by pikas, when I noticed a track of scuff marks across the talus slope a short distance away. Upon close examination, the scuff marks appeared to be tracks left by a very heavy animal, because it had dislodged rocks at each step, causing an impression in the talus. My own walking over the same area seldom disturbed a rock. The distance between scuff marks varied between 4 and 5 feet. I followed the track across the talus to a sheer drop, which blocked access to a brushy ravine and to an overhanging ledge on a higher level.

Backtracking and working my way down into the timber, I finally managed to get into the ravine, and was struggling through dense rhododendron, when I spotted a small opening. As I stepped forward, I saw, embedded in dry woody duff, a large footprint, about 5 inches longer than my 12-inch boot track, and also wider. There was no toe detail, only a broad, flat print, with some taper to the heel, which was rounded and wider than my boot heel. I had no idea how old the print was, but I assumed it was probably related to the scuff marks I had followed across the talus, since it was on about the same contour level in the canyon. This was the only unidentified track noted in that area over several seasons.

The following year, on October 1, 1974, I found three unidentified prints in another drainage at an elevation of about 2,500 feet. These prints were only 10 inches long, and the stride was 48 inches, each print in a straight line with the other. The soft sand did not permit toe detail. Although the prints were shorter than my boot print, they were slightly wider. Upstream about a quarter of a mile, I noticed where the track-maker had apparently jumped from a large rock which overhung the stream channel on the far bank, and had sunk deep heel prints into the wet sand at the edge of a pool. The fore part of the foot did not mark. This particular site is in a deeply forested canyon of mixed timber, fir, maple, and alder. The area is drained by a small, fast-flowing, bouldered stream.

Grubbing.—Bears are known to spend much time searching for food items such as rodents, roots, and grubs in old stumps and logs. Perhaps Sasquatches likewise search for similar food on the forest floor, grubbing through rotten logs and stumps and turning over rocks.

On April 28, 1975, while investigating a tract of second-growth timber (a mix of fir, hemlock, and cedar) at about 2,800 feet elevation, I noticed a stump that was freshly torn away on one side, and salal brush pulled off the top of the stump. There was no sign of claw marks on the stump. Tracking

was impossible because of a dense understory of salal. A few feet distant, a log 4 feet in diameter was broken off at one end, and there was a dry area, 1 foot square, scraped clean (in a sheltered section on top of the log) where duff had been swept off. This activity could easily be passed over as bear sign, but no claw marks were evident.

Sullivan and I found similar signs of activity in the Cascades on August 9, 1975, at about 3,500 feet elevation, in a patch of old-growth timber. Two rotted logs had been broken apart, and some pieces and slabs of wood were lying on top of the logs. The pieces of wood were about 3–4 feet long, and 4–6 inches thick. Other logs in the immediate area had evidence of fresh breakage, showing similar treatment, but without chunks of wood placed on top of them. If Sasquatches did this work, it appears they broke up the log by hand, and examined the pieces, leaving some lying on the log. A human could do the same—if he or she were strong enough to tear up the log. However, it is doubtful that a bear was involved, since no claw marks were visible on the logs.

Probably the most informative evidence uncovered came about via a report from a witness who stated that she had seen some large tracks in 2 inches of fresh snow in her backyard in the Cascade foothills. Neither Sullivan nor I could look into this report at the time because of other responsibilities. However, about a week later, I had the opportunity to investigate the incident. I interviewed the family on March 7, 1976. The witness, the mother of several children, was the only person in the family who had actually observed the tracks; she thought they were human tracks, but she could not understand why they were so big—about 1.5 feet in length, and spaced about 9 feet apart. Unfortunately, she had not bothered to go outside to examine the tracks closely; she had simply looked at them through the kitchen window. She also stated how angry she had been about their dog barking "like crazy" all night, not letting up until her daughters left for school in the morning. She then noticed the tracks while washing the breakfast dishes.

Before leaving the area, I talked to another man, who lived about a mile away, who claimed to have heard strange scratching noises on his back wall about a week earlier. His dog had also behaved erratically. He was not known to the woman who had seen the prints.

A week later, Sullivan and I investigated the area adjacent to this man's residence. Being a low-elevation area (about 1,000 feet), snow does not remain on the ground long, and unfortunately, the snow that had fallen prior to the woman's sighting of the tracks had melted. The hills in this vicinity are timbered with second-growth Douglas fir, and a mixture of alder and maple. The ground cover is dominated by salal brush. In general, this foothills area contains an abundance of small drainages containing water year-round. Spring seepages that form boggy areas are common, and these sites

characteristically support dense stands of thimbleberry, salmonberry, and devil's club, in pure stands and mixed. The old-growth timber had been logged off about 50 years before, and the stumps and logs remaining were in a rotting stage. Salal brush had established luxuriant growth on the top of many of these stumps.

Sullivan and I found some strange evidence only a short distance from the man's residence (approximately 200 yards). An old-growth log had been split lengthwise, and the halves were lying side by side, almost touching. This particular log was approximately 3–4 feet in diameter, and about 20 feet long, quite rotted throughout, but which would still require tremendous strength for any animal to pull apart into two pieces.

Approximately 50 yards uphill from the split log was a stump with a fresh tear in one side from top to bottom, and the salal brush and bark had been ripped off. The stump was about 6 feet high and 4–5 feet in diameter, which is about average for old-growth stumps in this area. Another stump of similar size located a few yards beyond had also been torn on one side with salal brush pulled off the top of the stump. We searched for tracks, but could only find a partial indentation alongside one-half of the split log. It appeared to be the outside edge of a footprint in damp soil mixed with alder leaves and litter. There was no visible sign of the toes or heel. The total length of the print was about 12 inches.

More evidence was uncovered later in the day as we walked along an old skid road in a small wooded canyon approximately 1.5 miles from the earlier investigation site. Our initial impression was that someone had turned rocks over to enable vehicle access. The trail was rough but passable with 4×4 vehicles. By replacing one rock back into the original position, we realized it would not high-center a vehicle. These rocks were of a large, flat type, the largest being about a foot or so in length, and possible for a human to handle. They were turned over and lying beside their original position in the road. For a distance of about 50 years, there were 10 to 12 rocks that had been turned. This was the only sector of the trail showing large rock. There was no indication of vehicle use on the road, and we discounted the work of a person moving the rocks—unless someone was attempting a prank, which seemed unrealistic under the circumstances of our unpublicized investigation. No one had been aware that I was going to visit the residence where tracks had been reported by the woman. The conversation with the second individual was a spur-of-the-moment contact, over a mile away from the track location, and the two individuals claimed not to be acquainted. Our investigations in the wooded areas were unknown to anyone but ourselves.

The above collection of evidence, although not conclusive, was very impressive to us. We surmised that the rocks had been turned over during a search for grubs, beetles, etc.; the split log and torn stumps are a source of small rodents, roots, and grubs. Although bear activity is similar, no claw

marks were visible, and the split log was simply too large for a bear to tear apart. The following accounts are of other logs later found split open with no claw marks:

On April 19, 1976, I examined a freshly split log and several torn stumps. This site was below the snow line, at about 2,500 feet elevation, in a heavy stand of second-growth Douglas fir and hemlock, with a dense ground cover of salal. Most old-growth logs in this area were between 3 and 4 feet in diameter. No claw marks were visible on the stumps, and no tracks were found in the area.

On January 14, 1978, I examined a large rotted log, about 3 feet in diameter, that had been rolled over and split lengthwise. This site was in the Coast Ranges in Clatsop County. No discernible claw marks were noted on the log to indicate bear activity. This site was on a mountainside covered with second-growth Douglas fir. The ground cover was mostly sword fern.

On January 2, 1980, a small split log (20 inches) was located together with an unidentified, partial footprint parallel to, and against, a split half of log. The location was in second-growth fir timber, with an understory of vine maple on the eastern slope of the Coast Ranges. This partial print was similar to the one mentioned above (a portion of outside foot edge).

Over the years, many torn stumps were investigated, but only the few split logs mentioned above have been found. Many of the torn stumps revealed claw marks, indicating bear activity, but *all* of the split logs were devoid of claw marks. Although not conclusive, this evidence indicates that an animal more powerful than a bear is present, and is capable of splitting logs by use of powerful shoulder and arm muscles.

Carrion.—One of the strangest reports came from a man who told us of his experiences trapping coyotes in 1970. He had dragged cattle carcasses with a 4×4 pickup truck to a brushy area, and had set traps around them. The cattle were obtained from a neighbor's feed lot, where they had died.

His troubles began when he found his traps sprung by someone or something using sticks. Thinking it was a neighbor with whom he was not on good terms, he accused him of the deed. He then discovered that one of the cows had been moved a short distance; later, it disappeared. One day he found a cow hanging in the low crotch of an alder tree. This was obviously beyond normal human capability, because the carcasses weighed 500 pounds and more. He apologized to his neighbor, and gave up trapping—having succeeded in capturing only one coyote. Sasquatch stories were unknown to him at the time, and no tracks were noted at the site. Of interest was the fact that none of the carcasses had been even partially eaten before they were found; however, the one carcass disappeared, and was never found. Other predators, even ravens, avoided the trap site.

When Sullivan and I were investigating the general area (about 100 square miles) in 1976, we were aware of 12 local Sasquatch reports. The area is

occupied by small farms and woodlots, but is primarily a foothills range comprising second-growth Douglas fir timber, with a mix of alder and maple. Logging activity was in progress, and a maze of logging roads penetrated most of the area. Off-road travel into the forest, however, was extremely difficult due to dense stands of salal brush, salmonberry, thimbleberry, and devil's club. Of the 12 Sasquatch reports, five involved actual sightings of an animal, and seven were of tracks. The reports occurred between 1968 and 1976, and involved every month of the year except June and July. Track reports invariably followed a fresh snowfall.

Another case involving carrion came from Jack Woodruff, an investigator who lived in the Coast Ranges, on the east fork of the Coquille River, in Oregon. We visited him on January 4, 1975, and he allowed us to make copies of the Sasquatch footprint casts he had made along a river near his home. The story, as he related it, involved a large buck deer that had died from injuries following a collision with a vehicle. The deer had managed to stagger several yards up a skid road before it died. The carcass was reported missing several days later by a neighbor. On a later date, the neighbor had found the skeleton of a buck deer in the timber above the cut bank where the body had lain. Lack of drag marks indicated that it had been carried up the bank and into the timber. The skeleton of the deer, lying on its back, was intact, with all bones in place. The hair, scraped off the animal, was piled to one side. Woodruff recalled that a logger had once found an elk carcass in similar condition, also with the hair piled to one side of the skeleton. As far as I know, this type of observation regarding the handling of carrion by an unidentified animal has not been reported in print.

I investigated another case involving carrion on June 18, 1979. This incident involved a high school student near the town of Barriere, British Columbia, who told of shooting at a Sasquatch from a blind, at a distance of about 50 feet. There were some new elements in his story, which could be compared to prior reports.

A few days before the incident took place, he had happened upon a concealed, fresh deer carcass buried under forest litter. He stressed how well the carcass had been hidden, as the litter which had been sprinkled over it appeared to be identical to the natural terrain. He would not have noticed it, but he had been standing near it and had noticed part of a foot. Later, he visited the site again, and saw that some of the carcass had been eaten. He then built a blind about 50 feet away, intending to shoot a bear. He waited in the blind while two of his friends fished from a boat in a small lake in sight of the blind. The creature appeared at the site near 5 p.m. He aimed and fired at its head, and the animal went down on its knuckles, leaped up immediately, and ran off, extremely quickly, on two legs. His description was similar to that in other Sasquatch reports: 8 feet tall, 4-foot shoulders, forehead slanted back, bulky build, and black hair. The chest

region was devoid of hair ("it appeared worn off"). This may sound suspicious to some investigators, but body hair can vary extensively among hominoids.

The witness suggested that I talk to his high school teacher, and to the two boys who had been fishing that day at the lake, so I contacted them later in the day. The teacher had a cast of a 16-inch footprint which he had taken near the site. It was very wide across the toes (10 inches), and tapered to a relatively narrow heel, but still wider than a human heel. The boys believed that the deer had been killed at the lake edge because they had found deer hair there, and the carcass was wet. Also, they stated that debris that covered the carcass had to be carried from somewhere. There was no evidence of material having been scratched up in the immediate vicinity.

At this point, it should be noted that local investigators who reacted to the report of this incident brushed it aside as a routine bear report (*Oregon Journal,* May 9, 1979). Although my interview with the boys and family members was 2 months later, there was no evidence to indicate that a bear was involved. The incident was either a hoax or had occurred and was witnessed as reported. My personal judgment was that the individuals involved were informative and sincere.

Discussion and Conclusions

The evidence cited above tends to support the existence of an animal which has been named Sasquatch. This information may aid other investigators, and stimulate searches for evidence.

Although only a few footprints were located, these few lend support to the many hundreds of others reported over the decades in the Pacific Northwest. Other evidence indicates a large animal grubbing for food by ripping up rotten stumps and logs. Food items of interest would be roots, small rodents, and beetle grubs. Although this type of grubbing is a common activity for black bears, no claw marks were observed in these instances. Furthermore, the large logs split lengthwise appear to rule out bears as the perpetrators, as such animals would not have the necessary strength, and no claw marks were visible on the logs.

Other incidents investigated indicate carrion is a source of food, and may be the primary reason for the odor associated with Sasquatch sightings. The involvement of carrion suggests the possibility of these animals caching large carcasses for use during winter months, when food is scarce. Such a habit would be crucial to sustain an animal the size of Sasquatch, estimated to stand 8 feet tall and to weigh as much as 800 pounds (Krantz 1986).

Reports of these animals consistently indicate they are present in wilderness areas. Since they are unique in their size and behavior, they should not be compared to humans or other primates. Green (1978) cites several noc-

turnal sightings of Sasquatch, which suggests they may have night vision, an asset absent in known large primates.

After a decade of investigating Sasquatch evidence in the field, and after studying the writings and evidence presented by others, I can now report my own personal conclusions. First, the evidence indicates that a species of giant, bipedal primate, weighing up to 800 pounds and standing as tall as 8 feet, and known as Sasquatch, does, in fact, exist. Its diet is probably omnivorous, with feeding habits similar to those of bears (grubbing for roots, larvae, etc.). It searches for rodents in stumps, logs, and rock slides. It might cache meat for winter use. The offensive odor which is sometimes reported in association with eyewitness sightings could be, in part, from the eating and handling of putrid meat. The source could be carrion and animals caught and then cached.

These primates live in remote, wilderness areas. They may have night vision, and may be more active at night. They may have the ability to sleep through prolonged periods of adverse weather, although there is as yet no evidence to support this hypothesis.

The only known enemy of Sasquatch is man, both directly and indirectly. Several reports of shootings have been published. The precise impact of man's activities upon its habitat is unknown, but wilderness areas are shrinking into smaller tracts each year due to road building, logging, and other forms of natural resource use. On the other hand, second-growth timber and other vegetative growth following logging of large tracts of land may benefit Sasquatch as a source of food and cover, as it has benefited many other wildlife species.

If Sasquatch has survived in North America without official recognition, it has been because it is elusive and intelligent, more so than other mammals in the area, and more so than other living apes in Africa and Asia. Whether Sasquatch is a hominoid or hominid, such as a descendant of the Plio-Pleistocene genus *Gigantopithecus* (Krantz 1986), remains unresolved. For now, we have the frustrating situation of failure by most scientific authorities and official bodies to examine the evidence for this species—much less to acknowledge its existence.

The Sasquatch represents a scientific problem in need of a thorough study to bring it into the zoological perspective and dimension it deserves: recognition as an extant species, and consideration for its role in the ecosystems of the Pacific Northwest. Once its behavioral peculiarities—which so far have kept it from scientific discovery—are better understood, this species will be susceptible to scientific field study just as other animal species have been eventually studied in their own habitat.

References Cited

Byrne, Peter
1975 *The Search for Bigfoot: Monster, Myth or Man?* Washington, D.C.: Acropolis Books.
Green, John
1978 *Sasquatch: The Apes Among Us.* Seattle: Hancock House.
Hunter, Don, with Rene Dahinden
1973 *Sasquatch.* Toronto: McClelland and Stewart.
Krantz, Grover S.
1986 A Species Named From Footprints. *Northwest Anthropological Research Notes,* Vol. 19(1): 93–99.
Markotic, Vladimir, and Grover S. Krantz (eds.)
1984 *The Sasquatch and Other Unknown Hominoids.* Calgary: Western Publishers.
Napier, John
1973 *Bigfoot: The Yeti and Sasquatch in Myth and Reality.* New York: E. P. Dutton.
Sprague, Roderick, and Grover S. Krantz (eds.)
1979 *The Scientist Looks at the Sasquatch II.* Moscow, Idaho: University Press of Idaho.

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THE LIKELIHOOD OF PERSISTENCE OF SMALL POPULATIONS OF LARGE ANIMALS AND ITS IMPLICATIONS FOR CRYPTOZOOLOGY

PETER F. BRUSSARD
Department of Biology, Montana State University, Bozeman, Montana 59717, U.S.A.

ABSTRACT: Species populations normally have considerable capacity to resist threats to their survival. However, very small populations, and hence, very rare species, have much less capacity to resist those threats because of their increased susceptibility to the deleterious effects of stochastic events. Three stochastic processes play extremely important roles in the survival of small populations; these are (1) environmental uncertainty, (2) populational uncertainty, and (3) genetic uncertainty.

A population consisting of fewer than 20 breeding individuals is at serious risk of extinction from the effects of all three types of uncertainty. This fact alone suggests that small populations of large animals, as typically reported in the cryptozoology literature, are not very likely to have persisted from some time in the distant past, at least at their projected present population sizes. If such populations do exist at the present time, they are precipitously close to extinction.

INTRODUCTION

The primary premise of cryptozoology is that undiscovered populations of known animals may exist in unexpected places (e.g., the mountain lion, *Felis concolor,* in the eastern United States), and that undiscovered species may exist in poorly explored or otherwise inaccessible localities (e.g., the "monsters" in Loch Ness). Thus, animals of interest to cryptozoology have populations that are either supposed to be sparsely distributed over a large area, or exist as a small group in one particular spot; both cases involve small numbers of animals. The question I will address here is whether populations of such animals are likely to exist in a viable state.

Population biologists have only recently become interested in the problem of population viability, primarily as a response to the increasing threats of extinction for dozens of endangered species. As one example, the requirement to manage National Forest System habitats to maintain "viable populations of wildlife and fish" (Salwasser, Mealey, and Johnson 1984) led to a series of workshops sponsored by the U.S. Forest Service to explore the concept of minimum viable population size. These workshops stimulated considerable theoretical work on this problem, and a book will soon be published on this topic (Soulé 1987).

The most important theoretical conclusion from work in this area is that stochastic processes play an extremely critical role in the survival of small populations. These processes separate naturally into three categories: (1) environmental uncertainty, (2) populational uncertainty, and (3) genetic uncertainty. Uncertain environmental factors range from major catastrophes (e.g., fires, earthquakes, major storms, pandemic disease, etc.) to mildly unpredictable environmental variation, such as year-to-year changes in weather patterns. Uncertain demographic factors include random variations in sex ratio, age of first reproduction, number of offspring, distribution of offspring over the lifetime of an individual, and time of death. Genetic uncertainty includes inbreeding (the mating of related individuals), and loss of variation through genetic drift.

POPULATION VIABILITY IN GENERAL

In the most general terms, a population's short- and mid-term survival potential is determined primarily by its resilience and its fitness. Resilience refers to a population's ability to survive in the face of normal birth and death events, which in turn are determined by the species' reproductive potential, social system, generation time, and the nature and severity of random environmental perturbations. A population's fitness depends on its having the appropriate set of genes to cope with its environment; this, in turn, is largely determined by the presence of sufficient genetic variation to maintain normal fecundity and viability under the prevailing ecological circumstances. Beyond this, a population's long-term survival potential is related to its adaptability, or its ability to evolve. Adaptability depends upon the maintenance of sufficient genetic variation to adjust to environmental change through the process of natural selection.

Species populations normally have considerable capacity to resist threats to their survival through various kinds of responses, i.e., they have adequate resilience, fitness, and adaptability. However, very small populations, and hence, very rare species, have much less capacity to resist those threats because of their increased susceptibility to the deleterious effects of stochastic events.

DEMOGRAPHIC FACTORS

Demographers usually model population growth by variations of two basic equations. The first is exponential growth:

$$dN/dt = rN$$

where N is the number of individuals in the population and r is the instantaneous rate of increase. It is a fair estimator of population increase in an unlimited environment. Many insect populations, especially those of crop pests, grow exponentially for a time. Eventually, however, something puts the brakes on population growth, and numbers decline, usually precipitously. It is highly unlikely that the exponential growth model has any applicability to cryptozoology.

The second model of population growth is referred to as the logistic equation. Under this model, a population grows exponentially until it reaches a point where the rate of growth begins to decline as resources become increasingly limiting. Eventually, the population stabilizes at a point called the carrying capacity (K), defined as the number of individuals that a given area can support:

$$dN/dt = rN\left(\frac{K - N}{K}\right)$$

This logistic model is more applicable to cryptozoological situations; however, it is generally unrealistic, since few populations have been observed to rise to some level and then remain constant over time. Rather, they fluctuate because the values of r and K change, both deterministically and stochastically.

Fluctuations in r are at the heart of the population persistence problem. Any factor contributing to a decrease in its growth rate is a potential threat to a population's persistence; however, most natural populations continually face such changes without going extinct. This is because some of these factors may be density-dependent. That is, they operate less intensively as population size decreases; or the operation of some negative factors may be discontinuous in time or space, so that they either diminish before exterminating a population, or affect only a segment of it at a time. Thus, most fluctuations in r usually have little long-term effect on the size and persistence probabilities of large populations.

However, as populations become smaller, the risk of extinction increases dramatically. MacArthur (1972) modeled the extinction process as a function of r, K, and the per capita birth rate (b), and predicted that populations with high growth rates, high per capita birth rates, and large K's (in the thousands) had expected times to extinction which were very large. However, for populations with lower r's and b's, extinction was likely to be fairly rapid below a threshold value of K that was in the tens to low hundreds, depending on the values of the former parameters. Since MacArthur's model did not consider the effects of age structure on the population, we have to interpret these figures as the numbers of *breeding individuals,* not total population size. A second model by Richter-Dyn and Goel (1972) also predicted a threshold effect for population persistence of approximately the same order of magnitude. Since large animals tend to have low r's and low b's, these models suggest that large, rare species can persist if the number of breeding individuals in their populations are above these threshhold values.

However, these models do not account for any variability in growth rates that might result from random variation in birth and death processes. May (1973) incorporated these factors, which we now call individual demographic stochasticity or Vi, into a second-generation model, and concluded that

random fluctuations in population size should be roughly proportional to $1/\sqrt{K}$. This implies that Vi will result in a population of about 100 individuals varying between 90 and 110 ($100 \pm \sqrt{K}$, or 10). Thus, May's result suggests that the effects of individual demographic stochasticity are unlikely to cause extinction in any but the smallest populations.

More recent models by Leigh (1981) and Goodman (1987) tend to support this conclusion. These models show that Vi is an important factor only for the survival of very small populations, and the importance of Vi declines rapidly with increases in population size. This is because individual variations in survivorship or reproduction tend to be compensated by the contributions of more and more individuals. Thus, as populations achieve even relatively modest numbers, predicted times to extinction calculated on the basis of Vi alone become quite large.

However, these models also make a critical point: the expected survival time of a population depends critically on the variability of its growth rate, and this variability actually consists of *two* components, the individual demographic stochasticity (Vi) modeled above, and environmental stochasticity (Ve). This second component, environmental stochasticity, is essentially independent of population size, and it poses problems for population persistence that can be extremely severe. Examples of this kind of variation are population-wide changes in the probabilities of death or reproduction related to the vagaries of climate, disease, competition, predation, or resource availability. Goodman's model shows that, with realistic estimates of the effects of Ve factored in, times to extinction become much shorter and much less responsive to higher values of K than those predicted by previous models which only considered the effects of Vi. Furthermore, environmental stochasticity results in times to extinction which increase only gradually with population size, rather than exhibiting threshold effects. If environmental variability is high, very large K's are required to achieve reasonably long times to extinction. Even an increasing population can have a relatively short predicted time to extinction if it has a low rate of increase and a relatively high variance in this rate.

Taking these factors into consideration, how likely is it that some of the subjects of cryptozoological interest exist as viable populations? Let us look at one example. Sheldon and Kerr (1972) and Scheider and Wallis (1973) calculated the maximum probable population density of monsters in Loch Ness based on ecologically defensible principles. Both groups concluded that the lake could support 10–20 individual monsters of 1,000–1,500 kg, and about 8 m long. Larger numbers of smaller animals could be supported, but these would not be suitably monstrous. Even if we assume that 20 monsters could live in the lake, it is extremely unlikely that all of them would be members of the breeding population; some are likely to be too old, and others too young to reproduce.

A population consisting of fewer than 20 breeding individuals is at serious risk of extinction from the effects of individual demographic stochasticity alone, and a population of this size could not withstand the effects of any environmental stochasticity whatsoever. Although Loch Ness has a fairly constant temperature of about 5.6°C. (Rines *et al.* 1976), other factors, such as food supply, are probably much more important potential contributors to a disastrous population-wide fluctuation in birth or death probabilities. Thus, we can conclude that the persistence of a viable population of monsters in Loch Ness from some indefinite time in the past is extremely unlikely. Even if 20 individuals do exist there at the moment, the population is precipitously close to extinction.

Genetic Factors

In addition to random demographic factors, genetic uncertainty can threaten population viability as well. Genetic uncertainty refers to random changes in a population's genetic makeup which have deleterious effects on the ability of individuals to survive and reproduce, as well as on the capacity of populations to respond adaptively to changes in their environments. The two major genetic factors causing deleterious effects are inbreeding depression and genetic drift.

Inbreeding depression results from the expression of deleterious genes as a result of the mating of close relatives. Most populations carry a "genetic load" of deleterious alleles. These alleles are usually rare and not particularly harmful in the heterozygous state; however, when closely related individuals mate, the chance of their offspring inheriting deleterious alleles in the homozygous state is increased. When deleterious alleles appear as homozygotes, they often result in the decline of various fitness traits such as fertility, fecundity, and viability. If population size is large enough, natural selection can eliminate the individuals expressing the deleterious recessive alleles, and the effects on the population as a whole will be minimal. However, if the population size is too small for selection to work effectively, the deleterious genes may become fixed in the population.

Furthermore, the deleterious effects of inbreeding can interact with random demographic events and result in even more severe threats to the persistence of small populations. For example, as population size becomes smaller, the incidence of inbreeding is likely to increase. As inbreeding increases, the incidence of reproductive failure is likely to increase as well. This results in a further reduction of population size, increasing inbreeding even more. Soon, a population can be caught in a downward spiral of ever decreasing viability, generally leading to its extinction.

Random changes in gene frequencies in populations are called genetic drift; these random changes sooner or later result in the loss of genetic variation, the rate of loss being dependent on population size. In small

populations, this loss can be quite severe and rapid. For example, in a population with 10 individuals contributing progeny to subsequent generations, 40% of the genetic variability in the population will be lost within ten generations. As was mentioned earlier, the fitness of a population depends on the presence of sufficient variation in its gene pool to maintain normal fecundity and viability. Likewise, a population's adaptability, or its ability to evolve, also depends on a sufficient reserve of different genes to adjust to environmental change through the process of natural selection.

Thus, in order to maintain population fitness and adaptability, a population must be large enough to prevent intense inbreeding and serious reductions in genetic variation by random drift. Unfortunately, the number of individuals actually involved in contributing progeny—and therefore genes—to subsequent generations is generally only a small fraction of the total population size. A population containing several hundred individuals (N) may have a genetically effective size (Ne) of only 10 or 20 in some species.

The genetically effective size of a population is reduced by any of a variety of factors that represent departures from a genetically ideal situation (Wright 1931). These include the presence of nonbreeding individuals, skewed sex ratios, non-random tendencies for inbreeding or outcrossing, random variation in progeny survivorship, the loss of genetic variability that may have occurred during previous periods of low population size (the "bottleneck" effect), and the tendency of individuals in some species to mate with individuals from an area that may be smaller than the area occupied by the population as a whole (the population structure effect). The cumulative effects of these factors are multiplicative, and are usually expressed as the ratio of Ne/N.

The results of low Ne's on population fitness can be devastating. For example, let us assume that our population of monsters in Loch Ness consists of 20 individuals, and that the ratio of Ne/N is somewhere between 0.2 to 0.4, figures typical of large vertebrates. This means that the genetically effective size of the population is between 4 and 8. At this size, the expected rate of increase in inbreeding in each generation (ΔF) is equal to 1/[2Ne], or between 6 and 13%. This is well above the level where natural selection for performance and fertility can balance inbreeding depression, which is about 1% (Frankel and Soulé 1981).

The loss of heterozygosity in this population can be estimated by the formula

$$H = (1 - 1/2N)^t$$

where t is the number of generations involved. With Ne's this small, about 6 to 13% of the genetic variation in the population will be lost each generation. After 10 generations, if Ne's stay the same, only 28–54% of the original

variation will be retained. Losses such as these pose serious threats for short-term survival; survival over longer periods depends on an even broader array of genetic resources.

Summary and Conclusions

According to current theory in population biology, the risk of extinction of a population depends on the number of individuals the habitat can support (K), its per capita birth rate, its rate of growth (r), the variability of its growth rate (Vi and Ve), and its genetically effective size (Ne). Although all populations are at some risk of extinction from various events that affect their demographic patterns and genetic composition, the risk is decidedly greater in small, isolated populations. If a rare species can maintain a minimum breeding population size somewhere above the mid tens to low hundreds, the exact number depending on its growth rate and per capita birth rate, the odds favor its persistence, provided that there is no evironmentally-caused variation in these rates. However, if environmental variation affects birth and death processes in any significant way, a minimum viable population needs to be much larger to avoid extinction from demographic factors alone.

Even at population sizes that are adequate to buffer populations from extinction from the effects of Vi and Ve, low genetically effective sizes can cause additional problems. Ne's below 50 or so result in levels of inbreeding and loss of genetic variation that also threaten short-term persistence. An Ne of 500 is probably the minimum necessary for continuing evolution (Franklin 1980, Frankel and Soulé 1981, Lande 1987). Since the actual number of individuals necessary to maintain an effective population size this large is likely to be considerably greater than 500, it is clear that extreme rarity is a condition that precludes much potential for evolutionary change.

There are a few documented cases of small populations which have persisted for thousands of years. One of the most striking examples is the Devil's Hole pupfish, *Cyprinodon diabolis,* which has survived in a tiny spring in the Nevada desert for 10–20,000 years (Miller 1981) with population sizes fluctuating seasonally from 150 to 400 individuals (Deacon 1979). This rather remarkable situation has resulted at least in part from the physical conditions in this spring, which are very constant, at least until recently, when it has been adversely affected by human activities (Williams *et al.* 1986). The historical influence of Ve on the persistence of this population must have been very small indeed. As predicted, *C. diabolis* has evidently lost all measurable genetic variability (Turner 1974).

Whatever combination of factors may have occurred to allow the Devil's Hole pupfish to hang on in its tiny habitat for tens of millenia, current theory in population biology suggests that its case is a very rare exception. If viable populations of large animals, still unknown to science, are "out there," they must either elude detection very well by sophisticated behavioral traits, or

live in extremely remote or unaccessible areas with virtually constant environments. In either event, they must continue to maintain breeding populations that number in the mid-tens to low hundreds in order to persist.

References Cited

Deacon, James E.
1979 Endangered and Threatened Fishes of the West. *Great Basin Naturalist Memoirs,* Vol. 3: 41–64.

Frankel, Otto H., and Michael E. Soulé
1981 *Conservation and Evolution.* Cambridge: Cambridge University Press.

Franklin, Ian R.
1980 Evolutionary Change in Small Populations. *In* Michael E. Soulé and Bruce A. Wilcox (eds.), *Conservation Biology: An Evolutionary-Ecological Perspective.* Sunderland, Massachusetts: Sinauer Associates.

Goodman, Daniel
1987 Considerations of Stochastic Demography in the Design and Management of Reserves. *In* M. E. Soulé (ed.), *Viable Populations.* Cambridge: Cambridge University Press.

Lande, Russell
1987 The Maintenance of Genetic Variability in Small Populations. *In* M. E. Soulé (ed.), *Viable Populations.* Cambridge: Cambridge University Press.

Leigh, Egbert, Jr.
1981 The Average Lifetime of a Population in a Varying Environment. *Journal of Theoretical Biology,* Vol. 90: 213–39.

MacArthur, Robert
1972 *Geographical Ecology.* New York: Harper and Row.

May, Robert M.
1973 *Stability and Complexity in Model Ecosystems.* Princeton: Princeton University Press.

Miller, Robert R.
1981 Coevolution of Deserts and Pupfishes (genus *Cyprinodon*) in the American Southwest. *In* Robert J. Naiman and David L. Soltz (eds.), *Fishes in North American Deserts.* New York: Wiley Interscience.

Richter-Dyn, N., and N. S. Goel
1972 On the Extinction of Colonizing Species. *Theoretical Population Biology,* Vol. 3: 406–33.

Rines, Robert H., Charles W. Wyckoff, Harold E. Edgerton, and Martin Klein
1976 Search for the Loch Ness Monster. *Technology Review,* Vol. 78(5): 25–40.

Salwasser, Hal, Stephen P. Mealey, and Kathy Johnson
1984 Wildlife Population Viability: A Question of Risk. *Transactions of the North American Wildlife and Natural Resources Conference,* Vol. 49: 421–29.

Scheider, W., and P. Wallis
1973 An Alternate Method of Calculating the Population Density of Monsters in Loch Ness. *Limnology and Oceanography,* Vol. 18(2): 343.

Sheldon, R. W., and S. R. Kerr
1972 The Population Density of Monsters in Loch Ness. *Limnology and Oceanography,* Vol. 17(5): 796–98.

Soulé, Michael E. (ed.)
1987 *Viable Populations.* Cambridge: Cambridge University Press.

Turner, Bruce J.
1974 Genetic Divergence of Death Valley Pupfish Species: Biochemical Versus Morphological Evidence. *Evolution,* Vol. 28: 281–94.

Williams, Jack E., David B. Bowman, James E. Brooks, Anthony A. Echelle, Robert J. Edwards, Dean A. Hendrickson, and Jerry J. Landye
1986 Endangered Aquatic Ecosystems in North American Deserts With a List of Vanishing Fishes of the Region. *Journal of the Arizona-Nevada Academy of Science,* Vol. 20: 1–62.
Wright, Sewall
1931 Evolution in Mendelian Populations. *Genetics,* Vol. 28: 114–38.

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THE YAHOO, THE YOWIE, AND REPORTS OF AUSTRALIAN HAIRY BIPEDS

COLIN P. GROVES
Department of Anthropology, The Australian National University, Canberra, A.C.T. 2601, Australia

ABSTRACT: Questions surrounding the supposed Yahoo, Yowie, or supposed wild man of south-eastern Australia are examined in light of what is known of the Australian mammal fauna, the nomenclature of the wild man, the role of the wild man in both Aboriginal and Anglo cosmologies, and the claimed existence of the wild man himself. A giant marsupial, such as a wombat, may have survived the megafaunal extinctions, giving rise to the wild man reports.

INTRODUCTION

The paper by Joyner (1984) on the Australian "wild man," and one of its names, Yahoo, has given rise to several responses (Raynal 1985, Bayanov 1985, Becker 1985). It is clear from these responses that several different issues have become mixed-up, and ought to be disentangled if we are to make any headway in this area of Australian cryptozoology. These issues include: (1) the nature of the Australian mammal fauna, present and past; (2) the nomenclature of the wild man; (3) the part played by near-human beings in the cosmology of (a) Aboriginal and (b) pioneer Anglo-European societies; and (4) the question of the existence of an unknown species itself. I would like to comment on these four issues in turn.

THE AUSTRALIAN MAMMAL FAUNA

Bayanov (1985: 109) states that Australia "is known to have originally been populated by only two species of major placental mammals, *Homo sapiens* and his dingo dog." Perhaps the meaning of "major" is in question here. According to the most recent compilation (Strahan 1983), plus a few subsequent additions known to me, the total number of extant or recently extinct indigenous mammal species in Australia is 258; of these, slightly over half (2 monotremes, 133 marsupials) are not placentals, the remainder being rodents (55 species, all endemic), bats (58 species, about half of them endemic), carnivores (9 species, one being endemic), the dugong, and sundry cetaceans. The existence of the endemic placental rodents, in particular, is unknown even to many Australians. If Bayanov, by "major" placentals, means species of large size, then one must draw attention to the presence of the marine carnivores (pinnipeds), all of rather large size; certainly, they originally arrived by swimming, but one of them, *Neophoca cinerea,* is found nowhere else. Bayanov, when he objects to Joyner's submission that any

unknown creature need not have been manlike, would therefore seem to have extra cards up his sleeve unknown even to himself!

What is true, however, is that combining large size with terrestrial habitat really would restrict the choice to marsupials. At the present time, the largest known terrestrial, indigenous mammal (after *Homo sapiens*) is the red kangaroo, *Macropus rufus*. In the not-too-distant past, however, far larger animals, the so-called Megafauna, were present: the rhino-sized *Diprotodon* and *Zygomaturus*, distantly related to wombats, the giant true wombat *Phascolonus* (mentioned by Joyner), large true kangaroos, and the gigantic short-faced kangaroos (Sthenurinae). Though generally thought to have become extinct at, or in some cases before, the end of the Pleistocene, some megafaunal species are now known to have persisted until 6,000 B.P. (Fethney, Horton, and Wright 1986).

It should also be mentioned that the former existence of two indigenous human "races" within Australia has been proposed, on fossil evidence (Thorne 1976): one archaic, with large teeth, and, especially, a flat receding forehead, and the other of modern type. More recently, Brown (1981) has shown that the main defining features of the "flatheads" are due to artificial cranial deformation, so that the two forms differ much less than was thought—if they were distinct at all.

The Nomenclature of Australian Wild Men

In an effort to determine whether anything could be added to Joyner's survey, I sought the assistance of the Australian National Dictionary Project. W. S. Ramson has very kindly allowed me to use the results of their researches to date. The earliest Australian record of the name *yahoo* so far dug up is from J. Holman's *Travels* (1835, 4: 480): "The natives are greatly terrified by the sight of a person in a mask calling him 'devil' or *Yah-hoo*, which signifies evil spirit." This predates by seven years the earliest record cited by Joyner (1977, 1980). A similar ritual or supernatural association to the Yahoo pervades all written reports up to 1871, when the first report of one being seen and identified as a Yahoo was made by a non-Aboriginal (Joyner 1977: 3–4).

Becker (1985: 107) recommends that "the aboriginal language should be examined more closely before it is discounted as the source of *yahoo*." There were, in fact, some 200 distinct Aboriginal languages spoken in Australia; while the languages of the Sydney, Snowy Mountains, and South Coast regions (the wild man's prime stamping-ground) are among the half or more that are now extinct, the name *yahoo* did indeed occur in one of them. Joyner (1977: 12) refers to a letter to a Queanbeyan newspaper in 1903 revealing that *yahoo* in one language (apparently from the Snowy Mountains region) meant the grey-crowned babbler (*Pomatostomus temporalis*). Also, the Australian National Dictionary refers to R. H. Croll in 1928 as awarding the name *yah-hoo* to a "catbird" in Victoria (but he probably likewise referred to a babbler, as catbirds do not, to my knowledge, occur as far south as Victoria).

So *yahoo* really did occur in an Aboriginal language. Does this make any difference? I would think not, especially as the Aboriginal people of the Snowies, who called the babbler *yahoo*, denied all knowledge of a wild man (Joyner 1977: 13). Joyner (1984) is quite right to refer to the likelihood of linguistic borrowings, to which all languages are liable. The line of argument promoted by him, and extended by Becker (1985), is that Swift's invention was first made flesh in the form of the orang-utan, and then transferred to an alien entity in Australia—and, indeed, in the Bahamas (Raynal 1985).

At present, the term *yahoo* seems to have lost its "hairy man" usage in Australia; it is commonly used to denote uncouth individuals, generally on motorcycles, whose chief activity is outraging the more docile citizenry (synonyms: *hoon, yobbo*). This is, of course, an exact return to Swift's usage. A better known name for the hairy wild man today is the Yowie. For this term, however, the Australian National Dictionary and Joyner (1977) fail to find any great antiquity; Joyner quotes the *Sun-Herald* for December, 1975, and the Australian National Dictionary *The Bulletin* for May of the same year. (This would be about the time that the city fathers of Queanbeyan offered an appreciable sum of money for the Yowie's apprehension—a sum which seems never to have been claimed.) The Australian National Dictionary does, however, draw attention to the following passage in Kevin Gilbert's *Living Black* (1977: 241): "We had the legendary bunyip, the giant water snake, the little people and the hairy youree—the huge shaggy man-like creature that the whites call 'yowie.'" If Gilbert (here referring to his own experience) is truly speaking of the myths of his own people, the Wiradjuri of southern New South Wales west of the ranges, rather than generalizing about Aboriginal mythology, then this would seem at the same time to suggest an origin for *yowie*, and to place the concept firmly within the mythological sphere, to which we should now turn.

Wild Men in Australian Cosmology

(a) Wild Men and the Aboriginal People

Where a wild man is described on the evidence of Aboriginal traditions (Joyner 1977), he is an unearthly humanoid monster, a "devil-devil" (pp. 4–6), "big pfeller devil" (p. 21), or a mythical bogeyman (pp. 22–26). Where specified, the locale of such beliefs is always the coastal region: the Hunter River, or the New South Wales south coast as far inland as Braidwood (Fig. 1). In one case (p. 25), the Ngarigo *dulugal* (almost the same word as used

in the coastal Dhurga, Dyirringan and Dharawal languages) is not especially supernatural, but a "wild blackfellow"; the Ngarigo language, as Joyner records, was spoken in the Delegate region, near Bombala (somewhat inland from the coast). Note that an Anglo resident of the Snowy Mountains region (Joyner 1977: 13) at the turn of the century stated that he had many times asked local Aborigines about the "hairy man," and they denied any knowledge of it.

This seems to localize Aboriginal wild man beliefs, and to identify them as mythological, like Gilbert's *youree* (above), and like the northeast Queensland *quinkan* mentioned by Joyner (1977: 22). Outside the New South Wales south and central coast region, if known at all, the word for wild man seems to have meant simply some kind of renegade. Aboriginal mythology, in surviving cultures at any rate, is not a history of once-and-for-all past events, but a living, ever-present reality (the Dreaming). In the main, early Anglo settlers had fixed ideas about Aboriginal people, and made little attempt to have these preconceptions challenged. It is very remarkable, on looking through Joyner's compilation, how few of the entries are based on Aboriginal reports, and those that are, are of a mythological nature, unappreciated by their Anglo recorders.

(b) Wild Men in Settler Folklore

One of the reports in Joyner's compilation (1977: 10–12) records the killing and post-mortem examination, in Braidwood, of what sounds like a very large wombat. (The common wombat, *Vombatus ursinus,* reaches a head-and-body length of 1,150 mm, i.e., some 45¼ inches; the Braidwood animal was "four feet long.") Another reference (pp. 14–17) seems to relate to a large kangaroo. As Bayanov (1985: 109) states, other reports certainly do not support the hypothesis that "the" wild man in Australia "is" a wombat, even the giant megafaunal *Phascolonus.* But the other reports from settlers and pioneers, although they are supposed to be eyewitness reports, are a hotchpotch of shooters' campfire tales, unidentifiable apparitions seen at dusk, and various hairy horrids that frightened the horses and demoralized the dogs. What can we make of them?

Anderson (1986) has recently provided a most striking analogue of these wild man reports in his analysis of supposed sightings of the extinct moa (a large, flightless bird) by early Anglo pioneers in New Zealand. As he notes, eighteenth century sailors were wont to see polar bears, gigantic kangaroos, and the like, but these sorts of sightings decline, and, after about 1840, the sightings of unknown beasts always concerned the native moas.

The following points emerge from Anderson's analysis: (1) moas were not reported until their subfossil bones became known; (2) they were reported as being very tall (up to twice as tall as we now know they were), and very

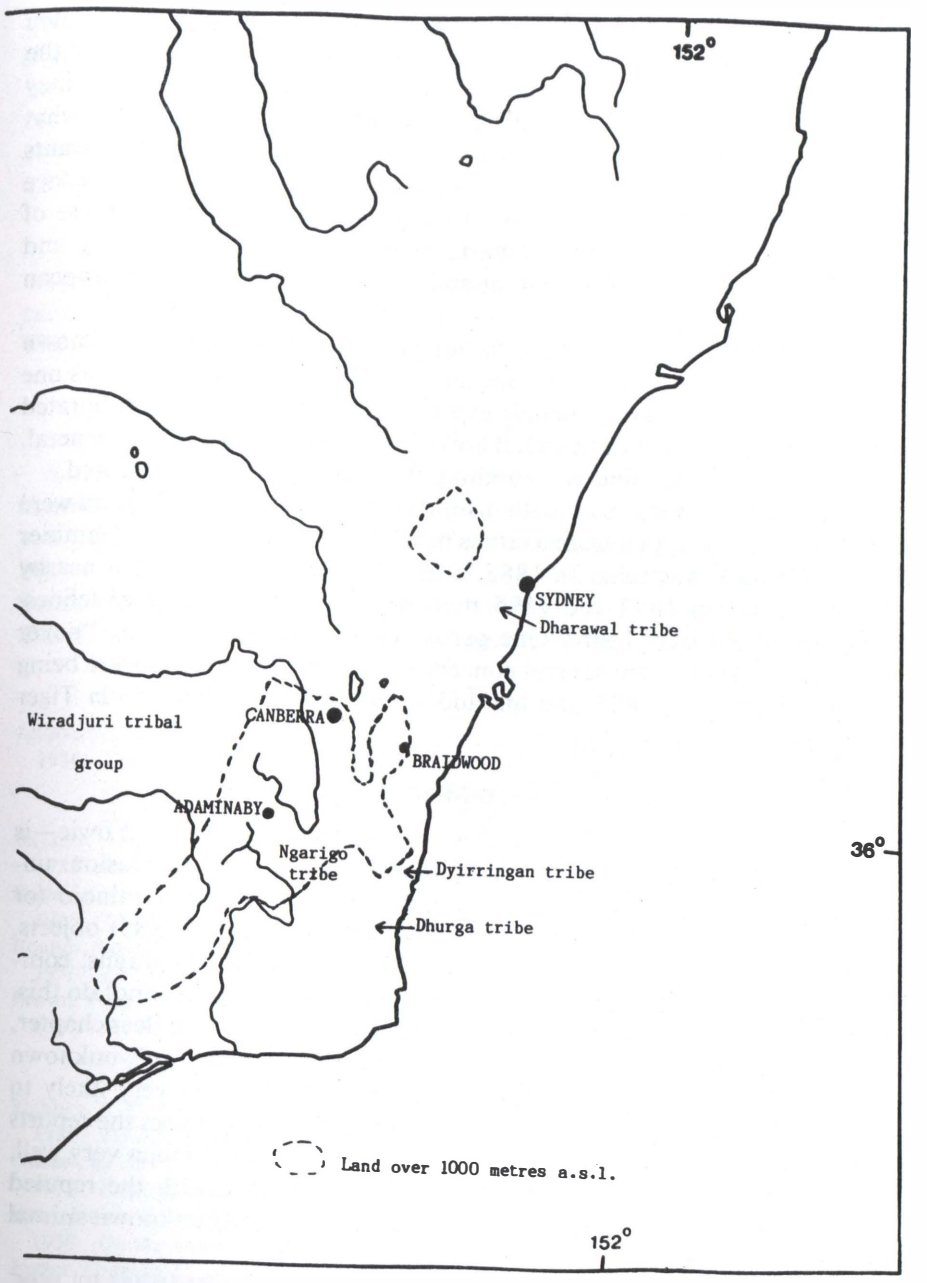

FIG. 1.—The New South Wales south coast region, the location of many Australian Aboriginal wild man traditions.

threatening, with red-rimmed eyes, hooked bills, etc.; (3) they were often described as being rather slim—just the impression that was given by the incorrectly mounted moa skeletons of the nineteenth century; and (4) they were always seen by recent immigrants. In other words, people saw what they *expected* to see; and those that made the sightings were immigrants under the stresses of loneliness, homesickness, and helplessness in the face of the wilderness. Anderson specifically likens moa "sightings" to those of supposed wild men, in different parts of the word, "a longstanding and powerful image of individual moral and material dissolution in European civilisation."

Joyner (1985) emphasizes that, to have any value, sightings of unknown animals must be independent of one another. This is the same point as one of those Anderson makes: if people *expect* to see something, uncorroborated reports that they have indeed seen it are of little value as evidence. In general, the witness's state of mind is something that simply cannot be ignored.

Bonney (1976) tells a story with a similar moral. In 1883, two tigers were reported to have escaped from a circus near Tantanoola, in the Mt. Gambier district of South Australia. In 1885, a tiger was reported seen on a nearby property. Between 1893 and 1895 there were several sightings of felines. Ferocious growls were heard. One person even spoke of a creature "never seen before." There were several concerted hunts for it, as sheep were being attacked. Finally, in 1895, the marauder was shot. The Tantanoola Tiger turned out to be a large dog.

Are There Wild Men in Australia?

The evidence for the existence of an Australian wild man—a Yowie—is extremely poor. Joyner ends his 1984 paper with just this conclusion: unknown species there may be, but that such a species is a hominoid (or hominid) is in no way required by the evidence. Bayanov (1985) objects, citing some reports from Joyner's own 1977 and 1980 monographs, combining them together to create a hairy wild man. One simply cannot do this. As on a previous occasion, I refer to Heuvelmans' (1958) Nandi Bear chapter, where he shows that, if one investigates the existence of "an" unknown animal, and lumps together all the sightings of "it," one is very likely to emerge with precisely that: an unknown animal. But if one teases the reports apart, recognizing that people often do not know their local fauna very well, and may be associating anything they do not recognize with the reputed animal, then the results may be quite different, and no truly unknown animal need be postulated.

New Australian mammal species continue to be described year by year. This is extremely exciting for the mammalogist, but there are, so far, few cryptozoological "events"—one, coincidentally, concerns a wombat (Tisdale

1986). As megafaunal survival has now been shown at such a recent date (Fethney, Horton, and Wright 1986), it is, I suppose, not completely out of the question that one or more giant marsupials hung on until the nineteenth century. I am of the same opinion as Joyner (1984): if there is a genuinely cryptozoological basis for any of the wild man (Yowie) stories, a wombat is quite certainly what it is.

Acknowledgment

I am very grateful to W. S. Ramson for sharing with me the records of *yahoo* and *yowie* obtained by the Australian National Dictionary Project at The Australian National University.

ADDENDUM

Since writing the above, W. S. Ramson has drawn my attention to a mention in C. William's *Grammar of Yuawaalaraay* (1980: 156) of the term *yuwi,* defined as a "dream spirit." The Yuawaalaraay live in the Walgett-Brewarrina district, about 29–30° S, 147–148° E, west of the Divide (in New South Wales, just south of the Queensland border). It would seem, therefore, that *yowie* myths might be quite widespread in the Western Plains district.

References Cited

Anderson, Atholl
1986 The Beast Without: Moa as Colonial Frontier Myths in New Zealand. *Cultural Attitudes to Animals including Birds, Fish and Invertebrates.* World Archaeological Congress (Southampton & London), 1–7 September 1986.

Bayanov, Dmitri
1985 Cryptowombat or Cryptohominid? *Cryptozoology,* Vol. 4: 107–110.

Becker, John
1985 The Yahoo: A Native Animal Without a Native Name? *Cryptozoology,* Vol. 4: 106–7.

Bonney, Neville
1976 *The Tantanoola Tiger.* Adelaide: Luthan Publishing House.

Brown, Peter
1981 Artificial Cranial Deformation: A Component in the Variation in Pleistocene Australian Aboriginal Crania. *Archaeology and Physical Anthropology in Oceania,* Vol. 16: 156–67.

Fethney, J., D. R. Horton, and R. V. S. Wright
1986 *Trinkey Spring: Kartan, Megafauna, Climate.*

Gilbert, Kevin
1977 *Living Black.* Ringwood, Victoria: Allen Lane.

Heuvelmans, Bernard
1958 *On the Track of Unknown Animals.* London: Rupert Hart-Davis.

Joyner, Graham, C.
1977 *The Hairy Man of South Eastern Australia.* Canberra: published by the author.
1980 *More Historical Evidence for the Yahoo, Hairy Man, Wild Man, or Australian "Gorilla."* National Library of Australia, MS 3889.

1984 The Orang-utan in England: An Explanation for the Use of *Yahoo* as a Name for the Australian Hairy Man. *Cryptozoology,* Vol. 3: 55–57.
1985 Science and the Australian Wild Man. *Cryptozoology,* Vol. 4: 111–12.

Raynal, Michael
1985 Yahoos in the Bahamas. *Cryptozoology,* Vol. 4: 106.

Strahan, Ronald
1983 *The Complete Book of Australian Mammals.* Sydney: Angus & Robertson.

Thorne, Alan G.
1976 Morphological Contrasts in Pleistocene Australians. *In* R. L. Kirk and A. G. Thorne (eds.), *The Origin of the Australians.* Canberra: Australian Institute of Aboriginal Studies.

Tisdale, Louise
1986 Hair Today, Gone Tomorrow. *BBC Wildlife* (May).

Research Reports

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BIOCHEMICAL ANALYSES OF PRESERVED *OCTOPUS GIGANTEUS* TISSUE

ROY P. MACKAL
Young Building, 307, The University of Chicago, Chicago, Illinois 60637, U.S.A.

ABSTRACT: Comparative amino acid analyses of *Octopus giganteus* tissue and a variety of control tissues of *Stenella plagiodon, Architeuthis dux, Delphinapterus leucas, Octopus dolfleini,* and *Octopus bimaculoides,* were carried out. The amino acid composition of *O. giganteus* tissue differed significantly from all other specimens, showing a very high proportion of glycine and proline. Comparison with the amino acid composition of known proteins indicates that the *O. giganteus* tissue is mainly collagen and certainly not "whale blubber," as was suggested soon after the discovery of the *O. giganteus* carcass on a Florida beach in late 1896. Comparative determinations of Cu and Fe content of *O. giganteus* tissues and controls were inconclusive, but consistent with a cephalopod identification. These analytical results support the original identification of the tissue and carcass by A. E. Verrill as an exceptionally large cephalopod, probably octopus, not referable to any known species.

INTRODUCTION

On November 30, 1896, a large carcass, half buried in the beach sand of St. Augustine, Florida, was discovered by two young boys while cycling on Anastasia Beach. The find was reported immediately to DeWitt Webb, a local medical doctor with a great interest in natural history. The carcass was washed out to sea and beached twice before Webb was able to obtain a team of horses and move the carcass high enough up the beach to prevent further flotation. Examination of the carcass was made—and photographs were taken—by several people, including Webb, who estimated that the part of the carcass visible above the sand weighed 4,500 kg, and measured 7 meters long by 1.2 meters high by 5.5 meters wide (Fig. 1). Webb identified the carcass as octopus, and, realizing the importance of this discovery, sent descriptive letters to several zoologists, including cephalopod expert A. E. Verrill at Yale University. Verrill promptly published a short note in the *American Journal of Science* (Verrill 1897a), concluding that the carcass was

that of a giant squid, but much larger than the specimens he had examined in Newfoundland in 1870.

Webb forwarded additional data, photographs, and tissue samples to Verrill and to William Healey Dall, curator of molluscs at the U.S. National Museum, in Washington, D.C. On the strength of this additional information, Verrill changed his mind, publishing two articles (Verrill 1897b, 1897c) describing the giant octopus. He calculated that the arms were 20 to 30 meters in length by 0.5 meters in diameter at the base. He named the new animal *Octopus giganteus.*

This identification was greeted with widespread skepticism, and eventually Verrill retracted his original identification (Verrill 1897d, 1897e, 1897f)—pointing out, however, that other zoologists who had examined the tissue still believed that it represented an unknown cephalopod related to the octopus. One of the last pronouncements was by F. A. Lucas, of the U.S. National Museum, who stated: "The substance looks like blubber and smells like blubber, and it is blubber, nothing more nor less." The matter rested there until 1957, when Forrest G. Wood, a marine mammalogist and then curator at Marineland and the Marineland Research Laboratory, Florida, became interested in the matter. He subsequently discovered that the Smithsonian Institution's National Museum of Natural History still possessed a large jar containing the *Octopus giganteus* tissue. Wood contacted a colleague, cell biologist Joseph F. Gennaro, then at the University of Florida, who obtained some tissue samples from the Museum.

Gennaro carried out comparative histological examination of the tissue, concluding that it most resembled contemporary octopus tissue (Wood and Gennaro 1971). While these results were highly suggestive, further biochemical work was required for an unambiguous identification of the tissue.

Method

A variety of tissue samples identified only by number were prepared and submitted to the author for analysis by Joseph F. Gennaro, Department of Biology, New York University. The identity of each sample was unknown to the analyst.

Amino acid analyses were performed by automated ion exchange chromatography, according to the general procedures of Spackman, Stein, and Moore (1958). Five to 50 mg samples were hydrolyzed in 6 N HCl for 24 hours at 110° C. Special precautions recommended for the preparation and hydrolysis of samples were observed (Crestfield, Moore, and Stein 1962, Moore and Stein 1963).

Small aliquots (no less than 25 mg) were analyzed in each case. Analyses were carried out on a Durrum D-500 amino acid analyzer (Dionex Instrument Corporation, Sunnyvale, California).

Cu and Fe determinations were made by standard atomic absorption techniques by P. Rancurel, Laboratoires de Zoologie et Biologie Marines, Centre D'Étude Des Ressources Animales Marines, Université D'aix-Marseille III, under the auspices of Michel Raynal.

FIG. 1.—DeWitt Webb standing by the St. Augustine, Florida, carcass in this 1896 photograph. The ropes were used to move the large mass away from the ocean water. (National Museum of Natural History, Smithsonian Institution.)

Results

The amino acid analyses of *O. giganteus* tissue and controls are shown in Tables 1, 2, and 3. The Cu and Fe concentrations are shown in Table 4.

Discussion

Table 1 shows the amino acid composition of tissue samples from several species, including the arm, mantle, and fin of the giant squid, *Architeuthis*

TABLE 1.—Comparison of amino acid composition of *O. giganteus* with cetacean and cephalopod tissues.

	Stenella plagiodon (spotted dolphin)	*Octopus giganteus*	*Architeuthis dux* (left tentacle III)	*Architeuthis dux* (mantle)	*Architeuthis dux* (fin)	*Delphinapterus leucas* (skin) (white whale or beluga)
Amount weighed out (mg)	5.2	12.4	18.4	49.0	17.0	18.0
Sample	1M	2M	3M	4M	5M	6M
Mole %						
Asp	10.5	5.9	10.5	11.7	10.3	10.5
Thr	4.6	2.5	4.9	5.4	4.8	4.6
Ser	7.1	3.9	6.0	5.8	5.5	8.0
Glu	17.7	8.8	14.2	16.6	12.6	16.7
Pro	4.7	16.8	6.3	4.7	6.5	4.3
Gly	10.6	34.6	19.2	11.5	20.0	14.2
Ala	7.5	13.4	8.6	9.5	8.6	7.6
Val	6.6	2.4	4.8	5.5	5.3	6.4
Met	2.2	0.4	1.9	2.2	1.9	2.1
Ile	5.1	1.2	4.9	5.9	5.4	4.6
Leu	10.7	2.9	7.8	10.0	8.1	10.4
Tyr	1.2	0.0	0.7	0.6	0.5	1.4
Phe	3.1	1.5	2.6	3.0	3.2	3.5
His	0.3	0.0	+	+	0.2	+
Lys	1.6	0.0	1.0	0.9	0.8	0.5
Arg	6.4	5.8	6.6	6.7	6.5	5.2
Hydroxy-lys	0.0	0.0	0.0	0.0	0.0	0.0

+ Trace detected but not integrated—less than 0.1%.

dux, and *Octopus giganteus.* It is immediately apparent that the *O. giganteus* tissue has an amino acid composition unlike any of the other specimens, particularly with respect to high percentages of glycine and proline and lower quantities of glutamic acid.

An important consideration in interpreting these amino acid analyses is the fact that the *O. giganteus* tissue has been in preservative (formaldehyde, and possibly also ethanol) for 90 years. This circumstance might have some effect on the measured quantities of serine, cysteine, threonine, tryptophan, tyrosine, and methionine, by causing degradation, and thus reducing the measured quantities. Since cysteine and tryptophan were not measured in this procedure, they need not concern us. Consequently, any conclusions based on the levels of serine, threonine, tryosine, and methionine would have to be made with caution.

Further, formaldehyde might produce some cross-linking between amino acids, which could also distort the analyses. It is important, therefore, to include analyses of similar tissues exposed to formaldehyde. Table 2 shows comparable amino acid analyses of squid and octopus tissues which have

TABLE 2.—Comparison of amino acid composition of fresh and formaldehyde-preserved cephalopod tissues.

	Contemporary squid (formaldehyde)	*Octopus dolfleini* (formaldehyde)	*Octopus bimaculoides* (formaldehyde)	Contemporary squid (fresh)	Contemporary octopus (fresh)
Amount weighed out (mg)	7.3	12.1	9.6	11.5	13.9
Sample	7G	8M	9M	8MG	9MG
Mole %					
Asp	12.2	13.9	12.0	12.2	13.5
Thr	5.1	5.5	5.2	6.0	5.7
Ser	5.3	1.2	4.2	6.1	2.7
Glu	16.5	11.0	12.4	16.9	16.1
Pro	4.2	5.1	4.7	5.3	5.4
Gly	8.7	22.2	16.7	8.3	11.4
Ala	9.8	11.2	11.4	8.6	10.1
Val	5.5	7.3	6.1	4.3	6.2
Met	2.6	0.0	1.8	2.1	0.5
Ile	6.0	6.5	7.3	5.8	6.2
Leu	10.5	8.9	11.7	9.8	9.8
Tyr	1.3	0.0	0.0	1.5	0.0
Phe	3.4	+	1.4	3.3	0.4
His	1.2	+	0.0	1.5	0.0
Lys	0.8	4.7	2.6	0.4	7.5
Arg	7.1	2.7	2.3	8.0	4.3
Hydroxy-lys	0.0	0.0	0.0	0.0	0.0
Hydroxy-pro	*	*	*	*	*

8M Tentacle tissue from *Octopus dolfleni martini,* 14 kg, 22 meters tentacle tip to tentacle tip. Specimen obtained off Washington State coast near Seattle. Kept in formalin for about 2 years. Courtesy of Roger Closek, Shedd Aquarium.

9M Tentacle tissue from *Octopus bimaculoides* from waters along the California coast. Preserved in formaldehyde at least since 1968, possibly much longer.

\+ Trace detected but not integrated—less than 0.1%.

* Analysis not done.

been preserved in formaldehyde from 2 to 11 years, as well as fresh tissues. No significant effects on the amino acid composition appear to be attributable to formaldehyde storage for these lengths of time. It should be noted that all octopus tissues contain greater quantities of glycine than tissues from squid of comparable size. The giant squid, *A. dux,* does contain larger quantities of glycine, but significantly less than *O. giganteus.* Purified squid collagen free of other proteins does contain higher amounts of glycine typical of collagen, reported by Kimura, Nagaoka, and Kubota (1969), 30.1 mole % glycine and 9.6% proline. These results suggest that the relative collagen content of both squid and octopus are related to their size, the larger the animal the greater the proportion of collagen. Since these animals have no extensive internal or external skeletal support, this interpretation seems reasonable. However, since squids (including *A. dux*), in contrast to octo-

TABLE 3.—Comparison of amino acid composition of *O. giganteus* with collagen, tendon, and bone.

	Bovine collagen	Human collagen	Bovine achilles tendon	Decalcified bone (formaldehyde)	*O. giganteus*	Decalcified bone
Amount weighed out (mg)			15.6	23.2	14.8	19.6
Sample			10MG	11MG	12MG	13MG
Mole %						
Asp	7.5	4.2	7.2	6.6	7.2	6.5
Thr	2.2	1.8	3.4	3.2	3.1	2.7
Ser	3.4	3.6	3.4	4.2	2.0	2.6
Glu	10.8	7.3	9.6	9.0	8.7	11.1
Pro	16.5	12.8	15.6	14.8	16.5	14.3
Gly	29.3	33.0	30.6	31.1	36.0	35.5
Ala	10.0	11.0	14.0	13.5	13.4	12.1
Val	2.7	2.4	3.0	2.9	2.8	2.6
Met	0.9	0.6	0.4	0.7	0.0	0.5
Ile	2.1	1.0	1.6	1.7	1.5	1.6
Leu	3.2	2.4	3.9	3.8	3.6	4.3
Tyr	1.0	0.03	0.0	0.0	0.0	0.0
Phe	2.4	1.2	0.7	1.2	0.6	0.6
His	0.7	0.5	0.0	0.0	0.0	0.0
Lys	5.0	2.7	3.1	2.5	2.3	2.7
Arg	8.6	5.1	3.3	4.7	2.4	2.8
Hydroxy-lys	*	0.6	+	+	+	+
Hydroxy-pro	14.0	9.0	*	*	*	*

+ Present in small amount, but not calculated.
* Analysis not done.

puses, have some rudimentary internal cartilaginous structural plates in addition to the chitinous vestigial pen, somewhat lesser amounts of collagen may be required to maintain their structural integrity than are required by octopuses of comparable size.

Table 3 shows an additional analysis of *O. giganteus* tissue, and analyses of bovine and human collagen, as well as bovine achilles tendon, decalcified bone stored in formaldehyde, and fresh decalcified bone. The amino acid composition of *O. giganteus* tissue is quite similar to collagen, and almost identical to decalcified bone material. The *O. giganteus* tissue is almost pure collagen, which is precisely what one might expect for an aquatic invertebrate, such as a giant octopus, with a mass of 6,000 kg or more.

Copper-containing hemocyanin is the most important respiratory pigment of molluscs with regard to the number of species which possess it. The iron-containing respiratory pigment hemoglobin is also widely—though irregularly—distributed in this group. However, the Cephalopoda, including squids and octopuses, do not possess it. Consequently, Michel Raynal suggested

TABLE 4.—Comparison of Cu and Fe composition of *O. giganteus* with cetacean and cephalopod tissues.

Sample identification	Sample weight (mg)	Cu (ppm)	Fe (ppm)	Cu/Fe
Stenella plagiodon (spotted dolphin) (muscle)	12.8	300	1,600	0.19
Octopus giganteus	29.1	60	200	0.30
Architeuthis dux (mantle)	5.6	240	560	0.43
Delphinapterus leucas (white whale) (skin)	10.5	330	470	0.70

that analyses of the Cu and Fe content of *O. giganteus* tissues might aid in differentiating between cephalopod and mammalian tissue, since cephalopod tissue should contain far less iron. The Cu and Fe content and the Cu and Fe ratios of selected tissues are shown in Table 4. As expected, the relative content of Fe in *A. dux* tissue is much lower than in porpoise tissue, *Stenella plagiodon.* The content of Cu and Fe in the *O. giganteus* tissue is similar to that in *A. dux,* rather than to that in *S. plagiodon.* The sample of whale skin tissue of *Delphinapterus leucas* shows a Cu content similar to that in the porpoise material, but appears to have a much reduced Fe content. The reason for such a low content of Fe in the whale skin is not clear. In any case, these results are consistent with the identification of *O. giganteus* tissue as a cephalopod.

On the basis of Gennaro's histological studies (Wood and Gennaro 1971) and the present amino acid and Cu and Fe analyses, I conclude that, to the extent the preserved *O. giganteus* tissue is representative of the carcass washed ashore at St. Augustine, Florida, in November of 1896, it was essentially a huge mass of collagenous protein. Certainly, the tissue was not blubber. I interpret these results as consistent with, and supportive of, Webb and Verrill's identification of the carcass as that of a gigantic cephalopod, probably an octopus, not referable to any known species. An absolutely definitive identification may possibly be obtained in the future by analyzing and comparing the amino acid sequences of purified collagen samples and/or by radio-immunoassay.

REFERENCES CITED

Crestfield, Arthur M., Stanford Moore, and William H. Stein
1962 The Preparation and Enzymatic Hydrolysis of Reduced and S-Carboxymethylated Proteins. *Journal of Biological Chemistry,* Vol. 238(2): 622–27.

Kimura, Shigeru, Yoshihiro Nagaoka, and Minoru Kubota
1969 Studies on Marine Invertebrate Collagens—I: Some Collagens from Crustaceans and Molluscs. *Bulletin of the Japanese Society of Scientific Fisheries,* Vol. 35(8): 743–47.

Moore, Stanford, and William H. Stein
1963 Chromatographic Determination of Amino Acids by the Use of Automatic Recording

Equipment. *In* Sidney P. Colowick and Nathan O. Kaplan (eds.), *Methods in Enzymology, Vol. 6*. New York: Academic Press.

Spackman, Darrel H., William H. Stein, and Stanford Moore
1958 Automatic Recording Apparatus for Use in the Chromatography of Amino Acids. *Analytical Chemistry*, Vol. 30(7): 1190–1206.

Wood, Forrest G. and Joseph F. Gennaro, Jr.
1971 An Octopus Trilogy. *Natural History* (March).

Verrill, Addison E.
1897a A Gigantic Cephalopod on the Florida Coast. *American Journal of Science*, 4th Series, Vol. 3(13): 78–79.

Verrill, Addison E.
1897b Additional Information Concerning the Giant Cephalopod of Florida. *American Journal of Science*, 4th Series, Vol. 3(14): 162–63.

Verrill, Addison E.
1897c Gigantic Octopus. *New York Herald* (January 3).

Verrill, Addison E.
1897d The Florida Monster. *Science*, Vol. 5(114).

Verrill, Addison E.
1897e What is this Creature? *New York Herald* (March 7).

Verrill, Addison E.
1897f The Supposed Great Octopus of Florida: Certainly Not a Cephalopod. *American Journal of Science*, 4th Series, Vol 3(16): 355–56.

Field Reports

Field Reports are not reviewed by members of the Editorial Board of Cryptozoology *or other outside referees. Reported descriptions or results of field work are the responsibility of the authors only, and are subject to criticism in the Comments and Responses section.*

Cryptozoology, 5, 1986, 63–76

FIRST PHOTOS OF THE YETI: AN ENCOUNTER IN NORTH INDIA

ANTHONY B. WOOLDRIDGE
43, Bollin Drive, Timperley, Altrincham, Cheshire, England WA14 5QR, U.K.

INTRODUCTION

In early March, 1986, the author observed and photographed a large hominid-like animal which was believed to be the Yeti. This remarkable incident occurred by chance during a solo run in the Garhwal Himalaya of northern India, near western Nepal. My purpose in undertaking the run was to raise money for an organization, Traidcraft, which supports self-help projects in developing countries. The run allowed me to combine my interests in long-distance running and mountaineering, and to obtain first-hand knowledge of the way of life in Himalayan mountain villages. I have no special training in zoology, and, when I undertook the run, I knew very little about the Yeti. My conviction that the creature in question was a Yeti is based on a subsequent detailed study of other reports, and on discussions with experts on this topic.

NARRATIVE DESCRIPTION

Between March 2 and March 10, 1986, I completed a solo run in the upper Alaknanda Valley (Fig. 1). Although I carried an ice axe and full survival equipment in my 8 kg rucksack, my strategy was to use accommodation available in the main villages, and hence avoid the need to bivouac. Both Hindu and Sikh pilgrims visit the area in the summer, although in

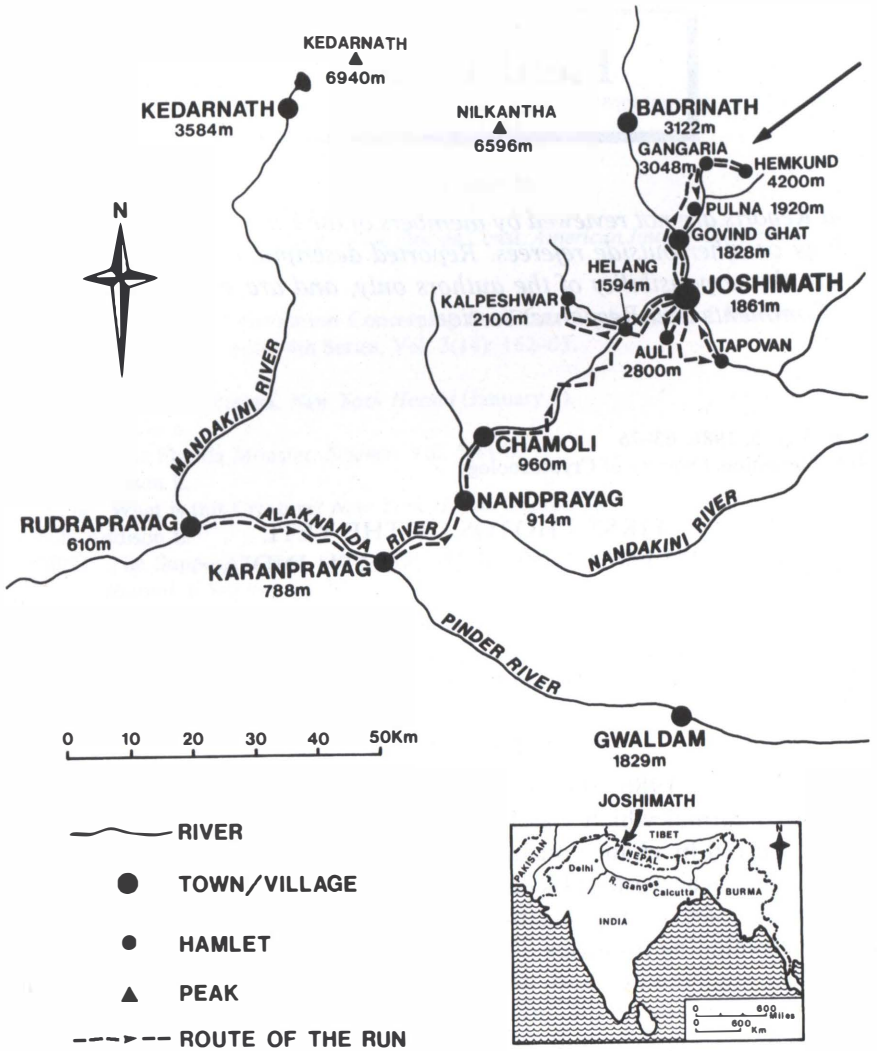

FIG. 1.—Routes followed by the author in the Himalayas indicated by arrows. Long arrow in upper right indicates location of the sighting of the presumed Yeti. The area is near the border with western Nepal.

early March any villages higher than about 2,000 meters are locked up and deserted.

On March 5, I left Joshimath early, ran easily up the valley as far as Govind Ghat, and then turned off up the Bhiundar Valley. That afternoon I reached an altitude of about 3,000 meters, and found the bungalows at Gangaria locked up and deserted. There were boot-marks in the snow as far

FIG. 2.—The terrain beyond Gangaria, towards Hemkund.

as the bungalows, but they continued no further. I cached my ice axe and survival bag in the snow, and set off back to the Sikh gurudwara at Govind Ghat for the night. My plan was to stock up with food, get a good night's sleep, and return as early as possible the next morning to reach Hemkund while the snow was in reasonable condition. By the time I reached Govind Ghat, I had covered 50 km, with about 1,860 meters of ascent since the morning.

On March 6, I left the Sikh gurudwara just after 6 a.m., and, although they had told me that the route to Hemkund was impassable because of ice, I was determined to see for myself. At Pulna, the last inhabited village (1,920 meters), I inquired about a local guide willing to go up to Hemkund, but could find no one willing to risk the possibility of icy conditions and a chilly bivouac. Their reticence did not inspire confidence in my chances of reaching Hemkund alone, but at least I could travel more rapidly unaccompanied, and was prepared to spend a night out if it proved necessary.

I ran most of the way up the valley until I reached the snow at about 2,800 meters, and then the huts at Gangaria (3,048 meters) by 10 a.m. Beyond Gangaria, I could just discern the track leading off up toward Hemkund, but there were no signs of anyone else having used the route since the last snowfall, and probably since the previous autumn. There had only

FIG. 3.—Unidentified tracks in snow at 3,300 meters observed by author.

been a light frost overnight, and with the sun thawing the thin surface crust of snow, I was soon sinking in above the tops of my training shoes.

As the track followed steep wooded slopes beyond Gangaria (Fig. 2), I was surprised, around 3,300 meters altitude, to come across an area where the snow had recently been disturbed. Strange tracks came up a steep gully on the right, and then went from bush to bush in the wood. I was naturally curious to know what creature could be sharing the wood with me, but could think of no satisfactory explanation. I took two quick photographs of the tracks (Figs. 3 and 4), and pressed on, knowing that time was precious if I was to reach Hemkund before the snow became too soft. Perhaps half an hour later, as I was emerging above the tree line, there was a sudden "bang," followed by protracted rumbling, and although I could not see any signs of snow movement, my first reaction was to suspect an avalanche.

By 12:30 p.m., I had reached about 3,800 meters, where my route left the comparative shelter of the cliffs and continued across an exposed steep snow slope. I became increasingly concerned about the stability of the snow, and was soon dismayed and worried to see that a recent wet snow avalanche extended right across my intended route. I continued for a few hundred yards to get to a better position to survey the damage and to assess the risks of proceeding. While studying the track of the debris, I noticed a large, smooth

FIG. 4.—A single footprint. Its length was about 250 mm (10 in).

groove in the loose snow which might have been caused by a large rock sliding down. But the groove came to an abrupt end just at the point where a set of tracks led off across the slope behind and beyond a spindly shrub. Standing behind the shrub was a large, erect shape perhaps up to 2 meters tall. Convinced that, whatever it was, it would disappear quickly, I took several photos rapidly, and then moved up about 50 meters nearer to a rocky outcrop, which was as close as I could get without venturing onto the broad, open snow slope which had just avalanched.

It was difficult to restrain my excitement as I came to the realization that the only animal I could think of which remotely resembled this one before me was the Yeti. My skepticism about the creature's existence was overturned by this all-too-real creature then in view. It was standing with its legs apart, apparently looking down the slope, with its right shoulder turned towards me. The head was large and squarish, and the whole body appeared to be covered with dark hair, although the upper arm was a slightly lighter color. The creature was amazingly good at remaining motionless, although the bush vibrated once or twice, and when I moved back down to lower ground, it appeared to have changed its head position and to be looking more directly at me.

I took a number of photographs from an estimated range of 150 meters,

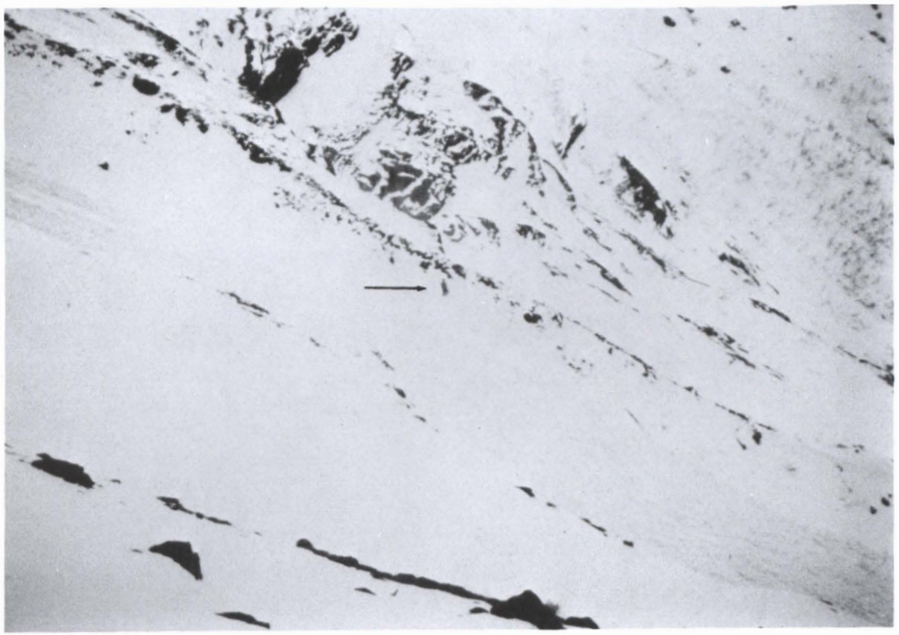

FIG. 5.—View across the avalanch debris. Arrow indicates figure presumed to be a Yeti.

one of which is included in the report (Fig. 5). At the time, I was unaware that no one had ever actually photographed a Yeti before, but I was aware that the pictures would be of great interest—provided that I got back safely. Unfortunately, my camera was only a light, compact 35 mm model, with a slightly wide angle lens. Being a Nikon, however, the lens is of good quality, so that the negatives have withstood considerable enlargement (Fig. 6). The sketch (Fig. 7) is included to clarify the general stance of the creature for those not having access to the original photographs. Some of the detail in this sketch should be regarded as conjectural. For example, with the creature seen in silhouette, it was not possible to distinguish any facial features, or to be certain of the depth to which its legs were submerged in the snow.

After about 45 minutes, the weather continued to deteriorate, and light snow began to fall. The animal still showed no sign of moving, although occasionally the shrub vibrated slightly. I moved back down the slope a short distance, and got the impression that the animal was now peering towards me around the other side of the shrub, but its feet had not changed in position. It was now about 1:30 p.m., and with the weather clouding over fast, I felt it was time to descend before new snow obliterated my tracks. On the way down, I kept a keen lookout for any further tracks, and noticed a considerable number on the slopes between the avalanche debris and the

FIG. 6.—Enlargement of the figure appearing in Fig. 5.

place where I had earlier seen the footprints in the wood. I surmised that the animal had been looking for food in the wood, and then on the open slopes above the trees. Perhaps it had been disturbed by my arrival in the valley, had made off over-hastily towards Hemkund, and had triggered off the avalanche.

Back in the wood, I came across the footprints which I had photographed some 3 hours earlier, but they had already melted severely in the intervening time. I photographed them as best I could, remembering to include my ice axe for a scale. The sky was now completely overcast, and the snow looked set to last some time, so I was reluctant to bivouac at Gangaria. I was torn between a strong desire to stay in the Bhiundar Valley for another day, and the need to maintain the schedule of my sponsored run. Since the Yeti was very likely to move over the col towards Hemkund that afternoon, and the footprints would be obscured by the recent snow, it was very doubtful whether much new evidence could be gleaned the following day.

By 4:30 p.m., I was back down to Pulna, and I reached the main road to Joshimath by 5 p.m. Not stopping as I passed the man brewing tea in the hut near the road, I made record time toward Vishnu Prayag, covering the 9 km in 40 minutes. It was dark by the time I finished the climb up to Joshimath, and I staggered in to the Tourist Resthouse to find the manager

FIG. 7.—Artist's impression of the figure's stance. (J. M. Coffey.)

sitting in his usual chair near the entrance. He was rather amazed about the distance I had traveled that day, and particularly that I had ventured towards Hemkund without a guide. I had covered a distance of about 58 km and ascended a total of nearly 3,000 meters. I would have enjoyed giving him a full account of my experiences that day, but I had already decided that, rather than risk a hunt being set up for the animal, I would keep the news to myself until the proper authorities in India and elsewhere had been consulted.

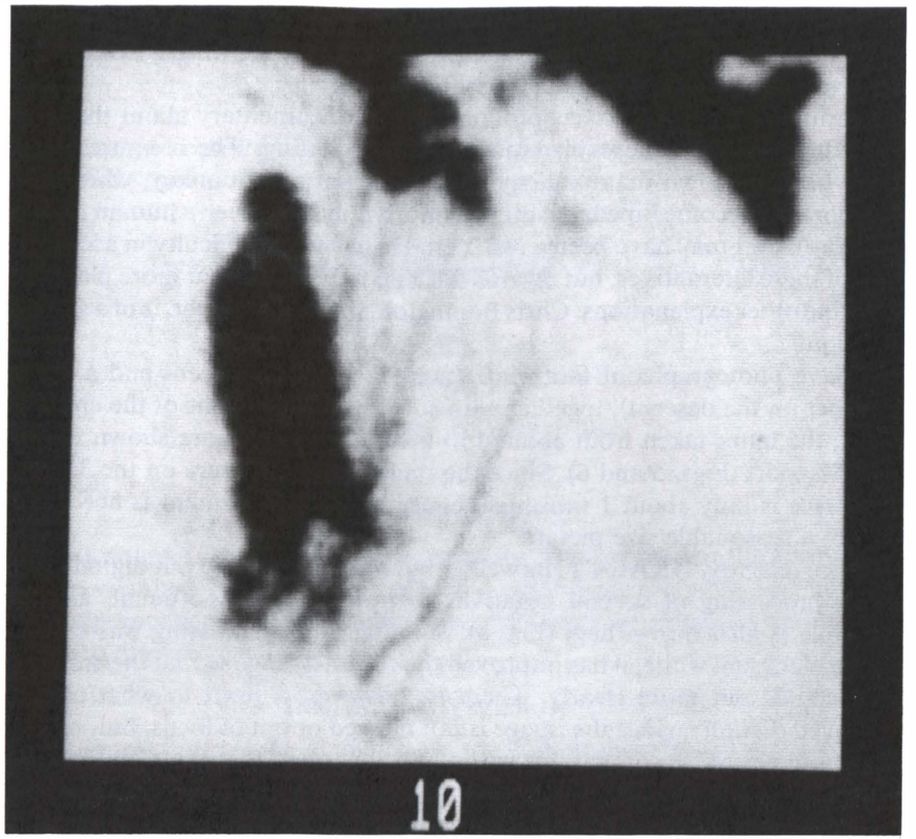

FIG. 8.—Digitally processed image of the figure. (Harwell Laboratory, UKAEA).

RESULTS

Returning to England on March 15, my spare time was spent reporting on the sponsored run, while consulting in comparative secrecy with zoologists, anthropologists, and mountaineers about the Yeti. The news of my encounter was first released on the BBC TV program "Wild Britain" on July 13, and more fully reported in *BBC Wildlife* magazine, September, 1986.

A number of experts believe that the creature I saw was probably a Yeti; others prefer to keep an open mind. John Napier, a primatologist and author of the 1973 book *Bigfoot: The Yeti and Sasquatch in Myth and Reality,* has reversed the skeptical position he had previously expressed, and now describes himself as a Yeti devotee. Myra Shackley, an archaeologist and author of the 1983 book *Wildmen: Yeti, Sasquatch and the Neanderthal Enigma,* has seen the full sequence of photographs, and believes that the whole ex-

perience is very consistent with other reports of Yeti sightings. Lord Hunt, leader of the successful 1953 Mount Everest Expedition, who has twice seen Yeti tracks himself, is similarly convinced.

Desmond Morris, who has produced a TV documentary about the Yeti, suggests three possible explanations for my sighting. The creature might have been a known mammal, such as a bear or large monkey, which had temporarily become bipedal, it might conceivably have been a human recluse (*saddhu*), or it may have been a real Yeti. He has some difficulty in accepting *any* of these alternatives, but regards the Yeti to be somewhat more plausible than the other explanations. Chris Bonington, the mountaineer, is of a similar opinion.

I have photographs of footprints (two taken on the ascent and a larger number on the descent), together with some 20 photographs of the creature itself, the latter taken from about 150 meters. Examples are shown in this Field Report (Figs. 5 and 6). Since the image of the creature on the 35 mm negatives is only about 1 mm high, considerable enlargement is needed to obtain a reasonable size picture.

More recently, UKAEA's Harwell Laboratory has carried out digital computer processing of several negatives to improve the fine detail, and an example is also shown here (Fig. 8). Although this processing was carried out in black and white, it has improved the contrast range so that the animal's arm stands out more clearly. There is, however, a limit to what can be achieved digitally, since the image is not blurred or out of focus, but, rather, the detail desired is comparable with the grain size of the emulsion. For this reason, more sophisticated computer routines, such as edge enhancement, are believed to have little to offer in refining the images.

Future Plans

The most significant additional information which I hope to obtain concerns measurement of the creature's size using photogrammetric techniques. This would require revisiting the area to obtain a theodolite survey of identifiable features of the terrain. It would then be possible to calculate the precise camera positions from which my photographs were taken, and to use pairs of negatives to measure the creature's dimensions to an accuracy of perhaps 5 percent.

Secondly, I am endeavoring to establish in what respects this experience is similar to—or differs from—other reports of Yeti footprints or sightings. Readers of *Cryptozoology* may well be able to help in this respect, and I have also contacted various people in India who are knowledgeable about the Garhwal.

The author wishes to thank S. F. Burch, of UKAEA's Harwell Laboratory, England, for carrying out the digital processing for Fig. 8. J. M. Coffey is thanked for the sketch appearing in Fig. 7. The help of S. Johnson in preparing the map in Fig. 1 is also gratefully acknowledged.

(The author requested publication of the following Addendum, containing additional information, to which the Editor agreed.)

ADDENDUM

Was It a Yeti?
Some Personal Thoughts on the Encounter

(by Anthony B. Wooldridge)

Introduction

This note sets down my main reasons for concluding that the animal met in the vicinity of Hemkund on March 6, 1986, was probably a Yeti. Some of the points which have puzzled those who have heard about the incident are also discussed.

Why the Animal Was Probably a Yeti

The most compelling evidence for the Yeti explanation is the similarity between other reports of footprints and sightings and the footprints and the general appearance of the animal which I observed. The single footprint of a left foot (Fig. 4) shows a large impression caused by the big toe, which is well separated from, but parallel with, the other toes. Behind it is a curious depression. These features are very reminiscent of Eric Shipton's photograph taken in 1951 on the Menlung Glacier, although the detail of the other toes is much clearer in the latter photograph than in mine.

As for the animal's general appearance, it is very much in line with the general consensus of a large animal capable of standing erect in an almost human posture, and with a powerful chest and long arms. What is particularly remarkable is the similarity with the creatures described by Slamouir Rawicz in his 1956 book *The Long Walk*. He mentioned specifically that the heads were squarish, and that, seen in profile, the back of the head was a straight line from the crown to the shoulders. This squareness was one of the features which I noticed immediately. Rawicz claimed to have observed the creatures for 2 hours in 1942, without once seeing them drop onto their hands, and he said that "their interest in the humans seemed to be of the slightest." This was also the impression that I gained, since the creature seemed more interested in looking down the avalanche than at me.

Rawicz noted that the animal's shoulders sloped sharply down to a powerful chest. Most of the body was covered with a tight, close fur, but this was mingled with long, loose, straight hairs hanging downwards which had a light greyish tinge as the light caught them. Similar lightish hairs might be the explanation of the lighter band around the crown of the animal I observed, although, with the sun behind the animal, it was difficult to distinguish small color variations. Rawicz's narrative has been criticized for technical inaccuracies in parts, but his description of the creatures is so similar in points of detail to my own experience that it is difficult for me to dismiss.

Many accounts of the Yeti refer to a pointed head with a pronounced sagittal crest when seen from the front. I am not able to comment on this, as I observed the head from the side. As for the color of the hair or fur, it looked dark brown, with no evidence of the red tinge mentioned in previous accounts. However, with the sun behind the animal, it was not easy to distinguish small color variations. The Yeti is also reported to emit a shrill whistling sound, particularly when frightened. I have no recollection of any sounds which struck me as unusual during my ascent, although I was approached by a very large bird of prey—probably a Himalayan griffon vulture—and might have attributed any strange sounds to this bird. Once I reached the avalanche, the animal certainly did not emit any audible sounds.

Why It Was Unlikely to be a Langur Monkey, a Bear, or a Human

A number of other possible candidates for what I observed have been suggested—an unusually large langur monkey, a bear, or a man. I will consider each in turn.

The common langur (*Presbytis entellus*) is not known to exceed 20 kg in weight, has a long tail, makes narrow footprints (about 50 mm wide), with the big toe at right angles to the others, and it is unlikely to stand erect for 45 minutes. None of these characteristics is consistent with those of the animal I encountered. It is true that langur monkeys live in the general area, and I saw several colonies, each of perhaps 40 monkeys, lower down the Bhiundar Valley. However, I am certain that such relatively small, arboreal animals could not be confused with the large animal I saw near the avalanche.

A bear is broadly of the right size and weight, but the profile of the head and shoulders I saw was not bear-like, and there is no evidence of a projecting muzzle in the photos. It is also extremely unlikely that a bear could, or would, stand erect for such a long time, and with its front limbs hanging down in a most unbear-like manner. Neither the single footprint (which had not suffered from melting), nor the pattern of tracks near the bush (Fig. 3), can be easily explained as bear tracks.

The figure near the avalanche had some human-like physical characteristics, but it is difficult to imagine a recluse or *saddhu* (hermit) having clothes

resembling fur, and with such a uniform close fit. The footprint in the wood is not human, nor is it consistent with a foot covered with bandages, and the tracks both in the wood and on the open slopes above go up steep, difficult terrain, and are more indicative of an agile animal than a human. Furthermore, it is difficult to imagine a human getting involved in an avalanche and then standing nearly motionless for about 45 minutes observing a fellow human.

Personally, I discount the idea of a langur monkey or bear, and consider the possibility of the figure being human to be a less plausible explanation than the proposition of an unknown hominoid or hominid—the Yeti.

Reasons for My Own Behavior

I have been asked repeatedly why I did not attempt to get closer to the animal, or try to attract its attention by shouting or throwing objects. My primary concern was the very real possibility of another avalanche. No one would have come looking for me had I suffered an accident, and I had got as close as I judged to be safe. I felt that the animal had good reasons for remaining stationary, whether to be less visible, to avoid triggering a second avalanche, or because it was injured. It must have been well aware of my presence, as a man with a bright red rucksack and blue hat on an open snowslope would be difficult to miss. Since my movements to take photographs over about 45 minutes had produced virtually no response, there is no certainty that shouting would have made the animal flee. Besides, I did not wish to frighten it into an over-hasty reaction, and there was alway the faint possibility that it might have moved in my direction!

Naturally, it would have been a tremendous advantage to have had a telephoto lens, or even a pair of binoculars. However, I had needed to keep weight to a minimum for my 200-mile run. Had I sacrificed some survival gear in favor of a single-lens reflex camera with interchangeable lenses, I might not have ventured so far towards Hemkund on my own. Furthermore, carrying additional weight would have slowed the schedule of my whole run, and I might not then have had the good fortune to cross paths with the Yeti at all. Fortunately, my Nikon AF35 produced sharp, well-exposed photographs that have withstood substantial enlargement.

My main regret is that I only took two photographs of the tracks in the wood during the ascent, when they were fresh and sharp. If only I had taken more interest in the Yeti before beginning my run, I might have immediately realized the significance of the tracks. A detailed study of the pattern of the tracks might then have shed considerable light on the animal's methods of movement over varied terrain.

As for following up my sighting immediately by getting local people engaged in a hunt, I still believe I made the right decision. First, I had no wish to do anything which might have endangered the animal's survival. In this

respect, I am not among those who support killing such creatures in order to prove their existence and to classify them. We have less destructive ways of studying wildlife nowadays. Secondly, there would probably have been little if any evidence the following day, with all the tracks melted and obscured with the fresh snow, and the Yeti (hopefully) safely away over the col into a remoter area.

Cryptozoology, 5, 1986, 77–80

LCPI WORK AT LAKE CHAMPLAIN, 1986

JOSEPH W. ZARZYNSKI
P.O. Box 2134, Wilton, New York 12866, U.S.A.

INTRODUCTION

With a maximum depth of 400 feet, the 109-mile-long Lake Champlain is a formidable laboratory for individuals and groups conducting field operations into the supposed Loch Ness-like animals known collectively as "Champ." After years of research and on-site exploring, the Champ phenomenon remains unresolved, but ongoing research and fieldwork has uncovered more data for cryptozoologists to study. This report serves as an update on our ongoing fieldwork (see Joseph Zarzynski, 1985, LCPI Work at Lake Champlain, 1985, *Cryptozoology,* Vol. 4: 69–73).

The 31 days that the Lake Champlain Phenomena Investigation (LCPI) conducted research and fieldwork during 1986 were directed at: (1) daylight surface surveillance by personnel using cameras and binoculars/telescope from boat and shore-based sites; (2) use of a night-scope for nocturnal surveillance; (3) underwater searches utilizing sonar deployed from boat and scuba monitoring/underwater photography; (4) further documentation, analysis, and publication of Champ sightings; (5) encouraging residents and visitors at Lake Champlain to carry cameras for possible photographic documentation; (6) lobbying to get the Vermont Senate to adopt the "Champ Resolution"; and (7) providing assistance to serious individuals and groups involved in Champ-related research.

NARRATIVE DESCRIPTION

The LCPI's 31 days of fieldwork at Lake Champlain were undertaken primarily by Mary Patram Meaney and Joseph W. Zarzynski. Assistance was also provided by Ted Straiton (June 1, 22, August 2–4, September 27–28), Scott Hill and Jim Kennard (July 19), Marian Zarzynski and Liz Meaney (August 25–27), Don Mayland (August 31), Ken Bartowski (September 27), and John Becker (September 27–28). Richard Smith also deserves recognition for his advice and suggestions in fieldwork techniques, and in uncovering some unreported Champ sightings.

The summer, 1986, field activity was marred by poor weather. The Champlain Valley experienced the third wettest summer in the past thirty years. Fieldwork consisted of: daytime surface surveillance from boat and shore using 35 mm cameras, a Super 8 mm camera, telephoto lenses, camera tripods, and binoculars/telescope; nocturnal surface surveillance using a handheld night-scope; boat-deployed sonar (Raytheon DE725C); scuba monitoring; and scuba diver underwater still and video photography.

Lake surface surveillance was conducted primarily from: Kimball Dock Pier, Vermont; Button Bay, Vermont; and Town House Bay, Vermont. Numerous surface surveillance sessions from boats were also carried out.

Five Champ fieldwork-related scuba dives were made as part of an underwater reconnaissance survey. Three of these scuba dives were made by Meaney and Zarzynski; one by Hill, Kennard, Meaney, and Zarzynski; and one by Mayland, Meaney, and Zarzynski.

The dates of the 31 days of 1986 LCPI fieldwork were: April 26; June 1, 22, 28–30; July 1–5, 19; August 2–16, 22, 31; September 27–28. Daytime surface surveillance from shore sites using cameras and binoculars/telescope was conducted during all 31 days; boat surface surveillance using cameras and binoculars/telescope during 18 days; nocturnal surface surveillance from shore using a night-sight scope during three nights; boat-deployed sonar usage during eight days; and five daytime scuba dives (one dive using an underwater still camera, and one dive using an underwater video camera).

Results

LCPI field sessions did not result in any visual sightings or any sonar contacts of an unidentified animal. Nevertheless, success was met in the Vermont Legislature. On April 29, 1986, the Vermont Senate finally adopted the "Champ Resolution" which had been sponsored by the Vermont Senate's Committee on Natural Resources and Energy. The resolution had already been adopted in the Vermont House of Representatives (1982), the New York Senate (1982), and the New York Assembly (1983). The Resolution recognizes "the possible existence of the animal commonly known as 'Champ,' " calls for its protection, encourages further scientific inquiry into the Champ phenomenon, and encourages citizens of Vermont and visitors to report Champ sightings.

The LCPI was able to acquire documentation on 11 Champ sightings reportedly made in 1986 (Fig. 1). A brief listing of these sightings appears below in chronological order:

- —April 11, 1986: Allen Matton and Greg Thacker; Plattsburgh Bay, New York; 6:00 p.m.; range 300–400 yards; near glass-smooth lake surface; animal's neck four feet out of water; width of neck 6–8 inches; animal dark in color; Matton said it "looked like a dinosaur you would see in a book or T.V."
- —May 27, 1986: Christine Hebert; mouth of Winooski River, north of Burlington, Vermont; 3:00 a.m.; barking dog awakened Hebert, who saw animal swimming by her boat ramp as it was illuminated by an outside house lamp; green in color, and muddy; reminded her of a "dinosaur"; observed again two other times that same night as Hebert was awakened by barking dog.

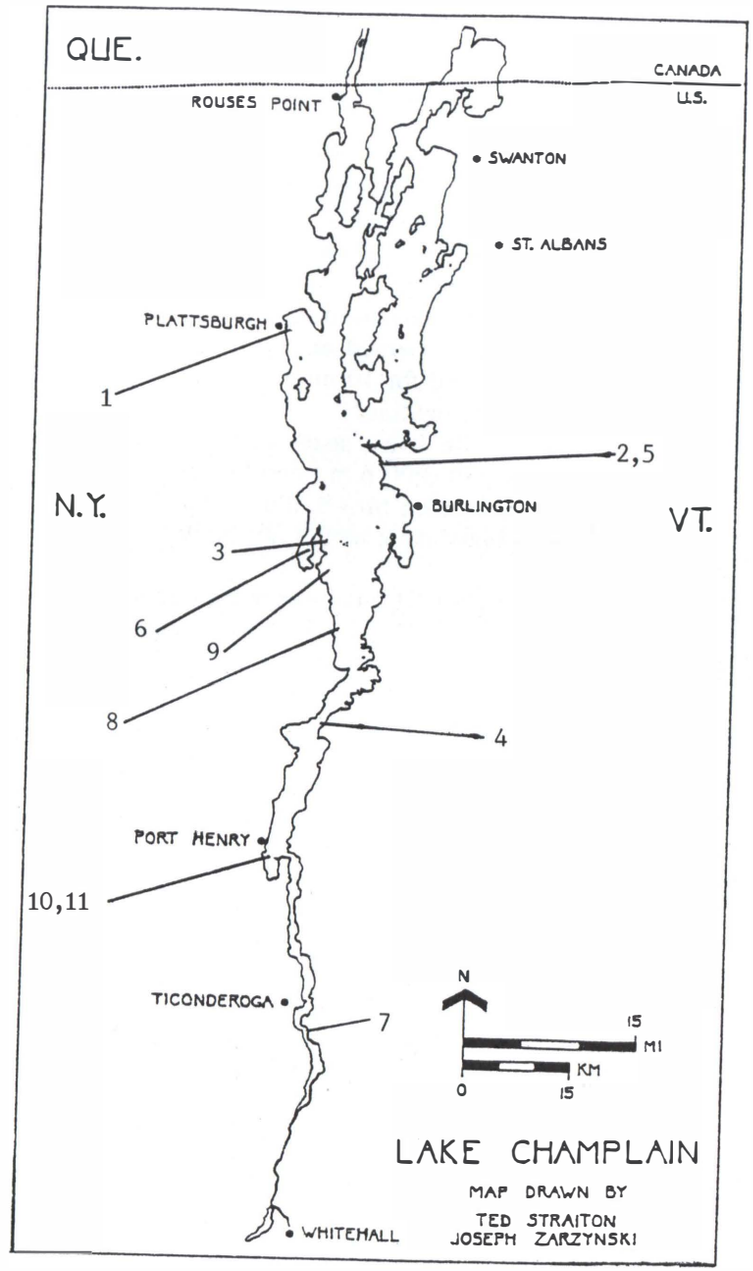

FIG. 1.—Map of Lake Champlain, with numbers indicating the locations of the 11 eyewitness sightings logged by LCPI during 1986.

—June 2, 1986: Scott Gifford and mother; east shore of Willsboro Point, New York, towards Four Brothers Islands; 8:34 p.m.; lake calm as glass; animal "looked about 30 feet long"; grey-brown in color.
—June 16, 1986: Mrs. William Kennedy, Mrs. Dorothy Hagood, and Mrs. Thomas Mathers; Basin Harbor, Vermont; 7:30 a.m.; lake "like a sea of glass"; animal 50 yards offshore; "it looked like a dark round object moving along at the front of the wake," wrote Mrs. Kennedy; "there was a slight hump part way back. There were no boats in the water, or was there any person swimming."
—July 1, 1986: Christine Hebert and mother; same location as above May 27, 1986, sighting; animal observed at night; barking dog awakened Hebert and mother; observed for 10 minutes; range 50 feet; same description as May 27, 1986, sighting.
—July 4, 1986: Lee Tucker, wife, wife's sister, and wife's father; Willsboro Bay, New York; about 2:30–3:00 p.m.; two humps observed offshore; notches on humps; animal dark brown, almost black in color; Tucker observed animal using binoculars; he did not think he observed one or several sturgeon.
—July 6, 1986: John Holt-Harris III, his mother, and father; Buoy 39 Marina, near Ticonderoga, New York; 10:30 a.m.; animal 20 feet long; grayish in color; back hump observed at a range of 50 yards.
—July 7, 1986: Al Trost; north of Essex, New York; 7:30 p.m.; Trost walking dog along lake; he reported seeing an unidentified swimming object at a range of 1,000 feet on quiet waters; animal moved at a speed of up to 10–15 m.p.h. in water; sighting lasted about 30 minutes.
—July 16, 1986: Mrs. Kimball Prince and Anne P. Marsh; near Point Elizabeth, Willsboro, New York; 6:15 p.m.; 15-foot-long, dark hump.
—July 27, 1986: Several people; Port Henry, New York; 7:30 p.m.; animal seen at Bulwagga Bay.
—August 3, 1986: Brenda Baker and several others; Port Henry Beach Dock, Port Henry, New York; 4:45 p.m.; ". . . a long, black, snake-like thing rose to the surface of the water," said Baker; animal appeared near a water-skier floating on the water awaiting the tow boat to return; approximately 25–30 feet long, and about 1½ feet high.

Future Plans

The LCPI will continue its research and field operations at Lake Champlain using a similar strategy to that conducted over the past several years. However, increased emphasis will be placed on subsurface search efforts in the hopes of discovering a Champ carcass, which would constitute irrefutable proof of Champ's existence.

Cryptozoology, 5, 1986, 81–84

RESULTS OF THE NEW WORLD EXPLORERS SOCIETY HIMALAYAN YETI EXPEDITION

Marc E. Miller
Department of Neuropsychology, Good Samaritan Medical Center, Zanesville, Ohio 43701, U.S.A.

William Cacciolfi
New World Explorers Society, 108 Dayton St., Yellow Springs, Ohio 45387, U.S.A.

Introduction

In February and March, 1986, the New World Explorers Society (NWES) conducted 14 days of on-site fieldwork in the Khumbu region of the Himalayas. The purpose of the expedition was twofold: first, to investigate the possible existence of the unknown animal known to the Sherpas as *yeti*, and, second, to follow up on the investigations conducted by explorer Sir Edmund Hillary and zoologist Marlin Perkins in 1960 in the village of Khumjung.

Because our time was limited, we decided to focus our energies on three strategic locations of Yeti artifacts. These included the Buddhist monasteries in Khumjung, Thyangboche, and Pangboche. A retracing of the 1960 Hillary expedition was attempted, and an extensive interview was conducted with Khumjung village elder Khonjo Khumbi, who had accompanied Sir Edmund and Perkins back to the United States with a supposed Yeti scalp from the Buddhist monastery.

Narrative Description

The NWES fieldwork was directed primarily by the authors. Assistance during the fieldwork was provided by Leon Childers, Ed Oxley, and Zane Mustaine.

The emphasis on the fieldwork was primarily to obtain information regarding the Yeti from a wide variety of Sherpas, particularly those who had been associated with the 1960 expedition. The initial flight was taken from Katmandu to Lukla. The expedition was met by Khonjo Khumbi's youngest son, Tukten Khumbi. Fifteen Sherpa porters helped in reaching the village of Khumjung. A previous break of the Khumbu glacier had washed out much of the old trail. The new trail consisted of very rough terrain, and was often only 8 to 12 inches in width, with icy and muddy ground; the climb became strenuous.

The expedition arrived in Khumjung, and an interview and overnight stays with Khonjo Khumbi were arranged. Many village Sherpas who claimed some knowledge of the Yeti came to his home, and much discussion took place regarding the Hillary and Perkins presence over 25 years ago. During

the course of interviewing the villagers, we discovered that an elderly Sherpani woman of the village possessed possible Yeti chest hairs. We were told that her son was carrying potatoes along a trail in 1978, and was allegedly attacked by a Yeti. The Yeti was described as a large male, nearly 7 feet tall, and covered with dark and reddish hair. During the course of the attack, the young man took his potato hoe and struck the Yeti across the chest. The Yeti fled into the higher mountain region. The young man struggled back to Khumjung village to his mother, and described his encounter with the Yeti. His wounds were serious, and he later died. This information has been kept confidential for many years by the local Sherpas. Only through much negotiation by Elder Khumbi were we able to obtain a number of hair specimens. These hairs are long, black, and coarse.

Khonjo discussed information on Yeti sightings. He had previously been a trader in Tibet. During trading expeditions, he had observed what he believed were Yeti "furs" in their entirety. He attempted to buy or trade for such a Yeti hide, but was unable to obtain one. The expedition members also examined, at a local Buddhist monastery, the alleged Yeti scalp that was brought to the United States in 1961 by Sir Edmund and Perkins, along with Khonjo. This scalp had been scientifically examined, with the conclusion that it had probably come from a goat hide. However, the villagers stated that the Yeti scalp had been in the monastery for over 100 years, and they still strongly believe that the scalp came from a Yeti.

The expedition team continued to the Thyangboche monastery, in which an audience was given by the High Lama Buddhist. He related seeing numerous Yeti hides—when he was a young man in training in Tibet—in various homes of great hunters. He related stories of the Yeti, including one involving a Yeti coming to a monastery and pounding on the roof and doors. He stated that, when student Lamas go into the mountains to conduct prayer, the Yetis make a shrill sound above the prayers of the student Lamas. This reportedly creates frustration among the young men, and they return to the monastery.

Further information was gathered from local Sherpas regarding attacks on yaks and goats. In one instance, a Sherpa mountain guide allegedly found footprints of a Yeti, and these led to rabbit carcasses in the snow.

The expedition visited the high monastery in Pangboche, at approximately 14,000 feet. The hand and scalp of a supposed Yeti are kept in this monastery. Special permission from the High Lama was obtained for a brief examination of the hand and scalp. Measurements could not be taken, as the Lamas were very reluctant to allow the team to hold the specimens, or to spend much time in the examination. When questioned, they feared we would harm the artifacts. The hand appeared to be very long in regard to finger structure. The scalp was very similar to the one at the Khumjung monastery. While

at this monastery, a local Sherpa came to expedition members indicating that footprints of a Yeti had been observed just the previous day in the base camp region. However, due to difficulties related to the altitude and the lack of supplies, it was decided to end the expedition at this point and return.

The vegetation in the Himalayan alpine areas is restricted to shrubs, rhododendrons, lichens, mosses, dwarf grasses, and cushion plants. Animals include the Himalayan mouse hare, the snow pigeon, and occasionally a pheasant or crow. We observed musk deer at lower elevations. Barren rock and snow was the most common sight in the high areas above 12,000–13,000 feet.

It should be noted that, the more remote and higher the region, the more the Sherpas are convinced of the existence of the Yeti. Someone in nearly every family has reportedly had an encounter with one. They believe there is more than one Yeti, as, on rare occasions, a family of Yeti has been reported.

Results

Although the information gathered from the Sherpas and the Lamas was certainly very interesting and intriguing, it was limited regarding actual sightings of the Yeti. The Yeti is intertwined with the Buddhist religion and culture of the remote Himalayan people. It was very difficult to separate myth from actual sightings and related information.

The hair samples have been submitted to the International Society of Cryptozoology for microscopic analysis.

Future Plans

NWES hopes to conduct further follow-up expeditions to gather additional information, including historical information from local Sherpas and Lamas. As far as we can determine, there do appear to be differences between descriptions of the Yeti and the North American Sasquatch. Yeti descriptions involve a smaller animal, typically not reaching 7 feet in height. Future anatomical comparisons by experts would certainly be helpful and interesting.

(The authors requested publication of the following Addendum, containing additional information, to which the Editor agreed.)

ADDENDUM

Descriptive Information on the Himalayan Yeti, Based on Information Obtained From Local Peoples

(by Marc E. Miller)

Physical Characteristics

Standing height, 5.5–7 feet (165–210 cm); weight, 200–400 lb. (90–180 kg)—size and weight dependent on age and sex; head, covered with hair, except on face and ears; sagittal crest, present; neck, short and thick, and hair-covered; face, hominoid features, dark skin, thin hair growth, wide mouth; trunk, large and muscular, broad chest and shoulders, thick hair growth, no tail; arms, long, reaching knees; fingers, long and extended (the phalanges or bones of the fingers appear to be 14 in number, with three for each finger and two for the thumb, as in humans; three knuckle joints appear to be above the carpus, as in humans); feet, no arch, with four smaller toes and enlargement of the big toe; hair, coarse, long, straight, dense; color, ranging from shades of brown, red, to black on various areas of the body.

Behavioral Characteristics

Calls, variety of shrill noises to howl (occasional reports of growling when threatened); culture, no fire, clothing, weapons, artifacts, art, or agriculture (rocks for defense or offense occasionally reported); habitation, use of caves; diet, omnivorous—roots, berries, bark, rodents, rabbits, birds, wild goat, sheep, deer (occasional attacks on domestic livestock reported); social structure, characterized by family, male-dominant units, with wandering individual males sighted more often; disposition, shy, reclusive, avoiding human contact.

Environmental Characteristics

Habitat, mountain areas, 10,000–20,000 feet in the Himalayan range; interactions, little or no contact with the largest carnivores of the region (Himalayan black bear and snow leopard); enemies, none known except man.

Sources

The above descriptive information was derived from a wide variety of sources, including discussions with Sherpas concerning their insights into the various features of the Yeti. Much of the above is based on assumptions made by the mountain people, as handed down through several generations. The more remote mountain people strongly believe in the Yeti's existence, as embodied in their history and culture, and in modern sightings.

Cryptozoology, 5, 1986, 85–88

INVESTIGATIONS AND SYSTEMS TESTS IN THE LAKE CHAMPLAIN BASIN, 1986

Richard D. Smith
P.O. Box 106, Rocky Hill, New Jersey 08553, U.S.A.

Introduction

In July, 1986, Wind & Whalebone Media Productions continued its field investigation into the supposed large, unknown animals in Lake Champlain, said to be "Loch Ness-like animals," and popularly referred to as "Champ." This year's research was a continuation of previous seasons' fieldwork (see Richard D. Smith, 1985, Investigations in the Lake Champlain Basin, 1985, *Cryptozoology*, Vol. 4: 74–79). The research methodology continued to be guided by considerations of the reported animals' three-dimensional, "drowned valley" habitat, and their possible position in the food chains or webs of the lake's ecosystem.

The intent of the 1986 work was: (1) to test a new underwater video system and a new chart-recording sonar device, both deployed from a boat; (2) to obtain records of bottom contours and aquatic life; (3) to test the effect of "chumming" (fish feeding) on attracting aquatic life within recording distance; (4) to cross-reference sonar and video work with bathymetric and standard navigational charts via boat position sightings; (5) to gather any data of use to professional scientists; and (6) to relay any information on previously unrecorded sightings of Champ to the Lake Champlain Phenomena Investigation (LCPI).

Our 1986 fieldwork consisted of 21 days on-site, July 6 through July 26. Ten days were spent in data-gathering operations, with the remaining period spent on equipment preparation, data analysis, and miscellaneous down time, including several work sessions canceled by bad weather and last minute changes in boat scheduling.

Exercises were coordinated by the author. Assisting him in operations were Gary S. Mangiacopra, Phil Keller, Kip Cooper, Phil Houston, and Wendy Lathrop. David Olsen, Ike Blonder, Tom Walko, Gil Fell, and Bill James provided assistance during preparations for this season's work.

Ike and Lois Blonder visited our base July 19 through July 21. Although unable to participate in field operations, due to bad weather and scheduling conflicts, Ike Blonder reviewed our sonar and video work to date. A physicist and electrical engineer, and veteran of the Academy of Applied Science's Loch Ness research, Blonder's comments were most helpful. LCPI director Joseph Zarzynski visited our base on July 25. As leader of research into "Champ," his interest and suggestions were particularly welcome. Ac-

knowledgment is made of the support of Robert Durant and Margaret Light of this season's work.

Narrative Description

The underwater video system, designed and built by David Olsen, used a GBC black and white camera in a watertight casing. The primary sonar unit was a Vexilar K-1200 chart recorder. The Raytheon/Apelco MR-201C chart recorder used in 1985 was used in separate operations for comparison with the Vexilar machine.

Primary equipment tests were conducted in deep water near Essex, New York. Additional runs using sonar only were conducted north to Willsboro Point and Four Brothers Island, south to Westport, and in Whallon Bay. An additional camera-only test was made in the Essex anchorage area.

The camera was deployed at varying depths where sonar tracings indicated the presence of large fish, and also the maximum available cable outlay (95 feet) to test the system's performance under increasing water pressure and greatly decreasing light. All camera trials were recorded aboard boat on a portable video recorder, and observed on a monitor screen. A sensor built into the camera casing provided water temperature readings at the surface.

As in previous seasons, shore watching for Champ was not emphasized, but still and motion picture cameras were carried by expedition members when on or near the lake in the event of a surface sighting. With the exception of one late-afternoon through early-evening session of camera tests in the Essex anchorage, scheduled dawn, dusk, and evening work was not possible due to unseasonably stormy weather and the last-minute unavailability of promised boats.

The names and addresses of eight persons with eyewitness accounts of what was thought to be Champ, previously unrecorded by LCPI, were relayed to Joseph Zarzynski for follow-up. Five involved sightings claimed for the 1986 season, three for previous years. The author interviewed at length Al Trost, owner of Trost's Bait & Tackle Shop, in Essex, and a driving education instructor for the township high school. Private inquiries revealed Trost to be a well-respected member of the community.

Trost reported seeing an elongated, pole-like object which was off-shore north of Essex, and moving north, on July 7, sometime between 6 and 7 p.m. At that time, the author was approximately one mile south of Trost's position, testing equipment in the Essex anchorage. No object was observed by the author, or reported by the several fisherman lining the shore. If this was indeed a real Champ event, the animal must have surfaced north of the Essex-to-Charlotte, Vermont, ferry run, and then come into Trost's field of view.

Although not classifying the object as a Champ animal, Trost said he had

observed it for a long time, perhaps as long as a half hour, and that it changed direction and speed twice while moving away from a motor boat (whose operator did not slow down, and probably did not see it). Trost said he could make out water breaking over what appeared to be the back of the object, but saw no hump as such. It finally became lost to view up the coast. Unfortunately, by the time the author was able to meet with Trost, weather conditions and boat availability did not allow a comparative sonar and positioning run over the object's course, as was carried out with the McGeoch/Temple sighting last year (see Smith, 1985, above).

The author conferred on July 24 with George LaBar, of the Wildlife and Fisheries Biology Program, University of Vermont, Burlington. Although LaBar expressed strong reservations about the existence of Champ animals, he examined some of the expedition's sonar records, and gave his opinions as to what forms of aquatic life may have been recorded during field operations.

Results

No video, photographic, or sonar recordings of any objects thought to be of Champ were made this season, nor were there any unexplained visual observations made by expedition members.

The new equipment functioned well. Numerous sonar recordings were made of lake basin contours, and of fish in deep water. The author's opinion, supported by George LaBar's examination of our sonar charts, is that lake trout (*Salvelinus*) and cisco or lake whitefish (*Coregonus*) were consistently recorded in the central basin swimming at depths of 72 to 108 feet (12 to 18 fathoms). LaBar also suggested that cloud-like clusters consistently recorded at approximately 120 feet depths near shore contours, and within 6 feet below the surface, were, respectively, aggregations of adult and juvenile smelt (*Osmerus*).

A bottom target was recorded which might represent a boat wreck. Information on the target is being sent to Champlain maritime history experts, at Joseph Zarzynski's suggestion, in the event it was indeed a wreck, and of historical interest.

Underwater video footage was obtained in the Essex anchorage of small fish—yellow perch (*Perca*), and some unidentified minnow-like fish. Only one indistinct video record of a fish was obtained in deep water, despite sonar indications that the camera had been lowered in the vicinity of a number of large fish. There are several likely reasons for this. Although two small lights on the camera functioned throughout field operations, a larger and more powerful light collapsed from water pressures at about 75 feet, severely restricting the camera's ability to "see" at such depths. Lake trout and other large fish found in deep freshwater lakes do not form true schools,

but typically form loose aggregations near food sources and in agreeable temperatures. Thus, the probability that individuals would pass within recording range of the camera (limited to a few feet with reduced lighting) was small compared to the probability of their passing through the sonar beam (the Vexilar unit recorded a continuous vertical range from surface to bottom anywhere in the lake). Finally, no deep water operations were carried out during dawn and dusk, periods of peak fish activity; it was understandably difficult to find boat owners willing to take us out on the lake for long periods at "odd" hours, and full-price boat charters were prohibitively expensive.

Sonar records indicated that we were successful in attracting fish by "chumming." Assuming that the large, unknown animals reported in deep freshwater lakes are at or near the top of the lakes' food chains, and therefore piscivorous, to consistently attract fish within recording range could greatly increase the chances of also recording these presumed fish predators. This strategy could provide a benign and relatively efficient method for identifying and studying such animals. However, we must improve our capabilities for deep water video recording, and significantly increase time spent on the lake before our approach can prove reliable.

Future Plans

The author and his associates will return to Lake Champlain in 1987. Research will proceed along the lines discussed above. Purchase of our own research vessel is planned, and it is hoped that operators of increasingly sophisticated sonar equipment will join our field work. Liaison will be maintained with LCPI and with professional scientists.

Book Reviews

Cryptozoology, 5, 1986, 89–108

Savage Shadow. The Search for the Australian Cougar. By David O'Reilly. Creative Research (P.O. Box 137), North Perth, Australia, 1981. 261 pp. $A6.00 (p.)

Australia, like many another countries, abounds in "wild dog" and "tiger" legends. With few exceptions, they can all be traced back to feral cats, dogs, dingos, or foxes, particularly if outsized or suffering from mange or an abnormal coat pattern, or seen under conditions of imperfect lighting. So, when I came across this book, I expected more of the same. I was wrong.

David O'Reilly was, at the time of the events related, the head of the Western Australian branch of the country's national newspaper, *The Australian.* It was in this capacity that he became involved in the investigation of a mysterious animal dubbed the "Cordering cougar," whose activities centered around the township of that name 110 miles southwest of Perth (approximately 33°30′S,116°40′E).

O'Reilly writes with the finesse of a professional storyteller, and the reader is provided with a detailed chronological account of his—and the farmers'—tracking of the mysterious "cougars." First there were the nighttime hunts with spotlights, then with an imported U.S. Army "star-scope," through which the author claims to have caught a fleeting glimpse of the quarry, and finally a hunt with a dog specially trained to respond to the scent of zoo cougars. No effort is spared to recreate the atmosphere of these exhausting and frustrating operations. There are also lengthy excerpts from local newspapers and discussions in Parliament. The long and complex story is told—unfortunately, from one side only—of the farmers' fight with officialdom. At one stage, relations became so bad that the farmers shunned the government veterinarian and hired a private one to perform autopsies on their dead livestock.

A regrettable by-product of the book being written for the popular market is that the hard data are presented in chronological order, and thus submerged in a broad sea of narrative. A scientist would have preferred a more succinct, systematic arrangement. The evidence, however, can be summarized as follows:

(1) A great many sightings, some under excellent viewing conditions, of

an unknown animal approximately 2½ feet in height. Witnesses most often reported a long, tubular tail, and a fluid, cat-like movement. Those who happened to see its face described it as shortened and feline. The creatures appeared to possess two distinct color phases: brown or tawny, and black. The latter is a puzzle since, according to the literature researched by O'Reilly, melanistic American cougars (*Felis concolor*) are very rare. A special questionnaire resulted in reports being registered from a triangle roughly 110 × 110 × 140 miles, with Cordering near its northern apex—most of the southwest, in fact.

(2) Multiple examples of claw marks, 5 cm long and 1 cm apart, found on both carcasses and special marking trees.

(3) Hairs found in scats and identified as feline.

(4) Hundreds, if not thousands, of livestock and wildlife killed by bites to the neck and the puncturing of the spinal column, with the viscera removed and often with grass and rubbish raked over the carcasses. Such kills never showed the mess normally associated with canine or pig predation. A migrant from the U.S., who had had experience at cougar hunting, unhesitantly identified them as cougar kills. A similar opinion was voiced by the private vet who had performed the autopsies, but not by the government vet.

(5) A photograph of a cougar-like animal produced by a Barry Morris. The author was present when it was "blown up." The most intriguing aspect of the photo was that it was allegedly taken near Carnarvon, 600 miles north of Cordering.

The interpretation of this evidence should be obvious to every reader of this journal. It points to some sort of big cat, rather than the usual canid, suid, or marsupial predator. The last needs to be emphasized, as this is the same area where Kevin Cameron claims to have sighted a thylacine, and backed it up with some suspect photographs (see *New Scientist,* April 24, 1986). On the debit side, none of the footprints or fecal samples were unequivocally identified as from an alien animal.

How does Mr. O'Reilly explain the presence of an American cougar (puma) population in southwest Australia? Bush rumors suggested a circus accident in the early 1960's, which permitted a breeding pair to escape. Government quarantine records, however, proved conclusively that no such accident took place between 1958 and 1974. On the other hand, the author heard of reliable sightings going back to 1949; and so the mystery continues.

Because this is a popular work, it lacks some sets of data cryptozoologists would have preferred, e.g., drawings of at least the best footprints, the full results of the questionnaire, the full autopsy reports, and the reports of the government workers who rejected the cougar hypothesis. It is still, however, worth reading.

Savage Shadow was published by a very small company, and had only a very restricted distribution. My own copy came from a clearance sale of unwanted books. The likelihood of finding it in any overseas library or bookshop would be extremely remote. I am informed that a few copies may still be available from the publisher, or from the author (42 Mort St., Braddon, ACT 2601, Australia). The price is $A6.00, with an added 95¢ for surface mail. However, as the book is virtually out of print, prospective buyers should inquire about availability before advancing any money.

MALCOLM SMITH
7, 23rd Avenue
Brighton, Brisbane, Queensland 4017, Australia

Search for the Tasmanian Tiger. By Quentin Beresford and Garry Bailey. Blubber Head Press (P.O. Box 475), Sandy Bay, Tasmania, Australia, 1981. 54 pp. n/p. (p.).

On September 7, 1936, a strange, wolf-like animal with stripes died in a zoo in Hobart, Tasmania, an island province of Australia. The animal was a thylacine (*Thylacinus cynocephalus*), a carnivorous marsupial better known as the Tasmanian tiger, and it was the last one ever seen by human eyes with any certainty. Despite 50 years of subsequent sighting reports, footprint finds, and countless expeditions, no scientific verification of the animal's existence beyond that date has ever been produced.

Frank Darby, the keeper who had attended the thylacine in its last years, recalled in 1968 that, "although the tiger was tame and could be patted, it was frequently morose and showed no affection." The zoo itself "did not long survive the animal; it was closed in November, 1937, as no longer economic [sic], and its collection was dispersed." These fascinating historical anecdotes, and many others, are presented in this booklet by Australians Beresford, a historian, and Bailey, a journalist.

The authors provide a surprising amount of information in 54 pages, including a selected bibliography, an index, and many photographs of thylacines from early in the century.

Chapter 1, "A Creature of Legend," provides a concise overview of the history of thylacine events. The animal had developed a reputation—unfairly, it now seems—as a fierce sheep killer. "Farmers continued to see the creature as a menace," the authors state, "long after it was capable of reproducing itself in any numbers." Ironically, full legal protection for the species was not established until the same year as its supposed demise, and it was not until 1965 that the British government prohibited its importation, and not until 1973 that the Australian government prohibited its exportation.

Sighting reports on the mainland—where the species has been thought extinct for thousands of years—are discussed briefly in Chapter 2, "From Discovery to Extinction." Although the authors concede that "such evidence is hard to ignore," they quickly prefer "putting to one side matters which seem more fanciful than factual and returning to firmer ground." That is, to the thylacine's possible survival in Tasmania. The rest of this chapter recounts the story of early contacts between man and thylacine.

In 1821, we learn, there were 200,000 sheep in Van Dieman's Land (Tasmania). By 1838, the number of sheep surpassed the one million mark, meaning almost certain doom for the hated tiger. Although it is now thought that feral dogs created more problems for stock owners than did thylacines, and despite the opposition of fair-minded legislators, an 1886 parliamentary debate resulted in a 21-year campaign to eradicate the animal by offering bounties. The vote was 12 in favor and 11 against. The one-vote majority resulted in 2,184 thylacines being killed for bounty. The last bounty, when the animal had become rare, was paid in 1909.

Beresford and Bailey conclude that, "if Tasmanians were aware that this singular animal was on the point of extinction, they showed little enthusiasm for its preservation." Furthermore, "those concerned with the management of the zoo seemed to be unaware that their charge was perhaps unique, and neither they nor the public appeared to take a great deal of interest in the surviving animal." Finally, "with the death of the survivor in the Hobart Zoo in 1936," Beresford and Bailey state, "the era of certainty ended and that of speculation and rumor began."

Chapter 3, "The Search Begins," reviews the history of the first expeditions to find living thylacines (in 1937, 1938, and 1945). Chapter 4, "The Evidence Mounts," discusses the postwar era, and the early involvement of Tasmanian zoologist Eric Guiler, now considered the leading authority on the species—whether it survives or not. The fifth and last chapter, "The Mystery Unsolved," primarily covers the efforts of James Malley and Jeremy Griffith, two persistent investigators who worked intensively but unsuccessfully to prove the thylacine's continued survival in the early 1970's.

Unfortunately, the authors do not discuss Guiler's own extensive efforts in much detail, and events since 1980—including another major field expedition, and a reported sighting by a park ranger—are, of course, not included (see *The ISC Newsletter,* Volume IV, No. 4, Winter, 1985). But this is compensated by nine remarkable photos of captive thylacines (out of a total of 40 photos, drawings, and paintings), including three juveniles, taken by Mary Grant Roberts early in the century at her Beaumaris menagerie, which, upon her death in 1921, was donated to the Hobart City Council and became the Hobart Zoo.

The thylacine problem represents one of the most remarkable series of events in modern cryptozoology, and this modest volume provides a good background for those wishing to learn more about the subject. The authors maintain a well-balanced and objective approach, without taking sides in the controversy. Fortunately, the publication is still available from Blubber Head Press.

J. Richard Greenwell
P.O. Box 43070
Tucson, Arizona 85733, U.S.A.

Seeungeheuer: Fabeln und Fakten [Sea Monsters: Fables and Facts]. By P. Werner Lange. Edition Leipzig, Leipzig (distributed in West Germany by Verlag Werner Dausien, Hanau), 1979. 259 pp. DDR14.80M (DM19.80) (c.).

Fabelwesen des Meeres [Fabulous Creatures of the Sea]. By Sonnfried Streicher. Hinstorff Verlag, Rostock, 1984. 80 pp. DDR12.00M (c.).

Cryptozoology has not had an easy stand in German publishing. Although more book titles appear annually in German than in any language save English, the number of books of cryptozoological interest published in German-speaking countries could be counted on the fingers of two hands—one hand for translations. Two recent East German publications on unknown, large, marine animals are therefore welcome, if modest contributions to the local literature. I say "modest" as neither book makes a pretense to include original research. Both authors, one with cryptozoology more in mind, the other looking more at mythology, merely hope to introduce the lay reader to the zoological mysteries of the sea. They did their fishing in other people's books, but they do reveal their fishing grounds.

Popular science publishers in East Germany have gained a reputation, at least in West Germany, for producing handsome and readable books. *Seeungeheuer* and *Fabelwesen* are no exceptions. No one illiterate in German would probably bother to check them out, and Germans who can read French or English would certainly do better by reading the monographs of Oudemans, and, especially of course, Heuvelmans. However, those German-readers who are interested in sea serpents and giant squids, but who do *not* want to wade through a large monograph, will find the books of Streicher and, particularly, Lange useful reviews of the status of the "species." Nicely illustrated and tastefully designed ones, too.

The author of *Seeungeheuer,* Werner Lange, *has* read his Heuvelmans, and duly acknowledged his debt to the master's *In the Wake of the Sea Serpents* in his foreword. The dust jacket introduces Lange as having had 15 years on the high seas behind him. He apparently never had the fortune

to see a sea serpent himself, but, as the author freely admits, he "still believes in the 'sea serpent,' whether a giant eel, a descendant of the zeuglodon or whatever it may be."

Does that mean that Lange, unlike Heuvelmans, feels that the sea serpents are all of one species? He would obviously rather not commit himself, but does not ignore the fate, and failure, of A. C. Oudemans' monumental monograph, *The Great Sea-Serpent,* of 1892. Oudemans *did* commit himself, and, as Lange puts it, his giant pinniped, *Megophias,* had to tally to so many contradictory observations that it itself became a fabulous creature.

Seeungeheuer is divided into three sections. Leaving the wake of the sea serpent, Lange narrates the discovery of the giant squid, dwelling on how large specimens really can become. "In all probability, calamaries do not measure more than thirty meters," is his conclusion. Playing safe.

Lange's third *Seeungeheuer* is the shark. The author does not say so, but apparently *Jaws* was thrashing its way through the East German cinemas while he was contemplating what to put into his book. He does the shark justice, and at the end of the section we know that that order of fish did not belong in a book on "monsters" in the first place. But it did give the book's artist, Lutz Müller, an opportunity to draw illustrations of animals he had at least seen.

The drawings and plates are the appeal of Sonnfried Streicher's book, *Fabelwesen des Meeres.* Cryptozoologists will find illustrations from the 16th century through the 20th century of giant squid and of the great sea serpent. Zoologists in general can amuse themselves over how our ancestors pictured whales and walruses. Fabulous sea creatures with human features and others with the features of ungulates give an idea of Medieval and Renaissance imagination, while examples of hoaxes illustrate universal gullibility.

Fabelwesen is one in a series of aesthetically designed, short books called "maritime miniaturen." Streicher's text puts the "fabulous creatures" into their environment of faith, superstition, and ignorance. Exactly there is where he would put the great sea serpent. Without quoting Lange, or anyone else, Streicher also gives the giant squid thirty meters, but no more. No matter. *Fabelwesen* is a fine, inexpensive gift for any cryptozoologist whose birthday is coming up. That is all; but then, that is pretty much all it was made out to be.

Unfortunately, neither book has an index, a big flaw especially of *Seeungeheuer,* which could well have done with one. Neither book is a *must* in any cryptozoologist's library. The lay reader, however, knowing what he has got, should not be disappointed. Unfortunately for those who only read German, there is no alternative on the market anyway.

HERMAN REICHENBACH
Paul-Sorge-Strasse 74
2000 Hamburg 61, Federal German Republic

Champ: Beyond the Legend. By Joseph W. Zarzynski. Bannister Publications, Port Henry, New York, 1984. 224 pp. $16.95 (c.), $8.95 (p.).

In recent years, newspapers and magazines have brought national, even international attention to the possible presence in Lake Champlain of an unidentified species of large animal. The efforts of Joseph Zarzynski ("Zarr") over the last decade have made it respectable to report sightings: he established the Lake Champlain Phenomena Investigation, which has carried out fieldwork and publishes a newsletter; he has interested legislators in calling for legal protection for the supposed species; and now he has written a book that makes it possible for all interested people to acquire an informed opinion about the state of the evidence for the existence of "Champ." Zarzynski has thereby put in his debt not only cryptozoologists, but also all who have an interest in anomalous claims in general.

The book surveys what has been said and done about Champ, makes frequent reference to Loch Ness, and puts the matter into the general context of cryptozoology. The most substantial body of data is in Appendix 4: 224 reported sightings are listed, together with salient details of the sightings and citation of the sources. The book's bibliography of four pages makes no claim to be exhaustive, but the serious student will glean additional references from the body of the text and from the list of sightings. Profuse illustrations add much interest to the book.

Claims of anomalies tend to be of interest to four groups of people: 1) those who are readily inclined or predisposed to believe out-of-the-way or unorthodox things; 2) those who readily dismiss anything that has not been firmly established; 3) those—much fewer in number—who believe that some wheat is to be found among all the chaff of fringe and populist and pseudoscience; and 4) those who are interested in the phenomenon of unorthodox beliefs. Zarzynski writes unashamedly as a believer, and that is likely to limit his appreciative audience to the *aficionados* and the initially uncommitted; skeptics will not find here a closely argued case, with careful weighing of evidence, and of alternative explanations and cautious suggestion of the possible existence of Champs.

An impressive aspect of the reported sightings is the contemporaneous documentation of a dozen-and-a-half instances from the 19th century (one in 1819 and the others from 1873 on). That makes a stronger historical case than has so far been constructed for Loch Ness itself, where no indubitable report was committed to writing before 1930. On the other hand, the case for Nessie has been immeasurably strengthened by film, still photographs, and sonar echoes; little such support is available for Champ.

Zarzynski mentions the existence of several photographs purportedly of Champ (pp. 24, 47, 61, 129; sightings nos. 147, 164, 167, 169, 182, 198, 216), but only one (the Mansi picture) is reproduced, and there is no de-

scription or discussion of the others—not even the ones that Zarzynski himself has seen (p. 61). The Mansi photo of 1977 is called "the classic Champ photo," and is dealt with in detail; Appendices 2 and 3 are analyses of that photograph by B. Roy Frieden, of the Optical Sciences Center at the University of Arizona, and by Paul H. LeBlond, of the Department of Oceanography at the University of British Columbia. According to Zarzynski (p. 65), and Richard Greenwell (p. 132), the object in the Mansi photograph bears comparison with that in the Surgeon's (Wilson) photo from Loch Ness; to this reviewer, no similarity is evident. In particular, the width of the Mansi "neck" is about ⅛ of the length of the whole visible object; if the latter is indeed (p. 143) between 4.8 and 17.2 meters, then the diameter of the neck is between 56 and 150 centimeters (22 and 78 inches). Even the lower bound is almost twice the largest reported estimate for Nessie, and hardly consistent with the common qualitative description of a long and thin neck.

Comparisons with Loch Ness are made also in other parts of the book with as little specific justification. Thus, the listed sightings include a goodly number that call Champ "snake-like," which is not said of Nessie; smooth skin is reported, whereas Nessie's is said to be rough or warty; eyes are featured several times, and fins and manes, which are almost totally lacking in reports from Loch Ness. So, the comparisons between Nessie and Champ are hardly compelling; and they are made, I suspect, for general rather than for specific reasons: the evidence for Nessie is so strong that it is tempting to try to validate other "lake monsters" by associating them with the Loch Ness phenomenon.

Also, because the data about Champ are so sparse, perhaps there is the temptation to augment it by extrapolating from Nessie. Just how sparse the information is may be seen from Chapter 7, "What is Champ?"—for this is actually a discussion of what "lake monsters" in general might be, rather than an assessment specifically of Champ's characteristics. Attempted validation by reference to Nessie is evident also in the comparison of the Champ Seminar, held in Vermont in 1981 (p. 125), with the presentation on Loch Ness in the British Houses of Parliament in 1975; and, indeed, the title of the book is reminiscent of Constance Whyte's enormously influential *More Than a Legend* (1957).

For this reviewer, the existence of Champ very much remains to be established; but my gratitude to Zarzynski is immediate and great, for enabling me to find out what has been going on at Lake Champlain. The book is easy to read, and I recommend it heartily to all but the most hardened skeptics and determined debunkers.

HENRY H. BAUER
Department of Chemistry
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061, U.S.A.

The Great Sea-Serpent Controversy: A Cultural Study. By Paul Lester. Protean Publications (34 Summerfield Crescent), Edgbaston, Birmingham, England, 1984. 24 pp. 60p. ($1) (p.).

The separate academic worlds of the biological and the social sciences do occasionally bump into each other—one thinks of recent progress in the study of animal behavior, for instance—and a curious intersection arises when the social scientist examines, not the physical content of cryptozoology, but the far less tangible beliefs of past and present cryptozoologists. Is it necessary for some of us, as humans, to believe in so far unclassified genera and species, and, if so, why? The answers must, by their nature, be posited in the realms of folklore or phychology. Paul Lester explores, briefly, the (unified) Great Sea-Serpent as "part of a larger modern myth of unknown phenomena of sea, sky and earth."

Now, this is a quite legitimate line of enquiry. If one extends the context of studies of unknown aquatic creatures to the entire "unknown," factual or Fortean, some admirable guidelines exist. Christopher Evans, in his *Cults of Unreason* (1973), ranged with a skilled psychologist's gentle objectivity over a fairly massive area of the bizarre. His implicit conclusions accord well with those of many modern (professional) archaeologists, who are obliged to tolerate those who credit ley lines, Earth forces, galactic interference in the material past, etc.; and who have generally abandoned the effort of pointing out the sheer illogicality of these notions. One senior archaeologist has commented that these cults of unreason are the expected outcome of "educating a mass of persons beyond their capacity to exercise critical judgement"—harsh, but doubtless true.

In cryptozoology, Ronald Binns' *The Loch Ness Mystery Solved* (1983) comes to similar conclusions in its last chapter ("A Necessary Monster")—in an increasingly terrifying world, ruled by technocrats and grey egg-heads from whom the average man feels alienated, there *must* be an area where science remains ignorant, or could be wrong and cannot triumph. As Binns puts it (p. 220), in such corners, Mr. Average still "has the chance . . . to concoct a new theory about what it is which has baffled the world for so long." In a parallel vein, Christopher Evans sees the rise of irrational cults as a replacement for popular religion, like the more demotic aspects of Victorian Christianity. There has to be a fringe world—outside "official" science, which ousted official religion—within which the ordinary person can shape his spiritual protest.

Though Lester cites neither of these seminal works (surely he has encountered Binns?), and takes most of his material from Heuvelmans, he is pursuing one thread in this general direction. As he says, "If religion [in the 19th century] clearly could not explain everything, the sea-serpent phenomenon suggested that neither yet could science, despite its supposed infinitude

of promise." New elements he puts forward are the suggestions that the Great Sea-Serpent is essentially singular, or unitary—all sightings refer or referred to the same mental construct, differently perceived by different observers—and is thus "pre-social" and a remnant of what man conceives to have been man's prehistory. I cannot follow this. As a necessary mythical object, the Sea-Serpent, suggestively phallic (?) in outline, is dredged from some dark reservoir of presumably Jungian archetypes. Well, possibly, if one happens to believe in Jungian and/or Freudian theory.

This is a useful little contribution to what will be a continuing debate, though considerably slight in treatment when compared to the Binns' book. Naturally, the prudent observer will continue to distinguish, most rigidly, between those phenomena of beliefs in the unknown or unknowable—protest-psychology, as it has been labelled—and the continued search for as-yet unknown material. It is necessary for us to believe in planets, in stars, in galaxies, the Universe, Something Out There, and an entire realm bigger than the observable world, a realm we privately people as we wish. Such private beliefs leave untouched the cold, physical fact that there *are* stars and galaxies.

CHARLES THOMAS
Institute of Cornish Studies
University of Exeter
Trevenson House, Pool, Redruth
Cornwall, England TR15 3RE, U.K.

The Evidence for Bigfoot and Other Man-Beasts. By Janet and Colin Bord. The Aquarian Press, Wellingborough, Northamptonshire, England, 1984. 160 pp. £2.50 (p.). (Sterling Publishing, New York, 1984, $5.95.)

This is one of a series of "The Evidence for . . ." books being published by The Aquarian Press in collaboration with the Association for the Scientific Study of Anomalous Phenomena, with the stated intention that each book "will give a comprehensive, impartial and up-to-date assessment of the evidence currently available for a particular phenomenon." Other books in the series deal with "Alien Abductions," "UFOs," "Visions of the Virgin Mary," "Ghosts," and "Phantom Hitch-hikers."

Cryptozoologists may well feel out of place in such company—and, indeed, the Bords do devote one of their six chapters to "Non-Physical Bigfoot and the UFO Link"—but most of the book is a fairly standard presentation of reports of sightings of large, hairy, bipedal creatures, and footprint, film, and other evidence for their existence. In this regard, its chief value is that it includes material not available when earlier books were published, while its

chief drawback is that it is far too short a book to make much of an attempt at being comprehensive.

There are just two chapters to cover information on such supposed creatures from the U.S.S.R., the Himalayas, China, Australia, Africa, and South America, plus a few items from Japan, New Zealand, and the Arctic. Extensive information from Australia and China has become available since most of the previous books on this subject were published, but in the 16 pages devoted to it, the authors can do little more than whet a serious reader's appetite.

The best item in the book is the opening incident, a close-range sighting of a pair of large, hairy bipeds which went up a steep, high bank beside a road in Idaho in two different ways, both beyond human capability. This took place in April, 1980, and the witness was Donald Hepworth, a chief inspector for the Ontario Humane Society, formerly with Canadian military intelligence, and the London, England, police force—surely a qualified observer. Unfortunately, this excellent beginning is tarnished a few pages later by the inclusion of a photo of an "unidentified creature" lying dead in the snow; it is almost certainly a cougar, and definitely nothing that could be related to the subject of the book.

In the discussion of the evidence, a few errors are obvious. For instance, it is twice stated that footprint reports in North America outnumber sighting reports, when, in fact, the reverse is true. It is also stated that experts can easily spot fake footprints, which has not always proved to be true in the past, and, indeed, this implies incorrectly that some footprints—and thus the animal that makes them—have been proved to be genuine.

In general, however, within the limitations they obviously faced, the authors have done a credible job of sampling and summarizing the evidence, and have produced a worthwhile book for anyone looking for a quick and up-to-date survey of this subject. For those who find they want more, there is a good bibliography, as well as notes on sources, and there is an index.

JOHN GREEN
Box 374
Harrison Hot Springs
British Columbia V0M 1K0, Canada

The Sasquatch and Other Unknown Hominoids. By Vladimir Markotic (Ed.) and Grover Krantz (Assoc. Ed.). Western Publishers, Calgary, 1984. 335 pp. C$12.00 (US$12.00) (p.).

For reasons that should become evident, this will be an unusual review, one filled with parenthetical footnotes, but no citations. I once refused to

review this work for another journal for several reasons: first, because Grover Krantz, the Associated Editor—I am not sure how that differs from an Associate Editor—and I edited two different editions of another Sasquatch book in 1977 and 1979 (*The Scientist Looks at the Sasquatch,* The University Press of Idaho). Secondly, Vladimir Markotic, the Editor of the present work, reviewed that volume in *Cryptozoology*. Thirdly, the book under review was originally conceived as a collection of those papers given at the 1978 University of British Columbia (UBC) Sasquatch conference in Vancouver, but which were not included in the subsequent UBC Press volume, *Manlike Monsters on Trial,* published in 1980, a work that was later reviewed by Grover Krantz, also in *Cryptozoology*. And, finally, to complete these incestuous relationships, my paper at that conference was one of those that *were* published in the UBC Press volume. However, because I am the review editor of a national journal, and thus know the problems of getting books reviewed, I have considerable sympathy for your *Cryptozoology* Editor. Also, I am on sabbatical leave this year (at the Inner Mongolia University, People's Republic of China), and have more time than usual; for the same reasons, however, the reader will have to excuse a lack of detailed citations, as I am without my library, or even a good substitute.

In a community as small as that of the serious Sasquatch researchers, it is difficult not to have personal and/or professional relationships with most of the other researchers. Such is the case with many of the authors in *The Sasquatch and Other Unknown Hominoids.* In addition to my above-mentioned editing of a book with Grover Krantz, I have accepted, as co-editor of *Northwest Anthropological Research Notes* (*NARN*), at least six articles by Krantz, four of which dealt with Sasquatch. As to other authors, Jay Miller and I have conducted ethnographic and archaeological research together, and co-authored a report on that work, and two articles by Miller have been published in *NARN*. Strasenburgh and Bayanov have both also published on Sasquatch in *NARN*. In addition to the above, Dahinden, Green, Keddie, and Markotic are all friends and correspondents. I also feel honored to have met the late Carleton Coon at the Vancouver conference.

I am not now, nor have I ever been, an active investigator of Sasquatch sightings. My original interest came from my observation of the similarity in the various Plateau Indian descriptions of a Sasquatch-like creature, combined later with John Green's challenge for a reasonable place to publish scientific Sasquatch studies, and the resulting opening of the pages of *NARN* to the topic. Just as Krantz's academic career has suffered because of his Sasquatch work, in retrospect I think *NARN* has probably suffered (except financially) for truly following the scientific method.

It has never been mentioned in print before, but when the first edition of *The Scientist Looks at the Sasquatch* was published in 1977, review copies were sent to *Science, American Scientist,* and *American Anthropologist*. None

of these journals even listed it in their "books received for review" sections. At that time, the review editor of *American Anthropologist* was one of my former graduate professors, one I highly respected for his sense of fair play. Yet, no acknowledgment has ever been received. For this reason alone, I see a real need for a journal such as *Cryptozoology*.

As just an editor or facilitator of Sasquatch research, I have tried to keep a neutral position and a low profile. However, Krantz blew my cover when he placed me on the "positive" side in his review of *Manlike Monsters on Trial*. My chapter in that volume was written to elicit comments and reactions. The only reaction (negative) was from my long-time friend, B. Robert Butler, who had loaned me prints for one of the illustrations, and his reaction was prior to publication. I would have to agree with Butler that *some* of the "ape heads" represent female mountain sheep in estrus—when their lips are pulled back exposing the teeth. Krantz notes that the positive articles in the *Manlike Monsters* volume are shorter, perhaps, because we came to the point and did not dance around the issue. It could have also been because all the positive articles—that is, those that were not completely eliminated—were cut to pieces, as mine was, with all of the interesting historical data taken out. Perhaps more to the point is the distribution of rank. It would appear to me that full professors with tenure were not concerned about what they said, while those in the lower ranks were more cautious; the case of Grover Krantz was there clearly for them to see.

With my biases and annoyances out of the way, we may now begin the review of what I consider to be an excellent book. I would agree with the introduction that the word Sasquatch is unquestionably preferable to the California-coined (and sounding) Bigfoot. But I wonder why the capitalization of Sasquatch when we do not capitalize other animals like deer, elk, wolf, etc.?[1] The lack of capitalization for the American Indian culture area, Northwest Coast, is even more difficult to understand.

Chapter I, The Monsters in General, begins with Jay Miller's "American Humanity and Other Monsters: A Structuralist Analysis of Frankenstein, the Mummy, Dracula, and the Wolfman." In my opinion, the greatest contribution of Miller is his ability to utilize Claude Levi-Strauss, to explain

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[1] The Editor cannot address the question of style in other publications, but *Cryptozoology* (and when possible *The ISC Newsletter*) capitalizes the names of supposed cryptozoological animals such as Sasquatch, so the capitalization appears in Dr. Sprague's review despite his comment. If and when such animals are discovered, described, and accepted by systematic zoology, the name may then move to lower case, such as wolf. When a native name is used, in that context, it is lower case, but italicized, such as *okapi*—not to be confused with the scientific name for the genus *Okapia*. Thus, the way the name of an animal or a supposed animal is printed in *Cryptozoology* depends on the context. Native name: *okapi*; Western name for presumed, undiscovered animal: Okapi; common name after discovery and acceptance: okapi—Editor.

how he uses him, and to come to some logical conclusion. Concerning this conclusion, I would suggest that the opposite of the monster profile does not just define the ideal male, but that the monster profile can also define the monster within the typical American male who desires to be nocturnal, out of control, libidinous, immature, extraordinary, impractical, areligious, and animalistic. The degree to which Miller's attributes of the monsters fit the Sasquatch depends on where you are on the California continuum, from Hollywood to the back-to-nature freaks. Another approach for future research might be the "beauty and the beast" theme, with Sasquatch compared to the popular ape-beast of Hollywood.

Grant Keddie's contribution, entitled "On Creating Un-Humans," is a well thought-out addition to the growing literature on Northwest Coast monsters, but happily gives little support to the Sasquatch=cannibal woman concept so popular among the "true believers."

Loren Coleman and Mark Hill in "From 'Atsen' to Giants in North America," continue in a highly readable but somewhat disorganized way the position taken by John Green several years ago that the stories by American Indians of large, smelly, hairy creatures are part of the American Indian natural world, and not part of their mythology as categorized by anthropologists. They admit that their "survey is not exhaustive" (p. 31), which it is not; but why not? Is this volume for popular consumption, or is it to report scientific research?

Chapter II, The Believers and the Skeptics, is introduced with Carleton Coon's discussion of "Why There Has to be a Sasquatch."His discussion of believers and non-believers is long overdue. It has long been my contention that the terms "believer" and "non-believer" as used for Sasquatch researchers reduce the discussion to a level of religious fervor, and are not appropriate terms in scientific research. This brief selection is a pleasant and upbeat summary of the thoughts on the subject by a world-renowned, and at times controversial, physical anthropologist. Those who knew Carleton Coon well will find this chapter worth the price of the volume. (Surely the fourth word from the end of the first paragraph of this selection must be "word," not "work.")

Hans Biedermann's errors of fact and interpretation when discussing work outside of Europe are so frequent that even the Editor was compelled to point them out in the introduction to "Sasquatch, Yeti, and Similar Beings." The article's greatest contribution to Sasquatch research is the inclusion of many German language references unknown to North American researchers. The position that such a widespread belief around the world is an argument against the reality of such a creature can be turned around and just as well be used as an argument for the existence of such creatures.

Grover Krantz, in "Sasquatch Believers vs. the Skeptics," fully intended to insult both the "scientific" skeptic and the true believer. If the scientific

community were to read his chapter, they would be insulted, but, unfortunately, they already have all the facts and will not read it. On the other hand, the true believers will read it, be insulted, and go on their merry way ignoring Krantz's message.

It is Krantz's willingness to openly investigate the unknown that has cost him the respect of many colleagues as well as timely academic promotion. Likewise, his unwillingness to be a fanatical believer in a religious sense has alienated him from most of the non-academic investigators. Like the Man Without a Country, he is cast afloat, awaiting the day of discovery—when he will "enjoy seeing a lot of people eat crow." It is no accident that Krantz and I edited a book together. Not because we are good friends or close colleagues, which we are not, nor because we both originally believed in the existence of Sasquatch, which I did not, but because we both believed, as scientists, that the phenomenon known as Sasquatch should be studied, and such studies should be published. To call the study of Sasquatch "like the study of little green men from Mars," as one of Krantz's former university administrators once said, could be called as anti-intellectual as the Spanish Inquisition.

Chapter III, Reports, begins with Dmitri Bayanov's "Hominology in the Soviet Union." This excellent review brings the reader up-to-date on Soviet research, but, as always, he is far more trusting of his informants than are the more jaded North American investigators.

Marie-Jeanne Koffmann's paper has the long title of "Brief Ecological Description of the Caucasus Relict Hominoid (Almasti) Based on Oral Reports by Local Inhabitants and on Field Investigations." This report should leave skeptic and believer alike asking, if the Almasti are that well known and available, where are the specimens (or at least the pictures, which we all clearly realize will not satisfy the skeptics)? I, for one, remain a skeptic concerning this paper.

John Green, with "The Search in China for Unknown Hominoids," has done all of us a service by bringing the Chinese reports up-to-date. (The References Cited are correct, but some over-zealous copy editor added commas between the surnames and the given names of all of the Chinese authors in the volume's Bibliography.) I wish I could share the stated optimism about the offical position in China toward Wildman studies. In 1984, at a small banquet in Beijing hosted by the Vice Minister of Forestry, who, among other duties, is responsible for endangered species, he agreed to answer a few informal questions. I asked what was being done about protecting the Wildman. He responded, in no uncertain terms, that "these are the beliefs of ignorant peasants and not worthy of further comment."

Bayanov's second contribution, entitled "The Case for the Australian Hominoids," is largely direct quotes from Graham Joyner's 1977 work on the Australian Yahoo or Yowie, plus some more recent reports. He closes

with some free-thought-wanderings on remotely related cases. Truly interested researchers would do well to obtain Joyner's original volume.[2] Bayanov takes the positive point of view, as opposed to Biedermann and Krantz, proposing that more cases on more continents indicate greater statistical likelihood of Sasquatch and related hominoids existing.

Krantz's summary paper, "Research on Unknown Hominoids in North America," is one of the highlights of the entire volume. In this well written section, his points are logically argued, and they would be difficult to refute. His point that the ecological zone of the Sasquatch is utilized by man less today than it has been for thousands of years can be verified by any U.S. Forest Serice archaeologist, who would state that the most remote areas are filled with prehistoric and historic human refuse. (I myself would suggest that the Great Depression was probably the high point in the utilization of the Sasquatch ecological zone by man.) This section is really the summation of all of Krantz's major points on Sasquatch from his well delivered and highly popular public speaking engagements. It is Krantz at his best: logical, articulate, and not hampered by footnotes and references.

The last of the regional reports, Loren Coleman's "The Occurrence of Wild Apes in North America," makes two major contributions. First, his References Cited section is virtually all new material to the western North American Sasquatch researcher. Secondly, he has collected all of the southeastern United States data and proposed an hypothesis for why the footprints look different, and why the reported heights of such creatures are less than those reported for the Sasquatch. The introduction of *Dryopithecus* into the New World without any fossil continuum is a weak point in an otherwise well developed argument.

Chapter IV, The Biological and Psychological Aspects of the Sasquatch, begins with "Eyewitness Reports and Footprints: An Analysis of Sasquatch Data." In this section, Dmitri Bayanov, Igor Bourtsev, and Rene Dahinden present still another well reasoned and logical argument for the acceptance of the evidence at hand for Sasquatch. It is unfortunate that, since Krantz was a contributor and Associated Editor, he did not comment on the dynamic vs. static theories of the functioning of the double ball of the Sasquatch foot. The continued insistence of the Soviet researchers to draw comparisons between *Homo sapiens neanderthalensis* and Sasquatch, in my opinion, only weakens their arguments, and, in general, weakens the case for the North American Sasquatch. To put it more bluntly, the concept of a relict Neanderthal is, to this reviewer, quite unlikely, but to suggest that the physical profile of the Sasquatch represents *H. s. neanderthalensis* is the least likely of all the hypotheses presented in this or any other responsible work.

Archie Buckley writes in "Report on Sasquatch Field Findings" with a

[2] See reference on Joyner's work in the article by Colin Groves in this issue—Editor.

folksy style that is completely out of place in this volume. His often illegible photographs do little to support his arbitrary conclusions, which seem based on personal opinion rather than logical and scientific reasoning.

While the deletion of Buckley's section would not have affected the value of the volume, the deletion of James R. Butler's "The Theoretical Importance of Higher Sensory Perceptions in the Sasquatch Phenomenon" would have helped it considerably. Such speculative nonsense does not help the cause of serious research on the Sasquatch or other unknown hominoids.

Chapter V, The Patterson-Gimlin Film, has only two sections. The first section is the second part of the Bayanov, Bourtsev, and Dahinden report entitled "Analysis of the Patterson-Gimlin Film: Why We Find it Authentic." It is by far the best and most thorough discussion of this classic film. What would be appreciated now would be a response from the strangely silent primatologist, William Montagna. With time, proponents seem to be building a psychological profile of those anthropologists and zoologists who are quick to condemn Sasquatch evidence and research—as well as evidence in other areas of cryptozoology. A discussion of this profile, and what it reveals about such individuals, would make an interesting article in itself.

Gordon Strasenburgh, a long-time supporter of *Australopithecus robustus* as the fossil representative of Sasquatch, writes on the relationship of the Patterson-Gimlin film to this discussion in his "The Crested *Australopithecus robustus* and the Patterson-Gimlin Film." His argument is generally well reasoned, but at times becomes convoluted. The central theme centers on the presence of a sagittal crest on females, while tending to ignore the severe problems detailed by Reed in the same volume. He does not speak to Krantz's suggestion that the pendulous breasts of a supposed female could actually be laryngeal sacks of a male. He also does not bother, and rightly so, to refute the Soviet position on *Homo sapiens neanderthalensis* because he has done so previously in print—a point on which the previous section by Bayanov, Bourtsev, and Dahinden is strangely silent.

Chapter VI, Europe of Old, also contains only two sections. The volume Editor, Vladimir Markotic, presents "The Great Greek God Pan—An Early Hominid?," and pursues the Pan-as-relict-form theme much further than anyone ever has before. This work represents one of the really new pieces of research in Sasquatch studies found in this volume. It is suggested that Pan is, in reality, not a minor god but a very old and extremely important god whose true identity has been lost. This old and important god is unique among the gods in that, like relict hominids (or hominoids), he dies. It is unfortunate that the vast majority of researchers in classical mythology will miss this provocative work.

Little can be said about the stories collected by Zvonko Lovrenčević under the title "Creatures from the Bilogora in Northern Croatia," except to hope that more such folklore will be collected. Again, as with the growing body

of such information from all over the world, we can take two opposing positions: 1) such stories are worldwide, and thus support the existence of hominoid forms worldwide; 2) such stories are worldwide, showing the basic need for such beliefs in terms of man's world view, and thus have no reality. In addition, if we accept Krantz's view, it is unlikely for there to be an unknown *series* of hominoids. These arguments aside, any folklore that is being lost as rapidly as Lovrenčević indicates should be collected.

Chapter VII, The Problems of Origins, again has only two sections, and one suffers by comparison to the other. In "Possible Ancestry of Sasquatch and Its Eurasian Kin," Charles A. Reed gives what is by far the best overall logical analysis of all possibilities, including New World evolution, which Reed discounts. The number of times he adds parenthetically after Sasquatch, "if they exist," gives the impression that he "doth protest too much." In spite of a long list of things we do *not* know about *Gigantopithecus,* Reed considers this the most likely candidate for the fossil ancestor of Sasquatch, but, unlike other researchers, he considers *Gigantopithecus bilaspurensis,* for a number of reasons, as more likely than *G. blacki.* The previous arguments by Strasenburgh, reiterated in this volume, for *Australopithecus robustus* as the Sasquatch ancestor, are refuted by Reed. The Soviet view of Neanderthal's taxonomic position, and the abundant evidence against such a position, is mentioned, but unfortunately is simply referred to as "too numerous to list here" (p. 285). On archaeological evidence alone, I am in total agreement with Reed on the status of Neanderthal, but it would have been useful to have all of the evidence referenced in this landmark volume. Perhaps it is because he expresses his position so clearly, and it is a position I tend to agree with, that I find Reed's selection to be one of the most valuable in a generally valuable collection. It is also one chapter that I have recommended to interested advanced students.

The final section by Krantz, entitled "The Origins of Sasquatch," illustrates one of the annoying traits of this volume: the lack of communication between authors prior to publication. Krantz lists the possible fossil ancestors of Sasquatch, including his own favorite, *Gigantopithecus blacki.* Yet, in the previous chapter by Reed, *G. bilaspurensis* is suggested as more likely, a point to which Krantz does not even allude. Krantz's discussion of Neanderthal seems to hang in space, as if he needed to express publicly his view that Neanderthal was less than human. *The Clan of the Cave Bear* may be good fiction, but is it good anthropology? This selection is not up to Krantz's usual level of writing; he should have stopped with his other two excellent selections. It is almost as if he is hedging his bets prior to his more recent pronouncement, in *NARN,* that *Gigaantopithecus blacki* is indeed Sasquatch.

The compilation of all of the References Cited into one complete Bibliography is a real service to the serious researcher, and should be emulated by more multi-authored works. A bibliography of recent sources not found

elsewhere in this volume, or the UBC Press *Manlike Monsters* volume, has been added under the strangely inaccurate title of "Some Recent Bibliographies." This is a highly useful tool, and a needed update for the serious Sasquatch researcher.

The several References Cited sections, however, suffer from editorial inconsistency. For example, Krantz 1972a is presented in four different ways on pages 184, 200, 247, and 317. The problem with Chinese names has already been mentioned. Most of the *Bureau of American Ethnology, Bulletin* references would be impossible to find without the aid of a documents librarian unless one already knows the references.

Editorial inconsistency is apparent also in the text. Some authors repeat the same reference each time in a series, others use the anthropologically shunned *ibid.,* and one author used "same." Superscript numbers were used both for true footnotes and for endnotes. Typographical errors are not flagrant, but common enough to indicate that the page proof needed one more reading. Franz Boas suffered on pages 24 and 40. Singular data were utilized on the lower half of pages 129 and 244.

Other errors obvious even to this very poor speller are found on pages 73, 80, 160, 189, and 329. The missing apostrophe in Hudson's Bay Company on p. 34 and the lack of the conditional "were" on p. 293 are the kinds of errors that make the difference between a good editorial job and an excellent editorial job. The "black area" on page 146 varies from pure white to dark grey on my copy. I have a very strong personal aversion to the use of the utterly redundant "see" when reference is made to a figure. (If the writer did not want the reader to see the map or illustration, then why even mention it or include it?)

The (table of) Contents is not an accurate rendering of many section titles, or, in some cases, even the full names of the authors. Future referencing of an single author's work would have been easier if the "chapters" had been called "sections," or at least parts and each author's contribution to a chapter. The separation of figures into "figures," "plates," and "maps" is an archaic and confusing practice that has been discouraged by the better presses for many years.

The Glossary by Krantz is a useful addition for the professional and amateur alike. It has been done with an obvious effort to give fair and unbiased definitions. The only bias to show up is in the interlocking definitions of *Gigantopithecus* and Sasquatch. Likewide, the Notes on the Contributors is a useful addition, especially in a field where anyone can, and often does, claim expertise. However, there are some obvious omissions of pertinent information—for example, Jay Miller's academic degrees.

All of these minor objections aside, *The Sasquatch and Other Unknown Hominoids* is certainly more of a major contribution to the study of Sasquatch than the 1980 UBC Press volume *Manlike Monsters on Trial.* The

work under review was originally seen by some as a "spite" volume, directed against the UBC Press volume. Happily, it took a positive approach, and it has become an important work on its own merits. It is unfortunate that it did not receive just a little more detailed editing, judicious pruning, a more attractive cover, and the publicity of a larger press. Of course, the reasonable price is related to the lack of some of these factors.

If there is just one volume that will bring the interested layman up-to-date on Sasquatch, it is this book. If the serious researcher is attempting to maintain a good library on Sasquatch, or Old World unknown hominoids, then this volume is an absolute necessity. Markotic, Krantz, and their colleagues are to be congratulated on bringing together so much detailed information and several astute summaries in one coherent form.

RODERICK SPRAGUE
Alfred W. Bowers Laboratory of Anthropology
University of Idaho
Moscow, Idaho 83843, U.S.A.

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Comments and Responses

This section permits readers to critique or comment on works previously published in Cryptozoology. *The original authors and other readers are encouraged to respond to these critiques or comments. Readers are also encouraged to critique or comment on the works appearing in this issue. All comments are the responsibility of the authors only, and do not reflect any policies established by the Editor or the Editorial Board of* Cryptozoology, *or the Board of Directors of the Society.*

ON WILDMAN REPORTS AND CHINESE MACAQUES

(Response to Poirier and Diamond, *Cryptozoology,* Vol. 4: 112–14)

The hand and foot specimens of the supposed Wildman from Jiulong Mountain of Zhejiang Province, People's Republic of China, have caused worldwide interest. They represent the first material evidence of this kind ever officially reported in this country. I have made an exhaustive study of these specimens, and have determined that they are not from the Wildman but, rather, from a large stump-tailed macaque (Zhou Guoxing, 1984, Morphological Analysis of the Jiulong Mountain "Manbear" [Wildman] Hand and Foot Specimens, *Cryptozoology,* Vol. 3: 58–70). This supports my earlier hypothesis that, among the various beliefs about the Chinese Wildman, there are misconceptions arising from the stump-tailed macaque (Zhou Guoxing, 1982, The Status of Wildman Research in China, *Cryptozoology,* Vol. 1: 13–23).

This kind of misconception arose again in China in late 1984: on December 24, a "man-like" animal called *mao gong* (hairy man) by local people was captured in Xinning County, Hunan Province, and was widely publicized as a specimen of the Wildman.

On February 8, 1985, *China Daily,* the only English newspaper in China, reported the news, and included my telephone conversation with the reporter, in which I had given my opinion that the animal, based on my previous experience, was not a Wildman, but probably a stump-tailed macaque. On February 11, *China Daily* reported the scientific identification of the animal—which proved my opinion of 3 days before was correct. In my conversation with the reporter, I had pointed out that, among those individuals involved in the investigation of the Wildman problem, are some who are not reliable and who are prone to errors and misidentifications.

Poirier states that the local people mistake the rare golden monkey, *Rhinopithecus roxellanae,* for the Wildman in Xingshan County. This is quite possible, and we encountered the same beliefs during our field investigations in the Shennongjia region. However, the reason Poirier had "never heard reports of a supposed smaller version of the Wildman" is probably because he had not interacted enough with the local people.

I would now like to address the classification of Chinese stump-tailed macaques mentioned by Diamond. After Milne-Edwards erected the new species name *Macaca thibetana* in 1870, based on a specimen first obtained in Baoxing County, Sichuan Province, Anderson named the red-faced macaque *Macaca arctoides* in 1879. In 1921, Pocock combined the two into a new species, *Lyssodes speciosa,* which included two subspecies: *L. s. thibetana* and *L. s. arctoides.*

However, things later got turned around again. The genus name of the stump-tailed macaque was reinstated to *Macaca,* and the species names *Macaca arctoides* or *Macaca speciosa* are now generally recognized. There are differing opinions as to whether one or two species are involved.

In China itself there are two schools of thought: one opinion considers the stump-tailed macaque to be represented by two species: the red-faced stump-tailed macaque, *Macaca arctoides,* and the hairy-faced stump-tailed macaque, *Macaca thibetana.* The other opinion recognizes only one species, *Macaca speciosa,* and three subspecies:

1) the subspecies in the west of Yunnan Province, *M. s. speciosa*;
2) the subspecies in Sichuan Province, *M. s. thibetana*; and
3) the subspecies in Fujian, Guangdong, and Guangxi provinces, *M. S. melli.*

The latter opinion appears in a book called *Primate Chromosomes of China.* In studying the number and form of chromosomes of these representatives of the genus *Macaca,* the author found that they all have a very close genetic relationship; the differences do not reach the level of species separation, indicating that these Chinese macaques are not different species, but different subspecies within the same species. The author also studied the chromosomes of the Huang Mountain macaque, concluding that this primate probably represents a new subspecies. Further work in this area needs to be conducted to reach a definitive conclusion.

It is today more accurate to study the classification of animals from the perspective of molecular biology, rather than morphology, and the previous change of the scientific name of the stump-tailed macaques from the genus *Macaca* to the genus *Lyssodes* and then back to the genus *Macaca* only confused the issue. I myself agree with the opinion that divides the Chinese stump-tailed macaques into three subspecies.

From the evidence now available, I think that the hand and foot morphology of the Huang Mountain macaque is so similar to that of the Jiulong Mountain macaque, that they may represent the same subspecies.

There are important differences between the Huang Mountain macaque and *M. s. thibetana.* The physical form of the former is robust. The weight of a male Huang Mountain macaque could be as much as 33 kg. The *average* weight is 25 kg. Based on the different distributions, and the differences shown by karyotype studies, I intend to describe the Huang Mountain macaque as a new subspecies.

As to the Jiulong Mountain stump-tailed macaque hand and foot specimens, from Zhejiang Province, I plan to conduct further comparative studies with the Huang Mountain stump-tailed macaque. However, a final conclusion probably cannot be reached until what is thought to be a live specimen of the former is captured.

ZHOU GUOXING
Beijing Natural History Museum
126 Tien Chiao South Street
Beijing 100050, People's Republic of China

(Zhou Guoxing is a paleoanthropologist who has extensively studied the Chinese Wildman problem.)

EDWIN RAY LANKESTER AND THE EARLY HISTORY OF CRYPTOZOOLOGY

(Comment on Heuvelmans, *Cryptozoology,* Vol. 3: 1–30)

In his remarkable article "The Birth and Early History of Cryptozoology," Bernard Heuvelmans mentions Sir Edwin Ray Lankester for his correct assignment of the okapi to the Giraffidae in June, 1901. Lankester was director of the British Museum (Natural History) at the time, an office he held from 1898 through 1907. As the author of various works, particularly in the field of evolutionary biology (he contributed to the refinement, among other things, of the concepts of structural homology and analogy), he was often quoted by his friend Charles Darwin, whom he supported firmly.

Even before the archaic okapi was discovered, Lankester considered it quite possible that giant ground sloths, known then in a subfossil state, could survive in remote regions of South America (Bernard Heuvelmans, 1958, *On the Track of Unknown Animals,* Rupert Hart-Davis, London). Ten years later, at the end of 1911, while acting as a zoological adviser to Sir Arthur Conan Doyle for the documentation of his novel *The Lost World,* he suggested to the latter the possible current existence of a pygmy elephant, stand-

ing 20 inches (50 cm) at the shoulder, and of a giant boa 60 feet (18 meters) in length. As both of these supposed animals continue to be reported, his choices were obviously not made haphazardly. It was also Sir Edwin who proposed to Sir Arthur the modern survival of a *Toxodon*.

The last hypothesis reveals a true cryptozoologically minded attitude, quite distinct, however, from the similar trend of such creationists as Thomas Jefferson and Louis Agassiz, expressed by the former in his opinion on the pseudofelid *Megalonyx,* and by the latter in his belief that a living plesiosaur—the Great Sea Serpent!—might well be found. It must be stressed that Agassiz, for instance, to whom geological catastrophism did not appeal in the least, took it for granted, for *a priori* reasons, that fossil species could survive to the present, either in unexplored countries or in the abyssal depths of the ocean. (Unlike Lamarck, creationists had not realized that "living fossils" were perfectly consistent with the idea of evolution.)

Lankester's recommendations to Conan Doyle were generally followed, and the author even referred twice to Sir Edwin's works in Chapter 4 of *The Lost World.* The relevant letter of Lankester was reported by John Dickson Carr in Chapter 17 of his classic biography of Doyle (John Dickson Carr, 1949, *The Life of Sir Arthur Conan Doyle,* John Murray, London).

All of this indicates that the prominent British zoologist Edwin Ray Lankester, who died in 1929, was a pioneer in the realm of cryptozoology—even if only privately. It shows also that Doyle's masterpiece had a much more solid scientific background than usually admitted.

BENOIT GRISON
18 rue Georges Boissaye du Bocage
76310 Sainte Adresse, France

(Benoit Grison is a biology student.)

A USEFUL AND PERTINENT CLASSIFICATION

(Comment on Greenwell, *Cryptozoology,* Vol. 4: 1–14)

The term cryptozoology has become more widely known, but is often applied incorrectly. In France, for instance, one magazine has recently published, under the heading of cryptozoology, an article about a flying model of a *Pteranodon.*

So the work of Richard Greenwell is very welcome. His definition of cryptozoology is good, and his classification of cryptozoological animals clarifies the subject; it will be particularly useful to zoologists, including skeptics.

I would like to remark on some points. The notion of "unexpectedness" should be limited to very extraordinary cases—a notion equally subjective—because some "unexpected" animals in a region are not necessarily cryptozoological. For instance, "accidental" birds (such as North American species sometimes observed in Europe) do not really involve cryptozoology.

Likewise, Category II should be limited to really unusual cases. Discussions concerning the limits of geographical distribution of a species concern classical zoology.

As with many other cryptozoologists, I am very interested in problems which are not part of cryptozoology *sensu stricto,* but which are closely related to it, particularly in terms of the similar methods of investigation involved.

Examples are the "pumas" and "bloody beasts" of Britain and sometimes Continental Europe, including the Beast of the Gévaudan (very famous in France), and feral children or men. These are generally not unknown or unusual species, but they are very interesting, and they may shed light on some cryptozoological problems. Even though the Beast of the Gévaudan has been described as an unknown animal, the solution of the problem is probably to be found elsewhere. Bernard Heuvelmans discusses wild children in his *Betes Humaines d'Afrique* (Plon, Paris, 1980).

Greenwell's classification has the merit of differentiating between the various kinds of alleged cryptozoological animals whose status varies a great deal. This approach is certainly original, and distinguishes it from previous cryptozoological works, which have adopted zoological or zoogeographical approaches, or have combined the two.

JEAN-JACQUES BARLOY
7 rue Lekain
75016 Paris, France

(Jean-Jacques Barloy is a zoologist and the author of over two dozen books on animal life and natural history.)

ON THE DEFINITION OF THE TERM "ETHNOKNOWN"

(Comment on Greenwell, *Cryptozoology,* Vol. 4: 1–14)

Within the new classification system for cryptozoology, Greenwell introduces the new term "ethnoknown," which may prove to be a useful term for both the layman and the scientist.

The notion behind this new term is that a naturalist, a traveler, or an explorer may encounter rumors, traditions, or eyewitness accounts of unknown animal species. He/she may also hear of, or read about, old or exotic chronicles mentioning the existence of strange animals. In a previous article,

Bernard Heuvelmans noted that François-Désiré Roulin emphasized in 1835 "the second important task of cryptozoology, that is, the careful analysis of myth, legends and folk tales of all cultures and all races in search of 'monsters' which could eventually be demythicized" (Bernard Heuvelmans, 1983, The Birth and Early History of Cryptozoology, *Cryptozoology,* Vol. 3: 1–30). Heuvelmans, at the end of his article, states that ". . . true cryptozoological research in the field consists, first of all, in collecting more complete or more recent information from the local people, and secondarily, looking for possible concrete evidence of the existence of the animal species one is tracing."

The term "ethnoknown" befits "true cryptozoological research," and its creator defines it as follows: "'Ethnoknown' is used to represent prior human knowledge of an animal, as discussed above, whether it be in the form of modern sighting reports, ancient depictions or manuscripts, or oral traditions or legends. Such prior human knowledge may come from both native peoples (Scots living alongside Loch Ness are here considered 'native peoples'), as well as traveling outsiders or explorers."

"Ethnoknown," strictly speaking, would exclude "traveling outsiders or explorers," since the Greek root *ethno* means nation or people. However, this is a minor disadvantage, considering that the basic idea Greenwell wants to express is "known to the native inhabitants of a region."

Michael Heaney (personal communication to Greenwell, September 1, 1986) criticizes the "unfortunate mixing of English and Greek roots," and advises Greenwell to "settle on a word of either English or Greek (or Latin) derivation." Heaney concluded: "I'd settle for 'ethnognostic' if pressed."

In my view, there is no hard and fast rule which prohibits the use of two roots of different language origins in the same word. The flexibility of the English language allows such etymological discrepancies. For instance, nobody complains about a compound term such as "brain therapy," which could be replaced by "cervico-treatment" if we were to suggest Latin roots instead. Still, Heaney may have a point when he says that "ethnoknown" is difficult to pronounce. In that case, a term as simple as "native-known" would eliminate such a difficulty. The concept behind it seems easy to grasp at once, especially by the layman. In addition, it is possible to transform the adjective into a noun: "native knowledge." One may imagine article titles such as: "Native Knowledge of the Soviet-Mongolian Almas," but should we accept "Ethnoknowledge of the Giant Octopus?"

Concerning Heaney's "ethnognostic," I know of a computer software consulting agency in California which chose the unusual name of Gnostic Concepts. Does it allude to the fact that the computer is the Supreme Administrator or God's new Messiah? In any case, *gnostic* has to do with religion. The *Concise Oxford Dictionary* defines *gnosis* as: "knowledge of spiritual mysteries." My worn-out *Webster's College Dictionary* tells us that *gnostic* means: "possessing mystic knowledge," and that a *Gnostic* is: "a believer in Gnosticism, a mystic, quasi-religious philosophy." The latter definition is partly wrong. Gnosticism is to be considered as a universal religion (*eine Weltreligion*). Titus Burchkhardt (1974, *Alchemy,* Penguin Books, Baltimore) translates *gnosis* as being the "way of knowledge."

Historians of religion trace Gnosticism back to the third century B.C., with the Hermetists. The Gnostic sects flourished during the first and second centuries A.D. The spiritual wealth of their doctrines and their influence—still to be felt—on Christianity have been studied extensively (H. Lelsegang, 1971, *La Gnose,* Payot, Paris).

A few founders of some of those sects were Simon Magus, Basilides, Marcion, Valentines, and Manes. In the middle of the third century A.D., three great forces vied with each other for the spiritual hegemony of the antique world: Christianity, Neoplatonism and Gnosticism. The Gnostic trend, fought as heretical by the Christian church, has never disappeared through the centuries. The spiritual revival of our times, exemplified by the emergence of numerous—even if odd—sects, occasionally bears the mark of Gnosticism.

During an interview in 1970, Carl Jung mentioned the Gnostics of the first, second, and third centuries. He found the problems we are facing today similar to those the Roman citizen of the first century A.D. was confronted with—including the turmoil caused by the current religious revival (Richard Evans, 1970, *Entretiens avec C. G. Jung,* Payot, Paris). A few years later, Raymond Ruyer published a book which had a wide readership. In it, he described new relationships between science, philosophy, and religion (thus establishing a new Gnosticism), making ample use of the works of scientists such as E. A. Milne, V. F. Weisskopf, E. T. Whittaker, D. W. Sciama, I. J. Good, D. Bohm, F. Hoyle and A. P. Feynmann (Raymond Ruyer, 1974, *La Gnose de Princeton,* Fayard, Paris).

We may therefore postulate that the semantics of the word *gnosis* has, from the very beginning, been related with a specific form of mysticism. To return to our initial dilemma, let us reconsider the term "ethnognostic" in the light of our brief survey of Gnosticism. "Ethnognosticism" would then seem to imply the intuitive and mystical grasp of cosmic forces—which may be personified in the form of divine entities, demons, spirits, angels, and mythological heroes—by one particular race or people.

Among the Gnostics, these divine entities did not take the shapes of animals, as gods did in Ancient Egypt: the Hawk-headed Sun-god Horus, the god of cemeteries Anubis, the Ibis-headed god of "science" and magic Thoth, the Cat-headed Sun-goddess Bast. In the Pantheon of India, Hanuman had the form of a monkey, and Ganesa, the god of wisdom, the head of an elephant. Such animal shapes did not appear in Gnosticism.

If one managed, however, to introduce the term "ethnognostic" in the sense of "known to the native inhabitants of a region," it would still retain

its strong religious connotation (the adjective "religious" should here be understood according to its original meaning, from the Latin *religare*: to bind, to link). Let us take an example. In a previous article in this journal, Michael D. Swords suggested that the zoomorphic god Set, which has never been identified, might be "an unclassified canid, possibly still in existence" (Michael D. Swords, 1985, On the Possible Identification of the Egyptian Animal-God Set, *Cryptozoology,* Vol. 4: 15–27).

Set was a sort of demon, worshipped by some, hated by others, feared by all. An ambiguous figure, Set was a symbol of the cosmic and moral conflict between good and evil. After reviewing several possibilities, Swords states his preference for "a greyhound predecessor native to the desert regions of Upper Egypt, and possibly ranging further south."[1]

Now, were I to come across a statement such as: "A group of scientists is looking for evidence of an ethnognostic canid of Upper Egypt resembling the ancient God Set," I would then choose another of Swords' stated possibilities: "a unique (in Egyptian mythology) synthesis of qualities of various desert animals (aardvark, wild dog, hyena)." This possibility infers that the Egyptians deliberately bred, if only in imagination, a symbol of wilderness and danger. The only concrete scientific evidence to be found would be the statues—or the mace-head Set figure depicted in Swords' article—which constituted the medium or link between the God Set and man. The selection of the term "ethnognostic" would clearly mean that "monsters" could not be demythicized.

To conclude, since the root *gnosis* definitely ought to be avoided in the context of cryptozoology, either "native-known" or "ethnoknown" should be retained.

Cryptozoology offers an unexpected approach to myths, legends, and folk tales, and sheds new light on legendary animals, a source of wonder for the literary-minded. The cryptozoologist, as well as the student of literature—with a strong interest in mythology in my case—share another interest: a need for accurate terms, which are indispensable tools in our quest for information.

JEAN-PAUL DEBENAT
Department of Information
University Institute of Technology
University of Nantes
3 Rue Marchechal-Joffre
44041 Nantes, France

(Jean Paul Debenat is a specialist in comparative literature and linguistics.)

[1] See separate Comment and Response on this topic appearing in this issue—Editor.

THE PERILS OF CRYPTOZOOLOGY AND A NEW CLASSIFICATION

(Comment on Greenwell, *Cryptozoology,* Vol. 4: 1–14)

The term "cryptozoology" was coined by that master sleuth of animals yet undescribed by science, Bernard Heuvelmans. Although the term did not appear in print until relatively recently (Lucien Blancou, 1959, *Géographie Cynégétique du Monde,* Presses Universitaires de France, Paris), the practice of cryptozoology—of attempting to discover and classify animals "known" only by hearsay or other fragmentary evidence—existed long before that time.

Indeed, cryptozoology flourished especially in the past century, and the quest for more knowledge about creatures described in incomplete or—often— fanciful terms resulted in quite a few magnificent discoveries, such as of the mountain tapir, the giant squid, and the okapi (Bernard Heuvelmans, 1984, The Birth and Early History of Cryptozoology, *Cryptozoology,* Vol. 3: 1–30). In hindsight, it appears likely that the existence of many more forms—for example, the pygmy hippopotamus, the lowland gorilla, the giant panda, and the recently discovered extant species of coelacanth—could have been uncovered earlier by western science, since such animals were all well-known to indigenous peoples. In these cases, however, local information was very slow in getting to the appropriate scientists, or it was ignored.

Of course, the stuff of local myths and legends need not represent actual zoological entities, and therein lies the real dilemma for the supposedly objective scientist. Should he or she allow the possibility of the zoological existence of a creature which exists in folklore, or has supposedly been seen only by an unwashed few? The mere admission of such a possibility is deemed by many researchers as a kind of failing of the scientific method. This is unfortunate, for great discoveries often come from the testing of hypotheses that originally show little promise. More often than not, the original hypothesis has to be strongly reshaped (if not discarded altogether) after close examination. In a similar vein, many of the fanciful creatures now reported will probably eventually be relegated to a dustbin of outmoded species. The griffons and canonical dragons probably belong on this pile, though they flourished in so many morphs and guises throughout their long existence in the human minds of diverse cultures (Robert M. May, 1976, The Ecology of Dragons, *Nature,* Vol. 264: 16–17).

The pursuit of cryptozoology is thought by some to be outmoded because, if the supposed animals were to exist, surely we in our omnipresence on this planet would have discovered them *scientifically* by now. Recent discoveries of the coelacanth, *Latimeria,* the Gulf of California harbor porpoise (Kenneth S. Norris and William N. McFarland, 1958, A New Harbor Porpoise of the genus *Phocaena* from the gulf of California, *Journal of Mammalogy,* Vol.

39[1]: 22–39), and megamouth (Leighton R. Taylor, L. J. V. Compagno, and Paul J. Struhsaker, 1983, Megamouth—A New Species, Genus, and Family of Lamnoid Shark [*Megachasma pelagios,* family Megachasmidae] from the Hawaiian Islands, *Proceedings of the California Academy of Sciences,* Vol. 4[8]: 87–110), simply to name a few of the large animals we really should not have missed, argue against that sentiment.

Another problem is certainly the one-sided popularity enjoyed by human-like and dinosaur-like animals. It appears that cryptozoological animals must be large in order to be considered as potential candidates for real, existing species. This cultural bias is an unfortunate one that cryptozoology, as a discipline, has to live with—for, indeed, the myths and legends *and* the sporadic sightings tend to concentrate on these dramatic forms. Since most of the mythology lies with these forms, the discipline feels obliged to investigate them—perhaps at the expense of lesser suspects—with correspondingly greater vigor.

As might be expected of any endeavor which deals with a nebulous concept of looking for the unknown, cryptozoology as a discipline has had some trouble defining itself. Heuvelmans has proposed a suite of definitions, of which we particularly like the simple ". . . systematized search for unknown species of animals about which some testimonial and circumstantial evidence is available" (Bernard Heuvelmans, 1984, above). J. Richard Greenwell has now expanded this definition to include all possible forms of evidence (such as archaeological, electronic, organic, etc.), as well as the requirement that the discovery of the species would have to be considered "unexpected" by zoologists. We don't like the "unexpected" part, since the very search for cryptozoological animals implies the possibility of expecting them to be real, and since we presume that, as more and more of "us" scientists become convinced of the validity of an objective analysis of possibly suggestive information, fewer and fewer researchers will find the realization of a previously rumored species "unexpected." Nevertheless, this is a minor point. A more important point is that all of the definitions are, in one manner or another, inadequate. Something is missing, and adequate descriptions appear as elusive and vague as the animals the discipline attempts to describe.

Greenwell has now made an admirable—and, it seems to us, successful—attempt to bring a greater order and objectivity to the field by proposing a system for classifying the different components of cryptozoology. In brief, he proposes five categories which are fully cryptozoological, and two which are only partly so. The five are: a) extant taxa possibly occurring in other, not generally recognized geographical areas; b) presumably extant taxa described from limited organic evidence; c) known taxa thought to have become extinct during historical times; d) representatives of fossil forms believed to have become extinct during geological times; and e) new taxa of extant forms

for which no known organic evidence exists. For all of these categories, there is some apparent human knowledge of the supposed animals, through oral traditions or legends, old manuscripts, ancient depictions, or modern sighting reports. Greenwell calls this prior human knowledge "ethnoknown," a concise and worthwhile new term for a broad concept.

The two categories which are not truly cryptozoological are: a) individual members of known extant species which are greatly abnormal in some manner, and b) totally new taxa which were not ethnoknown before their discovery (or, at least, were not *known* to be ethnoknown). The first category is not fully cryptozoological since it merely deals with the question of how different a particular abnormal morph of a species is (really a question of relative difference), and the final category is also not fully cryptozoological since it deals with animals that we don't know about in any sense prior to their discovery—and which therefore cannot be subjected to cryptozoological investigation.

This attempt at objective classification of what we could call "cryptozootic" animals—or "cryptozootics"—greatly helps our understanding of what is encompassed by the emerging discipline. Problems remain, of course. We see that the line between ethnoknown and what we could call "science-known" can be a fuzzy one, with our evaluation of what is ethnoknown especially fraught with pitfalls. The dichotomy also points out a peculiar sort of class distinction which we in technological societies tend to make: If it is only ethnoknown, it is not yet established; if it is science-known, it is true and honorable. Perhaps that distinction is fine (and it is certainly no fault of Greenwell's, who is interested in objectively considering all scraps of ethnoknown evidence), but we must remember that the truths of science itself can be ephemeral and changing. This warning probably does not apply when an actual previously cryptozootic creature is found, by hard morphological evidence, to exist.

On the other hand, we should also remember that it is difficult, if not impossible, to prove the non-existence of something, and we can never be totally smug about an assertion that the Yeti, or Nessie, or the Buru do *not* exist.

The present state of objective research of cryptozootic animals reminds us of another discipline, close to home to the kind of behavioral research we do with several species of highly social marine mammals. About a decade ago, Donald Griffin came out with a remarkable little book (Donald Griffin, 1976, *The Question of Animal Awareness,* Rockefeller University Press, New York). In it, Griffin exhorted us—in intellectual fashion, certainly—to consider the possibility that animals behave with more "mental awareness" of their actions than we previously suspected. This idea, so foreign to the anti-anthropomorphizing behavioral researcher of the past generation, is beginning to take hold. Some of us are, collectively as a group of scientists,

beginning to open our minds to the possibility of "mental awareness," however difficult we may find it to define in other species. We must now attempt to devise reliable techniques to objectively analyze the possibilities of this awareness in other species.

Similarly, pioneering thinkers such as Heuvelmans and Greenwell are exhorting us to open our minds to the possibilities of conducting objective searches for cryptozootics. Some progress has been made in defining the scope and intent of the pursuit, and we will continue to enhance the objectivity of the search as well. Let us hope that the search leads to the science-known discovery of some ethnoknown animals before the ruthless ways of humans destroy their habitats or well-being, that other supposed animals are as thoroughly debunked as is possible within a system which cannot prove the absolute absence of something, and that—in the process—we gain a greater appreciation of not only the marvels of nature, but also the potential fallibility of our ways.

BERND WÜRSIG
Moss Landing Marine Laboratories
California State University
Moss Landing, California 95039, U.S.A.

GREG SILBER
Center for Marine Studies
University of California
Santa Cruz, California 95064, U.S.A.

(Bernd Würsig and Greg Silber are marine mammalogists specializing in behavior and ecology.)

CRYPTOZOOLOGY: ITS SCOPE AND PROGRESS

(Comment on Greenwell, *Cryptozoology,* Vol. 4: 1–14)

Established as a field of study in the mid-1950's by Bernard Heuvelmans (1955, *Sur la Piste des Betes Ignorees,* Plon, Paris), cryptozoology has only become a zoological term during the past 15 years. Today, the term is relatively familiar to zoologists and the general public, regardless of continuing discussions, who place it either within the realm of science, or within the realm of fiction. Cryptozoological studies quite often border on other fields of research, with zoological and non-zoological fields frequently overlapping (i.e., wildlife conservation, paleontology, linguistics, ethnography, etc.). Hence, the many varied definitions of cryptozoology, all of them somewhat unsatisfactory—as is the case with other interdisciplinary fields which unite various branches and methods (i.e., ecology).

Generally speaking, cryptozoology is most often considered a branch of zoology dealing with "unknown" or "hidden" species; i.e., species so far unrecognized by science proper. As Richard Greenwell notes in his paper, such definitions are rather loose. Indeed, specialists describe new species every year (mainly invertebrates), but nobody considers them true cryptozoological discoveries.

Most often, cryptozoology is popularly identified with the search for supposed "monsters" and the tracing of dubious mythical creatures (Jared Diamond, 1985, In Quest of the Wild and Weird, *Discover,* March). Such studies, however, are neither the only subject matter of cryptozoological research nor its essentials. Nevertheless, cryptozoological fieldwork may have a clearly scientific character: an animal for which there is evidence that it may be inhabiting a certain area (or that it may have inhabited it until recently) can be subject to cryptozoological searches.

It is with the goal of determining the concrete subject matter of cryptozoology that Greenwell's work is formulated. He offers a classification for cryptozoology—breaking down the objects (hidden animals, etc.) into groups (categories). In order to fully meet the required criteria, these categories, the author states, should have at least one historical precedent and one current, unresolved claim.

Indeed, which animal species or claims fall within the scope of cryptozoology? First, there should be some preliminary (however unreliable) data, which can assist the researcher. Second, the objects should be what I call "ethnosignificant" (that is, they should be of special significance to people, and be somehow related to their way of life, or part of their folklore), or be of special interest to science. This ethnosignificance explains why animals with complex behaviors (most often large, or sufficiently large animals) are cryptozoological material, and why their discovery is accompanied by some sensation—"unexpectedness," as Greenwell calls it.

Man's interest in higher, "intelligent" animals, those genetically close to him, or in large animals, has been a natural tendency since the dawn of human life. Such animals are connected somehow with a human way of life, a folklore; they are venerated, feared, admired, or they simply arouse interest or curiosity. It is not by chance that such large animals are more popular subjects in literature—and are discussed more in scientific works—than numerous smaller or lower species. It is also not by chance that such animals are subjects of cryptozoological interest.

The discovery of new species of insects, or even small fishes and rodents, which occurs regularly, is not considered a cryptozoological event. However, the discovery of a "resurrected" species of fossil peccary in the thorn forest of northern Paraguay (Ralph Wetzel, 1977, The Chacoan Peccary *Catagonus*

wagneri [Rusconi], *Bulletin of the Carnegie Museum of Natural History,* Vol. 3: 66) is considered a cryptozoological discovery. Three species of small birds, on the average, are still being discovered annually; however, these discoveries generally remain known only to a narrow group of specialists, while news of the rediscovery of the ivory-billed woodpecker in a province of Cuba—a very impressive species, known as "the most elegant bird of North America"—spread as a sensation (*The ISC Newsletter,* 1986, Ivory-Billed Woodpecker Found Alive in Cuba, Vol. 5[2]: 3–6).

It should be noted here that cryptozoological discoveries are possible without a specific search for a particular animal decided on in advance, provided that such a discovery turns out to be sufficiently ethnosignificant, unexpected, and interesting, such as the serendipitous discovery in the 1970's of a new species of monkey in Central Africa (Dirk F. E. Thys van den Audenaerde, 1977, Description of Monkey-skin from East-Central Zaire as a Probably New Monkey-Species [Mammalia, Cercopithecidae], *Revue de Zoologie Africaine,* Vol. 91[4]: 1000–1010). When related to the discovery proper (not to the object of the search) Greenwell's Category VII is also cryptozoological from this point of view. This category corresponds to the above-mentioned second condition (ethnosignificance); cryptozoological discoveries and objects of cryptozoology should be differentiated. The above-mentioned monkey, *Cercopithecus salongo,* described from an incomplete skin, is only now in a certain manner a crypto-object, while the search for live specimens goes on in order to arrive at a confirmation of the newly described species.

A review of the separate cryptozoological categories proposed by Greenwell calls for the following additional observations:

Category I: This first category includes individual representatives featuring major divergences or differences from the accepted norms for the species. It should be noted that the search for individuals possessing such divergences, namely, in size, pattern, coloration, etc., could result in the discovery of an actual new taxon. It is possible that such individuals would no longer be abnormal representatives of a certain species, but, rather, normal representatives of a new species or subspecies. This could be the case with the striped South African king cheetah, if there is eventual confirmation that it represents an entire population. Another example may be Krumbiegel's Andean wolf, whose features differ from the maned wolf. There is but a single skin, and this animal has not been confirmed by new specimens.

Category II: This category includes certain forms existing in areas where they are not officially known to exist at the present time. Combined with Category IV, this area of cryptozoology represents many instances in which a search can be based on scientifically sound probabilities of success. There is some overlapping in these two categories, which also involve the study of the status of rare and threatened species. Cases in point are the question

of the existence of the lynx (*Lynx lynx*) in Bulgaria (believed extinct since the 1940's, but, according to unconfirmed reports, still observed in some regions of the country), and the Turanian (Caspian) subspecies of the tiger (*Panthera tigris virgata*), which, although officially declared extinct, is still heard and seen, according to reports from local hunters from Talish, Azerbaijan SSR (N. I. Bourtchak-Abramovich, personal communication).

Category V: Here we deal with fossil forms which may have been extant up to historical times, including to the present. A number of interesting hypotheses and suppositions could be included here, such as the possible persistence of the mammoth in Alaska and Siberia into historical times (I. Pidoplichko, 1951, *O Lednikovom Periode* [On the Ice Age], Ukrainian Academy of Science, Kiev); the persistence of the cave bear into the Holocene, a possibility supported by certain bone finds in the Caucasus (such bones have been dated as probably from the Holocene); the interpretation of a remarkably realistic ornament, dated at 3500 B.C., which may depict the fossil giraffid *Sivatherium,* found in the course of archaeological excavations in Iraq (Edwin H. Colbert, 1936, Was the Extinct Giraffe *Sivatherium* Known to the Early Sumerians?, *American Anthropologist,* Vol. 38: 605–608), as well as a number of other paleocryptozoological problems.

Category VI: The sixth category, when compared to the others, reveals its specific characteristics; nevertheless, it is rather close to Category IV. As Greenwell himself notes, these categories should not be seen as rigidly or permanently fixed; flexibility in their interpretation and application must be allowed.

Generally speaking, this system of categories does not constitute a strict hierarchical classification. Frequently, some of the features in different categories are not of equal rank. It is more a system which highlights the variety of cryptozoological quests, finds, and trends—and this is its merit. There was a danger before the evolution of cryptozoology—that of theorizing in a nonexistent field. Cryptozoology is still frequently criticized for being pseudoscientific (not without reason on some occasions), and it has had to assert its position as an established scientific field in zoology. Greenwell's classification reveals the broad scope of cryptozoology, how it is related to other fields of zoology, and how, in most cases, it deals with real, existing problems, such as the question of species survival or extinction.

Such is the case of the recent search for the kouprey in Indochina, or the thylacine in Tasmania, both of which involve wildlife conservation issues. The recent reports of thylacine sightings—and photographs—on mainland Australia, where it has been presumed extinct for thousands of years, has also aroused much scientific discussion.

A natural interest in mysteries, accompanied by naivete and incompetence, often results in many persons believing in the occurrence of a number of phenomena which are lacking in any logic. Hence, the skepticism of many

scientists is a natural reaction to sensational zoological "discoveries." Such healthy skepticism has helped clear the air of many naive beliefs, and has helped with the doing away of false observations.

Nevertheless, this skepticism should not become dogma. Cryptozoological reports or information, however improbable they may seem, cannot be rejected simply on the basis of bias, without a proper examination. A number of cryptozoological animals, such as the Mexican Onza, or the Australian thylacine, even if they exist, may be on the verge of extinction.

A competent evaluation of claims of their existence could be of importance to zoology, regardless of the final conclusions. Their discovery, however small the chances of their existence at first appear to be, could save extremely interesting and evolutionarily important representatives of the Animal Kingdom.

NIKOLAI SPASSOV
Department of Mammals
National Museum of Natural History
Bulgarian Academy of Science
Boulv, Russki 1
1000 Sofia, Bulgaria

(Nikolai Spassov is a zoologist working in the fields of evolution, paleontology, and ecology of mammals.)

TERMINOLOGY, CATEGORIES, AND THEORY IN CRYPTOZOOLOGY

(Response to Barloy, Debenat, Würsig and Silber, and Spassov)

In presenting my classification system for cryptozoology, I invited "constructive criticism," in the hope that stimulating discussions might take place on what could be called "cryptozoological theory"—some of which could even lead to changes or refinements of the classification itself. The above commentators have met the challenge, and I am very pleased to have them share their views, which will edify us all. I shall now respond to various major points in chronological order.

As I anticipated—perhaps because I am not altogether happy with the term myself—the concept of "unexpectedness" meets with some criticism. Barloy cautions that the word should be "limited to very extraordinary cases . . . because some 'unexpected' animals in a region are not necessarily cryptozoological," and he cites birds outside of their normal ranges. Birds are a very special case, of course, because they can travel uninterrupted across relatively large distances—by accident or by design. Almost every summer

we receive several Gulf of California pelicans in Tucson, which crash-land in the desert after being blown hundreds of miles off course by high winds; they are treated and eventually returned to their normal habitat.

Such events are "unexpected" in a sense (although, as they happen almost every summer, it could be argued that they are *not* unexpected, simply curious), but they are certainly not cryptozoological, as they do not even approach the requirements of Category II; thus, there is no real danger of such "unexpected" birds being so categorized. Certainly, I fully agree that Category II should be reserved for "really unusual cases," and that "discussions concerning the limits of geographical distribution of a species concern classical zoology."

As to "problems which are not part of cryptozoology *sensu stricto,*" such as the British "pumas" and Continental "beasts," we cannot always be certain of their cryptozoological status, if any, until such animals are collected—and, actually, the same could be said of all cryptozoological claims. What makes the supposed Loch Ness "monster" cryptozoological and British "puma" not? At least with the supposed "puma" we know *something* zoological; we know it is a mammal, a carnivore, and a felid. The question of so-called wolf-children, wild children, and closet children, although extremely interesting, has nothing to do with cryptozoology (Richard Greenwell, 1976, Animal-Reared Children [Review of *Gazelle Boy*], *Bioscience,* Vol. 26[5]: 348).

Debenat provides an in-depth discussion of the term "ethnoknown," which Michael Heaney (1986, personal communication) had questioned because it mixes Engish and Greek roots, a point which Bernard Heuvelmans (1985, personal communication) had also previously raised. Bernd Würsig (1986, personal communication), meanwhile, has stated: ". . . English is (thank goodness) a living, everchanging, dynamic language, and both 'ethno' and 'known' are now English, never mind what root history they have . . . . The purist is probably correct in insisting on keeping roots of words within the same branch of our family tree of the English language, but I would argue that same purist would have a devilishly difficult time in communicating if he or she adhered strictly to that dictum . . . . Keep your word and communicate, rather than change it and obfuscate. Neither Greek nor Latin nor English were invented. They evolved, and at least English is still evolving and ever-changing, and how wonderful it is!"

This position is now supported by Debenat when he states that "there is no hard and fast rule which prohibits the use of two roots of different language origins in the same word. The flexibility of the English language allows such etymological discrepancies." Incidentally, it was *not* my intention to express the basic idea "known to the native inhabitants of a region." "Ethnoknown" was proposed to represent "prior human knowledge of an animal," and such knowledge may come *equally* from native peoples or outside travelers. The

term "ethno," in this case, is not meant to define a particular nation or people, but, in a more general sense, the entire human population. ("Homo-known" is another possibility, but that could lead to additional problems.)

"Ethnognostic," the alternative term proposed by Heaney, has been thoroughly analyzed by Debenat—indeed, we almost have more information than we need—so I will not dwell on it further. It seems that this term could raise as many problems as it solves, so I propose that it not be adopted. Debenat's proposed "native-known" is a term which I had earlier—and independently—considered. However, I myself see no difficulty in pronouncing "ethnoknown," or in discussing the "ethnoknowledge of the giant octopus." Debenat's views, and Heaney's, are much appreciated. (Curiously, in a communication dated May 30, 1985, Bernard Heuvelmans was the first to recommend the avoidance of "ethnoknown," and to propose—quite independently—the alternative terms "native-known" and "ethnognostic.")

Würsig and Silber give an informative summary of some of the problems confronting modern cryptozoology. The main reason *they* don't like "unexpected" is because "the very search for cryptozoological animals implies the possibility of expecting them to be real." However, the term was used to apply to zoologists at large, most of whom will know little about cryptozoology (". . . and the discovery of which would be considered 'unexpected' by zoologists"), not to cryptozoologists. (Actually, the sensible cryptozoologist should also not "expect" to find the animal he or she is seeking, recognizing that, from a statistical perspective, if it exists at all, it will be difficult to locate. If such animals have remained almost undetected by Western science over a long period, there must be good reasons for it [behavioral, ecological, etc.], and those reasons are not going to be suddenly and easily overcome by one quick search in a certain area. At least this was the attitude which we maintained in 1981 when searching for Mokele-Mbembe in the Congo swamps.)

Also, I am dubious that, "as more and more of 'us' scientists become convinced" of cryptozoological possibilities, fewer would consider such finds "unexpected." I think that cryptozoology will probably always remain a relatively small field, and there is nothing particularly wrong with that. The political structure of modern science, the intense competition for megabucks, and the decreasing emphasis on pure research versus applied research, all operating within an invisible but fairly rigid social conformity system (J. Richard Greenwell, 1982, Comment on Westrum, *Zetetic Scholar,* Vol. 10: 137–38), inhibit significant deviations from the accepted or expected norms of each scientific discipline. Thus, most zoologists will continue to expect the "expected," not the "unexpected." Unfortunately, there is little time today for Plato's way of thinking among busy scientists absorbed in their own specific disciplines—except, of course, in the case of philosophers of science.

The term "science-known" introduced by Würsig and Silber is, in my opinion, very appropriate, and complements "ethnoknown" very well. I propose that "science-known" be adopted by cryptozoology to signify animals that are ethnoknown *and* known to systematic zoology (or, as with many invetebrates, known *only* to systematic zoology). Thus, Mokele-Mbembe is only ethnoknown, but the okapi, once only ethnoknown, is now science-known.

Finally, I am flattered to be put in the same company as Donald Griffin, although, curiously, our cryptozoological critters may be easier to prove—or disprove—in the end (yes, even though one can't absolutely disprove anything) than his proposed animal "mental awareness."

Nikolai Spassov's introduction of the term "ethnosignificant"—not to be confused with "ethnoknown"—is very relevant. As has often been pointed out, cryptozoological animals tend to be "big"—and this bigness has been used as a weapon by critics of the field (i.e., "cryptozoology dwells on large animals, when the real important areas of zoology and conservation concern many small, disappearing species"). The reason that most cryptozoological animals tend to be big is, of course, because they are ethnoknown, and human beings—and other mammals—tend to notice bigger things than smaller things—whether we like it or not. That is not an inherent weakness of cryptozoolgy, regardless of what the critics say. As Spassov states: "It is not by chance that such animals are subjects of cryptozoological interest."

"Ethnosignificance," as Spassov defines it—and if I understand him correctly—is therefore a requirement for a cryptozoological animal, as is "ethnoknown." The subtle difference is that "ethnosignificance" is not limited to cryptozoological animals. That is, both "ethnoknown" and "science-known" (see Würsig and Silber above) usually involve "ethnosignificance," but "ethnosignificance" does not necessarily involve a cryptozoological animal, as "ethnoknown" does. For example, the Himalayan black bear is "science-known" and "ethnosignificant" (non-cryptozoological), while the Yeti is "ethnoknown" and "ethnosignificant" (cryptozoological)—even if it doesn't exist!

If readers are still with me, I would like to address another point raised by Spassov. I agree that "cryptozoological discoveries are possible without a specific search for a particular animal decided in advance," provided the animal discovered is cryptozoological. For example, a hunter in Africa may one day shoot a Mokele-Mbembe dead, when he or she may never have even heard of such an animal. But that does *not* mean that Category VII is also cryptozoological, because no animals in this category are ethnoknown—or ethnosignificant—a basic requirement of cryptozoology. That is, humans do not know of their existence prior to discovery (and if later we find out that some did, the example would shift to another, appropriate category), thus there are no "claims" in that category, nor can there be. That is the

reason Category VII is not treated as fully cryptozoological in the classification. Bernard Heuvelmans himself has stated that such a find "simply confirms the *necessity* of cryptozoology. It's just more proof that large unknown animals do, in fact, exist, but the finding of it [megamouth] was not in the realm of cryptozoolgy" (Bernard Heuvelmans, 1984, Interview, *The ISC Newsletter,* Vol 3[3]: 2).

As for the 1977 description of the cercopithecoid monkey based on part of a skin, I would place this example in Category III ("Presumably extant taxa, not representing fossil forms, described from only limited organic evidence, such as skin, bone, or tissue, with no complete specimens ever collected"). I am uncertain why Spassov omitted discussion of this category in his Comment, but it is also where I would place the Andean wolf, which he mentions shortly afterwards. The king cheetah I would leave in Category I (unusual individual representatives of known, extant forms), at least for now. I find myself in agreement with all of Spassov's other specific comments, as well as his general views on cryptozoology, which were most judiciously stated.

I would like to express my appreciation to all the above commentators. If I read their comments correctly, the classification system for cryptozoology which I outlined previously has survived their insightful scrutiny intact. Furthermore, the terms "unexpected" and "ethnoknown" have survived, and we even have two new terms, "science-known" and "ethnosignificant," which can be added to the growing terminology of this small but emerging discipline. Whether or not these terms become better known and accepted will depend on the extent of their usage by other researchers and scholars.

J. Richard Greenwell
P.O. Box 43070
Tucson, Arizona 85733

(J. Richard Greenwell is Secretary of the International Society of Cryptozoology. His research interests range from desert biogeography to primate and carnivore morphology and behavior.)

The Unseen Argus Pheasant

(Comment on Greenwell, *Cryptozoology,* Vol. 4: 1–14)

There are many relatively obscure cryptozoological examples which can now be comfortably accommodated within the various categories of Greenwell's classification scheme for cryptozoology.

I would myself like to present one example for Category III ("presumably extant taxa, not representing fossil forms, described from only limited or-

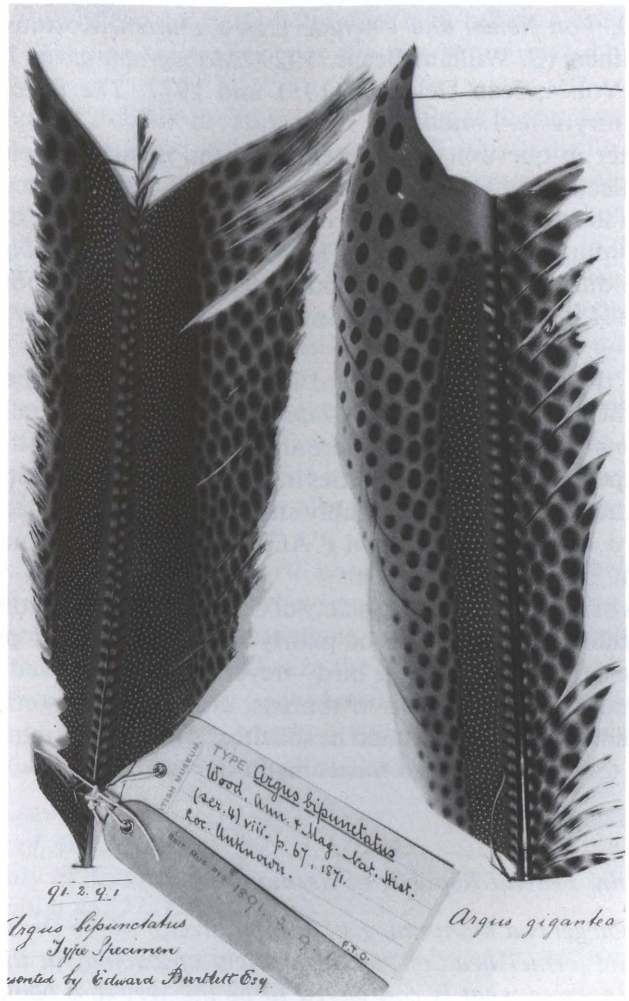

FIG. 1.—The *A. bipunctatus* feather (left) compared to an *A. gigantea* feather.

ganic evidence, such as skin, bone, or tissue, with no complete specimens ever collected"). The evidence, in this case, concerns a feather.

A new species of pheasant in the genus *Argus* was described over a century ago (T. W. Wood, 1871, *Argus bipuntatus,* sp. n., Described from a Single Feather, *Annals and Magazine of Natural History* [Ser. 4], Vol. 8: 67–68), based on the peculiarities of this one feather. In an extensive compilation in 1940, it was stated that no new evidence of this pheasant, *Argus bipunctatus,* had been reported in the previous 40 years. Other works omitted any mention of the species, but it was included in my own work (Ingo Krum-

biegel, 1950, *Von Neuen und Unentdeckten Tierarten,* Kosmos, Stuttgart), and some others (C. William Beebe, 1929, *Monograph of the Pheasants of the World,* Vol. 4; Jean Delacour, 1951 and 1977, *The Pheasants of the World,* Country Life, London).

The feather in question was presented to the British Museum (Natural History) collection at Tring in 1891 by Edward Bartlett. I recently had the opportunity to study this feather through the kind permission of the British Museum (Natural History)-Tring. The feather pattern of *A. bipunctatus* is significantly different from those of other *Argus* species and subspecies. Fig. 1 shows the *A. bipunctatus* feather in comparison to a feather from *A. gigantea.*

Although the genus *Argus* is found in Sumatra, Borneo, and the Malay peninsula, the location where the *A. bipunctatus* feather was collected is not known. Human encroachment in these areas, resulting in alterations of forest and landscapes, and military hostilities in Indochina, have undoubtedly been a threat to the species, which probably still survives. A classical writer once wrote: *Africa semper gignit novum* ("Africa always contains new things"). That maxim is also valid for Asia.

Members of the International Society of Cryptozoology have the important task of searching for unknown or poorly known animals. I propose that investigations to locate this large bird—never actually observed by Western man—be undertaken. The help of tourists, diplomatic personnel, hunters, explorers, and ornithologists should be solicited, and renewed inquiries should be directed to universities and museums in the search for new evidence.

Ingo Krumbiegel
Postfach 468
3250 Hameln, Federal Republic of Germany

(Ingo Krumbiegel is a mammalogist, former director of the Dresden Zoological Park and former head of the Department of Zoology at the Hannover Museum. He wrote what is considered to be the very first book on cryptozoology: Von Neuen und Unentdeckten Tierarten *[Of New and Undiscovered Animal Species], 1950.)*

More on the Identity of the Egyptian Animal Diety, Set

(Comment on Swords, *Cryptozoology,* Vol. 4: 15–27)

In his attempt to identify a cryptozoological analog for the dynastic Egyptian animal diety, Set, Swords rightfully points out the numerous canid-like characteristics it possesses. However, I am in disagreement with the author's

conclusions that reject the notion that Set may reflect a combination of physical and behavioral characteristics of a number of related hyaenids and canids.

Swords finds it "difficult to rationalize" why Set is the apparent exception to the dynastic Egyptian rule of portraying their dieties in the form of readily identifiable known species. It seems to me this incongruity can be explained as a result of Set's unique position in the ancient Egyptian pantheon. Set represents a diety of nearly unparalleled power and danger in the Egyptian cosmology. As the incarnation of such evil, it seems reasonable that no mere real-world beast would suffice to represent Set's visible avatar; thus, the combination of unattractive and repellent characteristics of many animals may have been chosen to express this condition.

It should be mentioned, too, that Set is not universally represented as an unidentifiable creature in dynastic Egyptian art. In the Temple of Horus, at Edfu, Upper Egypt, for example, Set is depicted as a hippopotamus, suggesting that mutability of form may also be one of Set's distinguishing characteristics.

In conclusion, I find Swords' fourth possibility—that of Set being an amalgamation of the physical and behavioral characteristics of a number of identifiable creatures—the most satisfying explanation for this phenomenon. If one accepts the unique role of Set in the ancient Egyptian pantheon, then it is logical that such a creature might be endowed with the capabilities and mannerisms of several beasts, which, if taken individually, would be identifiable as known, non-cryptozoological species.

John W. Olsen
Department of Anthropology
The University of Arizona
Tucson, Arizona 85721, U.S.A.

(John Olsen is an archaeologist and zooarchaeologist specializing in the prehistory of North Africa and China).

On Set as an Egyptian Figment

(Response to Olsen)

First, I am pleased that someone with the expertise of Olsen was interested enough to comment on my article. I claim no omniscience on ancient Egyptian theology, so I certainly respect Olsen's views. Nevertheless, I disagree with his conclusions.

A few opinions of my own, in defense of my intransigence, follow below:

1) I do not see the original Set as all that unique. Set seems to have originated as a city or regional god much like all the rest, and he continued to be honored by people of his area (Aswan and the "South," or Upper Egypt) as high god, in defiance of the governing Osiran and Amon-Ra religions.

2) His hieroglyph appears extremely early, and elicits the intuition of a normal animal (a canid in his case), as do all the rest of the animal-god hieroglyphs.

3) The late representations of Set as other known gods of the south (such as the hippopotamus in the very-late-period Edfu temple) have been attributed by several authorities to an alliance of these powerful southern city or microcultural forces vs. the "Sun-Power" of the north. To my knowledge, no such cross-confusion of god-forms for Set is known in *early* Egyptian history.

I think that Set was an entirely normal animal-god, who had the misfortune to represent the dangerous (to the north) southern Egyptian alliance. He *was* a powerful animal, but was maximally "smeared" by the counter-Osiran forces of the ruling aristocracy.

Without some astounding new set of archaeological discoveries, we probably won't be able to completely answer this question. Although I disagree, I must admit that Olsen has presented a possible alternative hypothesis.

MICHAEL D. SWORDS
Department of Science
Western Michigan University
Kalamazoo, Michigan 49008, U.S.A.

SOME FRICTION OVER SOLE PADS

(Comment on Cachel, *Cryptozoology,* Vol. 4: 45–54)

Susan Cachel presents a thoughtful and informed analysis of my original article on the Elk Wallow (Walla Walla) Sasquatch footprints (Grover S. Krantz, 1983, Anatomy and Dermatoglyphics of Three Sasquatch Footprints, *Cryptozoology,* Vol. 2: 53–81). While she disagrees with some of my conclusions, it is much more important that serious attention is now being paid to this remarkable Sasquatch evidence. Generally speaking, the present evidence is not clear enough to resolve our few differences of opinion, but a few comments may be in order.

Like Cachel, I found it difficult to determine the thickness of the human sole pad. Two of my anatomy texts have illustrations, from dissection,

measuring 1.0 and 1.5 cm—about half that of the gorilla. Allowing that gorillas outweigh us by three times, but carry only half of that on the hind limbs, their sole pads *ought* to be half-again thicker than ours. They are twice as thick by my data, and about equal to us by Cachel's. For now, I will use 1.7 cm, which is two-thirds of the gorilla figure.

Yes, locomotor variations must have a major effect on padding requirements. Elephants weigh 60 times as much as humans; because of their quadrupedalism, they "should" have 30 times our pad thickness, or 50 cm. Available space on mounted skeletons allows for a pad about one-fourth that thick.

The walking elephant impacts its entire foot almost vertically against the substrate. The walking human initially impacts just part of the foot (heel), and this with a considerable component of forward movement. So, how does a Sasquatch walk?

Lines of imprints show no obvious difference from a human gait; the Patterson film seems to show the same. My own tests, wearing fake feet with disproportionately long heels, show a tendency for the foot to slap down abruptly upon heel strike. From this, I would surmise that the Sasquatch impacts the heel less powerfully than we do. Some of the initial shock is taken up by this turn of the ankle. Thus, there may be some small shift in the direction of the elephant's vertical foot placement.

With a fully human stride, we expect a Sasquatch sole pad six times thicker than ours, or 10 cm. With an elephant foot placement, we expect 2.5 cm (one-tenth of the elephant's 12 cm, but doubled because of bipedalism). The truth may lie somewhere between 2.5 and 10 cm. I find no difficulty with an estimate of 6 cm under the heel, 4 cm in midfoot, and 2 cm under the toes (which also spread under pressure). With a compressability of one-half, this fits with the 2 cm indentation in the middle of one track. Cachel's estimate of 10–15 cm strikes me as unnecessarily high, though it does follow logically from her data.

Details should not be much erased by skin movements under compression, most of which would be an unrolling of skin from the sides of the foot—spreading it outward and downward against the substrate. Loss of detail in the prints is from a variety of causes, mainly from soil adhering to the sole—being introduced during previous steps, and being removed during a later step. The toes often show the best detail because their movements tend to reduce the material carried from step to step.

The extreme depths of imprints are a cause of some concern to me too. In human striding, the forward component on impact and the posterior component on step-off cause a far deeper impression than in standing, or even in jumping vertically. This impressive action may be only slightly reduced in the Sasquatch-type of stride. It is also possible that the Sasquatch

sole pads are stiffer, less compressible than in humans. We have much to learn here.

Cachel's comments about allometrics of limb bone design in different sizes of primates are well taken. But, in this case, the lever lengths of the foot, vs. muscle strength and weight, are not a question of compression. *Supporting* a great body weight is one matter, but *moving* that weight in the reported manner requires leverage adjustments. Of course, we do not yet have the bones of contention to examine directly.

There is an increasing possibility that we can trace genetic relationships and dermatoglyphic patterns. At this writing, we have dermal patterns on five imprints of the prime individual (two of them recovered in 1986), on four imprints of another (1982 and 1986), and on two imprints of a third individual (1983). The last member of the Sasquatch "Gang of Four" from the Blue Mountains of northern Oregon shows no details on its two known casts.

As to the hominid status of this species, which Cachel questions, I must agree this has not been demonstrated. The Sasquatch foot structure is unique to some degree, and a bipedal primate of this size, hominid or not, would necessarily have these kind of feet. If Sasquatch is not a hominid, then another line of higher primates, of brachiating background, independently gave rise to a terrestrial, bipedal, giant form. While this is not impossible, Occam's razor cuts a simpler path.

A division in the hominid line around the time of *Australopithecus afarensis* (3.7 million years B.P.) could have had one branch evolving large body size at an early date. *Gigantopithecus blacki* may be a late representative of this line, and the Sasquatch an even later representative. The virtue of this phylogeny is that it makes maximum use of available data with a minimum of speculation.

GROVER S. KRANTZ
Department of Anthropology
Washington State University
Pullman, Washington 99164, U.S.A.

(Grover Krantz is a physical anthropologist with a special interest in primatology, human evolution, and the question of Sasquatch.)

ON SASQUATCH WEIGHT AND GAIT

(Response to Krantz)

It is fruitless to argue about the depth and structure of the Elk Wallow (Walla Walla) sole pad, given that no direct observations of the pad are now possible. What does seem obvious—and surprising—is that no research has yet been directed toward comparative studies of sole pad depth, structure, and biomechanical function in mammals. If such comparative studies had been done, questions of pad depth, compressibility, weight transfer, and erasure of print detail might now be answerable.

The depth of the Elk Wallow prints themselves remains a major mystery, because a large sole pad should spread body weight over a relatively wide area. Only shallow impressions should be left, even if body weight is very high.

My comments about the allometry of limb bones were directed toward establishing that a very large biped such as Sasquatch is not intrinsically improbable, even if the trunk were held erect, and if bipedal striding similar to that of living hominids occurred. Is it possible for a creature substantially larger than living hominids to exhibit a hominid-like erect trunk and bipedal striding gait? The answer is yes, and limb bones would not have to be strikingly different in form from those of modern hominids, although supporting a much greater body weight. Movement causes much more stress on limb bones than does standing motionless. Because large mammals compensate for heavy bodies mainly through gait pattern, a large biped such as Sasquatch would increase the amount of foot contact and length of time of foot contact with the ground. Hence, the bones of such a large creature need not be extraordinarily robust, or exhibit gross differences in structure from those seen in modern hominids. Nevertheless, the hominid status of Sasquatch remains to be demonstrated.

SUSAN CACHEL
Department of Anthropology
Douglass College, Rutgers University
New Brunswick, New Jersey 08903, U.S.A.

(Susan Cachel is a physical anthropologist specializing in human and nonhuman primate evolution.)

THE SEARCH FOR RARE ANIMALS: STATISTICS AND PROBABILITY

(Comment on Guynn, Downing, and Askew, *Cryptozoology,* Vol. 4: 55–60)

The desire to quantify biological situations is one of the strongest forces motivating scientists. While in some applications, such as population modeling of game and other common animals, this desire leads to superbly useful results, in other cases it may prove useless or even counterproductive. I commend Guynn, Downing, and Askew for a good presentation of the sta-

tistics of non-detection of animals with known detection probabilities and known population densities, but I believe extrapolation of their method to genuinely rare animals—cryptozoans[1]—is unwarranted and probably dangerous.

There are many critical factors which enter into the success or failure of a search for a rare species. Two extremely important categories of these factors are the skills of the searchers and the behaviors of the animals. Searcher skills vary so widely, and are so refractory to quantification, that we are apt to ignore them, as did Guynn, Downing, and Askew. This course can lead to disaster for the rare species. A couple of examples from my own experiences with rare rodents in Florida may illustrate my point. Stephen R. Humphrey and D. Bruce Barbour (1979, Status and Habitat of Eight Kinds of Endangered and Threatened Rodents in Florida, *Special Scientific Report,* Florida State Museum, Vol. 2: 1–17) maintained that the silver rice rat, *Oryzomys argentatus,* was extinct, based on their field work in its known habitat. I subsequently secured another specimen in 1980 (Florida State Museum, No. 16366). Subsequently, Barbour and Humphrey (1982, Status of the Silver Rice Rat *Oryzomys argentatus, Florida Scientist,* Vol. 45: 112–16) republished their original report, essentially verbatim, and restated that the species was extinct. Subsequent to that, Numi C. Goodyear (in press, Distribution and Habitat of the Silver Rice Rat, *Oryzomys argentatus, Journal of Mammalogy*) found the species on at least eight additional islands in the Florida Keys. The species is far from extinct, but finding specimens depends on the skill of the searcher.

In a closely related case, Humphrey and Barbour (1981, Status and Habitat of Three Subspecies of *Peromyscus polionotus* in Florida, *Journal of Mammalogy,* Vol. 62: 840–44) concluded ". . . *P. p. decoloratus* is extinct." They caught none in 1,518 trapnights. This sounds compelling, until one considers that they caught only 34 in 1,680 trapnights of a second form, and 101 in 3,144 trapnights of a third form. A simple Chi-square test reveals that there is no statistically significant difference between their three capture : trapnight ratios.

This is not to say that *P. p. decoloratus* necessarily survives. It may well be extinct. But, as in the case of *Oryzomys argentatus,* a specious method was used to argue for extinction. Once a species' "extinction" is published in the refereed literature, most conservation organizations lose interest in preserving its habitat (Robert Chipley, The Nature Conservancy, personal communication). This could be terminal for the obviously extant, but rare, silver rice rat.

[1] Würsig and Silber, in their own, above Comment, refer to "cryptozootics." These terms have been left intact in their original forms, in the hope that one of them will eventually be universally accepted. See also the terms "cryptid" by John Wall (*The ISC Newsletter,* Summer, 1983), and "cryptozoid" by Daniel Lyons (*The ISC Newsletter,* Autumn, 1983).—Editor.

The other category of crucial factors involves animal behavior. Guynn, Downing, and Askew do not consider the effects of search effort on the behavior of the animal sought. Large carnivorous mammals such as the eastern U.S. cougar, *Felis concolor couguar,* and the thylacine, *Thylacinus cynocephalus*—if they still exist—probably respond negatively to human presence, and may leave those areas in which they are being sought. This is certainly true of the tiger, *Felis* [*Panthera*] *tigris,* and the leopard, *Felis* [*Panthera*] *pardus,* where I have encountered them in the field in India, Thailand, and tropical China. One skilled, knowledgeable, and experienced investigator working in the home range of a Florida panther, *Felis concolor coryi,* may obtain copious proof of its presence, but 20 enthusiastic amateurs searching the same home range will probably only result in the panther departing without leaving a fresh trace. Guynn, Downing, and Askew can provide no method for correcting search effort factors to account for this sort of animal behavior.

I have personally rediscovered at least five species of terrestrial vertebrates which had been published "extinct" in the primary zoological literature by fully-credentialed professional biologists. What Guynn, Downing, and Askew have actually provided is an even easier method for biologists to claim extinction, and one which has all the veneer and arcane appeal of a "true" statistical test. The species they use as their exemplar, the white-tailed deer, *Odocoileus virginianus,* is about the commonest and most easily detected item on the supermarket shelves of the American outdoors. It would be wonderful if they attempted to apply a statistic to actual case histories of rare animal rediscoveries, but I warrant they simply cannot.

In the hands of the unscrupulous, the Guynn, Downing, and Askew formula will predictably lead to grotesque consequences. A recent polemic may well illustrate how. Jerome A. Jackson and Betty J. Schardien Jackson (1986, Why Do Red-Cockaded Woodpeckers Need Old Trees?, *Wildlife Society Bulletin,* Vol. 14[3]: 318–22) explain why a certain habitat characteristic is needed by a rare and endangered species. Two government workers, Byron K. Williams and Rebecca Field (1986, Response: Evidence for Selection of Old Trees by Red-Cockaded Woodpeckers, *Wildlife Society Bulletin,* Vol. 14[3]: 322–25), use a specious statistical argument in an attempt to discredit the case for the habitat characteristic—old trees. The probable purpose is transparent: their company—the federal government—stands to make a lot of money if it can circumvent the recommendations of non-government biologists, and get on with the job of cutting-down old trees. The present atmosphere in Washington encourages, selects for, and well-nigh compels these sorts of biostitution. Sadly, the Guynn, Downing, and Askew formulation may serve the forces of evil well: rare species which can be claimed

"extinct" may be dropped from funding considerations, and can simply be forgotten about.

In sum, I can envision no way to quantify the probability of non-detection of a genuinely rare animal because many factors of human ability and animal behavior—probably the most important factors involved—are incalculable or imponderable. Extrapolating from a specious probability of non-detection to a statement of non-existence is all too simple and tempting. Quantification of the imponderable or incalculable is not true science and must be avoided.

James D. Lazell, Jr.
The Conservation Agency
6 Swinburne Street
Jamestown, Rhode Island 02835, U.S.A.

(James Lazell is a mammalogist and herpetologist specializing in field studies of rare animals. He is affiliated with the Peabody Museum of Natural History at Yale University, and the Museum of Comparative Zoology at Harvard University.)

Objective Data vs. Opinion

(Response to Lazell)

We agree with Lazell's statement that "there are many critical factors which enter into the success or failure of a search for a rare species." He correctly points out searcher skills and species' behavior as important factors. However, we did *not* ignore these factors in our paper, as stated by Lazell, and, in fact, we mention several additional factors that he failed to address. The field data on white-tailed deer fawns used in our example were affected by observer skill, weather, age of fawns, etc., and we do not know how data not affected by these variables can be collected for estimating probabilities of non-detection.

The data presented by Lazell on the three subspecies of *Peromyscus polionotus* can be used to describe the search effort needed to be reasonably confident that a species is absent from the area searched. The probability of detection, p, for one subspecies captured can be calculated as 34/1,680 = 0.02, and 101/3,144 = 0.03 for the other. If *P. p. decoloratus* were relatively less abundant or more cryptic than the two captured subspecies, we would expect a correspondingly smaller value for p. We can use equation (2) from our paper to calculate $f(x = 0)$, the probability of not detecting *P. p. decoloratus* for a given value of p and the 1,518 unsuccessful trapnights of Stephen R. Humphrey and D. Bruce Barbour (1981, Status and Habitat of

Three Subspecies of *Peromyscus polionotus* in Florida, *Journal of Mammalogy,* Vol. 62: 840–44). For $p \leq 0.005$, $f(x = 0) \leq 0.001$.

However, if *P. p. decoloratus* were ten times more difficult to detect ($p = 0.002$) than the least captured species, the probability of non-detection in 1,518 trapnights would be 0.05. If the subspecies were twenty times more difficult to detect ($p = 0.001$), the probability of non-detection increases to 0.22. For $p = 0.001$, 2,994 trapnights would be required for $f(x = 0) = 0.05$. These results would apply only to the area searched, and may not be applicable to other areas where the *P. p. decoloratus* may occur. Finding specimens depends not only on the skill of the observer, but also on how much and where he or she searches. Thus, our "formula" might be used to scrutinize claims of species extinction based on questionable fieldwork by considering the search effort expended for species having a low probability of detection.

Lazell's comments regarding the red-cockaded woodpecker are inappropriate to his argument against using statistical models for describing probabilities of non-detection. Both Jackson and Jackson (1986, Why do Red-Cockaded Woodpeckers Need Old Trees?, *Wildlife Society Bulletin,* Vol. 14[3]: 318–22) and Williams and Field (1986, Response: Evidence for Selection of Old Trees by Red-Cockaded Woodpeckers, *Wildlife Society Bulletin,* Vol. 14[3]: 322–25) present legitimate concerns on the necessity vs. preference for old growth by these birds. However, the study by Gene W. Wood, Larry L. Niles, Richard M. Hendrick, James R. Davis, and Terry L. Grimes (1985, Compatibility of Even-Aged Timber Management and Red-Cockaded Woodpecker Conservation, *Wildlife Society Bulletin,* Vol. 13[1]: 5–17), which was designed to determine the impacts of various levels of clearcutting within the territories of woodpecker clans, failed to show any impact of cutting old trees on annual territory area, potential foraging area, or number of fledglings.

Perhaps there is more substance to the arguments of Williams and Field than expediting company policy. At any rate, the red-cockaded woodpecker is a relatively abundant endangered species, that certainly is no more cryptic than white-tailed deer fawns less than three weeks of age. It would not be difficult to establish the probability of detecting a known density of woodpeckers for a given search effort by either expert or amateur searchers. The model should be applicable for this species.

Statistical techniques can neither prove nor disprove anything. There is always a change of erroneously rejecting or failing to reject hypotheses. Statistics serve as decision-making aids, but humans make the decisions. Thus, our model can neither prove nor disprove extinction of a species. The worth of a statistical application lies in how well a situation meets the model assumptions and the accuracy of the data.

A major purpose of our paper was to encourage cryptozoologists to objectively quantify the probability of detection for a variety of species at known densities and habitat conditions, rather than subjectively judge the adequacy of search efforts. We stand by the statement that "rigorous, scientific quantified search efforts reported with their associated probabilities of error are far more desirable than popular sentiment and hearsay evidence." Those who choose to, can misuse statistical techniques, including ours, to support or attack a hypothesis. Our technique was not meant to serve or combat "the forces of evil"; we leave that to the A-Team, Batman, and Robin.

DAVID C. GUYNN, JR.
Department of Forestry
Clemson University
Clemson, South Carolina 29634 U.S.A.

ROBERT L. DOWNING
114 Lewis Road
Clemson, South Carolina 29631, U.S.A.

GEORGE R. ASKEW
The Belle W. Baruch Forest Science Institute
Clemson University
Georgetown, South Carolina 29440, U.S.A.

(David Guynn is a specialist in wildlife management, Robert Downing is a wildlife biologist who has surveyed portions of the southeastern United States for the eastern cougar, and George Askew specializes in forest genetics.)

RI-EVALUATION

(Comment on Williams, *Cryptozoology,* Vol. 4: 61–68)

Thomas Williams and his associates are to be congratulated for bringing the case of the Ri to a final resolution by positively identifying it as the Indo-Pacific dugong, *Dugong dugon.* In a previous Comment (Richard Greenwell, 1984, The Ri: Zoology and Folklore, *Cryptozoology,* Vol. 3: 151–54), I stated: "Hopefully, observers will return to Nokon Bay one day, and determine exactly what kind of animal the Ri/Ilkai is, which will solve the problem once and for all." This is exactly what Williams and his associates have done, and although the animal turned out to be a known one, all cryptozoologists should be pleased that we can close the file on at least one case, and, furthermore, that this was made possible by cryptozoological fieldwork, not mere armchair explanations.

In looking back through previous volumes of *Cryptozoology,* it is remarkable how much has been written on the Ri. Every issue of the journal has had something on it (including the present Volume 5). The literature has included one Article, two Field Reports, and, with the present writing, 10 Comments and Responses; a total of 10 authors have been involved. And almost all had differing opinions as to what the Ri was or was not. I think a Ri-examination of this literature, with the advantage of hindsight, would be interesting and would teach us all a few lessons. Space does not allow an extensive literature review in this Comment, so rather than give full references on all the publications, I will simply refer readers to the appropriate volumes. I should also add that the comments below are my own, and do not necessarily reflect the thinking of other Wagner team members.

The first mention of the Ri appeared in an Article by anthropologist Roy Wagner (Vol. 1, 1982). He had collected curious stories from Barok villagers while conducting ethnographic fieldwork at Ramat Bay, on the southern part of the Papua New Guinea island province of New Ireland. The natives described what was essentially a "mermaid," but there were sufficient details to address the question of what animal it might be. Marine biologists John Sibert and James Mead attempted this in the next issue (Vol. 2, 1983). Sibert was intrigued, concluding that it was "obviously some sort of mammal," probably a cetacean or sirenian. Mead, a mammalogist, was convinced that it was "not a porpoise," based on the information given. He seemed to incline toward the dugong, which, together with its sirenian cousin the manatee, has usually been held responsible for worldwide mermaid stories and myths.

The same issue (Vol. 2, 1983) carried a new Field Report by Wagner, myself, Gale Raymond, and Kurt Von Nieda. These authors described their inability to obtain new Ri evidence at Ramat Bay. However, they had been told by a Barok informant that such animals were being seen at a village called Nokon, peopled by members of the Susurunga tribe. The team went to Nokon, further south on New Ireland, and verified this. They also found that the villagers, although they provided the same "mermaid" descriptions, were unacquainted with the term *ri,* which is a Barok name. The Susurunga named is *ilkai.* Raymond had a good shore observation, and Wagner and Greenwell observed what the villagers identified as an Ilkai repeatedly rolling at the surface of the bay for about 2 hours; this observation culminated with

an in-boat approach to within 50 feet. Flukes were observed, but the head remained unseen. The animal had no visible dorsal fin, and moved rapidly.

Because of the animal's rapid surface rolling, its apparent extreme vertical flexure when rolling (see illustration, Vol. 2), and its consistent 10-minute diving periods we called the dugong hypothesis "unlikely"—although, from the beginning, it had seemed the most probable *conventional* explanation.

Published data on dugong diving times by Paul K. Anderson showed that their average submergence in Australian waters is about a minute (Paul K. Anderson and Alastair Birtles, 1978, Behavior and Ecology of the Dugong, *Dugong dugon* [Sirenia]: Observations in Shoalwater and Cleveland Bays, Queensland, *Australian Wildlife Research,* Vol. 5: 1–23). Dives of more than 3 minutes are "rare," and the longest dive recorded by Anderson was 6 minutes, 40 seconds (Paul K. Anderson, 1982, Studies of Dugongs at Shark Bay, Western Australia. II. Surface and Subsurface Observations, *Australian Wildlife Research,* Vol. 9: 85–99). The longest dive period ever recorded for a dugong is 8 minutes (R. Kenny, 1967, The Breathing Pattern of the Dugong, *Australian Journal of Science,* Vol. 29: 372–73). It should be emphasized here that the dive times observed by us—and Williams—were *consistently* clocked at about 10 minutes. We recorded *no* dive times of less than 8 minutes.

Various dugong surfacing and diving behaviors have also been described (Anderson and Birtles, 1978, above; Anderson, 1979, Dugong Behavior: On Being a Marine Mammalian Grazer, *The Biologist,* Vol. 61[4]: 113–44; Anderson, 1981, Dugong Behavior: Observations, Extrapolations, and Speculations. *In* H. Marsh [ed.], *The Dugong. Proceedings of a Seminar/Workshop Held at James Cook University of North Queensland, 8–13 May, 1979*). One of these, the surface roll, seemed much more pronounced in the Nokon animal than in the dugong.

Anderson also loaned me film footage he had taken of Australian dugongs rolling at the surface, showing a quite different speed and degree of vertical flexure. He cautioned, however, that dugongs may flex more at the surface when in deeper water, such as Nokon Bay (over 30 feet), and may also stay submerged for longer periods. We included his caution in our report, but concluded that the animal we observed "was not a dugong." However, to our credit, we *did* state: ". . . the question arises as to whether they [the natives] are reporting an *unknown* animal, even if the descriptions are embellished, or a *known* animal which the natives have completely metamorphosed into their own version of the mermaid. At this time, there is no way to conclusively answer this question." We also ruled out the only two small, finless cetaceans: the right whale dolphin, *Lissodelphis* (both northern and southern species), and the finless porpoise, *Neophocaena phocaenoides.*

The following year (Vol. 3, 1984), saw several more Comments and Responses. Sibert, hinting at a dugong explanation, actually stated (p. 145): "Is it not possible for their behavior to vary between Queensland and Northeastern Papua New Guinea?" Richard Ellis, the well-known artist and writer of marine mammal books, supported the porpoise possibility, specifically *Neophocaena phocaenoides,* which we had already rejected. Kevin Britton, a British marine biologist, proposed the beluga (white whale), based on an enigmatic skull of the now-banished *Beluga kingii* in the British Museum (Natural History), said to come from Australasian waters. Eric Beckjord related his own investigations, insisting that the Ri was a dugong—he turned out to be right, but for the wrong reasons.

Wagner and I wrote our own separate Responses, and in mine (Greenwell, 1984, above), I stated: "I should add that my personal, subjective impression of the animal when we were within 50 feet of it—and I have no objective evidence to support that impression—is that it was a small cetacean of some kind. If I were to choose one of the candidates we and the others have discussed, I would choose *Neophocaena.*" Finally, Williams' definitive finding came in a new Field Report (Vol. 4, 1985), following an expedition to Nokon Bay. The very animal the Susurunga called *ilkai,* and described as a mermaid, was found to be clearly a dugong. We can thus safely assume that the Ri of the Barok, farther north, is likewise a dugong.

We (Wagner *et al.*) were wrong on several counts. First, we were mistaken in thinking of the dugong as a slow-moving animal, unlike the rapid swimmer we saw. This resulted from an association we had made in our minds with its truly more sluggish cousin, the manatee; the dugong's flukes, versus the manatee's paddle, should have warned us otherwise. This emphasizes the danger of applying a known behavior from one species to another, allied species. A dugong is *not* a manatee (or vice versa), and we were wrong in making that subjective association.

Second, we were mistaken in assuming that the dugong's bulky anatomy would not be capable of the pronounced vertical flexure we observed. I still find it hard to reconcile what we saw with a dugong, but we were obviously mistaken, and the dugong apparently is capable of consistent pronounced vertical flexure. Third, we were mistaken in assuming that the dugong cannot—and does not—dive consistently for 10-minute periods. Here we were on safer ground, as the literature seemed clear on this point. The difference betwen 1-minute and 10-minute consistent dives seemed, in itself, sufficient to rule out the dugong. But Anderson had cautioned us about possible longer dives in deeper water, and Sibert had mentioned possible different behaviors by New Ireland dugongs.

Interestingly, Williams—although demonstrating that the animal was a

dugong—confirmed our observation of 10-minute dives. Thus, we were not wrong in any of our observations, only in our interpretations, and it is here where we—and, I hope, all cryptozoologists—have learned a lesson. Of interest to marine mammalogy more generally, of course, are the phenomenal 10-minute submergence periods we observed, and now confirmed by Williams. It is hoped that this information, gained through cryptozoological fieldwork, will be of value to future researchers concerned with dugong ecology and behavior.

We have also learned a valuable lesson concerning native information when conducting cryptozoological fieldwork. One of the arguments often used in support of the concept of cryptozoology is that the native people of a region know their area—and its animals—well, and if they say there is a strange (unknown to science) animal there, they surely know what they are talking about. This is often true—as has been proven in the past—but is also sometimes not true. Many variables impinge on the fundamental knowledge native peoples have of their environment, and what they say about it. In the case of the Barok and the Susurunga, they are not seafaring peoples, and, in fact, rarely venture into the water (comparatively little fishing is done). Consequently, it seems clear in retrospect that their knowledge of their nearby marine environment, which they do not utilize much, would be less substantial—and this applies to the organisms living in it. In this instance, it seems, native knowledge (and "knowledge" is used here in its Western sense) was wrong; I certainly would have liked to have been on that beach with Williams to ask the villagers how they reconciled their claim of the Ri being different from the dugong, with the physical Ri—in the shape of a dugong—laying before them!

In my previous Comment (Greenwell, 1984, above), I stated that, for centuries, there had been speculation about the origins of mermaid myths, with manatees and dugongs as the main zoological candidates. Although I mistakenly thought the Ri would turn out to be a small cetacean (known or unknown), I pointed out that, apart from everything else, the Ri offered an excellent opportunity for short-cutting the scholarly process of tracing a mythified animal back to the original zoological species—a process outlined by Bernard Heuvelmans—*by finding the mythified animal itself, and determining what, in fact, it is.*

This is precisely what Williams and his associates have done. As far as I am aware, this is the first time that a mythified animal such as a "mermaid" has been located first-hand and identified zoologically, and, if for no other reason than this, future historians, folklorists, and zoologists, including cryptozoologists, will be indebted to them.

J. Richard Greenwell

The Subject Was Cats

(Comment on Bottriell, *Cryptozoology,* Vol. 4: 80–83)

I must first point out that I do not usually bother to respond to such reviews as the above. I am only interested in laying facts before an audience that has done its own research or is open-minded. Lena Bottriell clearly represents neither, and does not even appear to have read with any concentration the book she was reviewing.

Bottriell makes a great point that the two photos of the cub-like animal are of the same creature; apparently, she has closely examined the coat pattern to prove it. It is a pity she did not examine just as closely the text of the book; the two animals were one and the same. There has never been any question on that point. Steven Joyce, who took the photos, had seen two animals on previous occasions, but only one animal showed itself on the night he took the photographs.

Bottriell also seems rather obsessed by the existence of the European wild cat, *Felis silvestris,* in Britain, to the point of appearing to suggest that it is exclusive to Britain. On the other hand, she seems to know very little about its appearance. Perhaps I can enlighten her a little. *Felis silvestris,* which is found across Europe, is a little larger than the average domestic cat, with normally a grey/tabby pelage, and a short, bushy, striped tail consisting of seven dark bands. Yet Bottriell states that the photograph showing the cub-like animal "depicts what looks to be, without question, wild cat, from the ears and white throat right through to the tip of the tail." The photograph, in fact, clearly shows a heavily built cat with a long, non-bushy tail with at least 11 bands. Certainly not a wild cat!

She also comments on the discovery of large, black, long-legged cats in Scotland, though whether she is suggesting they are the so-called British Big Cat, she does not make clear. Perhaps I can also enlighten her on this point. I, in fact, discovered the existence of this black wild cat-like animal in Scotland, and despite us having five identical specimens in the last 12 months, we do not yet know for certain the affinities of the animal. I would also like to challenge her words "getting straight scientific facts wrong." This is a sweeping statement, but it has no examples to back it up.

I will just add that one of the most important pieces of evidence, the photographs of the black panther-like cat, was ignored completely, and the prints, upwards of 4 inches across, that she apparently also seems to think were made by a wild cat, had graded pads, unlike cat or dog prints.

We are hoping to have some results on the smaller, black, Scottish cats soon. Certainly, more will be known before this Comment goes to press. Zoologist Karl Shuker, an ISC member who has been working with me on

this project, is preparing a paper on the subject, which will be submitted to this journal in due course.

DI FRANCIS
West End
Dallas, Morayshire
Scotland, U.K.

(Di Francis has been the principal investigator of reports of "big cats" in Britain, and is the author of Cat Country, *David and Charles, 1983.)*

AFFLUENT CATS

(Comment on Bottriell, *Cryptozoology,* Vol. 4: 80–83)

Regarding Di Francis's book *Cat Country,* I would agree with Lena Bottriell that it is inconceivable that an animal the size of a puma could have lived for thousands of years in the British countryside and yet remain undetected until 20 or 30 years ago.

Moreover, since Francis makes it clear that the animals seen have varied greatly in size, shape, and color, I think it is unlikely that a single species is responsible for all the sightings. I would suggest that people have actually been seeing a mixture of wild cats, wild cat/domestic cat hybrids, and alien species such as pumas, lynxes, and ocelots which have escaped—or been released—from captivity.

I would also suggest that is is very significant that most of the first sightings, in the early 1960's, occurred in affluent areas in southern England, such as Surrey and Hampshire, where one would expect to find more people who could afford the expense of keeping an exotic animal such as a puma as a pet. It may also be significant that most of the sightings have occurred in the period since World War II, when the development of air transportation has made it much easier to import animals from overseas.

RODERICK MOORE
43 Garborough Close
Maryport, Cumbria
England CA15 6RY, U.K.

(Roderick Moore is a cartographer with Britain's Nature Conservancy Council.)

A CAT FOR ALL SEASONS

(Response to Francis and Moore)

The path of cryptozoological research is not an easy one, as many who tread it know, and one may sympathize with Di Francis' obvious frustration with my review of her book *Cat Country.* However, she wrongly perceives clearly stated facts in my review of her book.

I am charged with making "a great point" of the "cub" photographs being of the same individual—not as the text leads one to believe. According to Francis, I should have examined the text of her book as closely as I did the two photographs, for "the two animals were one and the same. There has never been any question on that point." I have again examined the text closely with regard to the photographs, and find, as before, that *two* tabby-like cubs are mentioned on pp. 139–40: "Steve had taken the photographs—and had to tell us of the only disappointment of the day. The cubs had come out perfectly, but mum strangely had not been captured by the camera (see pp. 110–12)." Again, on p. 141: "Steve managed to take two photographs of cubs taking bait—the photographs I had seen."

The one other damning bit of evidence which I cited against the existence of an unknown puma-like cat evolving exclusive to Britain—the print casts showing claws as clear on the ground as they are in dog spoor—Francis chooses only to challenge with the incorrect assertion that I appear to believe they were made by a wild cat.

Roderick Moore's comment that most of the early "big cat" sightings occurred in affluent southern England since World War II and the development of air transportation offers a refreshing *hor d'oeuvre* in the way of further food for thought on the existence of the supposed British "big cat."

LENA G. BOTTRIELL
Stoneyrock, Nags Head Lane
Great Missenden, Buckinghamshire
England, HP16 0HQ, U.K.

(Lena G. Bottriell and her husband Paul Bottriell are the principal instigators of renewed research on the king cheetah.)

THE DRAGONS ON THE RIVER KWAI

(Comment on Greenwell, *Cryptozoology,* Vol. 4: 86–88)

I was very interested in Greenwell's recounting of the exploits of Colonel John Blashford-Snell, particularly the latter's successful finding of the legendary New Guinea dragon *artrellia,* which turned out to be a 6-foot (2-meter)

monitor lizard, *Varanus salvator*. Colonel Blashford-Snell's belief that there are probably much larger monitors in the Australasia-Southeast Asia region—even larger than the Komodo monitor—is not without foundation.

In 1979, a team from ORTF, the French state television network, visited Western Thailand to produce a documentary film on the classic 1957 motion picture *The Bridge on the River Kwai,* starring Alec Guiness. This legendary bridge is, in fact, a composite of a series of bridges on the Bangkok to Rangoon railway, which was built during World War II by the Japanese government of occupation of 1943–44. The railway and its bridges were built with the use of prisoners of war held by the Japanese army, and who were, for the most part, British, Australian, and New Zealand soldiers and sailors.

During the building of the railway, many of the prisoners died of malnutrition and disease. However, a secondary story turned up by the French television team concerned the apparently mysterious disappearance of a number of these prisoners. According to information obtained by the French team from Japanese army and local Thai sources, during construction of the railway through the Western mountains of Thailand, in Kanchanaburi Province (on the Burmese border), the prisoners were housed in caves in the hillsides, and it was from these caves that they were disappearing at night.

Investigation by Japanese officers responsible for the railway construction turned up stories of prisoners who were being killed, carried off, and eaten by "monsters" said to live in these same caves. Since numerous prisoners disappeared, but actual escapes were quite rare, the Japanese authorities gave these reports some credence. Further, ORTF interviews with local inhabitants of the hill region turned up reports that passengers in trains passing along the line to the Burmese border—now closed to traffic—occasionally see these "monsters" looking out of the mouths of the caves in which they are said to live.

Local inhabitants describe these creatures as "dragons," lizard-like in appearance, gray in color, but sometimes with spots or stripes, and ranging up to several meters in length. From the presentation of this story on French television, it was thought that these animals might be of a species not yet known to science. For this reason, during a visit to Bangkok in November, 1984, I attempted to verify this television report, with the aim of identifying the animals in question.

With the assistance of a bilingual Thai assistant, inquiries were made by telephone to the zoology and biology departments of several universities in Bangkok and Chieng Mai, several ministries of the Royal Thai government, and the Bangkok Zoo. After considerable searching and telephoning, an official was located in the Royal Forest Department, in Bangkok, who recognized the reports, and offered some possible explanations for the story presented by the French television team.

He was very familiar with the animals which live in his forests, and stated that the "monsters" of the television report were almost certainly giant monitor lizards. He provided the following descriptions of the species of monitor lizards known to live in Thailand:

Species	Characteristics	Year First Recognized in Thailand
Varanus bengalnensis	1 to 2 meters in length; may reach 3 meters.	1807
Varanus dunerilii	Inhabits hill caves in Kanchanaburi Province; adults are 1 to 2 meters in length, and may exceptionally reach 3 meters.	1839
Varanus rucicollis	1 to 2 meters in length; may reach 3 meters.	1845
Varanus salvator	The largest monitor known in Thailand; adults may reach 3 meters in length, and some specimens are believed to reach 4 and 5 meters. Lives close to water, and is frequently observed swimming in lakes and rivers. Characterized by yellow spots on its back, in three lines.	1786

From these descriptions, I believe that the "monsters" of the television report are probably *Varanus dunerilii.* This conclusion is based on the following considerations: first, the statement from my contact in the Royal Forest Department that *Varanus dunerilii* normally ranges 1 to 2 meters in length, but can exceptionally reach a length of 3 meters. Second, that it is said to inhabit caves in the very same province as the wartime disappearances. Further, it seems likely that prisoners who were seriously weakened by illness, starvation, and overwork could very well be easy prey for monitors 2 to 3 meters in length. Finally, there have been reports that Komodo monitors, which reach 3 meters or more in length, and are the largest monitors otherwise known to science, have killed and eaten isolated humans.

It is also possible that the "monsters" of the television story were specimens of the larger species, Colonel Blashford-Snell's *Varanus salvator,* hav-

ing adapted to life in the hills rather than remaining close to water. However, I consider this to be a less likely explanation.

In conclusion, one may make several conjectures, the first being that the animals involved are normal-sized individuals of one of the above known species, the second being that they may be larger than normal individuals of one of these species, and the third being that they may represent a totally new species to science.

EDWARD B. WINN
25 chemin de Trembley
1197 Prangins, Switzerland

(Edward Winn is a physicist and administrator with SRI International. He serves as European Secretary of the International Society of Cryptozoology.)

1987 MEMBERSHIP MEETING
International Society of Cryptozoology

Held jointly with the Scottish Branch of
the Society for the History of Natural History

Hosted by the
National Museums of Scotland

July 25-26, 1987

Chairman and Moderator
David Heppell
Department of Natural History
National Museums of Scotland

All sessions will be held in the Lecture Theatre, Royal Museum of Scotland, Chambers Street, Edinburgh

Saturday, July 25th Symposium
THE SEARCH FOR NESSIE IN THE 1980s

Morning Session

10:00 - 10:05 a.m.	Welcoming Remarks Robert G. W. Anderson, Director, National Museums of Scotland
10:05 - 10:45	"The History of the Loch Ness Monster" Richard Fitter (former Board Member, Loch Ness Investigation Bureau & Chairman, Fauna and Flora Preservation Society)
10:45 - 11:30	"The Biology of the Loch Ness Monster" Roy P. Mackal (biologist, University of Chicago & author of *The Monsters of Loch Ness*)
11:30 - 12:15	"Public Perception of the Loch Ness Monster" Henry H. Bauer (chemist, Virginia Polytechnic Institute and State University & author of *The Enigma of Loch Ness*)
12:15 - 1:00 p.m.	"The Wilson Nessie Photo: A Size Determination Based on Physical Principles" Paul H. LeBlond (oceanographer, University of British Columbia)
1:00 - 2:00	Break for Lunch

Afternoon Session

2:00 - 2:40	"Recent Fieldwork by the Loch Ness and Morar Project" Adrian J. Shine (Field Leader, Loch Ness and Morar Project)
2:40 - 3:20	"A Review of Research Contributions to Date of the Academy of Applied Science at Loch Ness" Robert H. Rines (President, Academy of Applied Science)
3:20 - 3:50	Break for Tea/Coffee
3:50 - 4:30	"Three Decades of Nessie Hunting: A Personal Odyssey" Tim Dinsdale (author of *Loch Ness Monster, The Leviathans, & Project Water Horse*)
4:30 - 5:30	Panel Debate with all speakers & questions from the floor

Sunday, July 26th Symposium
SOME CATS OF CRYPTOZOOLOGY

Morning Session

10:00 - 10:45 a.m.	"The Case for the British Big Cat" Di Francis (author of *Cat Country: The Quest for the British Big Cat*)
10:45 - 11:30	"The Kellas Cat: An Overlooked Felid from Scotland" Karl P. N. Shuker (biologist, University of Birmingham, England)
11:30 - 12:15 p.m.	"The King Cheetah: A New Race in the Making?" Lena and Paul Bottriell (authors of forthcoming book *The King Cheetah*)
12:15 - 1:30	Break for Lunch

Afternoon Session

1:30 - 2:15 p.m.	"The Onza: Its History and Biology" J. Richard Greenwell (Secretary, International Society of Cryptozoology)
2:15 - 3:00	"The Queensland Tiger-Cat: Evidence for the Possible Survival of the Marsupial Lion, *Thylaco eo*, into Recent Times" Victor A. Albert (biologist, Brown University, Providence, Rhode Is.)
3:00	Concluding Remarks & Adjournment

INSTRUCTIONS TO CONTRIBUTORS

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All manuscripts submitted for publication in *Cryptozoology* must be typed double-spaced (if possible on 8½ × 11 inch or 22 cm × 28 cm sheets). American rather than British spelling and style are preferred (e.g., periods and commas placed *inside* of quotation marks). The author's last name must appear in the top, right-hand corner of every manuscript page.

Articles

Manuscripts must be submitted in triplicate, and must be prefaced by 50–100 word informative abstracts. The abstract should appear on the bottom half of the title page. The manuscript should begin on the second page. The citation of references is not mandatory, but is preferred. If references *are* cited, the author(s) must conform to the referencing instructions appearing below. Manuscripts should contain relevant descriptions or interpretations related to cryptozoological matters. Topical or theoretical discussions or literature reviews, rather than specific research findings, are preferred. Illustrations and maps are welcome, but original artwork and black and white photographs are required (color slides are not acceptable). The author(s) should design subheadings in accordance with the structure of the article. Manuscript length is left to the discretion of the author(s), although a minimum of 1,000 words is expected. Manuscripts are reviewed by two referees for scientific content, originality, and clarity of expression, and the Editor may suggest deletions or revisions before acceptance.

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These manuscripts should report on cryptozoological fieldwork. They should be limited to a maximum of 1,500 words (longer manuscripts will be considered in special circumstances). Only one manuscript copy need be submitted. Formal referencing should *not* be prepared, although references may be cited (in parentheses) *within* the text when appropriate (see examples in the journal); when so referencing, both the first (given) and second names of authors being cited should be spelled out, and the names of journals should also be completely spelled out and unabbreviated. Subheadings should be: *Introduction* (in which the type of cryptozoological event investigated is detailed, and the purpose or aims of the fieldwork, and the location and dates involved, are given; previous fieldwork by the author[s] in the same geographic region should also be mentioned); *Narrative Description* (in which the field activities are described, e.g., lake surveillance, equipment, interviews with aboriginal peoples); *Results* (in which the outcome of these efforts is described; the total lack of success of such fieldwork will not be used as a criterion in evaluating manuscripts); *Future Plans* (in which a brief discussion or statement on whether the author[s] plan[s] further fieldwork in the area is provided). Illustrations and maps are welcome, but original artwork and black and white photographs are required (color slides are not acceptable).

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